PRELIMINARY HYDROLOGY CALCULATIONS

FOR

OMP RANCHO CUCAMONGA
9000 HELLMAN AVENUE, RANCHO CUCAMONGA, CA

PREPARED FOR

OVERTON MOORE PROPERTIES
19300 HAMILTON AVENUE, SUITE 200
GARDENA, CA 90248
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JANUARY 18, 2018

JOB NO. 3523

PREPARED BY

THIENES ENGINEERING
14349 FIRESTONE BOULEVARD
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PRELIMINARY HYDROLOGY CALCULATIONS

FOR

OMP RANCHO CUCAMONGA

PREPARED BY
UNDER THE SUPERVISION OF

_____

REINHARD STENZEL DATE:
R.C.E. 56155
EXP. 12/31/18

INTRODUCTION

A: PROJECT LOCATION

The project site is located at 9000 Hellman Avenue, Rancho Cucamonga, on the southwest corner of 8th Street and Hellman Avenue. Please see next page for vicinity map.

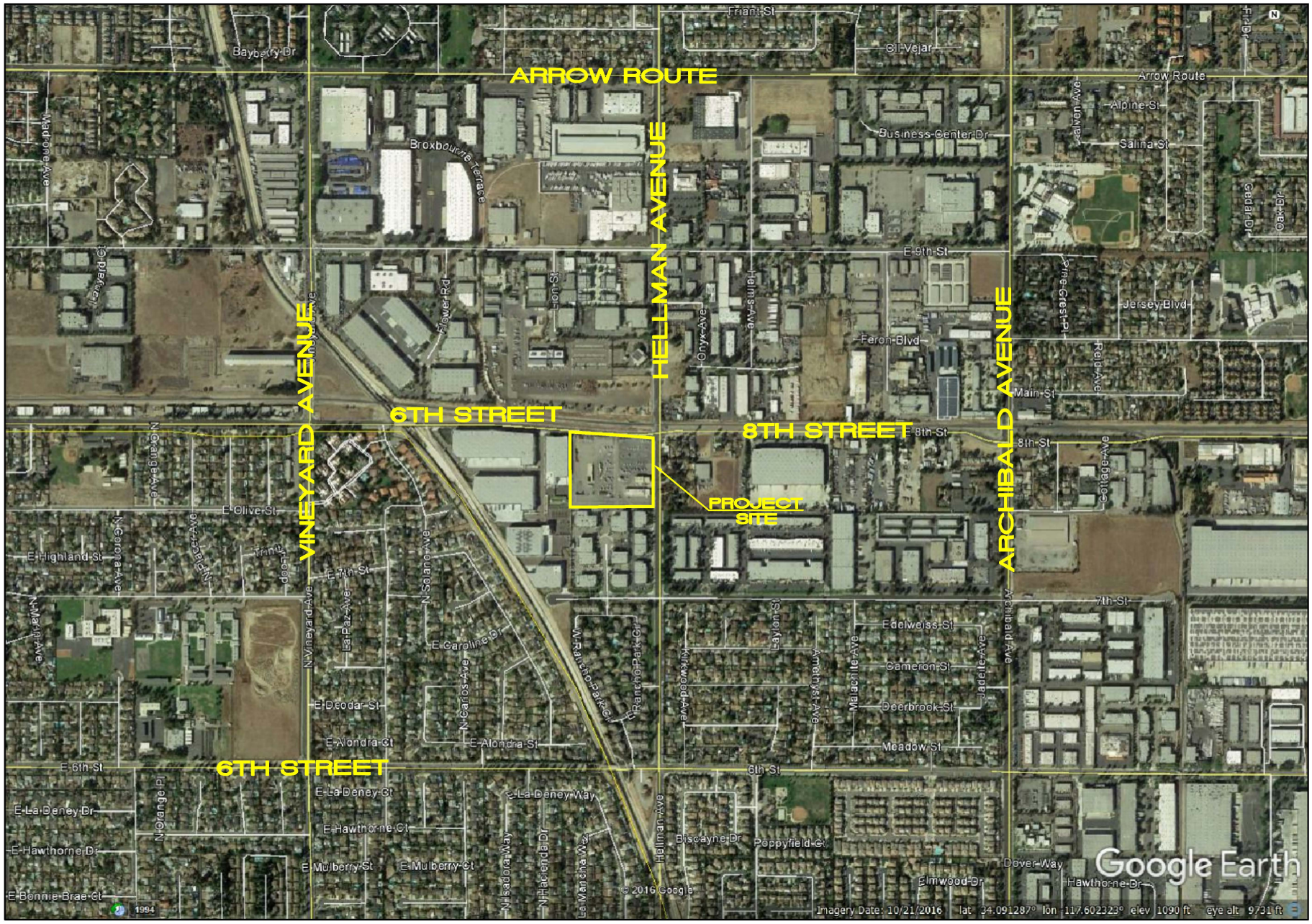
B: STUDY PURPOSE

The purpose of this study is to determine 25-year and 100-year existing and proposed condition peak flow rates from the project site.

C: PROJECT STAFF:

Thienes Engineering staff involved in this study include:

Reinhard Stenzel
Brian Weil
Matthew Cruz



Last Update: 3/5/17
O:\3500-3599\3523\3523VICMAP.dwg

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"VICINITY MAP"

FOR

9000 HELLMAN AVENUE

DISCUSSION

The project site encompasses approximately 8.10 acres. Proposed improvements to the site include one commercial type building of 174,580 square feet. There will be a truck yard southerly adjacent to the building and a vehicle parking lot on the northerly portion of the site. The remainder of this site is reserved for landscaping.

Master Plan Hydrology

Per the City of Rancho Cucamonga Master Plan of Drainage – Westside Area Technical exhibit, the site is tabled to the storm drain system within Hellman Avenue at Node 1278 and is part of Water Shed Area - IV. The Hydrology Study considered the 100-year storm event with commercial buildout. Furthermore, per the Hellman Ave. Master Planned Storm Drain and Street Improvements – Phase 2, Sheet 5, the 120" RCP within Hellman Avenue has been designed for the 100-year storm event. The storm drain system outlets to the Cucamonga Creek Channel.

Please see Appendix "A" for the Hydrology and Hydraulics Analysis for Hellman Avenue, Master Planned Storm Drain, by City of Rancho Cucamonga.

Existing Condition

The project site is currently a paved vehicle parking lot with a one story concrete office building and a metal storage building. The concrete building is approximately 9,840 sf and the metal storage building is approximately 3,330 sf. The entire site (Nodes 100-102, 8.10 acres) surface drains southeasterly to two, grated inlets and 4" curb drains. Although the outlets do not have the capacity to discharge peak flow rates, flows can pond around the grated inlets with a secondary outlet through the driveway, just north of the grates. All flows from the site outlets to Hellman Avenue. Flows ultimately drain to the 120" storm drain system within Hellman Avenue. The 25-year and 100-year existing condition peak flow rates from this area are approximately 20.1 cfs and 25.3 cfs, respectively.

See Appendix "B" for existing condition hydrology calculations and Appendix "C" for existing condition hydrology map.

Proposed Condition

Runoff from the majority of the site (Nodes 100-133, 7.95 acres) will drain southeasterly via a proposed private storm drain system. The proposed private storm drain system will connect to the 120" RCP within Hellman Avenue. The 25-year and 100-year proposed condition peak flow rates from this area are approximately 24.1 cfs and 30.2 cfs, respectively.

Runoff from the landscaped area fronting Hellman Avenue (Nodes 200-201, 0.15 acres) sheet flow directly to Hellman Avenue. The 25-year and 100-year proposed condition peak flow rates from this area are approximately 0.4 cfs and 0.8 cfs, respectively.

See Appendix "B" for proposed condition hydrology calculations and Appendix “C” for proposed condition hydrology map.

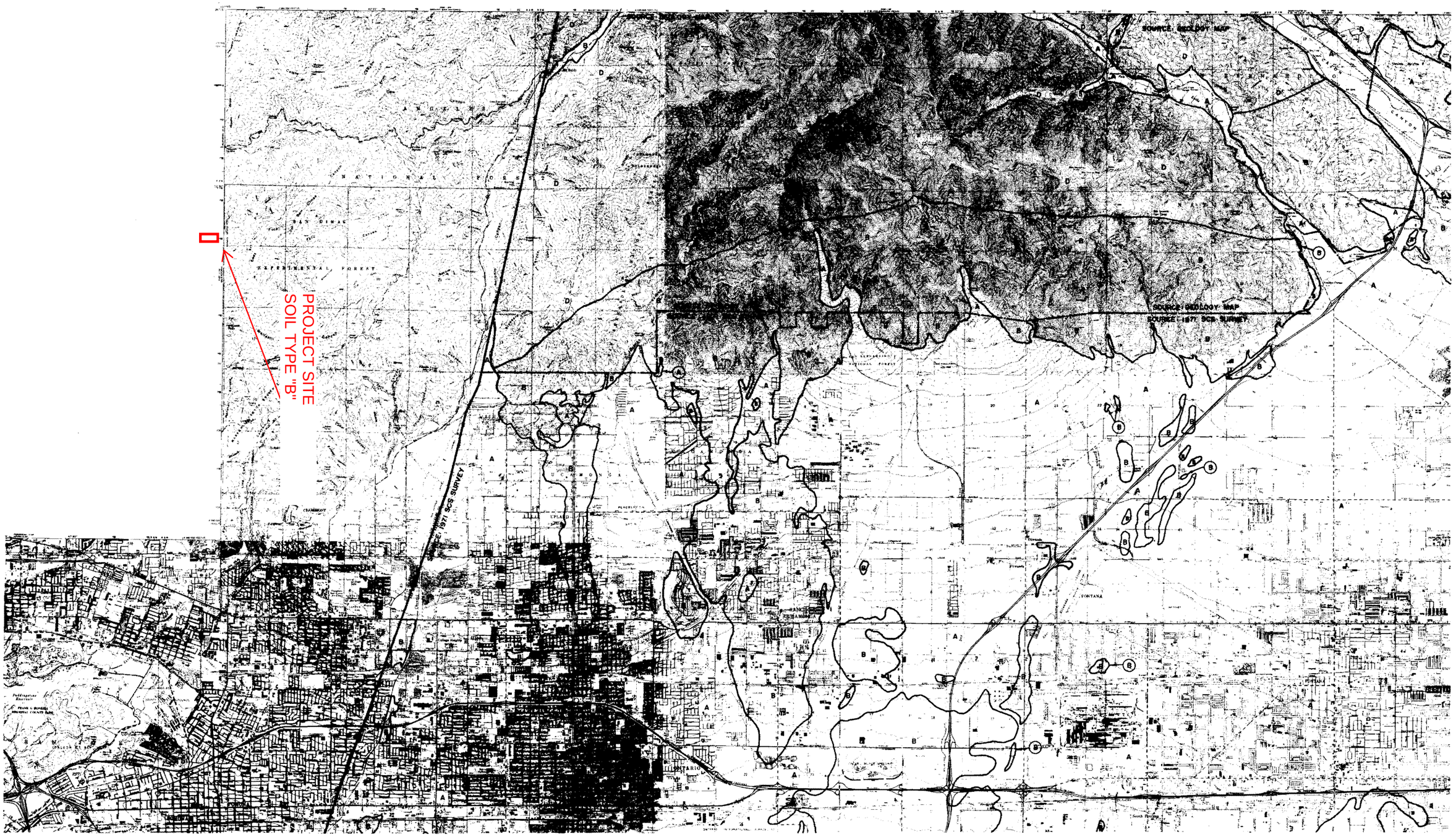
Methodology

Hydrology calculations were computed using San Bernardino County Rational Method program (by AES Software). The soil type is “B” per the San Bernardino County Hydrology Manual. See Appendix “A” for reference materials.

APPENDIX	DESCRIPTION
A	REFERENCE MATERIALS
B	HYDROLOGY CALCULATIONS
C	HYDROLOGY MAP

APPENDIX A

REFERENCE MATERIALS



SCALE REDUCED BY 1/2

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

HYDROLOGIC SOILS GROUP MAP
FOR
SOUTHWEST-A AREA

FIGURE C-13

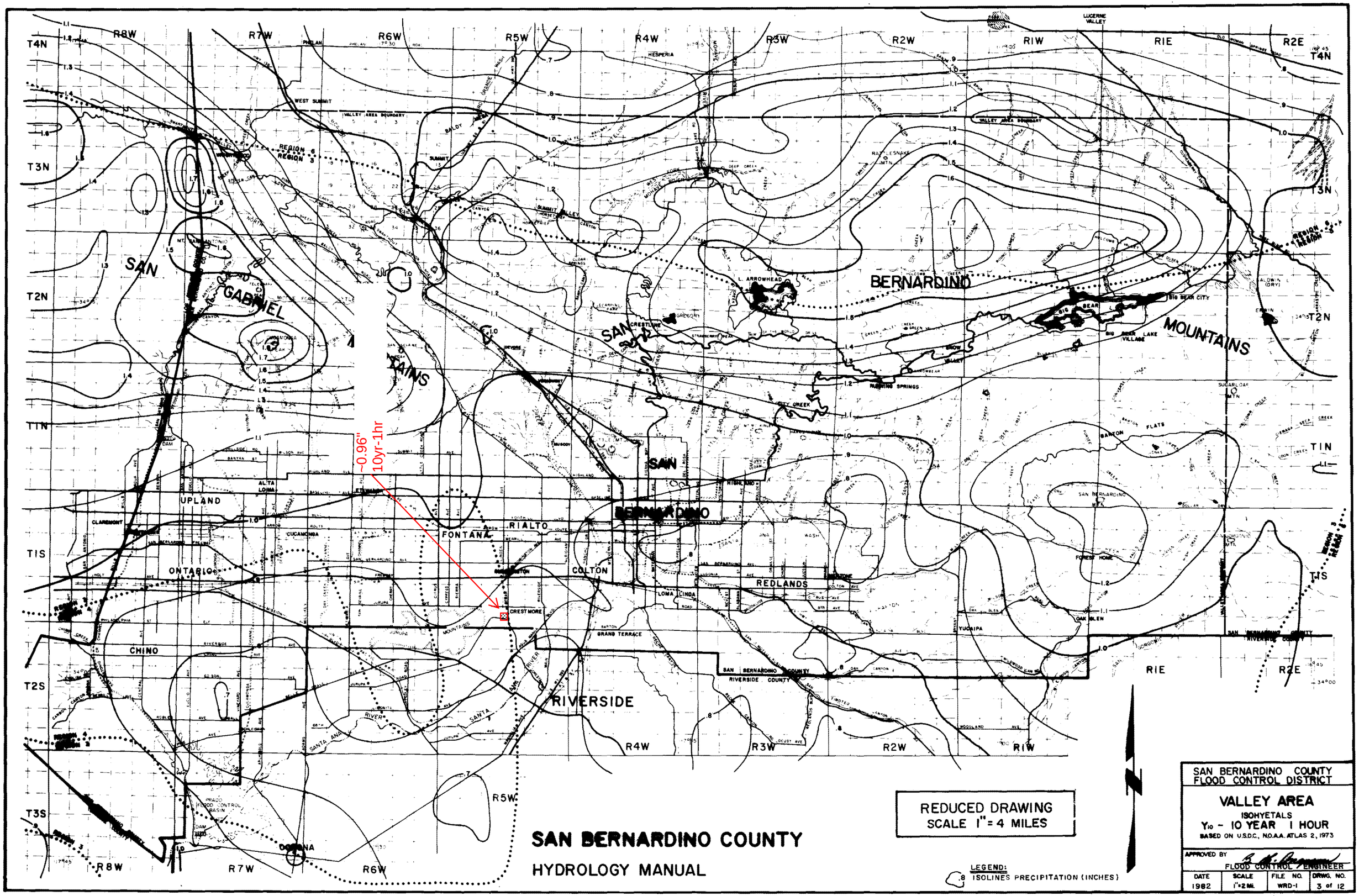

~0.96"
10yr-1hr
SAN BERNARDINO COUNTY
HYDROLOGY MANUAL
REDUCED DRAWING
SCALE 1" = 4 MILES
LEGEND:
.8 ISOLINES PRECIPITATION (INCHES)
SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT
VALLEY AREA
ISOHYETALS
Y10 - 10 YEAR 1 HOUR
BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973
APPROVED BY
FLOOD CONTROL ENGINEER
DATE 1982
SCALE 1"=2 MI.
FILE NO. WRD-1
DRWG. NO. 3 of 12

FIGURE B-3

~1.36"
100yr-1hr

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

REDUCED DRAWING
SCALE 1" = 4 MILES

LEGEND:
1.8 ISOLINES PRECIPITATION (INCHES)

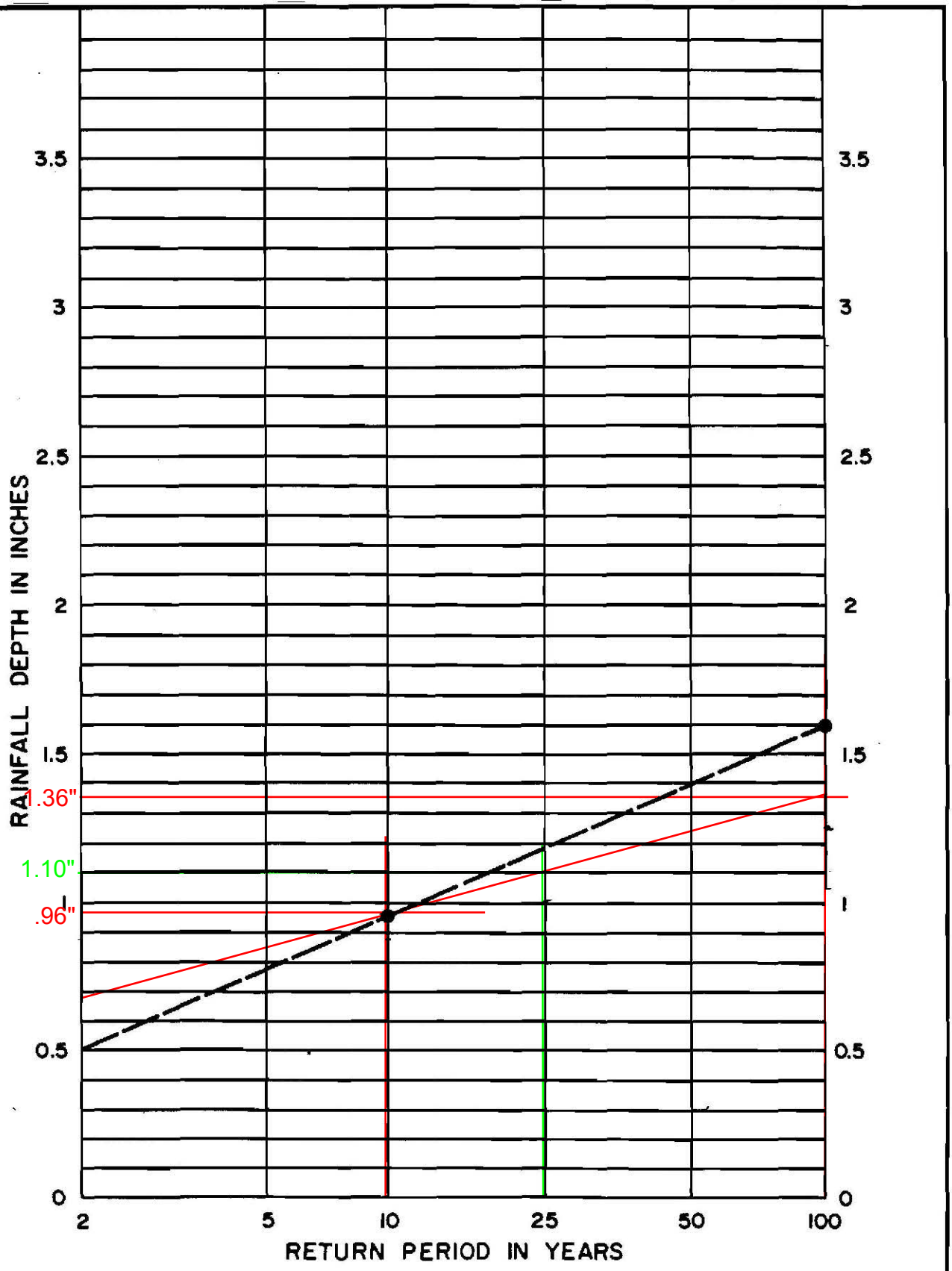
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

VALLEY AREA
ISOHYETALS
Y_{100} - 100 YEAR 1 HOUR
BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973

APPROVED BY

DATE	SCALE	FILE NO.	DRWG. NO.
1982	1"=2 MI.	HYD-1	4 of 12

FIGURE B-4



NOTE:

1. FOR INTERMEDIATE RETURN PERIODS PLOT 10-YEAR AND 100-YEAR ONE HOUR VALUES FROM MAPS, THEN CONNECT POINTS AND READ VALUE FOR DESIRED RETURN PERIOD. FOR EXAMPLE GIVEN 10-YEAR ONE HOUR = 0.95" AND 100-YEAR ONE HOUR = 1.60", 25-YEAR ONE HOUR = 1.18".

REFERENCE: NOAA ATLAS 2, VOLUME XI - CAL., 1973

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

RAINFALL DEPTH VERSUS RETURN PERIOD FOR PARTIAL DURATION SERIES

FIGURE D-2

```
    2      1468.7    17.04     3.044   .795(  .351)   .44      606.1     1231.00
    3      1468.1    17.42     3.003   .796(  .352)   .44      615.4     1238.00
    4      1458.6    18.45     2.902   .796(  .356)   .45      636.5     1222.00
    5      1455.8    18.63     2.884   .796(  .357)   .45      639.9     1244.00
    6      1409.5    21.11     2.676   .798(  .363)   .45      676.9     1263.00
    7      1405.3    21.29     2.663   .799(  .363)   .45      679.0     1226.00
    8      1390.9    21.79     2.626   .799(  .364)   .46      683.2     1242.00
    9      1272.4    25.99     2.362   .799(  .367)   .46      708.4     1218.00
   10      1234.5    27.42     2.288   .799(  .367)   .46      714.1     1234.00
   11      1199.2    28.74     2.224   .798(  .367)   .46      717.6     1248.00
   12      1175.8    29.61     2.184   .798(  .367)   .46      719.0     1220.00
   13      1387.9    13.17     3.552   .795(  .344)   .43      480.7     1250.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =   1468.73   Tc(MIN.) =   17.037
  EFFECTIVE AREA(ACRES) =    606.06  AREA-AVERAGED Fm(INCH/HR) =    .35
  AREA-AVERAGED Fp(INCH/HR) =    .80  AREA-AVERAGED Ap =    .44
  TOTAL AREA(ACRES) =    719.03
  LONGEST FLOWPATH FROM NODE  1220.00 TO NODE  1275.00 =  9480.00 FEET.


****************************************************************************
  FLOW PROCESS FROM NODE  1275.00 TO NODE  1276.00 IS CODE =  3.1
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =  1118.00
  DOWNSTREAM NODE ELEVATION(FEET) =  1102.00
  FLOW LENGTH(FEET) =   870.00   MANNING'S N =   .013

  DEPTH OF FLOW IN 108.0 INCH PIPE IS  81.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.63
  ESTIMATED PIPE DIAMETER(INCH) = 108.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =   1468.73
  PIPEFLOW TRAVEL TIME(MIN.) =    .51    Tc(MIN.) =  17.54


****************************************************************************
  FLOW PROCESS FROM NODE  1276.00 TO NODE  1276.00 IS CODE =  8.1
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  17.54
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.991
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B       28.00       .75        .10    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    .75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    .10
  SUBAREA AREA(ACRES) =   28.00      SUBAREA RUNOFF(CFS) =   73.48
  EFFECTIVE AREA(ACRES) =   634.06   AREA-AVERAGED Fm(INCH/HR) =    .34
  AREA-AVERAGED Fp(INCH/HR) =    .79  AREA-AVERAGED Ap =    .43
  TOTAL AREA(ACRES) =   747.03       PEAK FLOW RATE(CFS) =    1513.29


****************************************************************************
  FLOW PROCESS FROM NODE  1276.00 TO NODE  1277.00 IS CODE =  3.1
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
UPSTREAM NODE ELEVATION(FEET) =  1102.00
DOWNSTREAM NODE ELEVATION(FEET) =  1095.00
FLOW LENGTH(FEET) =   450.00   MANNING'S N =  .013

DEPTH OF FLOW IN 114.0 INCH PIPE IS  83.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  27.19
ESTIMATED PIPE DIAMETER(INCH) = 114.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =   1513.29
PIPEFLOW TRAVEL TIME(MIN.) =    .28    Tc(MIN.) =  17.82


****************************************************************************
FLOW PROCESS FROM NODE  1277.00 TO NODE  1277.00 IS CODE =  8.1
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  17.82
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.963
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 B       44.00       .75         .10    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =   .75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =   .10
SUBAREA AREA(ACRES) =   44.00      SUBAREA RUNOFF(CFS) =  114.36
EFFECTIVE AREA(ACRES) =   678.06   AREA-AVERAGED Fm(INCH/HR) =   .32
AREA-AVERAGED Fp(INCH/HR) =   .79  AREA-AVERAGED Ap =   .40
TOTAL AREA(ACRES) =   791.03       PEAK FLOW RATE(CFS) =    1611.75


****************************************************************************
FLOW PROCESS FROM NODE  1277.00 TO NODE  1277.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  17.82
RAINFALL INTENSITY(INCH/HR) =   2.96
AREA-AVERAGED Fm(INCH/HR) =   .32
AREA-AVERAGED Fp(INCH/HR) =   .79
AREA-AVERAGED Ap =   .40
EFFECTIVE STREAM AREA(ACRES) =  678.06
TOTAL STREAM AREA(ACRES) =  791.03
PEAK FLOW RATE(CFS) AT CONFLUENCE =   1611.75


****************************************************************************
FLOW PROCESS FROM NODE  1254.00 TO NODE  1255.00 IS CODE =  2.1
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =  1730.00
ELEVATION DATA: UPSTREAM(FEET) =   1125.00  DOWNSTREAM(FEET) =   1102.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]** .20
```

```
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    14.235
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.390
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B       13.00       .75        .10    56   14.23
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    .75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    .10
 SUBAREA RUNOFF(CFS) =     38.79
 TOTAL AREA(ACRES) =     13.00   PEAK FLOW RATE(CFS) =     38.79


****************************************************************************
 FLOW PROCESS FROM NODE  1255.00 TO NODE  1256.00 IS CODE =  3.1
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =  1102.00
 DOWNSTREAM NODE ELEVATION(FEET) =  1098.00
 FLOW LENGTH(FEET) =   750.00   MANNING'S N =  .013

 DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.32
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     38.79
 PIPEFLOW TRAVEL TIME(MIN.) =   1.71    Tc(MIN.) =  15.94


****************************************************************************
 FLOW PROCESS FROM NODE  1256.00 TO NODE  1256.00 IS CODE =  8.1
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  15.94
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.167
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        9.00       .75        .10    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    .75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    .10
 SUBAREA AREA(ACRES) =     9.00      SUBAREA RUNOFF(CFS) =   25.05
 EFFECTIVE AREA(ACRES) =    22.00   AREA-AVERAGED Fm(INCH/HR) =   .07
 AREA-AVERAGED Fp(INCH/HR) =   .75  AREA-AVERAGED Ap =   .10
 TOTAL AREA(ACRES) =    22.00       PEAK FLOW RATE(CFS) =      61.23


****************************************************************************
 FLOW PROCESS FROM NODE  1256.00 TO NODE  1277.00 IS CODE =  3.1
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =  1098.00
 DOWNSTREAM NODE ELEVATION(FEET) =  1095.00
 FLOW LENGTH(FEET) =   700.00   MANNING'S N =  .013

 DEPTH OF FLOW IN  42.0 INCH PIPE IS  33.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.40
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```
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     61.23
 PIPEFLOW TRAVEL TIME(MIN.) =   1.58    Tc(MIN.) =  17.52

 ****************************************************************************
 FLOW PROCESS FROM NODE  1277.00 TO NODE  1277.00 IS CODE =  8.1
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  17.52
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.993
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  B        7.00       .75        .10    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    .75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    .10
 SUBAREA AREA(ACRES) =    7.00      SUBAREA RUNOFF(CFS) =   18.39
 EFFECTIVE AREA(ACRES) =    29.00   AREA-AVERAGED Fm(INCH/HR) =    .07
 AREA-AVERAGED Fp(INCH/HR) =    .75  AREA-AVERAGED Ap =    .10
 TOTAL AREA(ACRES) =    29.00       PEAK FLOW RATE(CFS) =      76.17


 ****************************************************************************
 FLOW PROCESS FROM NODE  1277.00 TO NODE  1277.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
 ============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  17.52
 RAINFALL INTENSITY(INCH/HR) =   2.99
 AREA-AVERAGED Fm(INCH/HR) =    .07
 AREA-AVERAGED Fp(INCH/HR) =    .75
 AREA-AVERAGED Ap =    .10
 EFFECTIVE STREAM AREA(ACRES) =   29.00
 TOTAL STREAM AREA(ACRES) =   29.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     76.17
 ** CONFLUENCE DATA **
 STREAM     Q       Tc    Intensity   Fp(Fm)      Ap   Ae       SOURCE
 NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)        (ACRES)    NODE
    1   1611.48   17.71     2.974    .79( .32)   .40  675.02   1236.00
    1   1611.75   17.82     2.963    .79( .32)   .40  678.06   1231.00
    1   1609.49   18.20     2.925    .79( .32)   .41  687.35   1238.00
    1   1596.17   19.23     2.830    .80( .33)   .41  708.54   1222.00
    1   1592.79   19.42     2.814    .80( .33)   .41  711.89   1244.00
    1   1538.59   21.90     2.618    .80( .34)   .42  748.86   1263.00
    1   1533.94   22.08     2.605    .80( .34)   .42  750.98   1226.00
    1   1518.33   22.59     2.570    .80( .34)   .42  755.22   1242.00
    1   1390.26   26.80     2.319    .80( .34)   .43  780.42   1218.00
    1   1349.69   28.23     2.248    .80( .34)   .43  786.10   1234.00
    1   1311.86   29.56     2.187    .80( .34)   .43  789.56   1248.00
    1   1287.04   30.44     2.149    .80( .34)   .43  791.03   1220.00
    1   1552.29   13.96     3.430    .79( .31)   .39  552.70   1250.00
    2     76.17   17.52     2.993    .75( .07)   .10   29.00   1254.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **

 STREAM      Q        Tc    Intensity     Fp(Fm)       Ap      Ae        SOURCE
 UMBER     (CFS)    (MIN.)  (INCH/HR)   (INCH/HR)              (ACRES)     NODE
   1      1622.1    13.96     3.430    .793(  .299)   .38      575.8     1250.00
   2      1687.1    17.71     2.974    .794(  .311)   .39      704.0     1236.00
   3      1687.1    17.82     2.963    .794(  .311)   .39      707.1     1231.00
   4      1683.9    18.20     2.925    .794(  .313)   .39      716.4     1238.00
   5      1668.1    19.23     2.830    .795(  .317)   .40      737.5     1222.00
   6      1664.3    19.42     2.814    .795(  .318)   .40      740.9     1244.00
   7      1605.0    21.90     2.618    .797(  .325)   .41      777.9     1263.00
   8      1600.0    22.08     2.605    .797(  .326)   .41      780.0     1226.00
   9      1583.5    22.59     2.570    .797(  .326)   .41      784.2     1242.00
  10      1448.8    26.80     2.319    .798(  .330)   .41      809.4     1218.00
  11      1406.4    28.23     2.248    .797(  .331)   .41      815.1     1234.00
  12      1367.0    29.56     2.187    .797(  .331)   .42      818.6     1248.00
  13      1341.2    30.44     2.149    .797(  .331)   .42      820.0     1220.00
  14      1684.6    17.52     2.993    .794(  .310)   .39      697.8     1254.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =   1687.14   Tc(MIN.) =   17.710
 EFFECTIVE AREA(ACRES) =    704.02  AREA-AVERAGED Fm(INCH/HR) =    .31
 AREA-AVERAGED Fp(INCH/HR) =    .79  AREA-AVERAGED Ap =    .39
 TOTAL AREA(ACRES) =    820.03
 LONGEST FLOWPATH FROM NODE  1220.00 TO NODE  1277.00 = 10800.00 FEET.


****************************************************************************
 FLOW PROCESS FROM NODE  1277.00 TO NODE  1278.00 IS CODE =  3.1
 ----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =  1095.00
 DOWNSTREAM NODE ELEVATION(FEET) =  1074.00
 FLOW LENGTH(FEET) =  1280.00   MANNING'S N =  .013

 DEPTH OF FLOW IN 114.0 INCH PIPE IS  89.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  28.16
 ESTIMATED PIPE DIAMETER(INCH) = 114.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =   1687.14
 PIPEFLOW TRAVEL TIME(MIN.) =    .76    Tc(MIN.) =  18.47


****************************************************************************
 FLOW PROCESS FROM NODE  1278.00 TO NODE  1278.00 IS CODE =  8.1
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  18.47
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.900
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 OMMERCIAL                  A       46.00       .98        .10    32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    .98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    .10
 SUBAREA AREA(ACRES) =   46.00      SUBAREA RUNOFF(CFS) =  116.02
 EFFECTIVE AREA(ACRES) =   750.02   AREA-AVERAGED Fm(INCH/HR) =    .30
```

```
 AREA-AVERAGED Fp(INCH/HR) =    .80  AREA-AVERAGED Ap =    .37
 TOTAL AREA(ACRES) =    866.03       PEAK FLOW RATE(CFS) =    1756.40


 ****************************************************************************
 FLOW PROCESS FROM NODE  1278.00 TO NODE  1278.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  18.47
 RAINFALL INTENSITY(INCH/HR) =   2.90
 AREA-AVERAGED Fm(INCH/HR) =    .30
 AREA-AVERAGED Fp(INCH/HR) =    .80
 AREA-AVERAGED Ap =    .37
 EFFECTIVE STREAM AREA(ACRES) =  750.02
 TOTAL STREAM AREA(ACRES) =  866.03
 PEAK FLOW RATE(CFS) AT CONFLUENCE =   1756.40


****************************************************************************
 FLOW PROCESS FROM NODE  1257.00 TO NODE  1258.00 IS CODE =  2.1
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   890.00
 ELEVATION DATA: UPSTREAM(FEET) =   1103.00  DOWNSTREAM(FEET) =   1090.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]** .20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.708
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.022
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        8.00       .75        .10     56   10.71
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =   .75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =   .10
 SUBAREA RUNOFF(CFS) =     28.42
 TOTAL AREA(ACRES) =      8.00   PEAK FLOW RATE(CFS) =     28.42


****************************************************************************
 FLOW PROCESS FROM NODE  1258.00 TO NODE  1259.00 IS CODE =  6.1
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1090.00  DOWNSTREAM ELEVATION(FEET) = 1080.00
 STREET LENGTH(FEET) =   790.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
 INSIDE STREET CROSSFALL(DECIMAL) =    .018
 OUTSIDE STREET CROSSFALL(DECIMAL) =   .029

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL) =   .020
```

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 **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      45.36
 ***STREET FLOWING FULL***
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) =   .64
 HALFSTREET FLOOD WIDTH(FEET) =   16.91
 AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.59
 PRODUCT OF DEPTH&VELOCITY =    2.96
STREET FLOW TRAVEL TIME(MIN.) =   2.87   Tc(MIN.) =  13.58
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.487
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 B        11.00       .75        .10    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =   .75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =   .10
SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   33.79
EFFECTIVE AREA(ACRES) =   19.00    AREA-AVERAGED Fm(INCH/HR) =   .07
AREA-AVERAGED Fp(INCH/HR) =   .75  AREA-AVERAGED Ap =   .10
TOTAL AREA(ACRES) =   19.00        PEAK FLOW RATE(CFS) =      58.36

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) =  .69   HALFSTREET FLOOD WIDTH(FEET) = 19.17
FLOW VELOCITY(FEET/SEC.) =  5.06   DEPTH*VELOCITY =   3.49


****************************************************************************
 FLOW PROCESS FROM NODE  1259.00 TO NODE  1260.00 IS CODE =  3.1
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =  1080.00
 DOWNSTREAM NODE ELEVATION(FEET) =  1075.00
 FLOW LENGTH(FEET) =   950.00   MANNING'S N =  .013

 DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.07
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     58.36
 PIPEFLOW TRAVEL TIME(MIN.) =   1.96    Tc(MIN.) =  15.54


****************************************************************************
 FLOW PROCESS FROM NODE  1260.00 TO NODE  1260.00 IS CODE =  8.1
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  15.54
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.216
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        41.00       .75        .10    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =   .75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =   .10
  UBAREA AREA(ACRES) =   41.00      SUBAREA RUNOFF(CFS) =  115.91
 EFFECTIVE AREA(ACRES) =    60.00   AREA-AVERAGED Fm(INCH/HR) =   .07
 AREA-AVERAGED Fp(INCH/HR) =   .75  AREA-AVERAGED Ap =   .10
 TOTAL AREA(ACRES) =    60.00       PEAK FLOW RATE(CFS) =     169.63
```

```
****************************************************************************
 FLOW PROCESS FROM NODE  1260.00 TO NODE  1278.00 IS CODE =  3.1
----------------------------------------------------------------------------
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =  1075.00
 DOWNSTREAM NODE ELEVATION(FEET) =  1074.00
 FLOW LENGTH(FEET) =   730.00   MANNING'S N =  .013

 DEPTH OF FLOW IN  78.0 INCH PIPE IS  59.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
 ESTIMATED PIPE DIAMETER(INCH) =  78.00     NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    169.63
 PIPEFLOW TRAVEL TIME(MIN.) =   1.93    Tc(MIN.) =  17.47


****************************************************************************
 FLOW PROCESS FROM NODE  1278.00 TO NODE  1278.00 IS CODE =  8.1
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  17.47
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.998
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  B       21.00      .75         .10     56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =   .75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =   .10
 SUBAREA AREA(ACRES) =   21.00     SUBAREA RUNOFF(CFS) =   55.24
 EFFECTIVE AREA(ACRES) =   81.00   AREA-AVERAGED Fm(INCH/HR) =   .07
 AREA-AVERAGED Fp(INCH/HR) =   .75  AREA-AVERAGED Ap =   .10
 TOTAL AREA(ACRES) =   81.00       PEAK FLOW RATE(CFS) =    213.08


****************************************************************************
 FLOW PROCESS FROM NODE  1278.00 TO NODE  1278.00 IS CODE =  1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  17.47
 RAINFALL INTENSITY(INCH/HR) =   3.00
 AREA-AVERAGED Fm(INCH/HR) =   .07
 AREA-AVERAGED Fp(INCH/HR) =   .75
 AREA-AVERAGED Ap =   .10
 EFFECTIVE STREAM AREA(ACRES) =   81.00
 TOTAL STREAM AREA(ACRES) =   81.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    213.08
 ** CONFLUENCE DATA **
 STREAM     Q       Tc    Intensity   Fp(Fm)      Ap    Ae       SOURCE
 UMBER    (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
   1    1699.96   14.72     3.322    .80( .28)   .36   621.81   1250.00
   1    1756.40   18.47     2.900    .80( .30)   .37   750.02   1236.00
   1    1756.21   18.58     2.890    .80( .30)   .37   753.06   1231.00
   1    1752.44   18.96     2.854    .80( .30)   .38   762.35   1238.00
```

1	1735.46	19.99	2.766	.80(.30)	.38	783.54	1222.00
1	1731.46	20.17	2.750	.80(.31)	.38	786.89	1244.00
1	1669.93	22.66	2.565	.80(.31)	.39	823.86	1263.00
1	1664.81	22.84	2.552	.80(.31)	.39	825.98	1226.00
1	1647.96	23.35	2.519	.80(.31)	.39	830.22	1242.00
1	1510.12	27.59	2.279	.80(.32)	.40	855.42	1218.00
1	1466.90	29.02	2.211	.80(.32)	.40	861.10	1234.00
1	1426.76	30.35	2.152	.80(.32)	.40	864.56	1248.00
1	1400.47	31.23	2.116	.80(.32)	.40	866.03	1220.00
1	1754.43	18.28	2.918	.80(.30)	.37	743.76	1254.00
2	213.08	17.47	2.998	.75(.07)	.10	81.00	1257.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	SOURCE NODE
1	1899.4	14.72	3.322	.795(.264)	.33	690.1	1250.00
2	1961.7	18.28	2.918	.795(.275)	.35	824.8	1254.00
3	1962.3	18.47	2.900	.795(.276)	.35	831.0	1236.00
4	1961.4	18.58	2.890	.795(.277)	.35	834.1	1231.00
5	1955.1	18.96	2.854	.795(.279)	.35	843.4	1238.00
6	1931.6	19.99	2.766	.796(.283)	.36	864.5	1222.00
7	1926.5	20.17	2.750	.796(.284)	.36	867.9	1244.00
8	1851.5	22.66	2.565	.798(.291)	.36	904.9	1263.00
9	1845.4	22.84	2.552	.798(.292)	.37	907.0	1226.00
10	1826.2	23.35	2.519	.799(.293)	.37	911.2	1242.00
11	1670.8	27.59	2.279	.799(.297)	.37	936.4	1218.00
12	1622.6	29.02	2.211	.798(.297)	.37	942.1	1234.00
13	1578.2	30.35	2.152	.798(.298)	.37	945.6	1248.00
14	1549.3	31.23	2.116	.798(.298)	.37	947.0	1220.00
15	1955.2	17.47	2.998	.795(.272)	.34	797.2	1257.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 1962.35 Tc(MIN.) = 18.467
EFFECTIVE AREA(ACRES) = 831.02 AREA-AVERAGED Fm(INCH/HR) = .28
AREA-AVERAGED Fp(INCH/HR) = .80 AREA-AVERAGED Ap = .35
TOTAL AREA(ACRES) = 947.03
LONGEST FLOWPATH FROM NODE 1220.00 TO NODE 1278.00 = 12080.00 FEET.

****
FLOW PROCESS FROM NODE 1278.00 TO NODE 1279.00 IS CODE = 3.1

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
UPSTREAM NODE ELEVATION(FEET) = 1074.00
DOWNSTREAM NODE ELEVATION(FEET) = 1050.00
FLOW LENGTH(FEET) = 1350.00 MANNING'S N = .013

DEPTH OF FLOW IN 120.0 INCH PIPE IS 92.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.28
ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1962.35
PIPEFLOW TRAVEL TIME(MIN.) = .74 Tc(MIN.) = 19.21

```
**************************************************************************
 FLOW PROCESS FROM NODE  1279.00 TO NODE  1279.00 IS CODE =  8.1
--------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 ==========================================================================
 MAINLINE Tc(MIN) =  19.21
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.832
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"        A       20.00       .98        .50    32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    .98
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    .50
 SUBAREA AREA(ACRES) =   20.00     SUBAREA RUNOFF(CFS) =   42.20
 EFFECTIVE AREA(ACRES) =   851.02   AREA-AVERAGED Fm(INCH/HR) =    .28
 AREA-AVERAGED Fp(INCH/HR) =    .80  AREA-AVERAGED Ap =    .35
 TOTAL AREA(ACRES) =   967.03       PEAK FLOW RATE(CFS) =    1962.35
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE


**************************************************************************
 FLOW PROCESS FROM NODE  1279.00 TO NODE  1279.00 IS CODE =   1
--------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  19.21
 RAINFALL INTENSITY(INCH/HR) =   2.83
 AREA-AVERAGED Fm(INCH/HR) =    .28
 AREA-AVERAGED Fp(INCH/HR) =    .80
 AREA-AVERAGED Ap =    .35
 EFFECTIVE STREAM AREA(ACRES) =  851.02
 TOTAL STREAM AREA(ACRES) =  967.03
 PEAK FLOW RATE(CFS) AT CONFLUENCE =   1962.35


**************************************************************************
 FLOW PROCESS FROM NODE  1261.00 TO NODE  1262.00 IS CODE =  2.1
--------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  2340.00
 ELEVATION DATA: UPSTREAM(FEET) =   1083.00  DOWNSTREAM(FEET) =   1060.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]** .20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   23.125
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.534
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"        B       42.00       .75        .60    56   23.12
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    .75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    .60
 SUBAREA RUNOFF(CFS) =     78.81
 TOTAL AREA(ACRES) =     42.00   PEAK FLOW RATE(CFS) =     78.81
```

replaced

NORTH

SCALE 1"=1000'

0 500 1000 2000 3000 4000 5000

City of Rancho Cucamonga
Master Plan of Drainage - Westside Area
Technical Exhibit

OCTOBER, 1997

LEGEND

- Existing Open Channel
- Existing Storm Drain Requiring Future Upsizing
- Existing Storm Drain
- Rancho Cucamonga City Limits
- Proposed Storm Drain

LIN #-# = STORM DRAIN LINE DESIGNATIONS (WATERSHED AREA NO. / STORM DRAIN LINE NO.)

000 = DENOTES HYDRAULIC NODE NUMBER

XIV = WATERSHED AREA NUMBER

(xx) = DENOTES EXISTING SIZE
xx = DENOTES FUTURE SIZE

b = BASE WIDTH
H = HEIGHT / DEPTH
Z = CHANNEL SIDE SLOPE

A A A
B B = SOILS TYPE

= WATERSHED BOUNDARY

SAPPHIRE CREEK

CARNELIAN AVE.

HELLMAN AVE.

AMETHYST AVE.

ARCHIBALD AVE.

HERMOSA AVE.

DEER CREEK CHANNEL

MILLIKEN AVENUE

19th ST.

HIGHLAND AVE.

BASELINE ROAD

CHURCH ST.

FOOTHILL BLVD.

ARROW ROUTE

8TH ST.

6th STREET

4th STREET

9th STREET

BEECH AVE.

REDHILL PARK

RED HILL COUNTRY CLUB - 60CF COURSE

CHURCH BASIN

14'X14' R.C.B.

GROVE AVE.

VINEYARD AVE.

BAKER AVE.

CUCAMONGA

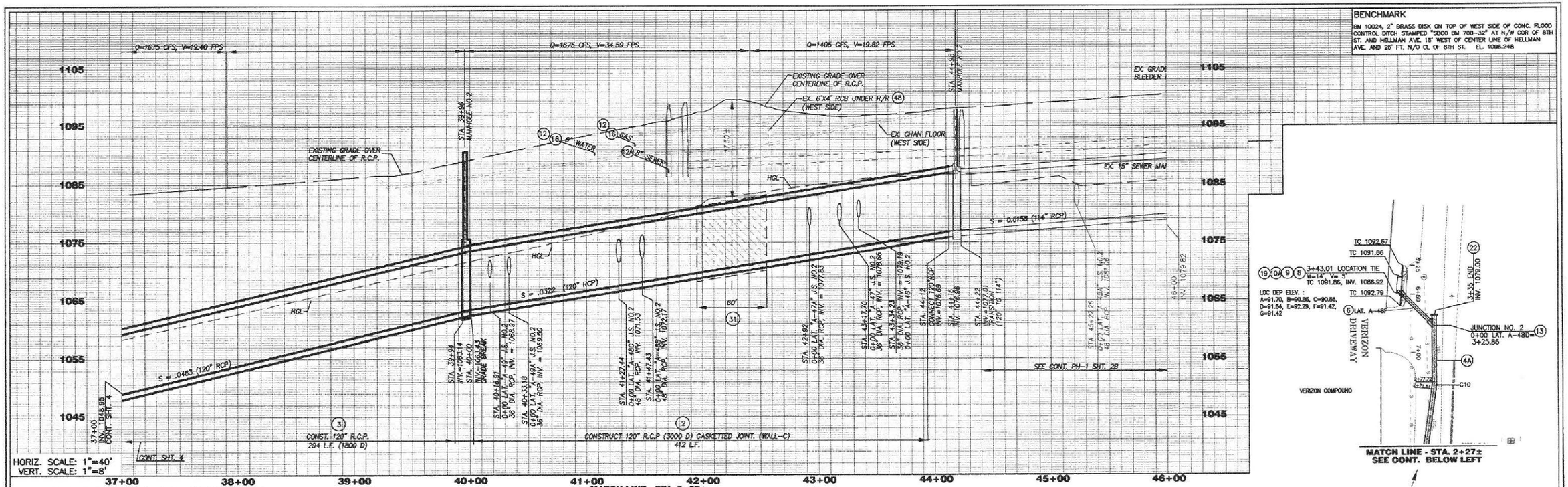
8th STREET SPREADING GROUNDS

HAVEN AVENUE

JERSEY BOULEVARD

I II III IV VI VII IX

LIN II-2A, LIN II-2E, LIN II-4, LIN II-7A, LIN II-7, LIN MOD II-7A, LIN MN-7, LIN VI-2, LIN VI-2A, LIN VI-2B, LIN VI-2C, LIN VI-2F, LIN III-1, LIN III-2, LIN III-3, LIN IV-1, LIN IV-2, LIN IV-4, LIN IV-5, LIN VII-1, LIN VII-2, LIN VII-3, LIN VII-4, LIN IX-1



MATCH LINE - STA. 2+27± SEE CONT. BELOW LEFT

MATCH LINE - STA. 2+27± SEE CONT. ABOVE RIGHT

SEE CONTINUATION MATCH

BENCHMARK

BM 10024, 2" BRASS DISK ON TOP OF WEST SIDE OF CONC. FLOOD CONTROL DITCH STAMPED "SBCO BM 700-32" AT N/W COR OF 8TH ST. AND HELLMAN AVE. 18' WEST OF CENTER LINE OF HELLMAN AVE. AND 28' FT. N/O CL OF 8TH ST. EL. 1088.248

STORM DRAIN CONSTRUCTION NOTES:

(2) INSTALL GASKETTED LEAK RESISTANT 120" DIA. R.C.P. (3000 D) PER PLAN ON SHT. 5 AND JACKING SPECIFICATION ON SHT. 1A, NOTE NO. 7, 8 AND 9.

(3) INSTALL 120" DIA. R.C.P. (1800 D) STORM DRAIN, PER PLAN.

(4A) INSTALL 48" DIA. R.C.P. (1750 D) STORM DRAIN, PER PLAN

(6) INSTALL 36" DIA. R.C.P. (1750 D) STORM DRAIN, PER PLAN

(7) RE-INSTALL EXIST. 30" DIA. S.D. LINE AFFECTED BY THE INSTALLATION OF 48" DIA. LATERAL PIPE (FIELD ADJUST AS NECESSARY)

(8) CONSTRUCT CURB OPENING CATCH BASIN PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 300.

(9) CONSTRUCT MONOLITHIC CATCH BASIN CONNECTION PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 308.

(10) CONSTRUCT LOCAL DEPRESSION PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 307, CASE A.

(10A) CONSTRUCT LOCAL DEPRESSION PER CITY OF RANCHO CUCAMONGA STD. DWG. NO. 307, CASE B.

(11) CONSTRUCT MANHOLE NO.2 PER CITY OF RANCHO CUCAMONGA STD. DWG. NO. 319.

(12) CONSTRUCT SUPPORT FOR CONDUITS CROSSING TENCHES PER CITY OF RANCHO CUCAMONGA STD. DWG. NO 339

(12A) REPLACE ALL EXIST. VCP SEWER LINE CROSSING MAIN LINE TRENCH TO DUCTILE IRON PIPE (D.I.P.) WITH EPOXY LINING

(13) CONSTRUCT JUNCTION STRUCTURE NO.2 PER CITY OF RANCHO CUCAMONNGA STANDARD DRAWING NO. 331.

(16) PROTECT IN PLACE.

(19) GRADE TO DRAIN (SEE PLAN)

(22) PLUG PIPE / BOX WITH MORTAR AND BRICKS, PER S.B.C.F.C.D. STD. DWG. NO. S.P. 176, TYPE-"B"

(44) REMOVE EXIST. OBSTRUCTING 2-60" RCP AND 2-4'X16' OUTLET BOX

(45) CONNECT EX. 36"ø LATERAL TO THE PROPOSED CATCH BASIN (SEE LAT.-44 & 45)

(47) RE-CONSTRUCT AFFECTED 24" DRAIN PIPE AFTER MAIN LINE INSTALLATION SEE SHT. 5 (FIELD ADJUST ELEV AND SLOPE AS NECESSARY)

(48) RE-CONSTRUCT AFFECTED CHANNEL IN LIKE AND KIND (BOTH OPEN CHAN. AND RCB UNDER R/R TRACT AFTER MAIN LINE INSTALLATION PER DETAIL ON SHT. 7 AND 9 (FOR RCB, D-80) FIELD ADJUST AS NECESSARY)

(51) POTHOLE AND VERIFY EXIST. UTILITY LINE DEPTH AND COORDINATE WITH UTILITY OWNER PRIOR TO ANY CONSTRUCTION

(31) 60' LENGTH OF JACK AND BORE PIPE INSTALLATION SYSTEM UNDER RAILROAD TRACK (REFER TO SCRRA STANDARD ES5001 FOR PIPE INSTALLATION UNDER RAILROAD TRACKS, SEE SHEET 1A AND 9 AND THE SPECIAL PROVISIONS. (SUPPORTS AND SHORING SYSTEM SHALL BE PER CITY ENGINEER AND SCRRA APPROVAL). SEE SHT. 5

REF. XING: CPUC XING NO. 101 SG-36.9 DOT XING NO. 026164R

NOTE: REFER TO SHEET 15 TO 24 FOR STREET WIDENING AND OVERLAY

Underground Service Alert
Call: TOLL FREE
1-800 422-4133
TWO WORKING DAYS BEFORE YOU DIG

CURVE TABLE					
CURVE	RADIUS	LENGTH	DELTA	CHORD DIR.	TANGENT
C12	22.50	35.33	89°57'30"	S45°05'00"E	22.48
C13	22.50	17.71	45°05'47"	N67°32'54"W	9.34

CURVE TABLE					
CURVE	LENGTH	RADIUS	DELTA	CHORD DIR.	TANGENT
C8	17.52	22.50	44°36'58"	N67°41'31"W	9.23
C9	17.63	22.50	44°53'55"	S67°28'58"W	9.30
C10	45.00	6.21	7°54'13"	N83°52'01"W	3.11
C11	45.00	6.21	7°54'36"	S85°52'19"E	3.11
C12	17.60	22.50	44°49'37"	N67°24'46"W	9.26

HELLMAN AVE.

NO.	DESCRIPTION OF REVISION	DATE	CITY APPROVED
△			

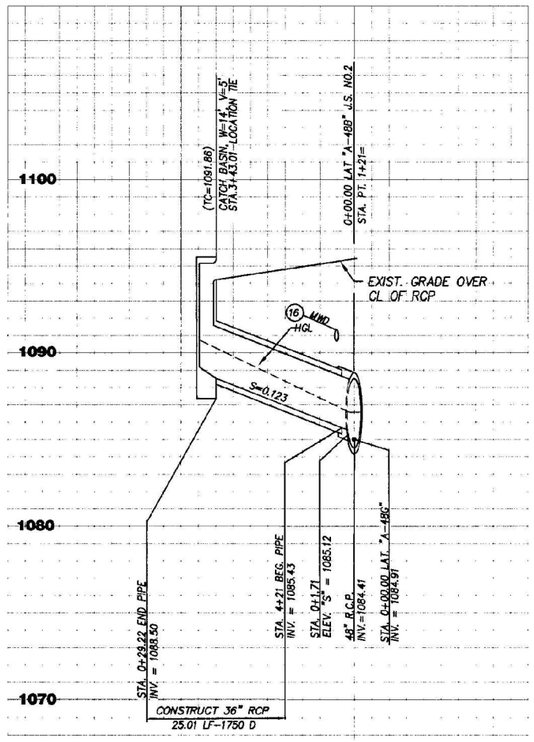
CITY OF RANCHO CUCAMONGA

PLAN AND PROFILE

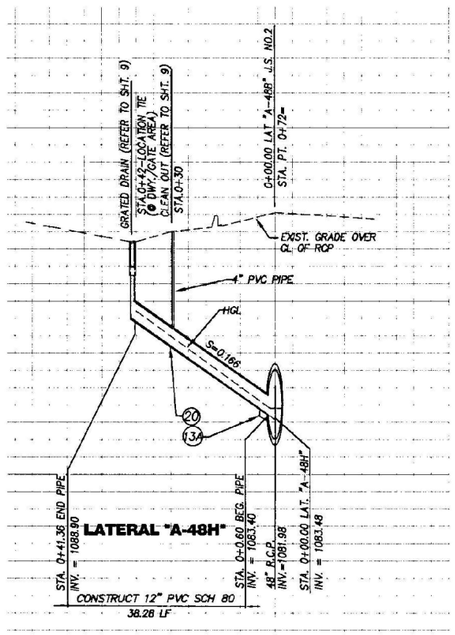
HELLMAN AVE. MASTER PLANNED STORM DRAIN AND STREET IMPROVEMENTS - PHASE 2
(FROM CUCAMONGA CREEK CHANNEL TO ±200' N/O 8TH STREET)

APPROVED BY: CITY ENGINEER — DATE: 9/28/12 RCE: 53672

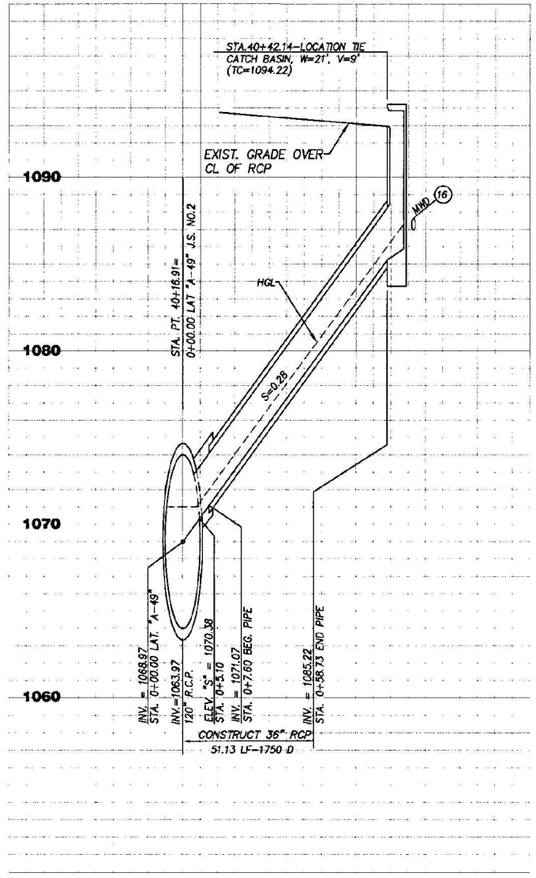
DESIGN: RD-1	PLAN PREPARED BY: CITY OF RANCHO CUCAMONGA, 10500 CIVIC CENTER DRIVE, RANCHO CUCAMONGA, CA 91730	RECOMMENDED	
DRAWN: RD-1		SHEET: 5 OF 29	
CHECKED: RD-2		DRAWING NO.: 2277-D	



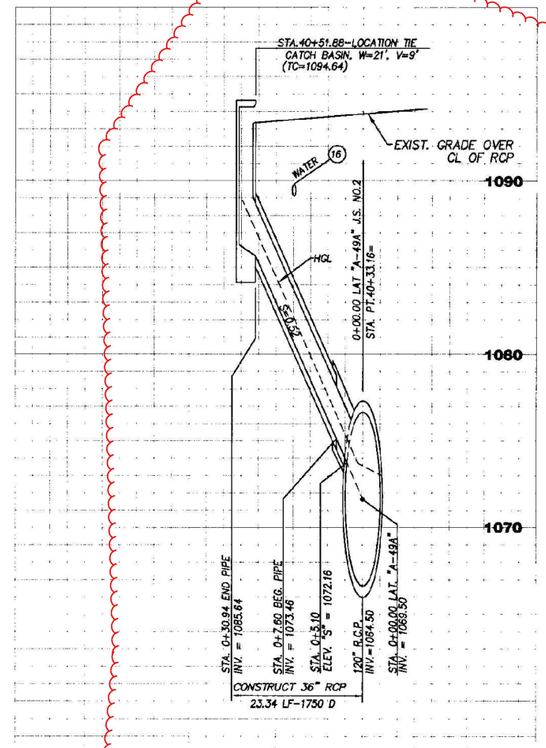
LATERAL "A-48G"



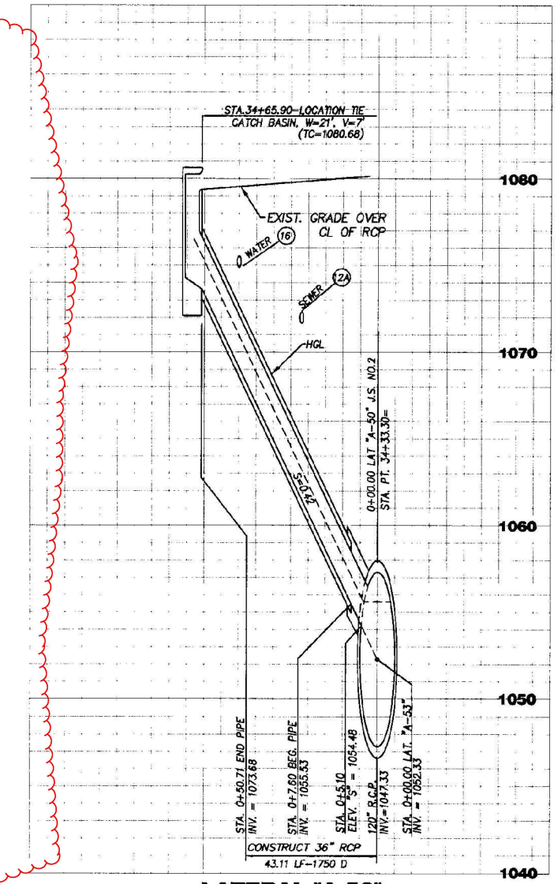
LATERAL "A-48H"



LATERAL "A-49"



LATERAL "A-49A"



LATERAL "A-50"

THIS PLAN IS FOR CATCH BASIN LAT. 49A INFORMATION ONLY

HORIZ. SCALE:1"=20'
VERT. SCALE: 1"=4'

ADD CATCH BASIN

STORM DRAIN CONSTRUCTION NOTES:

(12A) REPLACE ALL EXIST. VCP SEWER LINE SEWER LINE CROSSING MAIN LINE TRENCH TO DUCTILE IRON PIPE (D.I.P.) WITH EPOXY LINING

(13A) CONSTRUCT MODIFIED JUNCTION STRUCTURE NO.4 CASE 1 PER CITY OF R.C. DRAWING NO. 333.

(14) CONSTRUCT P.C.C. COLLAR PER CITY OF RANCHO STANDARD DRAWING NO. 329

(15) CONSTRUCT BLANKET PROTECTION FOR PIPES PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 340.

(16) PROTECT IN PLACE.

(37) INSTALL 12" ø DIA. SCH. 80 PVC DRAIN PIPE (SEE SHT. 11 AND SHT. 19 FOR TIE-IN LOCATION AND DETAILS)

NOTES REGARDING STATIONING:

ALL STATIONING SHOWN FOR STORM DRAIN MAINLINES, CATCH BASINS MANHOLES AND LATERALS ALONG THE CENTERLINE OF MAINLINE CONDUIT.

NOTES REGARDING UTILITIES:

1) THE CITY OF RANCHO CUCAMONGA DOES NOT ASSUME RESPONSIBILITY FOR THE ACCURACY OF ALL UTILITY LOCATION, IT IS THE CONTRACTOR RESPONSIBILITY TO PROTECT ALL EXISTING UTILITIES.

2) AS THE FIRST ORDER OF WORK, THE CONTRACTOR SHALL POTHOLE AND LOCATE ALL EXISTING UTILITIES, PRIOR TO EXCAVATION.

Underground Service Alert
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1-800 422-4133
TWO WORKING DAYS BEFORE YOU DIG

NO.	DESCRIPTION OF REVISION	DATE	CITY APPROVED:

LATERALS

HELLMAN AVENUE MASTER PLANNED STORM DRAIN IMPROVEMENTS - PHASE 2
FROM CUCAMONGA CREEK CHANNEL TO NORTH OF 8TH STREET

APPROVED BY: CITY ENGINEER — DATE: 4/26/17 — RCE: 53672

DESIGN: RD1
DRAWN: RD1
CHECKED: RD2

PLAN PREPARED BY:
CITY OF RANCHO CUCAMONGA
10500 CIVIC CENTER DRIVE
RANCHO CUCAMONGA, CA 91730

RECOMMENDED
SHEET 11 OF 32
DRAWING NO. 2277-D

15/41

APPENDIX B

HYDROLOGY CALCULATIONS

PROPOSED CONDITION
25-YEAR

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
       (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
      (c) Copyright 1983-99 Advanced Engineering Software (aes)
          Ver. 8.0  Release Date: 01/01/99  License ID 1435

                        Analysis prepared by:

                          THIENES ENGINEERING
                        16800 VALLEY VIEW AVENUE
                          LA MIRADA CA 90638
                    PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB NO 3523                                                        *
* 9000 HELLMAN AVENUE, RANCHO CUCAMONGA                                  *
* PROPOSED CONDITION - 25 YEAR EVENT                                     *
 ************************************************************************

  FILE NAME: C:\XDRIVE\3523\PR25.DAT
  TIME/DATE OF STUDY: 14:35 01/22/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.1000

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*


**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   310.00
  ELEVATION DATA: UPSTREAM(FEET) =   1092.10  DOWNSTREAM(FEET) =   1089.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.576
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.807
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        2.40      0.75       0.10     56    7.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      8.06
  TOTAL AREA(ACRES) =      2.40   PEAK FLOW RATE(CFS) =      8.06

**************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1085.00  DOWNSTREAM(FEET) =  1082.05
  FLOW LENGTH(FEET) =   590.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.29
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      8.06
  PIPE TRAVEL TIME(MIN.) =   1.86    Tc(MIN.) =   9.43
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =   900.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN) =   9.43
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.338
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.75       0.10     56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =     1.47
  EFFECTIVE AREA(ACRES) =     2.90    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     2.90       PEAK FLOW RATE(CFS) =       8.52

**************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    112.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1082.05  DOWNSTREAM(FEET) =  1080.00
```

```
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.51
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.52
 PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =  10.58
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    112.00 =  1280.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  10.58
 RAINFALL INTENSITY(INCH/HR) =   3.12
 AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.75
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    2.90
 TOTAL STREAM AREA(ACRES) =    2.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.52

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   380.00
 ELEVATION DATA: UPSTREAM(FEET) =   1090.00  DOWNSTREAM(FEET) =   1084.30

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.578
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.807
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  B        2.70      0.75       0.10     56    7.58
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      9.07
 TOTAL AREA(ACRES) =      2.70   PEAK FLOW RATE(CFS) =      9.07

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1080.30  DOWNSTREAM(FEET) =  1080.00
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.61
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.07
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   7.59
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =   390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   7.59
 RAINFALL INTENSITY(INCH/HR) =   3.80
 AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.75
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    2.70
 TOTAL STREAM AREA(ACRES) =    2.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.07

 ** CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)     NODE
     1       8.52  10.58     3.116   0.75( 0.07) 0.10      2.9      100.00
     2       9.07   7.59     3.802   0.75( 0.07) 0.10      2.7      110.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)     NODE
     1      15.92  10.58     3.116   0.75( 0.07) 0.10      5.6      100.00
     2      16.56   7.59     3.802   0.75( 0.07) 0.10      4.8      110.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     16.56    Tc(MIN.) =     7.59
 EFFECTIVE AREA(ACRES) =     4.78   AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =      5.60
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    112.00 =  1280.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1080.00  DOWNSTREAM(FEET) =  1079.10
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.13
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     16.56
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   8.08
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    122.00 =  1460.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   8.08
 RAINFALL INTENSITY(INCH/HR) =   3.66
 AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.75
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    4.78
 TOTAL STREAM AREA(ACRES) =    5.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.56

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   145.00
 ELEVATION DATA: UPSTREAM(FEET) =   1085.90  DOWNSTREAM(FEET) =   1084.30

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.481
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.623
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  B        1.30      0.75        0.10    56    5.48
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      5.32
 TOTAL AREA(ACRES) =      1.30   PEAK FLOW RATE(CFS) =      5.32

****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1080.15  DOWNSTREAM(FEET) =  1079.10
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.00
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.32
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   5.49
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =   155.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   5.49
 RAINFALL INTENSITY(INCH/HR) =   4.62
 AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.75
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    1.30
 TOTAL STREAM AREA(ACRES) =    1.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.32

 ** CONFLUENCE DATA **
  STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER    (CFS) (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1     15.92  11.07     3.032  0.75( 0.07) 0.10      5.6      100.00
     1     16.56   8.08     3.662  0.75( 0.07) 0.10      4.8      110.00
     2      5.32   5.49     4.618  0.75( 0.07) 0.10      1.3      120.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER    (CFS) (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1     20.76   8.08     3.662  0.75( 0.07) 0.10      6.1      110.00
```

```
    2     19.38  11.07    3.032  0.75( 0.07) 0.10      6.9      100.00
    3     19.57   5.49    4.618  0.75( 0.07) 0.10      4.5      120.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     20.76    Tc(MIN.) =     8.08
 EFFECTIVE AREA(ACRES) =     6.08   AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =      6.90
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    122.00 =  1460.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1079.10  DOWNSTREAM(FEET) =  1078.20
 FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.66
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     20.76
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   8.52
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    132.00 =  1635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   8.52
 RAINFALL INTENSITY(INCH/HR) =   3.55
 AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.75
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    6.08
 TOTAL STREAM AREA(ACRES) =    6.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.76

****************************************************************************
 FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   175.00
 ELEVATION DATA: UPSTREAM(FEET) =   1085.30  DOWNSTREAM(FEET) =   1082.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.486
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.621
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        1.05      0.75        0.10    56    5.49
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      4.30
 TOTAL AREA(ACRES) =      1.05   PEAK FLOW RATE(CFS) =      4.30

****************************************************************************
 FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1078.85  DOWNSTREAM(FEET) =  1078.20
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.87
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.30
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   5.50
 LONGEST FLOWPATH FROM NODE    130.00 TO NODE    132.00 =   185.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   5.50
 RAINFALL INTENSITY(INCH/HR) =   4.61
 AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.75
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    1.05
 TOTAL STREAM AREA(ACRES) =    1.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.30

 ** CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)         (ACRES)     NODE
     1     20.76   8.52     3.548   0.75( 0.07) 0.10      6.1      110.00
```

```
     1     19.38  11.52     2.962  0.75( 0.07) 0.10      6.9      100.00
     1     19.57   5.93     4.408  0.75( 0.07) 0.10      4.5      120.00
     2      4.30   5.50     4.614  0.75( 0.07) 0.10      1.0      130.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM      Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
   NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)        (ACRES)    NODE
      1     23.67   5.93     4.408  0.75( 0.07) 0.10      5.6      120.00
      2     24.05   8.52     3.548  0.75( 0.07) 0.10      7.1      110.00
      3     22.11  11.52     2.962  0.75( 0.07) 0.10      8.0      100.00
      4     23.30   5.50     4.614  0.75( 0.07) 0.10      5.3      130.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     24.05    Tc(MIN.) =     8.52
  EFFECTIVE AREA(ACRES) =     7.13   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =      7.95
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    132.00 =  1635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1078.20  DOWNSTREAM(FEET) =  1077.90
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.25
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     24.05
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   8.64
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    133.00 =  1685.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      7.95  TC(MIN.) =      8.64
  EFFECTIVE AREA(ACRES) =       7.13  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.10
  PEAK FLOW RATE(CFS)    =     24.05

  ** PEAK FLOW RATE TABLE **
   STREAM      Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
   NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)        (ACRES)    NODE
      1     23.30   5.62     4.557  0.75( 0.07) 0.10      5.3      130.00
      2     23.67   6.05     4.358  0.75( 0.07) 0.10      5.6      120.00
      3     24.05   8.64     3.520  0.75( 0.07) 0.10      7.1      110.00
      4     22.11  11.63     2.944  0.75( 0.07) 0.10      8.0      100.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

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******************************************************************************
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           Ver. 23.0  Release Date: 07/01/2016  License ID 1435

                        Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB NO 3523                                                        *
* SHEET FLOW TO HELLMAN AVENUE                                           *
* PROPOSED CONDITION - 25 YEAR EVENT                                     *
 ************************************************************************

  FILE NAME: W:\3523\PR200-25.DAT
  TIME/DATE OF STUDY: 16:14 01/22/2018
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.1000

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-   CROWN TO    STREET-CROSSFALL:    CURB  GUTTER-GEOMETRIES:   MANNING
     WIDTH   CROSSFALL   IN-  / OUT-/PARK-   HEIGHT  WIDTH  LIP    HIKE   FACTOR
NO.   (FT)      (FT)     SIDE / SIDE/ WAY     (FT)    (FT)  (FT)   (FT)     (n)
===  =====  ==========  ==================  ======  ===== ====== ====== =======
  1   30.0      20.0    0.018/0.018/0.020    0.67     2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE     200.00 TO NODE     201.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    20.00
  ELEVATION DATA: UPSTREAM(FEET) =   1087.20  DOWNSTREAM(FEET) =   1086.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.885
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                     B        0.10      0.42      1.000    78    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   PEAK FLOW RATE(CFS) =      0.40
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.1  TC(MIN.) =      5.00
  EFFECTIVE AREA(ACRES) =      0.10  AREA-AVERAGED Fm(INCH/HR)=  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)    =       0.40
==============================================================================
==============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

PROPOSED CONDITION
100-YEAR

```
**************************************************************************
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                        Analysis prepared by:

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                          LA MIRADA CA 90638
                    PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB NO 3523                                                        *
* 9000 HELLMAN AVENUE, RANCHO CUCAMONGA                                  *
* PROPOSED CONDITION - 100 YEAR EVENT                                    *
 **************************************************************************

  FILE NAME: C:\XDRIVE\3523\PR100.DAT
  TIME/DATE OF STUDY: 14:33 01/22/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.3600

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*


**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   310.00
  ELEVATION DATA: UPSTREAM(FEET) =   1092.10  DOWNSTREAM(FEET) =   1089.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.576
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.707
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  B        2.40      0.45       0.10     76    7.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.45
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =     10.07
  TOTAL AREA(ACRES) =      2.40   PEAK FLOW RATE(CFS) =     10.07

**************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1085.00  DOWNSTREAM(FEET) =  1082.05
  FLOW LENGTH(FEET) =   590.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.52
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     10.07
  PIPE TRAVEL TIME(MIN.) =   1.78    Tc(MIN.) =   9.36
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =   900.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN) =   9.36
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.147
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        0.50      0.45       0.10     76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.45
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =     1.85
  EFFECTIVE AREA(ACRES) =     2.90   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.45  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     2.90        PEAK FLOW RATE(CFS) =      10.71

**************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    112.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1082.05  DOWNSTREAM(FEET) =  1080.00
```

```
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.76
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.71
 PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =  10.46
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    112.00 =  1280.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  10.46
 RAINFALL INTENSITY(INCH/HR) =   3.88
 AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.45
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    2.90
 TOTAL STREAM AREA(ACRES) =    2.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.71

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   380.00
 ELEVATION DATA: UPSTREAM(FEET) =   1090.00  DOWNSTREAM(FEET) =   1084.30

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.578
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.706
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  B        2.70      0.45       0.10     76    7.58
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.45
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =     11.33
 TOTAL AREA(ACRES) =      2.70   PEAK FLOW RATE(CFS) =     11.33

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1080.30  DOWNSTREAM(FEET) =  1080.00
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.96
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.33
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   7.59
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =   390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   7.59
 RAINFALL INTENSITY(INCH/HR) =   4.70
 AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.45
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    2.70
 TOTAL STREAM AREA(ACRES) =    2.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.33

 ** CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1      10.71  10.46     3.880   0.45( 0.05) 0.10      2.9      100.00
     2      11.33   7.59     4.701   0.45( 0.05) 0.10      2.7      110.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1      20.04  10.46     3.880   0.45( 0.05) 0.10      5.6      100.00
     2      20.77   7.59     4.701   0.45( 0.05) 0.10      4.8      110.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     20.77    Tc(MIN.) =     7.59
 EFFECTIVE AREA(ACRES) =     4.81   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.45  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =      5.60
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    112.00 =  1280.00 FEET.
```

```
 FLOW PROCESS FROM NODE    112.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1080.00  DOWNSTREAM(FEET) =  1079.10
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.58
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     20.77
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   8.05
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    122.00 =  1460.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   8.05
 RAINFALL INTENSITY(INCH/HR) =   4.54
 AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.45
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    4.81
 TOTAL STREAM AREA(ACRES) =    5.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.77

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   145.00
 ELEVATION DATA: UPSTREAM(FEET) =   1085.90  DOWNSTREAM(FEET) =   1084.30

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.481
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.716
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        1.30      0.45        0.10    76    5.48
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.45
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      6.64
 TOTAL AREA(ACRES) =      1.30   PEAK FLOW RATE(CFS) =      6.64

****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1080.15  DOWNSTREAM(FEET) =  1079.10
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.84
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.64
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   5.49
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =   155.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   5.49
 RAINFALL INTENSITY(INCH/HR) =   5.71
 AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.45
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    1.30
 TOTAL STREAM AREA(ACRES) =    1.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.64

 ** CONFLUENCE DATA **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1     20.04  10.91     3.781   0.45( 0.05) 0.10      5.6      100.00
     1     20.77   8.05     4.539   0.45( 0.05) 0.10      4.8      110.00
     2      6.64   5.49     5.710   0.45( 0.05) 0.10      1.3      120.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1     26.03   8.05     4.539   0.45( 0.05) 0.10      6.1      110.00
     2     24.41  10.91     3.781   0.45( 0.05) 0.10      6.9      100.00
```

```
    3     24.49   5.49    5.710  0.45( 0.05) 0.10     4.6      120.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     26.03    Tc(MIN.) =     8.05
 EFFECTIVE AREA(ACRES) =     6.11   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.45  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =      6.90
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    122.00 =  1460.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1079.10  DOWNSTREAM(FEET) =  1078.20
 FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.09
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     26.03
 PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   8.46
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    132.00 =  1635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   8.46
 RAINFALL INTENSITY(INCH/HR) =   4.41
 AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.45
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    6.11
 TOTAL STREAM AREA(ACRES) =    6.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.03

****************************************************************************
 FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   175.00
 ELEVATION DATA: UPSTREAM(FEET) =   1085.30  DOWNSTREAM(FEET) =   1082.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.486
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.713
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        1.05      0.45       0.10    76    5.49
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.45
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      5.36
 TOTAL AREA(ACRES) =      1.05   PEAK FLOW RATE(CFS) =      5.36

****************************************************************************
 FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1078.85  DOWNSTREAM(FEET) =  1078.20
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.54
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.36
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   5.50
 LONGEST FLOWPATH FROM NODE    130.00 TO NODE    132.00 =   185.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   5.50
 RAINFALL INTENSITY(INCH/HR) =   5.70
 AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.45
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    1.05
 TOTAL STREAM AREA(ACRES) =    1.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.36

 ** CONFLUENCE DATA **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1     26.03   8.46     4.405   0.45( 0.05) 0.10      6.1      110.00
     1     24.41  11.33     3.697   0.45( 0.05) 0.10      6.9      100.00
     1     24.49   5.91     5.465   0.45( 0.05) 0.10      4.6      120.00
```

```
    2      5.36   5.50    5.705  0.45( 0.05) 0.10      1.0      130.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM     Q      Tc   Intensity   Fp(Fm)      Ap    Ae      HEADWATER
   NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
      1     29.62   5.91    5.465  0.45( 0.05) 0.10      5.6      120.00
      2     30.16   8.46    4.405  0.45( 0.05) 0.10      7.2      110.00
      3     27.87  11.33    3.697  0.45( 0.05) 0.10      8.0      100.00
      4     29.17   5.50    5.705  0.45( 0.05) 0.10      5.3      130.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     30.16    Tc(MIN.) =     8.46
  EFFECTIVE AREA(ACRES) =     7.16   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.45  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =      7.95
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    132.00 =  1635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1078.20  DOWNSTREAM(FEET) =  1077.90
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.73
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     30.16
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   8.57
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    133.00 =  1685.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      7.95  TC(MIN.) =      8.57
  EFFECTIVE AREA(ACRES) =       7.16  AREA-AVERAGED Fm(INCH/HR)=  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.45  AREA-AVERAGED Ap =  0.10
  PEAK FLOW RATE(CFS)    =     30.16

  ** PEAK FLOW RATE TABLE **
   STREAM     Q      Tc   Intensity   Fp(Fm)      Ap    Ae      HEADWATER
   NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
      1     29.17   5.61    5.638  0.45( 0.05) 0.10      5.3      130.00
      2     29.62   6.02    5.406  0.45( 0.05) 0.10      5.6      120.00
      3     30.16   8.57    4.372  0.45( 0.05) 0.10      7.2      110.00
      4     27.87  11.44    3.676  0.45( 0.05) 0.10      8.0      100.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
       (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
      (c) Copyright 1983-2016 Advanced Engineering Software (aes)
          Ver. 23.0  Release Date: 07/01/2016  License ID 1435

                        Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB NO 3523                                                        *
* SHEET FLOW TO HELLMAN AVENUE                                           *
* PROPOSED CONDITION - 100 YEAR EVENT                                    *
 **************************************************************************

  FILE NAME: W:\3523\PR200.DAT
  TIME/DATE OF STUDY: 16:14 01/22/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.3600

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  =====  ====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

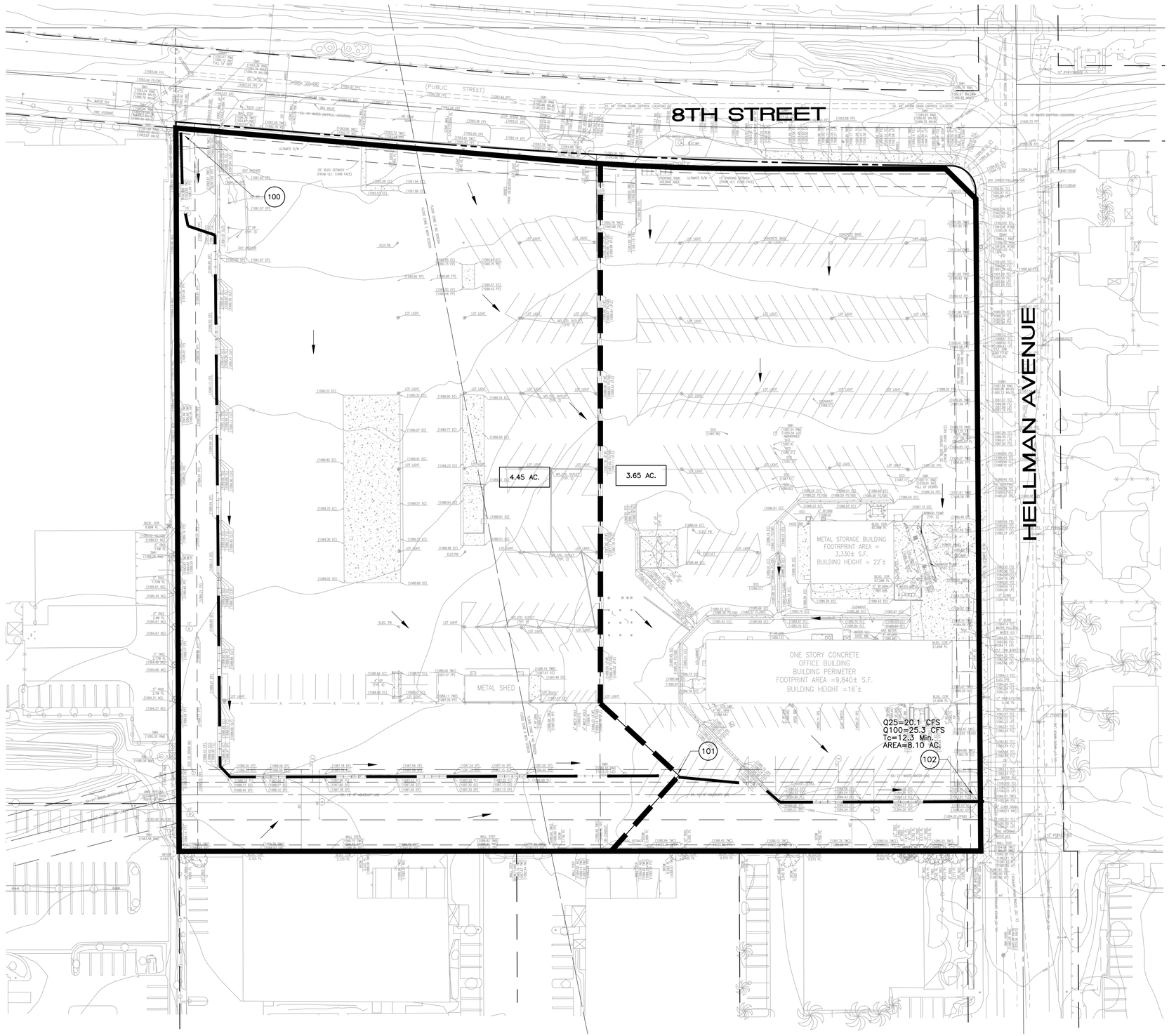
**************************************************************************
  FLOW PROCESS FROM NODE     200.00 TO NODE     201.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    20.00
  ELEVATION DATA: UPSTREAM(FEET) =   1087.20  DOWNSTREAM(FEET) =   1086.60

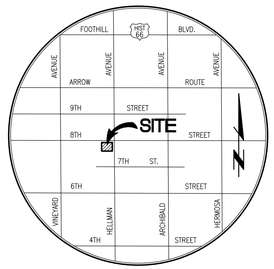
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.040
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                     B        0.15      0.18      1.000    93    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.79
  TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.79
==========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.2  TC(MIN.) =      5.00
  EFFECTIVE AREA(ACRES) =      0.15  AREA-AVERAGED Fm(INCH/HR)=  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)    =       0.79
==========================================================================
==========================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

APPENDIX C

HYDROLOGY MAP





VICINITY MAP
N.T.S.

LEGEND	
	PROJECT BOUNDARY
	SUBAREA BOUNDARY
	FLOW PATH
1.00 AC.	SUBAREA AREA
100	SUBAREA NUMBER
	FLOW DIRECTION

0 20 40 80 120

SCALE:1"=40'

Last Update: 4/3/17
O:\3500-3599\3523\3523HYD-EX.dwg

CITY OF RANCHO CUCAMONGA

EXISTING CONDITION HYDROLOGY MAP

OMP RANCHO CUCAMONGA
9000 HELLMAN AVENUE

3523/1 OF 1 SHEET

PREPARED FOR:

OVERTON MOORE PROPERTIES
19300 HAMILTON AVENUE, SUITE 200
GARDENA, CA 90248
PHONE:(310) 323-9100
FAX: (310) 608-7997

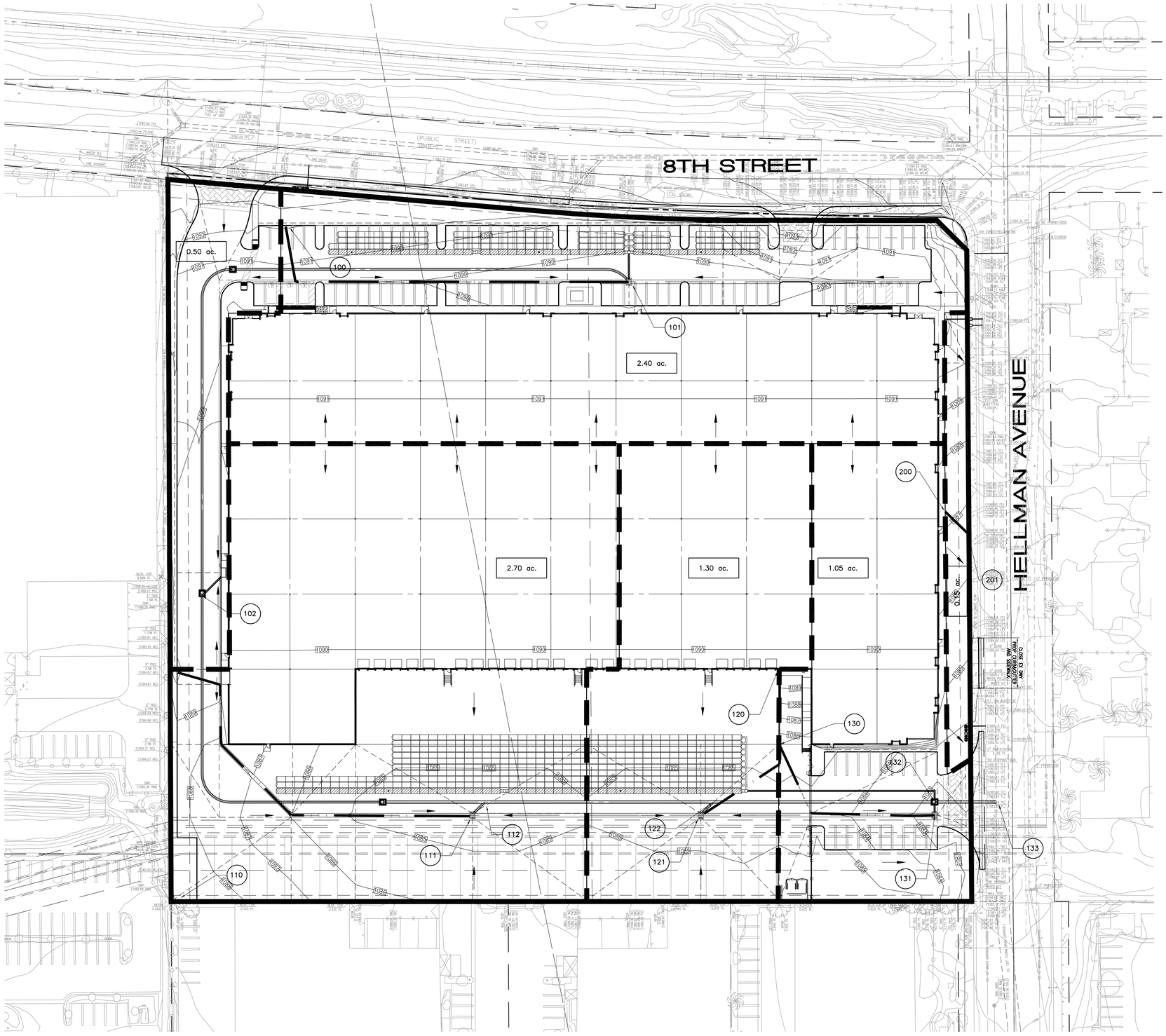
Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH:(714)521-4811 FAX(714)521-4173

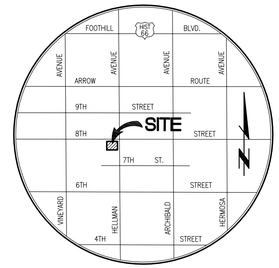
Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

Approved by _____ Date _____

Public Works Director _____ R.C.E. _____

Sheet 1 of 1 Sheets





VICINITY MAP
N.T.S.

LEGEND

- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- 1.00 AC. — SUBAREA AREA
- 100 — SUBAREA NUMBER
- FLOW DIRECTION

0 20 40 80 120

SCALE: 1"=40'

Last Update: 1/22/18
O:\3500-3599\3523\3523HYD.dwg

CITY OF RANCHO CUCAMONGA

PROPOSED CONDITION HYDROLOGY MAP

OMP RANCHO CUCAMONGA
9000 HELLMAN AVENUE

3523/1 OF 1 SHEET

PREPARED FOR:

OVERTON MOORE PROPERTIES
19300 HAMILTON AVENUE, SUITE 200
GARDENA, CA 90248
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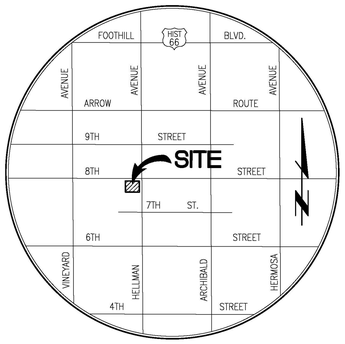
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LA MIRADA, CALIFORNIA 90638
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Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

Approved by _____ Date _____

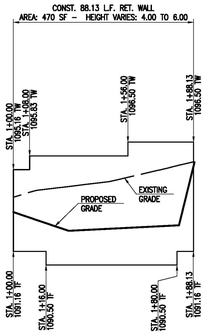
Public Works Director _____ R.C.E. _____

Sheet 1 of 1 Sheets



VICINITY MAP

N.T.S.



WALL 'A'

EARTHWORK BALANCE CALCULATIONS		3/7/2017
PROJECT:	HELLMAN AVE RANCHO CUCAMONGA	
JOB#	3523	
K.	SITE AREA:	373,340 SF
L.	SUBSIDENCE FACTOR:	0.125
M.	SHRINKAGE FACTOR:	10.0 %
N.	SITE STRIPPING FACTOR:	0.04
O.	OVEREXCAVATION:	34,154 CY
A.	CALCULATED CUT:	10,611 CY
B.	FOOTING AND UTILITY SPOILS	2,900 CY
B1.	UNDERGROUND STORAGE	3,722
C.	TOTAL CUT: (A+B)	17,233 CY
D.	CALCULATED FILL:	9,813 CY
E.	LIGHT PAVING FILL:	- CY
F.	SUBSIDENCE: (LxK)/27=	1,728 CY
G.	SHRINKAGE: (M/100)C=	1,723 CY
H.	SITE STRIPPING	553
I.	OVEREXCAVATION SHRINKAGE	3,415 CY
J.	TOTAL FILL: (D+E+F+G+H)=	17,233 CY
K.	TOTAL (IMPORT) OR EXPORT:	(0) CY
	SITE ADJUSTMENT	(0.00)

0 15 30 60 90

SCALE:1"=30'

Last Update:1/22/18
O:\3500-3599\3523\3523CGP01.dwg

PREPARED FOR:

OVERTON MOORE PROPERTIES
19300 HAMILTON AVENUE
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CITY OF RANCHO CUCAMONGA
PUBLIC WORKS DEPARTMENT

CONCEPTUAL GRADING PLAN

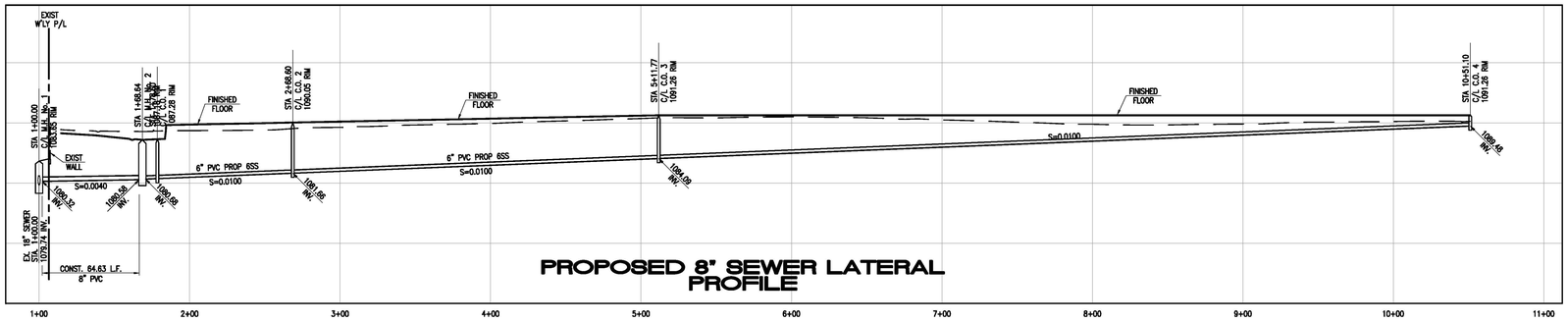
9000 HELLMAN AVENUE

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Checked by _____ Date _____

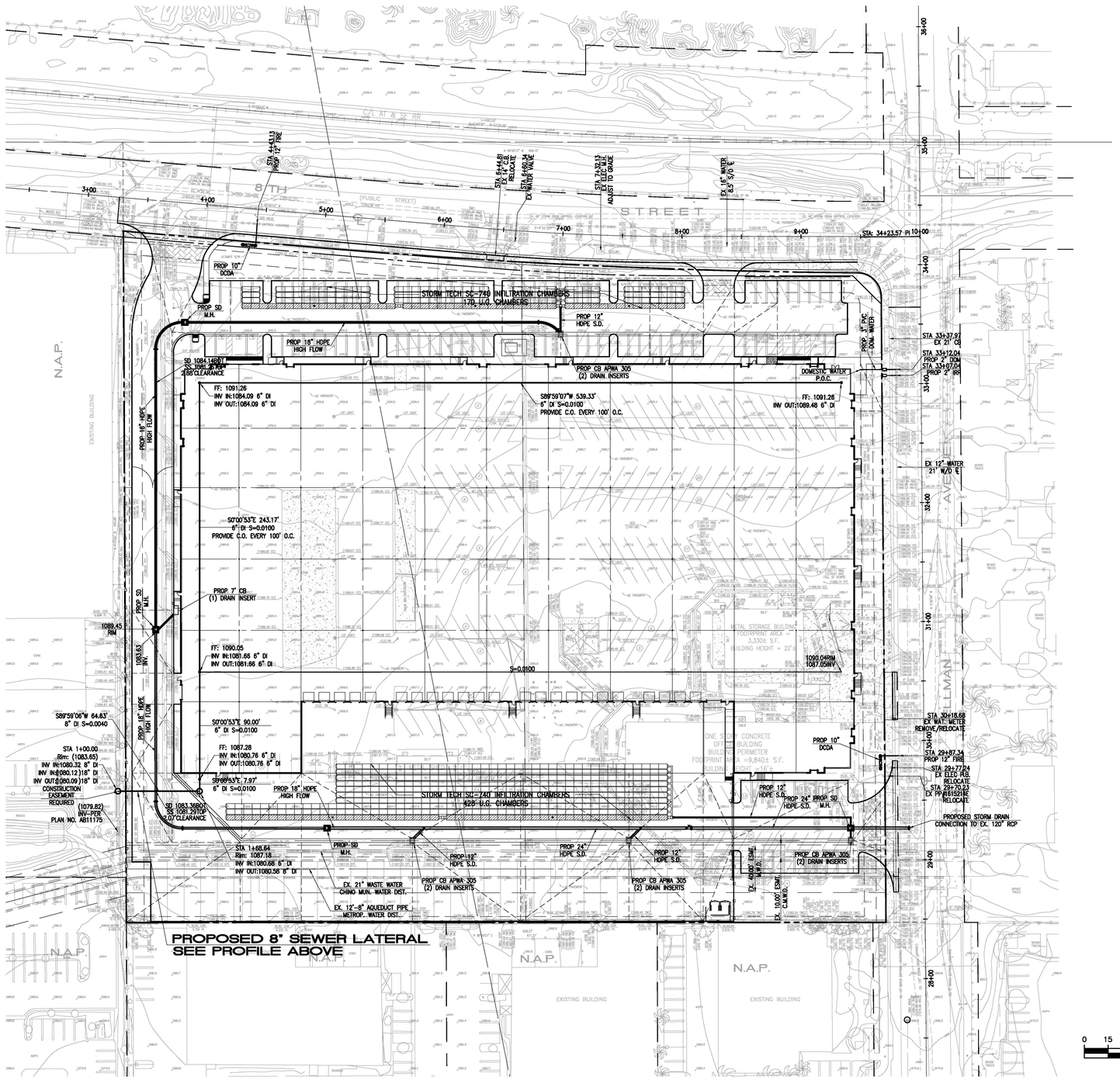
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Public Works Director _____ R.C.E. XXXXX

Sheet 1 of 4 Sheets

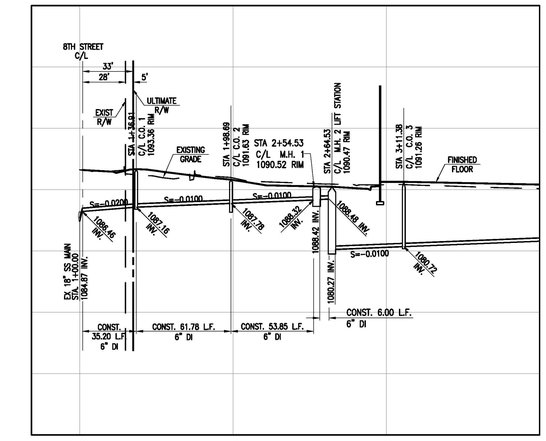
3523/1 OF 4 SHEET



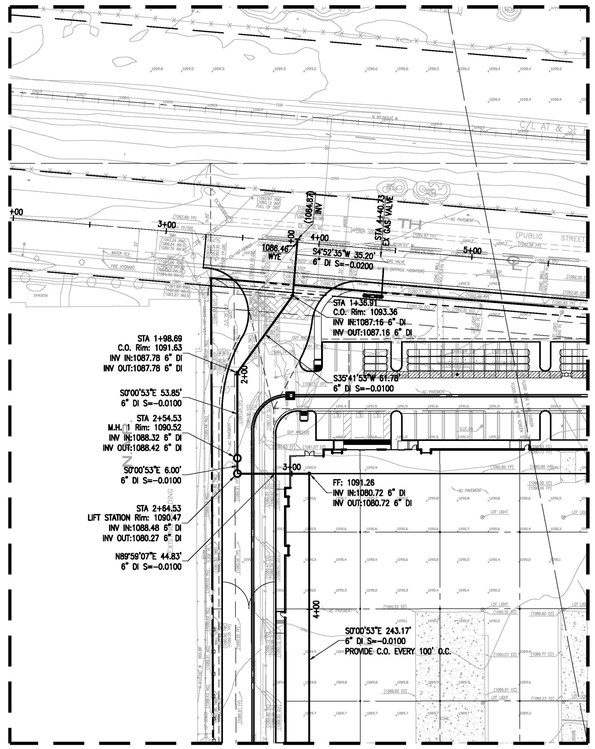
PROPOSED 8" SEWER LATERAL PROFILE



PROPOSED 8" SEWER LATERAL SEE PROFILE ABOVE



6" SEWER SERVICE LIFT STATION PROFILE - OPTION B



6" SEWER SERVICE LIFT STATION PLAN VIEW - OPTION B

SCALE: 1"=40'

0 15 30 60 90

SCALE:1"=30'

Last Update: 1/22/18
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CITY OF RANCHO CUCAMONGA
PUBLIC WORKS DEPARTMENT

CONCEPTUAL UTILITY PLAN

9000 HELLMAN AVENUE

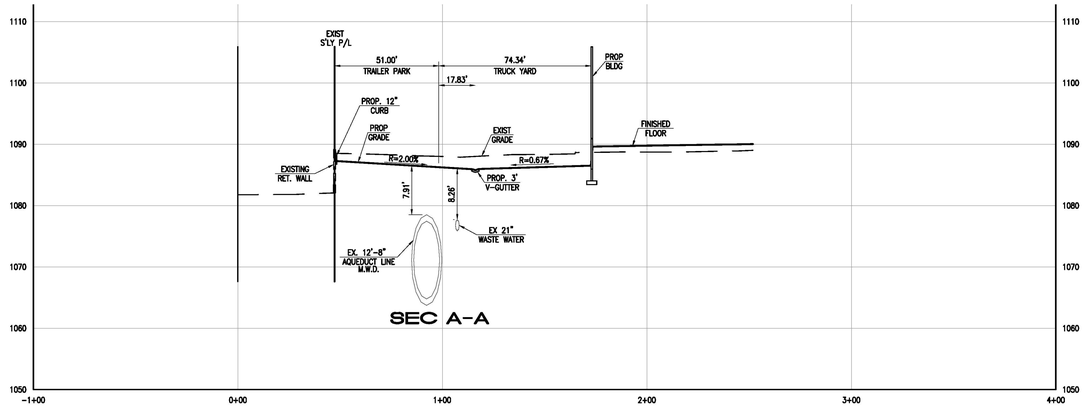
PREPARED FOR:
OVERTON MOORE PROPERTIES
19300 HAMILTON AVENUE
GARDENA CA, 90248
PHONE: (310) 323-9100
FAX: (310) 608-7997

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

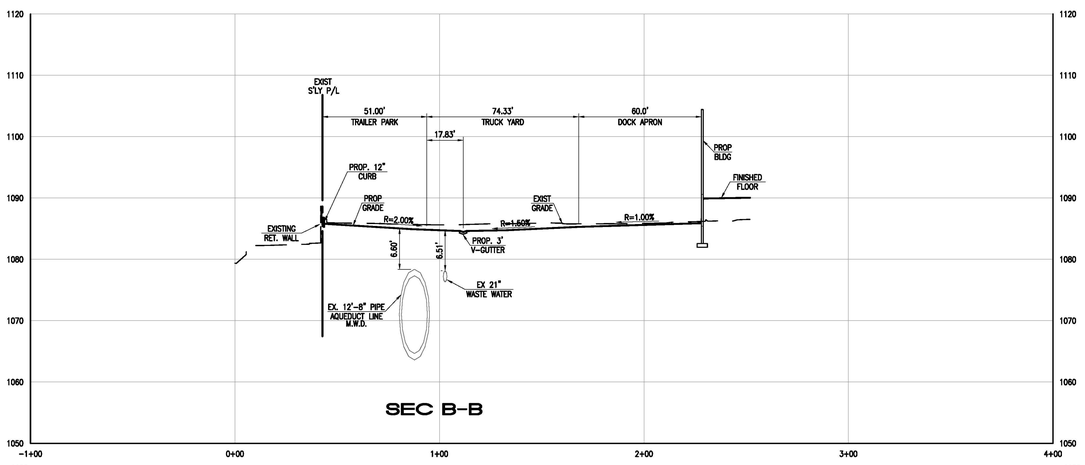
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Approved by _____ Date _____
Public Works Director _____ R.C.E. XXXXX

Sheet 2 of 4 Sheets

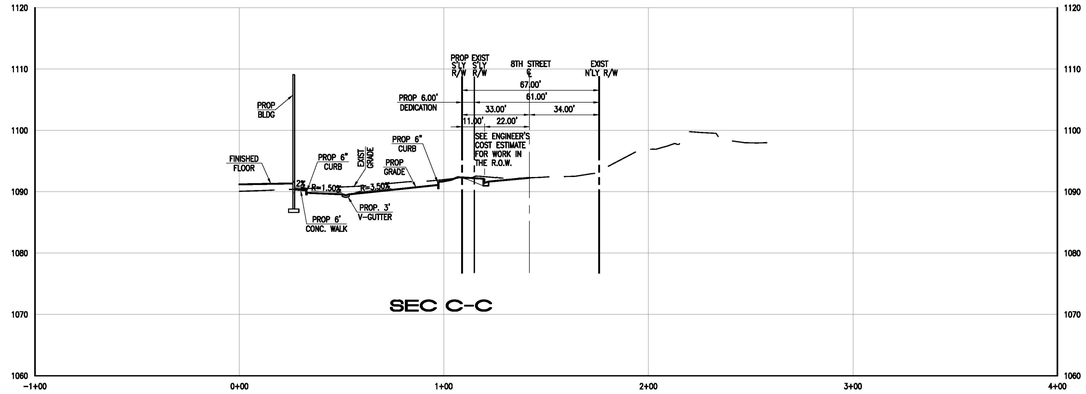
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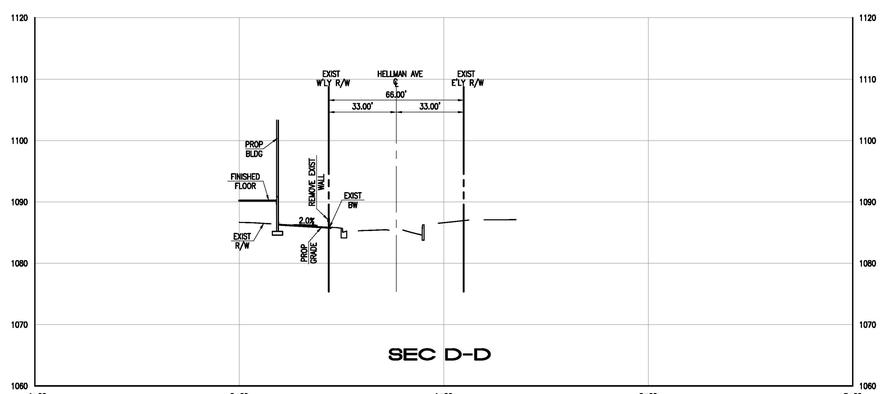
SEC A-A



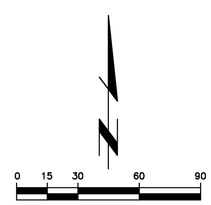
SEC B-B



SEC C-C



SEC D-D



SCALE:1"=30'

Last Update: 1/22/18
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PREPARED FOR:

OVERTON MOORE PROPERTIES
19300 HAMILTON AVENUE
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Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

Approved by _____ Date _____

Public Works Director R.C.E. XXXXX

Sheet 3 of 4 Sheets

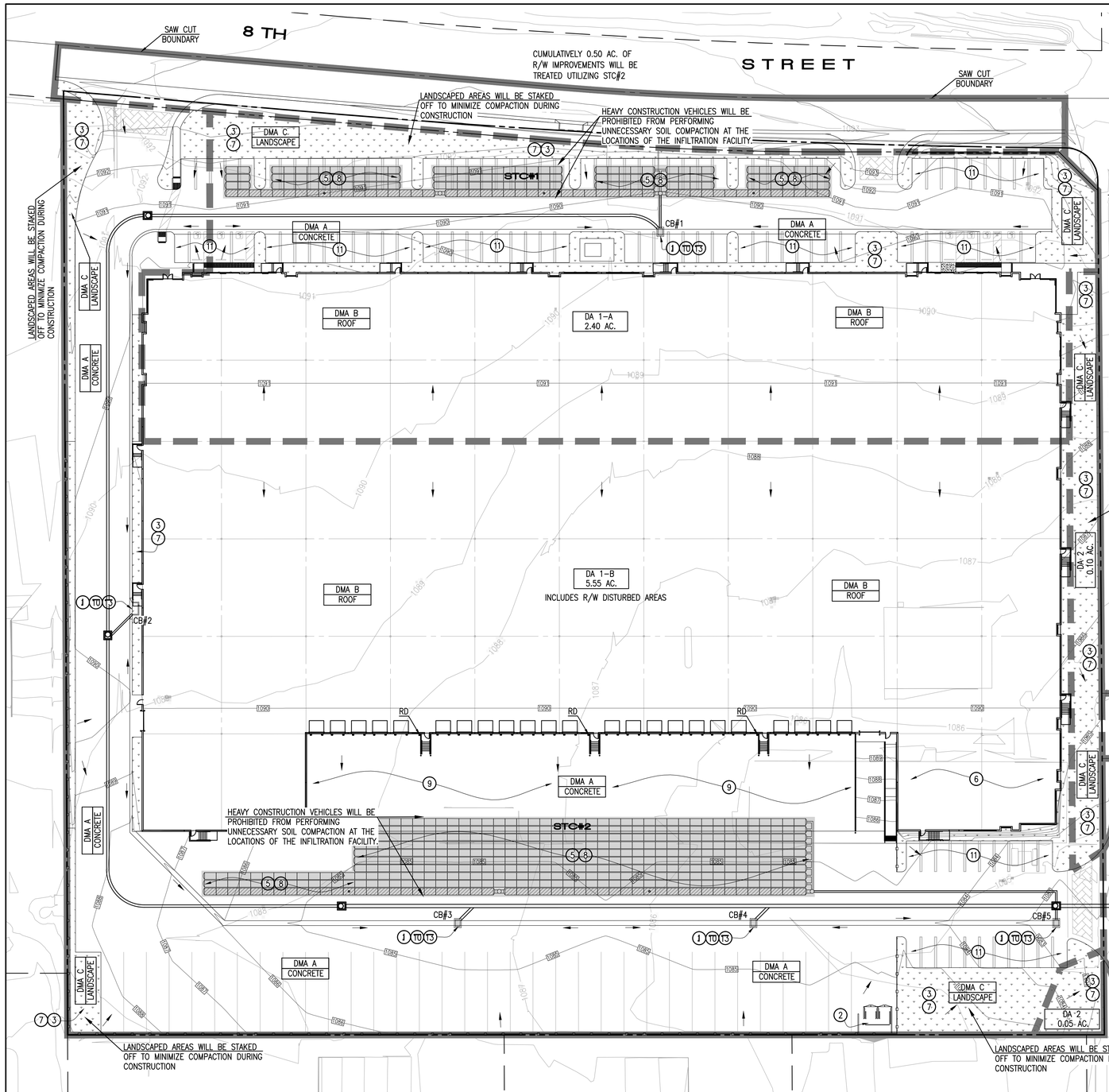
CITY OF RANCHO CUCAMONGA

PUBLIC WORKS DEPARTMENT

CONCEPTUAL CROSS SECTIONS

9000 HELLMAN AVENUE

3523/3 OF 4 SHEET



BMP COORDINATES

BMP	LATITUDE	LONGITUDE
STC#1	34.091702	−117.603616
STC#2	34.090501	−117.603466
CB#1	34.091612	−117.603301
CB#2	34.090941	−117.604405
CB#3	34.090427	−117.603698
CB#4	34.090438	−117.603132
CB#5	34.090429	−117.602497

StormTech SC-740 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots thus maximizing land usage for commercial and municipal applications.

StormTech Detention • Retention • Recharge
Subsurface Stormwater Management™



StormTech SC-740 Chamber (not to scale)

Nominal Chamber Specifications

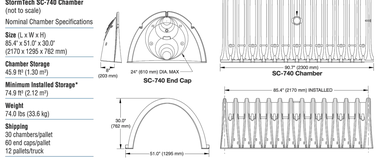
Size (L x W x H) 85.4" x 51.0" x 30.0" (2170 x 1295 x 762 mm)

Chamber Storage 45.9 ft³ (1.30 m³)

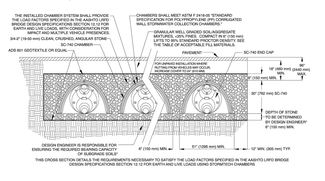
Minimum Installed Storage* 74.9 ft³ (2.12 m³)

Weight 74.0 lbs (33.6 kg)

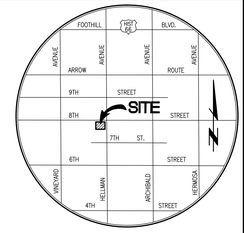
Shipping 30 chambers/pallet 60 end caps/pallet 12 pallets/truck



Typical Cross Section Detail (not to scale)



MADE IN THE USA



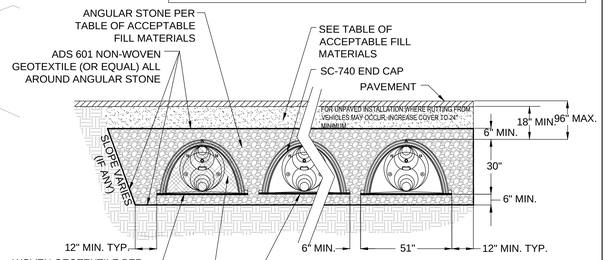
VICINITY MAP
N.T.S.

LEGEND

1. S1–STORM DRAIN SIGNS "NO DUMPING – DRAINS TO RIVER"
2. S3–TRASH ENCLOSURE
3. S4–EFFICIENT IRRIGATION
4. NOT USED
5. SC–740 STORMTECH CHAMBERS
6. N1–EDUCATIONAL MATERIALS
7. N3–LANDSCAPE MANAGEMENT BMPS
8. N4–BMP MAINTENANCE
9. N13–HOUSEKEEPING OF LOADING DOCKS
10. N14–CATCH BASIN INSPECTION
11. N15–SWEEPING OF PARKING LOTS
12. NOT USED
13. DRAIN INSERT(S)
14. NOT USED

ONGOING OVER THE ENTIRE SITE

RD ROOF DRAIN
BOUNDARY
DRAINAGE AREAS
FLOW DIRECTION
LANDSCAPE LOCATION
INFILTRATION FACILITY LOCATION



THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12 FOR EARTH AND LIVE LOADS, WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.

BIO CLEAN SCREENING FILTER WITH TROUGH SYSTEM FOR USE IN CURB INLETS

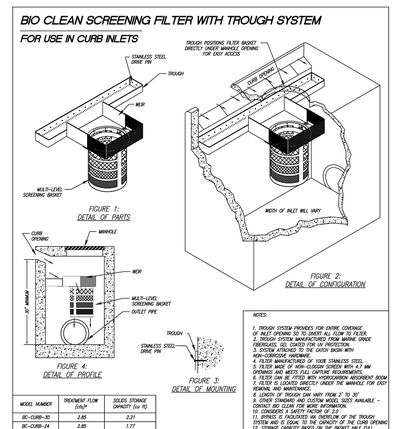


FIGURE 1: *DETAIL OF PARTS*
FIGURE 2: *DETAIL OF CONFIGURATION*
FIGURE 4: *DETAIL OF PROFILE*
FIGURE 3: *DETAIL OF MOUNTING*

NOTES:
1. TROUGH SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING SO TO ENSURE ALL FLOW TO FILTER.
2. TROUGH SYSTEM MANUFACTURED FROM MARINE GRADE FIBERGLASS, GEL COATED FOR UV PROTECTION.
3. SYSTEM ATTACHED TO THE CATCH BASIN WITH STAINLESS STEEL DRIVE PINS.
4. FILTER MANUFACTURED OF 100# STAINLESS STEEL.
5. FILTER MADE OF NON-CLOGGIN SCREEN WITH 4.7 MM OPENINGS AND MEETS FULL CAPTURE REQUIREMENTS.
6. FILTER CAN BE FITTED WITH HYDROCARBON ABSORBENT BOOM TO TRAP OILS AND FLOATABLES UNDER THE MANHOLE FOR EASY REMOVAL AND MAINTENANCE.
7. LENGTH OF TROUGH CAN VARY FROM 2' TO 30'
8. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE – CONTACT BIO CLEAN FOR MORE INFORMATION.
9. CURB OPENING MUST BE 4" MINIMUM.
11. BYPASS IS FACILITATED ON OVERFLOW OF THE TROUGH SYSTEM AND IS EQUAL TO THE CAPACITY OF THE CURB OPENING.
12. STORAGE CAPACITY BASED ON 1% PERFECTION.
13. ADDITIONAL TREATMENT AND STORAGE CAPACITY CAN BE ACHIEVED BY UTILIZING MULTIPLE FILTER BASKETS.

MODEL NUMBER	TREATMENT FLOW (cfs)*	SOLIDS STORAGE CAPACITY (cu ft)
BC-CURB-30	2.85	2.21
BC-CURB-24	2.85	1.77
BC-CURB-18	2.85	1.33
BC-CURB-12	2.81	0.88

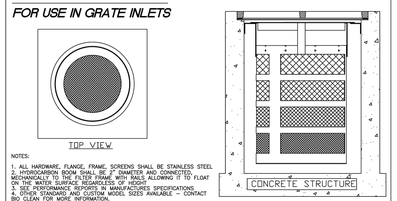
*SEE PAGE 2 FOR EXPLANATION OF FLOW RATES

DRAWING: BIO CLEAN CURB INLET FILTER DETAILS — MULTI-LEVEL SCREENING
TREATMENT FLOW RATE: 2.85 cfs — MODEL #: BC-CURB-4ES
WARRANTY: 5 YEAR MANUFACTURERS — PROJECT:
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 3598 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-631-7640 FAX: 760-420-3176 — REVISIONS: DATE:
DATE: 10/12/2017 — SCALE: NTS — REVISIONS: DATE:
DRAWN BY: M.C.P. — UNITS = INCHES — REVISIONS: DATE:

Bio Clean A Forterra Company

PAGE 1

BIO CLEAN SCREENING FILTER FOR USE IN GRATE INLETS

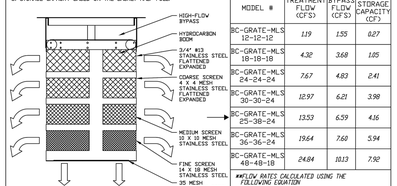


NOTES:
1. ALL HARDWARE, FLANGE, FRAME, SCREENS SHALL BE STAINLESS STEEL
2. HYDROCARBON BOOM SHALL BE 5" DIAMETER AND CONNECTED MECHANICALLY TO THE FILTER FRAME WITH RAILS ALLOWING IT TO FLOAT ON THE WATER SURFACE REGARDLESS OF HEIGHT.
3. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE – CONTACT BIO CLEAN FOR MORE INFORMATION.
4. BASED ON 51% OPEN AREA.
5. CONSIDERS A LOCAL DEPRESSION BOWL OF 2".
6. CONSIDERS A LOCAL DEPRESSION BOWL DEPTH OF 6 INCHES.
7. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.

MODEL #	TREATMENT FLOW (CFS)	BYPASS FLOW (CFS)	SOLIDS STORAGE CAPACITY (CF)
BC-GRATE-MLS 12-12-12	1.19	1.55	0.27
BC-GRATE-MLS 18-18-18	4.32	3.68	1.05
BC-GRATE-MLS 24-24-24	7.67	4.83	2.41
BC-GRATE-MLS 30-30-24	12.97	6.21	3.98
BC-GRATE-MLS 25-38-24	13.53	6.59	4.16
BC-GRATE-MLS 36-36-24	19.64	7.62	5.94
BC-GRATE-MLS 48-48-18	24.84	10.13	7.92

*WATFLOW RATES CALCULATED USING THE FOLLOWING EQUATION

$Q = 2.5 C_d A \sqrt{2gH}$; C_d = COEFFICIENT OF DISCHARGE = .62



DRAWING: BIO CLEAN GRATE INLET FILTER DETAILS — MULTI-LEVEL SCREENING
TYPICAL MODEL DETAIL
WARRANTY: 5 YEAR MANUFACTURERS — PROJECT:
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 3598 VIA EL CENTRO, OCEANSIDE, CA 92058 PHONE: 760-631-7640 FAX: 760-420-3176 — REVISIONS: DATE:
DATE: 10/10/17 — SCALE: 0" = 25 — REVISIONS: DATE:
DRAWN BY: M.C.P. — UNITS = INCHES — REVISIONS: DATE:

Bio Clean A Forterra Company

PAGE 1

PROJECT AREA:	8.171 AC (GROSS)	8.091 AC (NET)
	374,616 SF (DISTRUBED AREA)	374,616 SF (EXISTING IMPERVIOUS)
	35,000 SF (PROPOSED LANDSCAPE)	340,116 SF (PROPOSED IMPERVIOUS)

Form 5-1 BMP Inspection and Maintenance

BMP	Responsible Party(ies)	Inspection/Maintenance Activities Required	Minimum Frequency of Activities
StormTech SC-740 Chambers	Owner	The isolator row shall be inspected for debris and sediment accumulations and maintained by a qualified technician and he/she will properly dispose of all wastes and inspect for standing water. A manhole is installed in order to inspect and maintain the inlet row. All entry into the chamber system must be done per OSHA codes to ensure operator and inspector safety. Inspection ports should be checked 48 hours after storm events to see that the water is draining down, at least once each rainy season, following a major storm event. Records shall be maintained by owner to document inspections.	The isolator row shall be inspected semi-annually (by October 1st and February 1st) and cleaned by water-flush and vacuum when solids accumulate to 3" depth. Maintenance to be conducted through service contract with the vendor or equally qualified contractor.
Drain Inserts	Owner	Visually inspect for defects and illegal dumping. Notify proper authorities if illegal dumping has occurred. Using an industrial vacuum, the collected materials shall be removed from the filter basket and disposed of properly. Inspect biosorb hydrocarbon boom and replace as necessary.	Four times per year or following any rain event that would potentially accumulate a large amount of debris in the system. Replace boom twice per year, at a minimum.
Storm Drain Stenciled Message	Owner	Visually inspect for legibility and replace or repaint as necessary.	Annually

Last Update: 1/24/18
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0 15 30 60 90
SCALE:1"=30'

CITY OF RANCHO CUCAMONGA
PUBLIC WORKS DEPARTMENT

PREPARED FOR:
OVERTON MOORE PROPERTIES
19300 HAMILTON AVENUE
GARDENA CA, 90248
PHONE: (310) 323-9100
FAX: (310) 608-7997

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

PRELIMINARY SITE AND DRAINAGE MAP

9000 HELLMAN AVENUE

Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

Approved by _____ Date _____
Public Works Director _____ R.C.E. _____

Sheet 4 of 4 Sheets

3523/4 OF 4 SHEET

Thienes Engineering, Inc.
CIVIL ENGINEERING LAND SURVEYING

Preliminary Water Quality Management Plan (PWQMP)

For:

9000 Hellman Avenue
Rancho Cucamonga, CA 91730

APN: 0209-151-36

Prepared for:
Overton Moore Properties
19300 Hamilton Avenue, Suite 200
Gardena, CA 90248
Phone: (310) 323-9100
Contact: Michael Johnson

Prepared by:
Thienes Engineering, Inc
14349 Firestone Boulevard
La Mirada, CA 90638
Phone: (714) 521-4811
Contact: Luis Prado (luisp@thieneseng.com)
Job No. 3523

Approval Date: _____
Implementation Date: _____

1st Submittal: January 24, 2018
2nd Submittal: _____
3rd Submittal: _____

Project Owner's Certification

This Water Quality Management Plan (WQMP) has been prepared for ***Overton Moore Properties*** by ***Thienes Engineering, Inc***. The WQMP is intended to comply with the requirements of the ***City of Rancho Cucamonga*** and the NPDES Areawide Stormwater Program requiring the preparation of a WQMP.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the San Bernardino County's Municipal Storm Water Management Program and the intent of the NPDES Permit for San Bernardino County and the incorporated cities of San Bernardino County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors in interest and the city/county shall be notified of the transfer. The new owner will be informed of its responsibility under this WQMP. A copy of the approved WQMP shall be available on the subject site in perpetuity.

"I certify under a penalty of law that the provisions (implementation, operation, maintenance, and fund) of the WQMP have been accepted and that the plan will be transferred to future successors."

Project Data			
Permit/Application Number(s):	DRC-2018-XXXXX	**Grading Permit Number(s):**	PMT2018-XXXXX
Tract/Parcel Map Number(s):	PM #XXXX	**Building Permit Number(s):**	PMT2018-XXXXX
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APN: 0209-151-36

Owner's Signature			
Owner Name: Timur Tecimer			
Title	CEO		
Company	Overton Moore Properties		
Address	19300 Hamilton Avenue, Suite 200, Gardena, CA 90248		
Email	ttecimer@omprop.com		
Telephone #	(310) 323-9100		
Signature		**Date**	

Preparer's Certification

Project Data			
Permit/Application Number(s):	DRC-2018-XXXXX	**Grading Permit Number(s):**	PMT2018-XXXXX
Tract/Parcel Map Number(s):	PM #XXXX	**Building Permit Number(s):**	PMT2018-XXXXX
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APN: 0210-081-19 and -20

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan were prepared under my oversight and meet the requirements of Regional Water Quality Control Board Order No. R8-2010-0036."

Engineer: Reinhard Stenzel		**PE Stamp Below**
Title	Director of Engineering	
Company	Thienes Engineering, Inc	
Address	14349 Firestone Boulevard, La Mirada, CA 90638	
Email	reinhard@thieneseng.com	
Telephone #	(714) 521-4811	
Signature		

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2.4 Water Quality Credits 2-3
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Form 4.3-12 Hydromodification Control BMPs 4-24
Form 5-1 BMP Inspection and Maintenance 5-1

Attachments

Attachment A: Existing Condition Site Photos
Attachment B: BMP Design Calculations & Supporting Documentation
Attachment C: Site and Drainage Plan
Attachment D: Memorandum of Agreement of Storm Water Quality Management Plan
Attachment E: Educational Materials
Attachment F: Soil/Infiltration Report
Attachment G: BMP Maintenance Material
Attachment H: Conditions of Approval (pending)
Attachment I: Class V Injection Well Registration (pending)

Section 1 Discretionary Permit(s)

Form 1-1 Project Information					
Project Name	Overton Moore Properties				
Project Owner Contact Name:	Michael Johnson				
Mailing Address:	19300 Hamilton Avenue, Suite 200 Gardena, CA 90248	**E-mail Address:**	MJohnson@omprop.com	**Telephone:**	(310) 323-9100
Permit/Application Number(s):	DRC2018-XXXXX		**Tract/Parcel Map Number(s):**	n/a	
Additional Information/ Comments:	N/A				
Description of Project:	The project site encompasses approximately 8.60 acres, where 8.10 acres is onsite improvements and 0.50 is offsite improvements. Proposed improvements to the site include one commercial type building of 174,580 square feet. There will be a truck yard along the south side of the building. Vehicular parking lots are proposed along the north side of the building and a drive aisle along the west side of the building. The remainder of this site is reserved for landscaping. Runoff from the majority of the site will drain southeasterly via a proposed private storm drain system. The proposed private storm drain system will connect to the 120" RCP within Hellman Avenue. Runoff from the landscaped areas fronting Hellman Avenue (0.15 acres total) sheet flow directly to Hellman Avenue. As part of the onsite storm drain system, low flow diversions on catch basins and manholes will direct the water quality flows to underground retention systems for infiltration. Lastly, the project site will utilize the maximum extent practicable (MEP) principle in order to treat disturbed Public Right-of-Way (ROW) impervious areas onsite. This area is approximately 0.50 acres and is included along with the onsite design capture volume (DCV).				
Provide summary of Conceptual WQMP conditions (if previously submitted and approved). Attach complete copy.					

Section 2 Project Description

2.1 Project Information

This section of the WQMP should provide the information listed below. The information provided for Conceptual/ Preliminary WQMP should give sufficient detail to identify the major proposed site design and LID BMPs and other anticipated water quality features that impact site planning. Final Project WQMP must specifically identify all BMP incorporated into the final site design and provide other detailed information as described herein.

The purpose of this information is to help determine the applicable development category, pollutants of concern, watershed description, and long term maintenance responsibilities for the project, and any applicable water quality credits. This information will be used in conjunction with the information in Section 3, Site Description, to establish the performance criteria and to select the LID BMP or other BMP for the project or other alternative programs that the project will participate in, which are described in Section 4.

Form 2.1-1 Description of Proposed Project

[1] Development Category (Select all that apply):

☐ Significant re-development involving the addition or replacement of 5,000 ft^2 or more of impervious surface on an already developed site	☒ New development involving the creation of 10,000 ft^2 or more of impervious surface collectively over entire site	☐ Automotive repair shops with standard industrial classification (SIC) codes 5013, 5014, 5541, 7532-7534, 7536-7539	☐ Restaurants (with SIC code 5812) where the land area of development is 5,000 ft^2 or more
☐ Hillside developments of 5,000 ft^2 or more which are located on areas with known erosive soil conditions or where the natural slope is 25 percent or more	☐ Developments of 2,500 ft^2 of impervious surface or more adjacent to (within 200 ft) or discharging directly into environmentally sensitive areas or waterbodies listed on the CWA Section 303(d) list of impaired waters.	☒ Parking lots of 5,000 ft^2 or more exposed to storm water	☐ Retail gasoline outlets that are either 5,000 ft^2 or more, or have a projected average daily traffic of 100 or more vehicles per day

☐ Non-Priority / Non-Category Project

May require source control LID BMPs and other LIP requirements. Please consult with local jurisdiction on specific requirements.

[2] Project Area (ft^2):	374,616 sq-ft 8.60 acres*	**[3] Number of Dwelling Units:**	n/a	**[4] SIC Code:**	4225

[5] Is Project going to be phased? ☐Yes ☒No

If yes, ensure that the WQMP evaluates each phase as a distinct DA, requiring LID BMPs to address runoff at time of completion.

[6] Does Project include roads? ☐Yes ☒No

If yes, ensure that applicable requirements for road projects are addressed (see Appendix A of TGD for WQMP)

*This includes 0.50 acres of public ROW improvements.

2.2 Property Ownership/Management

Describe the ownership/management of all portions of the project and site. State whether any infrastructure will transfer to public agencies (City, County, Caltrans, etc.) after project completion. State if a homeowners or property owners association will be formed and be responsible for the long-term maintenance of project stormwater facilities. Describe any lot-level stormwater features that will be the responsibility of individual property owners.

Form 2.2-1 Property Ownership/Management

Describe property ownership/management responsible for long-term maintenance of WQMP stormwater facilities:

Overton Moore Properties
19300 Hamilton Avenue, Suite 200
Gardena, CA 90248
Phone: (310) 323-9100
Contact: Michael Johnson

No infrastructure will be transferred to a public agency after project completion.
A property owner's association (POA) will not be formed for long-term maintenance of project stormwater facilities.

2.3 Potential Stormwater Pollutants

Determine and describe expected stormwater pollutants of concern based on land uses and site activities (refer to Table 3-3 in the TGD for WQMP).

Form 2.3-1 Pollutants of Concern

Pollutant	Please check: E=Expected, N=Not Expected		Additional Information and Comments
Pathogens (Bacterial / Virus)	**E** ☒	N ☐	Bacterial indicators are routinely detected in pavement runoff.
Phosphorous	**E** ☒	N ☐	
Nitrogen	**E** ☒	N ☐	Expected pollutant if landscaping exists on-site.
Sediment	**E** ☒	N ☐	Expected pollutant if landscaping exists on-site.
Metals	**E** ☒	N ☐	
Oil and Grease	**E** ☒	N ☐	
Trash / Debris	**E** ☒	N ☐	
Pesticides / Herbicides	**E** ☒	N ☐	
Organic Compounds	**E** ☒	N ☐	Including petroleum hydrocarbons.
Other:			

The expected POCs for the project site are ***Pathogens, Nitrogen, and Metals***.

2.4 Water Quality Credits

A water quality credit program is applicable for certain types of development projects if it is not feasible to meet the requirements for on-site LID. Proponents for eligible projects, as described below, can apply for water quality credits that would reduce project obligations for selecting and sizing other treatment BMP or participating in other alternative compliance programs. Refer to Section 6.2 in the TGD for WQMP to determine if water quality credits are applicable for the project.

Form 2.4-1 Water Quality Credits

[1] Project Types that Qualify for Water Quality Credits: *Select all that apply*			
☐ Redevelopment projects that reduce the overall impervious footprint of the project site. [Credit = % impervious reduced]	Higher density development projects ☐ Vertical density [20%] ☐ 7 units/ acre [5%]	☐ Mixed use development, (combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that demonstrate environmental benefits not realized through single use projects) [20%]	☐ Brownfield redevelopment (redevelop real property complicated by presence or potential of hazardous contaminants) [25%]
☐ Redevelopment projects in established historic district, historic preservation area, or similar significant core city center areas [10%]	☐ Transit-oriented developments (mixed use residential or commercial area designed to maximize access to public transportation) [20%]	☐ In-fill projects (conversion of empty lots & other underused spaces < 5 acres, substantially surrounded by urban land uses, into more beneficially used spaces, such as residential or commercial areas) [10%]	☐ Live-Work developments (variety of developments designed to support residential and vocational needs) [20%]
[2] Total Credit %: n/a *(Total all credit percentages up to a maximum allowable credit of 50 percent)*			
Description of Water Quality Credit Eligibility (if applicable)	n/a		

The proposed project will ***not*** utilize any water quality credits.

Section 3 Site and Watershed Description

Describe the project site conditions that will facilitate the selection of BMP through an analysis of the physical conditions and limitations of the site and its receiving waters. Identify distinct drainage areas (DA) that collect flow from a portion of the site and describe how runoff from each DA (and sub-watershed DMAs) is conveyed to the site outlet(s). Refer to Section 3.2 in the TGD for WQMP. Complete form 3.2 for each DA on the project site.

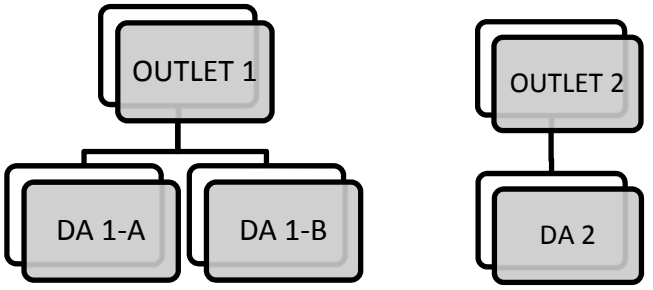
Form 3-1 Site Location and Hydrologic Features

Site coordinates *Take GPS measurement at approximate center of site*	**Latitude:** 34.091200	**Longitude:** -117.60337	**Thomas Bros Map page:** Page 602

[1] San Bernardino County climatic region: ☒Valley ☐Mountain ☐Desert

[2] Does the site have more than one drainage area (DA): ☒Yes ☐No

If no, proceed to Form 3-2. If yes, then use this form to show a conceptual schematic describing DMAs and hydrologic feature connecting DMAs to the site outlet(s). An example is provided below that can be modified for proposed project or a drawing clearly showing DMA and flow routing may be attached.



DA 1-A & DA 1-B To Outlet 1	Runoff from the majority of the site will drain southeasterly via a proposed private storm drain system. The proposed private storm drain system will connect to the 120" RCP within Hellman Avenue. As part of the onsite storm drain system, low flow diversions on catch basins and manholes will direct the water quality flows to underground retention systems for infiltration. The project site will utilize the maximum extent practicable (MEP) principle in order to treat disturbed Public Right-of-Way (ROW) impervious areas onsite. This area is approximately 0.50 acres and is included along with the onsite design capture volume (DCV).
DA 2 To Outlet 2	Runoff from the landscaped areas fronting Hellman Avenue (0.15 acres total) sheet flow directly to Hellman Avenue.

Form 3-2 Existing Hydrologic Characteristics for Drainage Area (DA)

For each drainage area's sub-watershed DMA, provide the following characteristics	**DMA A**	**n/a**	**n/a**	**n/a**
[1] **DMA drainage area (ft^2)**	352,836 (8.10 ac)	n/a	n/a	n/a
[2] **Existing site impervious area (ft^2)**	352,836 (8.10 ac)	n/a	n/a	n/a
[3] **Antecedent moisture condition** *For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf*	AMC II	n/a	n/a	n/a
[4] **Hydrologic soil group** *Refer to Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP*	HSG B	n/a	n/a	n/a
[5] **Longest flowpath length (ft)**	1,122	n/a	n/a	n/a
[6] **Longest flowpath slope (ft/ft)**	0.0088	n/a	n/a	n/a
[7] **Current land cover type(s)** *Select from Fig C-3 of Hydrology Manual*	Commercial	n/a	n/a	n/a
[8] **Pre-developed pervious area condition:** *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% See Attachment A for photos of site to support rating*	Poor	n/a	n/a	n/a

Hydrology map available in Attachment C.

Form 3-3 Watershed Description

Receiving Waters *Refer to Watershed Mapping Tool - http://sbcounty.permitrack.com/WAP* *See 'Drainage Facilities" link at this website*	Cucamonga Creek, Reach 1 Mill Creek (Prado Area) Chino Creek, Reach 1A Santa Ana River, Reach 3 Prado Dam Santa Ana River, Reach 2 Santa Ana River, Reach 1 Pacific Ocean
Applicable TMDLs *Refer to Local Implementation Plan*	Cucamonga Creek, Reach 1: High Coliform Bacteria Count Mill Creek (Prado Area): Coliform Bacteria Chino Creek, Reach 1A: Pathogens Santa Ana River, Reach 3: Pathogens, Nitrate and Bacteria Prado Dam: Pathogens Santa Ana River, Reach 2: None Santa Ana River, Reach 1: None Pacific Ocean: None
303(d) listed impairments *Refer to Local Implementation Plan and Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP and State Water Resources Control Board website – http://www.waterboards.ca.gov/santaana/water_iss ues/programs/tmdl/index.shtml*	Cucamonga Creek, Reach 1: Cadmium, Coliform Bacteria, Copper, Lead, and Zinc Mill Creek (Prado Area): Nutrients, Pathogens, and Total Suspended Solids Chino Creek, Reach 1A: Nutrients and Pathogens Santa Ana River, Reach 3: Copper, Lead, and Pathogens Prado Dam: None Santa Ana River, Reach 2: Indicator Bacteria Santa Ana River, Reach 1: None Pacific Ocean: None
Environmentally Sensitive Areas (ESA) *Refer to Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP*	n/a
Unlined Downstream Water Bodies *Refer to Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP*	Santa Ana River
Hydrologic Conditions of Concern	☐ Yes *Complete Hydrologic Conditions of Concern (HCOC) Assessment. Include Forms 4.2-2 through Form 4.2-5 and Hydromodification BMP Form 4.3-10 in submittal* ☒ No
Watershed–based BMP included in a RWQCB approved WAP	☐ Yes *Attach verification of regional BMP evaluation criteria in WAP* • *More Effective than On-site LID* • *Remaining Capacity for Project DCV* • *Upstream of any Water of the US* • *Operational at Project Completion* • *Long-Term Maintenance Plan* ☒ No

Section 4 Best Management Practices (BMP)

4.1 Source Control BMP

4.1.1 Pollution Prevention

Non-structural and structural source control BMP are required to be incorporated into all new development and significant redevelopment projects. Form 4.1-1 and 4.1-2 are used to describe specific source control BMPs used in the WQMP or to explain why a certain BMP is not applicable. Table 7-3 of the TGD for WQMP provides a list of applicable source control BMP for projects with specific types of potential pollutant sources or activities. The source control BMP in this table must be implemented for projects with these specific types of potential pollutant sources or activities.

The preparers of this WQMP have reviewed the source control BMP requirements for new development and significant redevelopment projects. The preparers have also reviewed the specific BMP required for project as specified in Forms 4.1-1 and 4.1-2. All applicable non-structural and structural source control BMP shall be implemented in the project.

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N1	Education of Property Owners, Tenants and Occupants on Stormwater BMPs	X		Property owner will familiarize him/herself with the educational materials in Attachment "E" and the contents of the WQMP.
N2	Activity Restrictions	X		No outdoor work areas, processing, storage or wash area. Activities are restricted to only those for which a BMP has been implemented. Pesticide control through licensed application.
N3	Landscape Management BMPs	X		Irrigation must be consistent with City's Water Conservation Ordinance. Fertilizer and pesticide usage will be consistent with County Management Guidelines for Use of Fertilizers and Pesticides.
N4	BMP Maintenance	X		BMP maintenance, implementation schedules, and responsible parties are included with each specific BMP narrative.
N5	Title 22 CCR Compliance (How development will comply)		X	No hazardous wastes onsite.
N6	Local Water Quality Ordinances	X		Owner/tenant will comply with Local Water Ordinances.
N7	Spill Contingency Plan	X		Owner/tenant will have a spill contingency plan, a separate document, based on specific site needs.
N8	Underground Storage Tank Compliance		X	No USTs onsite.
N9	Hazardous Materials Disclosure Compliance		X	No hazardous materials onsite.
N10	Uniform Fire Code Implementation	X		If applicable, owner will comply with Article 80 of the Uniform Fire Code enforced by the fire protection agency. The facility operators will be educated annually regarding requirements for handling, storage and proper disposal of hazardous substances.
N11	Litter/Debris Control Program	X		Contract with their landscape maintenance firm to provide this service during regularly schedule maintenance. They are required to implement trash management and litter control procedures in the common areas aimed at reducing pollution of drainage water.
N12	Employee Training	X		The owner will ensure that tenants are also familiar with onsite BMPs and necessary maintenance required of the tenants. Owner will check with City and County at least once a year to obtain new or updated educational materials and provide these materials to tenants. Employees shall be trained to clean up spills and participate in ongoing maintenance. The WQMP requires annual employee training and new hires within 2 months.
N13	Housekeeping of Loading Docks	X		Keep all fluids indoors. Clean up spills immediately and keep spills from entering storm drain system. No direct discharges into the storm drain system. Area shall be inspected weekly for proper containment and practices with spills cleaned up immediately and disposed of properly.

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N14	Catch Basin Inspection Program	X		Monthly inspection by property owner's designee. Inspection consists of immediate repair of any deterioration of the structures and maintenance of drain inserts before and after major rain events. Drain insert maintenance shall be per manufacturer's guidelines.
N15	Vacuum Sweeping of Private Streets and Parking Lots	X		All landscape maintenance contractors will be required to sweep up all landscape cuttings, mowings and fertilizer materials off paved areas weekly and dispose of properly. Parking areas and drive ways will be swept monthly by sweeping contractor.
N16	Other Non-structural Measures for Public Agency Projects		X	Not a public agency project.
N17	Comply with all other applicable NDPES permits	X		Will comply with Construction General Permit and Industrial General Permit (may apply for No Exposure Certification/NEC).

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
S1	Provide storm drain system stenciling and signage (CASQA New Development BMP Handbook SD-13)	X		"No Dumping – Drains to River" stencils will be applied. Legibility of stencil will be maintained on a yearly basis.
S2	Design and construct outdoor material storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-34)		X	No outdoor material storage areas onsite.
S3	Design and construct trash and waste storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-32)	X		Paved with an impervious surface, designed not to allow run-on from adjoining areas, designed to divert drainage from adjoining roofs and pavements diverted around the area, screened or walled to prevent off-site transport of trash. Detail to be provided once available.
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control (Statewide Model Landscape Ordinance; CASQA New Development BMP Handbook SD-12)	X		Irrigation systems shall include reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines. Timers will be used to avoid over watering and watering cycles and duration shall be adjusted seasonally by the landscape maintenance contractor. The landscaping areas will be grouped with plants that have similar water requirements. Native or drought tolerant species shall also be used where appropriate to reduce excess irrigation runoff and promote surface filtration.
S5	Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement		X	Stormwater runoff from all areas will drain into the proposed infiltration facilities for treatment.
S6	Protect slopes and channels and provide energy dissipation (CASQA New Development BMP Handbook SD-10)		X	No slopes or channels to protect.
S7	Covered dock areas (CASQA New Development BMP Handbook SD-31)		X	No applicable.
S8	Covered maintenance bays with spill containment plans (CASQA New Development BMP Handbook SD-31)		X	No maintenance bays onsite.
S9	Vehicle wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)		X	No vehicle wash areas onsite.
S10	Covered outdoor processing areas (CASQA New Development BMP Handbook SD-36)		X	No outdoor processing areas onsite.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
S11	Equipment wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)		X	No equipment wash areas onsite.
S12	Fueling areas (CASQA New Development BMP Handbook SD-30)		X	No fueling areas onsite.
S13	Hillside landscaping (CASQA New Development BMP Handbook SD-10)		X	No hillsides onsite.
S14	Wash water control for food preparation areas		X	No food preparation onsite.
S15	Community car wash racks (CASQA New Development BMP Handbook SD-33)		X	No community cars wash racks onsite.

4.1.2 Preventive LID Site Design Practices

Site design practices associated with new LID requirements in the MS4 Permit should be considered in the earliest phases of a project. Preventative site design practices can result in smaller DCV for LID BMP and hydromodification control BMP by reducing runoff generation. Describe site design and drainage plan including:

- A narrative of site design practices utilized or rationale for not using practices
- A narrative of how site plan incorporates preventive site design practices
- Include an attached Site Plan layout which shows how preventative site design practices are included in WQMP

Refer to Section 5.2 of the TGD for WQMP for more details.

Form 4.1-3 Preventive LID Site Design Practices Checklist

Site Design Practices *If yes, explain how preventative site design practice is addressed in project site plan. If no, other LID BMPs must be selected to meet targets.*
Minimize impervious areas: ☒Yes ☐No Explanation: The project will utilize below ground infiltration facilities to collect runoff from impervious areas. Roads and sidewalk widths are reduced to the City standards.
Maximize natural infiltration capacity: ☒Yes ☐No Explanation: The infiltration facilities are positioned in downstream and highly permeable areas that will maximize the amount of stormwater collected for treatment.
Preserve existing drainage patterns and time of concentration: ☒Yes ☐No Explanation: Post-development drainage patterns will mimic pre-development conditions. Stormwater will be retained in infiltration facilities and mimic the time of concentration compared to existing condition.
Disconnect impervious areas: ☒Yes ☐No Explanation: The infiltration facilities are permeable areas that will disconnect impervious areas before discharging offsite. Roof downspouts are designed to drain into BMPs that are permeable.
Protect existing vegetation and sensitive areas: ☐Yes ☒No Explanation: Not applicable, there is no existing vegetation onsite (see Attachment A for recent site photos). The site is being developed into a light industrial facility. There are no sensitive areas to protect. Landscape will be provided throughout the site.
Re-vegetate disturbed areas: ☐Yes ☒No Explanation: Not applicable, development consists of a light industrial facility. Most of the disturbed areas will be paved; however, all disturbed areas will be collected by the infiltration facilities for treatment. Landscape will be provided throughout the site.
Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: ☒Yes ☐No Explanation: Heavy construction vehicles will be prohibited from performing unnecessary soil compaction at the locations of the infiltration facilities.
Utilize vegetated drainage swales in place of underground piping or imperviously lined swales: ☐Yes ☒No Explanation: Underground piping and imperviously lined swales are located at truck and car loading areas that could not be substituted with vegetated swales. All Imperviously lined swales will be taken to the infiltration facilities for treatment.
Stake off areas that will be used for landscaping to minimize compaction during construction : ☒Yes ☐No Explanation: Landscaped areas will be staked to minimize unnecessary compaction during construction. Material storage areas and stockpiles will be located on areas being developed into a parking lot. Access routes for heavy equipment will be located around infiltration locations.

4.2 Project Performance Criteria

The purpose of this section of the Project WQMP is to establish targets for post development hydrology based on performance criteria specified in the MS4 Permit. These targets include runoff volume for water quality control (referred to as LID design capture volume), and runoff volume, time of concentration, and peak runoff for protection of any downstream waterbody segments with a HCOC. ***If the project has more than one outlet for stormwater runoff, then complete additional versions of these forms for each DA / outlet.***

Methods applied in the following forms include:

- For LID BMP Design Capture Volume (DCV), the San Bernardino County Stormwater Program requires use of the P6 method (MS4 Permit Section XI.D.6a.ii) – Form 4.2-1
- For HCOC pre- and post-development hydrologic calculation, the San Bernardino County Stormwater Program requires the use of the Rational Method (San Bernardino County Hydrology Manual Section D). Forms 4.2-2 through Form 4.2-5 calculate hydrologic variables including runoff volume, time of concentration, and peak runoff from the project site pre- and post-development using the Hydrology Manual Rational Method approach. For projects greater than 640 acres (1.0 mi2), the Rational Method and these forms should not be used. For such projects, the Unit Hydrograph Method (San Bernardino County Hydrology Manual Section E) shall be applied for hydrologic calculations for HCOC performance criteria.

Refer to Section 4 in the TGD for WQMP for detailed guidance and instructions.

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 1)

[1] **Project area (ft^2):** 104,544 (DA 1-A – 2.40 ac)	[2] **Imperviousness after applying preventative site design practices (Imp%):** 95%	[3] **Runoff Coefficient (R_c):** 0.807 *$R_C = 0.858(Imp\%)^3 - 0.78(Imp\%)^2 + 0.774(Imp\%) + 0.04$*
[4] **Determine 1-hour rainfall depth for a 2-year return period $P_{2yr-1hr}$ (in):** 0.616 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
[5] **Compute P6, Mean 6-hr Precipitation (inches):** 0.912 *P6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1* *(Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
[6] **Drawdown Rate** *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
[7] **Compute design capture volume, DCV (ft^3):** 12,588 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 1)

[1] Project area (ft^2): 241,758 (DA 1-B – 5.55 ac)	**[2] Imperviousness after applying preventative site design practices (Imp%):** 95%	**[3] Runoff Coefficient (R_c):** 0.807 *$R_C = 0.858(Imp\%)^3 - 0.78(Imp\%)^2 + 0.774(Imp\%) + 0.04$*
[4] Determine 1-hour rainfall depth for a 2-year return period $P_{2yr-1hr}$ (in): 0.616 *http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html*		
[5] Compute P6, Mean 6-hr Precipitation (inches): 0.912 *P6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1* *(Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
[6] Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
[7] Compute design capture volume, DCV (ft^3): 29,109 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 1)

[1] Project area (ft^2): 21,780 (Offsite Improvements – 0.50 ac)*	**[2] Imperviousness after applying preventative site design practices (Imp%):** 100%	**[3] Runoff Coefficient (R_c):** 0.892 *$R_C = 0.858(Imp\%)^3 - 0.78(Imp\%)^2 + 0.774(Imp\%) + 0.04$*
[4] Determine 1-hour rainfall depth for a 2-year return period $P_{2yr-1hr}$ (in): 0.616 *http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html*		
[5] Compute P6, Mean 6-hr Precipitation (inches): 0.912 *P6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1* *(Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
[6] Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
[7] Compute design capture volume, DCV (ft^3): 2,899 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

*The DCV is accounted for in STC #2.

Form 4.2-2 Summary of HCOC Assessment

Does project have the potential to cause or contribute to an HCOC in a downstream channel: ☐Yes ☒No

Go to: http://sbcounty.permitrack.com/WAP/

If "Yes", then complete HCOC assessment of site hydrology for 2yr storm event using Forms 4.2-3 through 4.2-5 and insert results below (Forms 4.2-3 through 4.2-5 may be replaced by computer software analysis based on the San Bernardino County Hydrology Manual)

If "No," then proceed to Section 4.3 Project Conformance Analysis

Condition	Runoff Volume (ft^3)	Time of Concentration (min)	Peak Runoff (cfs)
Pre-developed	[1] n/a *Form 4.2-3 Item 12*	[2] n/a *Form 4.2-4 Item 13*	[3] n/a *Form 4.2-5 Item 10*
Post-developed	[4] n/a *Form 4.2-3 Item 13*	[5] n/a *Form 4.2-4 Item 14*	[6] n/a *Form 4.2-5 Item 14*
Difference	[7] n/a *Item 4 – Item 1*	[8] n/a *Item 5 – Item 2*	[9] n/a *Item 6 – Item 3*
Difference (as % of pre-developed)	[10] n/a *Item 7 / Item 1*	[11] n/a *Item 8 / Item 2*	[12] n/a *Item 9 / Item 3*

Form 4.2-3 HCOC Assessment for Runoff Volume

Compute weighted curve number for pre and post developed conditions	**Pre-developed DA** *Add more columns if more than 4 DMA*				**Post-developed DA** *Add more columns if more than 4 DMA*			
	DMA A	DMA B	DMA C	DMA D	DMA A	DMA B	DMA C	DMA D
[1] Land Cover type								
[2] Hydrologic Soil Group (HSG)								
[3] DMA Area, ft^2 *sum of areas of DMA should equal area of DA*								
[4] Curve Number (CN) *Use Items 1 and 2 to select the appropriate CN from Appendix C-2 of the TGD for WQMP*								
	[5] Pre-Developed area-weighted CN:				**[6] Post-Developed area-weighted CN:**			
	[7] Pre-developed soil storage capacity, S (in): *S = (1000 / Item 5) - 10*				**[8] Post-developed soil storage capacity, S (in):** *S = (1000 / Item 6) - 10*			
	[9] Initial abstraction, I_a (in): *I_a = 0.2 * Item 7*				**[10] Initial abstraction, I_a (in):** *I_a = 0.2 * Item 8*			
[11] Precipitation for 2 yr, 24 hr storm (in): *Go to: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html*								
[12] Pre-developed Volume (ft^3): *V_{pre} =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 9)^2 / ((Item 11 – Item 9 + Item 7)*								
[13] Post-developed Volume (ft^3): *V_{pre} =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 10)^2 / ((Item 11 – Item 10 + Item 8)*								
[14] Volume Reduction needed to meet HCOC Requirement, (ft^3): *V_{HCOC} = (Item 13 * 0.95) – Item 12*								

Form 4.2-4 HCOC Assessment for Time of Concentration

Compute time of concentration for pre and post developed conditions for each DA *(For projects using the Hydrology Manual complete the form below)*

Variables	Pre-developed DA *Add more columns if more than 4 DMA*				Post-developed DA *Add more columns if more than 4 DMA*			
	DMA A	DMA B	DMA C	DMA D	DMA A	DMA B	DMA C	DMA D
[1] **Length of flowpath (ft)** *Use Form 3-2 Item 5 for pre-developed condition*								
[2] **Change in elevation (ft)**								
[3] **Slope (ft/ft), So = Item 2 / Item 1**								
[4] **Land cover**								
[5] **Initial DMA Time of Concentration (min)** *Appendix C-1 of the TGD for WQMP*								
[6] **Length of conveyance from DMA outlet to project site outlet (ft)** *May be zero if DMA outlet is at project site outlet*								
[7] **Cross-sectional area of channel (ft2)**								
[8] **Wetted perimeter of channel (ft)**								
[9] **Manning's roughness of channel (n)**								
[10] **Channel flow velocity (ft/sec)** $V_{fps} = (1.49 /Item\ 9) * (Item\ 7/Item\ 8)^{0.67} * (Item\ 3)^{0.5}$								
[11] **Travel time to outlet (min)** $T_t = Item\ 6 / (Item\ 10 * 60)$								
[12] **Total time of concentration (min)** $T_c = Item\ 5 + Item\ 11$								
[13] **Pre-developed time of concentration (min):** *Minimum of Item 12 pre-developed DMA*								
[14] **Post-developed time of concentration (min):** *Minimum of Item 12 post-developed DMA*								
[15] **Additional time of concentration needed to meet HCOC requirement (min):** $T_{C\text{-}HCOC} = (Item\ 14 * 0.95) – Item\ 13$								

Form 4.2-5 HCOC Assessment for Peak Runoff

Compute peak runoff for pre and post developed conditions

Variables		Pre-developed DA *Add more columns if more than 3 DMA*			Post-developed DA *Add more columns if more than 3 DMA*		
		DMA A	**DMA B**	**DMA C**	**DMA A**	**DMA B**	**DMA C**
[1] Rainfall Intensity for storm duration equal to time of concentration *I_{peak} = 10^(LOG Form 4.2-1 Item 4 - 0.6 LOG Form 4.2-4 Item 5 /60)*							
[2] Drainage Area of each DMA (ft2) *For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
[3] Ratio of pervious area to total area *For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
[4] Pervious area infiltration rate (in/hr) *Use pervious area CN and antecedent moisture condition with Appendix C-3 of the TGD for WQMP*							
[5] Maximum loss rate (in/hr) *F_m = Item 3 * Item 4* *Use area-weighted Fm from DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
[6] Peak Flow from DMA (cfs) *Q_p =Item 2 * 0.9 * (Item 1 - Item 5)*							
[7] Time of concentration adjustment factor for other DMA to site discharge point *Form 4.2-4 Item 12 DMA / Other DMA upstream of site discharge point (If ratio is greater than 1.0, then use maximum value of 1.0)*	**DMA A**	*n/a*			*n/a*		
	DMA B		*n/a*			*n/a*	
	DMA C			*n/a*			*n/a*

[8] Pre-developed Q_p at T_c for DMA A:	**[9] Pre-developed Q_p at T_c for DMA B:**	**[10] Pre-developed Q_p at T_c for DMA C:**
*Q_p = Item 6_{DMAA} + [Item 6_{DMAB} * (Item 1_{DMAA} – Item 5_{DMAB}) / (Item 1_{DMAB} - Item 5_{DMAB}) * Item $7_{DMAA/2}$] + [Item 6_{DMAC} * (Item 1_{DMAA} - Item 5_{DMAC}) / (Item 1_{DMAC} - Item 5_{DMAC}) * Item $7_{DMAA/3}$]*	*Q_p = Item 6_{DMAB} + [Item 6_{DMAA} * (Item 1_{DMAB} – Item 5_{DMAA}) / (Item 1_{DMAA} - Item 5_{DMAA}) * Item $7_{DMAB/1}$] + [Item 6_{DMAC} * (Item 1_{DMAB} - Item 5_{DMAC}) / (Item 1_{DMAC} - Item 5_{DMAC}) * Item $7_{DMAB/3}$]*	*Q_p = Item 6_{DMAC} + [Item 6_{DMAA} * (Item 1_{DMAC} – Item 5_{DMAA}) / (Item 1_{DMAA} - Item 5_{DMAA}) * Item $7_{DMAC/1}$] + [Item 6_{DMAB} * (Item 1_{DMAC} - Item 5_{DMAB}) / (Item 1_{DMAB} - Item 5_{DMAB}) * Item $7_{DMAC/2}$]*

11 Peak runoff from pre-developed condition confluence analysis (cfs):
Maximum of Item 8, 9, and 10

12 Post-developed Q_p at T_c for DMA A:	***13 Post-developed Q_p at T_c for DMA B:***	***14 Post-developed Q_p at T_c for DMA C:***
Same as Item 8 for post-developed values	*Same as Item 9 for post-developed values*	*Same as Item 10 for post-developed values*

15 Peak runoff from post-developed condition confluence analysis (cfs):
Maximum of Item 12, 13, and 14

16 Peak runoff reduction needed to meet HCOC Requirement (cfs):
*$Q_{p\text{-}HCOC}$ = (Item 14 * 0.95) – Item 11*

4.3 Project Conformance Analysis

Complete the following forms for each project site DA to document that the proposed LID BMPs conform to the project DCV developed to meet performance criteria specified in the MS4 Permit (WQMP Template Section 4.2). For the LID DCV, the forms are ordered according to hierarchy of BMP selection as required by the MS4 Permit (see Section 5.3.1 in the TGD for WQMP). The forms compute the following for on-site LID BMP:

- Site Design and Hydrologic Source Controls (Form 4.3-2)
- Retention and Infiltration (Form 4.3-3)
- Harvested and Use (Form 4.3-4) or
- Biotreatment (Form 4.3-5).

At the end of each form, additional fields facilitate the determination of the extent of mitigation provided by the specific BMP category, allowing for use of the next category of BMP in the hierarchy, if necessary.

The first step in the analysis, using Section 5.3.2.1 of the TGD for WQMP, is to complete Forms 4.3-1 and 4.3-3) to determine if retention and infiltration BMPs are infeasible for the project. For each feasibility criterion in Form 4.3-1, if the answer is "Yes," provide all study findings that includes relevant calculations, maps, data sources, etc. used to make the determination of infeasibility.

Next, complete Forms 4.3-2 and 4.3-4 to determine the feasibility of applicable HSC and harvest and use BMPs, and, if their implementation is feasible, the extent of mitigation of the DCV.

If no site constraints exist that would limit the type of BMP to be implemented in a DA, evaluate the use of combinations of LID BMPs, including all applicable HSC BMPs to maximize on-site retention of the DCV. If no combination of BMP can mitigate the entire DCV, implement the single BMP type, or combination of BMP types, that maximizes on-site retention of the DCV within the minimum effective area.

If the combination of LID HSC, retention and infiltration, and harvest and use BMPs are unable to mitigate the entire DCV, then biotreatment BMPs may be implemented by the project proponent. If biotreatment BMPs are used, then they must be sized to provide sufficient capacity for effective treatment of the remainder of the volume-based performance criteria that cannot be achieved with LID BMPs (TGD for WQMP Section 5.4.4.2). Under no circumstances shall any portion of the DCV be released from the site without effective mitigation and/or treatment.

Form 4.3-1 Infiltration BMP Feasibility
Feasibility Criterion – Complete evaluation for each DA on the Project Site
[1] **Would infiltration BMP pose significant risk for groundwater related concerns?** ☐Yes ☒No *Refer to Section 5.3.2.1 of the TGD for WQMP*
If Yes, Provide basis: (attach)
[2] **Would installation of infiltration BMP significantly increase the risk of geotechnical hazards?** ☐Yes ☒No *(Yes, if the answer to any of the following questions is yes, as established by a geotechnical expert):* • *The location is less than 50 feet away from slopes steeper than 15 percent* • *The location is less than eight feet from building foundations or an alternative setback.* • *A study certified by a geotechnical professional or an available watershed study determines that stormwater infiltration would result in significantly increased risks of geotechnical hazards.*
If Yes, Provide basis: (attach)
[3] **Would infiltration of runoff on a Project site violate downstream water rights?** ☐Yes ☒No
If Yes, Provide basis: (attach)
[4] **Is proposed infiltration facility located on hydrologic soil group (HSG) D soils or does the site geotechnical investigation indicate presence of soil characteristics, which support categorization as D soils?** ☐Yes ☒No
If Yes, Provide basis: (attach)
[5] **Is the design infiltration rate, after accounting for safety factor of 2.0, below proposed facility less than 0.3 in/hr (accounting for soil amendments)?** ☐Yes ☒No
If Yes, Provide basis: (attach)
[6] **Would on-site infiltration or reduction of runoff over pre-developed conditions be partially or fully inconsistent with watershed management strategies as defined in the WAP, or impair beneficial uses?** ☐Yes ☒No *See Section 3.5 of the TGD for WQMP and WAP*
If Yes, Provide basis: (attach)
[7] **Any answer from Item 1 through Item 3 is "Yes":** ☐Yes ☒No *If yes, infiltration of any volume is not feasible onsite. Proceed to Form 4.3-4, Harvest and Use BMP. If no, then proceed to Item 9 below.*
[8] **Any answer from Item 4 through Item 6 is "Yes":** ☐Yes ☒No *If yes, infiltration is permissible but is not required to be considered. Proceed to Form 4.3-2, Hydrologic Source Control BMP.* *If no, then proceed to Item 9, below.*
[9] **All answers to Item 1 through Item 6 are "No":** ☒Yes ☐No *Infiltration of the full DCV is potentially feasible, LID infiltration BMP must be designed to infiltrate the full DCV to the MEP.* *Proceed to Form 4.3-2, Hydrologic Source Control BMP.*

4.3.1 Site Design Hydrologic Source Control BMP

Section XI.E. of the Permit emphasizes the use of LID preventative measures; and the use of LID HSC BMPs reduces the portion of the DCV that must be addressed in downstream BMPs. Therefore, all applicable HSC shall be provided except where they are mutually exclusive with each other, or with other BMPs. Mutual exclusivity may result from overlapping BMP footprints such that either would be potentially feasible by itself, but both could not be implemented. Please note that while there are no numeric standards regarding the use of HSC, if a project cannot feasibly meet BMP sizing requirements or cannot fully address HCOCs, feasibility of all applicable HSC must be part of demonstrating that the BMP system has been designed to retain the maximum feasible portion of the DCV. Complete Form 4.3-2 to identify and calculate estimated retention volume from implementing site design HSC BMP. Refer to Section 5.4.1 in the TGD for more detailed guidance.

Form 4.3-2 Site Design Hydrologic Source Control BMPs

[1] **Implementation of Impervious Area Dispersion BMP (i.e. routing runoff from impervious to pervious areas), excluding impervious areas planned for routing to on-lot infiltration BMP):** ☐Yes ☒No *If yes, complete Items 2-5; If no, proceed to Item 6*	*DA DMA BMP Type*	*DA DMA BMP Type*	*DA DMA BMP Type (use additional forms for more BMPs)*
[2] **Total impervious area draining to pervious area (ft^2)**	0	0	0
[3] **Ratio of pervious area receiving runoff to impervious area**	0	0	0
[4] **Retention volume achieved from impervious area dispersion (ft^3)** *V = Item2 * Item 3 * (0.5/12), assuming retention of 0.5 inches of runoff*	0	0	0
[5] **Sum of retention volume achieved from impervious area dispersion (ft^3): 0** *$V_{retention}$ = Sum of Item 4 for all BMPs*			
[6] **Implementation of Localized On-lot Infiltration BMPs (e.g. on-lot rain gardens):** ☐Yes ☒No *If yes, complete Items 7-13 for aggregate of all on-lot infiltration BMP in each DA; If no, proceed to Item 14*	*DA DMA BMP Type*	*DA DMA BMP Type*	*DA DMA BMP Type (use additional forms for more BMPs)*
[7] **Ponding surface area (ft^2)**	0	0	0
[8] **Ponding depth (ft)**	0	0	0
[9] **Surface area of amended soil/gravel (ft^2)**	0	0	0
[10] **Average depth of amended soil/gravel (ft)**	0	0	0
[11] **Average porosity of amended soil/gravel**	0	0	0
[12] **Retention volume achieved from on-lot infiltration (ft^3)** *$V_{retention}$ = (Item 7 *Item 8) + (Item 9 * Item 10 * Item 11)*	0	0	0
[13] **Runoff volume retention from on-lot infiltration (ft^3): 0** *$V_{retention}$ = Sum of Item 12 for all BMPs*			
[14] **Implementation of evapotranspiration BMP (green, brown, or blue roofs):** ☐Yes ☒No *If yes, complete Items 15-20. If no, proceed to Item 21*	*DA DMA BMP Type*	*DA DMA BMP Type*	*DA DMA BMP Type (use additional forms for more BMPs)*
[15] **Rooftop area planned for ET BMP (ft^2)**	0	0	0
[16] **Average wet season ET demand (in/day)** *Use local values, typical ~ 0.1*	0	0	0
[17] **Daily ET demand (ft^3/day)** *Item 15 * (Item 16 / 12)*	0	0	0
[18] **Drawdown time (hrs)** *Copy Item 6 in Form 4.2-1*	0	0	0
[19] **Retention Volume (ft^3)** *$V_{retention}$ = Item 17 * (Item 18 / 24)*	0	0	0
[20] **Runoff volume retention from evapotranspiration BMPs (ft^3): 0** *$V_{retention}$ = Sum of Item 19 for all BMPs*			
[21] **Implementation of Street Trees:** ☐Yes ☒No *If yes, complete Items 20-2. If no, proceed to Item 26*	*DA DMA BMP Type*	*DA DMA BMP Type*	*DA DMA BMP Type (use additional forms for more BMPs)*
[22] **Number of Street Trees**	0	0	0
[23] **Average canopy cover over impervious area (ft^2)**	0	0	0
[24] **Runoff volume retention from street trees (ft^3)** *$V_{retention}$ = Item 22 * Item 23 * (0.05/12) assume runoff retention of 0.05 inches*	0	0	0
[25] **Runoff volume retention from street tree BMPs (ft^3): 0** *$V_{retention}$ = Sum of Item 24 for all BMPs*			
[26] **Implementation of residential rain barrels/cisterns:** ☐Yes ☒No *If yes, complete Items 27-28; If no, proceed to Item 30*	*DA DMA BMP Type*	*DA DMA BMP Type*	*DA DMA BMP Type (use additional forms for more BMPs)*
[27] **Number of rain barrels/cisterns**	0	0	0
[28] **Runoff volume retention from rain barrels/cisterns (ft^3)** *$V_{retention}$ = Item 27 * 3*	0	0	0
[29] **Runoff volume retention from residential rain barrels/Cisterns (ft^3): 0** *$V_{retention}$ =Sum of Item 28 for all BMPs*			
[30] **Total Retention Volume from Site Design Hydrologic Source Control BMPs: 0** *Sum of Items 5, 13, 20, 25 and 29*			

4.3.2 Infiltration BMPs

Use Form 4.3-3 to compute on-site retention of runoff from proposed retention and infiltration BMPs. Volume retention estimates are sensitive to the percolation rate used, which determines the amount of runoff that can be infiltrated within the specified drawdown time. The infiltration safety factor reduces field measured percolation to account for potential inaccuracy associated with field measurements, declining BMP performance over time, and compaction during construction. Appendix D of the TGD for WQMP provides guidance on estimating an appropriate safety factor to use in Form 4.3-3.

If site constraints limit the use of BMPs to a single type and implementation of retention and infiltration BMPs mitigate no more than 40% of the DCV, then they are considered infeasible and the Project Proponent may evaluate the effectiveness of BMPs lower in the LID hierarchy of use (Section 5.5.1 of the TGD for WQMP)

If implementation of infiltrations BMPs is feasible as determined using Form 4.3-1, then LID infiltration BMPs shall be implemented to the MEP (section 4.1 of the TGD for WQMP).

Form 4.3-3 Infiltration LID BMP (DA 1)

[1] Remaining LID DCV not met by site design HSC BMP (ft^3): 44,596
V = Form 4.2-1 Item 7 - Form 4.3-2 Item 30

BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP)*	**DA 1-A STC #1**	**DA 1-B STC #2**	**DA DMA BMP Type (use additional forms for more BMPs)**
[2] Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods*	2.0	2.0	0
[3] Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	2.2	2.2	0
[4] Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	0.91	0.91	0
[5] Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48	48	0
[6] Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	3.64	3.64	0
[7] Ponding Depth (ft) *d_{BMP} = Minimum of (1/12 * Item 4 * Item 5) or Item 6*	2.90	2.90	0
[8] Infiltrating surface area, SA (ft^2) *The lesser of the area needed for BMP infiltration of full DCV or minimum space requirements from Table 5-7 of the TGD for WQMP*	6,249	15,111	0
[9] Amended soil depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*	n/a	n/a	0
[10] Amended soil porosity	n/a	n/a	0
[11] Gravel depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*	0.50	0.50	0
[12] Gravel porosity	0.4	0.4	0
[13] Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3	0
[14] Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 retention * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	n/a	n/a	0
[15] Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	12,733	32,057	0

[16] Total Retention Volume from LID Infiltration BMPs (ft^3): 44,790
(Sum of Items 14 and 15 for all infiltration BMP included in plan)

[17] Fraction of DCV achieved with infiltration BMP: 100%
Retention% = Item 16 / Form 4.2-1 Item 7

[18] Is full LID DCV retained on-site with combination of hydrologic source control and LID retention and infiltration BMPs?
☒Yes ☐No
If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.

4.3.3 Harvest and Use BMP

Harvest and use BMP may be considered if the full LID DCV cannot be met by maximizing infiltration BMPs. Use Form 4.3-4 to compute on-site retention of runoff from proposed harvest and use BMPs.

Volume retention estimates for harvest and use BMPs are sensitive to the on-site demand for captured stormwater. Since irrigation water demand is low in the wet season, when most rainfall events occur in San Bernardino County, the volume of water that can be used within a specified drawdown period is relatively low. The bottom portion of Form 4.3-4 facilitates the necessary computations to show infeasibility if a minimum incremental benefit of 40 percent of the LID DCV would not be achievable with MEP implementation of on-site harvest and use of stormwater (Section 5.5.4 of the TGD for WQMP).

Form 4.3-4 Harvest and Use BMPs

[1] Remaining LID DCV not met by site design HSC or infiltration BMP (ft^3): 0
V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16

BMP Type(s) *Compute runoff volume retention from proposed harvest and use BMP (Select BMPs from Table 5-4 of the TGD for WQMP)*	**BMP Type and DA**	**BMP Type and DA**	**BMP Type and DA**
[2] Describe cistern or runoff detention facility	0	0	0
[3] Storage volume for proposed detention type (ft^3) *Volume of cistern*	0	0	0
[4] Landscaped area planned for use of harvested stormwater (ft^2)	0	0	0
[5] Average wet season daily irrigation demand (in/day) *Use local values, typical ~ 0.1 in/day*	0	0	0
[6] Daily water demand (ft^3/day) *Item 4 * (Item 5 / 12)*	0	0	0
[7] Drawdown time (hrs) *Copy Item 6 from Form 4.2-1*	0	0	0
[8] Retention Volume (ft^3) *$V_{retention}$ = Minimum of (Item 3) or (Item 6 * (Item 7 / 24))*	0	0	0

[9] Total Retention Volume (ft^3) from Harvest and Use BMP: 0
Sum of Item 8 for all harvest and use BMP included in plan

[10] Is the full DCV retained with a combination of LID HSC, retention and infiltration, and harvest and use BMPs? ☐Yes ☐No
If yes, demonstrate conformance using Form 4.3-10. If no, then re-evaluate combinations of all LID BMP and optimize their implementation such that the maximum portion of the DCV is retained on-site (using a single BMP type or combination of BMP types). If the full DCV cannot be mitigated after this optimization process, proceed to Section 4.3.4.

4.3.4 Biotreatment BMP

Biotreatment BMPs may be considered if the full LID DCV cannot be met by maximizing retention and infiltration, and harvest and use BMPs. A key consideration when using biotreatment BMP is the effectiveness of the proposed BMP in addressing the pollutants of concern for the project (see Table 5-5 of the TGD for WQMP).

Use Form 4.3-5 to summarize the potential for volume based and/or flow based biotreatment options to biotreat the remaining unmet LID DCV. Biotreatment computations are included as follows:

- Use Form 4.3-6 to compute biotreatment in small volume based biotreatment BMP (e.g. bioretention w/underdrains);
- Use Form 4.3-7 to compute biotreatment in large volume based biotreatment BMP (e.g. constructed wetlands);
- Use Form 4.3-8 to compute sizing criteria for flow-based biotreatment BMP (e.g. bioswales)

Form 4.3-5 Selection and Evaluation of Biotreatment BMP

<table>
<tr><td colspan="2">[1] Remaining LID DCV not met by site design HSC, infiltration, or harvest and use BMP for potential biotreatment (ft³): 0
Form 4.2-1 Item 7 – Form 4.3-2 Item 30 – Form 4.3-3 Item 16- Form 4.3-4 Item 9</td><td>List pollutants of concern
Copy from Form 2.3-1
none</td></tr>
<tr><td rowspan="2">[2] Biotreatment BMP Selected
(Select biotreatment BMP(s) necessary to ensure all pollutants of concern are addressed through Unit Operations and Processes, described in Table 5-5 of the TGD for WQMP)</td><td>Volume-based biotreatment
Use Forms 4.3-6 and 4.3-7 to compute treated volume</td><td>Flow-based biotreatment
Use Form 4.3-8 to compute treated volume</td></tr>
<tr><td>☐ Bioretention with underdrain
☐ Planter box with underdrain
☐ Constructed wetlands
☐ Wet extended detention
☐ Dry extended detention</td><td>☐ Vegetated swale
☐ Vegetated filter strip
☐ Proprietary biotreatment</td></tr>
<tr><td>[3] Volume biotreated in volume based biotreatment BMP (ft³): 0
Form 4.3-6 Item 15 + Form 4.3-7 Item 13</td><td>[4] Compute remaining LID DCV with implementation of volume based biotreatment BMP (ft³): 0
Item 1 – Item 3</td><td>[5] Remaining fraction of LID DCV for sizing flow based biotreatment BMP: %
Item 4 / Item 1</td></tr>
<tr><td colspan="3">[6] Flow-based biotreatment BMP capacity provided (cfs): 0
Use Figure 5-2 of the TGD for WQMP to determine flow capacity required to provide biotreatment of remaining percentage of unmet LID DCV (Item 5), for the project's precipitation zone (Form 3-1 Item 1)</td></tr>
<tr><td colspan="3">[7] Metrics for MEP determination:
☐ Provided a WQMP with the portion of site area used for suite of LID BMP equal to minimum thresholds in Table 5-7 of the TGD for WQMP for the proposed category of development:
If maximized on-site retention BMPs is feasible for partial capture, then LID BMP implementation must be optimized to retain and infiltrate the maximum portion of the DCV possible within the prescribed minimum effective area. The remaining portion of the DCV shall then be mitigated using biotreatment BMP.</td></tr>
</table>

Form 4.3-6 Volume Based Biotreatment – Bioretention and Planter Boxes with Underdrains

BMP Type(s) *Compute runoff volume retention from proposed harvest and use BMP (Select BMPs from Table 5-4 of the TGD for WQMP)*	**BMP Type and DA**	**BMP Type and DA**	**BMP Type and DA**
[1] **Pollutants addressed with BMP** *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*	n/a	n/a	n/a
[2] **Amended soil infiltration rate** *Typical ~ 5.0 in/hr*	0	0	0
[3] **Amended soil infiltration safety factor** *Typical ~ 2.0*	0	0	0
[4] **Amended soil design percolation rate (in/hr)** P_{design} *= Item 2 / Item 3*	0	0	0
[5] **Ponded water drawdown time (hr)** *Copy Item 6 from Form 4.2-1*	0	0	0
[6] **Maximum ponding depth (ft)** *See Table 5-6 of the TGD for WQMP for reference to BMP design details*	0	0	0
[7] **Ponding Depth (ft)** d_{BMP} *= Minimum of (1/12 * Item 4 * Item 5) or Item 6*	0	0	0
[8] **Amended soil surface area (ft^2)**	0	0	0
[9] **Amended soil depth (ft)** *See Table 5-6 of the TGD for WQMP for reference to BMP design details*	0	0	0
[10] **Amended soil porosity, *n***	0	0	0
[11] **Gravel depth (ft)** *See Table 5-6 of the TGD for WQMP for reference to BMP design details*	0	0	0
[12] **Gravel porosity, *n***	0	0	0
[13] **Duration of storm as basin is filling (hrs)** *Typical ~ 3hrs*	0	0	0
[14] **Biotreated Volume (ft^3)** $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	0	0	0
[15] **Total biotreated volume from bioretention and/or planter box with underdrains BMP: 0** *Sum of Item 14 for all volume-based BMPs included in this form*			

Form 4.3-7 Volume Based Biotreatment – Constructed Wetlands and Extended Detention

Biotreatment BMP Type *Constructed wetlands, extended wet detention, extended dry detention, or other comparable proprietary BMP. If BMP includes multiple modules (e.g. forebay and main basin), provide separate estimates for storage and pollutants treated in each module.*	**BMP Type and DA**		**BMP Type and DA**		**BMP Type and DA**	
	Forebay	**Basin**	**Forebay**	**Basin**	**Forebay**	**Basin**
[1] **Pollutants addressed with BMP forebay and basin** *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*	n/a	n/a	n/a	n/a	n/a	n/a
[2] **Bottom width (ft)**	0	0	0	0	0	0
[3] **Bottom length (ft)**	0	0	0	0	0	0
[4] **Bottom area (ft^2)** A_{bottom} *= Item 2 * Item 3*	0	0	0	0	0	0
[5] **Side slope (ft/ft)**	0	0	0	0	0	0
[6] **Depth of storage (ft)**	0	0	0	0	0	0
[7] **Water surface area (ft2)** $A_{surface}$ *= (Item 2 + (2 * Item 5 * Item 6)) * (Item 3 + (2 * Item 5 * Item 6))*	0	0	0	0	0	0
[8] **Storage volume (ft3)** *For BMP with a forebay, ensure fraction of total storage is within ranges specified in BMP specific fact sheets, see Table 5-6 of the TGD for WQMP for reference to BMP design details V =Item 6 / 3 * [Item 4 + Item 7 + (Item 4 * Item 7)$^{0.5}$]*	0	0	0	0	0	0
[9] **Drawdown Time (hrs)** *Copy Item 6 from Form 2.1*	0		0		0	
[10] **Outflow rate (cfs)** Q_{BMP} *= (Item* $8_{forebay}$ *+ Item* 8_{basin}*) / (Item 9 * 3600)*	0		0		0	
[11] **Duration of design storm event (hrs)**	0		0		0	
[12] **Biotreated Volume (ft^3)** $V_{biotreated}$ *= (Item* $8_{forebay}$ *+ Item* 8_{basin}*) +(Item 10 * Item 11 * 3600)*	0		0		0	
[13] **Total biotreated volume from constructed wetlands, extended dry detention, or extended wet detention: 0** *(Sum of Item 12 for all BMP included in plan)*						

Form 4.3-8 Flow Based Biotreatment			
Biotreatment BMP Type *Vegetated swale, vegetated filter strip, or other comparable proprietary BMP*	**BMP Type and DA**	**BMP Type and DA**	**BMP Type and DA**
[1] Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in TGD Table 5-5*	n/a	n/a	n/a
[2] Flow depth for water quality treatment (ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*	0	0	0
[3] Bed slope (ft/ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*	0	0	0
[4] Manning's roughness coefficient	0	0	0
[5] Bottom width (ft) *b_w = (Form 4.3-5 Item 6 * Item 4) / (1.49 * Item $2^{1.67}$ * Item $3^{0.5}$)*	0	0	0
[6] Side Slope (ft/ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*	0	0	0
[7] Cross sectional area (ft^2) *A = (Item 5 * Item 2) + (Item 6 * Item 2^2)*	0	0	0
[8] Water quality flow velocity (ft/sec) *V = Form 4.3-5 Item 6 / Item 7*	0	0	0
[9] Hydraulic residence time (min) *Pollutant specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*	0	0	0
[10] Length of flow based BMP (ft) *L = Item 8 * Item 9 * 60*	0	0	0
[11] Water surface area at water quality flow depth (ft2) *SA_{top} = (Item 5 + (2 * Item 2 * Item 6)) * Item 10*	0	0	0

4.3.5 Conformance Summary

Complete Form 4.3-9 to demonstrate how on-site LID DCV is met with proposed site design hydrologic source control, infiltration, harvest and use, and/or biotreatment BMP. The bottom line of the form is used to describe the basis for infeasibility determination for on-site LID BMP to achieve full LID DCV, and provides methods for computing remaining volume to be addressed in an alternative compliance plan. If the project has more than one outlet, then complete additional versions of this form for each outlet.

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 1)

[1] **Total LID DCV for the Project DA-1 (ft^3):** 44,596 *Copy Item 7 in Form 4.2-1*

[2] **On-site retention with site design hydrologic source control LID BMP (ft^3):** 0 *Copy Item 30 in Form 4.3-2*

[3] **On-site retention with LID infiltration BMP (ft^3):** 44,790 *Copy Item 16 in Form 4.3-3*

[4] **On-site retention with LID harvest and use BMP (ft^3):** 0 *Copy Item 9 in Form 4.3-4*

[5] **On-site biotreatment with volume based biotreatment BMP (ft^3):** 0 *Copy Item 3 in Form 4.3-5*

[6] **Flow capacity provided by flow based biotreatment BMP (cfs):** 0 *Copy Item 6 in Form 4.3-5*

[7] **LID BMP performance criteria are achieved if answer to any of the following is "Yes":**

- Full retention of LID DCV with site design HSC, infiltration, or harvest and use BMP: Yes ☒ No ☐
  If yes, sum of Items 2, 3, and 4 is greater than Item 1
- Combination of on-site retention BMPs for a portion of the LID DCV and volume-based biotreatment BMP that address all pollutants of concern for the remaining LID DCV: Yes ☐ No ☒
  If yes, a) sum of Items 2, 3, 4, and 5 is greater than Item 1, and Items 2, 3 and 4 are maximized; or b) Item 6 is greater than Form 4.3--5 Item 6 and Items 2, 3 and 4 are maximized
- On-site retention and infiltration is determined to be infeasible and biotreatment BMP provide biotreatment for all pollutants of concern for full LID DCV: Yes ☐ No ☒
  If yes, Form 4.3-1 Items 7 and 8 were both checked yes

[8] **If the LID DCV is not achieved by any of these means, then the project may be allowed to develop an alternative compliance plan. Check box that describes the scenario which caused the need for alternative compliance:**

- Combination of HSC, retention and infiltration, harvest and use, and biotreatment BMPs provide less than full LID DCV capture: ☐
  *Checked yes for Form 4.3-5 Item 7, Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance, V_{alt} = (Item 1 – Item 2 – Item 3 – Item 4 – Item 5) * (100 - Form 2.4-1 Item 2)%*
- An approved Watershed Action Plan (WAP) demonstrates that water quality and hydrologic impacts of urbanization are more effective when managed in at an off-site facility: ☐
  Attach appropriate WAP section, including technical documentation, showing effectiveness comparisons for the project site and regional watershed

4.3.6 Hydromodification Control BMP

Use Form 4.3-10 to compute the remaining runoff volume retention, after LID BMP are implemented, needed to address HCOC, and the increase in time of concentration and decrease in peak runoff necessary to meet targets for protection of waterbodies with a potential HCOC. Describe hydromodification control BMP that address HCOC, which may include off-site BMP and/or in-stream controls. Section 5.6 of the TGD for WQMP provides additional details on selection and evaluation of hydromodification control BMP.

Form 4.3-10 Hydromodification Control BMPs

[1] Volume reduction needed for HCOC performance criteria (ft^3): 0 *(Form 4.2-2 Item 4 * 0.95) – Form 4.2-2 Item 1*	**[2] On-site retention with site design hydrologic source control, infiltration, and harvest and use LID BMP (ft^3): 0** *Sum of Form 4.3-9 Items 2, 3, and 4. Evaluate option to increase implementation of on-site retention in Forms 4.3-2, 4.3-3, and 4.3-4 in excess of LID DCV toward achieving HCOC volume reduction*
[3] Remaining volume for HCOC volume capture (ft^3): 0 *Item 1 – Item 2*	**[4] Volume capture provided by incorporating additional on-site or off-site retention BMPs (ft^3): 0** *Existing downstream BMP may be used to demonstrate additional volume capture (if so, attach to this WQMP a hydrologic analysis showing how the additional volume would be retained during a 2-yr storm event for the regional watershed)*
[5] If Item 4 is less than Item 3, incorporate in-stream controls on downstream waterbody segment to prevent impacts due to hydromodification ☐ *Attach in-stream control BMP selection and evaluation to this WQMP*	
[6] Is Form 4.2-2 Item 11 less than or equal to 5%: ☐Yes ☐No *If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:* ☐ **Demonstrate increase in time of concentration achieved by proposed LID site design, LID BMP, and additional on-site or off-site retention BMP.** *BMP upstream of a waterbody segment with a potential HCOC may be used to demonstrate increased time of concentration through hydrograph attenuation (if so, show that the hydraulic residence time provided in BMP for a 2-year storm event is equal or greater than the addition time of concentration requirement in Form 4.2-4 Item 15)* ☐ **Increase time of concentration by preserving pre-developed flow path and/or increase travel time by reducing slope and increasing cross-sectional area and roughness for proposed on-site conveyance facilities.** ☐ **Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California.**	
[7] Form 4.2-2 Item 12 less than or equal to 5%: ☐Yes ☐No *If yes, HCOC performance criteria are achieved. If no, select one or more mitigation options below:* ☐ **Demonstrate reduction in peak runoff achieved by proposed LID site design, LID BMPs, and additional on-site or off-site retention BMPs.** *BMPs upstream of a waterbody segment with a potential HCOC may be used to demonstrate additional peak runoff reduction through hydrograph attenuation (if so, attach to this WQMP, a hydrograph analysis showing how the peak runoff would be reduced during a 2-yr storm event)* ☐ **Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California.**	

4.4 Alternative Compliance Plan (if applicable)

Describe an alternative compliance plan (if applicable) for projects not fully able to infiltrate, harvest and use, or biotreat the DCV via on-site LID practices. A project proponent must develop an alternative compliance plan to address the remainder of the LID DCV. Depending on project type some projects may qualify for water quality credits that can be applied to reduce the DCV that must be treated prior to development of an alternative compliance plan (see Form 2.4-1, Water Quality Credits). Form 4.3-9 Item 8 includes instructions on how to apply water quality credits when computing the DCV that must be met through alternative compliance. Alternative compliance plans may include one or more of the following elements:

- On-site structural treatment control BMP - All treatment control BMP should be located as close to possible to the pollutant sources and should not be located within receiving waters;
- Off-site structural treatment control BMP - Pollutant removal should occur prior to discharge of runoff to receiving waters;
- Urban runoff fund or In-lieu program, if available

Depending upon the proposed alternative compliance plan, approval by the executive officer may or may not be required (see Section 6 of the TGD for WQMP).

Section 5 Inspection and Maintenance Responsibility for Post Construction BMP

All BMP included as part of the project WQMP are required to be maintained through regular scheduled inspection and maintenance (refer to Section 8, Post Construction BMP Requirements, in the TGD for WQMP). Fully complete Form 5-1 summarizing all BMP included in the WQMP. Attach additional forms as needed. The WQMP shall also include a detailed Operation and Maintenance Plan for all BMP and may require a Maintenance Agreement (consult the jurisdiction's LIP). If a Maintenance Agreement is required, it must also be attached to the WQMP.

Form 5-1 BMP Inspection and Maintenance

BMP	Responsible Party(ies)	Inspection/Maintenance Activities Required	Minimum Frequency of Activities
StormTech SC-740 Chambers	Owner	The isolator row shall be inspected for debris and sediment accumulations and maintained by a qualified technician and he/she will properly dispose of all wastes and inspect for standing water. A manhole is installed in order to inspect and maintain the inlet row. All entry into the chamber system must be done per OSHA codes to ensure operator and inspector safety. Inspection ports should be checked 48 hours after storm events to see that the water is draining down, at least once each rainy season, following a major storm event. Records shall be maintained by owner to document inspections.	The isolator row shall be inspected semi-annually (by October 1st and February 1st) and cleaned by water-flush and vacuum when solids accumulate to 3" depth. Maintenance to be conducted through service contract with the vendor or equally qualified contractor.
Drain Inserts	Owner	Visually inspect for defects and illegal dumping. Notify proper authorities if illegal dumping has occurred. Using an industrial vacuum, the collected materials shall be removed from the filter basket and disposed of properly. Inspect biosorb hydrocarbon boom and replace as necessary.	Four times per year or following any rain event that would potentially accumulate a large amount of debris in the system. Replace boom twice per year, at a minimum.
Storm Drain Stenciled Message	Owner	Visually inspect for legibility and replace or repaint as necessary.	Annually

Section 6 WQMP Attachments

6.1 Site Plan and Drainage Plan

Include a site plan and drainage plan sheet set containing the following minimum information:

- Project location
- Site boundary
- Land uses and land covers, as applicable
- Suitability/feasibility constraints
- Structural Source Control BMP locations
- Site Design Hydrologic Source Control BMP locations
- LID BMP details
- Drainage delineations and flow information
- Drainage connections

See Attachment C for Site and Drainage Plan.

6.2 Electronic Data Submittal

Minimum requirements include submittal of PDF exhibits in addition to hard copies. Format must not require specialized software to open. If the local jurisdiction requires specialized electronic document formats (consult the LIP), this section will describe the contents (e.g., layering, nomenclature, geo-referencing, etc.) of these documents so that they may be interpreted efficiently and accurately.

6.3 Post Construction

Attach all O&M Plans and Maintenance Agreements for BMP to the WQMP (Attachment D).

6.4 Other Supporting Documentation

- BMP Educational Materials (Attachment E)
- Soil/Infiltration Report (Attachment F)
- BMP Maintenance Material (Attachment G)
- Conditions of Approval (Attachment H)(pending)
- Class V Injection Well Registration (Attachment I) (pending)

Attachment A
Existing Condition Site Photos


01/16/2017


FiOS
from Frontier
Frontier
COMMUNICATIONS
Entertainment
Delivered.
1.800.FRONTIER
Frontier.com
01/16/2017


01/16/2017


01/16/2017

Attachment B
BMP Design Calculations & Supporting Documentation

www.nws.noaa.gov

NOAA's National Weather Service
Hydrometeorological Design Studies Center
Precipitation Frequency Data Server (PFDS)

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General Info
Homepage
Current Projects
FAQ
Glossary

Precipitation Frequency (PF)
PF Data Server
PF in GIS Format
PF Maps
Temporal Distr.
Time Series Data
PFDS Perform.
PF Documents

Probable Maximum Precipitation (PMP)
PMP Documents

Miscellaneous
Publications
AEP Storm Analysis
Record Precipitation

Contact Us
Inquiries
List-server

NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: CA

Data description

Data type: Precipitation depth | Units: English | Time series type: Partial duration

Select location

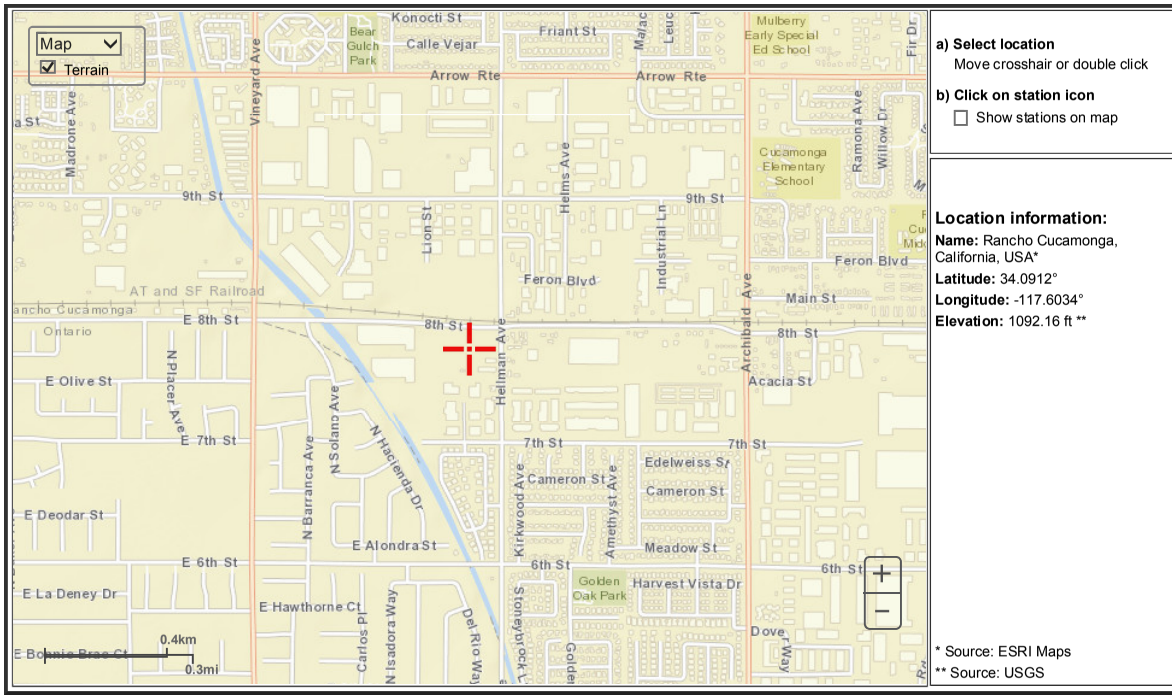
1) Manually:

a) By location (decimal degrees, use "-" for S and W): Latitude: 34.091200 Longitude: -117.60337 Submit

b) By station (list of CA stations): Select station

c) By address: Search

2) Use map:



POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION
NOAA Atlas 14, Volume 6, Version 2

PF tabular | PF graphical | Supplementary information | Print page

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years) 1	2	5	10	25	50	100	200	500	1000
5-min	0.118 (0.099-0.143)	0.159 (0.133-0.193)	0.210 (0.174-0.256)	0.249 (0.205-0.306)	0.299 (0.238-0.380)	0.336 (0.261-0.436)	0.371 (0.281-0.494)	0.405 (0.298-0.555)	0.449 (0.317-0.643)	0.482 (0.328-0.714)
10-min	0.169 (0.141-0.205)	0.228 (0.190-0.277)	0.301 (0.250-0.366)	0.357 (0.294-0.438)	0.429 (0.341-0.545)	0.481 (0.374-0.624)	0.531 (0.403-0.707)	0.581 (0.428-0.796)	0.644 (0.454-0.922)	0.690 (0.470-1.02)
15-min	0.205 (0.171-0.248)	0.276 (0.230-0.335)	0.364 (0.302-0.443)	0.432 (0.356-0.530)	0.519 (0.412-0.659)	0.582 (0.452-0.755)	0.642 (0.487-0.855)	0.702 (0.517-0.963)	0.779 (0.549-1.12)	0.835 (0.568-1.24)
30-min	0.309 (0.258-0.374)	0.417 (0.347-0.506)	0.549 (0.456-0.668)	0.652 (0.536-0.800)	0.782 (0.622-0.994)	0.877 (0.682-1.14)	0.969 (0.735-1.29)	1.06 (0.780-1.45)	1.17 (0.829-1.68)	1.26 (0.857-1.87)
60-min	0.457 (0.381-0.553)	0.616 (0.513-0.747)	0.812 (0.674-0.988)	0.963 (0.793-1.18)	1.16 (0.920-1.47)	1.30 (1.01-1.68)	1.43 (1.09-1.91)	1.57 (1.15-2.15)	1.74 (1.23-2.49)	1.86 (1.27-2.76)
2-hr	0.690 (0.575-0.836)	0.918 (0.764-1.11)	1.20 (0.993-1.46)	1.41 (1.16-1.73)	1.68 (1.34-2.13)	1.88 (1.46-2.43)	2.06 (1.56-2.75)	2.25 (1.65-3.08)	2.48 (1.75-3.55)	2.65 (1.80-3.93)
3-hr	0.870 (0.726-1.05)	1.15 (0.958-1.40)	1.49 (1.24-1.82)	1.75 (1.44-2.15)	2.09 (1.66-2.65)	2.32 (1.81-3.02)	2.55 (1.93-3.40)	2.77 (2.04-3.80)	3.05 (2.15-4.37)	3.26 (2.22-4.83)
6-hr	1.25 (1.04-1.51)	1.64 (1.37-1.99)	2.12 (1.76-2.58)	2.49 (2.05-3.05)	2.95 (2.35-3.75)	3.28 (2.56-4.26)	3.60 (2.73-4.80)	3.91 (2.88-5.36)	4.30 (3.04-6.16)	4.59 (3.12-6.80)
12-hr	1.64 (1.37-1.98)	2.16 (1.80-2.62)	2.80 (2.33-3.41)	3.29 (2.71-4.04)	3.91 (3.11-4.97)	4.36 (3.39-5.66)	4.79 (3.63-6.37)	5.20 (3.83-7.13)	5.73 (4.04-8.20)	6.12 (4.16-9.07)
24-hr	2.22 (1.96-2.55)	2.96 (2.61-3.41)	3.87 (3.41-4.48)	4.57 (4.00-5.33)	5.47 (4.63-6.59)	6.12 (5.08-7.53)	6.75 (5.46-8.50)	7.36 (5.80-9.53)	8.15 (6.17-11.0)	8.73 (6.38-12.2)
2-day	2.68 (2.37-3.09)	3.65 (3.23-4.21)	4.86 (4.29-5.63)	5.81 (5.08-6.77)	7.03 (5.96-8.48)	7.93 (6.58-9.76)	8.81 (7.14-11.1)	9.68 (7.63-12.5)	10.8 (8.18-14.6)	11.7 (8.52-16.3)

3-day	**2.88** (2.55–3.32)	**3.99** (3.52–4.60)	**5.38** (4.74–6.22)	**6.47** (5.66–7.55)	**7.91** (6.70–9.53)	**8.98** (7.45–11.0)	**10.0** (8.12–12.6)	**11.1** (8.73–14.3)	**12.4** (9.42–16.8)	**13.5** (9.86–18.8)
4-day	**3.11** (2.75–3.59)	**4.36** (3.85–5.03)	**5.93** (5.23–6.86)	**7.18** (6.28–8.37)	**8.82** (7.47–10.6)	**10.1** (8.34–12.4)	**11.3** (9.13–14.2)	**12.5** (9.85–16.2)	**14.1** (10.7–19.0)	**15.3** (11.2–21.4)
7-day	**3.57** (3.16–4.11)	**5.09** (4.50–5.88)	**7.04** (6.21–8.15)	**8.60** (7.53–10.0)	**10.7** (9.05–12.9)	**12.3** (10.2–15.1)	**13.8** (11.2–17.4)	**15.4** (12.2–20.0)	**17.6** (13.3–23.7)	**19.2** (14.1–26.8)
10-day	**3.84** (3.40–4.42)	**5.53** (4.89–6.38)	**7.72** (6.81–8.93)	**9.49** (8.30–11.1)	**11.9** (10.0–14.3)	**13.7** (11.3–16.8)	**15.5** (12.6–19.5)	**17.4** (13.7–22.5)	**19.9** (15.1–26.8)	**21.9** (16.0–30.5)
20-day	**4.59** (4.06–5.29)	**6.69** (5.92–7.72)	**9.46** (8.34–10.9)	**11.7** (10.3–13.7)	**14.9** (12.6–17.9)	**17.3** (14.3–21.3)	**19.8** (16.0–24.9)	**22.4** (17.6–29.0)	**25.9** (19.6–35.0)	**28.7** (21.0–40.1)
30-day	**5.40** (4.78–6.23)	**7.85** (6.94–9.06)	**11.1** (9.80–12.9)	**13.8** (12.1–16.1)	**17.6** (14.9–21.2)	**20.6** (17.1–25.3)	**23.7** (19.2–29.8)	**26.9** (21.2–34.9)	**31.4** (23.8–42.4)	**35.1** (25.7–49.0)
45-day	**6.56** (5.81–7.56)	**9.36** (8.28–10.8)	**13.2** (11.6–15.2)	**16.4** (14.3–19.1)	**20.9** (17.7–25.2)	**24.5** (20.4–30.2)	**28.4** (23.0–35.7)	**32.5** (25.6–42.0)	**38.2** (28.9–51.6)	**42.9** (31.4–59.9)
60-day	**7.71** (6.83–8.89)	**10.8** (9.53–12.4)	**15.0** (13.2–17.4)	**18.6** (16.3–21.7)	**23.8** (20.1–28.6)	**27.9** (23.2–34.4)	**32.4** (26.2–40.8)	**37.2** (29.3–48.2)	**44.1** (33.4–59.5)	**49.8** (36.4–69.4)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Estimates from the table in CSV format: Precipitation frequency estimates Submit

Main Link Categories:
Home | OWP(OHD)

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
Office of Water Prediction (OWP)
1325 East West Highway
Silver Spring, MD 20910
Page Author: HDSC webmaster
Page last modified: August 27, 2014

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Disclaimer
Credits
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Privacy Poli
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Career Opportuniti

Worksheet H: Factor of Safety and Design Infiltration Rate Worksheet
Applicable to: Entire Site

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	1	0.25
		Predominant soil texture	0.25	2	0.50
		Site soil variability	0.25	1	0.25
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.25
B	Design	Tributary area size	0.25	2	0.50
		Level of pretreatment/ expected sediment loads	0.25	1	0.25
		Redundancy	0.25	3	0.75
		Compaction during construction	0.25	1	0.25
		Design Safety Factor, $S_B = \Sigma p$			1.75

Combined Safety Factor, $S_{TOT} = S_A \times S_B$	2.19; use 2.2
Measured Infiltration Rate, inch/hr, K_M (corrected for test-specific bias)	2.0
Design Infiltration Rate, in/hr, $K_{DESIGN} = K_M / S_{TOT}$	0.91

Supporting Data

Briefly describe infiltration test and provide reference to test forms:

A double-ring infiltrometer was conducted at the project site to support a minimum measured infiltration result of 2.0 in/hr. The design infiltration rate is 0.91 in/hr after applying the appropriate safety factor. This design rate is suitable for infiltration facilities.

Note: The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.

VOLUME-BASED BMP DESIGN

$C_{BMP} = 0.858(imp)^3 - 0.78(imp)^2 + 0.774(imp) + 0.04$
P6 = (0.616)(1.4807) = 0.912 inches
$P0 = (1.963)(C_{BMP})(0.912)$
DCV = (P0 * Area) / 12

DA 1-A – STC #1

Region		Valley	
Drainage Area (acres)		2.40	acres
Drainage Area (sq-ft)		**104,544**	sq-ft
Impervious Coeff	i =	0.95	< 1.0
Runoff Coeff	**C =**	**0.807**	
1-hr 2-yr from NOAA		0.616	
P6 Coeff		**1.4807**	
Mean 6-hr (P6)		**0.912**	
Drawdown Rate (a)		1.963	
DCV		**12,588**	cu-ft
DCV		**0.289**	acre-ft

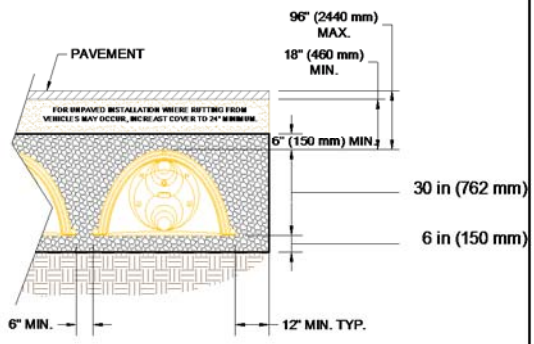
StormTech
Detention • Retention • Recharge
Subsurface Stormwater Management™

Units: Imperial

Project: 9000 Hellman Avenue (DA 1-A)
By: Thienes Engineering, Inc
Point of Contact: Luis Prado
Date: 1/24/2018

System Requirements

Required Storage Volume	12,588	CF
Select Stormtech Chamber System	SC-740	
Stone Porosity (Industry Standard = 40%)	40%	
Stone Foundation Depth	6	Inches
Storage Volume Per Chamber	74.90	CF
Avg Cover over Chambers (18 in min. & 96 in max.)	18	Inches
Number of Chambers Required	169	Each
Required Bed Size	6,249	SF
Tons of Stone Required	732	Tons
Volume of Excavation	1,041	CY
Area of Filter Fabric	1,892	SY
# of End Caps Required	8	Each
Length of ISOLATOR ROW	306.16	FT
ISOLATOR FABRIC	170	SY



Is the limiting dimension for the bed the width or length? width

Controlled by Width (Rows)			Controlled by Length		
Width	25	FT	Length	100	FT
# of Chambers Long	43	EA	# of Chambers Long	-	EA
# of Rows	4	EA	# of Rows	-	EA
Actual Length	309.76	FT	Actual Length	-	FT
Actual Width	20.50	FT	Actual Width	-	FT

3 of the chambers rows will contain only 42 chambers

Design infiltration rate = 0.91 in/hr

d_{max} = Design infiltration rate x 48 hours = 0.91 in/hr x 48 hrs = 43.68 inches

d_{BMP} = [(6 inches + 6 inches) x 0.40] + 30 inches = 34.8 inches

$d_{max} > d_{BMP}$

DA 1-B – STC #2 – ONSITE IMPROVEMENTS

Region		Valley	
Drainage Area (acres)		5.55	acres
Drainage Area (sq-ft)		241,758	sq-ft
Impervious Coeff	i =	0.95	< 1.0
Runoff Coeff	**C =**	0.807	
1-hr 2-yr from NOAA		0.616	
P6 Coeff		1.4807	
Mean 6-hr (P6)		0.912	
Drawdown Rate (a)		1.963	
DCV		29,109	cu-ft
DCV		0.668	acre-ft

DA 1-B – STC #2 – OFFSITE IMPROVEMENTS

Region		Valley	
Drainage Area (acres)		0.50	acres
Drainage Area (sq-ft)		21,780	sq-ft
Impervious Coeff	i =	1	< 1.0
Runoff Coeff	**C =**	0.892	
1-hr 2-yr from NOAA		0.616	
P6 Coeff		1.4807	
Mean 6-hr (P6)		0.912	
Drawdown Rate (a)		1.963	
DCV		2,899	cu-ft
DCV		0.067	acre-ft

Total DCV = 29,109 + 2,899 = 32,008 CF

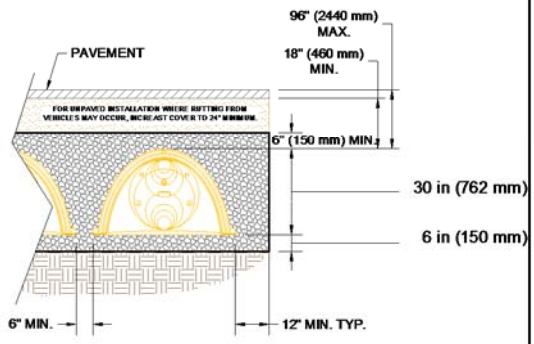
StormTech
Detention • Retention • Recharge
Subsurface Stormwater Management™

Units: Imperial

Project: 9000 Hellman Avenue (DA 1-B)
By: Thienes Engineering, Inc
Point of Contact: Luis Prado
Date: 1/24/2018

System Requirements

Required Storage Volume	32,008	CF
Select Stormtech Chamber System	SC-740	
Stone Porosity (Industry Standard = 40%)	40%	
Stone Foundation Depth	6	Inches
Storage Volume Per Chamber	74.90	CF
Avg Cover over Chambers (18 in min. & 96 in max.)	18	Inches
Number of Chambers Required	428	Each
Required Bed Size	15,111	SF
Tons of Stone Required	1,724	Tons
Volume of Excavation	2,518	CY
Area of Filter Fabric	4,182	SY
# of End Caps Required	20	Each
Length of ISOLATOR ROW	306.16	FT
ISOLATOR FABRIC	170	SY



Is the limiting dimension for the bed the width or length? width

Controlled by Width (Rows)

Width	50	FT
# of Chambers Long	43	EA
# of Rows	10	EA
Actual Length	309.76	FT
Actual Width	49.00	FT

2 of the chambers rows will contain only 42 chambers

Controlled by Length

Length	100	FT
# of Chambers Long	-	EA
# of Rows	-	EA
Actual Length	-	FT
Actual Width	-	FT

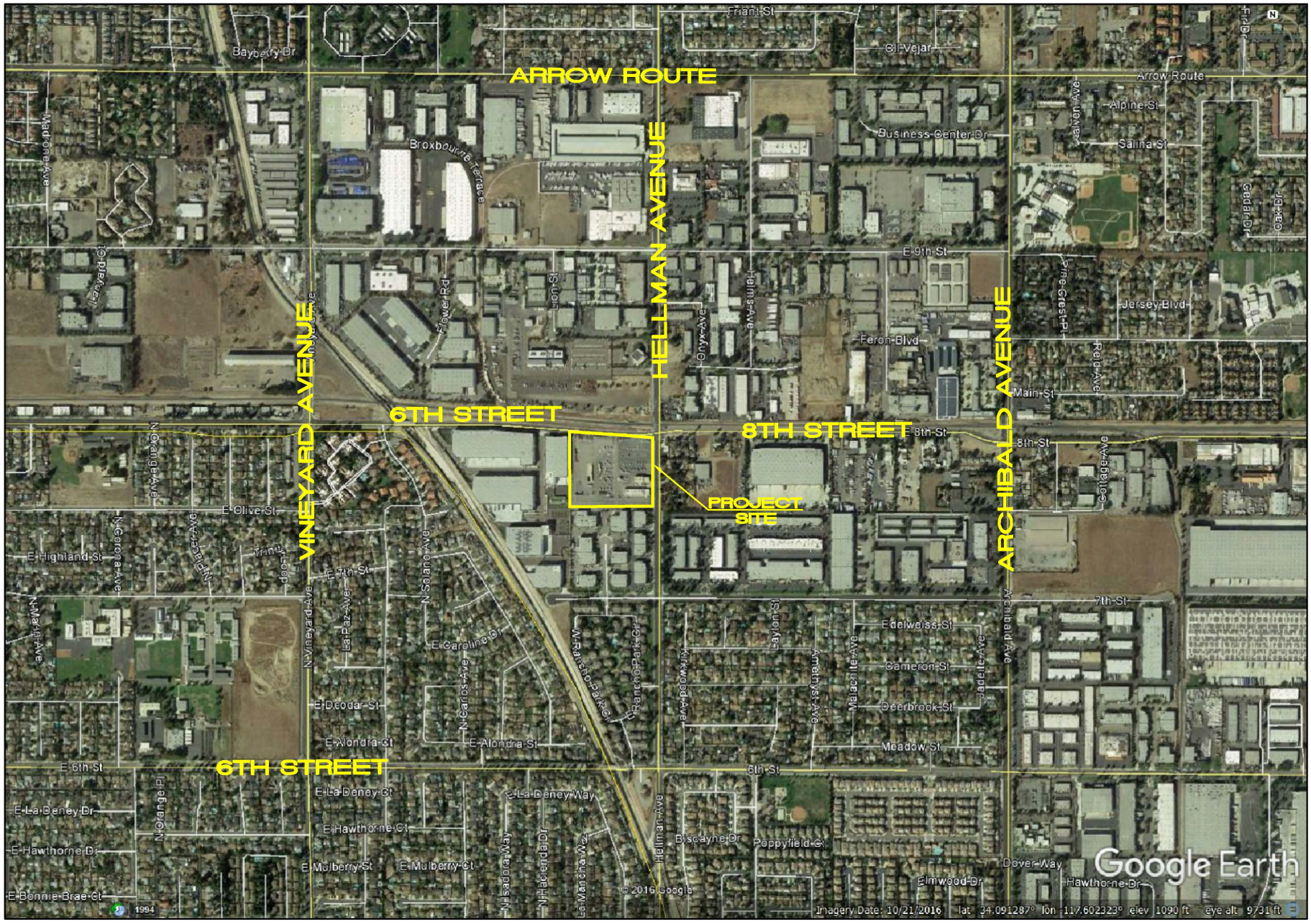
Design infiltration rate = 0.91 in/hr

d_{max} = Design infiltration rate x 48 hours = 0.91 in/hr x 48 hrs = 43.68 inches

d_{BMP} = [(6 inches + 6 inches) x 0.40] + 30 inches = 34.8 inches

$d_{max} > d_{BMP}$

Attachment C
Site and Drainage Plan



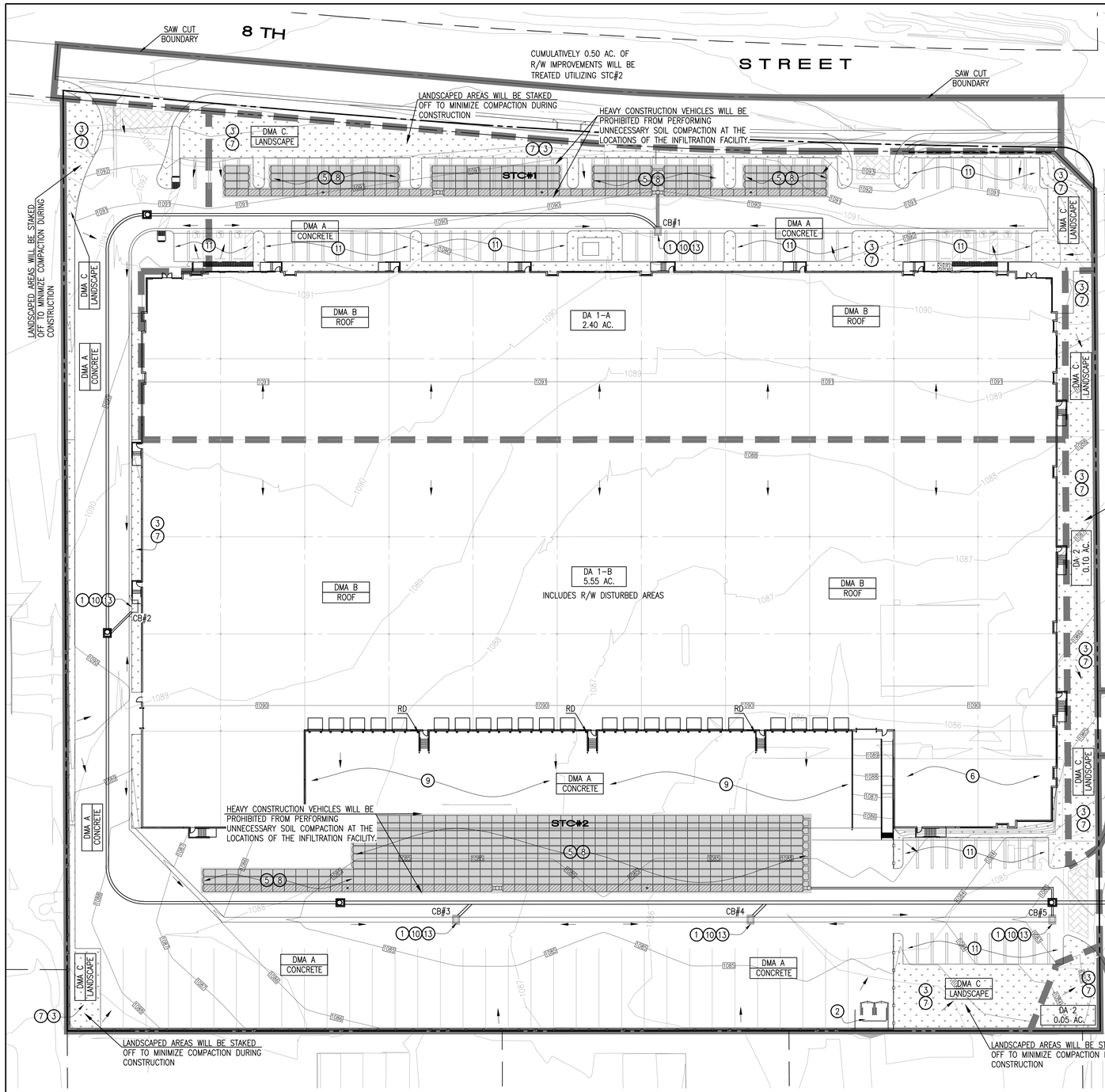
Last Update: 3/5/17
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Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

"VICINITY MAP"

FOR

9000 HELLMAN AVENUE



BMP COORDINATES

BMP	LATITUDE	LONGITUDE
STC#1	34.091702	−117.603616
STC#2	34.090501	−117.603466
CB#1	34.091612	−117.603301
CB#2	34.090941	−117.604405
CB#3	34.090427	−117.603698
CB#4	34.090438	−117.603132
CB#5	34.090429	−117.602497

StormTech SC-740 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots thus maximizing land usage for commercial and municipal applications.

StormTech Subsurface Stormwater Management™



StormTech SC-740 Chamber
(not to scale)

Nominal Chamber Specifications

Size (L x W x H)
85.4" x 51.0" x 30.0"
(2170 x 1295 x 762 mm)

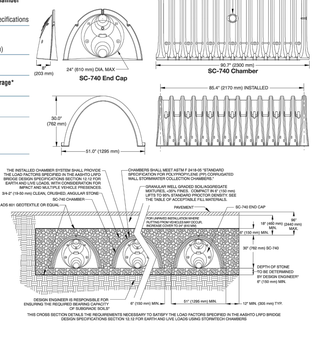
Chamber Storage
45.9 ft³ (1.30 m³)

Minimum Installed Storage*
74.9 ft³ (2.12 m³)

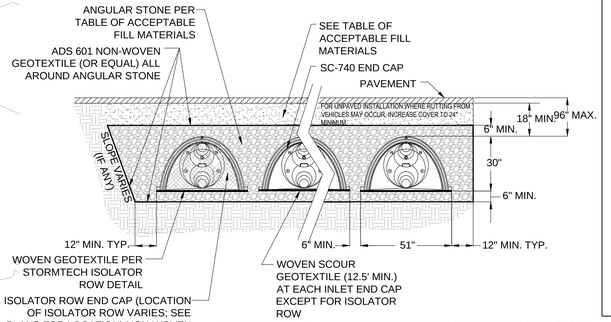
Weight
74.0 lbs (33.6 kg)

Shipping
30 chambers/pallet
60 end caps/pallet
12 pallets/truck

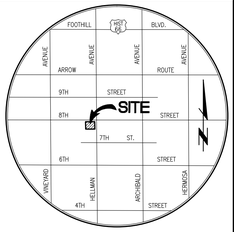
Typical Cross Section Detail
(not to scale)



MADE IN THE USA



THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12 FOR EARTH AND LIVE LOADS, WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.



VICINITY MAP
N.T.S.

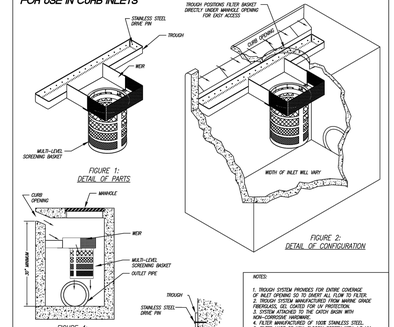
LEGEND

1. S1–STORM DRAIN SIGNS "NO DUMPING – DRAINS TO RIVER"
2. S3–TRASH ENCLOSURE
3. S4–EFFICIENT IRRIGATION
4. NOT USED
5. SC–740 STORMTECH CHAMBERS
6. N1–EDUCATIONAL MATERIALS
7. N3–LANDSCAPE MANAGEMENT BMPS
8. N4–BMP MAINTENANCE
9. N13–HOUSEKEEPING OF LOADING DOCKS
10. N14–CATCH BASIN INSPECTION
11. N15–SWEEPING OF PARKING LOTS
12. NOT USED
13. DRAIN INSERT(S)
14. NOT USED

ONGOING OVER THE ENTIRE SITE

RD ROOF DRAIN
BOUNDARY
DRAINAGE AREAS
FLOW DIRECTION
LANDSCAPE LOCATION
INFILTRATION FACILITY LOCATION

BIO CLEAN SCREENING FILTER WITH TROUGH SYSTEM
FOR USE IN CURB INLETS



NOTES:
1. TROUGH SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING TO TO DIVERT ALL FLOW TO FILTER.
2. TROUGH SYSTEM ATTACHES TO THE CATCH BASIN USING STAINLESS STEEL DRIVE PINS.
3. SYSTEM ATTACHED TO THE CATCH BASIN WITH NON-CORROSIVE HARDWARE.
4. FILTER MANUFACTURED OF 1008 STAINLESS STEEL
5. FILTER BASKET SCREEN MEDIUM IS WOVEN WITH 50 MM OPENINGS AND MEETS FULL CAPTURE REQUIREMENTS.
6. FILTER CAN BE FITTED WITH HYDROCARBON ABSORBENT BOOM
7. FILTER IS LOCATED DIRECTLY UNDER THE MANHOLE FOR EASY ACCESS AND MAINTENANCE.
8. LENGTH OF TROUGH CAN VARY FROM 2' TO 30'
9. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE – CONTACT BIO CLEAN FOR MORE INFORMATION.
10. CONSIDERS A SAFETY FACTOR OF 2.0
11. BYPASS IS ENGINEERED VIA OVERFLOW OF THE TROUGH
12. BYPASS FLOW RATE IS BASED ON THE SIZE OF THE CURB OPENING
13. STORAGE CAPACITY BASED ON 1% PERCENTILE
14. ADDITIONAL TREATMENT AND STORAGE CAPACITY CAN BE ACHIEVED BY UTILIZING MULTIPLE FILTER BASKETS.

MODEL NUMBER	TREATMENT FLOW (cfs)*	SOLIDS STORAGE CAPACITY (cu ft)
BC-CURB-30	2.85	2.21
BC-CURB-24	2.85	1.77
BC-CURB-18	2.85	1.33
BC-CURB-12	2.81	0.88

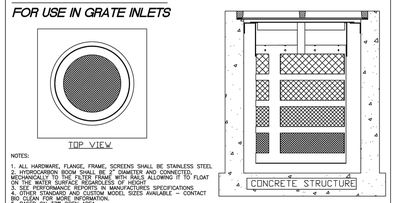
*SEE PAGE 2 FOR EXPLANATION OF FLOW RATES

DRAWING: BIO CLEAN CURB INLET FILTER DETAILS — MULTI-LEVEL SCREENING
TREATMENT FLOW RATE: 2.85 cfs — MODEL #: BC-CURB-WLS
WARRANTY: 5 YEAR MANUFACTURERS — PROJECT:
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 3990 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176 — REVISIONS: DATE:
DATE: 10/12/2017 — SCALE: NTS — REVISIONS: DATE:
DRAWTER: M.C.P. — UNITS = INCHES — REVISIONS: DATE:

Bio Clean
A Forterra Company

PAGE 1

BIO CLEAN SCREENING FILTER
FOR USE IN GRATE INLETS

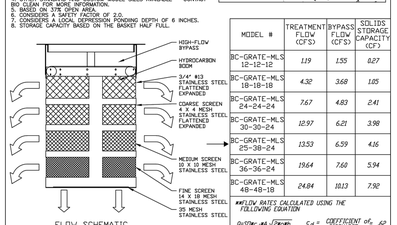


NOTES:
1. ALL HARDWARE, FLANGE, FRAME, SCREENS SHALL BE STAINLESS STEEL
2. BASKET SHALL BE EQUIPPED WITH FLOATATION SYSTEM CONNECTED MECHANICALLY TO THE FILTER FRAME WHICH FAILS ALLOWING IT TO FLOAT ON THE WATER SURFACE REGARDLESS OF HEIGHT
3. SEE PERFORMANCE REPORTS IN MANUFACTURES SPECIFICATIONS
4. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE – CONTACT BIO CLEAN FOR MORE INFORMATION.
5. BASED ON 3/4 OPEN AREA
6. CONSIDERS A SAFETY FACTOR OF 2.0
7. CONSIDERS A LOCAL DEPRESSION PONDING DEPTH OF 6 INCHES.
8. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.

MODEL #	TREATMENT FLOW (CFS)	BYPASS FLOW (CFS)	SOLIDS STORAGE CAPACITY (CF)
BC-GRATE-MLS 12-12-12	1.19	1.55	0.27
BC-GRATE-MLS 18-18-18	4.32	3.68	1.05
BC-GRATE-MLS 24-24-24	7.67	4.83	2.41
BC-GRATE-MLS 30-30-24	10.97	6.21	3.98
BC-GRATE-MLS 25-38-24	13.53	6.59	4.16
BC-GRATE-MLS 36-36-24	19.64	7.68	5.94
BC-GRATE-MLS 48-48-18	24.84	10.13	7.92

*FLOW RATES CALCULATED USING THE FOLLOWING EQUATION

$Q = C_d A \sqrt{2gh}$ C_d = COEFFICIENT OF DISCHARGE = .62



DRAWING BIO CLEAN GRATE INLET FILTER DETAILS — MULTI-LEVEL SCREENING
TYPICAL MODEL DETAIL
WARRANTY: 5 YEAR MANUFACTURERS — PROJECT:
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 3990 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176 — REVISIONS: DATE:
DATE: 10/12/17 — SCALE: SF = 15 — REVISIONS: DATE:
DRAWTER: M.C.P. — UNITS = INCHES — REVISIONS: DATE:

Bio Clean
A Forterra Company

PAGE 1

PROJECT AREA:	8.171 AC (GROSS)	8.091 AC (NET)
	374,616 SF (DISTRUBED AREA)	374,616 SF (EXISTING IMPERVIOUS)
	35,000 SF (PROPOSED LANDSCAPE)	340,116 SF (PROPOSED IMPERVIOUS)

Form 5-1 BMP Inspection and Maintenance

BMP	Responsible Party(ies)	Inspection/Maintenance Activities Required	Minimum Frequency of Activities
StormTech SC-740 Chambers	Owner	The isolator row shall be inspected for debris and sediment accumulations and maintained by a qualified technician and he/she will properly dispose of all wastes and inspect for standing water. A manhole is installed in order to inspect and maintain the inlet row. All entry into the chamber system must be done per OSHA codes to ensure operator and inspector safety. Inspection ports should be checked 48 hours after storm events to see that the water is draining down, at least once each rainy season, following a major storm event. Records shall be maintained by owner to document inspections.	The isolator row shall be inspected semi-annually (by October 1st and February 1st) and cleaned by water-flush and vacuum when solids accumulate to 3" depth. Maintenance to be conducted through service contract with the vendor or equally qualified contractor.
Drain Inserts	Owner	Visually inspect for defects and illegal dumping. Notify proper authorities if illegal dumping has occurred. Using an industrial vacuum, the collected materials shall be removed from the filter basket and disposed of properly. Inspect biosorb hydrocarbon boom and replace as necessary.	Four times per year or following any rain event that would potentially accumulate a large amount of debris in the system. Replace boom twice per year, at a minimum.
Storm Drain Stenciled Message	Owner	Visually inspect for legibility and replace or repaint as necessary.	Annually

0 15 30 60 90
SCALE:1"=30'

Last Update: 1/24/18
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CITY OF RANCHO CUCAMONGA
PUBLIC WORKS DEPARTMENT

PRELIMINARY SITE AND DRAINAGE MAP

9000 HELLMAN AVENUE

3523/4 OF 4 SHEET

PREPARED FOR:
OVERTON MOORE PROPERTIES
19300 HAMILTON AVENUE
GARDENA CA, 90248
PHONE: (310) 323-9100
FAX: (310) 608-7997

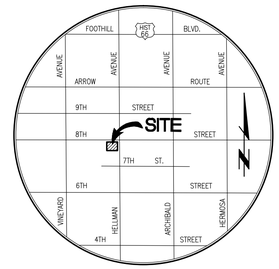
Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

Approved by _____ Date _____
Public Works Director _____ R.C.E. _____

Sheet 4 of 4 Sheets





VICINITY MAP
N.T.S.

LEGEND

- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- 1.00 AC. — SUBAREA AREA
- 100 — SUBAREA NUMBER
- FLOW DIRECTION

0 20 40 80 120
SCALE:1"=40'

Last Update: 4/3/17
O:\3500-3599\3523\3523HYD-EX.dwg

CITY OF RANCHO CUCAMONGA

EXISTING CONDITION HYDROLOGY MAP

OMP RANCHO CUCAMONGA
9000 HELLMAN AVENUE

3523/1 OF 1 SHEET

PREPARED FOR:

OVERTON MOORE PROPERTIES
19300 HAMILTON AVENUE, SUITE 200
GARDENA, CA 90248
PHONE:(310) 323-9100
FAX:(310) 608-7997

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

Approved by _____ Date _____

Public Works Director _____ R.C.E. _____

Sheet 1 of 1 Sheets

Attachment D
Memorandum of Agreement of Storm Water Quality Management Plan

File TEI 3523
Prepared by Thienes Engineering, Inc.
Checked by RS/LP/VL
Assessor's Parcel Number:
0209-151-36

Recording requested by the
City of Rancho Cucamonga
And when recorded mail to:
CITY OF RANCHO CUCAMONGA
BUILDING AND SAFETY DEPARTMENT
P.O. BOX 807
RANCHO CUCAMONGA, CA 91729

THIS SPACE FOR RECORDER'S USE

MEMORANDUM OF AGREEMENT OF STORM WATER QUALITY MANAGEMENT PLAN

The undersigned hereby enters into this Memorandum of Storm Water Quality Management Plan (the "Memorandum") on this _____ day of _____, 2018 with reference to the following:

A. The undersigned is the owner of certain real property located in the City of Rancho Cucamonga, County of San Bernardino, State of California legally described below and hereto referred to as (the "Real Property") (attach additional sheets if necessary):
See exhibits "A", "B", "C" and "D"

B. The undersigned is seeking certain permits and approvals from the City of Rancho Cucamonga ("City") for the development of the Real Property as follows: Precise Grading and Building Permit (the "Approvals").

C. In consideration of the City granting the Approvals, I the undersigned, agree to and accept the terms and conditions of the Storm Water Quality Management Plan (the "Plan") approved by the City's Building and Safety Department on [MONTH] [DAY], 2018, and bind the Real Property with the provisions of the Plan, which is on file with the City of Rancho Cucamonga's Building and Safety Department, File No. DRC2018-XXXXX / PMT2018-XXXXX.

D. In consideration of the City granting the Approvals, the undersigned has agreed to and accepts the terms and conditions of the Plan as it relates to the Real Property and agrees that the Real Property shall be bound by and subject to the Plan.

E. The owner has chosen to install structures as required by Best Management Practices (BMPs) and to implement non-structural BMPs as described in Exhibit “C” (List of BMP Maintenance Items) and depicted in Exhibit “D” (BMP Site Map). Each exhibit is attached hereto and incorporated herein by this reference and also in the Water Quality Management Plan document, on file with the owner or its successors or assigns, and the City and hereinafter is referred to as “WQMP”. The purpose of the WQMP is to minimize pollutants in urban runoff and to minimize other adverse impacts of urban runoff;

F. Said WQMP has been certified by the Owner and reviewed and approved by the City;

G. Said BMPs, with installation and/or implementation on private property and draining only private property, are part of a private facility with all implementation, maintenance or replacement, therefore, the sole responsibility of the Owner in accordance with the terms of this Agreement;

NOW, THEREFORE, it is hereby agreed by the undersigned as follows:

1. Owner hereby provides the City of Rancho Cucamonga's designee complete inspection access, of any duration, to the areas in which BMPs are applied and their immediate vicinity at any time, upon reasonable notice, or in the event of emergency, as determined by the City's Engineer, no advance notice, for the purpose of inspection, sampling, testing of device(s), and in case of emergency, to undertake all necessary repairs or other preventative measures at owner's expense as provided in paragraph 3 below. City shall make every effort at all times to minimize or avoid interference with Owner's use of the property.

2. The undersigned hereby agrees to the terms and conditions of the Plan, the provisions of which are incorporated by reference as though set out herein in full, and agrees that the Real Property shall be bound by and subject to the terms and conditions of the Plan, subject to minor modifications incorporated during construction, as approved by the City of Rancho Cucamonga Building and Safety Services Director.

3. The undersigned agrees to conduct the necessary routine maintenance of any structural devices designed into or installed as part of the storm water drainage system on the Real Property to reduce pollutants in storm water runoff to the maximum extent practicable or to reestablish infiltration through the lifetime of the development which is the subject of Approvals.

4. The undersigned agrees to hold the City, its officials, officers, employees, volunteers, and agents free and harmless from any and all claims, demands, causes of action, costs, expenses, liability, loss, damage, or injury, in law or equity, to property or persons, arising from the imposition of the Plan by the City.

5. The agreements contained herein and the terms and conditions of the Plan are covenants intended to run with the land and shall burden the Real Property and shall be binding upon future owners of all or any portion of the Real Property. Upon a transfer of the Real Property, the transferor (including the undersigned) shall be relieved of any obligations under this Memorandum or the Plan arising from and after the effective date of the transfer.

6. The provisions of this Memorandum are intended to constitute equitable servitudes which shall encumber the Real Property and be binding upon future owners of the Real Property or any portion thereof.

7. The provisions of the Memorandum may be enforced by the City, which, among other remedies, shall have the remedy of injunctive relief and other equitable remedies.

8. This Memorandum shall not be amended, modified or terminated without the prior written consent of the City, which consent to be effective shall be contained in a document executed by the City and recorded against the Real Property.

Owner Name:_____

Authorized Signature:_____

Print Name:_____

Title:_____

Date:_____

Project Description: _____

A notary acknowledgement is required for recordation:

Attachment E
Educational Materials

Drain Inserts MP-52

Description

Drain inserts are manufactured filters or fabric placed in a drop inlet to remove sediment and debris. There are a multitude of inserts of various shapes and configurations, typically falling into one of three different groups: socks, boxes, and trays. The sock consists of a fabric, usually constructed of polypropylene. The fabric may be attached to a frame or the grate of the inlet holds the sock. Socks are meant for vertical (drop) inlets. Boxes are constructed of plastic or wire mesh. Typically a polypropylene "bag" is placed in the wire mesh box. The bag takes the form of the box. Most box products are one box; that is, the setting area and filtration through media occur in the same box. Some products consist of one or more trays or mesh grates. The trays may hold different types of media. Filtration media vary by manufacturer. Types include polypropylene, porous polymer, treated cellulose, and activated carbon.

California Experience

The number of installations is unknown but likely exceeds a thousand. Some users have reported that these systems require considerable maintenance to prevent plugging and bypass.

Advantages

- Does not require additional space as inserts as the drain inlets are already a component of the standard drainage systems.
- Easy access for inspection and maintenance.
- As there is no standing water, there is little concern for mosquito breeding.
- A relatively inexpensive retrofit option.

Limitations

Performance is likely significantly less than treatment systems that are located at the end of the drainage system such as ponds and vaults. Usually not suitable for large areas or areas with trash or leaves than can plug the insert.

Design and Sizing Guidelines

Refer to manufacturer's guidelines. Drain inserts come any many configurations but can be placed into three general groups: socks, boxes, and trays. The sock consists of a fabric, usually constructed of polypropylene. The fabric may be attached to a frame or the grate of the inlet holds the sock. Socks are meant for vertical (drop) inlets. Boxes are constructed of plastic or wire mesh. Typically a polypropylene "bag" is placed in the wire mesh box. The bag takes the form of the box. Most box products are

Design Considerations

- Use with other BMPs
- Fit and Seal Capacity within Inlet

Targeted Constituents

- ☑ Sediment
- ☑ Nutrients
- ☑ Trash
- ☑ Metals
- Bacteria
- ☑ Oil and Grease
- ☑ Organics

Removal Effectiveness

See New Development and Redevelopment Handbook-Section 5.

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one box; that is, the setting area and filtration through media occurs in the same box. One manufacturer has a double-box. Stormwater enters the first box where setting occurs. The stormwater flows into the second box where the filter media is located. Some products consist of one or more trays or mesh grates. The trays can hold different types of media. Filtration media vary with the manufacturer: types include polypropylene, porous polymer, treated cellulose, and activated carbon.

Construction/Inspection Considerations

Be certain that installation is done in a manner that makes certain that the stormwater enters the unit and does not leak around the perimeter. Leakage between the frame of the insert and the frame of the drain inlet can easily occur with vertical (drop) inlets.

Performance

Few products have performance data collected under field conditions.

Siting Criteria

It is recommended that inserts be used only for retrofit situations or as pretreatment where other treatment BMPs presented in this section area used.

Additional Design Guidelines

Follow guidelines provided by individual manufacturers.

Maintenance

Likely require frequent maintenance, on the order of several times per year.

Cost

- The initial cost of individual inserts ranges from less than $100 to about $2,000. The cost of using multiple units in curb inlet drains varies with the size of the inlet.
- The low cost of inserts may tend to favor the use of these systems over other, more effective treatment BMPs. However, the low cost of each unit may be offset by the number of units that are required, more frequent maintenance, and the shorter structural life (and therefore replacement).

References and Sources of Additional Information

Hrachovec, R., and G. Minton, 2001, Field testing of a sock-type catch basin insert, Planet CPR, Seattle, Washington

Interagency Catch Basin Insert Committee, Evaluation of Commercially-Available Catch Basin Inserts for the Treatment of Stormwater Runoff from Developed Sites, 1995

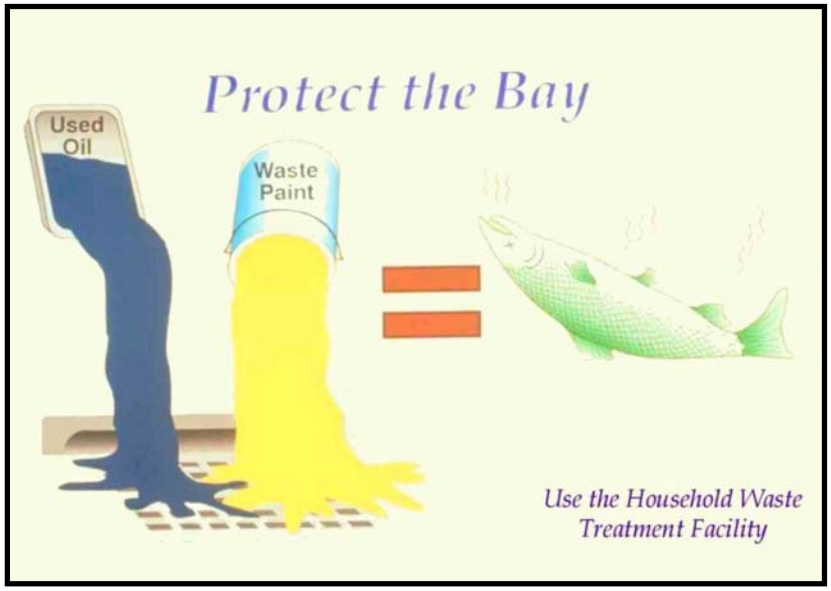
Larry Walker Associates, June 1998, NDMP Inlet/In-Line Control Measure Study Report

Manufacturers literature

Santa Monica (City), Santa Monica Bay Municipal Stormwater/Urban Runoff Project - Evaluation of Potential Catch basin Retrofits, Woodward Clyde, September 24, 1998

Woodward Clyde, June 11, 1996, Parking Lot Monitoring Report, Santa Clara Valley Nonpoint Source Pollution Control Program.

Non-Stormwater Discharges SC-10



Art Credit: Margie Winter

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Description

Non-stormwater discharges are those flows that do not consist entirely of stormwater. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include car washing, air conditioner condensate, etc. However there are certain non-stormwater discharges that pose environmental concern. These discharges may originate from illegal dumping or from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges (which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants into storm drains. They can generally be detected through a combination of detection and elimination. The ultimate goal is to effectively eliminate non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges of pollutants on streets and into the storm drain system and creeks.

Approach

Initially the industry must make an assessment of non-stormwater discharges to determine which types must be eliminated or addressed through BMPs. The focus of the following approach is in the elimination of non-stormwater discharges.

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Pollution Prevention

- Ensure that used oil, used antifreeze, and hazardous chemical recycling programs are being implemented. Encourage litter control.

Suggested Protocols

Recommended Complaint Investigation Equipment

- Field Screening Analysis
  - pH paper or meter
  - Commercial stormwater pollutant screening kit that can detect for reactive phosphorus, nitrate nitrogen, ammonium nitrogen, specific conductance, and turbidity
  - Sample jars
  - Sample collection pole
  - A tool to remove access hole covers
- Laboratory Analysis
  - Sample cooler
  - Ice
  - Sample jars and labels
  - Chain of custody forms
- Documentation
  - Camera
  - Notebook
  - Pens
  - Notice of Violation forms
  - Educational materials

General

- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially those that are not classified as hazardous. These are often not responded to as effectively as they need to be.
- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as “Dump No Waste Drains to Stream” stenciled or demarcated next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.

- See SC44 Stormwater Drainage System Maintenance for additional information.

Illicit Connections

- Locate discharges from the industrial storm drainage system to the municipal storm drain system through review of "as-built" piping schematics.
- Isolate problem areas and plug illicit discharge points.
- Locate and evaluate all discharges to the industrial storm drain system.

Visual Inspection and Inventory

- Inventory and inspect each discharge point during dry weather.
- Keep in mind that drainage from a storm event can continue for a day or two following the end of a storm and groundwater may infiltrate the underground stormwater collection system. Also, non-stormwater discharges are often intermittent and may require periodic inspections.

Review Infield Piping

- A review of the "as-built" piping schematic is a way to determine if there are any connections to the stormwater collection system.
- Inspect the path of floor drains in older buildings.

Smoke Testing

- Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two systems.
- During dry weather the stormwater collection system is filled with smoke and then traced to sources. The appearance of smoke at the base of a toilet indicates that there may be a connection between the sanitary and the stormwater system.

Dye Testing

- A dye test can be performed by simply releasing a dye into either your sanitary or process wastewater system and examining the discharge points from the stormwater collection system for discoloration.

TV Inspection of Drainage System

- TV Cameras can be employed to visually identify illicit connections to the industrial storm drainage system.

Illegal Dumping

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.

- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Once a site has been cleaned:

- Post "No Dumping" signs with a phone number for reporting dumping and disposal.
- Landscaping and beautification efforts of hot spots may also discourage future dumping, as well as provide open space and increase property values.
- Lighting or barriers may also be needed to discourage future dumping.
- See fact sheet SC11 Spill Prevention, Control, and Cleanup.

Inspection

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Conduct field investigations of the industrial storm drain system for potential sources of non-stormwater discharges.
- Pro-actively conduct investigations of high priority areas. Based on historical data, prioritize specific geographic areas and/or incident type for pro-active investigations.

Reporting

- A database is useful for defining and tracking the magnitude and location of the problem.
- Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained, and cleaned up or eliminated.
- Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any on-site drainage points observed.
- Document and report annually the results of the program.
- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.

Training

- Training of technical staff in identifying and documenting illegal dumping incidents is required.
- Consider posting the quick reference table near storm drains to reinforce training.
- Train employees to identify non-stormwater discharges and report discharges to the appropriate departments.

- Educate employees about spill prevention and cleanup.
- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Determine and implement appropriate outreach efforts to reduce non-permissible non-stormwater discharges.
- Conduct spill response drills annually (if no events occurred to evaluate your plan) in cooperation with other industries.
- When a responsible party is identified, educate the party on the impacts of his or her actions.

Spill Response and Prevention

- See SC11 Spill Prevention Control and Cleanup.

Other Considerations

- Many facilities do not have accurate, up-to-date schematic drawings.

Requirements

Costs (including capital and operation & maintenance)

- The primary cost is for staff time and depends on how aggressively a program is implemented.
- Cost for containment and disposal is borne by the discharger.
- Illicit connections can be difficult to locate especially if there is groundwater infiltration.
- Indoor floor drains may require re-plumbing if cross-connections to storm drains are detected.

Maintenance (including administrative and staffing)

- Illegal dumping and illicit connection violations requires technical staff to detect and investigate them.

Supplemental Information

Further Detail of the BMP

Illegal Dumping

- Substances illegally dumped on streets and into the storm drain systems and creeks include paints, used oil and other automotive fluids, construction debris, chemicals, fresh concrete, leaves, grass clippings, and pet wastes. All of these wastes cause stormwater and receiving water quality problems as well as clog the storm drain system itself.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots

- Types and quantities (in some cases) of wastes
- Patterns in time of occurrence (time of day/night, month, or year)
- Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
- Responsible parties

One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people at the facility who are aware of the problem and who have the tools to at least identify the incident, if not correct it. Therefore, train field staff to recognize and report the incidents.

What constitutes a "non-stormwater" discharge?

- Non-stormwater discharges to the stormwater collection system may include any water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

Permit Requirements

- Facilities subject to stormwater permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence of non-stormwater discharges. The State's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

Performance Evaluation

- Review annually internal investigation results; assess whether goals were met and what changes or improvements are necessary.
- Obtain feedback from personnel assigned to respond to, or inspect for, illicit connections and illegal dumping incidents.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Spill Prevention, Control & Cleanup SC-11



Photo Credit: Geoff Brosseau

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

Many activities that occur at an industrial or commercial site have the potential to cause accidental or illegal spills. Preparation for accidental or illegal spills, with proper training and reporting systems implemented, can minimize the discharge of pollutants to the environment.

Spills and leaks are one of the largest contributors of stormwater pollutants. Spill prevention and control plans are applicable to any site at which hazardous materials are stored or used. An effective plan should have spill prevention and response procedures that identify potential spill areas, specify material handling procedures, describe spill response procedures, and provide spill clean-up equipment. The plan should take steps to identify and characterize potential spills, eliminate and reduce spill potential, respond to spills when they occur in an effort to prevent pollutants from entering the stormwater drainage system, and train personnel to prevent and control future spills.

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Approach

Pollution Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- Develop a Spill Prevention Control and Countermeasure (SPCC) Plan. The plan should include:

- Description of the facility, owner and address, activities and chemicals present
- Facility map
- Notification and evacuation procedures
- Cleanup instructions
- Identification of responsible departments
- Identify key spill response personnel

- Recycle, reclaim, or reuse materials whenever possible. This will reduce the amount of process materials that are brought into the facility.

Suggested Protocols (including equipment needs)

Spill Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- If consistent illegal dumping is observed at the facility:
  - Post "No Dumping" signs with a phone number for reporting illegal dumping and disposal. Signs should also indicate fines and penalties applicable for illegal dumping.
  - Landscaping and beautification efforts may also discourage illegal dumping.
  - Bright lighting and/or entrance barriers may also be needed to discourage illegal dumping.

- Store and contain liquid materials in such a manner that if the tank is ruptured, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters, or groundwater.

- If the liquid is oil, gas, or other material that separates from and floats on water, install a spill control device (such as a tee section) in the catch basins that collects runoff from the storage tank area.

- Routine maintenance:
  - Place drip pans or absorbent materials beneath all mounted taps, and at all potential drip and spill locations during filling and unloading of tanks. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.
  - Store and maintain appropriate spill cleanup materials in a location known to all near the tank storage area; and ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.
  - Sweep and clean the storage area monthly if it is paved, *do not hose down the area to a storm drain.*

  - Check tanks (and any containment sumps) daily for leaks and spills. Replace tanks that are leaking, corroded, or otherwise deteriorating with tanks in good condition. Collect all spilled liquids and properly dispose of them.

- Label all containers according to their contents (e.g., solvent, gasoline).
- Label hazardous substances regarding the potential hazard (corrosive, radioactive, flammable, explosive, poisonous).
- Prominently display required labels on transported hazardous and toxic materials (per US DOT regulations).
- Identify key spill response personnel.

Spill Control and Cleanup Activities

- Follow the Spill Prevention Control and Countermeasure Plan.
- Clean up leaks and spills immediately.
- Place a stockpile of spill cleanup materials where it will be readily accessible (e.g., near storage and maintenance areas).
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste. Physical methods for the cleanup of dry chemicals include the use of brooms, shovels, sweepers, or plows.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Chemical cleanups of material can be achieved with the use of adsorbents, gels, and foams. Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Reporting

- Report spills that pose an immediate threat to human health or the environment to the Regional Water Quality Control Board.
- Federal regulations require that any oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour).
- Report spills to local agencies, such as the fire department; they can assist in cleanup.
- Establish a system for tracking incidents. The system should be designed to identify the following:

  - Types and quantities (in some cases) of wastes

  - Patterns in time of occurrence (time of day/night, month, or year)

- Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)

- Responsible parties

Training

- Educate employees about spill prevention and cleanup.

- Well-trained employees can reduce human errors that lead to accidental releases or spills:

  - The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.

  - Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.

- Employees should be educated about aboveground storage tank requirements. Employees responsible for aboveground storage tanks and liquid transfers should be thoroughly familiar with the Spill Prevention Control and Countermeasure Plan and the plan should be readily available.

- Train employees to recognize and report illegal dumping incidents.

Other Considerations (Limitations and Regulations)

- State regulations exist for facilities with a storage capacity of 10,000 gallons or more of petroleum to prepare a Spill Prevention Control and Countermeasure (SPCC) Plan (Health & Safety Code Chapter 6.67).

- State regulations also exist for storage of hazardous materials (Health & Safety Code Chapter 6.95), including the preparation of area and business plans for emergency response to the releases or threatened releases.

- Consider requiring smaller secondary containment areas (less than 200 sq. ft.) to be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

Requirements

Costs (including capital and operation & maintenance)

- Will vary depending on the size of the facility and the necessary controls.

- Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil or water can be quite expensive.

Maintenance (including administrative and staffing)

- This BMP has no major administrative or staffing requirements. However, extra time is needed to properly handle and dispose of spills, which results in increased labor costs.

Supplemental Information

Further Detail of the BMP

Reporting

Record keeping and internal reporting represent good operating practices because they can increase the efficiency of the facility and the effectiveness of BMPs. A good record keeping system helps the facility minimize incident recurrence, correctly respond with appropriate cleanup activities, and comply with legal requirements. A record keeping and reporting system should be set up for documenting spills, leaks, and other discharges, including discharges of hazardous substances in reportable quantities. Incident records describe the quality and quantity of non-stormwater discharges to the storm sewer. These records should contain the following information:

- Date and time of the incident
- Weather conditions
- Duration of the spill/leak/discharge
- Cause of the spill/leak/discharge
- Response procedures implemented
- Persons notified
- Environmental problems associated with the spill/leak/discharge

Separate record keeping systems should be established to document housekeeping and preventive maintenance inspections, and training activities. All housekeeping and preventive maintenance inspections should be documented. Inspection documentation should contain the following information:

- The date and time the inspection was performed
- Name of the inspector
- Items inspected
- Problems noted
- Corrective action required
- Date corrective action was taken

Other means to document and record inspection results are field notes, timed and dated photographs, videotapes, and drawings and maps.

Aboveground Tank Leak and Spill Control

Accidental releases of materials from aboveground liquid storage tanks present the potential for contaminating stormwater with many different pollutants. Materials spilled, leaked, or lost from

tanks may accumulate in soils or on impervious surfaces and be carried away by stormwater runoff.

The most common causes of unintentional releases are:

- Installation problems
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves)
- External corrosion and structural failure
- Spills and overfills due to operator error
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be impervious and paved with Portland cement concrete, free of cracks and gaps, in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of all of the containers or 110 percent of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- For used oil or dangerous waste, a dead-end sump should be installed in the drain.
- All other liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanger, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.

- Visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Frequently relocate accumulated stormwater during the wet season.
- Periodically conduct integrity testing by a qualified professional.

Vehicle Leak and Spill Control

Major spills on roadways and other public areas are generally handled by highly trained Hazmat teams from local fire departments or environmental health departments. The measures listed below pertain to leaks and smaller spills at vehicle maintenance shops.

In addition to implementing the spill prevention, control, and clean up practices above, use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- Perform all vehicle fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills.
- Regularly inspect vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Immediately drain all fluids from wrecked vehicles.
- Store wrecked vehicles or damaged equipment under cover.
- Place drip pans or absorbent materials under heavy equipment when not in use.
- Use adsorbent materials on small spills rather than hosing down the spill.
- Remove the adsorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.

- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- Design the fueling area to prevent the run-on of stormwater and the runoff of spills:
  - Cover fueling area if possible.
  - Use a perimeter drain or slope pavement inward with drainage to a sump.
  - Pave fueling area with concrete rather than asphalt.
- If dead-end sump is not used to collect spills, install an oil/water separator.
- Install vapor recovery nozzles to help control drips as well as air pollution.
- Discourage "topping-off' of fuel tanks.
- Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- Use adsorbent materials on small spills and general cleaning rather than hosing down the area. Remove the adsorbent materials promptly.
- Carry out all Federal and State requirements regarding underground storage tanks, or install above ground tanks.
- Do not use mobile fueling of mobile industrial equipment around the facility; rather, transport the equipment to designated fueling areas.
- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Train employees in proper fueling and cleanup procedures.

Industrial Spill Prevention Response

For the purposes of developing a spill prevention and response program to meet the stormwater regulations, facility managers should use information provided in this fact sheet and the spill prevention/response portions of the fact sheets in this handbook, for specific activities. The program should:

- Integrate with existing emergency response/hazardous materials programs (e.g., Fire Department)
- Develop procedures to prevent/mitigate spills to storm drain systems
- Identify responsible departments
- Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures
- Address spills at municipal facilities, as well as public areas

- Provide training concerning spill prevention, response and cleanup to all appropriate personnel

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Stormwater Managers Resource Center http://www.stormwatercenter.net/

Outdoor Loading/Unloading SC-30



Photo Credit: Geoff Brosseau

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

The loading/unloading of materials usually takes place outside on docks or terminals; therefore, materials spilled, leaked, or lost during loading/unloading may collect in the soil or on other surfaces and have the potential to be carried away by stormwater runoff or when the area is cleaned. Additionally, rainfall may wash pollutants from machinery used to unload or move materials. Implementation of the following protocols will prevent or reduce the discharge of pollutants to stormwater from outdoor loading/unloading of materials.

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Keep accurate maintenance logs to evaluate materials removed and improvements made.
- Park tank trucks or delivery vehicles in designated areas so that spills or leaks can be contained.
- Limit exposure of material to rainfall whenever possible.
- Prevent stormwater run-on.
- Check equipment regularly for leaks.

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Suggested Protocols

Loading and Unloading – General Guidelines

- Develop an operations plan that describes procedures for loading and/or unloading.
- Conduct loading and unloading in dry weather if possible.
- Cover designated loading/unloading areas to reduce exposure of materials to rain.
- Consider placing a seal or door skirt between delivery vehicles and building to prevent exposure to rain.
- Design loading/unloading area to prevent stormwater run-on, which would include grading or berming the area, and position roof downspouts so they direct stormwater away from the loading/unloading areas.
- Have employees load and unload all materials and equipment in covered areas such as building overhangs at loading docks if feasible.
- Load/unload only at designated loading areas.
- Use drip pans underneath hose and pipe connections and other leak-prone spots during liquid transfer operations, and when making and breaking connections. Several drip pans should be stored in a covered location near the liquid transfer area so that they are always available, yet protected from precipitation when not in use. Drip pans can be made specifically for railroad tracks. Drip pans must be cleaned periodically, and drip collected materials must be disposed of properly.
- Pave loading areas with concrete instead of asphalt.
- Avoid placing storm drains in the area.
- Grade and/or berm the loading/unloading area to a drain that is connected to a deadend.

Inspection

- Check loading and unloading equipment regularly for leaks, including valves, pumps, flanges and connections.
- Look for dust or fumes during loading or unloading operations.

Training

- Train employees (e.g., fork lift operators) and contractors on proper spill containment and cleanup.
- Have employees trained in spill containment and cleanup present during loading/unloading.
- Train employees in proper handling techniques during liquid transfers to avoid spills.
- Make sure forklift operators are properly trained on loading and unloading procedures.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Contain leaks during transfer.
- Store and maintain appropriate spill cleanup materials in a location that is readily accessible and known to all and ensure that employees are familiar with the site's spill control plan and proper spill cleanup procedures.
- Have an emergency spill cleanup plan readily available.
- Use drip pans or comparable devices when transferring oils, solvents, and paints.

Other Considerations (Limitations and Regulations)

- Space and time limitations may preclude all transfers from being performed indoors or under cover.
- It may not be possible to conduct transfers only during dry weather.

Requirements

Costs

Costs should be low except when covering a large loading/unloading area.

Maintenance

- Conduct regular inspections and make repairs as necessary. The frequency of repairs will depend on the age of the facility.
- Check loading and unloading equipment regularly for leaks.
- Conduct regular broom dry-sweeping of area.

Supplemental Information

Further Detail of the BMP

Special Circumstances for Indoor Loading/Unloading of Materials

Loading or unloading of liquids should occur in the manufacturing building so that any spills that are not completely retained can be discharged to the sanitary sewer, treatment plant, or treated in a manner consistent with local sewer authorities and permit requirements.

- For loading and unloading tank trucks to above and below ground storage tanks, the following procedures should be used:
  - The area where the transfer takes place should be paved. If the liquid is reactive with the asphalt, Portland cement should be used to pave the area.
  - The transfer area should be designed to prevent run-on of stormwater from adjacent areas. Sloping the pad and using a curb, like a speed bump, around the uphill side of the transfer area should reduce run-on.

- The transfer area should be designed to prevent runoff of spilled liquids from the area. Sloping the area to a drain should prevent runoff. The drain should be connected to a dead-end sump or to the sanitary sewer. A positive control valve should be installed on the drain.

- For transfer from rail cars to storage tanks that must occur outside, use the following procedures:

  - Drip pans should be placed at locations where spillage may occur, such as hose connections, hose reels, and filler nozzles. Use drip pans when making and breaking connections.

  - Drip pan systems should be installed between the rails to collect spillage from tank cars.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Outdoor Equipment Operations SC-32

Description

Outside process equipment operations and maintenance can contaminate stormwater runoff. Activities, such as grinding, painting, coating, sanding, degreasing or parts cleaning, landfills and waste piles, solid waste treatment and disposal, are examples of process operations that can lead to contamination of stormwater runoff. Source controls for outdoor process equipment operations and maintenance include reducing the amount of waste created, enclosing or covering all or some of the equipment, installing secondary containment, and training employees.

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Approach

Pollution Prevention

- Perform the activity during dry periods.
- Use non-toxic chemicals for maintenance and minimize or eliminate the use of solvents.

Targeted Constituents

Sediment	✓
Nutrients	
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Suggested Protocols

- Consider enclosing the activity in a building and connecting the floor drains to the sanitary sewer.
- Cover the work area with a permanent roof if possible.
- Minimize contact of stormwater with outside process equipment operations through berming and drainage routing (run-on prevention). If possible, connect process equipment area to public sewer or facility wastewater treatment system. Some municipalities require that secondary containment areas be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.
- Dry clean the work area regularly.

Training

- Train employees to perform the activity during dry periods only or substituting benign materials for more toxic ones.
- Train employee and contractors in proper techniques for spill containment and cleanup. Employees should have the tools and knowledge to immediately begin cleaning up a spill should one occur.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.

- Have employees trained in emergency spill cleanup procedures present when dangerous waste, liquid chemicals, or other wastes are delivered.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Prevent operator errors by using engineering safe guards and thus reducing accidental releases of pollutant.
- Inspect storage areas regularly for leaks or spills. Also check for structural failure, spills and overfills due to operator error, and/or failure of piping system.

Other Considerations

- Providing cover may be expensive.
- Space limitations may preclude enclosing some equipment.
- Storage sheds often must meet building and fire code requirements.

Requirements

Costs

Costs vary depending on the complexity of the operation and the amount of control necessary for stormwater pollution control.

Maintenance

- Conduct routine preventive maintenance, including checking process equipment for leaks.
- Clean the storm drain system regularly.

Supplemental Information

Further Detail of the BMP

Hydraulic/Treatment Modifications

If stormwater becomes polluted, it should be captured and treated. If you do not have your own process wastewater treatment system, consider discharging to the public sewer system. Use of the public sewer might be allowed under the following conditions:

- If the activity area is very small (less than a few hundred square feet), the local sewer authority may be willing to allow the area to remain uncovered with the drain connected to the public sewer.
- It may be possible under unusual circumstances to connect a much larger area to the public sewer, as long as the rate of stormwater discharges does not exceed the capacity of the wastewater treatment plant. The stormwater could be stored during the storm and then transferred to the public sewer when the normal flow is low, such as at night.

Industries that generate large volumes of process wastewater typically have their own treatment system and corresponding permit. These industries have the discretion to use their wastewater treatment system to treat stormwater within the constraints of their permit requirements for process treatment. It may also be possible for the industry to discharge the stormwater directly to an effluent outfall without treatment as long as the total loading of the discharged process

water and stormwater does not exceed the loading had a stormwater treatment device been used. This could be achieved by reducing the loading from the process wastewater treatment system. Check with your Regional Water Quality Control Board or local sewering agency, as this option would be subject to permit constraints and potentially regular monitoring.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Stormwater Managers Resource Center http://www.stormwatercenter.net

Waste Handling & Disposal SC-34



Photo Credit: Geoff Brosseau

Description

Improper storage and handling of solid wastes can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter stormwater runoff. The discharge of pollutants to stormwater from waste handling and disposal can be prevented and reduced by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, reuse, and recycling; and preventing run-on and runoff.

Approach

Pollution Prevention

- Accomplish reduction in the amount of waste generated using the following source controls:
  - Production planning and sequencing
  - Process or equipment modification
  - Raw material substitution or elimination
  - Loss prevention and housekeeping
  - Waste segregation and separation
  - Close loop recycling
- Establish a material tracking system to increase awareness about material usage. This may reduce spills and minimize contamination, thus reducing the amount of waste produced.
- Recycle materials whenever possible.

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

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Suggested Protocols

General

- Cover storage containers with leak proof lids or some other means. If waste is not in containers, cover all waste piles (plastic tarps are acceptable coverage) and prevent stormwater run-on and runoff with a berm. The waste containers or piles must be covered except when in use.
- Use drip pans or absorbent materials whenever grease containers are emptied by vacuum trucks or other means. Grease cannot be left on the ground. Collected grease must be properly disposed of as garbage.
- Check storage containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.
- Sweep and clean the storage area regularly. If it is paved, do not hose down the area to a storm drain.
- Dispose of rinse and wash water from cleaning waste containers into a sanitary sewer if allowed by the local sewer authority. Do not discharge wash water to the street or storm drain.
- Transfer waste from damaged containers into safe containers.
- Take special care when loading or unloading wastes to minimize losses. Loading systems can be used to minimize spills and fugitive emission losses such as dust or mist. Vacuum transfer systems can minimize waste loss.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide a sufficient number of litter receptacles for the facility.
- Clean out and cover litter receptacles frequently to prevent spillage.

Waste Collection

- Keep waste collection areas clean.
- Inspect solid waste containers for structural damage regularly. Repair or replace damaged containers as necessary.
- Secure solid waste containers; containers must be closed tightly when not in use.
- Do not fill waste containers with washout water or any other liquid.
- Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc., may not be disposed of in solid waste containers (see chemical/ hazardous waste collection section below).

- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal.

Good Housekeeping

- Use all of the product before disposing of the container.
- Keep the waste management area clean at all times by sweeping and cleaning up spills immediately.
- Use dry methods when possible (e.g., sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.

Chemical/Hazardous Wastes

- Select designated hazardous waste collection areas on-site.
- Store hazardous materials and wastes in covered containers and protect them from vandalism.
- Place hazardous waste containers in secondary containment.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Stencil or demarcate storm drains on the facility's property with prohibitive message regarding waste disposal.

Run-on/Runoff Prevention

- Prevent stormwater run-on from entering the waste management area by enclosing the area or building a berm around the area.
- Prevent waste materials from directly contacting rain.
- Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropyleneor hypalon.
- Cover the area with a permanent roof if feasible.
- Cover dumpsters to prevent rain from washing waste out of holes or cracks in the bottom of the dumpster.
- Move the activity indoor after ensuring all safety concerns such as fire hazard and ventilation are addressed.

Inspection

- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- Check waste management areas for leaking containers or spills.

- Repair leaking equipment including valves, lines, seals, or pumps promptly.

Training

- Train staff in pollution prevention measures and proper disposal methods.
- Train employees and contractors in proper spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.
- Train employees and subcontractors in proper hazardous waste management.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Have an emergency plan, equipment and trained personnel ready at all times to deal immediately with major spills
- Collect all spilled liquids and properly dispose of them.
- Store and maintain appropriate spill cleanup materials in a location known to all near the designated wash area.
- Ensure that vehicles transporting waste have spill prevention equipment that can prevent spills during transport. Spill prevention equipment includes:
  - Vehicles equipped with baffles for liquid waste
  - Trucks with sealed gates and spill guards for solid waste

Other Considerations (Limitations and Regulations)

Hazardous waste cannot be reused or recycled; it must be disposed of by a licensed hazardous waste hauler.

Requirements

Costs

Capital and O&M costs for these programs will vary substantially depending on the size of the facility and the types of waste handled. Costs should be low if there is an inventory program in place.

Maintenance

- None except for maintaining equipment for material tracking program.

Supplemental Information

Further Detail of the BMP

Land Treatment System

Minimize runoff of polluted stormwater from land application by:

- Choosing a site where slopes are under 6%, the soil is permeable, there is a low water table, it is located away from wetlands or marshes, and there is a closed drainage system

- Avoiding application of waste to the site when it is raining or when the ground is saturated with water
- Growing vegetation on land disposal areas to stabilize soils and reduce the volume of surface water runoff from the site
- Maintaining adequate barriers between the land application site and the receiving waters (planted strips are particularly good)
- Using erosion control techniques such as mulching and matting, filter fences, straw bales, diversion terracing, and sediment basins
- Performing routine maintenance to ensure the erosion control or site stabilization measures are working

Examples

The port of Long Beach has a state-of-the-art database for identifying potential pollutant sources, documenting facility management practices, and tracking pollutants.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

Solid Waste Container Best Management Practices – Fact Sheet On-Line Resources – Environmental Health and Safety. Harvard University. 2002.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Safer Alternative Products SC-35

Description

Promote the use of less harmful products and products that contain little or no TMDL pollutants. Alternatives exist for most product classes including chemical fertilizers, pesticides, cleaning solutions, janitorial chemicals, automotive and paint products, and consumables (batteries, fluorescent lamps).

Approach

Pattern a new program after the many established programs around the state and country. Integrate this best management practice as much as possible with existing programs at your facility.

Develop a comprehensive program based on:

- The "Precautionary Principle," which is an alternative to the "Risk Assessment" model that says it's acceptable to use a potentially harmful product until physical evidence of its harmful effects are established and deemed too costly from an environmental or public health perspective. For instance, a risk assessment approach might say it's acceptable to use a pesticide until there is direct proof of an environmental impact. The Precautionary Principle approach is used to evaluate whether a given product is safe, whether it is really necessary, and whether alternative products would perform just as well.
- Environmentally Preferable Purchasing Program to minimize the purchase of products containing hazardous ingredients used in the facility's custodial services, fleet maintenance, and facility maintenance in favor of using alternate products that pose less risk to employees and to the environment.
- Integrated Pest Management (IPM) or Less-Toxic Pesticide Program, which uses a pest management approach that minimizes the use of toxic chemicals and gets rid of pests by methods that pose a lower risk to employees, the public, and the environment.
- Energy Efficiency Program including no-cost and low-cost energy conservation and efficiency actions that can reduce both energy consumption and electricity bills, along with long-term energy efficiency investments.

Consider the following mechanisms for developing and implementing a comprehensive program:

- Policies

Objectives

- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	
Nutrients	✓
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

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- Procedures
  - Standard operating procedures (SOPs)
  - Purchasing guidelines and procedures
  - Bid packages (services and supplies)
- Materials
  - Preferred or approved product and supplier lists
  - Product and supplier evaluation criteria
  - Training sessions and manuals
  - Fact sheets for employees

Implement this BMP in conjunction with the Vehicle and Equipment Management fact sheets (SC20 – SC22) and SC41, Building and Grounds Maintenance.

Training

- Employees who handle potentially harmful materials in the use of safer alternatives.
- Purchasing departments should be encouraged to procure less hazardous materials and products that contain little or no harmful substances or TMDL pollutants.

Regulations

This BMP has no regulatory requirements. Existing regulations already encourage facilities to reduce the use of hazardous materials through incentives such as reduced:

- Specialized equipment storage and handling requirements,
- Storm water runoff sampling requirements,
- Training and licensing requirements, and
- Record keeping and reporting requirements.

Equipment

- There are no major equipment requirements to this BMP.

Limitations

- Alternative products may not be available, suitable, or effective in every case.

Requirements

Cost Considerations

- The primary cost is for staff time to: 1) develop new policies and procedures and 2) educate purchasing departments and employees who handle potentially harmful materials about the availability, procurement, and use of safer alternatives.

- Some alternative products may be slightly more expensive than conventional products.

Supplemental Information

Employees and contractors / service providers can both be educated about safer alternatives by using information developed by a number of organizations including the references and resources listed below.

The following discussion provides some general information on safer alternatives. More specific information on particular hazardous materials and the available alternatives may be found in the references and resources listed below.

- Automotive products – Less toxic alternatives are not available for many automotive products, especially engine fluids. But there are alternatives to grease lubricants, car polishes, degreasers, and windshield washer solution. Rerefined motor oil is also available.
- Vehicle/Trailer lubrication – Fifth wheel bearings on trucks require routine lubrication. Adhesive lubricants are available to replace typical chassis grease.
- Cleaners – Vegetables-based or citrus-based soaps are available to replace petroleum-based soaps/detergents.
- Paint products – Water-based paints, wood preservatives, stains, and finishes are available.
- Pesticides – Specific alternative products or methods exist to control most insects, fungi, and weeds.
- Chemical Fertilizers – Compost and soil amendments are natural alternatives.
- Consumables – Manufacturers have either reduced or are in the process of reducing the amount of heavy metals in consumables such as batteries and fluorescent lamps. All fluorescent lamps contain mercury, however low-mercury containing lamps are now available from most hardware and lighting stores. Fluorescent lamps are also more energy efficient than the average incandescent lamp.
- Janitorial chemicals – Even biodegradable soap can harm fish and wildlife before it biodegrades. Biodegradable does not mean non-toxic. Safer products and procedures are available for floor stripping and cleaning, as well as carpet, glass, metal, and restroom cleaning and disinfecting.

Examples

There are a number of business and trade associations, and communities with effective programs. Some of the more prominent are listed below in the references and resources section.

References and Resources

Note: Many of these references provide alternative products for materials that typically are used inside and disposed to the sanitary sewer as well as alternatives to products that usually end up in the storm drain.

General Sustainable Practices and Pollution Prevention Including Pollutant-Specific Information

California Department of Toxic Substances Control (www.dtsc.ca.gov)

California Integrated Waste Management Board (www.ciwmb.ca.gov)

City of Santa Monica (www.santa-monica.org/environment)

City of Palo Alto (www.city.palo-alto.ca.us/cleanbay)

City and County of San Francisco, Department of the Environment (www.ci.sf.ca.us/sfenvironment)

Earth 911 (www.earth911.org/master.asp)

Environmental Finance Center Region IX (www.greenstart.org/efc9)

Flex Your Power (www.flexyourpower.ca.gov)

GreenBiz.com (www.greenbiz.com)

Green Business Program (www.abag.org/bayarea/enviro/gbus/gb.html)

Pacific Industrial and Business Association (www.piba.org)

Sacramento Clean Water Business Partners (www.sacstormwater.org)

USEPA BMP fact sheet – Alternative products (http://cfpub.epa.gov/npdes/stormwater/menuofbmps/poll_2.cfm)

USEPA Region IX Pollution Prevention Program (www.epa.gov/region09/p2)

Western Regional Pollution Prevention Network (www.westp2net.org)

Metals (mercury, copper)

National Electrical Manufacturers Association - Environment, Health and Safety (www.nema.org)

Sustainable Conservation (www.suscon.org)

- Auto Recycling Project
- Brake Pad Partnership

Pesticides and Chemical Fertilizers

Bio-Integral Resource Center (www.birc.org)

California Department of Pesticide Regulation (www.cdpr.ca.gov)

University of California Statewide IPM Program (www.ipm.ucdavis.edu/default.html)

Dioxins

Bay Area Dioxins Project (http://dioxin.abag.ca.gov/)

Building & Grounds Maintenance SC-41



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	
Organics	

Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, abnormal pH, and oils and greases. Utilizing the protocols in this fact sheet will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.

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- Encourage use of Integrated Pest Management techniques for pest control.
- Encourage proper onsite recycling of yard trimmings.
- Recycle residual paints, solvents, lumber, and other material as much as possible.

Suggested Protocols

Pressure Washing of Buildings, Rooftops, and Other Large Objects

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.
- If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff.
- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement.

Landscaping Activities

- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures on exposed soils.

Building Repair, Remodeling, and Construction

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.
- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.
- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.
- Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.
- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. This is particularly necessary on rainy days. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. If directed off-site, you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- Store toxic material under cover during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

Mowing, Trimming, and Planting

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures when soils are exposed.
- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Consider an alternative approach when bailing out muddy water: do not put it in the storm drain; pour over landscaped areas.
- Use hand weeding where practical.

Fertilizer and Pesticide Management

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- Use less toxic pesticides that will do the job when applicable. Avoid use of copper-based pesticides if possible.
- Do not use pesticides if rain is expected.
- Do not mix or prepare pesticides for application near storm drains.
- Use the minimum amount needed for the job.
- Calibrate fertilizer distributors to avoid excessive application.
- Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.
- Apply pesticides only when wind speeds are low.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Dispose of empty pesticide containers according to the instructions on the container label.

- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering and repair leaks in the irrigation system as soon as they are observed.

Training

- Educate and train employees on pesticide use and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the nature of the staff.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.
- Familiarize employees with the Spill Prevention Control and Countermeasure Plan.
- Clean up spills immediately.

Other Considerations

Alternative pest/weed controls may not be available, suitable, or effective in many cases.

Requirements

Costs

- Cost will vary depending on the type and size of facility.
- Overall costs should be low in comparison to other BMPs.

Maintenance

Sweep paved areas regularly to collect loose particles. Wipe up spills with rags and other absorbent material immediately, do not hose down the area to a storm drain.

Supplemental Information

Further Detail of the BMP

Fire Sprinkler Line Flushing

Building fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping, but it is subject to rusting and results in lower quality water. Initially, the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time (typically a year) and between flushes may accumulate iron, manganese, lead, copper, nickel, and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Mobile Cleaners Pilot Program: Final Report. 1997. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Building Repair and Construction SC-42



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Recycle

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Description

Modifications are common particularly at large industrial sites. The activity may vary from minor and normal building repair to major remodeling, or the construction of new facilities. These activities can generate pollutants including solvents, paints, paint and varnish removers, finishing residues, spent thinners, soap cleaners, kerosene, asphalt and concrete materials, adhesive residues, and old asbestos installation. Protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants to stormwater from building repair, remodeling, and construction by using soil erosion controls, enclosing or covering building material storage areas, using good housekeeping practices, using safer alternative products, and training employees.

Approach

Pollution Prevention

- Recycle residual paints, solvents, lumber, and other materials to the maximum extent practical.
- Buy recycled products to the maximum extent practical.
- Inform on-site contractors of company policy on these matters and include appropriate provisions in their contract to ensure certain proper housekeeping and disposal practices are implemented.

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- Make sure that nearby storm drains are well marked to minimize the chance of inadvertent disposal of residual paints and other liquids.

Suggested Protocols

Repair & Remodeling

- Follow BMPs identified in Construction BMP Handbook.
- Maintain good housekeeping practices while work is underway.
- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep the area.
- Cover materials of particular concern that must be left outside, particularly during the rainy season.
- Do not dump waste liquids down the storm drain.
- Dispose of wash water, sweepings, and sediments properly.
- Store materials properly that are normally used in repair and remodeling such as paints and solvents.
- Sweep out the gutter or wash the gutter and trap the particles at the outlet of the downspout if when repairing roofs, small particles have accumulated in the gutter. A sock or geofabric placed over the outlet may effectively trap the materials. If the downspout is tight lined, place a temporary plug at the first convenient point in the storm drain and pump out the water with a vactor truck, and clean the catch basin sump where you placed the plug.
- Properly store and dispose waste materials generated from construction activities. See Construction BMP Handbook.
- Clean the storm drain system in the immediate vicinity of the construction activity after it is completed.

Painting

- Enclose painting operations consistent with local air quality regulations and OSHA.
- Local air pollution regulations may, in many areas of the state, specify painting procedures which if properly carried out are usually sufficient to protect water quality.
- Develop paint handling procedures for proper use, storage, and disposal of paints.
- Transport paint and materials to and from job sites in containers with secure lids and tied down to the transport vehicle.
- Test and inspect spray equipment prior to starting to paint. Tighten all hoses and connections and do not overfill paint containers.
- Mix paint indoors before using so that any spill will not be exposed to rain. Do so even during dry weather because cleanup of a spill will never be 100% effective.
- Transfer and load paint and hot thermoplastic away from storm drain inlets.

- Do not transfer or load paint near storm drain inlets.
- Plug nearby storm drain inlets prior to starting painting and remove plugs when job is complete when there is significant risk of a spill reaching storm drains.
- Cover nearby storm drain inlets prior to starting work if sand blasting is used to remove paint.
- Use a ground cloth to collect the chips if painting requires scraping or sand blasting of the existing surface. Dispose the residue properly.
- Cover or enclose painting operations properly to avoid drift.
- Clean the application equipment in a sink that is connected to the sanitary sewer if using water based paints.
- Capture all cleanup-water and dispose of properly.
- Dispose of paints containing lead or tributyl tin and considered a hazardous waste properly.
- Store leftover paints if they are to be kept for the next job properly, or dispose properly.
- Recycle paint when possible. Dispose of paint at an appropriate household hazardous waste facility.

Training

Proper education of off-site contractors is often overlooked. The conscientious efforts of well trained employees can be lost by unknowing off-site contractors, so make sure they are well informed about what they are expected to do.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Clean up spills immediately.
- Excavate and remove the contaminated (stained) soil if a spill occurs on dirt.

Limitations

- This BMP is for minor construction only. The State's General Construction Activity Stormwater Permit has more requirements for larger projects. The companion "Construction Best Management Practice Handbook" contains specific guidance and best management practices for larger-scale projects.
- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Be certain that actions to help stormwater quality are consistent with Cal- and Fed-OSHA and air quality regulations.

SC-42 Building Repair and Construction

Requirements

Costs

These BMPs are generally low to modest in cost.

Maintenance

N/A

Supplemental Information

Further Detail of the BMP

Soil/Erosion Control

If the work involves exposing large areas of soil, employ the appropriate soil erosion and control techniques. See the Construction Best Management Practice Handbook. If old buildings are being torn down and not replaced in the near future, stabilize the site using measures described in SC-40 Contaminated or Erodible Areas.

If a building is to be placed over an open area with a storm drainage system, make sure the storm inlets within the building are covered or removed, or the storm line is connected to the sanitary sewer. If because of the remodeling a new drainage system is to be installed or the existing system is to be modified, consider installing catch basins as they serve as effective "in-line" treatment devices. See Treatment Control Fact Sheet TC-20 Wet Pond/Basin in Section 5 of the New Development and Redevelopment Handbook regarding design criteria. Include in the catch basin a "turn-down" elbow or similar device to trap floatables.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Parking/Storage Area Maintenance SC-43



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Description

Parking lots and storage areas can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking/storage areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas and storage areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Encourage alternative designs and maintenance strategies for impervious parking lots. (See New Development and Redevelopment BMP Handbook)
- Keep accurate maintenance logs to evaluate BMP implementation.

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SC-43 Parking/Storage Area Maintenance

Suggested Protocols

General

- Keep the parking and storage areas clean and orderly. Remove debris in a timely fashion.
- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.
- Discharge soapy water remaining in mop or wash buckets to the sanitary sewer through a sink, toilet, clean-out, or wash area with drain.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Provide trash receptacles in parking lots to discourage litter.
- Routinely sweep, shovel, and dispose of litter in the trash.

Surface Cleaning

- Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- Sweep all parking lots at least once before the onset of the wet season.
- Follow the procedures below if water is used to clean surfaces:
  - Block the storm drain or contain runoff.
  - Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
  - Dispose of parking lot sweeping debris and dirt at a landfill.
- Follow the procedures below when cleaning heavy oily deposits:
  - Clean oily spots with absorbent materials.
  - Use a screen or filter fabric over inlet, then wash surfaces.

- Do not allow discharges to the storm drain.
- Vacuum/pump discharges to a tank or discharge to sanitary sewer.
- Appropriately dispose of spilled materials and absorbents.

Surface Repair

- Preheat, transfer or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff.
- Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.
- Use only as much water as necessary for dust control, to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

Inspection

- Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.
- Inspect cleaning equipment/sweepers for leaks on a regular basis.

Training

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up fluid spills immediately with absorbent rags or material.
- Dispose of spilled material and absorbents properly.

Other Considerations

Limitations related to sweeping activities at large parking facilities may include high equipment costs, the need for sweeper operator training, and the inability of current sweeper technology to remove oil and grease.

SC-43 Parking/Storage Area Maintenance

Requirements

Costs

Cleaning/sweeping costs can be quite large. Construction and maintenance of stormwater structural controls can be quite expensive as well.

Maintenance

- Sweep parking lot regularly to minimize cleaning with water.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Clean parking facilities regularly to prevent accumulated wastes and pollutants from being discharged into conveyance systems during rainy conditions.

Supplemental Information

Further Detail of the BMP

Surface Repair

Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff. Where applicable, cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal. Only use only as much water as is necessary for dust control to avoid runoff.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

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Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Drainage System Maintenance SC-44



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and stormwater that may contain certain pollutants. The protocols in this fact sheet are intended to reduce pollutants reaching receiving waters through proper conveyance system operation and maintenance.

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	
Bacteria	✓
Oil and Grease	
Organics	

Approach

Pollution Prevention

Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Suggested Protocols

Catch Basins/Inlet Structures

- Staff should regularly inspect facilities to ensure compliance with the following:
  - Immediate repair of any deterioration threatening structural integrity.
  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
  - Stenciling of catch basins and inlets (see SC34 Waste Handling and Disposal).

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- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

Storm Drain Conveyance System

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

Pump Stations

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

Open Channel

- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS.

Illicit Connections and Discharges

- Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:
  - Is there evidence of spills such as paints, discoloring, etc?

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.

- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

- Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties
- Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Training

- Train crews in proper maintenance activities, including record keeping and disposal.
- Allow only properly trained individuals to handle hazardous materials/wastes.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).

- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).

- Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

Spill Response and Prevention

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.
- Refer to fact sheet SC-11 Spill Prevention, Control, and Cleanup.

Other Considerations (Limitations and Regulations)

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and prohibition against disposal of flushed effluent to sanitary sewer in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.

Requirements

Costs

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.
- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:

  - Purchase and installation of signs.

  - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.

  - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.

  - Purchase of landfill space to dispose of illegally-dumped items and material.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

Maintenance

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.

Supplemental Information

Further Detail of the BMP

Storm Drain Flushing

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing resuspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm sewer flushing.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

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King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net

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http://www.epa.gov/npdes/menuofbmps/poll_16.htm

Landscape Maintenance SC-73



Objectives

- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	
Bacteria	
Oil and Grease	
Organics	
Oxygen Demanding	☑

Description

Landscape maintenance activities include vegetation removal; herbicide and insecticide application; fertilizer application; watering; and other gardening and lawn care practices. Vegetation control typically involves a combination of chemical (herbicide) application and mechanical methods. All of these maintenance practices have the potential to contribute pollutants to the storm drain system. The major objectives of this BMP are to minimize the discharge of pesticides, herbicides and fertilizers to the storm drain system and receiving waters; prevent the disposal of landscape waste into the storm drain system by collecting and properly disposing of clippings and cuttings, and educating employees and the public.

Approach

Pollution Prevention

- Implement an integrated pest management (IPM) program. IPM is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools.
- Choose low water using flowers, trees, shrubs, and groundcover.
- Consider alternative landscaping techniques such as naturescaping and xeriscaping.
- Conduct appropriate maintenance (i.e. properly timed fertilizing, weeding, pest control, and pruning) to help preserve the landscapes water efficiency.

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- Consider grass cycling (grass cycling is the natural recycling of grass by leaving the clippings on the lawn when mowing. Grass clippings decompose quickly and release valuable nutrients back into the lawn).

Suggested Protocols

Mowing, Trimming, and Weeding

- Whenever possible use mechanical methods of vegetation removal (e.g mowing with tractor-type or push mowers, hand cutting with gas or electric powered weed trimmers) rather than applying herbicides. Use hand weeding where practical.
- Avoid loosening the soil when conducting mechanical or manual weed control, this could lead to erosion. Use mulch or other erosion control measures when soils are exposed.
- Performing mowing at optimal times. Mowing should not be performed if significant rain events are predicted.
- Mulching mowers may be recommended for certain flat areas. Other techniques may be employed to minimize mowing such as selective vegetative planting using low maintenance grasses and shrubs.
- Collect lawn and garden clippings, pruning waste, tree trimmings, and weeds. Chip if necessary, and compost or dispose of at a landfill (see waste management section of this fact sheet).
- Place temporarily stockpiled material away from watercourses, and berm or cover stockpiles to prevent material releases to storm drains.

Planting

- Determine existing native vegetation features (location, species, size, function, importance) and consider the feasibility of protecting them. Consider elements such as their effect on drainage and erosion, hardiness, maintenance requirements, and possible conflicts between preserving vegetation and the resulting maintenance needs.
- Retain and/or plant selected native vegetation whose features are determined to be beneficial, where feasible. Native vegetation usually requires less maintenance (e.g., irrigation, fertilizer) than planting new vegetation.
- Consider using low water use groundcovers when planting or replanting.

Waste Management

- Compost leaves, sticks, or other collected vegetation or dispose of at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Place temporarily stockpiled material away from watercourses and storm drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Reduce the use of high nitrogen fertilizers that produce excess growth requiring more frequent mowing or trimming.

- Avoid landscape wastes in and around storm drain inlets by either using bagging equipment or by manually picking up the material.

Irrigation

- Where practical, use automatic timers to minimize runoff.
- Use popup sprinkler heads in areas with a lot of activity or where there is a chance the pipes may be broken. Consider the use of mechanisms that reduce water flow to sprinkler heads if broken.
- Ensure that there is no runoff from the landscaped area(s) if re-claimed water is used for irrigation.
- If bailing of muddy water is required (e.g. when repairing a water line leak), do not put it in the storm drain; pour over landscaped areas.
- Irrigate slowly or pulse irrigate to prevent runoff and then only irrigate as much as is needed.
- Apply water at rates that do not exceed the infiltration rate of the soil.

Fertilizer and Pesticide Management

- Utilize a comprehensive management system that incorporates integrated pest management (IPM) techniques. There are many methods and types of IPM, including the following:
  - Mulching can be used to prevent weeds where turf is absent, fencing installed to keep rodents out, and netting used to keep birds and insects away from leaves and fruit.
  - Visible insects can be removed by hand (with gloves or tweezers) and placed in soapy water or vegetable oil. Alternatively, insects can be sprayed off the plant with water or in some cases vacuumed off of larger plants.
  - Store-bought traps, such as species-specific, pheromone-based traps or colored sticky cards, can be used.
  - Slugs can be trapped in small cups filled with beer that are set in the ground so the slugs can get in easily.
  - In cases where microscopic parasites, such as bacteria and fungi, are causing damage to plants, the affected plant material can be removed and disposed of (pruning equipment should be disinfected with bleach to prevent spreading the disease organism).
  - Small mammals and birds can be excluded using fences, netting, tree trunk guards.
  - Beneficial organisms, such as bats, birds, green lacewings, ladybugs, praying mantis, ground beetles, parasitic nematodes, trichogramma wasps, seed head weevils, and spiders that prey on detrimental pest species can be promoted.
- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.

- Use pesticides only if there is an actual pest problem (not on a regular preventative schedule).
- Do not use pesticides if rain is expected. Apply pesticides only when wind speeds are low (less than 5 mph).
- Do not mix or prepare pesticides for application near storm drains.
- Prepare the minimum amount of pesticide needed for the job and use the lowest rate that will effectively control the pest.
- Employ techniques to minimize off-target application (e.g. spray drift) of pesticides, including consideration of alternative application techniques.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Calibrate fertilizer and pesticide application equipment to avoid excessive application.
- Periodically test soils for determining proper fertilizer use.
- Sweep pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Purchase only the amount of pesticide that you can reasonably use in a given time period (month or year depending on the product).
- Triple rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Dispose of empty pesticide containers according to the instructions on the container label.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.
- Inspect pesticide/fertilizer equipment and transportation vehicles daily.

Training

- Educate and train employees on use of pesticides and in pesticide application techniques to prevent pollution. Pesticide application must be under the supervision of a California qualified pesticide applicator.
- Train/encourage municipal maintenance crews to use IPM techniques for managing public green areas.
- Annually train employees within departments responsible for pesticide application on the appropriate portions of the agency's IPM Policy, SOPs, and BMPs, and the latest IPM techniques.

- Employees who are not authorized and trained to apply pesticides should be periodically (at least annually) informed that they cannot use over-the-counter pesticides in or around the workplace.
- Use a training log or similar method to document training.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Have spill cleanup materials readily available and in a know in location
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- The Federal Pesticide, Fungicide, and Rodenticide Act and California Title 3, Division 6, Pesticides and Pest Control Operations place strict controls over pesticide application and handling and specify training, annual refresher, and testing requirements. The regulations generally cover: a list of approved pesticides and selected uses, updated regularly; general application information; equipment use and maintenance procedures; and record keeping. The California Department of Pesticide Regulations and the County Agricultural Commission coordinate and maintain the licensing and certification programs. All public agency employees who apply pesticides and herbicides in "agricultural use" areas such as parks, golf courses, rights-of-way and recreation areas should be properly certified in accordance with state regulations. Contracts for landscape maintenance should include similar requirements.
- All employees who handle pesticides should be familiar with the most recent material safety data sheet (MSDS) files.
- Municipalities do not have the authority to regulate the use of pesticides by school districts, however the California Healthy Schools Act of 2000 (AB 2260) has imposed requirements on California school districts regarding pesticide use in schools. Posting of notification prior to the application of pesticides is now required, and IPM is stated as the preferred approach to pest management in schools.

Requirements

Costs

Additional training of municipal employees will be required to address IPM techniques and BMPs. IPM methods will likely increase labor cost for pest control which may be offset by lower chemical costs.

Maintenance

Not applicable

Supplemental Information

Further Detail of the BMP

Waste Management

Composting is one of the better disposal alternatives if locally available. Most municipalities either have or are planning yard waste composting facilities as a means of reducing the amount of waste going to the landfill. Lawn clippings from municipal maintenance programs as well as private sources would probably be compatible with most composting facilities

Contractors and Other Pesticide Users

Municipal agencies should develop and implement a process to ensure that any contractor employed to conduct pest control and pesticide application on municipal property engages in pest control methods consistent with the IPM Policy adopted by the agency. Specifically, municipalities should require contractors to follow the agency's IPM policy, SOPs, and BMPs; provide evidence to the agency of having received training on current IPM techniques when feasible; provide documentation of pesticide use on agency property to the agency in a timely manner.

References and Resources

King County Stormwater Pollution Control Manual. Best Management Practices for Businesses. 1995. King County Surface Water Management. July. On-line: http://dnr.metrokc.gov/wlr/dss/spcm.htm

Los Angeles County Stormwater Quality Model Programs. Public Agency Activities http://ladpw.org/wmd/npdes/model_links.cfm

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July. 1998.

Orange County Stormwater Program http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1997 Urban Runoff Management Plan. September 1997, updated October 2000.

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Landscaping and Lawn Care. Office of Water. Office of Wastewater Management. On-line: http://www.epa.gov/npdes/menuofbmps/poll_8.htm

Efficient Irrigation SD-12



Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

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- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Storm Drain Signage SD-13



Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include “NO DUMPING

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– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.

- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Maintenance Bays & Docks SD-31



Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Description

Several measures can be taken to prevent operations at maintenance bays and loading docks from contributing a variety of toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to the stormwater conveyance system.

Approach

In designs for maintenance bays and loading docks, containment is encouraged. Preventative measures include overflow containment structures and dead-end sumps. However, in the case of loading docks from grocery stores and warehouse/distribution centers, engineered infiltration systems may be considered.

Suitable Applications

Appropriate applications include commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for vehicle maintenance and repair are governed by Building and Fire Codes, and by current local agency ordinances, and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code requirements.

Designing New Installations

Designs of maintenance bays should consider the following:

- Repair/maintenance bays and vehicle parts with fluids should be indoors; or designed to preclude urban run-on and runoff.
- Repair/maintenance floor areas should be paved with Portland cement concrete (or equivalent smooth impervious surface).

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- Repair/maintenance bays should be designed to capture all wash water leaks and spills. Provide impermeable berms, drop inlets, trench catch basins, or overflow containment structures around repair bays to prevent spilled materials and wash-down waters form entering the storm drain system. Connect drains to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm drain system is prohibited. If required by local jurisdiction, obtain an Industrial Waste Discharge Permit.

- Other features may be comparable and equally effective.

The following designs of loading/unloading dock areas should be considered:

- Loading dock areas should be covered, or drainage should be designed to preclude urban run-on and runoff.

- Direct connections into storm drains from depressed loading docks (truck wells) are prohibited.

- Below-grade loading docks from grocery stores and warehouse/distribution centers of fresh food items should drain through water quality inlets, or to an engineered infiltration system, or an equally effective alternative. Pre-treatment may also be required.

- Other features may be comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Stormwater and non-stormwater will accumulate in containment areas and sumps with impervious surfaces. Contaminated accumulated water must be disposed of in accordance with applicable laws and cannot be discharged directly to the storm drain or sanitary sewer system without the appropriate permit.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Trash Storage Areas SD-32

Description

Trash storage areas are areas where a trash receptacle (s) are located for use as a repository for solid wastes. Stormwater runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. Waste handling operations that may be sources of stormwater pollution include dumpsters, litter control, and waste piles.

Approach

This fact sheet contains details on the specific measures required to prevent or reduce pollutants in stormwater runoff associated with trash storage and handling. Preventative measures including enclosures, containment structures, and impervious pavements to mitigate spills, should be used to reduce the likelihood of contamination.

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Design requirements for waste handling areas are governed by Building and Fire Codes, and by current local agency ordinances and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements. Hazardous waste should be handled in accordance with legal requirements established in Title 22, California Code of Regulation.

Wastes from commercial and industrial sites are typically hauled by either public or commercial carriers that may have design or access requirements for waste storage areas. The design criteria in this fact sheet are recommendations and are not intended to be in conflict with requirements established by the waste hauler. The waste hauler should be contacted prior to the design of your site trash collection areas. Conflicts or issues should be discussed with the local agency.

Designing New Installations

Trash storage areas should be designed to consider the following structural or treatment control BMPs:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater.
- Make sure trash container areas are screened or walled to prevent off-site transport of trash.

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- Use lined bins or dumpsters to reduce leaking of liquid waste.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Pave trash storage areas with an impervious surface to mitigate spills.
- Do not locate storm drains in immediate vicinity of the trash storage area.
- Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Maintenance Considerations

The integrity of structural elements that are subject to damage (i.e., screens, covers, and signs) must be maintained by the owner/operator. Maintenance agreements between the local agency and the owner/operator may be required. Some agencies will require maintenance deed restrictions to be recorded of the property title. If required by the local agency, maintenance agreements or deed restrictions must be executed by the owner/operator before improvement plans are approved.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Drain Insert MP-52

General Description

Drain inserts are manufactured filters or fabric placed in a drop inlet to remove sediment and debris. There are a multitude of inserts of various shapes and configurations, typically falling into one of three different groups: socks, boxes, and trays. The sock consists of a fabric, usually constructed of polypropylene. The fabric may be attached to a frame or the grate of the inlet holds the sock. Socks are meant for vertical (drop) inlets. Boxes are constructed of plastic or wire mesh. Typically a polypropylene "bag" is placed in the wire mesh box. The bag takes the form of the box. Most box products are one box; that is, the setting area and filtration through media occur in the same box. Some products consist of one or more trays or mesh grates. The trays may hold different types of media. Filtration media vary by manufacturer. Types include polypropylene, porous polymer, treated cellulose, and activated carbon.

Inspection/Maintenance Considerations

Washout problems increase with rain intensity. Susceptibility of accumulated sediments to be re-suspended at low flow rates, can be corrected with an energy dissipater between gate and treatment areas.

Inspection Activities	Suggested Frequency
■ Inspect for sediment buildup and proper functioning.	At the beginning of the wet season and after significant storms
■ Verify that stormwater enters the unit and does not leak around the perimeter.	After construction.
Maintenance Activities	**Suggested Frequency**
■ Remove sediment as needed.	At the beginning of the wet season and as necessary

Maintenance Concerns, Objectives, and Goals

■ Sediment Removal

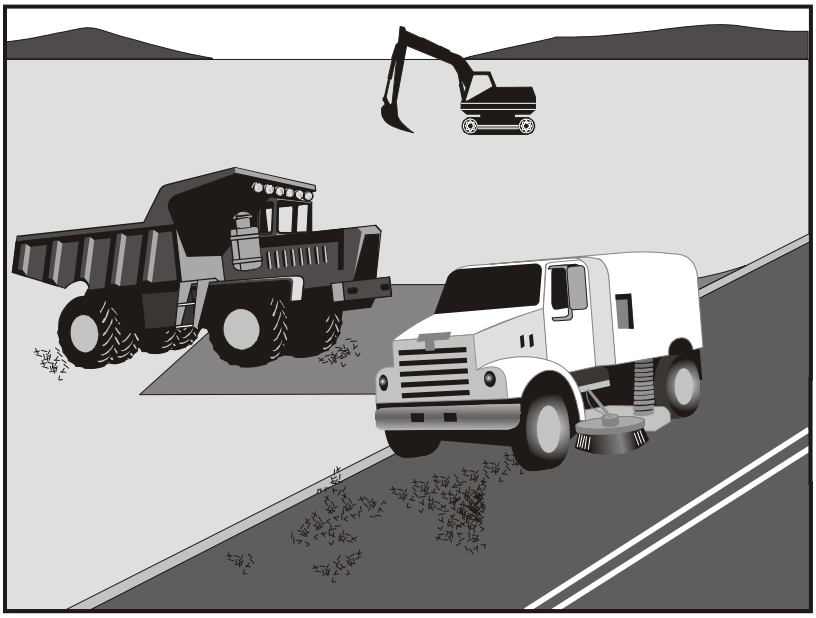
Targeted Constituents

- ✓ Sediment
- ✓ Nutrients
- ✓ Trash
- ✓ Metals
- Bacteria
- ✓ Oil and Grease
- ✓ Organics

Removal Effectiveness

See New Development and Redevelopment Handbook-Section 5.

Street Sweeping and Vacuuming SE-7



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.
- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.

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- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from $58/hour (3 yd^3 hopper) to $88/hour (9 yd^3 hopper), plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Labor Surcharge and Equipment Rental Rates, State of California Department of Transportation (Caltrans), April 1, 2002 – March 31, 2003.

Attachment F
Soil/Infiltration Report

February 27, 2017

Overton Moore Properties
19300 S. Hamilton Ave, Suite 200
Gardena, California 90248

Attention: Mr. Jason Hines
Vice President

Project No.: **17G112-2**

Subject: **Results of Infiltration Testing**
Proposed Warehouse
9000 Hellman Avenue
Rancho Cucamonga, California

Reference: Geotechnical Investigation, Proposed Warehouse, 9000 Hellman Avenue, Rancho Cucamonga, California, prepared for Overton Moore Properties, by Southern California Geotechnical, Inc. (SCG), SCG Project No. 17G112-1, dated February 23, 2017.

Gentlemen:

In accordance with your request, we have conducted infiltration testing at the subject site. We are pleased to present this report summarizing the results of the infiltration testing and our design recommendations.

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 16P437-2, dated January 12, 2017. The scope of services included surface reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rate of the onsite soils. The infiltration testing was performed in general accordance with the Technical Guidance Document for Water Quality Management Plans prepared for the County of San Bernardino Areawide Stormwater Program dated June 7, 2013. The San Bernardino County standards defer to guidelines published by Riverside County Department of Environmental Health (RCDEH).

Site and Project Description

The subject site is located at the southwest corner of the intersection of Hellman Avenue and East 8th Street in Rancho Cucamonga, California. The site address is 9000 Hellman Avenue. The site is bounded to the north by East 8th Street, to the east by Hellman Avenue, and to the south and west by existing commercial/industrial buildings. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The site is a rectangular shaped parcel, 8.10± acres in size. The site is currently utilized as a Verizon storage and maintenance yard. The southeast and central portions of the site are currently developed with several small to medium-sized single-story structures which include

buildings, pump canopies, trailers, and electrical boxes. Several electrical poles are present throughout the site. The remainder of the site is developed as a parking lot with ground surface cover consisting of mostly asphaltic concrete pavements with limited areas of Portland cement concrete pavements. The existing pavements are in poor condition with moderate to severe cracking throughout.

Aerial photographs from 1980 indicate that the western region of the subject site was in the process of being developed. Aerial photographs from 1994 indicate the possible presence of previous structures within this region. Aerial photographs indicate that this portion of the site was first developed as a parking lot between 1980 and 1994.

Detailed topographic information was not available at the time of this report. Based on visual observations made at the time of the subsurface investigation and from elevations obtained from Google Earth, the overall site topography generally slopes downward to the southeast at a gradient of less than 1 percent.

Proposed Development

A conceptual site plan, prepared by HPA Architecture, for the proposed development was provided to our office by the client. Based on this site plan, one (1) new warehouse will be constructed at the subject site. The building will have an approximate footprint of 174,580± ft². Dock-high doors will be constructed on the south side of the building. It is expected that the building will be surrounded by asphaltic concrete pavements in the parking and drive areas, and Portland cement concrete in the loading dock areas. Limited areas of landscaped planters and concrete flatwork may also be included in the proposed development.

We understand the subject site will utilize an on-site infiltration system to dispose of storm water. Based on conversations with the project civil engineer, the storm water infiltration system will consist of one (1) below-grade chamber system located in the south-central area of the subject site. The bottom of the proposed chamber system will be approximately 8± feet below the existing grades.

Concurrent Study

Southern California Geotechnical, Inc. (SCG) recently conducted a geotechnical investigation at the subject site. As a part of this study, seven (7) borings were advanced to depths of 5 to 30± feet below currently existing site grades. All of the borings were logged during drilling by a member of our staff.

Asphaltic concrete pavements were encountered at the ground surface at all of the boring locations. At these locations, the pavement section consists of 3 to 6± inches of asphaltic concrete with 0 to 6± inches of underlying aggregate base. Artificial fill soils were encountered beneath the pavements at all of the boring locations, extending to depths of 4½ to 12± feet below the existing site grades. The fill soils generally consist of very loose to medium dense silty fine sands to fine sandy silts with varying amounts of medium to coarse sands, fine to coarse gravel, and cobbles. Native alluvial soils were encountered below the artificial fill soils at all of the boring locations, extending to at least the maximum depths explored of 30± feet below the existing site grades. The near-surface alluvium generally consists of loose to medium dense silty

fine sands with varying amounts of medium to coarse sand and fine to coarse gravel, extending to depths of 6½ to 12± feet below existing site grades. At greater depths, the borings encountered dense to very dense gravelly fine to coarse sands with occasional to extensive cobbles, extending to 30± feet below existing site grades. Free water was not encountered during the drilling of any of the borings.

Subsurface Exploration

Scope of Exploration

The subsurface exploration conducted for this project consisted of one (1) infiltration test boring, advanced to a depth of 8± feet below existing site grades. The infiltration boring was advanced using a truck-mounted drilling rig, equipped with 8-inch diameter hollow stem augers and was logged during drilling by a member of our staff. The approximate location of the infiltration boring (identified as I-1) is indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Upon the completion of the infiltration boring, the bottom of the test hole was covered with 2± inches of clean ¾-inch gravel. A sufficient length of 3-inch-diameter perforated PVC casing was then placed into the test hole so that the PVC casing extended from the bottom of the test hole to the ground surface. Clean ¾-inch gravel was then installed in the annulus surrounding the PVC casing.

Geotechnical Conditions

Infiltration Boring No. I-1 was drilled through existing pavements. At this location, the pavements consist of 5± inches of asphaltic concrete with 5± inches of underlying aggregate base. Artificial fill soils were encountered beneath the pavements at the infiltration boring location, extending to a depth of 6± feet below existing site grades. The fill soils consist of very loose to medium dense silty fine sands with little medium to coarse sand.

Native alluvial soils were encountered beneath the fill soils at the infiltration boring location, extending to the maximum depth explored of 8± feet below existing site grades. The alluvial soils consist of very loose to loose silty fine to medium sands with little coarse sand and fine gravel. Groundwater was not encountered at the infiltration test boring location. The Boring Log, which illustrates the conditions encountered at the boring location, is included with this report.

Infiltration Testing

We understand that the results of the testing will be used to prepare a preliminary design for the proposed storm water infiltration system that will be used to dispose of storm water at the subject site. As previously stated, the infiltration testing was performed in general accordance with Technical Guidance Document for Water Quality Management Plans, prepared for the County of San Bernardino Areawide Stormwater Program, dated June 7, 2013.

Pre-soaking

In accordance with the county infiltration standards for non-sandy soils, the infiltration test boring was pre-soaked on February 7, 2017, one (1) day prior to infiltration testing. The pre-soaking procedure consisted of filling the test boring with clean potable water to a depth of at least 5 times the radius of the hole. In accordance with San Bernardino County guidelines, since at least 6 inches of water did not infiltrate into the surrounding soils in less than 25 minutes for 2 consecutive readings, infiltration testing was conducted at least 15 hours after initiating the pre-soaking procedure.

Infiltration Testing

Following the pre-soaking process of the infiltration test boring, SCG performed the infiltration testing. The test hole was filled with water to a depth of at least 5 times the hole radius above the gravel at the bottom of the test hole prior to each test interval. In accordance with the county guidelines, since "non-sandy soils" were encountered at the bottom of the infiltration test boring, readings were taken at an interval of 30 minutes for a total of 6 hours at the test location. After each reading, water was added to the boring so that the depth of the water was again at least 5 times the radius of the hole. The water level readings are presented on the spreadsheet enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on the spreadsheet.

The infiltration rates for the tests are tabulated in inches per hour. In accordance with the typically accepted practice, it is recommended that the most conservative reading from the latter part of the infiltration test be used for design. The rate is summarized below:

Infiltration Test No.	Soil Description	Infiltration Rate (inches/hour)
I-1	Silty fine to medium Sand, little coarse Sand, little fine Gravel	2.0

Laboratory Testing

Grain Size Analysis

The grain size distribution of selected soils taken from the base of the infiltration test boring has been determined using a range of wire mesh screens. The analysis was performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of the analysis are presented at the end of this report.

Design Recommendations

One (1) infiltration test was performed at the subject site. As noted above, the infiltration rate is 2.0 inches per hour. The high silt content of the on-site soils resulted in a low infiltration rate at the infiltration test location.

Based on the infiltration test results at the location and depth tested, an infiltration rate of 2.0 inches per hour is recommended for the design of the proposed chamber system located in the south-central area of the subject site. This infiltration rate has been determined from one test at one elevation at the subject site. Should the civil engineer require a faster design rate, SCG recommends additional infiltration testing at lower elevations where sandy soils are expected to be located within the proposed system.

We recommend that a representative from the geotechnical engineer be on-site during the construction of the proposed below-grade chamber system to identify the soil classification at the base of the infiltration system. It should be confirmed that the soils at the base of the proposed below-grade chamber system correspond with those presented in this report to ensure that the performance of the system will be consistent with the rate reported herein.

The design of the storm water infiltration system should be performed by the project civil engineer, in accordance with the City of Rancho Cucamonga and/or San Bernardino County guidelines. It is recommended that the system be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the system. The presence of such materials would decrease the effective infiltration rate. **It is recommended that the project civil engineer apply an appropriate factor of safety. The infiltration rate recommended above is based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rate.** It should be noted that the recommended infiltration rate is based on infiltration testing at one (1) discrete location and that the overall infiltration rate of the proposed infiltration system could vary considerably.

Infiltration versus Permeability

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil permeability. The infiltration rate presented herein was determined in accordance with the San Bernardino County guidelines, and is considered valid for the time and place of the actual test. Changes in soil moisture content will affect the infiltration rate. Infiltration rates should be expected to decrease until the soils become saturated. Soil permeability values will then govern groundwater movement. Permeability values may be on the order of 10 to 20 times less than infiltration rates. The system designer should incorporate adequate factors of safety and allow for overflow design into appropriate traditional storm drain systems, which would transport storm water off-site.

Location of Infiltration System

The use of on-site storm water infiltration system carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Overlying structures and pavements in the infiltration area could potentially be damaged due to saturation of subgrade soils. If possible, the proposed infiltration system for this

site should be located at least 25 feet away from any structures, including retaining walls. Even with this provision of locating the infiltration system at least 25 feet from the buildings, it is possible that infiltrating water into the subsurface soils could have an adverse effect on the proposed or existing structures. It should also be noted that utility trenches which happen to collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be given to the proposed locations of underground utilities which may pass near the proposed infiltration system.

General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the proposed storm water infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rate contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the proposed storm water infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.
The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and testing depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted.

The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

Closure

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

Scott McCann
Staff Scientist

Robert G. Trazo, GE 2655
Principal Engineer



Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Boring Log Legend and Log (3 pages)
Infiltration Test Results Spreadsheet (1 page)
Grain Size Distribution Graph (1 page)



SOURCE: SAN BERNARDINO COUNTY
THOMAS GUIDE, 2013

SITE LOCATION MAP

PROPOSED WAREHOUSE BUILDING

RANCHO CUCAMONGA, CALIFORNIA

SCALE: 1" = 2400'

DRAWN: JLL
CHKD: RGT

SCG PROJECT
17G112-2

PLATE 1

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL

8TH STREET

HELLMAN STREET

B-1

B-2

B-3

B-4

B-5

B-6

B-7

I-1

BUILDING AREA
174,580 S.F.

23 DOCK DOORS

NORTH

SoCalGeo

GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION TEST LOCATION
- APPROXIMATE BORING LOCATION (SCG PROJECT NO. 17G112-1)
- EXISTING STRUCTURES TO BE DEMOLISHED

NOTE: SITE PLAN PREPARED BY HPA ARCHITECTURE.

INFILTRATION TEST LOCATION PLAN

PROPOSED WAREHOUSE BUILDING

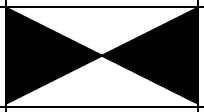
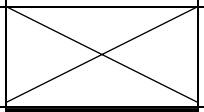
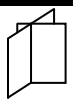
RANCHO CUCAMONGA, CALIFORNIA

SCALE: 1" = 60'	
DRAWN: JLL CHKD: RGT	
SCG PROJECT 17G112-2	
PLATE 2	

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL

BORING LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

BLOW COUNT: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG: Graphic Soil Symbol as depicted on the following page.

DRY DENSITY: Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.

MOISTURE CONTENT: Moisture content of a soil sample, expressed as a percentage of the dry weight.

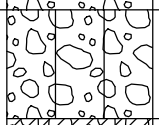
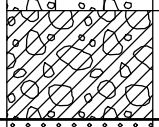
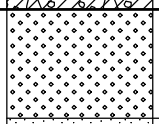
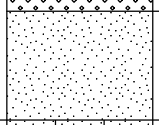
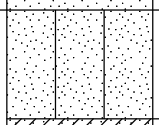
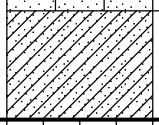
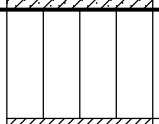
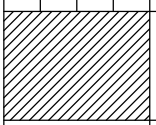
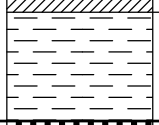
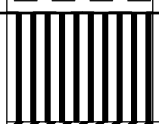
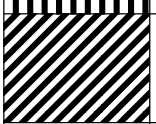
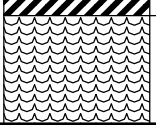
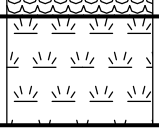
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT: The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE: The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR: The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-1

JOB NO.: 17G112-2 | DRILLING DATE: 2/7/17 | WATER DEPTH: Dry
PROJECT: Proposed Warehouse | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: ---
LOCATION: Rancho Cucamonga, California | LOGGED BY: Jason Hiskey | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					5± inches Asphaltic concrete, 5± inches Aggregate base							
		13			FILL: Dark Brown Silty fine Sand, little medium to coarse Sand, very loose to medium dense-moist		12					
		1					13					
5												
		4			ALLUVIUM: Brown Silty fine to medium Sand, little coarse Sand, little fine Gravel, very loose to loose-damp to moist		8					
					Boring Terminated at 8'							

TBL 17G112-2.GPJ SOCALGEO.GDT 2/27/17

TEST BORING LOG **PLATE I-1**

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse Building
Project Location	Rancho Cucamonga, CA
Project Number	17G112-2
Engineer	Scott McCann

Test Hole Radius	4	(in)
Test Depth	7.9	(ft)

Infiltration Test Hole	I-1

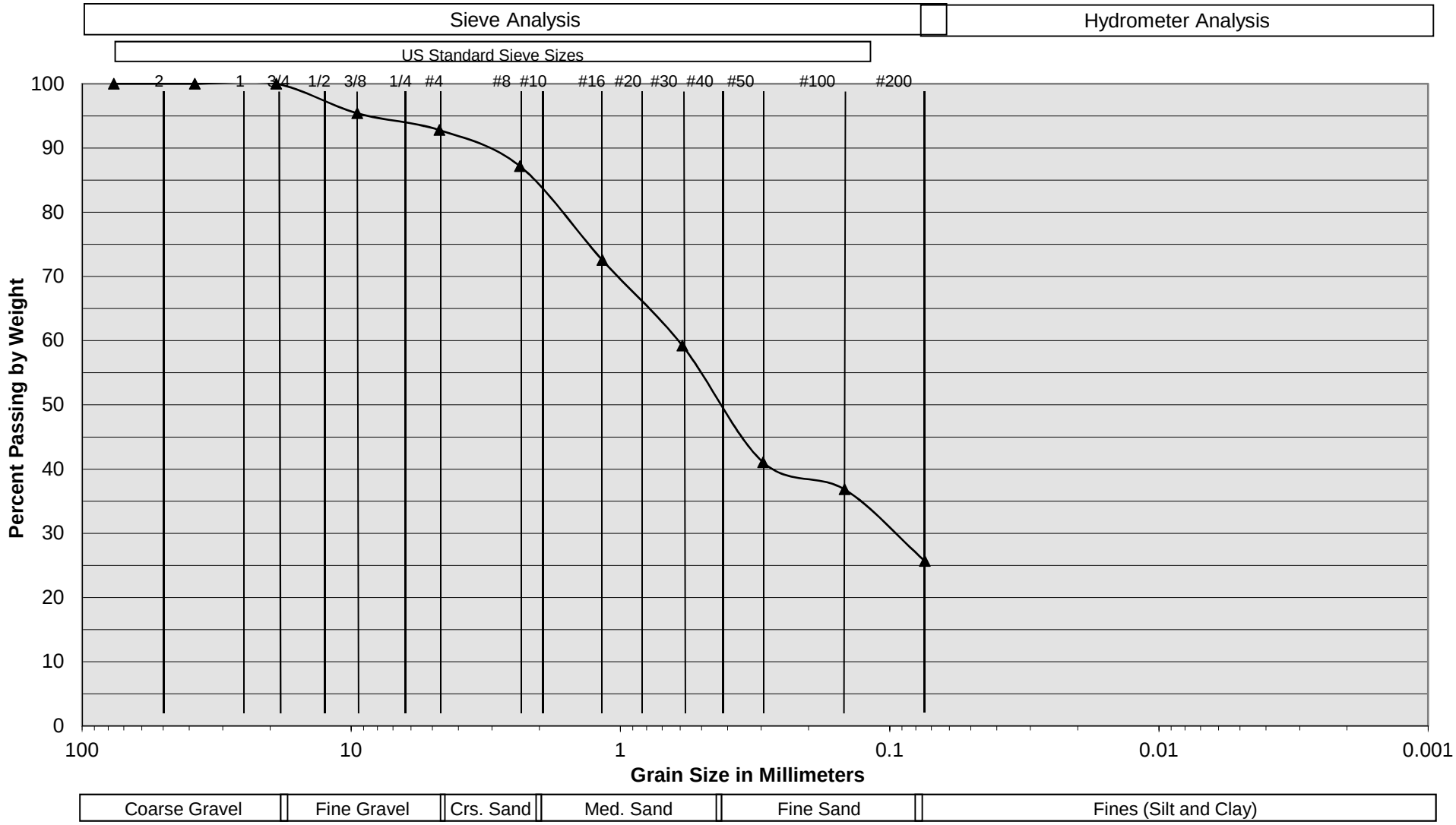
Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	7:30 AM	30.0	5.25	1.50	1.90	2.90
	Final	8:00 AM		6.75			
2	Initial	8:00 AM	30.0	5.27	1.46	1.90	2.83
	Final	8:30 AM		6.73			
3	Initial	8:30 AM	30.0	5.29	1.41	1.91	2.72
	Final	9:00 AM		6.70			
4	Initial	9:00 AM	30.0	5.35	1.35	1.88	2.64
	Final	9:30 AM		6.70			
5	Initial	9:30 AM	30.0	5.40	1.28	1.86	2.53
	Final	10:00 AM		6.68			
6	Initial	10:00 AM	30.0	5.46	1.22	1.83	2.44
	Final	10:30 AM		6.68			
7	Initial	10:30 AM	30.0	5.52	1.17	1.80	2.39
	Final	11:00 AM		6.69			
8	Initial	11:00 AM	30.0	5.58	1.13	1.76	2.35
	Final	11:30 AM		6.71			
9	Initial	11:30 AM	30.0	5.65	1.05	1.73	2.22
	Final	12:00 PM		6.70			
10	Initial	12:00 PM	30.0	5.68	1.02	1.71	2.17
	Final	12:30 PM		6.70			
11	Initial	12:30 PM	30.0	5.72	0.98	1.69	2.11
	Final	1:00 PM		6.70			
12	Initial	1:00 PM	30.0	5.77	0.94	1.66	2.06
	Final	1:30 PM		6.71			

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

Where: Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval
H_{avg} = Average Head Height over the time interval

Grain Size Distribution



Sample Description	I-1 @ 6.5 feet
Soil Classification	Brown Silty fine to medium Sand, little coarse Sand, little fine Gravel

Proposed Warehouse Building
Rancho Cucamonga, California
Project No. 17G112-2
PLATE C-1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

GEOTECHNICAL INVESTIGATION
PROPOSED WAREHOUSE

9000 Hellman Avenue
Rancho Cucamonga, California
for
Overton Moore Properties

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

February 23, 2017

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Overton Moore Properties
19300 South Hamilton Ave, Suite 200
Gardena, California 90248

Attention: Mr. Jason Hines
Vice President

Project No.: **17G112-1**

Subject: **Geotechnical Investigation**
Proposed Warehouse
9000 Hellman Avenue
Rancho Cucamonga, California

Gentlemen:

In accordance with your request, we have conducted a geotechnical investigation at the subject site. We are pleased to present this report summarizing the conclusions and recommendations developed from our investigation.

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

Joseph Lozano Leon
Staff Engineer

Robert G. Trazo, M.Sc., GE 2655
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
ROBERT TRAZO
No. 2655
GEOTECHNICAL
STATE OF CALIFORNIA

Distribution: (1) Addressee

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APPENDICES

A Plate 1: Site Location Map
Plate 2: Boring Location Plan
B Boring Logs
C Laboratory Test Results
D Grading Guide Specifications
E Seismic Design Parameters

1.0 EXECUTIVE SUMMARY

Presented below is a brief summary of the conclusions and recommendations of this investigation. Since this summary is not all inclusive, it should be read in complete context with the entire report.

Geotechnical Design Considerations

- The subsurface exploration for this site included seven (7) borings.
- Artificial fill soils were encountered at all of the borings, extending from the ground surface to depths of 4½ to 12± feet.
- The fill soils and near-surface alluvial soils possess low strengths and potential for moderate consolidation/collapse. In addition, the existing fill soils are considered to represent undocumented fill. These soils, in their present condition, are not considered suitable for support of the foundation loads of the new structure.
- Remedial grading will be necessary to remove the existing fill soils and a portion of the near-surface alluvial soils and replace them as compacted structural fill.

Site Preparation Recommendations

- Initial site stripping should include removal of any surficial vegetation from the site. Stripping should include any weeds, grasses, shrubs and any organic top soils.
- The site plan provided to our office indicates that five existing structures will be demolished in order to facilitate the construction of the proposed development. Demolition should include all foundations, floor slabs, pavements, utilities and any other subsurface improvements that will not remain in place with the new development. Debris resultant from demolition should be disposed of offsite. Alternatively, concrete and asphalt debris may be pulverized to a maximum 2-inch particle size, well mixed with the on-site soils, and incorporated into new structural fills or it may be crushed and made into CMB, if desired.
- The results of laboratory testing indicate that the fill soils and a portion of the near-surface alluvial soils possess low strengths and a moderate potential for consolidation settlement and collapse. These soils could be subject to excessive settlements due to the loads imposed by the proposed building foundations.
- Remedial grading is recommended to be performed within the proposed building area in order to remove all of the artificial fill soils and a portion of the alluvial soils. The soils present within the proposed building area should be overexcavated to a depth of 5 feet below existing grade and to a depth of at least 5 feet below proposed building pad subgrade elevation. The proposed foundation influence zones should also be overexcavated to a depth of at least 3 feet below proposed foundation bearing grade.
- After overexcavation has been completed, the resulting subgrade soils should be evaluated by the geotechnical engineer to identify any additional soils that should be overexcavated. The resulting soils should be scarified and moisture conditioned to achieve a moisture content of 2 to 4 percent above optimum moisture, to a depth of at least 12 inches. The overexcavation subgrade soils should then be recompacted under the observation of the geotechnical engineer. The previously excavated soils may then be replaced as compacted structural fill.
- Based on the presence of very loose undocumented fill soils, the new pavement subgrade soils should be overexcavated to a depth of at least 12 inches below pavement subgrade

elevation. The geotechnical engineer should then evaluate the exposed soils to identify any areas of additional unsuitable soils.

- The resulting pavement subgrade soils are recommended to be scarified to a depth of 12± inches, moisture conditioned to 2 to 4 percent above optimum, and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. The overexcavation subgrade soils should then be recompacted under the observation of the geotechnical engineer. The previously excavated soils may then be replaced as compacted structural fill.

Foundation Design Recommendations

- Conventional shallow foundations, supported in newly placed compacted fill.
- 2,500 lbs/ft^2 maximum allowable soil bearing pressure.
- Reinforcement consisting of at least two (2) No. 5 rebars (1 top and 1 bottom) in strip footings. Additional reinforcement may be necessary for structural considerations.

Building Floor Slab Design Recommendations

- Conventional Slab-on-Grade: minimum 5 inch thickness.
- Modulus of Subgrade Reaction: k = 150 psi/in.
- Reinforcement is not expected to be necessary for geotechnical considerations.
- The actual thickness and reinforcement of the floor slab should be determined by the structural engineer.

Pavement Design Recommendations

ASPHALT PAVEMENTS (R=40)					
Materials	**Thickness (inches)**				
	Auto Parking and Auto Drive Lanes (TI = 4.0 to 5.0)	Truck Traffic			
		TI = 6.0	TI = 7.0	TI = 8.0	TI = 9.0
Asphalt Concrete	3	3½	4	5	5½
Aggregate Base	4	6	7	8	10
Compacted Subgrade	12	12	12	12	12

PORTLAND CEMENT CONCRETE PAVEMENTS (R=40)				
Materials	**Thickness (inches)**			
	Autos and Light Truck Traffic (TI = 6.0)	Truck Traffic		
		TI = 7.0	TI = 8.0	TI = 9.0
PCC	5	6½	8	9
Compacted Subgrade (95% minimum compaction)	12	12	12	12

2.0 SCOPE OF SERVICES

The scope of services performed for this project was in accordance with our Proposal No. 16P437, dated November 21, 2016. The scope of services included a visual site reconnaissance, subsurface exploration, field and laboratory testing, and geotechnical engineering analysis to provide criteria for preparing the design of the building foundations, building floor slab, and parking lot pavements along with site preparation recommendations and construction considerations for the proposed development. The evaluation of the environmental aspects of this site was beyond the scope of services for this geotechnical investigation.

3.0 SITE AND PROJECT DESCRIPTION

3.1 Site Conditions

The subject site is located at the southwest corner of the intersection of Hellman Avenue and East 8th Street, at the street address of 9000 Hellman Avenue in Rancho Cucamonga, California. The site is bounded to the north by East 8th Street, to the east by Hellman Avenue, and to the south and west by existing commercial/industrial buildings. The general location of the site is illustrated on the Site Location Map, enclosed as Plate 1 in Appendix A of this report.

The site is a rectangular shaped parcel, 8.10± acres in size. The site is currently utilized as a Verizon storage and maintenance yard. The southern and central portions of the site are currently developed with several small to medium-sized single-story structures which include three buildings and two fuel stations. The existing buildings are of wood and metal construction and are assumed to be supported on conventional shallow foundations with concrete slab-on-grade floors. The existing fuel stations may indicate the presence of underground storage tanks. Several electrical poles are present throughout the site. The remainder of the site is developed as a parking lot with ground surface cover consisting of mostly asphaltic concrete pavements with limited areas of Portland cement concrete pavements. The existing pavements are in poor condition with moderate to severe cracking throughout.

Aerial photographs from 1980 indicate that the western ¼-most region of the subject site was being developed at the time of the photograph. Aerial photographs from 1994 indicate the possible presence of previous structures within this region. Aerial photographs indicate that this portion of the site was first developed as a parking lot between 1980 and 1994.

Detailed topographic information was not available at the time of this report. Based on visual observations made at the time of the subsurface investigation and from elevations obtained from Google Earth, the overall site topography generally slopes downward to the southeast at a gradient of less than 1 percent.

3.2 Proposed Development

A conceptual site plan for the proposed development, prepared by HPA Architecture, was provided to our office by the client. Based on the site plan, one (1) new commercial/industrial building will be constructed at the subject site. The proposed building will have an approximate footprint of 174,580 ft². Dock-high doors will be constructed on the south side of the building. It is expected that the building will be surrounded by asphaltic concrete pavements in the parking and drive areas, and Portland cement concrete in the loading dock areas. Limited areas of landscaped planters and concrete flatwork may also be included in the proposed development.

Detailed structural information has not been provided. It is assumed that the new building will be of concrete tilt-up construction, typically supported on a conventional shallow foundation system,

with a concrete slab-on-grade floor. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 100 kips and 4 to 6 kips per linear foot, respectively.

No significant amounts of below grade construction, such as basements or crawl spaces, are expected to be included in the proposed development. Based on the assumed topography, cuts and fills of up to 3± feet are expected to be necessary to achieve the proposed site grades. It should be noted that this estimate does not include any remedial grading recommendations which are presented in a subsequent section of this report.

4.0 SUBSURFACE EXPLORATION

4.1 Scope of Exploration/Sampling Methods

The subsurface exploration conducted for this project consisted of seven (7) borings advanced to depths of 5 to 29± feet below the existing site grades. All of the borings were logged during drilling by a member of our staff.

The borings were advanced with hollow-stem augers by a conventional truck-mounted drilling rig. Representative bulk and relatively undisturbed soil samples were taken during drilling. Relatively undisturbed soil samples were taken with a split barrel "California Sampler" containing a series of one inch long, 2.416± inch diameter brass rings. This sampling method is described in ASTM Test Method D-3550. Samples were also taken using a 1.4± inch inside diameter split spoon sampler, in general accordance with ASTM D-1586. Both of these samplers are driven into the ground with successive blows of a 140-pound weight falling 30 inches. The blow counts obtained during driving are recorded for further analysis. Bulk samples were collected in plastic bags to retain their original moisture content. The relatively undisturbed ring samples were placed in molded plastic sleeves that were then sealed and transported to our laboratory.

The approximate locations of the borings are indicated on the Boring Location Plan, included as Plate 2 in Appendix A of this report. The Boring Logs, which illustrate the conditions encountered at the boring locations, as well as the results of some of the laboratory testing, are included in Appendix B.

4.2 Geotechnical Conditions

Pavements

Asphaltic concrete pavements were encountered at the ground surface at all of the boring locations. At these locations, the pavement section consists of 3 to 6± inches of asphaltic concrete, underlain by 0 to 6± inches of aggregate base.

Artificial Fill

Artificial fill soils were encountered beneath the pavements at all of the boring locations, extending to depths of 4½ to 12± feet below the existing site grades. The fill soils generally consist of very loose to medium dense silty sands with varying amounts of fine gravel. Very loose soils were encountered at Boring Nos. B-2, B-3, B-4 and B-5 at depths of 1 to 5½± feet, 1 to 2½± feet, 3 to 12± feet and 1 to 4± feet, respectively. Occasional cobbles were encountered within the fill soils at Boring No. B-5 at depths of 4½ to 6½± feet, and at Boring No. B-6 at depths of 3 to 5± feet. The fill soils possess a disturbed appearance and some samples contain minor debris, such as asphaltic concrete fragments, resulting in their classification as artificial fill. Boring Nos. B-2, B-6 and B-7 were terminated within the artificial fill soils.

Alluvium

Native alluvial soils were encountered beneath the artificial fill soils at Boring Nos. B-1, B-3, B-4 and B-5, extending to the maximum depth explored of 29± feet below the existing site grades. The near-surface alluvium at Boring Nos B-1 and B-3, extending to depths of 12± and 6½± feet respectively, generally consists of loose to medium dense silty sands with varying amounts of fine to coarse gravel. The alluvial soils encountered at the remaining locations and depths generally consist of medium dense to very dense gravelly sands with varying amounts of cobbles. Boring No. B-3 encountered a layer of medium dense silty sands at depths of 12 to 15± feet. Boring No. B-5 encountered a layer of loose gravelly sands with occasional cobbles at depths of 6½ to 8½± feet.

Groundwater

Free water was not encountered during the drilling of any of the borings. Based on the lack of any water within the borings, and the moisture contents of the recovered soil samples, the static groundwater is considered to have existed at a depth in excess of 29± feet at the time of the subsurface exploration.

As part of our research, we reviewed available groundwater data in order to determine regional groundwater depths. Recent water level data was obtained from the California Department of Water Resources website, http://www.water.ca.gov/waterdatalibrary/. The nearest monitoring well is located 1.1 miles southeast of the subject site. Water level readings within this monitoring well indicate high groundwater levels of 326± feet (January 1989) below the ground surface.

5.0 LABORATORY TESTING

The soil samples recovered from the subsurface exploration were returned to our laboratory for further testing to determine selected physical and engineering properties of the soils. The tests are briefly discussed below. It should be noted that the test results are specific to the actual samples tested, and variations could be expected at other locations and depths.

Classification

All recovered soil samples were classified using the Unified Soil Classification System (USCS), in accordance with ASTM D-2488. Field identifications were then supplemented with additional visual classifications and/or by laboratory testing. The USCS classifications are shown on the Boring Logs and are periodically referenced throughout this report.

In-situ Density and Moisture Content

The density has been determined for selected relatively undisturbed ring samples. These densities were determined in general accordance with the method presented in ASTM D-2937. The results are recorded as dry unit weight in pounds per cubic foot. The moisture contents are determined in accordance with ASTM D-2216, and are expressed as a percentage of the dry weight. These test results are presented on the Boring Logs.

Consolidation

Selected soil samples have been tested to determine their consolidation potential, in accordance with ASTM D-2435. The testing apparatus is designed to accept either natural or remolded samples in a one-inch high ring, approximately 2.416 inches in diameter. Each sample is then loaded incrementally in a geometric progression and the resulting deflection is recorded at selected time intervals. Porous stones are in contact with the top and bottom of the sample to permit the addition or release of pore water. The samples are typically inundated with water at an intermediate load to determine their potential for collapse or heave. The results of the consolidation testing are plotted on Plates C-1 through C-6 in Appendix C of this report.

Maximum Dry Density and Optimum Moisture Content

A representative bulk sample has been tested for its maximum dry density and optimum moisture content. The results have been obtained using the Modified Proctor procedure, per ASTM D-1557, and are presented on Plate C-7 in Appendix C of this report. These tests are generally used to compare the in-situ densities of undisturbed field samples, and for later compaction testing. Additional testing of other soil types or soil mixes may be necessary at a later date.

Soluble Sulfates

A representative sample of the near-surface soils was submitted to a subcontracted analytical laboratory for determination of soluble sulfate content. Soluble sulfates are naturally present in soils, and if the concentration is high enough, can result in degradation of concrete which comes

into contact with these soils. The result of the soluble sulfate testing is presented below, and is discussed further in a subsequent section of this report.

Sample Identification	Soluble Sulfates (%)	Sulfate Classification
B-1 @ 0 to 5 feet	< 0.001	Negligible

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our review, field exploration, laboratory testing and geotechnical analysis, the proposed development is considered feasible from a geotechnical standpoint. The recommendations contained in this report should be taken into the design, construction, and grading considerations. The recommendations are contingent upon all grading and foundation construction activities being monitored by the geotechnical engineer of record. The Grading Guide Specifications, included as Appendix D, should be considered part of this report, and should be incorporated into the project specifications. The contractor and/or owner of the development should bring to the attention of the geotechnical engineer any conditions that differ from those stated in this report, or which may be detrimental for the development.

6.1 Seismic Design Considerations

The subject site is located in an area which is subject to strong ground motions due to earthquakes. The performance of a site specific seismic hazards analysis was beyond the scope of this investigation. However, numerous faults capable of producing significant ground motions are located near the subject site. Due to economic considerations, it is not generally considered reasonable to design a structure that is not susceptible to earthquake damage. Therefore, significant damage to structures may be unavoidable during large earthquakes. The proposed structures should, however, be designed to resist structural collapse and thereby provide reasonable protection from serious injury, catastrophic property damage and loss of life.

Faulting and Seismicity

Research of available maps indicates that the subject site is not located within an Alquist-Priolo Earthquake Fault Zone. Furthermore, SCG did not identify any evidence of faulting during the geotechnical investigation. Therefore, the possibility of significant fault rupture on the site is considered to be low.

Seismic Design Parameters

The 2016 California Building Code (CBC) was adopted by all municipalities within Southern California on January 1, 2017. The CBC provides procedures for earthquake resistant structural design that include considerations for on-site soil conditions, occupancy, and the configuration of the structure including the structural system and height. The seismic design parameters presented below are based on the soil profile and the proximity of known faults with respect to the subject site.

The 2016 CBC Seismic Design Parameters have been generated using U.S. Seismic Design Maps, a web-based software application developed by the United States Geological Survey. This software application, available at the USGS web site, calculates seismic design parameters in accordance with the 2016 CBC, utilizing a database of deterministic site accelerations at 0.01 degree intervals. The table below is a compilation of the data provided by the USGS application. A copy of the output generated from this program is included in Appendix E of this report. A copy

of the Design Response Spectrum, as generated by the USGS application is also included in Appendix E. Based on this output, the following parameters may be utilized for the subject site:

2016 CBC SEISMIC DESIGN PARAMETERS

Parameter		Value
Mapped Spectral Acceleration at 0.2 sec Period	S_S	1.500
Mapped Spectral Acceleration at 1.0 sec Period	S_1	0.600
Site Class	---	D
Site Modified Spectral Acceleration at 0.2 sec Period	S_{MS}	1.500
Site Modified Spectral Acceleration at 1.0 sec Period	S_{M1}	0.900
Design Spectral Acceleration at 0.2 sec Period	S_{DS}	1.000
Design Spectral Acceleration at 1.0 sec Period	S_{D1}	0.600

Liquefaction

Liquefaction is the loss of strength in generally cohesionless, saturated soils when the pore-water pressure induced in the soil by a seismic event becomes equal to or exceeds the overburden pressure. The primary factors which influence the potential for liquefaction include groundwater table elevation, soil type and plasticity characteristics, relative density of the soil, initial confining pressure, and intensity and duration of ground shaking. The depth within which the occurrence of liquefaction may impact surface improvements is generally identified as the upper 50 feet below the existing ground surface. Liquefaction potential is greater in saturated, loose, poorly graded fine sands with a mean (d_{50}) grain size in the range of 0.075 to 0.2 mm (Seed and Idriss, 1971). Non-sensitive clayey (cohesive) soils which possess a plasticity index of at least 18 (Bray and Sancio, 2006) are generally not considered to be susceptible to liquefaction, nor are those soils which are above the historic static groundwater table.

The California Geological Survey (CGS) has not yet conducted seismic hazard mapping in the area of the subject site. The San Bernardino County Land Use Plan, Geologic Hazard Overlays, Guasti Quadrangle, does not indicate the subject site to be in an area of liquefaction susceptibility. In addition, the subsurface conditions at the boring locations are not considered to be conducive to liquefaction. Based on the mapping performed by San Bernardino County and the conditions encountered at the boring locations, liquefaction is not considered to be a significant design concern for this project.

6.2 Geotechnical Design Considerations

General

The site is generally underlain by artificial fill soils, extending to depths of 4½ to 12± feet below the existing site grades. These soils possess low strengths, varying densities, and unfavorable consolidation/collapse characteristics. Very loose soils were encountered at Boring Nos. B-2, B-3,

B-4 and B-5 at depths of 1 to 5½± feet, 1 to 2½± feet, 3 to 12± feet and 1 to 4± feet, respectively. In addition, we have not been provided with documentation regarding the placement of the on-site fill soils. Based on all of these factors, these soils are considered undocumented fill soils. In addition, the near-surface alluvium varies in density and possesses low strengths. Therefore, the existing undocumented fill and the upper portion of the native alluvium are not considered suitable for support of the new structure. Based on these conditions, remedial grading is considered warranted within the proposed building area in order to remove all of the undocumented fill soils in their entirety as well as the upper portion of the near-surface native alluvial soils, and replace them as compacted fill soils.

It should be noted that Boring No. B-2, drilled within the proposed building area, was terminated due to refusal within fill soils. Therefore, deeper fill soils than 12± feet may be present within the proposed building area.

Settlement

The recommended remedial grading will remove the existing undocumented fill soils and a portion of the near-surface native alluvial soils and replace these materials as compacted structural fill. The native soils that will remain in place below the recommended depth of overexcavation will not be subject to significant stress increases from the foundations of the new structures. Therefore, following completion of the recommended grading, post-construction settlements are expected to be within tolerable limits.

Expansion

The near-surface soils generally consist of silty sands. These materials have been visually classified as very low to non-expansive. Therefore, no design considerations related to expansive soils are considered warranted for this site.

Soluble Sulfates

The results of the soluble sulfate testing indicate that the selected sample of the on-site soils contains negligible concentrations of soluble sulfates, in accordance with American Concrete Institute (ACI) guidelines. Therefore, specialized concrete mix designs are not considered to be necessary, with regard to sulfate protection purposes. It is, however, recommended that additional soluble sulfate testing be conducted at the completion of rough grading to verify the soluble sulfate concentrations of the soils which are present at pad grade within the building area.

Shrinkage/Subsidence

Removal and recompaction of the near-surface fill and/or alluvial soils is estimated to result in an average shrinkage of 12 to 18 percent. Minor ground subsidence is expected to occur in the soils below the zone of removal, due to settlement and machinery working. The subsidence is estimated to be 0.1± feet. This estimate may be used for grading in areas that are underlain by native alluvial soils.

These estimates are based on previous experience and the subsurface conditions encountered at the boring locations. The actual amount of subsidence is expected to be variable and will be

dependent on the type of machinery used, repetitions of use, and dynamic effects, all of which are difficult to assess precisely.

Grading and Foundation Plan Review

No grading or foundation plans were available at the time of this report. It is therefore recommended that we be provided with copies of the preliminary plans, when they become available, for review with regard to the conclusions, recommendations, and assumptions contained within this report.

6.3 Site Grading Recommendations

The grading recommendations presented below are based on the subsurface conditions encountered at the boring locations and our understanding of the proposed development. We recommend that all grading activities be completed in accordance with the Grading Guide Specifications included as Appendix D of this report, unless superseded by site-specific recommendations presented below.

Site Stripping and Demolition

Initial site stripping should include removal of any surficial vegetation from the site. Stripping should include any weeds, grasses, shrubs and any organic top soils. The actual extent of site stripping should be determined in the field by the geotechnical engineer, based on the organic content and stability of the materials encountered.

The site plan provided to our office indicates that five existing structures at the subject site will be demolished in order to facilitate the construction of the proposed development. Demolition should include all foundations, floor slabs, pavements, utilities and any other subsurface improvements that will not remain in place with the new development. Debris resultant from demolition should be disposed of offsite. Alternatively, concrete and asphalt debris may be pulverized to a maximum 2-inch particle size, well mixed with the on-site soils, and incorporated into new structural fills. It may also be crushed and made into CMB, if desired. If underground storage tanks are encountered, they should be properly removed and disposed of off-site in accordance with all applicable rules and regulations.

Treatment of Existing Soils: Building Pad

Remedial grading should be performed within the proposed building pad area in order to remove the existing low strength, potentially compressible/collapsible undocumented fill soils and the upper portion of the existing low strength near-surface native alluvial soils. Based on conditions encountered at the boring locations, the existing soils within the proposed building area are recommended to be overexcavated to a depth of at least 5 feet below existing grade and to a depth of at least 5 feet below proposed building pad subgrade elevations, whichever is greater. **The depth of the overexcavation should also extend to a depth sufficient to remove all undocumented fill soils**. The undocumented fill soils at Boring Nos. B-2 and B-4 extend to depths of 10± and 12± feet, respectively. Additional overexcavation should be performed within the influence zones of the new foundations, to provide for a new layer of compacted structural fill extending to a depth of at least 3 feet below proposed bearing grades.

The overexcavation areas should extend at least 5 feet beyond the building and foundation perimeters, and to an extent equal to the depth of fill below the new foundations. If the proposed structure incorporates any exterior columns (such as for a canopy or overhang) the area of overexcavation should also encompass these areas.

Due to the proximity of the proposed building to the eastern property line, the overexcavation within this area may require utilizing slot cut (A-B-C slots) excavation techniques. If required, the newly exposed overexcavation subgrade soils for each slot should be evaluated and approved for filling by SCG prior to placement of structural fill. The remainder of the proposed building pad area may be overexcavated using conventional grading techniques.

Following completion of the overexcavation, the subgrade soils within the overexcavation areas should be evaluated by the geotechnical engineer to verify their suitability to serve as the structural fill subgrade, as well as to support the foundation loads of the new structure. This evaluation should include proofrolling and probing to identify any soft, loose or otherwise unstable soils that must be removed. **Some localized areas of deeper excavation may be required if additional fill materials or loose, porous, or low density native soils are encountered at the base of the overexcavation**. More detailed recommendations regarding slot-cutting procedures are discussed in Section 6.4 of this report.

After a suitable overexcavation subgrade has been achieved, the exposed soils should be scarified to a depth of at least 12 inches and moisture conditioned to achieve a moisture content of 2 to 4 percent above optimum moisture content. The subgrade soils should then be recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. The building pad area may then be raised to grade with previously excavated soils or imported structural fill.

Treatment of Existing Soils: Retaining Walls and Site Walls

The existing soils within the areas of proposed retaining and non-retaining site walls should be overexcavated to a depth of at least 3 feet below foundation bearing grade and replaced as compacted structural fill as discussed above for the proposed building pad. Any undocumented fill soils within any of these foundation areas should be removed in their entirety. The overexcavation subgrade soils should be evaluated by the geotechnical engineer prior to scarifying, moisture conditioning, and recompacting the upper 12 inches of exposed subgrade soils, as discussed for the building areas. The previously excavated soils may then be replaced as compacted structural fill.

Treatment of Existing Soils: Parking and Drive Areas

Remedial grading should be performed within the proposed parking and drive areas in order to remove the existing near-surface low strength, potentially compressible/collapsible undocumented fill soils and the upper portion of the existing low strength near-surface native alluvial soils. The existing soils within the proposed parking and drive areas are recommended to be overexcavated to a depth of at least 12 inches below proposed pavement subgrade elevation. Based on economic considerations, deeper overexcavation of the existing near-surface soils in the new parking and drive areas is not considered warranted, with the exception of areas where lower strength or unstable soils are identified by the geotechnical engineer during grading.

The geotechnical engineer should then evaluate the exposed soils to identify any areas of additional unsuitable soils. Based on the presence of variable strength soils throughout the site, it is expected that some isolated areas of additional overexcavation may be required to remove zones of lower strength, unsuitable soils. After a suitable overexcavation subgrade has been achieved, the exposed soils should be scarified to a depth of at least 12 inches and moisture conditioned to achieve a moisture content of 2 to 4 percent above optimum moisture content. The subgrade soils should then be recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. The parking and drive areas may then be raised to grade with previously excavated soils or imported structural fill.

The grading recommendations presented above for the proposed parking and drive areas assume that the owner and/or developer can tolerate minor amounts of settlement within the proposed parking areas. The grading recommendations presented above do not mitigate the extent of undocumented fill soils and low strength alluvium in the parking and drive areas. As such, settlement and associated pavement distress could occur. Typically, repair of such distressed areas involves significantly lower costs than completely mitigating these soils at the time of construction. If the owner cannot tolerate the risk of such settlements, the parking and drive areas should be overexcavated to a depth of 2 feet below proposed pavement subgrade elevation, with the resulting soils replaced as compacted structural fill.

Fill Placement

- Fill soils should be placed in thin (6± inches), near-horizontal lifts, moisture conditioned to 2 to 4 percent above the optimum moisture content, and compacted.
- On-site soils may be used for fill provided they are cleaned of any debris to the satisfaction of the geotechnical engineer.
- All grading and fill placement activities should be completed in accordance with the requirements of the CBC and the grading code of the city of Rancho Cucamonga.
- All fill soils should be compacted to at least 90 percent of the ASTM D-1557 maximum dry density. Fill soils should be well mixed.
- Compaction tests should be performed periodically by the geotechnical engineer as random verification of compaction and moisture content. These tests are intended to aid the contractor. Since the tests are taken at discrete locations and depths, they may not be indicative of the entire fill and therefore should not relieve the contractor of his responsibility to meet the job specifications.

Selective Grading and Oversized Material Placement

At some of the boring locations, the existing soils at depths of 3 to 6½± feet possess occasional cobbles with varying amounts of fine to coarse gravel. It is expected that large scrapers (Caterpillar 657 or equivalent) will be adequate to move the cobble containing soils. Since the proposed grading will require excavation of cobble containing soils, it may be desirable to selectively grade the proposed building pad area. The presence of particles greater than 3 inches in diameter within the upper 1 to 3 feet of the building pad subgrade will impact the utility and foundation excavations. Depending on the depths of fills required within the proposed parking areas, it may be feasible to sort the on-site soils, placing the materials greater than 3 inches in diameter within the lower depths of the fills, and limiting the upper 1 to 3 feet of soils to materials less than 3 inches in size. Oversized materials could also be placed within the lower depths of the recommended overexcavations. In order to achieve this grading, it would likely be necessary to

use rock buckets and/or rock sieves to separate the oversized materials from the remaining soil. Although such selective grading will facilitate further construction activities, it is not considered mandatory and a suitable subgrade could be achieved without such extensive sorting. However, in any case it is recommended that all materials greater than 6 inches in size be excluded from the upper 1 foot of the surface of any compacted fills. **The placement of any oversized materials should be performed in accordance with the grading guide specifications included in Appendix D of this report**. If disposal of oversized materials is required, rock blankets or windrows should be used and such areas should be observed during construction and placement by a representative of the geotechnical engineer.

Imported Structural Fill

All imported structural fill should consist of very low expansive (EI < 20), well graded soils possessing at least 10 percent fines (that portion of the sample passing the No. 200 sieve). Additional specifications for structural fill are presented in the Grading Guide Specifications, included as Appendix D.

Utility Trench Backfill

In general, all utility trench backfill soils should be compacted to at least 90 percent of the ASTM D-1557 maximum dry density. It is recommended that materials in excess of 3 inches in size not be used for utility trench backfill. Compacted trench backfill should conform to the requirements of the local grading code, and more restrictive requirements may be indicated by the city of Rancho Cucamonga. All utility trench backfills should be witnessed by the geotechnical engineer. The trench backfill soils should be compaction tested where possible; probed and visually evaluated elsewhere.

Utility trenches which parallel a footing, and extending below a 1h:1v plane projected from the outside edge of the footing should be backfilled with structural fill soils, compacted to at least 90 percent of the ASTM D-1557 standard. Pea gravel backfill should not be used for these trenches.

6.4 Construction Considerations

Excavation Considerations

The near-surface soils generally consist of silty sands. Some of these materials will likely be subject to minor caving within shallow excavations. Where caving does occur, flattened excavation slopes may be sufficient to provide excavation stability. On a preliminary basis, the inclination of temporary slopes should not exceed 2h:1v. Deeper excavations may require some form of external stabilization such as shoring or bracing. Maintaining adequate moisture content within the near-surface soils will improve excavation stability. All excavation activities on this site should be conducted in accordance with Cal-OSHA regulations.

Slot Cutting Recommendations

The proposed building is located 18 to 22± feet west of the eastern property line. Due to the fill depth within this area, the lateral extent of overexcavation may be limited. Therefore, depending

upon the subsurface conditions encountered during remedial grading procedures, slot cutting may be necessary. The initial phase of excavation is expected to consist of a 2h:1v temporary slope. Small slot cuts may be made at the base of this inclined slope in order to remove all existing low strength, potentially collapsible soils from within the foundation influence zones and to provide the new layer of compacted structural fill beneath the proposed building foundations.

Groundwater

The static groundwater table is considered to have existed at a depth in excess of 29± feet at the time of the subsurface exploration. Therefore, groundwater is not expected to impact the grading or foundation construction activities.

6.5 Foundation Design and Construction

Based on the preceding grading recommendations, it is assumed that the new building pad will be underlain by structural fill soils used to replace existing fill soils and potentially compressible/collapsible near-surface alluvial soils. These new structural fill soils are expected to extend to depths of at least 3 feet below proposed foundation bearing grade, underlain by 1± foot of additional soil that has been scarified, moisture conditioned, and recompacted. Based on this subsurface profile, the proposed structure may be supported on conventional shallow foundations.

Foundation Design Parameters

New square and rectangular footings may be designed as follows:

- Maximum, net allowable soil bearing pressure: 2,500 lbs/ft^2.
- Minimum wall/column footing width: 14 inches/24 inches.
- Minimum longitudinal steel reinforcement within strip footings: Two (2) No. 5 rebars (1 top and 1 bottom).
- Minimum foundation embedment: 12 inches into suitable structural fill soils, and at least 18 inches below adjacent exterior grade. Interior column footings may be placed immediately beneath the floor slab.
- It is recommended that the perimeter building foundations be continuous across all exterior doorways. Any flatwork adjacent to the exterior doors should be doweled into the perimeter foundations in a manner determined by the structural engineer.

The allowable bearing pressures presented above may be increased by 1/3 when considering short duration wind or seismic loads. The minimum steel reinforcement recommended above is based on geotechnical considerations; additional reinforcement may be necessary for structural considerations. The actual design of the foundations should be determined by the structural engineer.

Foundation Construction

The foundation subgrade soils should be evaluated at the time of overexcavation, as discussed in Section 6.3 of this report. It is further recommended that the foundation subgrade soils be evaluated by the geotechnical engineer immediately prior to steel or concrete placement. Soils suitable for direct foundation support should consist of newly placed structural fill, compacted to at least 90 percent of the ASTM D-1557 maximum dry density. Any unsuitable materials should be removed to a depth of suitable bearing compacted structural fill, with the resulting excavations backfilled with compacted fill soils. As an alternative, lean concrete slurry (500 to 1,500 psi) may be used to backfill such isolated overexcavations.

The foundation subgrade soils should also be properly moisture conditioned to at least 2 to 4 percent of the Modified Proctor optimum, to a depth of at least 12 inches below bearing grade. **Since it is typically not feasible to increase the moisture content of the floor slab and foundation subgrade soils once rough grading has been completed, care should be taken to maintain the moisture content of the building pad subgrade soils throughout the construction process**.

Estimated Foundation Settlements

Post-construction total and differential settlements of shallow foundations designed and constructed in accordance with the previously presented recommendations are estimated to be less than 1.0 and 0.5 inches, respectively. Differential movements are expected to occur over a 30-foot span, thereby resulting in an angular distortion of less than 0.002 inches per inch.

Lateral Load Resistance

Lateral load resistance will be developed by a combination of friction acting at the base of foundations and slabs and the passive earth pressure developed by footings below grade. The following friction and passive pressure may be used to resist lateral forces:

- Passive Earth Pressure: 300 lbs/ft^3
- Friction Coefficient: 0.30

These are allowable values, and include a factor of safety. When combining friction and passive resistance, the passive pressure component should be reduced by one-third. These values assume that footings will be poured directly against compacted structural fill soils. The maximum allowable passive pressure is 3,000 lbs/ft^2.

6.6 Floor Slab Design and Construction

Subgrades which will support the new floor slab should be prepared in accordance with the recommendations contained in the ***Site Grading Recommendations*** section of this report. Based on the anticipated grading which will occur at this site, the floor of the proposed structure may be constructed as a conventional slab-on-grade supported on newly placed structural fill (or densified existing soils), extending to a depth of at least 5 feet below finished pad grade. Based on geotechnical considerations, the floor slab may be designed as follows:

- Minimum slab thickness: 5 inches.

- Modulus of Subgrade Reaction: k = 150 psi/in.

- Minimum slab reinforcement: Reinforcement is not considered necessary from a geotechnical standpoint. The actual floor slab reinforcement should be determined by the structural engineer, based on the imposed slab loading.

- Slab underlayment: If moisture sensitive floor coverings will be used then minimum slab underlayment should consist of a moisture vapor barrier constructed below the entire area of the proposed slab where such moisture sensitive floor coverings are anticipated. The moisture vapor barrier should meet or exceed the Class A rating as defined by ASTM E 1745-97 and have a permeance rating less than 0.01 perms as described in ASTM E 96-95 and ASTM E 154-88. A polyolefin material such as Stego® Wrap Vapor Barrier or equivalent will meet these specifications. The moisture vapor barrier should be properly constructed in accordance with all applicable manufacturer specifications. Given that a rock free subgrade is anticipated and that a capillary break is not required, sand below the barrier is not required. The need for sand and/or the amount of sand above the moisture vapor barrier should be specified by the structural engineer or concrete contractor. The selection of sand above the barrier is not a geotechnical engineering issue and hence outside our purview. Where moisture sensitive floor coverings are not anticipated, the vapor barrier may be eliminated.

- Moisture condition the floor slab subgrade soils to 2 to 4 percent above the Modified Proctor optimum moisture content, to a depth of 12 inches. The moisture content of the floor slab subgrade soils should be verified by the geotechnical engineer within 24 hours prior to concrete placement.

- Proper concrete curing techniques should be utilized to reduce the potential for slab curling or the formation of excessive shrinkage cracks.

The actual design of the floor slab should be completed by the structural engineer to verify adequate thickness and reinforcement.

6.7 Retaining Wall Design and Construction

Although not indicated on the site plan, some small (less than 6 feet in height) retaining walls may be required to facilitate the new site grades. The parameters recommended for use in the design of these walls are presented below.

Retaining Wall Design Parameters

Based on the soil conditions encountered at the boring locations, the following parameters may be used in the design of new retaining walls for this site. The following parameters assume that only the on-site soils will be utilized for retaining wall backfill. The near-surface soils generally consist of silty sands. Based on their composition, the on-site soils have been assigned a friction angle of 30 degrees.

If desired, SCG could provide design parameters for an alternative select backfill material behind the retaining walls. The use of select backfill material could result in lower lateral earth pressures. In order to use the design parameters for the imported select fill, this material must be placed within the entire active failure wedge. This wedge is defined as extending from the heel of the retaining wall upwards at an angle of approximately 60° from horizontal. If select backfill material behind the retaining wall is desired, SCG should be contacted for supplementary recommendations.

RETAINING WALL DESIGN PARAMETERS

Design Parameter		Soil Type
		On-site Silty Sands
Internal Friction Angle (ϕ)		30°
Unit Weight		132 lbs/ft^3
Equivalent Fluid Pressure:	Active Condition (level backfill)	44 lbs/ft^3
	Active Condition (2h:1v backfill)	71 lbs/ft^3
	At-Rest Condition (level backfill)	66 lbs/ft^3

The walls should be designed using a soil-footing coefficient of friction of 0.30 and an equivalent passive pressure of 300 lbs/ft^3. The structural engineer should incorporate appropriate factors of safety in the design of the retaining walls.

The active earth pressure may be used for the design of retaining walls that do not directly support structures or support soils that in turn support structures and which will be allowed to deflect. The at-rest earth pressure should be used for walls that will not be allowed to deflect such as those which will support foundation bearing soils, or which will support foundation loads directly.

Where the soils on the toe side of the retaining wall are not covered by a "hard" surface such as a structure or pavement, the upper 1 foot of soil should be neglected when calculating passive resistance due to the potential for the material to become disturbed or degraded during the life of the structure.

Seismic Lateral Earth Pressures

In accordance with the CBC, any retaining walls more than 6 feet in height must be designed for seismic lateral earth pressures. If walls 6 feet or more are required for this site, the geotechnical engineer should be contacted for supplementary seismic lateral earth pressure recommendations.

Retaining Wall Foundation Design

The retaining wall foundations should be supported within newly placed compacted structural fill, extending to a depth of at least 3 feet below proposed foundation bearing grade. Foundations to support new retaining walls should be designed in accordance with the general Foundation Design Parameters presented in a previous section of this report.

Backfill Material

On-site soils may be used to backfill the retaining walls. However, all backfill material placed within 3 feet of the back wall face should have a particle size no greater than 3 inches. The retaining wall backfill materials should be well graded.

It is recommended that a properly installed prefabricated drainage composite such as the MiraDRAIN 6000XL (or approved equivalent), which is specifically designed for use behind retaining walls be used. If the drainage composite material is not covered by an impermeable surface, such as a structure or pavement, a 12-inch thick layer of a low permeability soil should be placed over the backfill to reduce surface water migration to the underlying soils. The drainage composite should be separated from the backfill soils by a suitable geotextile, approved by the geotechnical engineer.

All retaining wall backfill should be placed and compacted under engineering controlled conditions in the necessary layer thicknesses to ensure an in-place density between 90 and 93 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D1557). Care should be taken to avoid over-compaction of the soils behind the retaining walls, and the use of heavy compaction equipment should be avoided.

Subsurface Drainage

As previously indicated, the retaining wall design parameters are based upon drained backfill conditions. Consequently, some form of permanent drainage system will be necessary in conjunction with the appropriate backfill material. Subsurface drainage may consist of either:

- A weep hole drainage system typically consisting of a series of 4-inch diameter holes in the wall situated slightly above the ground surface elevation on the exposed side of the wall and at an approximate 8-foot on-center spacing. The weep holes should include a 2 cubic foot pocket of open graded gravel, surrounded by an approved geotextile fabric, at each weep hole location.

- A 4-inch diameter perforated pipe surrounded by 2 cubic feet of gravel per linear foot of drain placed behind the wall, above the retaining wall footing. The gravel layer should be wrapped in a suitable geotextile fabric to reduce the potential for migration of fines. The footing drain should be extended to daylight or tied into a storm drainage system.

6.8 Pavement Design Parameters

Site preparation in the pavement area should be completed as previously recommended in the ***Site Grading Recommendations*** section of this report. The subsequent pavement recommendations assume proper drainage and construction monitoring, and are based on either PCA or CALTRANS design parameters for a twenty (20) year design period. However, these designs also assume a routine pavement maintenance program to obtain the anticipated 20-year pavement service life.

Pavement Subgrades

It is anticipated that the new pavements will be primarily supported on a layer of compacted structural fill, consisting of scarified, thoroughly moisture conditioned and recompacted existing soils. The near-surface soils generally consist of silty sands. These soils are generally considered to possess good pavement support characteristics, with R-values in the range of 40 to 50. The subsequent pavement design is therefore based upon an assumed R-value of 40. Any fill material imported to the site should have support characteristics equal to or greater than that of the on-site soils and be placed and compacted under engineering controlled conditions. It is recommended that R-value testing be performed after completion of rough grading. Depending upon the results of the R-value testing, it may be feasible to use thinner pavement sections in some areas of the site.

Asphaltic Concrete

Presented below are the recommended thicknesses for new flexible pavement structures consisting of asphaltic concrete over a granular base. The pavement designs are based on the traffic indices (TI's) indicated. The client and/or civil engineer should verify that these TI's are representative of the anticipated traffic volumes. If the client and/or civil engineer determine that the expected traffic volume will exceed the applicable traffic index, we should be contacted for supplementary recommendations. The design traffic indices equate to the following approximate daily traffic volumes over a 20-year design life, assuming six operational traffic days per week.

Traffic Index	No. of Heavy Trucks per Day
4.0	0
5.0	1
6.0	3
7.0	11
8.0	35
9.0	93

For the purpose of the traffic volumes indicated above, a truck is defined as a 5-axle tractor trailer unit with one 8-kip axle and two 32-kip tandem axles. All of the traffic indices allow for 1,000 automobiles per day.

ASPHALT PAVEMENTS (R=40)					
Materials	Thickness (inches)				
	Auto Parking and Auto Drive Lanes (TI = 4.0 to 5.0)	Truck Traffic			
		TI = 6.0	TI = 7.0	TI = 8.0	TI = 9.0
Asphalt Concrete	3	3½	4	5	5½
Aggregate Base	4	6	7	8	10
Compacted Subgrade	12	12	12	12	12

The aggregate base course should be compacted to at least 95 percent of the ASTM D-1557 maximum dry density. The asphaltic concrete should be compacted to at least 95 percent of the Marshall maximum density, as determined by ASTM D-2726. The aggregate base course may consist of crushed aggregate base (CAB) or crushed miscellaneous base (CMB), which is a recycled gravel, asphalt and concrete material. The gradation, R-Value, Sand Equivalent, and Percentage Wear of the CAB or CMB should comply with appropriate specifications contained in the current edition of the "Greenbook" Standard Specifications for Public Works Construction.

Portland Cement Concrete

The preparation of the subgrade soils within concrete pavement areas should be performed as previously described for proposed asphalt pavement areas. The minimum recommended thicknesses for the Portland Cement Concrete pavement sections are as follows:

PORTLAND CEMENT CONCRETE PAVEMENTS (R=40)				
Materials	**Thickness (inches)**			
	Autos and Light Truck Traffic (TI = 6.0)	Truck Traffic		
		TI = 7.0	TI = 8.0	TI = 9.0
PCC	5	6½	8	9
Compacted Subgrade (95% minimum compaction)	12	12	12	12

The concrete should have a 28-day compressive strength of at least 3,000 psi. Any reinforcement within the PCC pavements should be determined by the project structural engineer. The maximum joint spacing within all of the PCC pavements is recommended to be equal to or less than 30 times the pavement thickness.

7.0 GENERAL COMMENTS

This report has been prepared as an instrument of service for use by the client, in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, civil engineer, and/or structural engineer. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur. The client(s)' reliance upon this report is subject to the Engineering Services Agreement, incorporated into our proposal for this project.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and sample depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted.

The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

APPENDIX A



SOURCE: SAN BERNARDINO COUNTY
THOMAS GUIDE, 2013

SITE LOCATION MAP

PROPOSED WAREHOUSE

RANCHO CUCAMONGA, CALIFORNIA

SCALE: 1" = 2400'

DRAWN: JLL
CHKD: RGT

SCG PROJECT
17G112-1

PLATE 1

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL

8TH STREET

B-6

B-1

B-2

BUILDING AREA
174,580 S.F.

B-3

23 DOCK DOORS

B-4

B-7

B-5

HELLMAN AVENUE

NORTH

SoCalGeo

GEOTECHNICAL LEGEND

APPROXIMATE BORING LOCATION

EXISTING STRUCTURES TO BE DEMOLISHED

NOTE: SITE PLAN PREPARED BY HPA ARCHITECTURE.

BORING LOCATION PLAN

PROPOSED WAREHOUSE

RANCHO CUCAMONGA, CALIFORNIA

SCALE: 1" = 60'

DRAWN: JLL
CHKD: RGT

SCG PROJECT
17G112-1

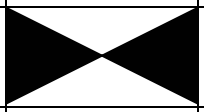
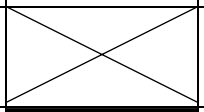
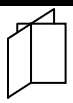
PLATE 2

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL

APPENDIX B

BORING LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

BLOW COUNT: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG: Graphic Soil Symbol as depicted on the following page.

DRY DENSITY: Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.

MOISTURE CONTENT: Moisture content of a soil sample, expressed as a percentage of the dry weight.

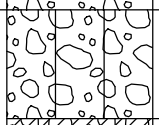
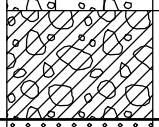
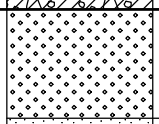
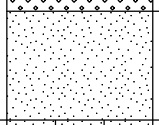
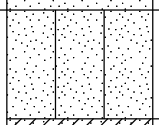
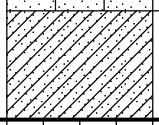
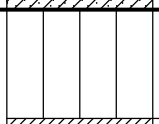
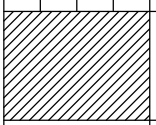
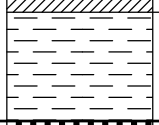
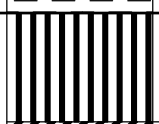
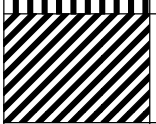
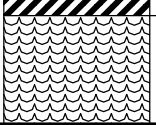
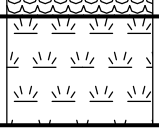
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT: The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE: The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR: The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-1

JOB NO.: 17G112 | DRILLING DATE: 2/7/17 | WATER DEPTH: Dry
PROJECT: Proposed Warehouse | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 15 feet
LOCATION: Rancho Cucamonga, California | LOGGED BY: Jason Hiskey | READING TAKEN: At Completion

DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					5± inches Asphaltic concrete, no discernible Aggregate base							
		13			FILL: Dark Brown Silty fine Sand, trace medium Sand, loose-moist	118	10					
		8			FILL: Brown Silty fine Sand, little medium Sand, trace coarse Sand, trace fine Gravel, loose-moist	105	12					
5		7				112	12					
		13			ALLUVIUM: Brown Silty fine Sand, loose to medium dense-moist	101	12					
		15				112	16					
10												
					Light Gray Brown Gravelly fine to coarse Sand, trace Silt, dense to very dense-damp							
		40					3					
15												
		71/5"					3					
20												
		52					4					
25												
		50/6"										No Sample Recovered
					Boring Terminated at 29' due to refusal on Boulders or Cobbles							

TBL 17G112.GPJ SOCALGEO.GDT 2/23/17

TEST BORING LOG **PLATE B-1**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-2

JOB NO.: 17G112 | DRILLING DATE: 2/7/17 | WATER DEPTH: Dry
PROJECT: Proposed Warehouse | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 9 feet
LOCATION: Rancho Cucamonga, California | LOGGED BY: Jason Hiskey | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					3± inches Asphaltic concrete, 6± inches Aggregate base							
		4			FILL: Dark Brown Silty fine Sand, some medium to coarse Sand, trace fine Gravel, trace Asphaltic concrete fragments, very loose to loose-damp to moist		9					
		1					10					
5												
		11			FILL: Dark Brown Silty fine to medium Sand, little coarse Sand, trace fine Gravel, trace Asphaltic concrete fragments, loose-damp to moist	115	11					
		50/6"										No Sample Recovered
					Boring Terminated at 9' due to refusal on oversize fragments							

TBL 17G112.GPJ SOCALGEO.GDT 2/23/17

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-3

JOB NO.: 17G112
PROJECT: Proposed Warehouse
LOCATION: Rancho Cucamonga, California

DRILLING DATE: 2/7/17
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH: Dry
CAVE DEPTH: 13 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					5± inches Asphaltic concrete, 3± inches Aggregate base							
		4			FILL: Dark Brown Silty fine Sand to fine Sandy Silt, trace medium to coarse Sand, very loose-moist	107	14					
		7			FILL: Brown Silty fine Sand, trace medium to coarse Sand, occasional Cobbles, loose-moist	118	12					
5		16			ALLUVIUM: Brown Silty fine to coarse Sand, trace fine to coarse Gravel, medium dense-damp	115	9					
		27			Light Brown Gravelly fine to coarse Sand, occasional to extensive Cobbles, medium dense-damp	108	5					
10		38				115	5					
		16			Brown Silty fine Sand, trace medium to coarse Sand, medium dense-moist		15					
15					Boring Terminated at 15'							

TBL 17G112.GPJ SOCALGEO.GDT 2/23/17

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-4

JOB NO.: 17G112 | DRILLING DATE: 2/7/17 | WATER DEPTH: Dry
PROJECT: Proposed Warehouse | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 14 feet
LOCATION: Rancho Cucamonga, California | LOGGED BY: Jason Hiskey | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					3± inches Asphaltic concrete, no discernible Aggregate base							
		15			FILL: Gray Brown Silty fine Sand, trace medium to coarse Sand, medium dense-moist		13					
		1			FILL: Dark Gray Brown Silty fine Sand, little medium Sand, trace fine Gravel, very loose-moist		14					
5												
		2			FILL: Brown Silty fine Sand, trace medium Sand, trace fine to coarse Gravel, very loose to loose-moist		11					
		8					10					
10												
		49			ALLUVIUM: Light Gray Brown Gravelly fine to coarse Sand, occasional to extensive Cobbles, dense-damp		4					
15												
		22			Brown Silty fine to medium Sand, trace coarse Sand, trace fine Gravel, medium dense-moist		12					
20					Boring Terminated at 20'							

TBL 17G112.GPJ SOCALGEO.GDT 2/23/17

TEST BORING LOG **PLATE B-4**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-5

JOB NO.: 17G112 | DRILLING DATE: 2/7/17 | WATER DEPTH: Dry
PROJECT: Proposed Warehouse | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 14.5 feet
LOCATION: Rancho Cucamonga, California | LOGGED BY: Jason Hiskey | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					5± inches Asphaltic concrete, 4± inches Aggregate base							
		11			FILL: Dark Gray Brown Silty fine Sand, little medium to coarse Sand, trace fine Gravel, very loose to loose-damp to moist	113	10					
		6				105	9					
5		9			FILL: Brown Silty fine to medium Sand, little coarse Sand, occasional Cobbles, trace fine to coarse Gravel, loose-damp		5					Disturbed Sample
		14			ALLUVIUM: Light Gray Brown Gravelly fine to coarse Sand, occasional Cobbles, loose-damp		5					Disturbed Sample
		22			Light Gray Brown Gravelly fine to coarse Sand, extensive Cobbles, medium dense to very dense-damp to moist	114	7					
10												
		56					4					
15												
		44					5					
20												
		59					5					
25					Boring Terminated at 25' due to refusal							

TBL 17G112.GPJ SOCALGEO.GDT 2/23/17

TEST BORING LOG **PLATE B-5**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-6

JOB NO.: 17G112 | DRILLING DATE: 2/7/17 | WATER DEPTH: Dry
PROJECT: Proposed Warehouse | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 3 feet
LOCATION: Rancho Cucamonga, California | LOGGED BY: Jason Hiskey | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					6± inches Asphaltic concrete, 4± inches Aggregate base							
		6			FILL: Dark Brown Silty fine Sand, trace medium to coarse Sand, trace fine Gravel, trace Asphaltic concrete fragments, loose-moist		11					
		18			FILL: Gray Brown Silty fine to medium Sand, little coarse Sand, trace fine to coarse Gravel, occasional Cobbles, medium dense-damp		4					
5					Boring Terminated at 5'							

TBL 17G112.GPJ SOCALGEO.GDT 2/23/17

TEST BORING LOG **PLATE B-6**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-7

JOB NO.: 17G112 | DRILLING DATE: 2/7/17 | WATER DEPTH: Dry
PROJECT: Proposed Warehouse | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 3.5 feet
LOCATION: Rancho Cucamonga, California | LOGGED BY: Jason Hiskey | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					4± inches Asphaltic concrete, 3± inches Aggregate base							
		15			FILL: Dark Brown Silty fine Sand, trace fine to coarse Gravel, trace medium to coarse Sand, loose to medium dense-moist		9					
		4					13					
5					Boring Terminated at 5'							

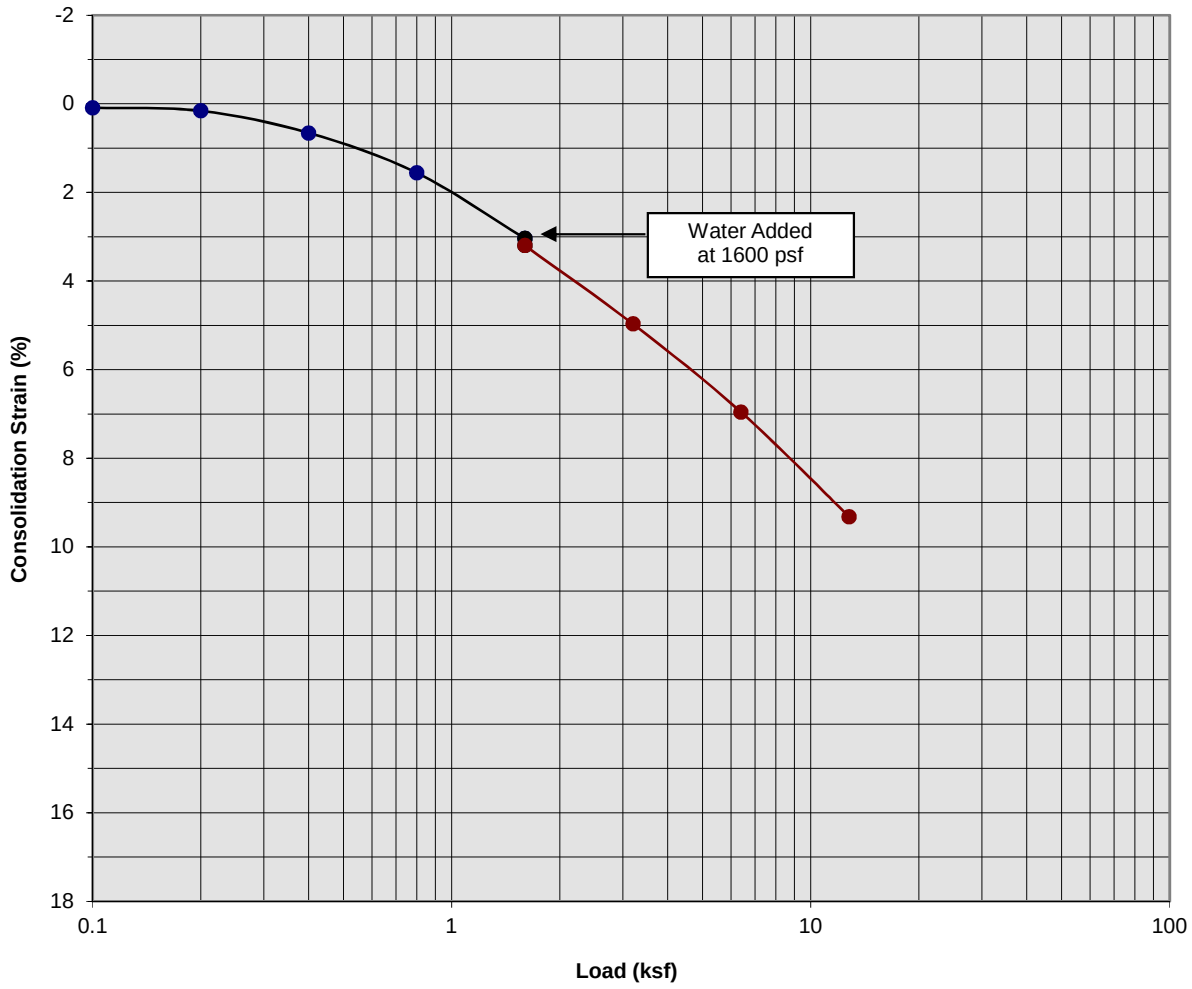
TBL 17G112.GPJ SOCALGEO.GDT 2/23/17

TEST BORING LOG

PLATE B-7

APPENDIX C

Consolidation/Collapse Test Results



Classification: FILL: Brown Silty fine Sand, little medium Sand, trace coarse Sand

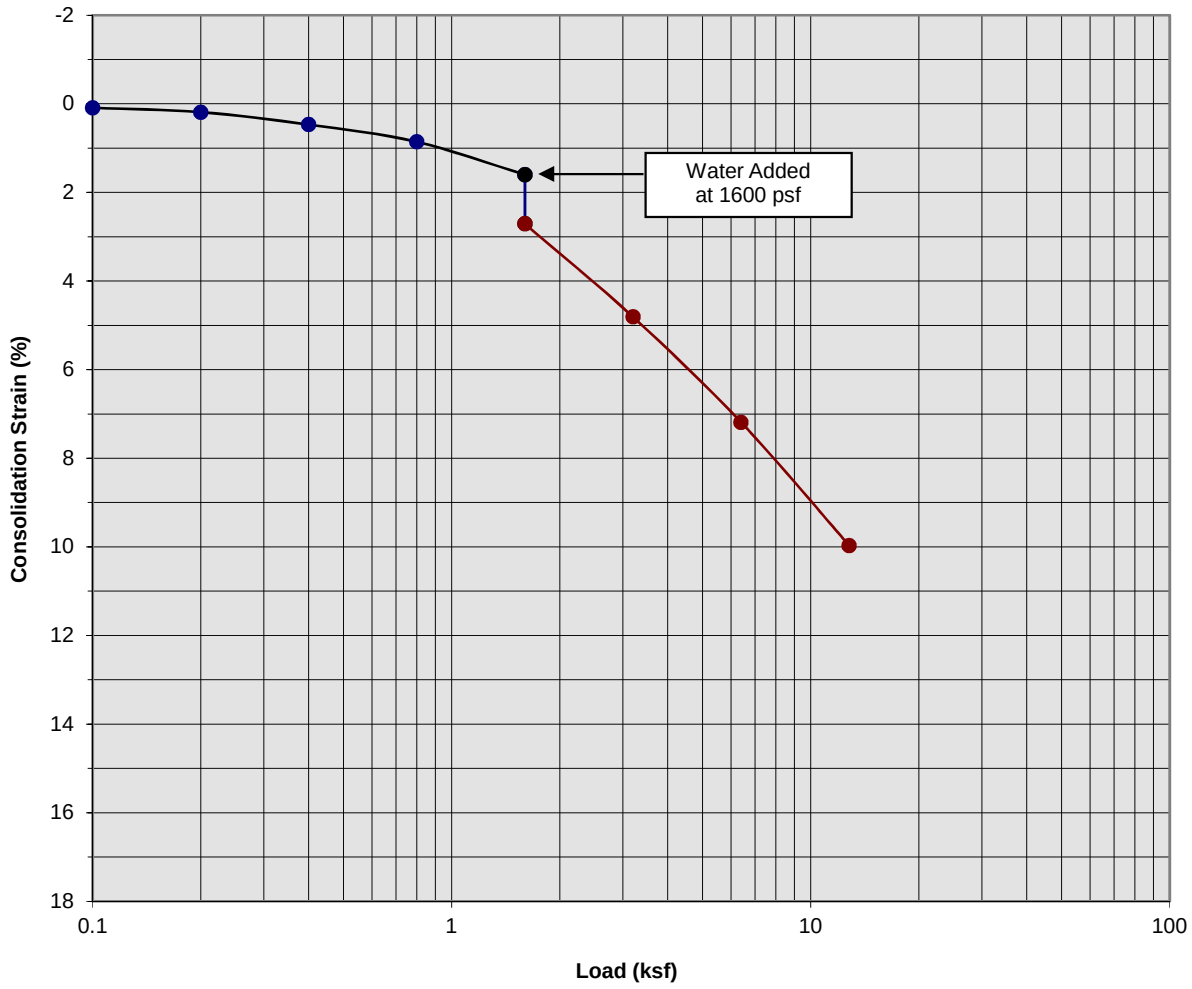
Boring Number:	B-1	Initial Moisture Content (%)	12
Sample Number:	---	Final Moisture Content (%)	15
Depth (ft)	3 to 4	Initial Dry Density (pcf)	105.0
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	115.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.16

Proposed Warehouse
Rancho Cucamonga, California
Project No. 17G112

PLATE C- 1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: FILL: Brown Silty fine Sand, little medium Sand, trace coarse Sand

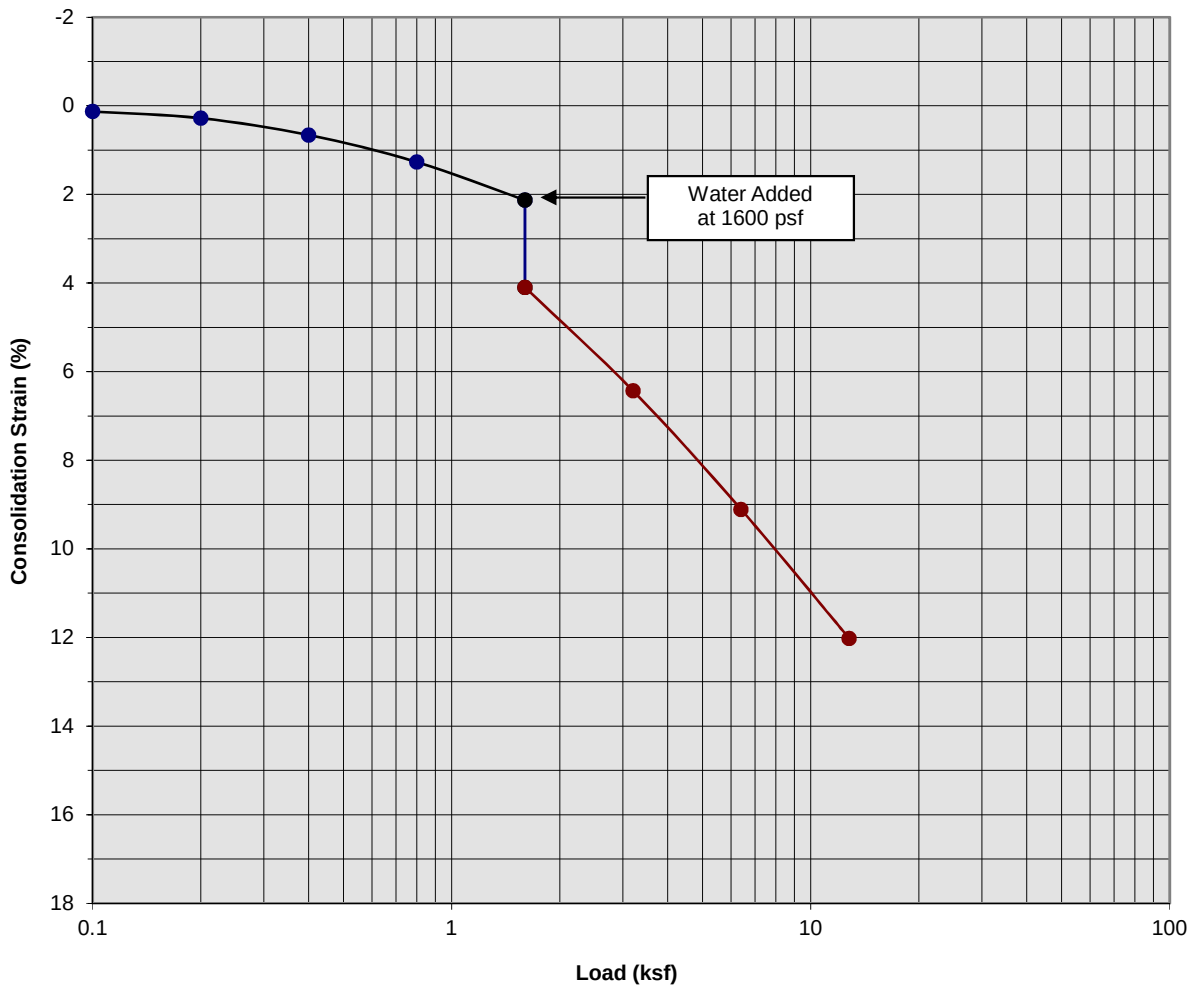
Boring Number:	B-1	Initial Moisture Content (%)	12
Sample Number:	---	Final Moisture Content (%)	15
Depth (ft)	5 to 6	Initial Dry Density (pcf)	111.7
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	123.8
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.11

Proposed Warehouse
Rancho Cucamonga, California
Project No. 17G112

PLATE C- 2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Brown Silty fine Sand

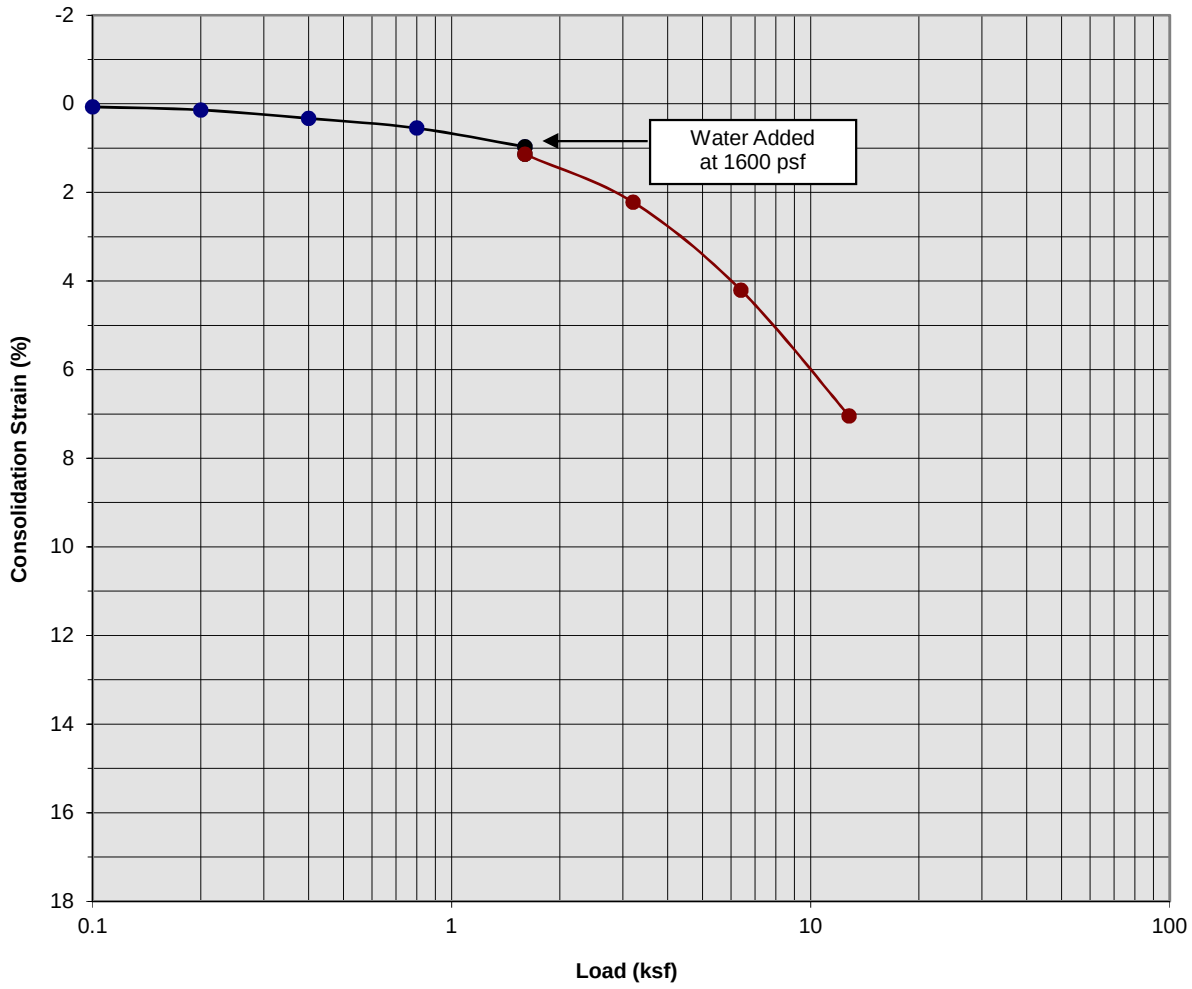
Boring Number:	B-1	Initial Moisture Content (%)	12
Sample Number:	---	Final Moisture Content (%)	17
Depth (ft)	7 to 8	Initial Dry Density (pcf)	101.2
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	115.2
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.97

Proposed Warehouse
Rancho Cucamonga, California
Project No. 17G112

PLATE C- 3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Brown Silty fine Sand

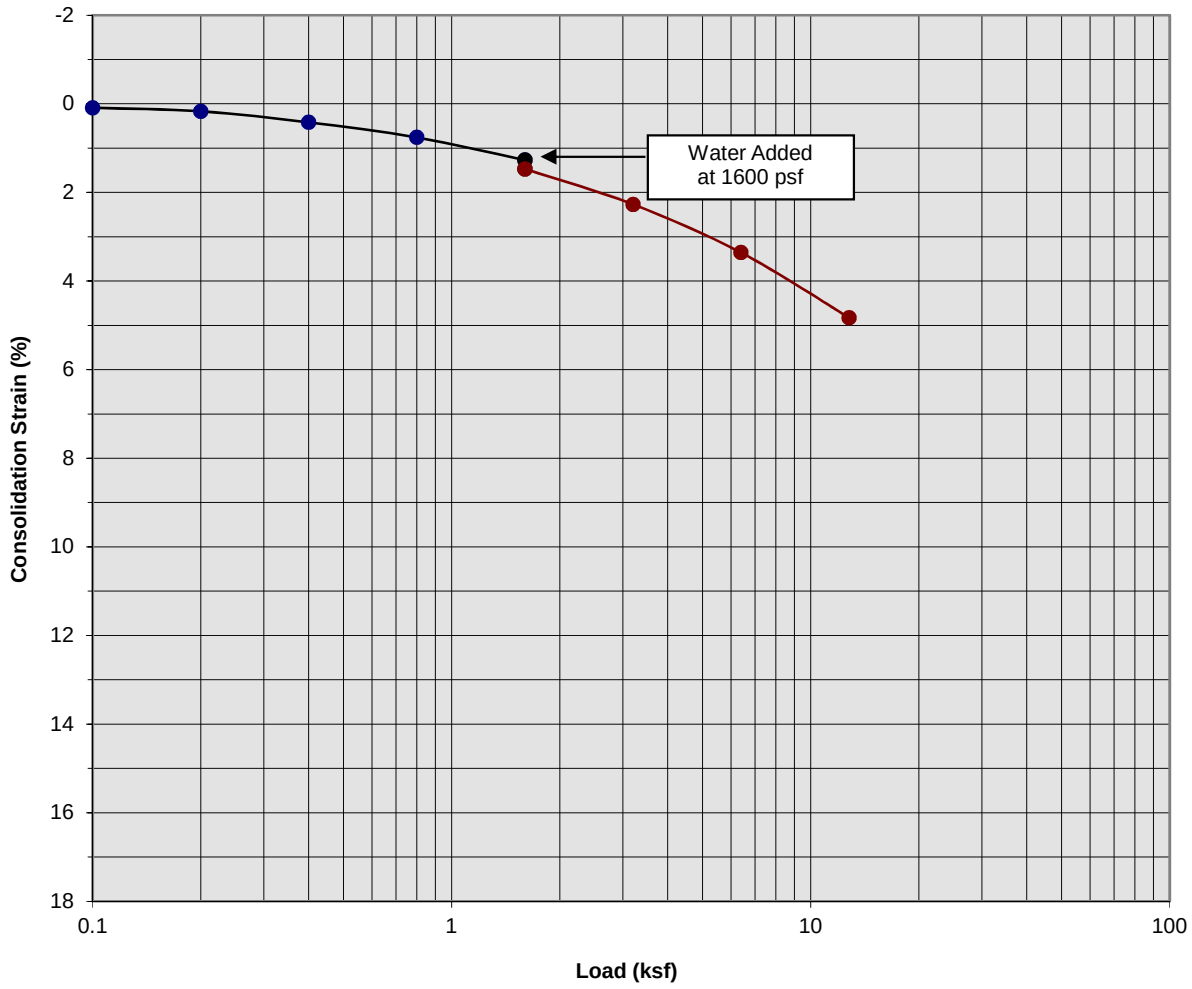
Boring Number:	B-1	Initial Moisture Content (%)	16
Sample Number:	---	Final Moisture Content (%)	19
Depth (ft)	9 to 10	Initial Dry Density (pcf)	111.7
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	119.8
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.17

Proposed Warehouse
Rancho Cucamonga, California
Project No. 17G112

PLATE C- 4

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: FILL: Dark Gray Brown Silty fine Sand, little medium to coarse Sand

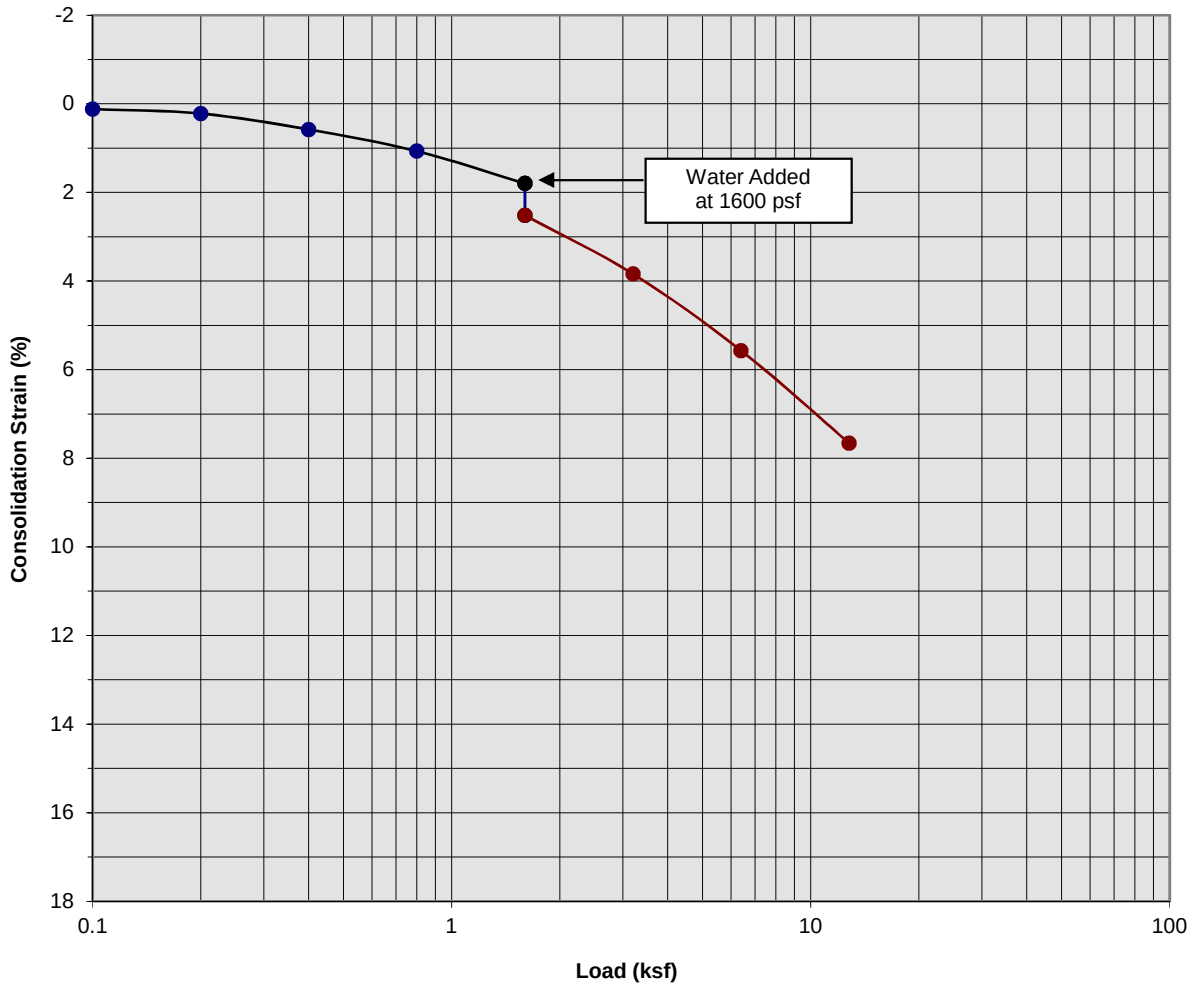
Boring Number:	B-5	Initial Moisture Content (%)	10
Sample Number:	---	Final Moisture Content (%)	15
Depth (ft)	1 to 2	Initial Dry Density (pcf)	113.0
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	118.4
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.20

Proposed Warehouse
Rancho Cucamonga, California
Project No. 17G112

PLATE C- 5

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: FILL: Dark Gray Brown Silty fine Sand, little medium to coarse Sand

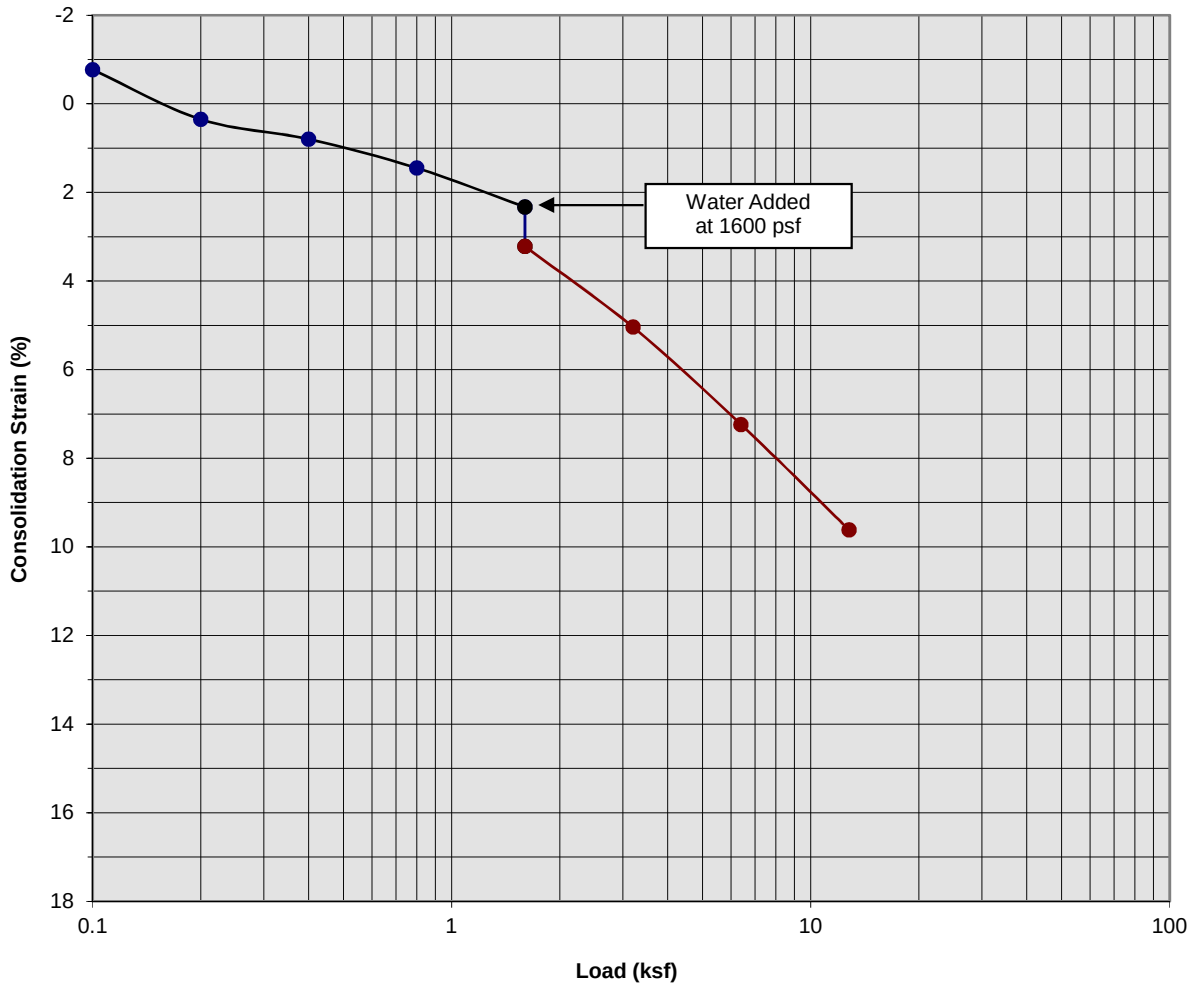
Boring Number:	B-5	Initial Moisture Content (%)	9
Sample Number:	---	Final Moisture Content (%)	15
Depth (ft)	3 to 4	Initial Dry Density (pcf)	104.8
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	113.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.72

Proposed Warehouse
Rancho Cucamonga, California
Project No. 17G112

PLATE C- 6

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: FILL: Brown Silty fine to medium Sand, little coarse Sand

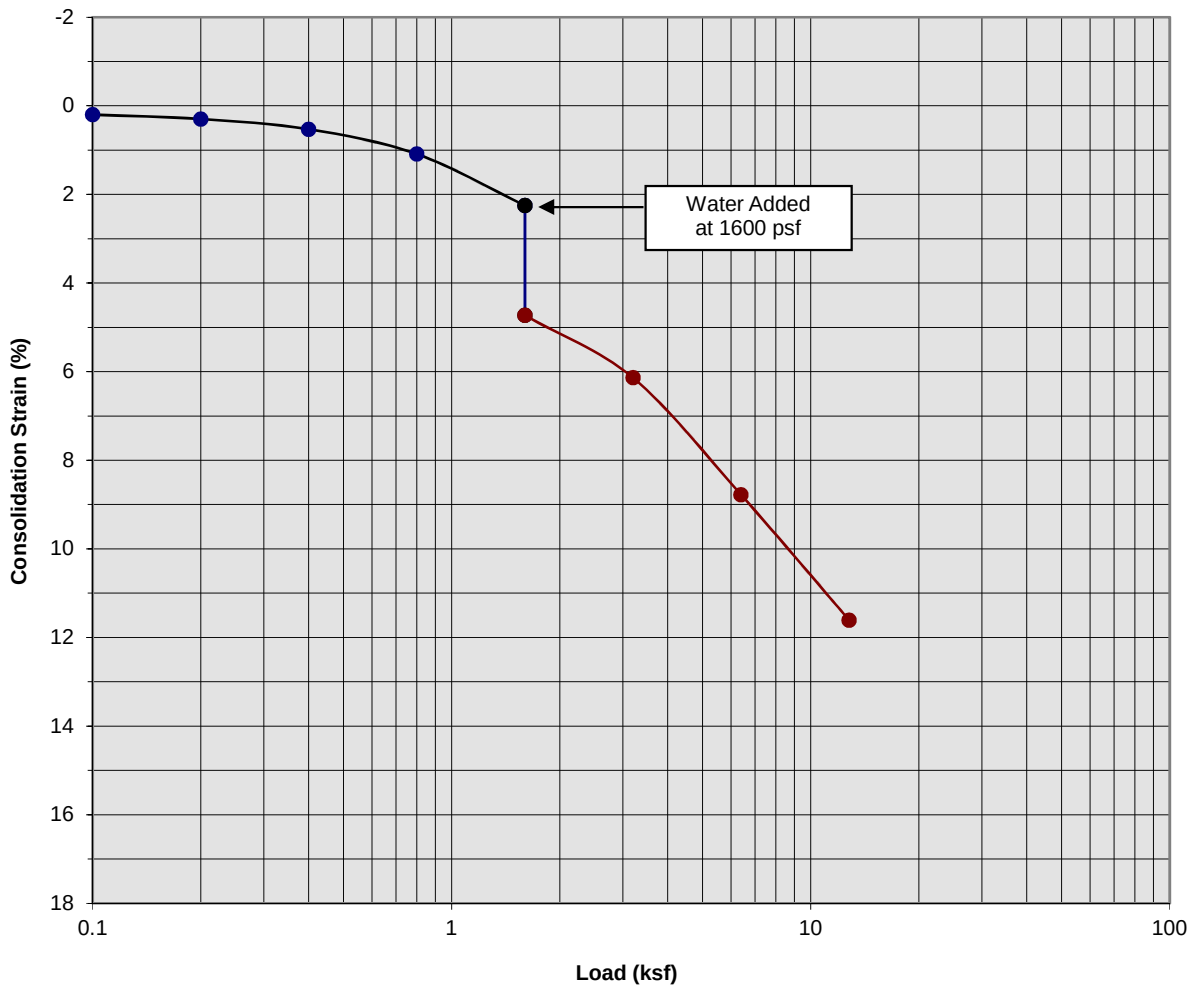
Boring Number:	B-5	Initial Moisture Content (%)	6
Sample Number:	---	Final Moisture Content (%)	15
Depth (ft)	5 to 6	Initial Dry Density (pcf)	111.2
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	118.6
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.89

Proposed Warehouse
Rancho Cucamonga, California
Project No. 17G112

PLATE C- 7

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Light Gray Brown Gravelly fine to coarse Sand

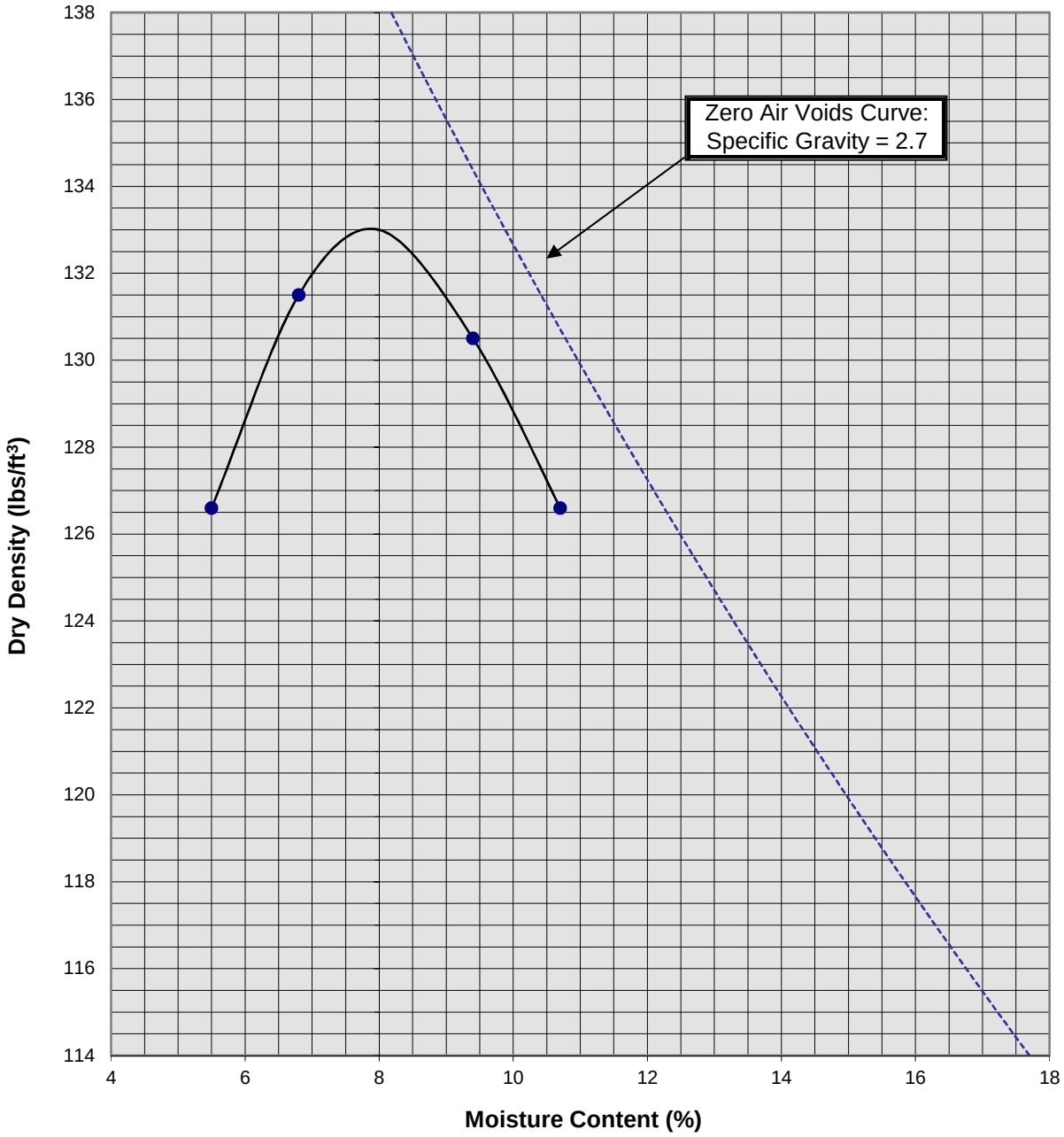
Boring Number:	B-5	Initial Moisture Content (%)	4
Sample Number:	---	Final Moisture Content (%)	14
Depth (ft)	7 to 8	Initial Dry Density (pcf)	116.6
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	116.6
Specimen Thickness (in)	1.0	Percent Collapse (%)	2.48

Proposed Warehouse
Rancho Cucamonga, California
Project No. 17G112

PLATE C- 8

SoCalGeo
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A California Corporation

Moisture/Density Relationship
ASTM D-1557



Soil ID Number	B-1 @ 0 to 5'
Optimum Moisture (%)	8
Maximum Dry Density (pcf)	133
Soil Classification	Brown Silty fine to coarse Sand, trace fine Gravel

Proposed Warehouse
Rancho Cucamonga, California
Project No. 17G112

PLATE C-7

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

APPENDIX D

GRADING GUIDE SPECIFICATIONS

These grading guide specifications are intended to provide typical procedures for grading operations. They are intended to supplement the recommendations contained in the geotechnical investigation report for this project. Should the recommendations in the geotechnical investigation report conflict with the grading guide specifications, the more site specific recommendations in the geotechnical investigation report will govern.

General

- The Earthwork Contractor is responsible for the satisfactory completion of all earthwork in accordance with the plans and geotechnical reports, and in accordance with city, county, and applicable building codes.

- The Geotechnical Engineer is the representative of the Owner/Builder for the purpose of implementing the report recommendations and guidelines. These duties are not intended to relieve the Earthwork Contractor of any responsibility to perform in a workman-like manner, nor is the Geotechnical Engineer to direct the grading equipment or personnel employed by the Contractor.

- The Earthwork Contractor is required to notify the Geotechnical Engineer of the anticipated work and schedule so that testing and inspections can be provided. If necessary, work may be stopped and redone if personnel have not been scheduled in advance.

- The Earthwork Contractor is required to have suitable and sufficient equipment on the job-site to process, moisture condition, mix and compact the amount of fill being placed to the approved compaction. In addition, suitable support equipment should be available to conform with recommendations and guidelines in this report.

- Canyon cleanouts, overexcavation areas, processed ground to receive fill, key excavations, subdrains and benches should be observed by the Geotechnical Engineer prior to placement of any fill. It is the Earthwork Contractor's responsibility to notify the Geotechnical Engineer of areas that are ready for inspection.

- Excavation, filling, and subgrade preparation should be performed in a manner and sequence that will provide drainage at all times and proper control of erosion. Precipitation, springs, and seepage water encountered shall be pumped or drained to provide a suitable working surface. The Geotechnical Engineer must be informed of springs or water seepage encountered during grading or foundation construction for possible revision to the recommended construction procedures and/or installation of subdrains.

Site Preparation

- The Earthwork Contractor is responsible for all clearing, grubbing, stripping and site preparation for the project in accordance with the recommendations of the Geotechnical Engineer.

- If any materials or areas are encountered by the Earthwork Contractor which are suspected of having toxic or environmentally sensitive contamination, the Geotechnical Engineer and Owner/Builder should be notified immediately.

- Major vegetation should be stripped and disposed of off-site. This includes trees, brush, heavy grasses and any materials considered unsuitable by the Geotechnical Engineer.

- Underground structures such as basements, cesspools or septic disposal systems, mining shafts, tunnels, wells and pipelines should be removed under the inspection of the Geotechnical Engineer and recommendations provided by the Geotechnical Engineer and/or city, county or state agencies. If such structures are known or found, the Geotechnical Engineer should be notified as soon as possible so that recommendations can be formulated.

- Any topsoil, slopewash, colluvium, alluvium and rock materials which are considered unsuitable by the Geotechnical Engineer should be removed prior to fill placement.

- Remaining voids created during site clearing caused by removal of trees, foundations basements, irrigation facilities, etc., should be excavated and filled with compacted fill.

- Subsequent to clearing and removals, areas to receive fill should be scarified to a depth of 10 to 12 inches, moisture conditioned and compacted

- The moisture condition of the processed ground should be at or slightly above the optimum moisture content as determined by the Geotechnical Engineer. Depending upon field conditions, this may require air drying or watering together with mixing and/or discing.

Compacted Fills

- Soil materials imported to or excavated on the property may be utilized in the fill, provided each material has been determined to be suitable in the opinion of the Geotechnical Engineer. Unless otherwise approved by the Geotechnical Engineer, all fill materials shall be free of deleterious, organic, or frozen matter, shall contain no chemicals that may result in the material being classified as “contaminated,” and shall be very low to non-expansive with a maximum expansion index (EI) of 50. The top 12 inches of the compacted fill should have a maximum particle size of 3 inches, and all underlying compacted fill material a maximum 6-inch particle size, except as noted below.

- All soils should be evaluated and tested by the Geotechnical Engineer. Materials with high expansion potential, low strength, poor gradation or containing organic materials may require removal from the site or selective placement and/or mixing to the satisfaction of the Geotechnical Engineer.

- Rock fragments or rocks less than 6 inches in their largest dimensions, or as otherwise determined by the Geotechnical Engineer, may be used in compacted fill, provided the distribution and placement is satisfactory in the opinion of the Geotechnical Engineer.

- Rock fragments or rocks greater than 12 inches should be taken off-site or placed in accordance with recommendations and in areas designated as suitable by the Geotechnical Engineer. These materials should be placed in accordance with Plate D-8 of these Grading Guide Specifications and in accordance with the following recommendations:

    - Rocks 12 inches or more in diameter should be placed in rows at least 15 feet apart, 15 feet from the edge of the fill, and 10 feet or more below subgrade. Spaces should be left between each rock fragment to provide for placement and compaction of soil around the fragments.

    - Fill materials consisting of soil meeting the minimum moisture content requirements and free of oversize material should be placed between and over the rows of rock or

concrete. Ample water and compactive effort should be applied to the fill materials as they are placed in order that all of the voids between each of the fragments are filled and compacted to the specified density.

- Subsequent rows of rocks should be placed such that they are not directly above a row placed in the previous lift of fill. A minimum 5-foot offset between rows is recommended.

- To facilitate future trenching, oversized material should not be placed within the range of foundation excavations, future utilities or other underground construction unless specifically approved by the soil engineer and the developer/owner representative.

- Fill materials approved by the Geotechnical Engineer should be placed in areas previously prepared to receive fill and in evenly placed, near horizontal layers at about 6 to 8 inches in loose thickness, or as otherwise determined by the Geotechnical Engineer for the project.

- Each layer should be moisture conditioned to optimum moisture content, or slightly above, as directed by the Geotechnical Engineer. After proper mixing and/or drying, to evenly distribute the moisture, the layers should be compacted to at least 90 percent of the maximum dry density in compliance with ASTM D-1557-78 unless otherwise indicated.

- Density and moisture content testing should be performed by the Geotechnical Engineer at random intervals and locations as determined by the Geotechnical Engineer. These tests are intended as an aid to the Earthwork Contractor, so he can evaluate his workmanship, equipment effectiveness and site conditions. The Earthwork Contractor is responsible for compaction as required by the Geotechnical Report(s) and governmental agencies.

- Fill areas unused for a period of time may require moisture conditioning, processing and recompaction prior to the start of additional filling. The Earthwork Contractor should notify the Geotechnical Engineer of his intent so that an evaluation can be made.

- Fill placed on ground sloping at a 5-to-1 inclination (horizontal-to-vertical) or steeper should be benched into bedrock or other suitable materials, as directed by the Geotechnical Engineer. Typical details of benching are illustrated on Plates D-2, D-4, and D-5.

- Cut/fill transition lots should have the cut portion overexcavated to a depth of at least 3 feet and rebuilt with fill (see Plate D-1), as determined by the Geotechnical Engineer.

- All cut lots should be inspected by the Geotechnical Engineer for fracturing and other bedrock conditions. If necessary, the pads should be overexcavated to a depth of 3 feet and rebuilt with a uniform, more cohesive soil type to impede moisture penetration.

- Cut portions of pad areas above buttresses or stabilizations should be overexcavated to a depth of 3 feet and rebuilt with uniform, more cohesive compacted fill to impede moisture penetration.

- Non-structural fill adjacent to structural fill should typically be placed in unison to provide lateral support. Backfill along walls must be placed and compacted with care to ensure that excessive unbalanced lateral pressures do not develop. The type of fill material placed adjacent to below grade walls must be properly tested and approved by the Geotechnical Engineer with consideration of the lateral earth pressure used in the design.

Foundations

- The foundation influence zone is defined as extending one foot horizontally from the outside edge of a footing, and proceeding downward at a ½ horizontal to 1 vertical (0.5:1) inclination.

- Where overexcavation beneath a footing subgrade is necessary, it should be conducted so as to encompass the entire foundation influence zone, as described above.

- Compacted fill adjacent to exterior footings should extend at least 12 inches above foundation bearing grade. Compacted fill within the interior of structures should extend to the floor subgrade elevation.

Fill Slopes

- The placement and compaction of fill described above applies to all fill slopes. Slope compaction should be accomplished by overfilling the slope, adequately compacting the fill in even layers, including the overfilled zone and cutting the slope back to expose the compacted core

- Slope compaction may also be achieved by backrolling the slope adequately every 2 to 4 vertical feet during the filling process as well as requiring the earth moving and compaction equipment to work close to the top of the slope. Upon completion of slope construction, the slope face should be compacted with a sheepsfoot connected to a sideboom and then grid rolled. This method of slope compaction should only be used if approved by the Geotechnical Engineer.

- Sandy soils lacking in adequate cohesion may be unstable for a finished slope condition and therefore should not be placed within 15 horizontal feet of the slope face.

- All fill slopes should be keyed into bedrock or other suitable material. Fill keys should be at least 15 feet wide and inclined at 2 percent into the slope. For slopes higher than 30 feet, the fill key width should be equal to one-half the height of the slope (see Plate D-5).

- All fill keys should be cleared of loose slough material prior to geotechnical inspection and should be approved by the Geotechnical Engineer and governmental agencies prior to filling.

- The cut portion of fill over cut slopes should be made first and inspected by the Geotechnical Engineer for possible stabilization requirements. The fill portion should be adequately keyed through all surficial soils and into bedrock or suitable material. Soils should be removed from the transition zone between the cut and fill portions (see Plate D-2).

Cut Slopes

- All cut slopes should be inspected by the Geotechnical Engineer to determine the need for stabilization. The Earthwork Contractor should notify the Geotechnical Engineer when slope cutting is in progress at intervals of 10 vertical feet. Failure to notify may result in a delay in recommendations.

- Cut slopes exposing loose, cohesionless sands should be reported to the Geotechnical Engineer for possible stabilization recommendations.

- All stabilization excavations should be cleared of loose slough material prior to geotechnical inspection. Stakes should be provided by the Civil Engineer to verify the location and dimensions of the key. A typical stabilization fill detail is shown on Plate D-5.

- Stabilization key excavations should be provided with subdrains. Typical subdrain details are shown on Plates D-6.

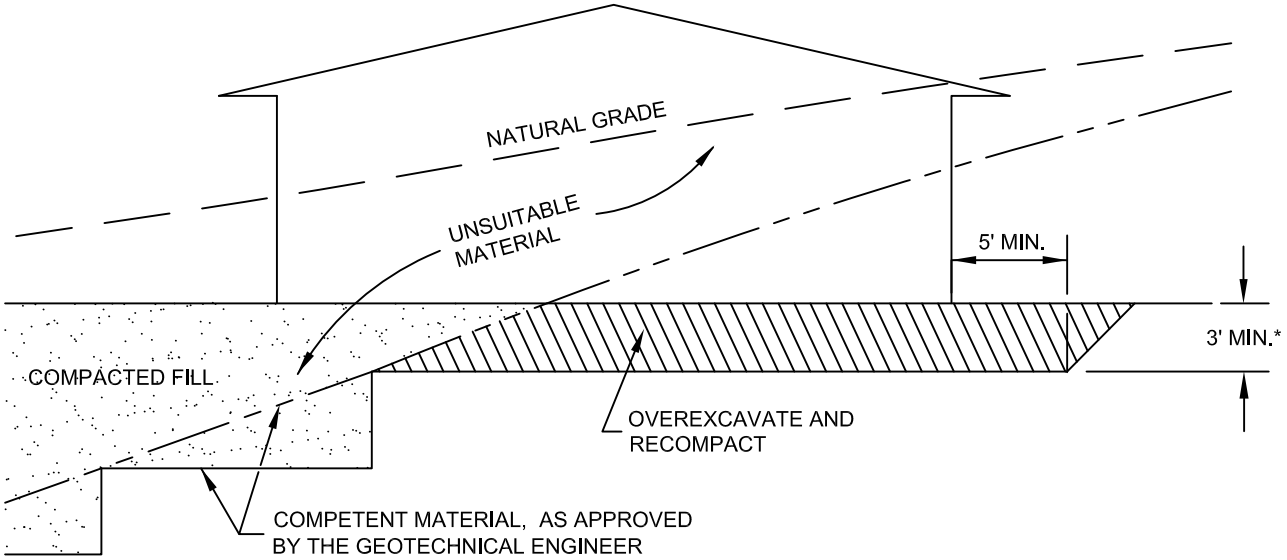
Subdrains

- Subdrains may be required in canyons and swales where fill placement is proposed. Typical subdrain details for canyons are shown on Plate D-3. Subdrains should be installed after approval of removals and before filling, as determined by the Soils Engineer.

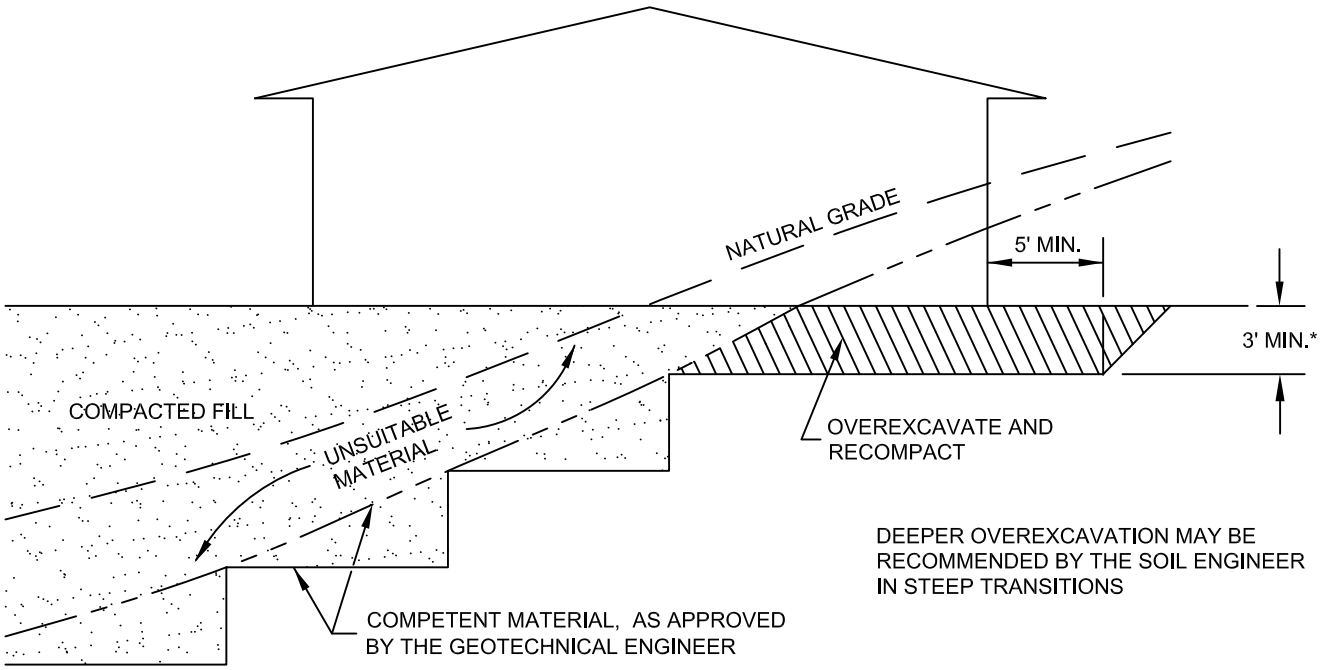
- Plastic pipe may be used for subdrains provided it is Schedule 40 or SDR 35 or equivalent. Pipe should be protected against breakage, typically by placement in a square-cut (backhoe) trench or as recommended by the manufacturer.

- Filter material for subdrains should conform to CALTRANS Specification 68-1.025 or as approved by the Geotechnical Engineer for the specific site conditions. Clean ¾-inch crushed rock may be used provided it is wrapped in an acceptable filter cloth and approved by the Geotechnical Engineer. Pipe diameters should be 6 inches for runs up to 500 feet and 8 inches for the downstream continuations of longer runs. Four-inch diameter pipe may be used in buttress and stabilization fills.

CUT LOT



CUT/FILL LOT (TRANSITION)



*SEE TEXT OF REPORT FOR SPECIFIC RECOMMENDATION. ACTUAL DEPTH OF OVEREXCAVATION MAY BE GREATER.

TRANSITION LOT DETAIL

GRADING GUIDE SPECIFICATIONS

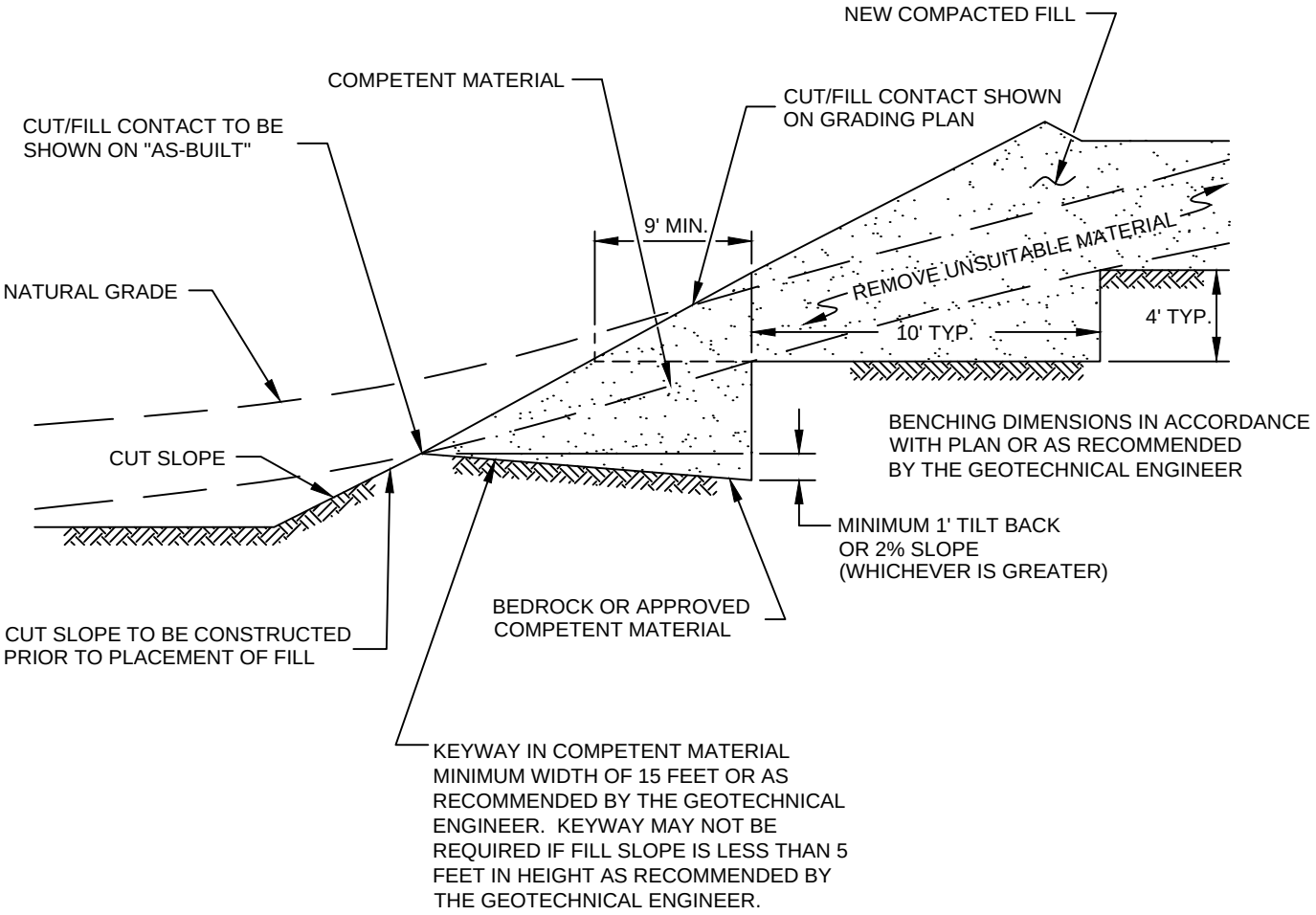
NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-1

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



FILL ABOVE CUT SLOPE DETAIL

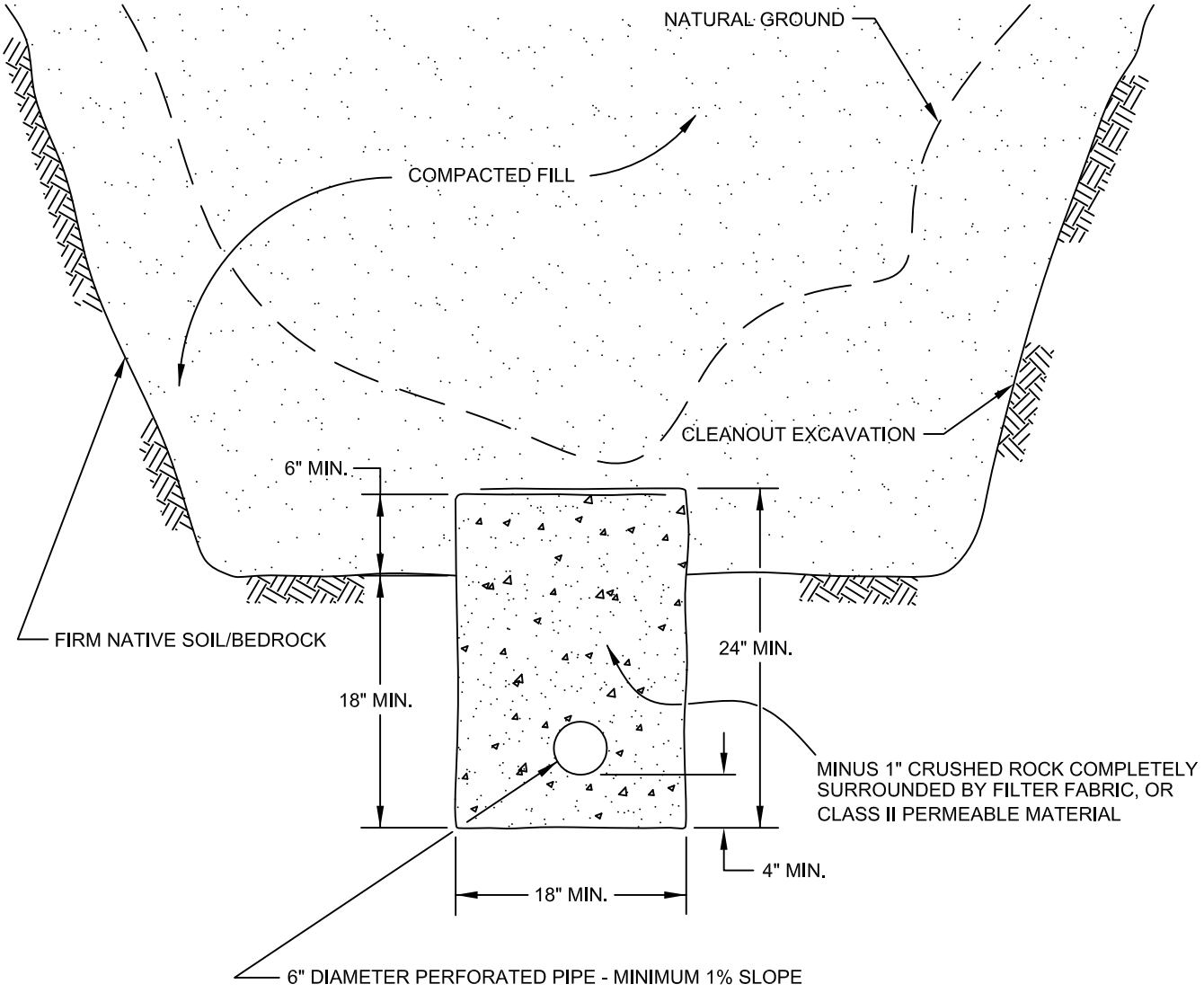
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



PIPE MATERIAL	DEPTH OF FILL OVER SUBDRAIN
ADS (CORRUGATED POLETHYLENE)	8
TRANSITE UNDERDRAIN	20
PVC OR ABS: SDR 35	35
SDR 21	100

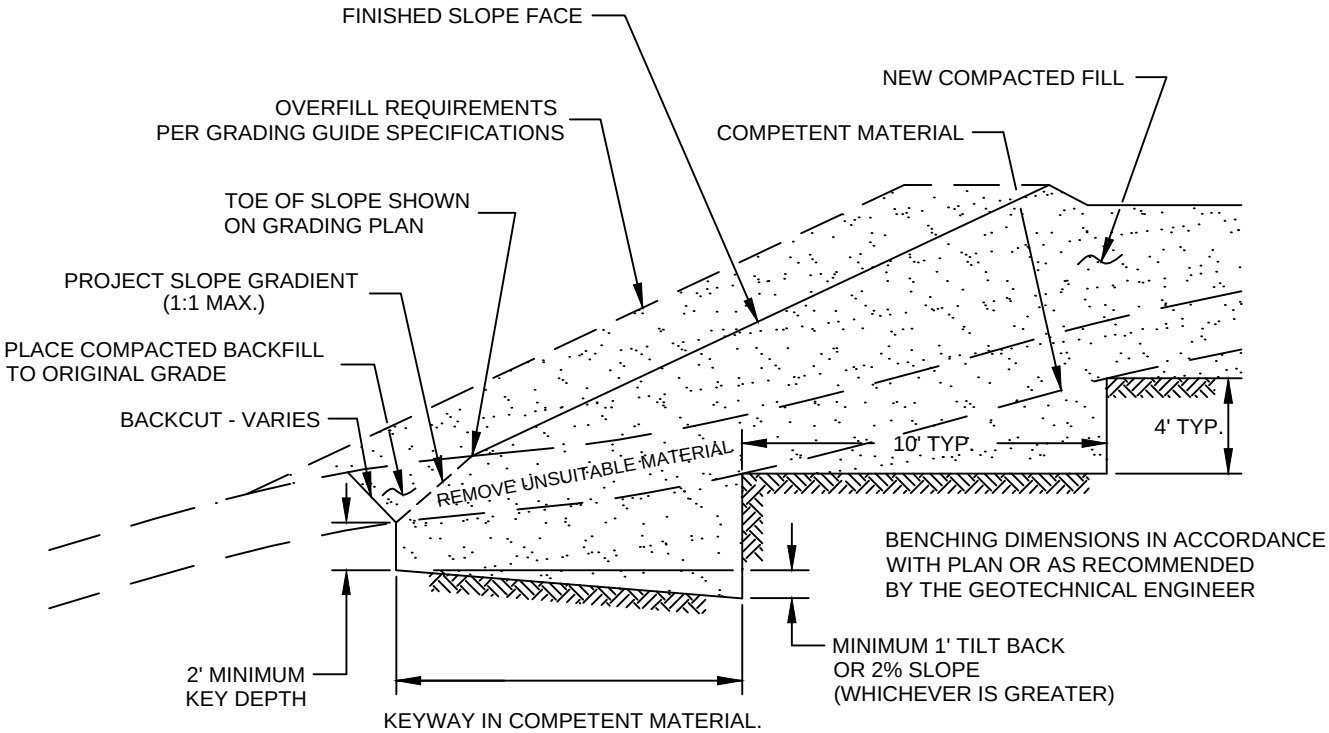
SCHEMATIC ONLY
NOT TO SCALE

CANYON SUBDRAIN DETAIL
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE
DRAWN: JAS
CHKD: GKM

PLATE D-3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



NOTE:
BENCHING SHALL BE REQUIRED WHEN NATURAL SLOPES ARE EQUAL TO OR STEEPER THAN 5:1 OR WHEN RECOMMENDED BY THE GEOTECHNICAL ENGINEER.

FILL ABOVE NATURAL SLOPE DETAIL

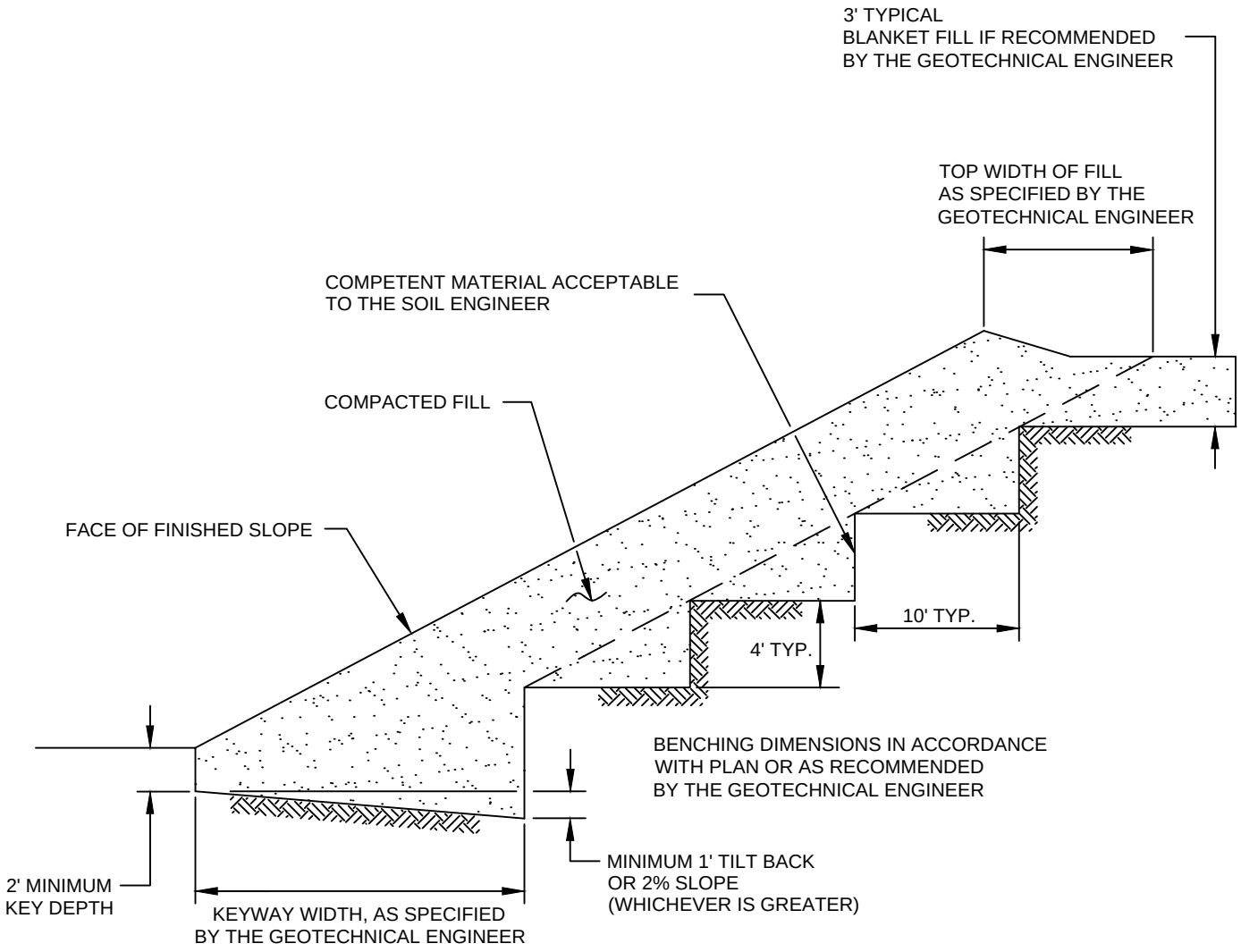
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-4

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



STABILIZATION FILL DETAIL

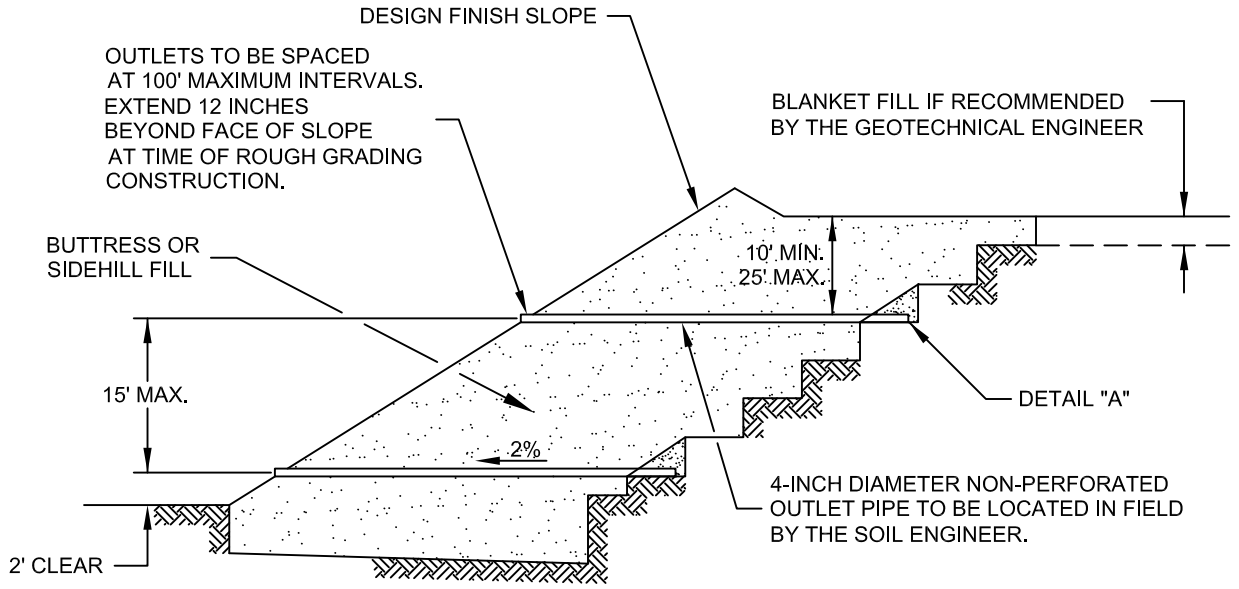
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-5

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



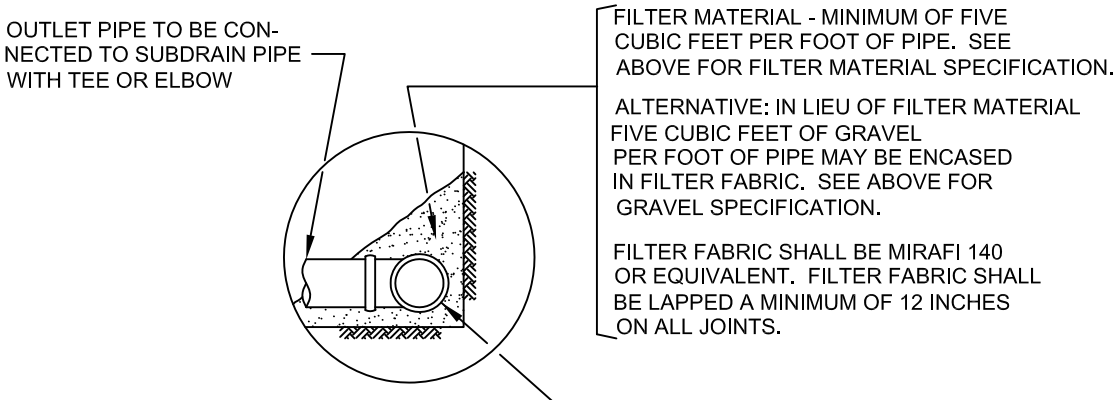
"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50



DETAIL "A"

NOTES:
1. TRENCH FOR OUTLET PIPES TO BE BACKFILLED WITH ON-SITE SOIL.

SLOPE FILL SUBDRAINS

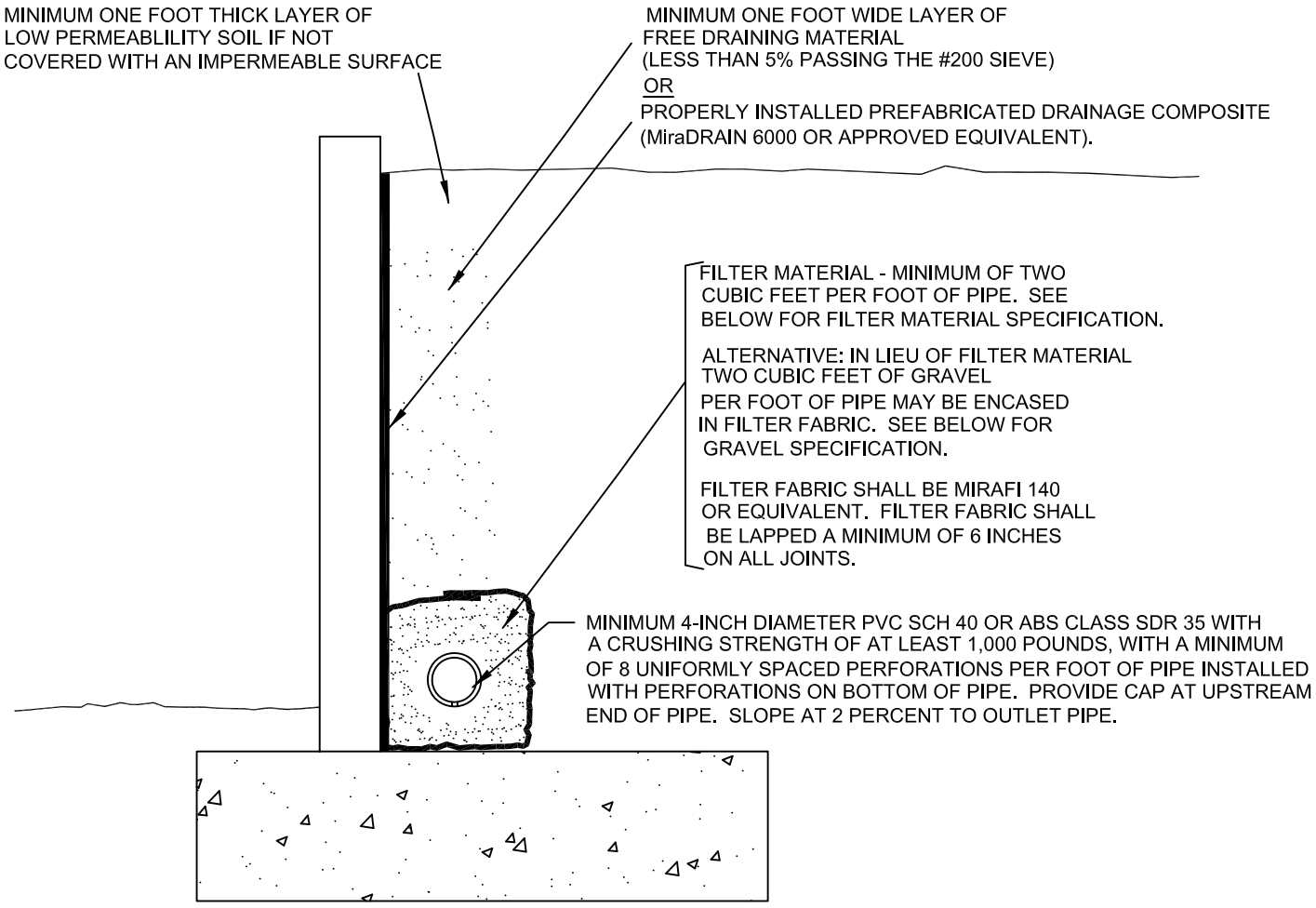
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-6

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50

RETAINING WALL BACKDRAINS

GRADING GUIDE SPECIFICATIONS

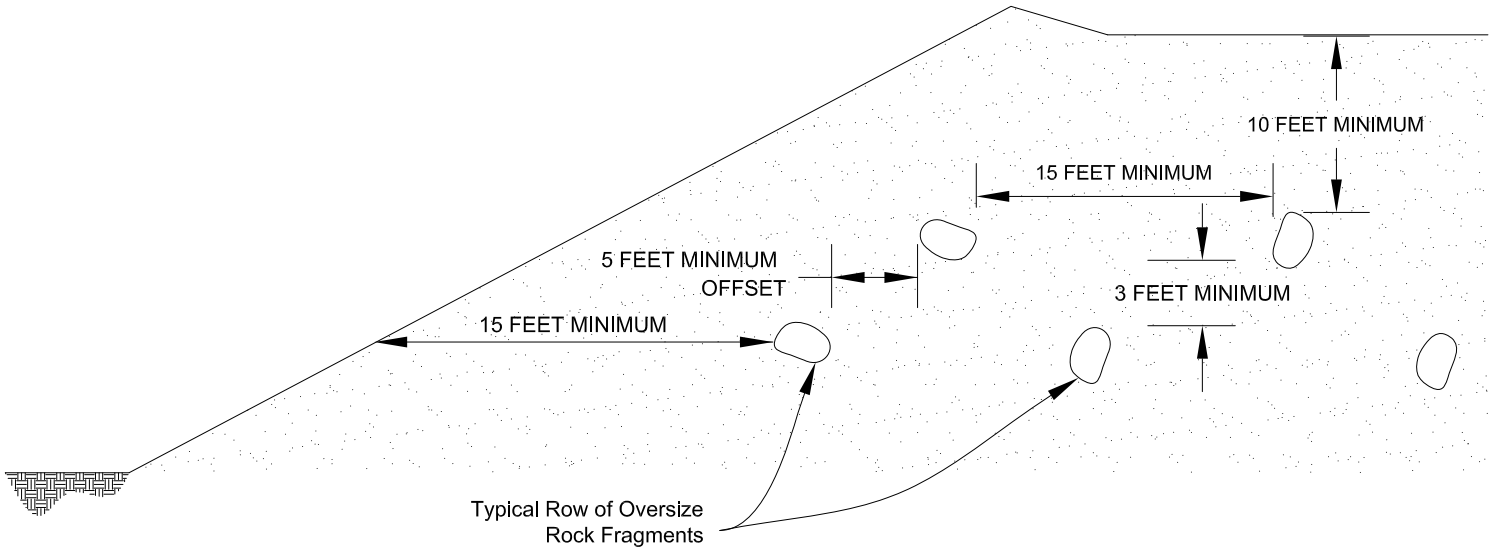
NOT TO SCALE

DRAWN: JAS
CHKD: GKM

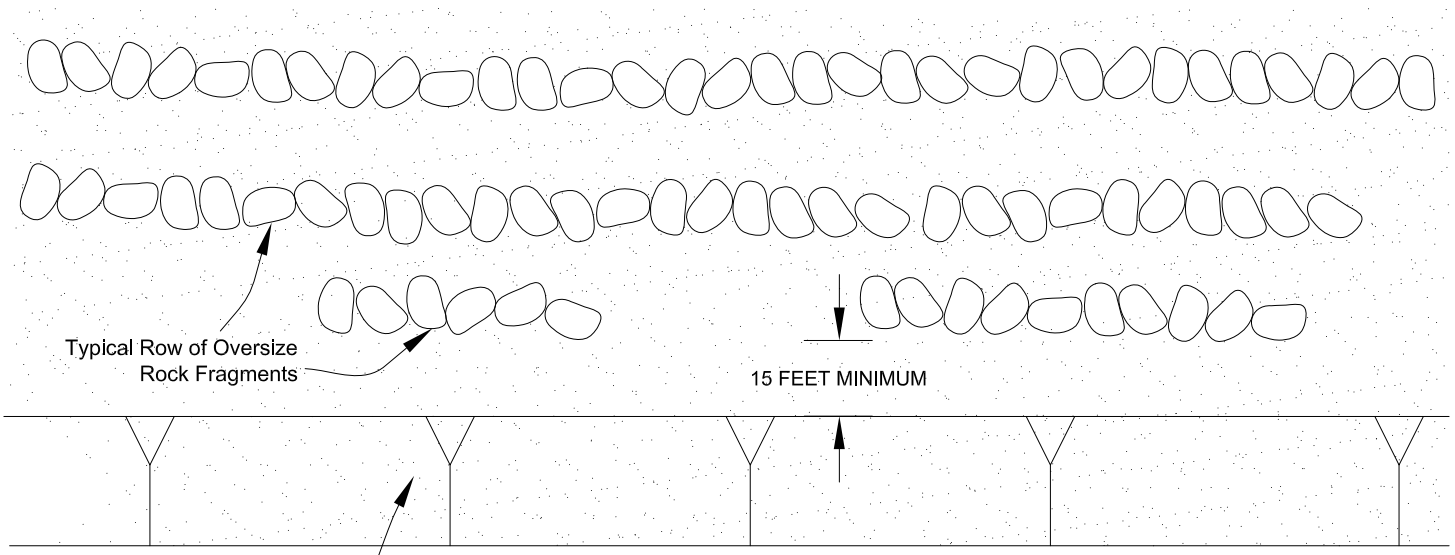
PLATE D-7

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



Section View



Plan View

PLACEMENT OF OVERSIZED MATERIAL

GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: PM
CHKD: GKM

PLATE D-8

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL

APPENDIX E

USGS Design Maps Summary Report

User–Specified Input

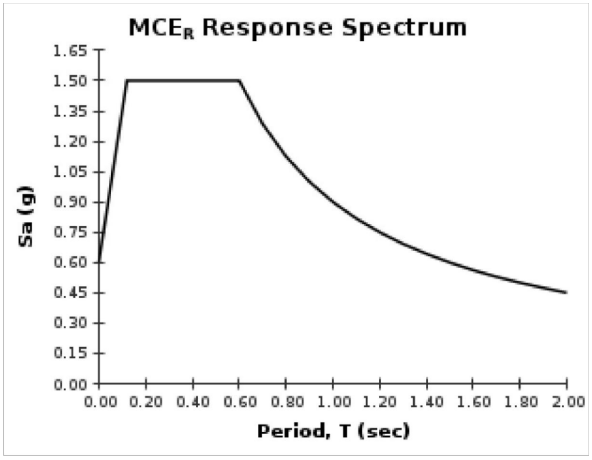
Building Code Reference Document	ASCE 7-10 Standard (which utilizes USGS hazard data available in 2008)
Site Coordinates	34.09114°N, 117.60342°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

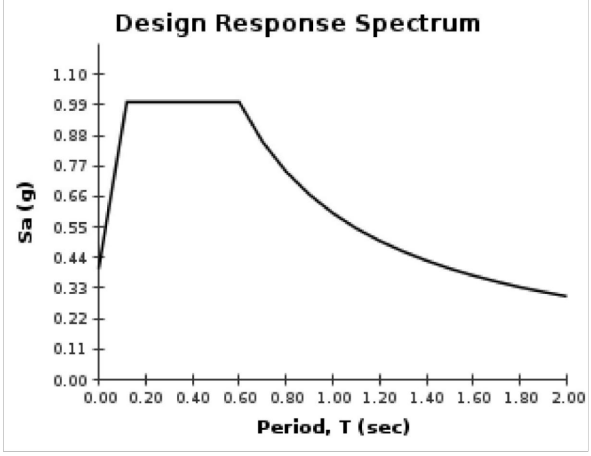


USGS–Provided Output

S_S =	1.500 g	S_{MS} =	1.500 g	S_{DS} =	1.000 g
S_1 =	0.600 g	S_{M1} =	0.900 g	S_{D1} =	0.600 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





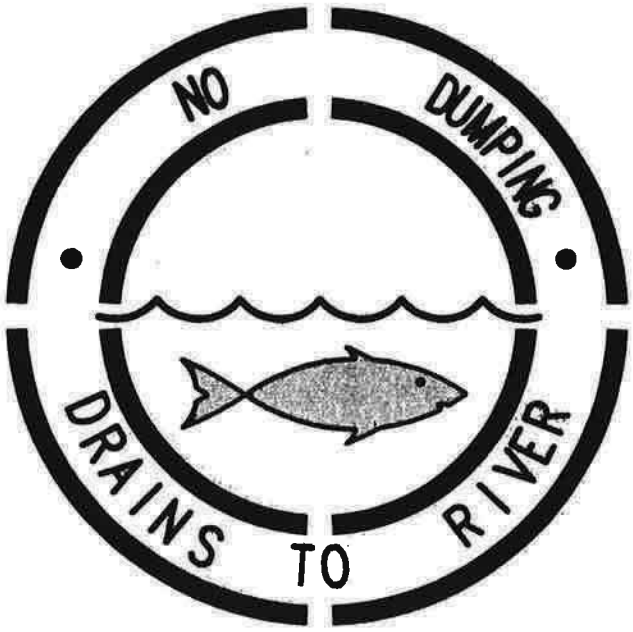
SOURCE: U.S. GEOLOGICAL SURVEY (USGS)
<http://geohazards.usgs.gov/designmaps/us/application.php>

SEISMIC DESIGN PARAMETERS
PROPOSED WAREHOUSE
RANCHO CUCAMONGA, CALIFORNIA

DRAWN: JLL
CHKD: RGT
SCG PROJECT 17G112-1
PLATE E-1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL

Attachment G
BMP Maintenance Material



SAMPLE STENCIL TO BE USED NEAR GRATE AND CURB OPENING INLETS

SYMBOL TO BE 24" IN DIAMETER

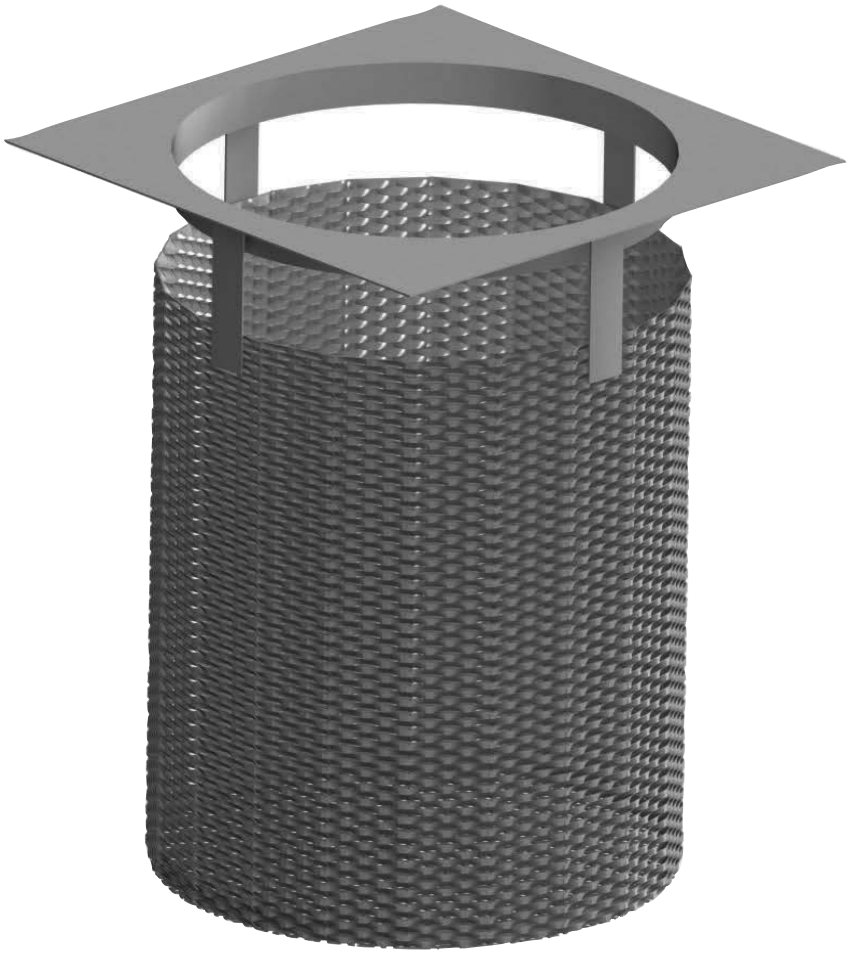
Thienes Engineering
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

SAMPLE CATCH BASIN STENCIL
PER BMP SD-13

Grate Inlet Filter

Bio Clean
A Forterra Company

INSTALLATION MANUAL



Bio Clean Environmental Services, Inc.
398 Via El Centro
Oceanside, CA 92058

www.BioCleanEnvironmental.com
p: 760.433.7640
f: 760.433.3176

INSTALLATION PROCEDURES

The Bio Clean Grate Filter is a stormwater catch basin filter designed to remove high levels of trash, debris, sediments and hydrocarbons. The filter is available in several configurations including trash full capture, multi-level screening, Kraken membrane filter and media filter variations. This manual covers installation procedures of all configurations. This filter is made of 100% stainless steel and is available and various sizes and depths allowing it to fit in any grated catch basin inlet. The filter is generally mounted under the grate flange but can also be mounted below the grate to the wall of the basin. This configuration is recommended in areas with "direct traffic" ratings such as roads with higher speed traffic. The flange is cut to size allowing for quick and simple installation.

Delivery

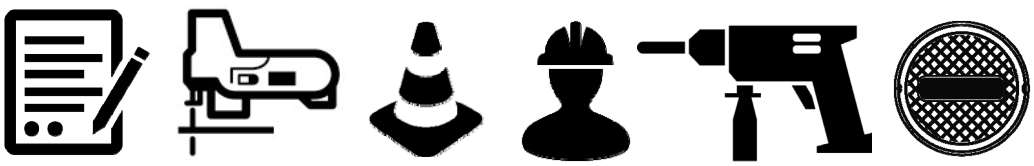
- Bio Clean Environmental Services, Inc. shall deliver the filter(s) to the site in coordination with the Contractor.

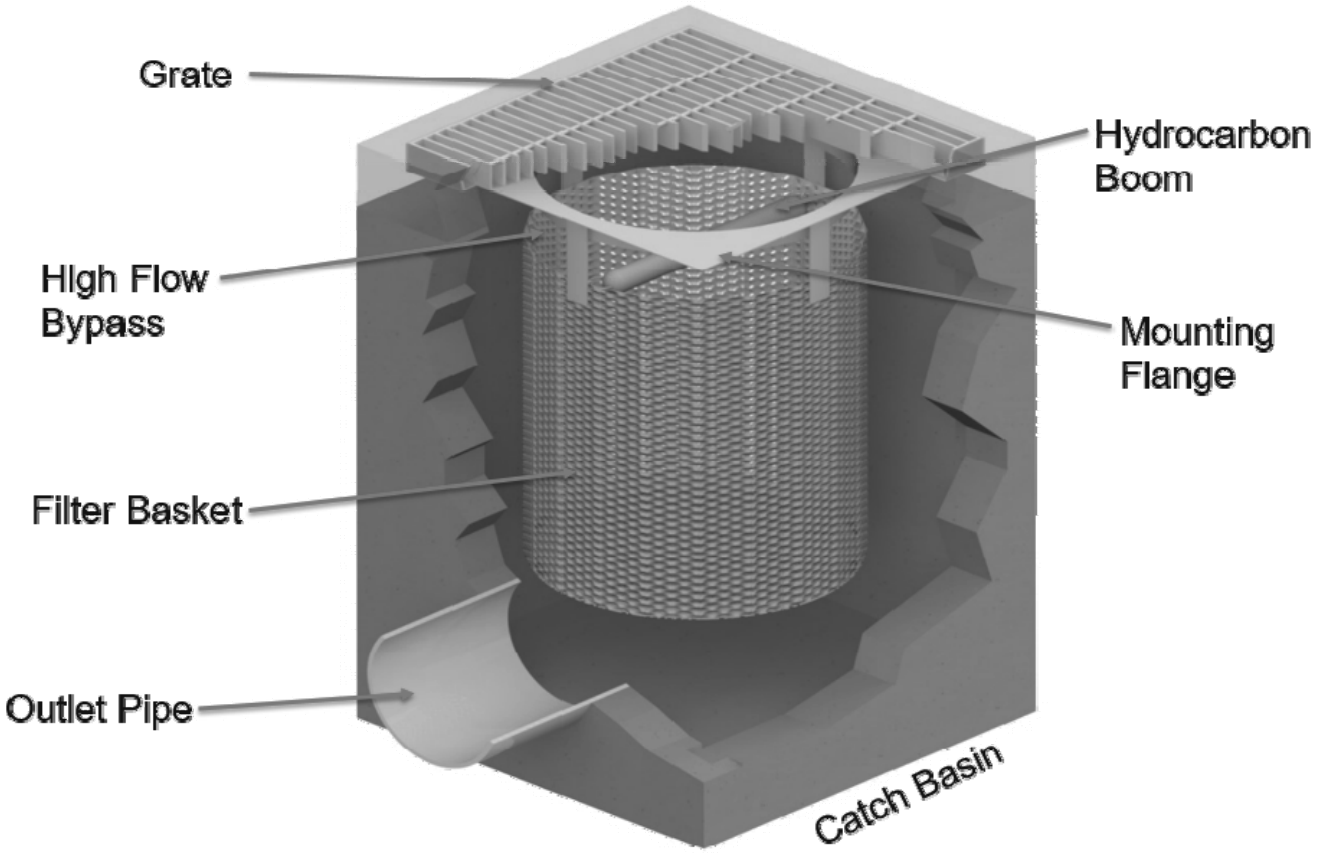
Inspection

- Inspection of the Grate Inlet Filter and all parts contained in or shipped shall be inspected at time of delivery by the site Engineer/Inspector and the Contractor. Any non-conformance to approved drawings or damage to any part of the system shall be documented on the Bio Clean shipping ticket.

Catch Basin Preparation

- The Contractor is responsible for providing adequate and complete catch basin and fall protection including gas metering and other safety equipment when installing the Grate Inlet Filter.
- The Contractor shall adhere to all jurisdictional and/or OSHA safety rules during installation of the filter.
- The Contractor or Owner is responsible for appropriately barricading the catch basin from traffic (in accordance with local codes).





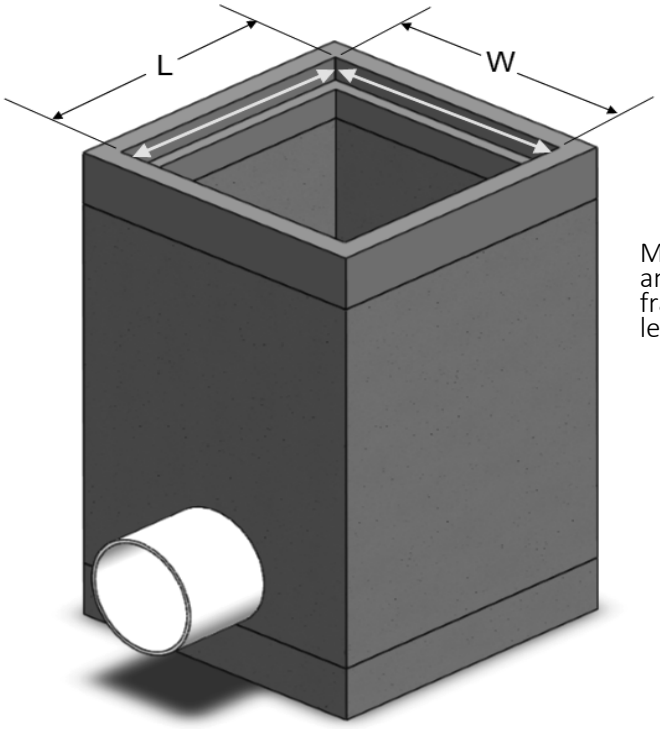
Filter Diagram:

Installation (non-under mount configuration)

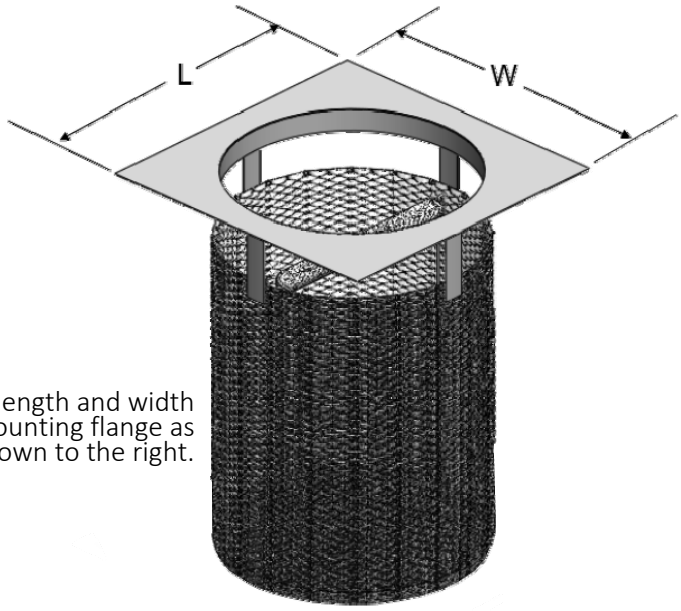
- Each Grate Inlet Filter shall be installed based on the locations and elevations according to the sizes shown on the approved drawings. Any modifications to the elevation or location shall be at the direction of and approved by the Engineer.
- It is recommended that the catch basin is properly cleaned and inspected for any damage prior to installing the Grate Inlet Filter. If under mounts are being used for "direct traffic" installations, the under mounts connect directly to the walls of the catch basin using concrete wedge and/or drive anchors/pins.
- Step one (non-under mount configuration) involves double checking measurements to ensure the filter will properly and fully fit the catch basin opening. Once the grate is removed use a tape measure to pull the dimensions (length and width) of the grate frame lip. Next check the dimensions (length and width) on the mounting flange. The mounting flange should be approximately ¼" to ½" shorter than the grate frame flange. If the mounting flange is larger

than the grate frame dimensions trimming of the flange will be required. Various tools and methods can be used to cut the flange such as a circular saw, cut-off-saw, plasma cutter or grinder. After cutting off the flange ensure that any sharp or protruding edges are removed with a grinder. Sharp edges could cause injury. Once cut, verify again that dimensions are accurate and the filter will properly fit. If a filter is delivered with a flange smaller than grate frame, meaning that the edge of the flange is too short to rest on the grate frame lip please call the manufacturer for guidance. Either a new filter can be sent out, a replacement flange piece or the filter under mounted.

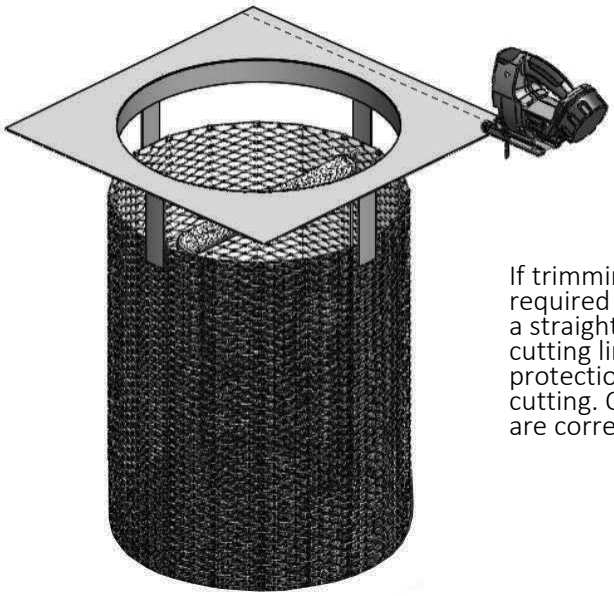
STEP 1



Measure the length and width of the grate frame as shown to the left.

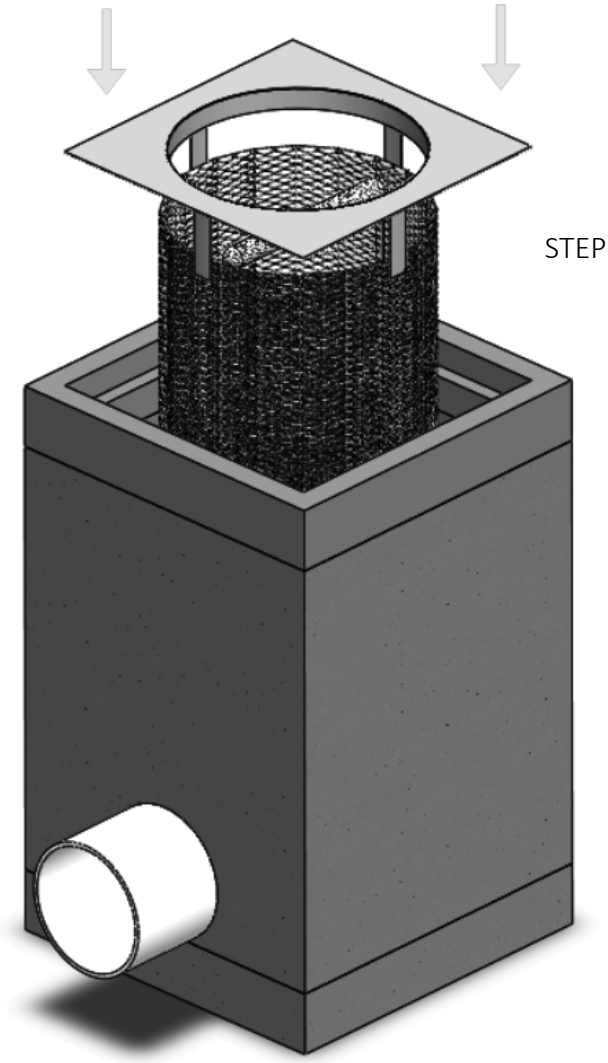


Measure the length and width of the mounting flange as shown to the right.



If trimming of the mounting flange is required use a tape measure along with a straightedge and market to draw a cutting line. Use proper tools and safety protection such as eyewear before cutting. Once cut verify measurements are correct.

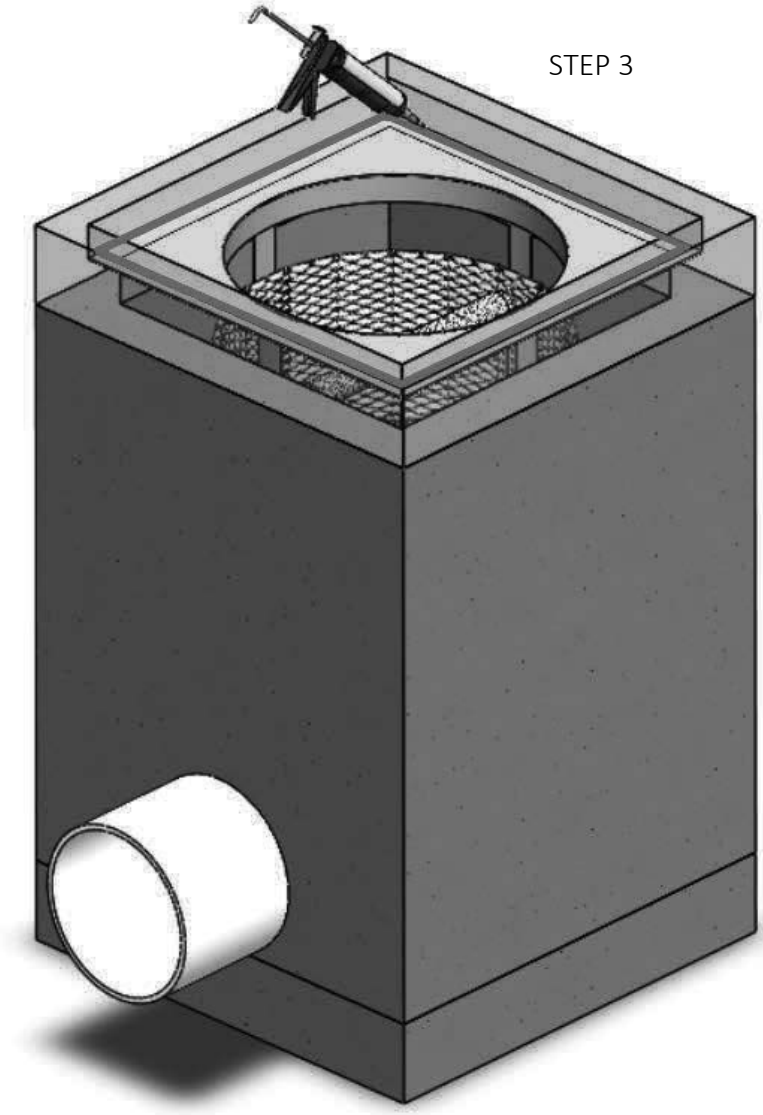
- Step 2 now that the filter is ready for installation, simply set the filter into place resting the mounting flange on the grate frame lip. Before setting, clean the grate frame lip of any debris. It is recommended the gloves are worn and proper lifting techniques are used. Larger filter may require two people to set in place. Do not drop the filter in place. Ensure that the filter is in proper position. Center the filter in the grate frame so any gaps are even on all four sides.



STEP 2

Installation of the filter is simple and fast. Set the filter in place on the grate frame lip and center.

- Step 3 requires using sealant to seal all seams, gaps and joints to ensure no leakage. All surfaces in which the stainless steel flange make contact with a concrete surface must be fully filled with sealant and made completely watertight. Sealant must be Sil-Flx (RTV 7500). See below for diagram highlighting all areas where sealant is required:

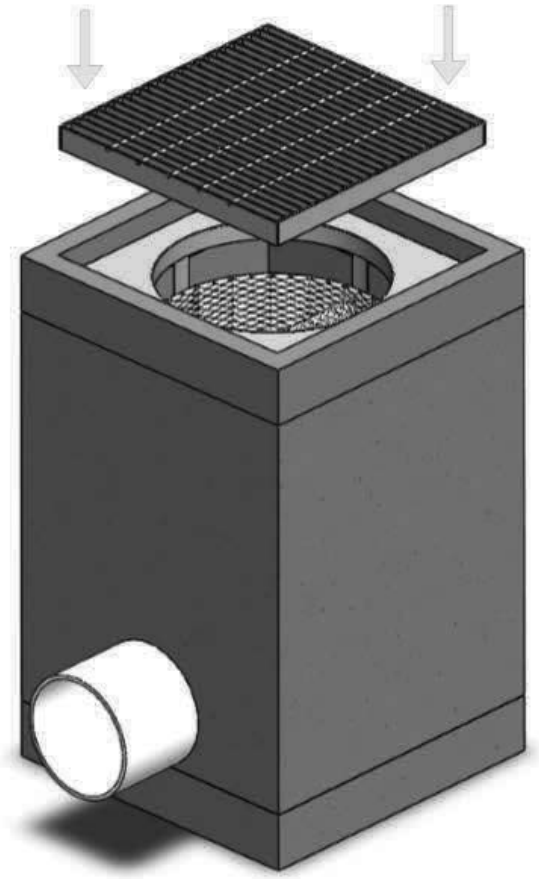


STEP 3

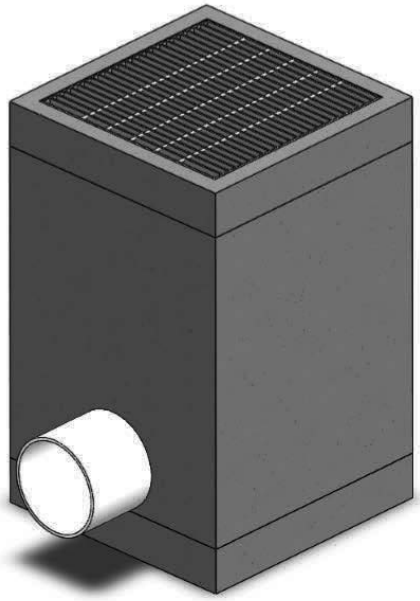
Making sure the seams of the flange are watertight is important to ensure 100% of stormwater entering the catch basin is directed through the filter, especially smaller dry weather flows.

- Step 4 installation is now complete. Be sure to remove all tools and seal up the catch basin by replacing the grate and take down any traffic control.

STEP 4



Not that installation of the filter is complete ensure that the grate is replaced and the install site is returned to its original condition.



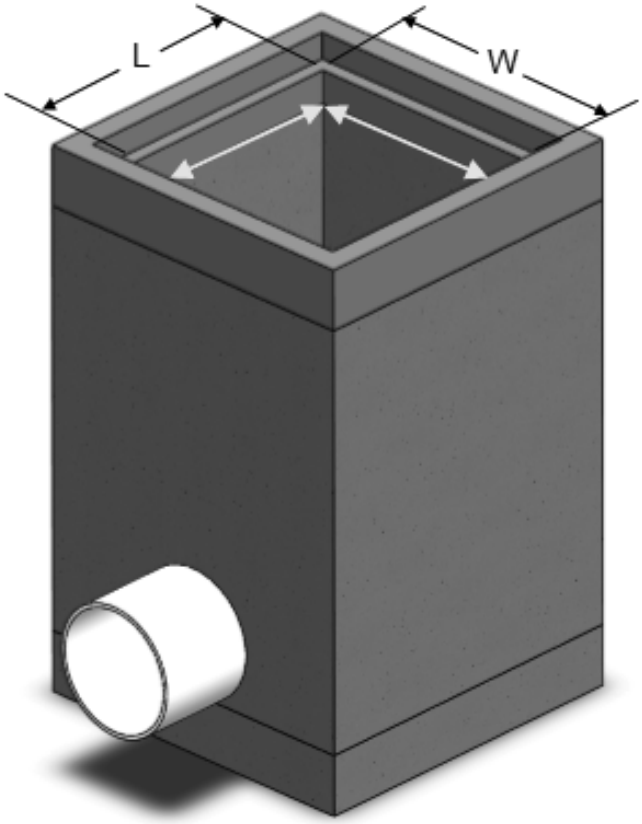
Installation (under mount configuration)

- Each Grate Inlet Filter shall be installed based on the locations and elevations according to the sizes shown on the approved drawings. Any modifications to the elevation or location shall be at the direction of and approved by the Engineer.
- It is recommended that the catch basin is properly cleaned and inspected for any damage prior to installing the Grate Inlet Filter. If under mounts are being used for "direct traffic" installations the under mounts connect directly to the walls of the catch basin using concrete wedge and/or drive anchors/pins.

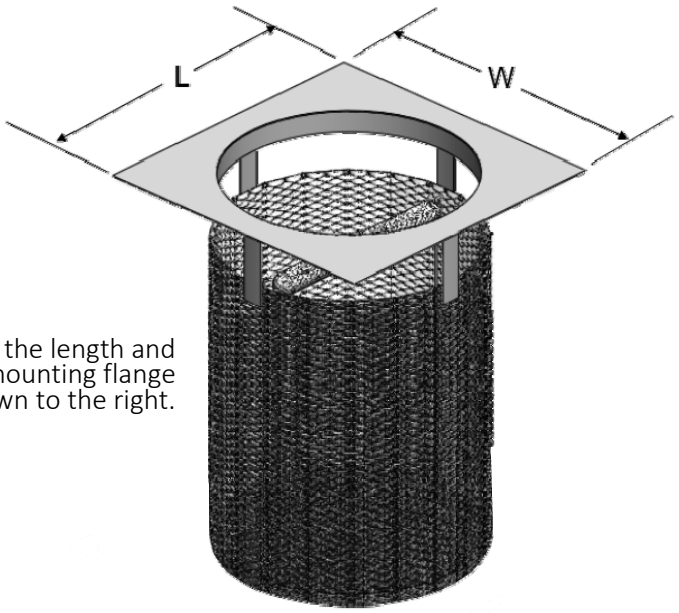
- Step one (under mount configuration) involves double checking measurements to ensure the filter will properly and fully fit the catch basin opening. Once the grate is removed use a tape measure to pull the dimensions (length and width) of catch basin walls below the grate frame

lip. Next check the dimensions (length and width) on the mounting flange. The mounting flange should be approximately ¼" to ½" shorter than the catch basin ID. If the mounting flange is larger than the catch basin ID trimming of the flange will be required. Various tools and methods can be used to cut the flange such as a circular saw, cut of saw, plasma cutter or grinder. After cutting of the flange ensure that any sharp or protruding edges are removed with a grinder. Sharp edges could cause injury. Once cut verify again that dimensions are accurate and the filter will properly fit.

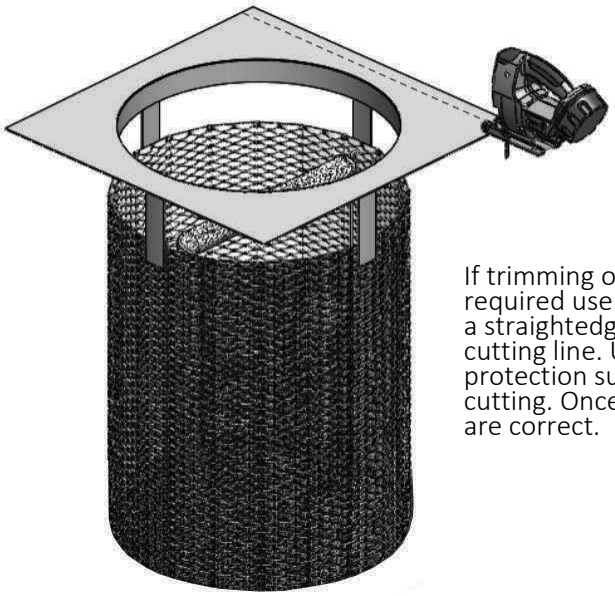
STEP 1



Measure the length and width of the catch basin ID as shown to the left.



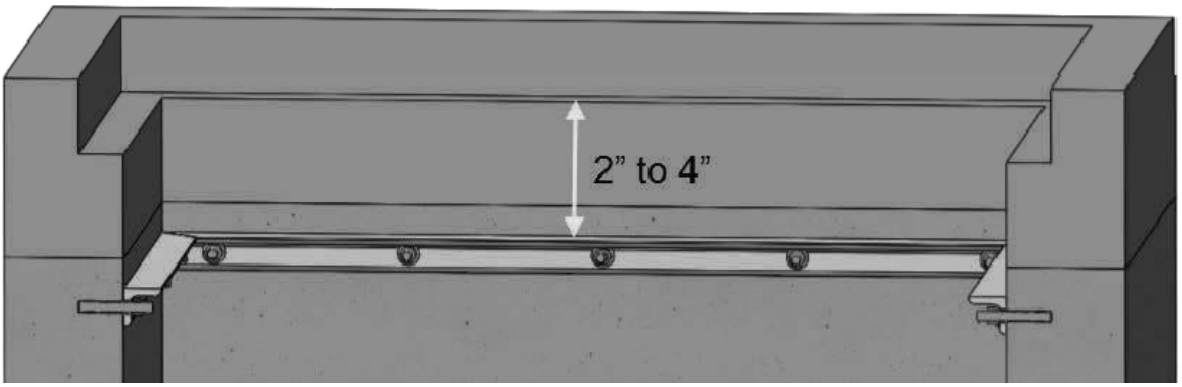
Measure the length and width of the mounting flange as shown to the right.

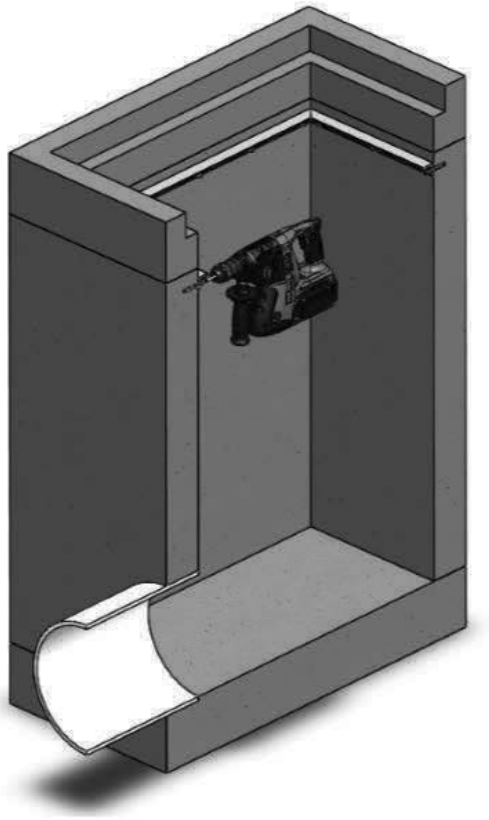


If trimming of the mounting flange is required use a tape measure along with a straightedge and market to draw a cutting line. Use proper tools and safety protection such as eyewear before cutting. Once cut verify measurements are correct.

- Step 2 involves mounting the under mounts which are supplied with the filter. Under mounts will be either aluminum or stainless steel L metal with holes pre-drilled for mounting. Using a tape measure along chalk or a large marker to draw a guideline 1 to 2" below the edge of the grate flange on all four sides of the basin walls. Ensure that the lines are level. This guideline shows where the top edge of the L metal under mounts will be positioned. Next check the length of each under mount. There should be two longer pieces and two shorter pieces. Double check their length and trim down if necessary to properly fit inside the basin. Next, while holding the first under mount in place use a rotary hammer with a 1/4" diameter concrete drill bit to drill holes 2 ¾" deep (minimum) at each location along the under mount that there is a pre-drilled hole. Once all holes are drilled, insert a ¼" diameter by 2 ¾" long stainless steel drive pins into each hole. This will temporarily support the weight of the under mount. Next drive the wedge anchors or drive pin tight using the hammer. Repeat the process on the other 3 under mounts.

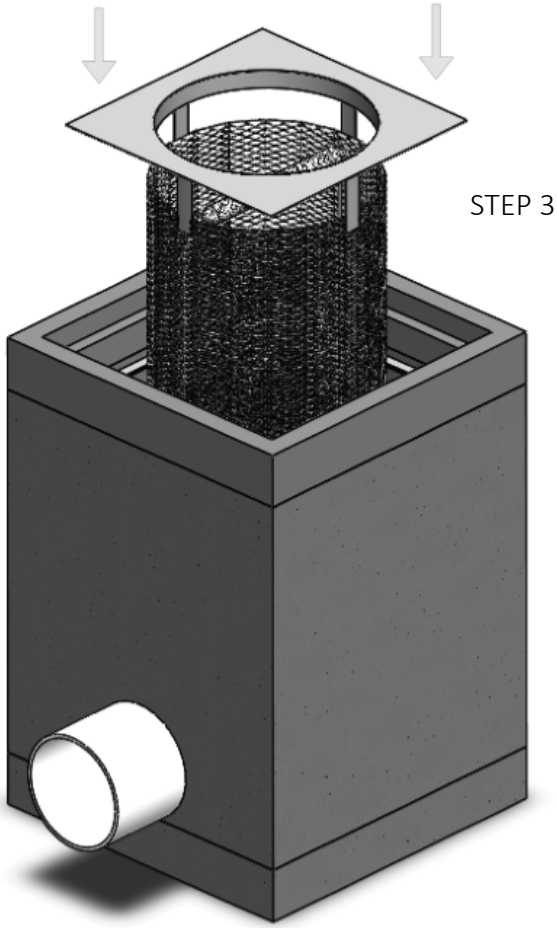
STEP 2





Under mounts should be installed with their top flange 2 to 4” below the grate flange to allow for proper clearance. Ensure the under mounts are level.

- Step 3 now that the filter is ready for installation and the under mount installed simply set the filter into place resting the mounting flange on the under mounts. Before setting clean the under mounts of any debris. It is recommended the gloves are worn and proper lifting techniques are use. Larger filter may require two people to set in place. Do not drop the filter in place. Ensure that the filter is in proper position. Center the filter in the grate frame so any gaps are even on all four sides.

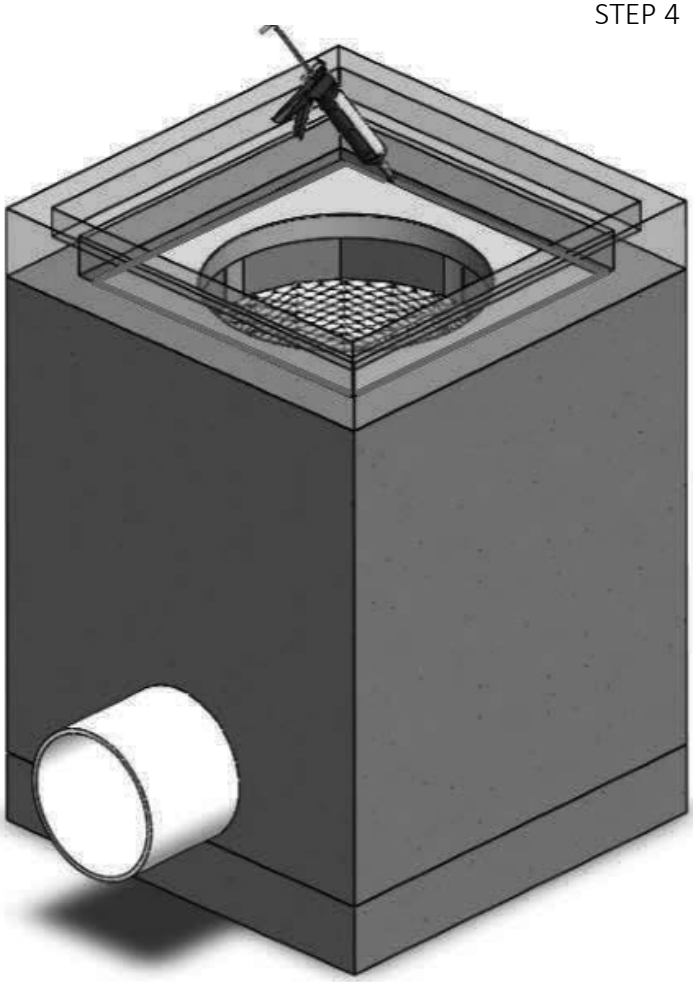


STEP 3

Installation of the filter is simple and fast. Set the filter in place on the grate frame lip and center.

- Step 4 requires using sealant to seal all seams, gaps and joints to ensure no leakage. All surfaces in which the stainless steel flange make contact with a concrete surface must be fully filled with sealant and made completely watertight. Sealant must be Sil-Flx (RTV 7500). See below for diagram highlighting all areas where sealant is required:

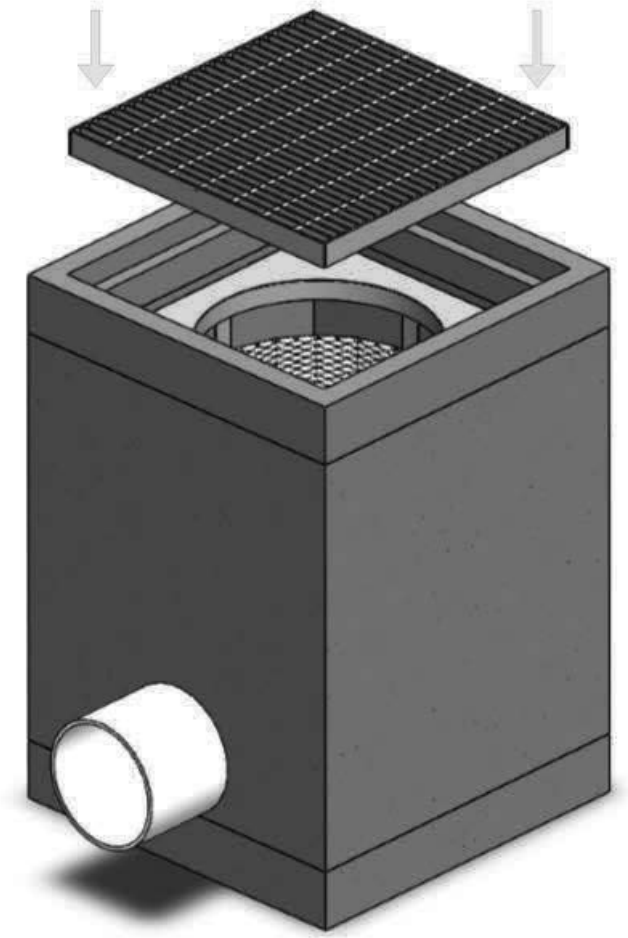
STEP 4



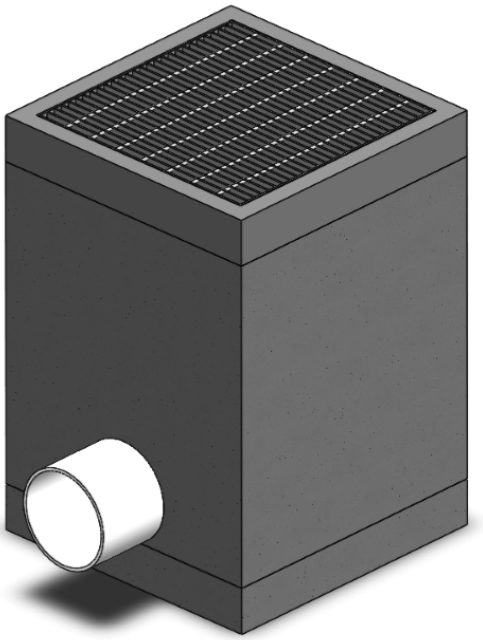
Making sure the seams of the flange are watertight is important to ensure 100% of stormwater entering the catch basin is directed through the filter, especially smaller dry weather flows.

- Step 5 installation is now complete. Be sure to remove all tools and seal up the catch basin by replacing the grate and take down any traffic control.

STEP 5



Not that installation of the filter is complete ensure that the grate is replaced and the install site is returned to its original condition.



For Installation Support or Information Please Contact Us At:
760-433-7640
Or Email: info@biocleanenvironmental.com

Curb Inlet Filter

Bio Clean
A Forterra Company

OPERATION & MAINTENANCE



Bio Clean Environmental Services, Inc.
398 Via El Centro
Oceanside, CA 92058

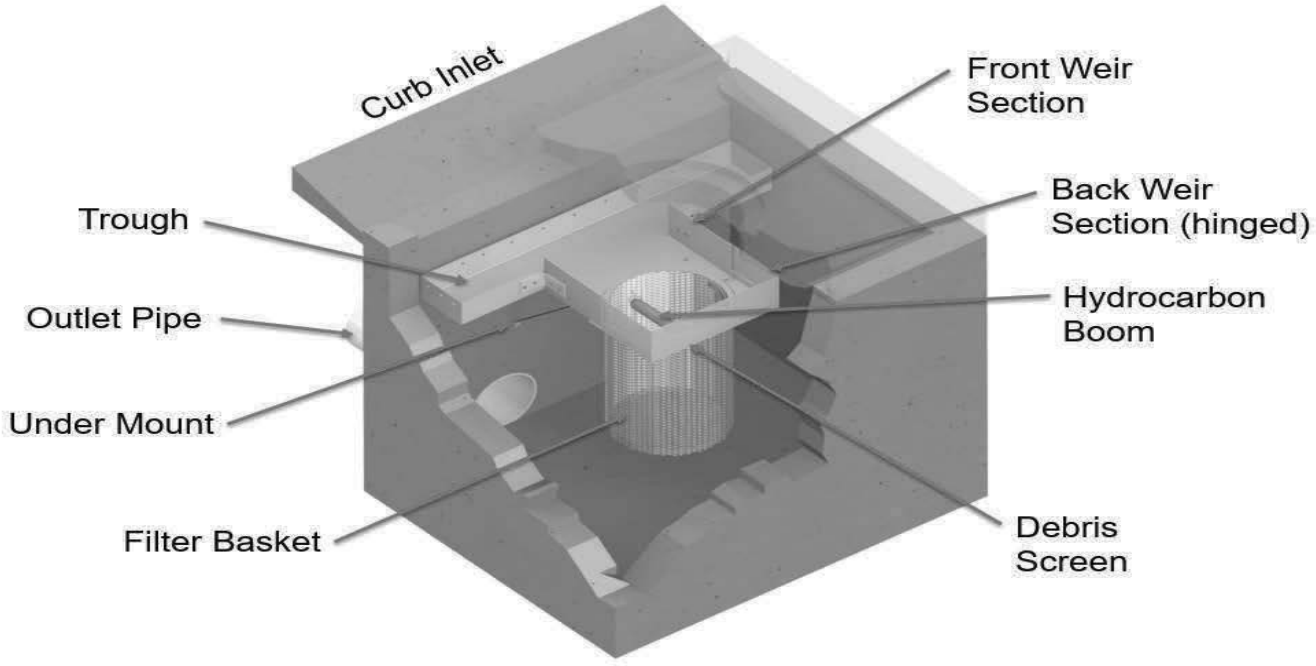
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OPERATION & MAINTENANCE

The Bio Clean Curb Inlet Filter is a stormwater device designed to remove high levels of trash, debris, sediments and hydrocarbons. The filter is available in several configurations including trash full capture, multi-level screening, Kraken membrane filter and media filter variations. This manual covers maintenance procedures of the trash full capture and multi-level screening configurations. A supplemental manual is available for the Kraken and media filter variations. The innovative trough & weir system is mounted along the curb face and directs incoming stormwater toward the filter basket which is positioned "directly" under the manhole access opening regardless of its location in the catch basin. This innovative design allows the filter to be cleaned from finish surface without access into the catch basin, therefore drastically reducing maintenance time and eliminating confined space entry. The filter has a lifting handle allowing for the filter to be removed easily through the manhole. The weir also folds up to allow for unimpeded access into the basin for routine maintenance or pipe jetting.

As with all stormwater BMPs, inspection and maintenance on the Curb Inlet Filter is necessary. Stormwater regulations require BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess site-specific loading conditions. This is recommended because pollutant loading can vary greatly from site to site. Variables such as nearby soil erosion or construction sites, winter sanding of roads, amount of daily traffic and land use can increase pollutant loading on the system. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years. Without appropriate maintenance a BMP can exceed its storage capacity which can negatively affect its continued performance in removing and retaining captured pollutants.



System Diagram:

Inspection Equipment

Following is a list of equipment to allow for simple and effective inspection of the Curb Inlet Filter:

- Bio Clean Environmental Inspection Form (contained within this manual).
- Manhole hook or appropriate tools to remove access hatches and covers.
- Appropriate traffic control signage and procedures.
- Protective clothing and eye protection.
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections or maintenance of the system.



Inspection Steps

The core to any successful stormwater BMP maintenance program is routine inspections. The inspection steps required on the Curb Inlet Fitler are quick and easy. As mentioned above the first year should be seen as the maintenance interval establishment phase. During the first year more frequent inspections should occur in order to gather loading data and maintenance requirements for that specific site. This information can be used to establish a base for long-term inspection and maintenance interval requirements.

The Curb Inlet Filter can be inspected though visual observation without entry into the catch basin. All necessary pre-inspection steps must be carried out before inspection occurs, such as safety measures to protect the inspector and nearby pedestrians from any dangers associated with an open access hatch or manhole. Once the manhole has been safely opened the inspection process can proceed:

- Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other info (see inspection form).
- Observe the inside of the catch basin through the manhole. If minimal light is available and vision into the unit is impaired utilize a flashlight to see inside the catch basin.
- Look for any out of the ordinary obstructions in the catch basin, trough, weir, filter basket, basin floor our outlet pipe. Write down any observations on the inspection form.
- Through observation and/or digital photographs estimate the amount of trash, foliage and sediment accumulated inside the filter basket. Record this information on the inspection form.
- Observe the condition and color of the hydrocarbon boom. Record this information on the inspection form.

- Finalize inspection report for analysis by the maintenance manager to determine if maintenance is required.

Maintenance Indicators

Based upon observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components.
- Obstructions in the trough, weir, filter basket or catch basin.
- Excessive accumulation of trash, foliage and sediment in the filter basket and/or trough and weir sections. Maintenance is required when the basket is greater than half-full.
- The following chart shows the 50% and 100% storage capacity of each filter height:

Model	Filter Basket Diameter (in)	Filter Basket Height (in)	50% Storage Capacity (cu ft)	100% Storage Capacity (cu ft)
BC-CURB-30	18	30	2.21	4.42
BC-CURB-24	18	24	1.77	3.53
BC-CURB-18	18	18	1.33	2.65
BC-CURB-12	18	12	0.88	1.77

Maintenance Equipment

It is recommended that a vacuum truck be utilized to minimize the time required to maintain the Curb Inlet Filter though it can easily cleaned by hand:

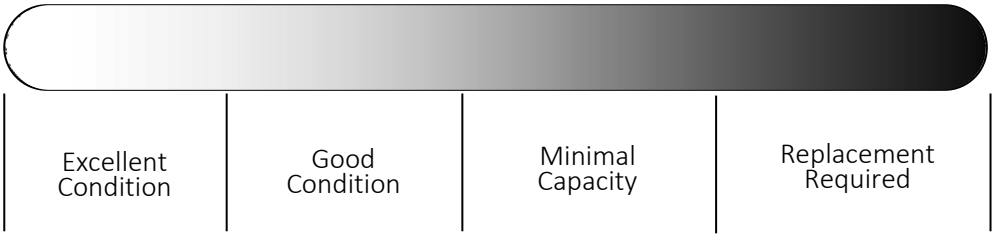
- Bio Clean Environmental Maintenance Form (contained in O&M Manual).
- Manhole hook or appropriate tools to access hatches and covers.
- Appropriate safety signage and procedures.
- Protective clothing and eye protection.
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine maintenance of the system. Small or large vacuum truck (with pressure washer attachment preferred).

Maintenance Procedures

It is recommended that maintenance occurs at least two days after the most recent rain event to allow debris and sediments to dry out. Maintaining the system while flows are still entering it will increase the time and complexity required for maintenance. Cleaning of the Curb Inlet Filter can be performed from finish surface without entry into catch basin utilizing a vacuum truck. Some unique

and custom configurations may create conditions which would require entry for some or all of the maintenance procedures. Once all safety measures have been set up cleaning of the Curb Inlet Filter can proceed as followed:

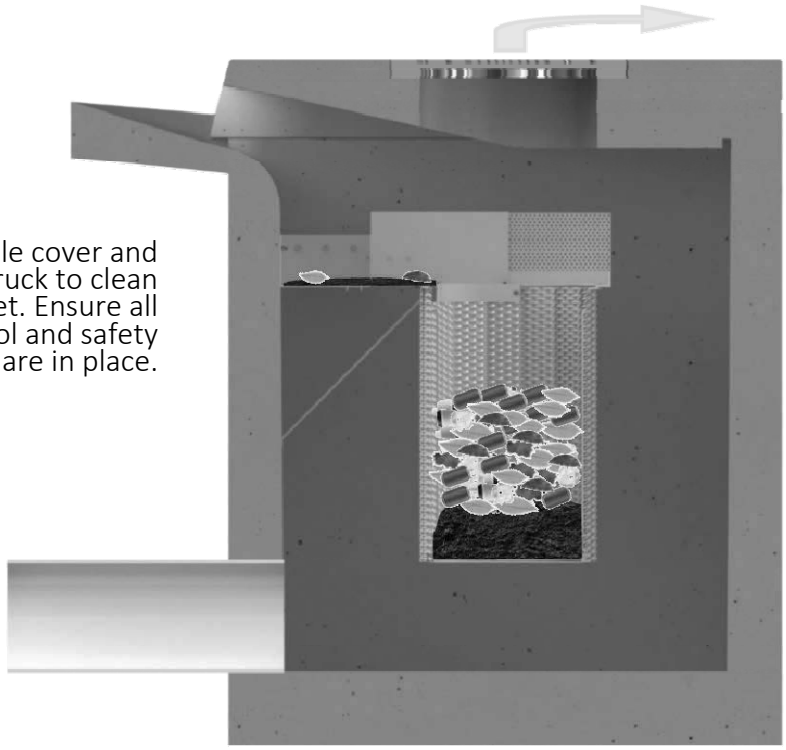
- Remove all manhole cover or access hatches (traffic control and safety measures to be completed prior).
- Using an extension on a vacuum truck position the hose over the opened manhole or hatch opening. Insert the vacuum hose down into the filter basket and suck out trash, foliage and sediment. A pressure wash is recommended and will assist in spraying of any debris stuck on the side or bottom of the filter basket. If the filter basket is full, trash, sediment, and debris will accumulate inside the trough and weir sections of the system. Once the filter basket is clean power wash the weir and trough pushing these debris into the filter basket (leave the hose in the filter basket during this process so entering debris will be sucked out). Power wash off the trough, weir, debris screen, and filter basket sides and bottom.
- Next remove the hydrocarbon boom that is attached to the inside of the filter basket. The hydrocarbon boom is fastened to rails on two opposite sides of the basket (vertical rails). Assess the color and condition of the boom using the following information in the next bullet point. If replacement is required install and fasten on a new hydrocarbon boom. Booms can be ordered directly from the manufacturer.
- Follow is a replacement indication color chart for the hydrocarbon booms:

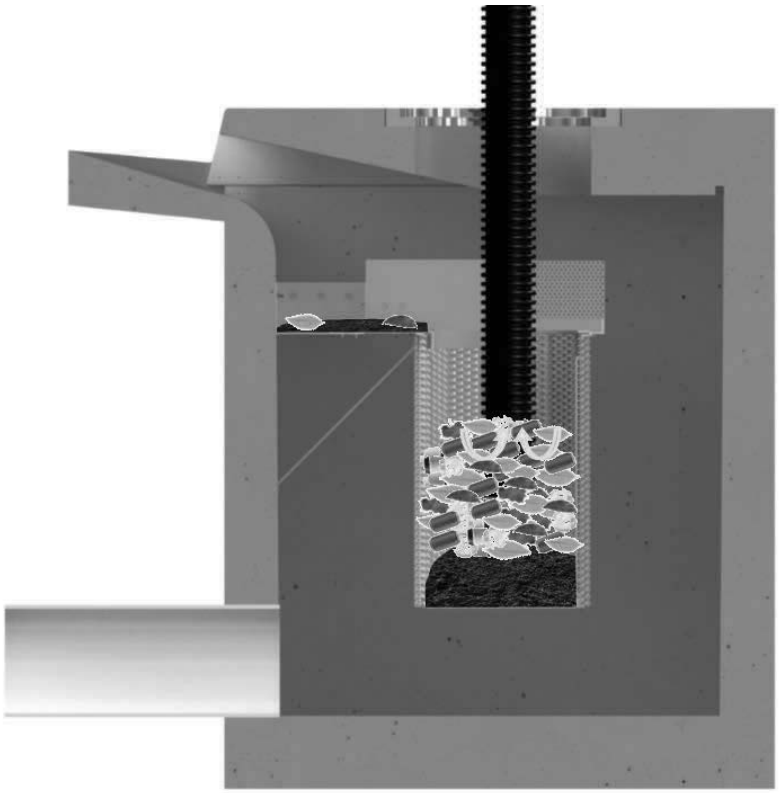


- The last step is to close up and replace the manhole or hatch and remove all traffic control.
- All removed debris and pollutants shall be disposed of following local and state requirements.
- Disposal requirements for recovered pollutants may vary depending on local guidelines. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste.
- In the case of damaged components, replacement parts can be ordered from the manufacturer. Hydrocarbon booms can also be ordered directly from the manufacturer as previously noted.

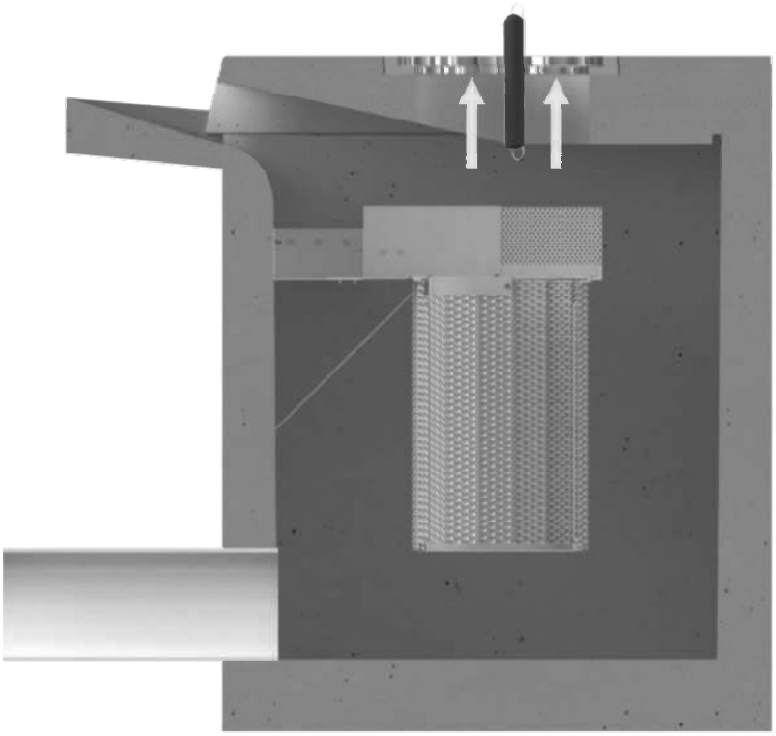
Maintenance Sequence

Remove manhole cover and set up vacuum truck to clean the filter basket. Ensure all traffic control and safety measures are in place.



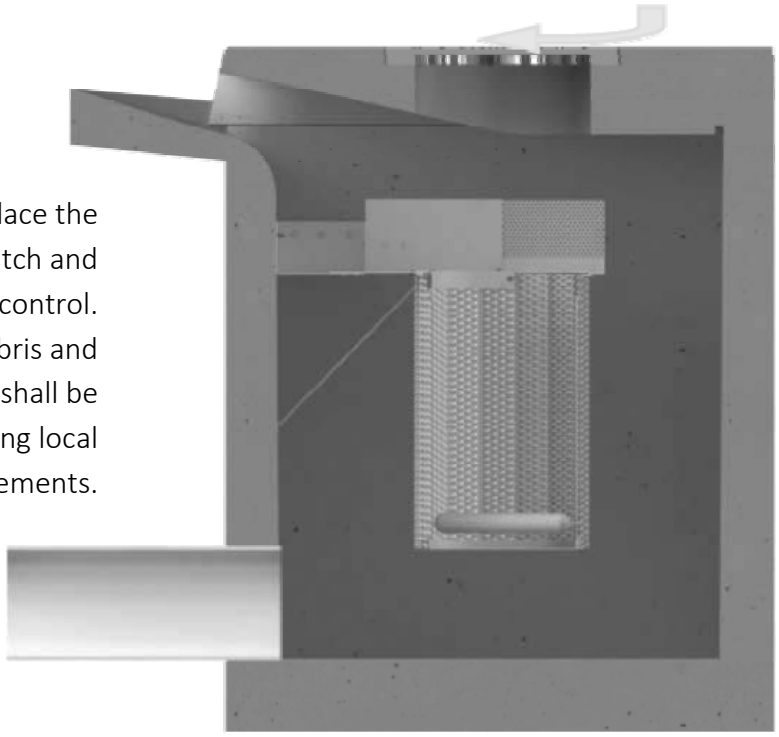


Insert the vacuum hose down into the filter basket and suck out debris. Use a pressure washer to assist in vacuum removal. Pressure wash off the weir and trough and vacuum out any remaining debris.



Remove the hydrocarbon boom that is attached to the inside of the filter basket. The hydrocarbon boom is fastened to rails on two opposite sides of the basket (vertical rails). Assess the color and condition of the boom using the following information in the next bullet point. If replacement is required install and fasten on a new hydrocarbon boom.

Close up and replace the manhole or hatch and remove all traffic control. All removed debris and pollutants shall be disposed of following local and state requirements.



For Maintenance Services or Information Please Contact Us At:
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Inspection and Maintenance Report
Catch Basin Only

Project Name _____

Project Address _____ (city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ollow Up ☐omplaint ☐torm Storm Event in Last 72-hours? ☐ ☐s

Weather Condition _____ Additional Notes _____

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Site Map #	GPS Coordinates of Insert	Catch Basin Size	Evidence of Illicit Discharge?	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Signs of Structural Damage?	Functioning Properly or Maintenance Needed?
1	Lat: Long:							
2	Lat: Long:							
3	Lat: Long:							
4	Lat: Long:							
5	Lat: Long:							
6	Lat: Long:							
7	Lat: Long:							
8	Lat: Long:							
10	Lat: Long:							
11	Lat: Long:							
12	Lat: Long:							

Comments:

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Isolator® Row O&M Manual

StormTech® Chamber System for Stormwater Management

1.0 The Isolator® Row

1.1 INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a patented technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.



Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.

1.2 THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC-310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

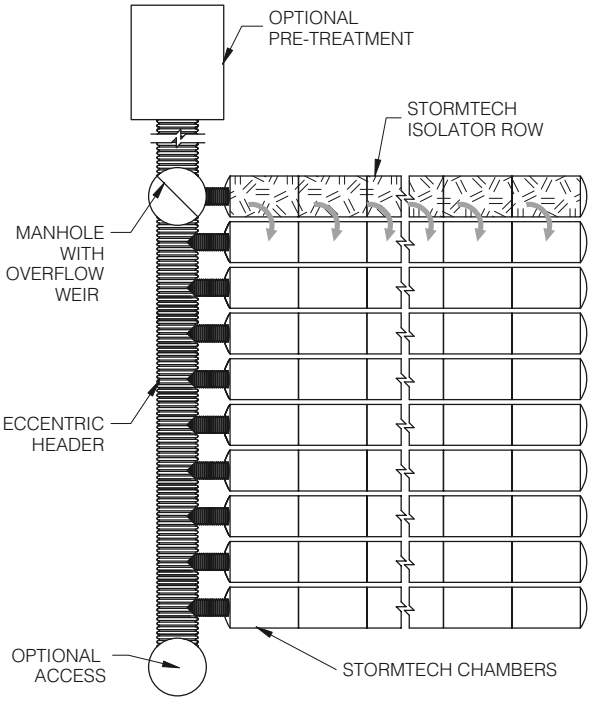
Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

The Isolator Row is typically designed to capture the "first flush" and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.

StormTech Isolator Row with Overflow Spillway
(not to scale)



2.0 Isolator Row Inspection/Maintenance

2.1 INSPECTION

The frequency of Inspection and Maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

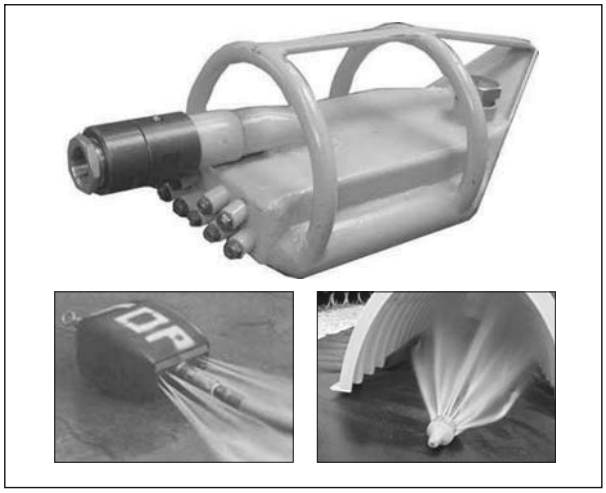
At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

2.2 MAINTENANCE

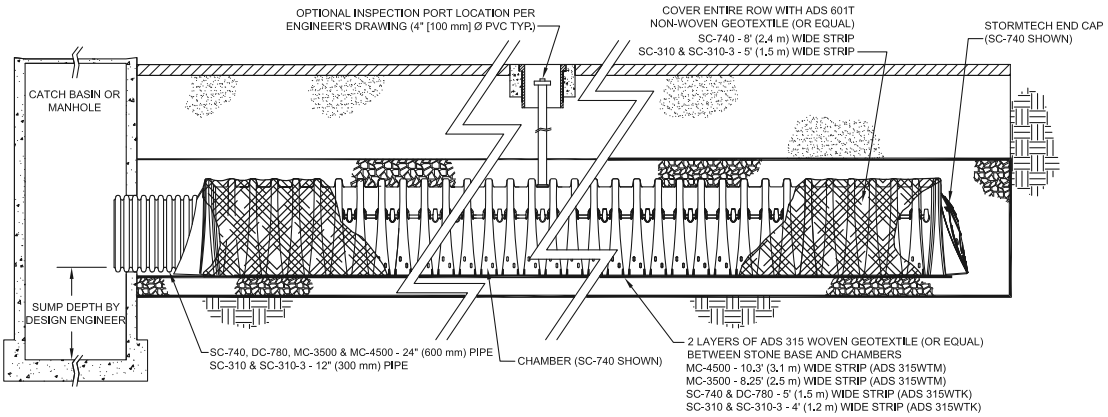
The Isolator Row was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.



Examples of culvert cleaning nozzles appropriate for Isolator Row maintenance. (These are not StormTech products.)

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

StormTech Isolator Row (not to scale)



NOTE: NON-WOVEN FABRIC IS ONLY REQUIRED OVER THE INLET PIPE CONNECTION INTO THE END CAP FOR DC-780, MC-3500 AND MC-4500 CHAMBER MODELS AND IS NOT REQUIRED OVER THE ENTIRE ISOLATOR ROW.

3.0 Isolator Row Step By Step Maintenance Procedures

Step 1) Inspect Isolator Row for sediment

A) Inspection ports (if present)

i. Remove lid from floor box frame

ii. Remove cap from inspection riser

iii. Using a flashlight and stadia rod, measure depth of sediment and record results on maintenance log.

iv. If sediment is at, or above, 3 inch depth proceed to Step 2. If not proceed to step 3.

B) All Isolator Rows

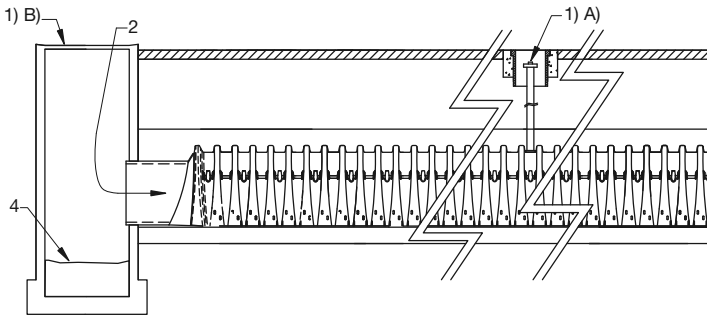
i. Remove cover from manhole at upstream end of Isolator Row

ii. Using a flashlight, inspect down Isolator Row through outlet pipe

1. Mirrors on poles or cameras may be used to avoid a confined space entry
2. Follow OSHA regulations for confined space entry if entering manhole

iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches) proceed to Step 2. If not proceed to Step 3.

StormTech Isolator Row (not to scale)



Step 2) Clean out Isolator Row using the JetVac process

A) A fixed culvert cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable

B) Apply multiple passes of JetVac until backflush water is clean

C) Vacuum manhole sump as required

Step 3) Replace all caps, lids and covers, record observations and actions

Step 4) Inspect & clean catch basins and manholes upstream of the StormTech system

Sample Maintenance Log

Date	Stadia Rod Readings		Sediment Depth (1) - (2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/01	6.3 ft.	none		New installation. Fixed point is CI frame at grade	djm
9/24/01		6.2	0.1 ft.	Some grit felt	sm
6/20/03		5.8	0.5 ft.	Mucky feel, debris visible in manhole and in isolator row, maintenance due	rv
7/7/03	6.3 ft.		0	System jetted and vacuumed	djm

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Attachment H
Conditions of Approval
(pending)

Attachment I
Class V Injection Well Registration (pending)

KUNZMAN ASSOCIATES, INC.

8TH STREET AND HELLMAN AVENUE WAREHOUSING PROJECT

AIR QUALITY, GLOBAL CLIMATE CHANGE, AND HEALTH RISK ASSESSMENT IMPACT ANALYSIS

May 22, 2018

Traffic Engineering | Transportation Planning | Parking | Noise/Vibration | Expert Witness
Air Quality | Global Climate Change | Health Risk Assessment

8TH STREET AND HELLMAN AVENUE WAREHOUSING PROJECT

AIR QUALITY, GLOBAL CLIMATE CHANGE, AND HEALTH RISK ASSESSMENT IMPACT ANALYSIS

May 22, 2018

Prepared by:

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JN 7405b

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I. INTRODUCTION & SETTING

A. Purpose and Objectives

This study was performed for the proposed 8th Street and Hellman Avenue Warehousing project to address the possibility of regional and local air quality impacts, global climate change impacts, and cancer risk from mobile source diesel emissions. The objectives of the study include:

- documentation of the atmospheric setting
- discussion of criteria pollutants and greenhouse gases
- discussion of the air quality and global climate change regulatory framework
- discussion of the air quality, greenhouse gases, and cancer risk thresholds of significance
- analysis of the construction related air quality and greenhouse gas emissions
- analysis of the operations related air quality and greenhouse gas emissions
- analysis of the operations related cancer risk from diesel emissions
- analysis of the conformity of the proposed project with the SCAQMD AQMP
- recommendations for mitigation measures

The City of Rancho Cucamonga is the lead agency for the preparation of this air quality impact analysis, in accordance with the California Environmental Quality Act authorizing legislation. Although this is a technical report, every effort has been made to write the report clearly and concisely. To assist the reader with terms unique to air quality and global climate change, a definition of terms has been provided in Appendix A.

B. Project Location

The project site (9000 Hellman Avenue) is located at the southwestern corner of the 8th Street and Hellman Avenue intersection in the City of Rancho Cucamonga. The project site APN is 0209-151-36. The project location is provided on Figure 1.

C. Project Description

The 8.09 acre project site is proposed to be developed with a 174,745 square foot warehouse (includes mezzanine and office). The project site is proposed to include 119 parking stalls and 33 trailer parking stalls. Figure 2 illustrates the site plan.

D. Phasing and Timing

The project is anticipated to be built in one phase. Construction is anticipated to start no sooner than the beginning of April 2019 and take approximately eight months to complete. The project is anticipated to be operational in 2020.

E. Sensitive Receptors in Project Vicinity

Those who are sensitive to air pollution include children, the elderly, and persons with preexisting respiratory or cardiovascular illness. For purposes of CEQA, the SCAQMD defines a sensitive receptor as a land use such as residences, schools, child care centers, athletic facilities, playgrounds, retirement homes and convalescent homes (South Coast Air Quality Management District 2008). Commercial and industrial facilities are not included in the definition because employees do not typically remain on-site for 24 hours.

The nearest sensitive receptors to the project site include the single-family detached residential dwelling units located approximately 50 feet east of the project site (across Hellman Avenue). In addition, multi-family attached residential dwelling units are located approximately 685 feet south and single-family detached residential dwelling units are located approximately 710 feet southeast and southwest of the project site.

F. Executive Summary of Findings

Construction-Source Emissions
Project construction-source emissions would not exceed applicable regional thresholds of significance established by the SCAQMD. For localized emissions, the project will not exceed applicable Localized Significance Thresholds (LSTs) established by the SCAQMD.

Project construction-source emissions would not conflict with the Basin Air Quality Management Plan (AQMP). As discussed herein, the project will comply with all applicable SCAQMD construction-source emission reduction rules and guidelines. Project construction source emissions would not cause or substantively contribute to violation of the California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS).

Established requirements addressing construction equipment operations, and construction material use, storage, and disposal requirements act to minimize odor impacts that may result from construction activities. Moreover, construction-source odor emissions would be temporary, short-term, and intermittent in nature and would not result in persistent impacts that would affect substantial numbers of people. Potential construction-source odor impacts are therefore considered less than significant.

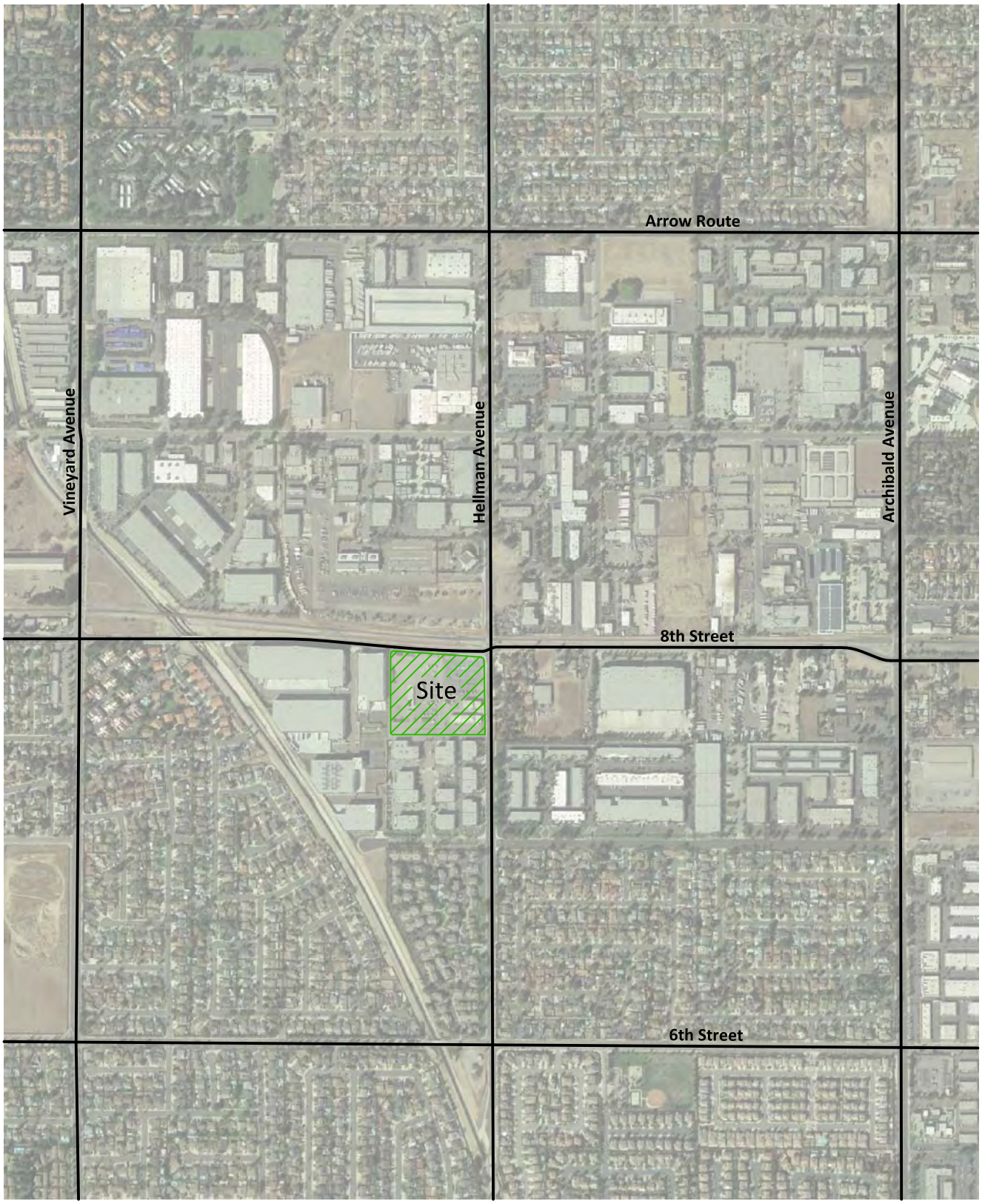
Operational-Source Emissions
The project operational-sourced emissions would not exceed applicable regional thresholds of significance established by the SCAQMD. Project operational-source emissions would not result in or cause a significant localized air quality impact as discussed in the Operations-Related Local Air Quality Impacts section of this report. Additionally, project-related trips will not cause or result in CO concentrations exceeding applicable state and/or federal standards (CO “hotspots). Project operational-source emissions would therefore not adversely affect sensitive receptors within the vicinity of the project.

Project operational-source emissions would not conflict with the Basin Air Quality Management Plan (AQMP). The project's emissions meet SCAQMD regional thresholds and will not result in a significant cumulative impact. The project does not propose any such uses or activities that would result in potentially significant operational-source odor

impacts. Potential operational-source odor impacts are therefore considered less-than significant.

Project-related GHG emissions are also considered to be less than significant and will not conflict with the goals of AB-32, SB-32, or the City of Rancho Cucamonga Sustainable Community Action Plan.

Figure 1
Project Location Map

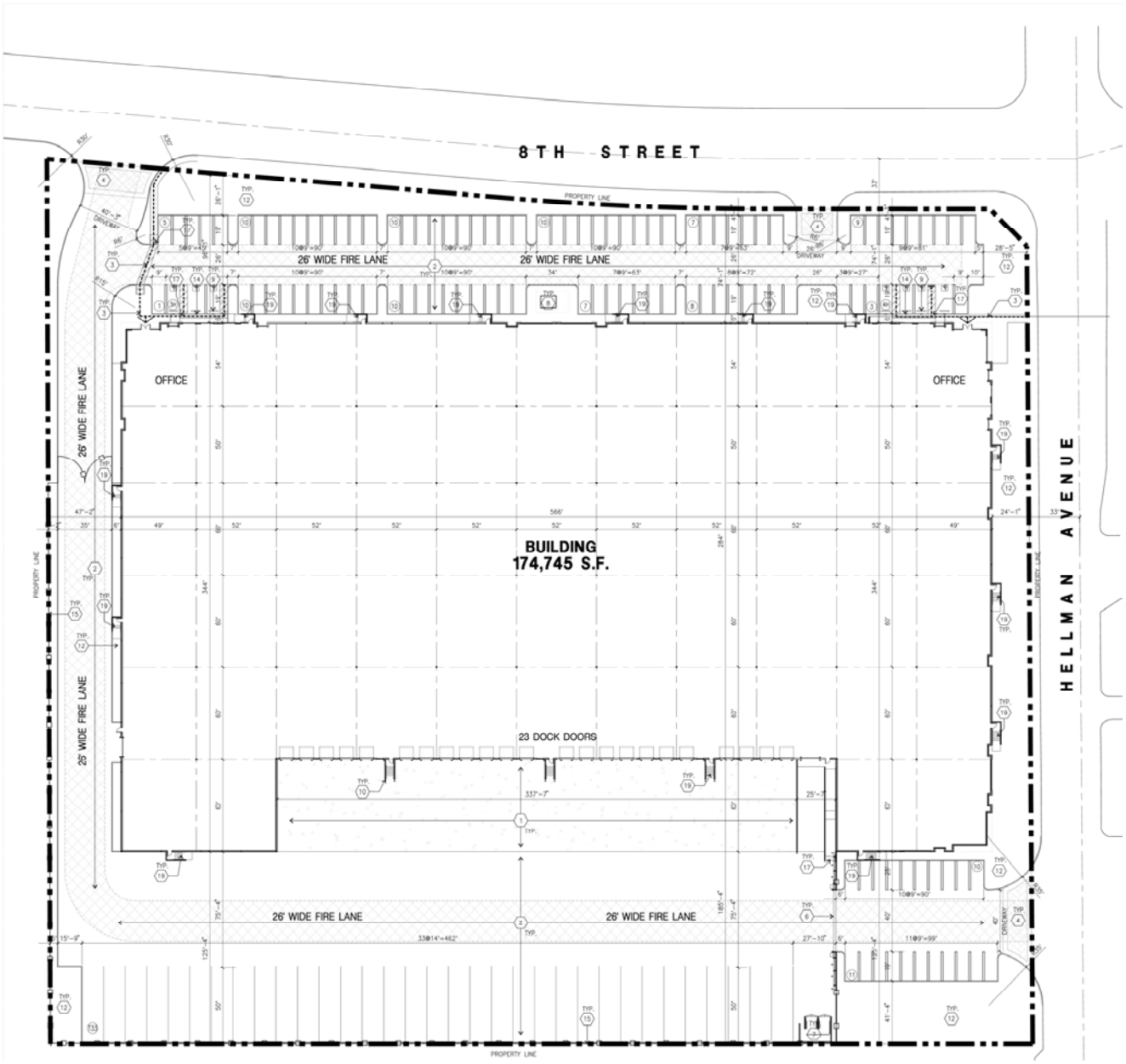


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Figure 2
Site Plan



II. ATMOSPHERIC SETTING

The project site is located within the southwestern portion of San Bernardino County, which is part of the South Coast Air Basin (SCAB) that includes all of Orange County as well as the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The South Coast Air Basin is located on a coastal plain with connecting broad valleys and low hills to the east. Regionally, the South Coast Air Basin is bounded by the Pacific Ocean to the southwest and high mountains to the east forming the inland perimeter. The project site is located toward the northeast portion of the South Coast Air Basin near the foot of the San Bernardino Mountains, which define the eastern boundary of the South Coast Air Basin.

The climate of western San Bernardino County, technically called an interior valley subclimate of the Southern California's Mediterranean-type climate, is characterized by hot dry summers, mild moist winters with infrequent rainfall, moderate afternoon breezes, and generally fair weather. Occasional periods of strong Santa Ana winds and winter storms interrupt the otherwise mild weather pattern. The clouds and fog that form along the area's coastline rarely extend as far inland as western San Bernardino County. When morning clouds and fog form, they typically burn off quickly after sunrise. The most important weather pattern from an air quality perspective is associated with the warm season airflow across the populated areas of the Los Angeles Basin. This airflow brings polluted air into western San Bernardino County late in the afternoon. This transport pattern creates unhealthful air quality that may extend to the project site particularly during the summer months.

Winds are an important parameter in characterizing the air quality environment of a project site because they both determine the regional pattern of air pollution transport and control the rate of dispersion near a source. Daytime winds in western San Bernardino County are usually light breezes from off the coast as air moves regionally onshore from the cool Pacific Ocean to the warm Mojave Desert interior of Southern California. These winds allow for good local mixing, but as discussed above, these coastal winds carry significant amounts of industrial and automobile air pollutants from the densely urbanized western portion of the South Coast Air Basin into the interior valleys which become trapped by the mountains that border the eastern edge of the South Coast Air Basin.

In the summer, strong temperature inversions may occur that limit the vertical depth through which air pollution can be dispersed. Air pollutants concentrate because they cannot rise through the inversion layer and disperse. These inversions are more common and persistent during the summer months. Over time, sunlight produces photochemical reactions within this inversion layer that creates ozone, a particularly harmful air pollutant. Occasionally, strong thermal convections occur which allows the air pollutants to rise high enough to pass over the mountains and ultimately dilute the smog cloud.

In the winter, light nocturnal winds result mainly from the drainage of cool air off of the mountains toward the valley floor while the air aloft over the valley remains warm. This forms a type of inversion known as a radiation inversion. Such winds are characterized by stagnation and poor local mixing and trap pollutants such as automobile exhaust near their source. While these inversions may lead to air pollution "hot spots" in heavily developed coastal areas of the basin, there is not enough traffic volumes in inland valleys to cause any winter air pollution problems.

Despite light wind conditions, especially at night and in the early morning, winter is generally a period of good air quality in the project vicinity.

The temperature and precipitation levels for the neighboring city of Fontana are shown below in Table 1. Table 1 shows that August is typically the warmest month and December is typically the coolest month. Rainfall in the project area varies considerably in both time and space. Almost all the annual rainfall comes from the fringes of mid-latitude storms from late November to early April, with summers being almost completely dry.

Table 1

Fontana Monthly Climate Data[1]

Descriptor	Month of Year											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Max. Temperature	66.4	68.9	68.5	72.8	80.3	86.5	95	96.2	90	80.4	68.7	66
Avg. Min. Temperature	41.5	42.6	43.9	45.9	51.5	56.1	59.5	62.4	60.2	52.5	43.5	41.7
Avg. Total Precipitation (in.)	3.17	3.27	4.13	1.31	0.31	0.00	0.00	0.28	0.62	0.77	2.59	2.33

[1] Source: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca3120. Data taken from the Fontana Kaiser, CA station (043120).

III. POLLUTANTS

Pollutants are generally classified as either criteria pollutants or non-criteria pollutants. Federal ambient air quality standards have been established for criteria pollutants, whereas no ambient standards have been established for non-criteria pollutants. For some criteria pollutants, separate standards have been set for different periods. Most standards have been set to protect public health. For some pollutants, standards have been based on other values (such as protection of crops, protection of materials, or avoidance of nuisance conditions). A summary of federal and state ambient air quality standards is provided in the Regulatory Framework section.

A. Criteria Pollutants

The criteria pollutants consist of: ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, lead, and particulate matter. These pollutants can harm your health and the environment, and cause property damage. The Environmental Protection Agency (EPA) calls these pollutants "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally-based criteria for setting permissible levels. The following provides descriptions of each of the criteria pollutants.

1. Nitrogen Dioxide

Nitrogen Oxides (NOx) is the generic term for a group of highly reactive gases which contain nitrogen and oxygen. While most NOx are colorless and odorless, concentrations of nitrogen dioxide (NO_2) can often be seen as a reddish-brown layer over many urban areas. NOx form when fuel is burned at high temperatures, as in a combustion process. The primary manmade sources of NOx are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuel. NOx reacts with other pollutants to form, ground-level ozone, nitrate particles, acid aerosols, as well as NO_2, which cause respiratory problems. NOx and the pollutants formed from NOx can be transported over long distances, following the patterns of prevailing winds. Therefore controlling NOx is often most effective if done from a regional perspective, rather than focusing on the nearest sources.

2. Ozone

Ozone is not usually emitted directly into the air but at ground-level is created by a chemical reaction between NOx and volatile organic compounds (VOC) in the presence of sunlight. Motor vehicle exhaust, industrial emissions, gasoline vapors, chemical solvents as well as natural sources emit NOx and VOC that help form ozone. Ground-level ozone is the primary constituent of smog. Sunlight and hot weather cause ground-level ozone to form with the greatest concentrations usually occurring downwind from urban areas. Ozone is subsequently considered a regional pollutant. Ground-level ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and can cause substantial damage to vegetation and other materials. Because NOx and VOC are ozone precursors, the health effects associated with ozone are also indirect health effects associated with significant levels of NOx and VOC emissions.

3. Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 56 percent of all CO emissions nationwide. In cities, 85 to 95 percent of all CO emissions may come from motor vehicle exhaust. Other sources of CO emissions include industrial processes (such as metals processing and chemical manufacturing), residential wood burning, and natural sources such as forest fires. Woodstoves, gas stoves, cigarette smoke, and unvented gas and kerosene space heaters are indoor sources of CO. The highest levels of CO in the outside air typically occur during the colder months of the year when inversion conditions are more frequent. The air pollution becomes trapped near the ground beneath a layer of warm air. CO is described as having only a local influence because it dissipates quickly. Since CO concentrations are strongly associated with motor vehicle emissions, high CO concentrations generally occur in the immediate vicinity of roadways with high traffic volumes and traffic congestion, active parking lots, and in automobile tunnels. Areas adjacent to heavily traveled and congested intersections are particularly susceptible to high CO concentrations.

CO is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. The health threat from lower levels of CO is most serious for those who suffer from heart disease such as angina, clogged arteries, or congestive heart failure. For a person with heart disease, a single exposure to CO at low levels may cause chest pain and reduce that person's ability to exercise; repeated exposures may contribute to other cardiovascular effects. High levels of CO can affect even healthy people. People who breathe high levels of CO can develop vision problems, reduced ability to work or learn, reduced manual dexterity, and difficulty performing complex tasks. At extremely high levels, CO is poisonous and can cause death.

4. Sulfur Dioxide

Sulfur Oxide (SOx) gases (including sulfur dioxide) are formed when fuel containing sulfur, such as coal and oil is burned, and from the refining of gasoline. SOx dissolves easily in water vapor to form acid and interacts with other gases and particles in the air to form sulfates and other products that can be harmful to people and the environment.

5. Lead

Lead is a metal found naturally in the environment as well as manufactured products. The major sources of lead emissions have historically been motor vehicles and industrial sources. Due to the phase out of leaded gasoline, metal processing is now the primary source of lead emissions to the air. High levels of lead in the air are typically only found near lead smelters, waste incinerators, utilities, and lead-acid battery manufacturers. Exposure of fetuses, infants and children to low levels of lead can adversely affect the development and function of the central nervous system,

leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased lead levels are associated with increased blood pressure.

6. Particulate Matter

Particulate matter (PM) is the term for a mixture of solid particles and liquid droplets found in the air. Particulate matter is made up of a number of components including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health problems. Particles that are less than 10 micrometers in diameter (PM10) are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. Particles that are less than 2.5 micrometers in diameter (PM2.5) have been designated as a subset of PM10 due to their increased negative health impacts and its ability to remain suspended in the air longer and travel further.

7. Volatile Organic Compounds (VOC)

Although not a criteria pollutant, reactive organic gases (ROGs), or VOCs, are defined as any compound of carbon—excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate—that participates in atmospheric photochemical reactions. Although there are slight differences in the definition of ROGs and VOCs, the two terms are often used interchangeably. Indoor sources of VOCs include paints, solvents, aerosol sprays, cleansers, tobacco smoke, etc. Outdoor sources of VOCs are from combustion and fuel evaporation. A reduction in VOC emissions reduces certain chemical reactions that contribute to the formulation of ozone. VOCs are transformed into organic aerosols in the atmosphere, which contribute to higher PM10 and lower visibility.

B. Other Pollutants of Concern

1. Toxic Air Contaminants

In addition to the above-listed criteria pollutants, toxic air contaminants (TACs) are another group of pollutants of concern. Sources of toxic air contaminants include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least forty different toxic air contaminants. The most important of these toxic air contaminants, in terms of health risk, are diesel particulates, benzene, formaldehyde, 1,3-butadiene, and acetaldehyde. Public exposure to toxic air contaminants can result from emissions from normal operations as well as accidental releases. Health effects of toxic air contaminants include cancer, birth defects, neurological damage, and death.

Toxic air contaminants are less pervasive in the urban atmosphere than criteria air pollutants, however they are linked to short-term (acute) or long-term (chronic or carcinogenic) adverse human health effects. There are hundreds of different types of

toxic air contaminants with varying degrees of toxicity. Sources of toxic air contaminants include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), and motor vehicle exhaust.

According to the 2013 California Almanac of Emissions and Air Quality, the majority of the estimated health risk from toxic air contaminants can be attributed to relatively few compounds, the most important of which is diesel particulate matter (DPM). Diesel particulate matter is a subset of PM2.5 because the size of diesel particles are typically 2.5 microns and smaller. The identification of diesel particulate matter as a toxic air contaminant in 1998 led the California Air Resources Board (CARB) to adopt the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles in September 2000. The plan's goals are a 75-percent reduction in diesel particulate matter by 2010 and an 85-percent reduction by 2020 from the 2000 baseline. Diesel engines emit a complex mixture of air pollutants, composed of gaseous and solid material. The visible emissions in diesel exhaust are known as particulate matter or PM, which includes carbon particles or "soot." Diesel exhaust also contains a variety of harmful gases and over 40 other cancer-causing substances. California's identification of diesel particulate matter as a toxic air contaminant was based on its potential to cause cancer, premature deaths, and other health problems. Exposure to diesel particulate matter is a health hazard, particularly to children whose lungs are still developing and the elderly who may have other serious health problems. Overall, diesel engine emissions are responsible for the majority of California's potential airborne cancer risk from combustion sources.

2. Asbestos

Asbestos is listed as a TAC by ARB and as a Hazardous Air Pollutant by the EPA. Asbestos occurs naturally in mineral formations and crushing or breaking these rocks, through construction or other means, can release asbestoform fibers into the air. Asbestos emissions can result from the sale or use of asbestos-containing materials, road surfacing with such materials, grading activities, and surface mining. The risk of disease is dependent upon the intensity and duration of exposure. When inhaled, asbestos fibers may remain in the lungs and with time may be linked to such diseases as asbestosis, lung cancer, and mesothelioma. Naturally occurring asbestos is not present in San Bernardino County. The nearest likely locations of naturally occurring asbestos, as identified in the General Location Guide for Ultramafic Rocks in California prepared by the California Division of Mines and Geology, is located in Santa Barbara County. Due to the distance to the nearest natural occurrences of asbestos, the project site is not likely to contain asbestos.

C. Greenhouse Gases

Constituent gases of the Earth's atmosphere, called atmospheric greenhouse gases (GHG), play a critical role in the Earth's radiation amount by trapping infrared radiation emitted from the Earth's surface, which otherwise would have escaped to space. Prominent greenhouse gases contributing to this process include carbon dioxide (CO_2), methane (CH_4), ozone, water vapor, nitrous oxide (N_2O), and chlorofluorocarbons (CFCs). This phenomenon, known as the Greenhouse Effect, is responsible for maintaining a habitable

climate. Anthropogenic (caused or produced by humans) emissions of these greenhouse gases in excess of natural ambient concentrations are responsible for the enhancement of the Greenhouse Effect and have led to a trend of unnatural warming of the Earth's natural climate, known as global warming or climate change. Emissions of gases that induce global warming are attributable to human activities associated with industrial/manufacturing, agriculture, utilities, transportation, and residential land uses. Transportation is responsible for 41 percent of the State's greenhouse gas emissions, followed by electricity generation. Emissions of CO_2 and nitrous oxide (NOx) are byproducts of fossil fuel combustion. Methane, a potent greenhouse gas, results from off-gassing associated with agricultural practices and landfills. Sinks of CO_2, where CO_2 is stored outside of the atmosphere, include uptake by vegetation and dissolution into the ocean. The following provides a description of each of the greenhouse gases and their global warming potential.

1. Water Vapor

Water vapor is the most abundant, important, and variable GHG in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. The feedback loop in which water is involved in is critically important to projecting future climate change. As the temperature of the atmosphere rises, more water is evaporated from ground storage (rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher (in essence, the air is able to "hold" more water when it is warmer), leading to more water vapor in the atmosphere. As a GHG, the higher concentration of water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere. The warmer atmosphere can then hold more water vapor and so on and so on. This is referred to as a "positive feedback loop." The extent to which this positive feedback loop will continue is unknown as there is also dynamics that put the positive feedback loop in check. As an example, when water vapor increases in the atmosphere, more of it will eventually also condense into clouds, which are more able to reflect incoming solar radiation (thus allowing less energy to reach the Earth's surface and heat it up).

2. Carbon Dioxide

The natural production and absorption of CO_2 is achieved through the terrestrial biosphere and the ocean. However, humankind has altered the natural carbon cycle by burning coal, oil, natural gas, and wood. Since the industrial revolution began in the mid-1700s. Each of these activities has increased in scale and distribution. CO_2 was the first GHG demonstrated to be increasing in atmospheric concentration with the first conclusive measurements being made in the last half of the 20th century. Prior to the industrial revolution, concentrations were fairly stable at 280 parts per million (ppm). The International Panel on Climate Change (IPCC Fifth Assessment Report, 2014) Emissions of CO_2 from fossil fuel combustion and industrial processes contributed about 78% of the total GHG emissions increase from 1970 to 2010, with a similar percentage contribution for the increase during the period 2000 to 2010. Globally, economic and population growth continued to be the most important

drivers of increases in CO_2 emissions from fossil fuel combustion. The contribution of population growth between 2000 and 2010 remained roughly identical to the previous three decades, while the contribution of economic growth has risen sharply.

3. Methane

CH_4 is an extremely effective absorber of radiation, although its atmospheric concentration is less than that of CO_2. Its lifetime in the atmosphere is brief (10 to 12 years), compared to some other GHGs (such as CO_2, N_2O, and Chlorofluorocarbons (CFCs). CH_4 has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane. Other anthropocentric sources include fossil-fuel combustion and biomass burning.

4. Nitrous Oxide

Concentrations of N_2O also began to rise at the beginning of the industrial revolution. In 1998, the global concentration was 314 parts per billion (ppb). N_2O is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used as an aerosol spray propellant (i.e., in whipped cream bottles, in potato chip bags to keep chips fresh, and in rocket engines and in race cars).

5. Chlorofluorocarbons

CFCs are gases formed synthetically by replacing all hydrogen atoms in methane or ethane (C_2H_6) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the Earth's surface). CFCs have no natural source, but were first synthesized in 1928. It was used for refrigerants, aerosol propellants, and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and in 1989 the European Community agreed to ban CFCs by 2000 and subsequent treaties banned CFCs worldwide by 2010. This effort was extremely successful, and the levels of the major CFCs are now remaining level or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years.

6. Hydrofluorocarbons

HFCs are synthetic man-made chemicals that are used as a substitute for CFCs. Out of all the GHGs, they are one of three groups with the highest global warming potential. The HFCs with the largest measured atmospheric abundances are (in order), HFC-23 (CHF_3), HFC-134a (CF_3CH_2F), and HFC-152a (CH_3CHF_2). Prior to 1990, the only significant emissions were HFC-23. HFC-134a use is increasing due to its use as a

refrigerant. Concentrations of HFC-23 HFC-134a are now about 10 parts per trillion (ppt) each. Concentrations of HFC-152a are about 1 ppt. HFCs are manmade for applications such as automobile air conditioners and refrigerants.

7. Perfluorocarbons

PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. High-energy ultraviolet rays about 60 kilometers above Earth's surface are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6). Concentrations of CF_4 in the atmosphere are over 70 ppt. The two main sources of PFCs are primary aluminum production and semiconductor manufacturing.

8. Sulfur Hexafluoride

SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 has the highest global warming potential of any gas evaluated; 23,900 times that of CO_2. Concentrations in the 1990s were about 4 ppt. Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

9. Aerosols

Aerosols are particles emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Cloud formation can also be affected by aerosols. Sulfate aerosols are emitted when fuel containing sulfur is burned. Black carbon (or soot) is emitted during biomass burning due to the incomplete combustion of fossil fuels. Particulate matter regulation has been lowering aerosol concentrations in the United States; however, global concentrations are likely increasing.

10. Global Warming Potential

The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO_2). The larger the GWP, the more that a given gas warms the Earth compared to CO_2 over that time period. The time period usually used for GWPs is 100 years. GWPs provide a common unit of measure, which allows analysts to add up emissions estimates of different gases (e.g., to compile a national GHG inventory), and allows policymakers to compare emissions reduction opportunities across sectors and gases. A summary of the atmospheric lifetime and the global warming potential of selected gases are summarized in Table 2. As shown in Table 2, the global warming potential of GHGs ranges from 1 to 22,800.

Table 2

Global Warming Potentials and Atmospheric Lifetimes[1]

Gas	Atmospheric Lifetime	Global Warming Potential[2] (100 Year Horizon)
Carbon Dioxide (CO_2)	—[3]	1
Methane (CH_4)	12	28-36
Nitrous Oxide (NO)	114	298
Hydrofluorocarbons (HFCs)	1-270	12-14,800
Perfluorocarbons (PFCs)	2,600-50,000	7,390-12,200
Nitrogen trifluoride (NF_3)	740	17,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

[1] Source: http://www3.epa.gov/climatechange/ghgemissions/gases.html

[2] Compared to the same quantity of CO_2 emissions.

[3] Carbon dioxide's lifetime is poorly defined because the gas is not destroyed over time, but instead moves among different parts of the ocean–atmosphere–land system. Some of the excess carbon dioxide will be absorbed quickly (for example, by the ocean surface), but some will remain in the atmosphere for thousands of years, due in part to the very slow process by which carbon is transferred to ocean sediments.

IV. AIR QUALITY MANAGEMENT

A. Regulatory Setting

The proposed project is addressed through the efforts of various international, federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies responsible for improving the air quality are discussed below.

1. International

Montreal Protocol

In 1988, the United Nations established the Intergovernmental Panel on Climate Change (IPCC) to evaluate the impacts of global climate change and to develop strategies that nations could implement to curtail global climate change. In 1992, the United States joined other countries around the world in signing the United Nations' Framework Convention on Climate Change (UNFCCC) agreement with the goal of controlling GHG emissions. As a result, the Climate Change Action Plan was developed to address the reduction of GHGs in the United States. The plan consists of more than 50 voluntary programs.

Additionally, the Montreal Protocol was originally signed in 1987 and substantially amended in 1990 and 1992. The Montreal Protocol stipulates that the production and consumption of compounds that deplete ozone in the stratosphere—CFCs, halons, carbon tetrachloride, and methyl chloroform—were to be phased out, with the first three by the year 2000 and methyl chloroform by 2005.

The Paris Agreement

The Paris Agreement entered into force on 4 November 2016, thirty days after the date on which at least 55 Parties to the Convention accounting in total for at least an estimated 55 % of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depositary.

The Paris Agreement builds upon the Convention and – for the first time – brings all nations into a common cause to undertake take ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. As such, it charts a new course in the global climate effort.

The Paris Agreement's central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Additionally, the agreement aims to strengthen the ability of countries to deal with the impacts of climate change. To reach these ambitious goals, appropriate financial flows, a new technology framework and an enhanced capacity building framework will be put in place, thus supporting action by developing countries and the most vulnerable

countries, in line with their own national objectives. The Agreement also provides for enhanced transparency of action and support through a more robust transparency framework.

2. Federal - United States Environmental Protection Agency

The United States Environmental Protection Agency (EPA) is responsible for setting and enforcing the National Ambient Air Quality Standards (NAAQS) for atmospheric pollutants. It regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain locomotives. The National Ambient Air Quality Standards (NAAQS) pollutants were identified using medical evidence and are shown below in Table 3.

As part of its enforcement responsibilities, the EPA requires each state with federal nonattainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the national standards. The State Implementation Plan (SIP) must integrate federal, state, and local components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the timeframe identified in the State Implementation Plan (SIP).

The EPA and the California Air Resource Board (CARB) designate air basins where ambient air quality standards are exceeded as "nonattainment" areas. If standards are met, the area is designated as an "attainment" area. If there is inadequate or inconclusive data to make a definitive attainment designation, they are considered "unclassified." National nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards. Each standard has a different definition, or 'form' of what constitutes attainment, based on specific air quality statistics. For example, the Federal 8-hour CO standard is not to be exceeded more than once per year; therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring values exceeds the threshold per year. In contrast, the Federal annual PM2.5 standard is met if the three-year average of the annual average PM2.5 concentration is less than or equal to the standard. Attainment status is shown in Table 4.

As indicated below in Table 4, the Basin has been designated by the EPA as a non-attainment area for ozone (O_3) and suspended particulates (PM10 and PM2.5). Currently, the Basin is in attainment with the ambient air quality standards for carbon monoxide (CO), lead, sulfur dioxide (SO_2), and nitrogen dioxide (NO_2).

In 2011, the Basin exceeded federal standards for either ozone or PM2.5 at one or more locations on a total of 124 days, based on the current federal standards for 8-hour ozone and 24-hour PM2.5. Despite substantial improvements in air quality over the past few decades, some air monitoring stations in the Basin still exceed the NAAQS for ozone more frequently than any other stations in the U.S. In 2011, three of the top five stations that exceeded the 8-hour ozone NAAQS were located in the Basin (Central San Bernardino Mountains, East San Bernardino Valley, and Metropolitan Riverside County).

PM2.5 in the Basin has improved significantly in recent years, with 2010 and 2011 being the cleanest years on record. In 2011, only one station in the Basin (Metropolitan Riverside County at Mira Loma) exceeded the annual PM2.5 NAAQS and the 98th percentile form of the 24-hour PM2.5 NAAQS, as well as the 3-year design values for these standards. Basin-wide, the federal PM2.5 24-hour standard level was exceeded in 2011 on 17 sampling days.

The Basin is currently in attainment for the federal standards for carbon monoxide (CO), lead, sulfur dioxide (SO_2), and nitrogen dioxide (NO_2). While the concentration level of the new 1-hour NO_2 federal standard (100 ppb) was exceeded in the Basin at two stations (Central Los Angeles and Long Beach) on the same day in 2011, the NAAQS NO_2 design value has not been exceeded. Therefore, the Basin remains in attainment of the NO_2 NAAQS.

The EPA designated the Los Angeles County portion of the Basin as nonattainment for the revised (2008) federal lead standard (0.15 µg/m3, rolling 3-month average), due to the addition of source-specific monitoring under the new federal regulation. This designation was based on two source-specific monitors in Vernon and the City of Industry exceeding the new standard in the 2007-2009 period of data used.

In Massachusetts v. Environmental Protection Agency (Docket No. 05–1120), argued November 29, 2006 and decided April 2, 2007, the U.S. Supreme Court held that not only did the EPA have authority to regulate greenhouse gases, but the EPA's reasons for not regulating this area did not fit the statutory requirements. As such, the U.S. Supreme Court ruled that the EPA should be required to regulate CO_2 and other greenhouse gases as pollutants under the federal Clean Air Act (CAA).

In response to the FY2008 Consolidations Appropriations Act (H.R. 2764; Public Law 110-161), EPA proposed a rule on March 10, 2009 that requires mandatory reporting of GHG emissions from large sources in the United States. On September 22, 2009, the Final Mandatory Reporting of GHG Rule was signed and published in the Federal Register on October 30, 2009. The rule became effective on December 29, 2009. This rule requires suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions to submit annual reports to EPA.

On December 7, 2009, the EPA Administrator signed two distinct findings under section 202(a) of the Clean Air Act. One is an endangerment finding that finds concentrations of the six GHGs in the atmosphere threaten the public health and welfare of current and future generations. The other is a cause or contribute finding, that finds emissions from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare. These actions will not themselves impose any requirements on industry or other entities. However, it is a prerequisite to finalizing the EPA's proposed GHG emission standards for light-duty vehicles, which were jointly proposed by the EPA and Department of Transportation on September 15, 2009.

On March 19, 2015, the Whitehouse announced that President Obama will issue an Executive Order that will cut the Federal Government's greenhouse gas (GHG) emissions 40 percent over the next decade from 2008 levels -- saving taxpayers up to $18 billion in avoided energy costs -- and increase the share of electricity the Federal Government consumes from renewable sources to 30 percent. Complementing this effort, several major Federal suppliers are announcing commitments to cut their own GHG emissions. The Administration hosted a roundtable that brought some of these large Federal suppliers together to discuss the benefits of their GHG reduction targets or to make their first-ever corporate commitments to disclose emissions and set new reduction goals.

Together, the combined results of the Federal Government actions and new supplier commitments will reduce GHG emissions by 26 million metric tons by 2025 from 2008 levels, the equivalent of taking nearly 5.5 million cars off the road for a year. And to encourage continued progress across the Federal supply chain, the Administration is releasing a new scorecard to publicly track self-reported emissions disclosure and progress for all major Federal suppliers, who together represent more than $187 billion in Federal spending and account for more than 40 percent of all Federal contract dollars.

Since the Federal Government is the single largest consumer of energy in the Nation, Federal emissions reductions and progress across the supply chain will have broad impacts. The new commitments announced today support the United States' international commitment to cut net GHG emissions 26-28 percent below 2005 levels by 2025, which President Obama first announced in November 2014 as part of an historic agreement with China. Additionally, the goals build on the strong progress made by Federal agencies during the first six years of the Administration under President Obama's 2009 Executive Order on Federal Leadership on Environmental, Energy and Economic Performance, including reducing Federal GHG emissions by 17 percent — which helped Federal agencies avoid $1.8 billion in cumulative energy costs — and increasing the share of renewable energy consumption to 9 percent.[1]

3. State – California Air Resources Board

The California Air Resources Board (CARB), which is a part of the California Environmental Protection Agency, is responsible for the coordination and administration of both federal and state air pollution control programs within California. In this capacity, the CARB conducts research, sets the California Ambient Air Quality Standards (CAAQS), compiles emission inventories, develops suggested control measures, provides oversight of local programs, and prepares the State Implementation Plan (SIP). The California Ambient Air Quality Standards (CAAQS) for criteria pollutants are shown in Table 3. In addition, the CARB establishes emission standards for motor vehicles sold in California, consumer products (e.g., hairspray, aerosol paints, and barbeque lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions.

[1] Source: https://www.whitehouse.gov/the-press-office/2015/03/19/fact-sheet-reducing-greenhouse-gas-emissions-federal-government-and-acro.

The South Coast Air Basin has been designated by the CARB as a nonattainment area for ozone, PM10 and PM2.5. Currently, the South Coast Air Basin is in attainment with the ambient air quality standards for CO, lead, SO_2, NO_2, and sulfates and is unclassified for visibility reducing particles and Hydrogen Sulfide.

On June 20, 2002, the CARB revised the PM10 annual average standard to 20 µg/m3 and established an annual average standard for PM2.5 of 12 µg/m3. These standards were approved by the Office of Administrative Law in June 2003 and are now effective. On September 27, 2007 CARB approved the South Coast Air Basin and the Coachella Valley 2007 Air Quality Management Plan for Attaining the Federal 8-hour Ozone and PM2.5 Standards. The plan projects attainment for the 8-hour Ozone standard by 2024 and the PM2.5 standard by 2015.

On December 12, 2008 the CARB adopted Resolution 08-43, which limits NOx, PM10 and PM2.5 emissions from on-road diesel truck fleets that operate in California. On October 12, 2009 Executive Order R-09-010 was adopted that codified Resolution 08-43 into Section 2025, title 13 of the California Code of Regulations. This regulation requires that by the year 2023 all commercial diesel trucks that operate in California shall meet model year 2010 (Tier 4) or latter emission standards. In the interim period, this regulation provides annual interim targets for fleet owners to meet. This regulation also provides a few exemptions including a onetime per year 3-day pass for trucks registered outside of California.

The CARB is also responsible for regulations pertaining to toxic air contaminants. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987, Connelly) was enacted in 1987 as a means to establish a formal air toxics emission inventory risk quantification program. AB 2588, as amended, establishes a process that requires stationary sources to report the type and quantities of certain substances their facilities routinely release into the South Coast Air Basin. The data is ranked by high, intermediate, and low categories, which are determined by: the potency, toxicity, quantity, volume, and proximity of the facility to nearby receptors.

The State currently has no regulations that establish ambient air quality standards for GHGs. However, the State has passed laws directing CARB to develop actions to reduce GHG emissions, which are listed below.

Assembly Bill 1493

California Assembly Bill 1493 enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. In 2005, the CARB submitted a "waiver" request to the EPA from a portion of the federal Clean Air Act in order to allow the State to set more stringent tailpipe emission standards for CO_2 and other GHG emissions from passenger vehicles and light duty trucks. On December 19, 2007 the EPA announced that it denied the "waiver" request. On January 21, 2009, CARB submitted a letter to the EPA administrator regarding the State's request to reconsider the waiver denial. The EPA approved the waiver on June 30, 2009.

Executive Order S-3-05

The California Governor issued Executive Order S-3-05, GHG Emission, in June 2005, which established the following reduction targets:

- 2010: Reduce greenhouse gas emissions to 2000 levels
- 2020: Reduce greenhouse gas emissions to 1990 levels
- 2050: Reduce greenhouse gas emissions to 80 percent below 1990 levels.

The executive order directed the secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. To comply with the Executive Order, the secretary of CalEPA created the California Climate Action Team (CAT), made up of members from various state agencies and commissions. The team released its first report in March 2006. The report proposed to achieve the targets by building on the voluntary actions of businesses, local governments, and communities and through State incentive and regulatory programs.

Assembly Bill 32

In 2006, the California State Legislature adopted Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006. AB 32 requires CARB, to adopt rules and regulations that would achieve GHG emissions equivalent to statewide levels in 1990 by 2020 through an enforceable statewide emission cap which will be phased in starting in 2012. Emission reductions shall include carbon sequestration projects that would remove carbon from the atmosphere and best management practices that are technologically feasible and cost effective.

On December 6, 2007 CARB released the calculated Year 1990 GHG emissions of 427 million metric tons of CO_2e ($MMTCO_2e$). The 2020 target of 427 $MMTCO_2e$ requires the reduction of 169 $MMTCO_2e$, or approximately 30 percent from the State's projected 2020 business as usual emissions of 596 $MMTCO_2e$ and the reduction of 42 $MMTCO_2e$, or almost 10 percent from the 2002-2004 average GHG emissions. Under AB 32, CARB was required to adopt regulations by January 1, 2011 to achieve reductions in GHGs to meet the 1990 cap by 2020. Early measures CARB took to lower GHG emissions included requiring operators of the largest industrial facilities that emit 25,000 metric tons of CO_2 in a calendar year to submit verification of GHG emissions by December 1, 2010. The CARB Board also approved nine discrete early action measures that include regulations affecting landfills, motor vehicle fuels, refrigerants in cars, port operations and other sources that became enforceable on or before January 1, 2010.

On December 11, 2008 the CARB Board approved a Scoping Plan, with final adoption May 11, 2009 that proposed a variety of measures including direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, a market-based cap-and-trade system, and a fee regulation to fund the program. In current pending litigation, Association of Irritated Residents v. California Air Resources Board, a California State trial

court found that the analysis of the alternatives identified in the AB 32 Scoping Plan Functional Equivalent Document (FED) was not sufficient for informed decision-making and public review under CEQA. In response, CARB has appealed the decision. In addition, CARB prepared the *Supplement to the AB 32 Scoping Plan Functional Equivalent Document,* June 13, 2011. On August 24, 2011 CARB recertified the complete AB 32 Scoping Plan Functional Equivalent Environmental Document revised by the Final Supplement. In December, 2011 the Final Supplement was accepted as sufficient to fulfill the trial court's March order.

While local government operations were not accounted for in achieving the 2020 emissions reduction, local land use changes are estimated to result in a reduction of 5 metric tons of CO_2e, which is approximately 3 percent of the 2020 GHG emissions reduction goal. In recognition of the critical role local governments will play in successful implementation of AB 32, CARB is recommending GHG reduction goals of 15 percent of 2010 levels by 2020 to ensure that municipal and community-wide emissions match the state's reduction target. According to the Measure Documentation Supplement to the Scoping Plan, local government actions and targets are anticipated to reduce vehicle miles by approximately 2 percent through land use planning, resulting in a potential GHG reduction of 2 metric tons of CO_2e (or approximately 1.2 percent of the GHG reduction target).

In May 2014, CARB released its *First Update to the Climate Change Scoping Plan* (CARB 2014). This *Update* identifies the next steps for California's leadership on climate change. While California continues on its path to meet the near-term 2020 greenhouse gas limit, it must also set a clear path toward long-term, deep GHG emission reductions. This report highlights California's success to date in reducing its GHG emissions and lays the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050.

In November 2017, CARB released the 2017 Scoping Plan. This latest Scoping Plan incorporates, coordinates, and leverages many existing and ongoing efforts and identifies new policies and actions to accomplish the State's climate goals, and includes a description of a suite of specific actions to meet the State's 2030 GHG limit. In addition, this Scoping Plan provides a broader description of the many actions and proposals being explored across the sectors, including the natural resources sector, to achieve the State's mid and long-term climate goals.

The 2017 Scoping Plan builds upon the successful framework established by the Initial Scoping Plan and First Update, while identifying new, technologically feasible, and cost-effective strategies to ensure that California meets its GHG reduction targets in a way that promotes and rewards innovation, continues to foster economic growth, and delivers improvements to the environment and public health, including in disadvantaged communities. The 2017 Scoping Plan includes policies to require direct GHG reductions at some of the State's largest

stationary sources and mobile sources. These policies include the use of lower GHG fuels, efficiency regulations, and the Cap-and Trade Program, which constrains and reduces emissions at covered sources.

SB 32. SB 32, Pavley. California Global Warming Solutions Act of 2006.

(1) The California Global Warming Solutions Act of 2006 designates the State Air Resources Board as the state agency charged with monitoring and regulating sources of emissions of greenhouse gases. The state board is required to approve a statewide greenhouse gas emissions limit equivalent to the statewide greenhouse gas emissions level in 1990 to be achieved by 2020 and to adopt rules and regulations in an open public process to achieve the maximum, technologically feasible, and cost-effective greenhouse gas emissions reductions. This bill would require the state board to ensure that statewide greenhouse gas emissions are reduced to 40% below the 1990 level by 2030.

(2) This bill would become operative only if AB 197 of the 2015–16 Regular Session is enacted and becomes effective on or before January 1, 2017. AB 197 requires that the California Air Resources Board, which directs implementation of emission-reduction programs, should target direct reductions at both stationary and mobile sources.

Senate Bill 1368

Senate Bill 1368 (SB 1368) is the companion Bill of AB 32 and was adopted September, 2006. SB 1368 requires the California Public Utilities Commission (CPUC) to establish a performance standard for baseload generation of GHG emissions by investor-owned utilities by February 1, 2007 and for local publicly owned utilities by June 30, 2007. These standards could not exceed the GHG emissions rate from a baseload combined-cycle, natural gas-fired plant. Furthermore, the legislation states that all electricity provided to the State, including imported electricity, must be generated by plants that meet the standards set by California Public Utilities Commission (CPUC) and California Energy Commission (CEC).

Executive Order S-1-07

Executive Order S-1-07 was issued in 2007 and proclaims that the transportation sector is the main source of GHG emissions in the State, since it generates more than 40 percent of the State's GHG emissions. It establishes a goal to reduce the carbon intensity of transportation fuels sold in the State by at least ten percent by 2020. This Order also directs CARB to determine whether this Low Carbon Fuel Standard (LCFS) could be adopted as a discrete early-action measure as part of the effort to meet the mandates in AB 32.

On April 23, 2009 CARB approved the proposed regulation to implement the low carbon fuel standard. The low carbon fuel standard is anticipated to reduce GHG emissions by about 16 MMT per year by 2020. The low carbon fuel standard is designed to provide a framework that uses market mechanisms to spur the steady introduction of lower carbon fuels. The framework establishes performance standards that fuel producers and importers must meet each year

beginning in 2011. Separate standards are established for gasoline and diesel fuels and the alternative fuels that can replace each. The standards are "back-loaded", with more reductions required in the last five years, than the first five years. This schedule allows for the development of advanced fuels that are lower in carbon than today's fuels and the market penetration of plug-in hybrid electric vehicles, battery electric vehicles, fuel cell vehicles, and flexible fuel vehicles. It is anticipated that compliance with the low carbon fuel standard will be based on a combination of both lower carbon fuels and more efficient vehicles.

Reformulated gasoline mixed with corn-derived ethanol at ten percent by volume and low sulfur diesel fuel represent the baseline fuels. Lower carbon fuels may be ethanol, biodiesel, renewable diesel, or blends of these fuels with gasoline or diesel as appropriate. Compressed natural gas and liquefied natural gas also may be low carbon fuels. Hydrogen and electricity, when used in fuel cells or electric vehicles are also considered as low carbon fuels for the low carbon fuel standard.

Senate Bill 97

Senate Bill 97 (SB 97) was adopted August 2007 and acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. SB 97 directed the Governor's Office of Planning and Research (OPR), which is part of the State Resource Agency, to prepare, develop, and transmit to CARB guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, by July 1, 2009. The Resources Agency was required to certify and adopt those guidelines by January 1, 2010.

Pursuant to the requirements of SB 97 as stated above, on December 30, 2009 the Natural Resources Agency adopted amendments to the state CEQA guidelines that address GHG emissions. The CEQA Guidelines Amendments changed 14 sections of the CEQA Guidelines and incorporate GHG language throughout the Guidelines. However, no GHG emissions thresholds of significance are provided and no specific mitigation measures are identified. The GHG emission reduction amendments went into effect on March 18, 2010 and are summarized below:

- Climate action plans and other greenhouse gas reduction plans can be used to determine whether a project has significant impacts, based upon its compliance with the plan.
- Local governments are encouraged to quantify the greenhouse gas emissions of proposed projects, noting that they have the freedom to select the models and methodologies that best meet their needs and circumstances. The section also recommends consideration of several qualitative factors that may be used in the determination of significance, such as the extent to which the given project complies with state, regional, or local GHG reduction plans and policies. OPR does not set or dictate specific thresholds of significance. Consistent with existing CEQA

Guidelines, OPR encourages local governments to develop and publish their own thresholds of significance for GHG impacts assessment.

- When creating their own thresholds of significance, local governments may consider the thresholds of significance adopted or recommended by other public agencies, or recommended by experts.
- New amendments include guidelines for determining methods to mitigate the effects of greenhouse gas emissions in Appendix F of the CEQA Guidelines.
- OPR is clear to state that "to qualify as mitigation, specific measures from an existing plan must be identified and incorporated into the project; general compliance with a plan, by itself, is not mitigation."
- OPR's emphasizes the advantages of analyzing GHG impacts on an institutional, programmatic level. OPR therefore approves tiering of environmental analyses and highlights some benefits of such an approach.
- Environmental impact reports (EIRs) must specifically consider a project's energy use and energy efficiency potential.

Senate Bills 1078, 107, and X1-2 and Executive Orders S-14-08 and S-21-09

Senate Bill 1078 (SB 1078) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. Senate Bill 107 (SB 107) changed the target date to 2010. Executive Order S-14-08 was signed on November 2008 and expands the State's Renewable Energy Standard to 33 percent renewable energy by 2020. Executive Order S-21-09 directed CARB to adopt regulations by July 31, 2010 to enforce S-14-08. Senate Bill X1-2 codifies the 33 percent renewable energy requirement by 2020.

Senate Bill 375

Senate Bill 375 (SB 375) was adopted September 2008 and aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPO) to adopt a sustainable communities strategy (SCS) or alternate planning strategy (APS) that will prescribe land use allocation in that MPOs Regional Transportation Plan (RTP). CARB, in consultation with each MPO, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's sustainable communities strategy or alternate planning strategy for consistency with its assigned targets.

The proposed project is located within the Southern California Association of Governments (SCAG), which has authority to develop the SCS or APS. For the SCAG region, the targets set by CARB are at eight percent below 2005 per capita GHG emissions levels by 2020 and 13 percent below 2005 per capita GHG emissions levels by 2035. On April 4, 2012, SCAG adopted the 2012-2035

Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), which meets the CARB emission reduction requirements. The Housing Element Update is required by the State to be completed within 18 months after RTP/SCS adoption or by October 2013.

On April 7, 2016, SCAG's Regional Council adopted the 2016-2040 Regional Transportation Plan/ Sustainable Communities Strategy (2016 RTP/SCS or Plan). The Plan is a long-range visioning plan that balances future mobility and housing needs with economic, environmental and public health goals. The Plan charts a course for closely integrating land use and transportation – so that the region can grow smartly and sustainably. It outlines more than $556.5 billion in transportation system investments through 2040. The Plan was prepared through a collaborative, continuous, and comprehensive process with input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses and local stakeholders within the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura. In June 2016, SCAG received its conformity determination from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) indicating that all air quality conformity requirements for the 2016 RTP/SCS and associated 2015 FTIP Consistency Amendment through Amendment 15-12 have been met.

Senate Bill X7-7

Senate Bill X7-7 (SB X7-7), enacted on November 9, 2009, mandates water conservation targets and efficiency improvements for urban and agricultural water suppliers. SB X7-7 requires the Department of Water Resources (DWR) to develop a task force and technical panel to develop alternative best management practices for the water sector. In addition SB X7-7 required the DWR to develop criteria for baseline uses for residential, commercial, and industrial uses for both indoor and landscaped area uses. The DWR was also required to develop targets and regulations that achieve a statewide 20 percent reduction in water usage.

Assembly Bill 939 and Senate Bill 1374

Assembly Bill 939 (AB 939) requires that each jurisdiction in California to divert at least 50 percent of its waste away from landfills, whether through waste reduction, recycling or other means. Senate Bill 1374 (SB 1374) requires the California Integrated Waste Management Board to adopt a model ordinance by March 1, 2004 suitable for adoption by any local agency to require 50 to 75 percent diversion of construction and demolition of waste materials from landfills.

California Code of Regulations (CCR) Title 24, Part 6

CCR Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24) were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Although it was not originally

intended to reduce GHG emissions, electricity production by fossil fuels results in GHG emissions and energy efficient buildings require less electricity. Therefore, increased energy efficiency results in decreased GHG emissions.

The Energy Commission adopted 2008 Standards on April 23, 2008 and Building Standards Commission approved them for publication on September 11, 2008. These updates became effective on August 1, 2009. 2013 Standards have been approved and were effective July 1, 2014. 2016 Standards were adopted January 1, 2017.

California Code of Regulations (CCR) Title 24, Part 11

All buildings for which an application for a building permit is submitted on or after January 1, 2017 must follow the 2016 standards. The 2016 standards are estimated to be approximately 28 percent more efficient than the 2013 standards. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases greenhouse gas emissions.

California Green Building Standards

On January 12, 2010, the State Building Standards Commission unanimously adopted updates to the California Green Building Standards Code, which went into effect on January 1, 2011. The Code is a comprehensive and uniform regulatory code for all residential, commercial and school buildings. CCR Title 24, Part 11: California Green Building Standards (Title 24) became effective in 2001 in response to continued efforts to reduce GHG emissions associated with energy consumption. CCR Title 24, Part 11 now require that new buildings reduce water consumption, employ building commissioning to increase building system efficiencies, divert construction waste from landfills, and install low pollutant-emitting finish materials. One focus of CCR Title 24, Part 11 is water conservation measures, which reduce GHG emissions by reducing electrical consumption associated with pumping and treating water. CCR Title 24, Part 11 has approximately 52 nonresidential mandatory measures and an additional 130 provisions for optional use. Some key mandatory measures for commercial occupancies include specified parking for clean air vehicles, a 20 percent reduction of potable water use within buildings, a 50 percent construction waste diversion from landfills, use of building finish materials that emit low levels of volatile organic compounds, and commissioning for new, nonresidential buildings over 10,000 square feet.

The 2016 version of the standards became effective as of January 1, 2017. The 2016 version address additional items such as clean air vehicles, increased requirements for electric vehicles charging infrastructure, organic waste, and water efficiency and conservation.

The California Green Building Standards Code does not prevent a local jurisdiction from adopting a more stringent code as state law provides methods for local enhancements. The Code recognizes that many jurisdictions have developed existing construction and demolition ordinances, and defers to them

as the ruling guidance provided they provide a minimum 50-percent diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. State building code provides the minimum standard that buildings need to meet in order to be certified for occupancy. Enforcement is generally through the local building official.

Executive Order B-30-15
Executive Order B-30-15, establishing a new interim statewide greenhouse gas emission reduction target to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030, was signed by Governor Brown in April 2015.

Executive Order B-29-15
Executive Order B-29-15, mandates a statewide 25% reduction in potable water usage. EO B-29-15 signed into law on April 1, 2015.

Executive Order B-37-16
Executive Order B-29-15, continuing the State's adopted water reductions, was signed into law on May 9, 2016. The water reductions build off the mandatory 25% percent reduction called for in EO B-29-15.

4. Regional

The SCAQMD is the agency principally responsible for comprehensive air pollution control in the South Coast Air Basin. To that end, as a regional agency, the SCAQMD works directly with the Southern California Association of Governments (SCAG), county transportation commissions, and local governments and cooperates actively with all federal and state agencies.

South Coast Air Quality Management District
The SCAQMD develops rules and regulations, establishes permitting requirements for stationary sources, inspects emission sources, and enforces such measures through educational programs or fines, when necessary. The SCAQMD is directly responsible for reducing emissions from stationary, mobile, and indirect sources. It has responded to this requirement by preparing a sequence of AQMPs. On June 30, 2016, the SCAQMD released its Draft 2016 AQMP. The 2016 AQMP is a regional blueprint for achieving the federal air quality standards and healthful air.

The 2016 AQMP includes both stationary and mobile source strategies to ensure that rapidly approaching attainment deadlines are met, that public health is protected to the maximum extent feasible, and that the region is not faced with burdensome sanctions if the Plan is not approved or if the NAAQS are not met on time. As with every AQMP, a comprehensive analysis of emissions, meteorology, atmospheric chemistry, regional growth projections, and the impact of existing control measures is updated with the latest data and methods. The most significant air quality challenge in the Basin is to reduce nitrogen oxide (NOx) emissions sufficiently to meet the upcoming ozone standard deadlines. On March 23, 2017 CARB approved the 2016 AQMP. The primary goal of this Air Quality Management Plan is to meet clean air

standards and protect public health, including ensuring benefits to environmental justice and disadvantaged communities. Now that the plan has been approved by CARB, it has been forwarded to the U.S. Environmental Protection Agency for its review. If approved by EPA, the plan becomes federally enforceable.

A revised draft of the 2012 AQMP was released on September, 2012, and was adopted by the SCAQMD Board on December 7, 2012. The 2012 AQMP is now awaiting approval from CARB and the U.S. EPA. The 2012 AQMP is being prepared in order to meet the federal Clean Air Act requirement that all 24-hour PM2.5 non-attainment areas prepare a SIP, which was required to be submitted to the U.S. EPA by December 14, 2012 and demonstrate attainment with the 24-hour PM2.5 standard by 2014. The 2012 AQMP demonstrates attainment of the federal 24-hour PM2.5 standard by 2014 in the Basin through adoption of all feasible measures, and therefore, no extension of the attainment date is needed.

The 2007 AQMP demonstrated attainment with the 1997 8-hour ozone (80 ppb) standard by 2023, through implementation of future improvements in control techniques and technologies. These "black box" emissions reductions represent 65 percent of the remaining NOx emission reductions by 2023 in order to show attainment with the 1997 8-hour ozone NAAQS. Given the magnitude of these needed emissions reductions, additional NOx control measures have been provided in this AQMP even though the primary purpose of this AQMP is to show compliance with 24-hour PM2.5 emissions standards.

The 2012 AQMP built upon the approaches taken in the 2007 AQMP for the attainment of federal PM and ozone standards, and highlights the significant amount of reductions needed and the need to engage in interagency coordinated planning of mobile sources to meet all of the federal criteria pollutant standards. Compared with the 2007 AQMP, the 2012 AQMP utilizes revised emissions inventory projections that use 2008 as the base year. On-road emissions are calculated using CARB EMFAC2011 emission factors and the transportation activity data provided by SCAG from their 2012 Regional Transportation Plan (2012 RTP). Off-road emissions were updated using CARB's 2011 In-Use Off-Road Fleet Inventory Model. Since the 2007 AQMP was finalized new area source categories such as LPG transmission losses, storage tank and pipeline cleaning and degassing, and architectural colorants, were created and included in the emissions inventories. The 2012 AQMP also includes analysis of several additional sources of GHG emissions such as landfills and could also assist in reaching the GHG target goals in the AB32 Scoping Plan.

The control measures in the 2012 AQMP consist of three components: (1) Basin-wide and episodic short-term PM2.5 measures; (2) Section 182(e)(5) implementation measures; and (3) Transportation control measures. Many of the control measures are not based on command and control regulations, but instead focus on incentives, outreach, and education to bring about emissions reductions through voluntary participation and behavioral changes. More broadly, a transition to zero- and near-zero emission technologies is necessary to meet 2023 and 2032 air quality standards and 2050 climate goals. Many of the same technologies will address both air quality and climate needs.

During construction and operation, the project must comply with applicable rules and regulations. The following are rules the project may be required to comply with, either directly, or indirectly:

SCAQMD Rule 402 prohibits a person from discharging from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

SCAQMD Rule 403 governs emissions of fugitive dust during construction and operation activities. Compliance with this rule is achieved through application of standard Best Management Practices, such as application of water or chemical stabilizers to disturbed soils, covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 miles per hour, sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph, and establishing a permanent ground cover on finished sites.

Rule 403 requires that fugitive dust be controlled with best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 403 requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off-site. Applicable dust suppression techniques from Rule 403 are summarized below. Implementation of these dust suppression techniques can reduce the fugitive dust generation (and thus the PM_{10} component). Compliance with these rules would reduce impacts on nearby sensitive receptors. Rule 403 measures may include but are not limited to the following:

- Apply nontoxic chemical soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for 10 days or more).
- Water active sites at least three times daily. (Locations where grading is to occur will be thoroughly watered prior to earthmoving.)
- Cover all trucks hauling dirt, sand, soil, or other loose materials, or maintain at least 0.6 meters (2 feet) of freeboard (vertical space between the top of the load and top of the trailer) in accordance with the requirements of California Vehicle Code section 23114.
- Reduce traffic speeds on all unpaved roads to 15 miles per hour (mph) or less.
- Suspension of all grading activities when wind speeds (including instantaneous wind gusts) exceed 25 mph.
- Bumper strips or similar best management practices shall be provided where vehicles enter and exit the construction site onto paved roads or wash off trucks and any equipment leaving the site each trip.
- Replanting disturbed areas as soon as practical.
- During all construction activities, construction contractors shall sweep on-site and off-site streets if silt is carried to adjacent public thoroughfares, to reduce

the amount of particulate matter on public streets. All sweepers shall be compliant with SCAQMD Rule 1186.1, Less Polluting Sweepers.

SCAQMD Rule 445 prohibits permanently installed wood burning devices into any new development. A wood burning device means any fireplace, wood burning heater, or pellet-fueled wood heater, or any similarly enclosed, permanently installed, indoor or outdoor device burning any solid fuel for aesthetic or space-heating purposes, which has a heat input of less than one million British thermal units per hour.

SCAQMD Rule 481 applies to all spray painting and spray coating operations and equipment. The rule states that a person shall not use or operate any spray painting or spray coating equipment unless one of the following conditions is met:

(1) The spray coating equipment is operated inside a control enclosure, which is approved by the Executive Officer. Any control enclosure for which an application for permit for new construction, alteration, or change of ownership or location is submitted after the date of adoption of this rule shall be exhausted only through filters at a design face velocity not less than 100 feet per minute nor greater than 300 feet per minute, or through a water wash system designed to be equally effective for the purpose of air pollution control.
(2) Coatings are applied with high-volume low-pressure, electrostatic and/or airless spray equipment.
(3) An alternative method of coating application or control is used which has effectiveness equal to or greater than the equipment specified in the rule.

SCAQMD Rule 1108 governs the sale, use, and manufacturing of asphalt and limits the volatile organic compound (VOC) content in asphalt used in the South Coast Air Basin. This rule would regulate the VOC content of asphalt used during construction. Therefore, all asphalt used during construction of the project must comply with SCAQMD Rule 1108.

SCAQMD Rule 1113 governs the sale, use, and manufacturing of architectural coating and limits the VOC content in paints and paint solvents. This rule regulates the VOC content of paints available during construction. Therefore, all paints and solvents used during construction and operation of the project must comply with SCAQMD Rule 1113.

SCAQMD Rule 1143 governs the manufacture, sale, and use of paint thinners and solvents used in thinning of coating materials, cleaning of coating application equipment, and other solvent cleaning operations by limiting their VOC content. This rule regulates the VOC content of solvents used during construction. Solvents used during the construction phase must comply with this rule.

SCAQMD Rule 1186 limits the presence of fugitive dust on paved and unpaved roads and sets certification protocols and requirements for street sweepers that are under contract to provide sweeping services to any federal, state, county, agency or special district such as water, air, sanitation, transit, or school district.

SCAQMD Rule 1303 governs the permitting of re-located or new major emission sources, requiring Best Available Control Measures and setting significance limits for PM_{10} among other pollutants.

SCAQMD Rule 1401, New Source Review of Toxic Air Contaminants, specifies limits for maximum individual cancer risk, cancer burden, and non-cancer acute and chronic hazard index from new permit units, relocations, or modifications to existing permit units, which emit toxic air contaminants.

SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options, is to provide employers with a menu of options to reduce mobile source emissions generated from employee commutes, to comply with federal and state Clean Air Act requirements, Health & Safety Code Section 40458, and Section 182(d)(1)(B) of the federal Clean Air Act. It applies to any employer who employs 250 or more employees on a full or part-time basis at a worksite for a consecutive six-month period calculated as a monthly average.

In order to assist local agencies with direction on GHG emissions, the SCAQMD organized a working group and adopted Rules 2700, 2701, 2702, and 3002 which are described below.

SCAQMD Working Group

Since neither CARB nor the OPR has developed GHG emissions threshold, the SCAQMD formed a Working Group to develop significance thresholds related to GHG emissions. At the September 28, 2010 Working Group meeting, the SCAQMD released its most current version of the draft GHG emissions thresholds, which recommends a tiered approach that provides a quantitative annual thresholds of 10,000 MTCO2e for industrial uses.

Rules 2700 and 2701

The SCAQMD adopted Rules 2700 and 2701 on December 5, 2008, which establishes the administrative structure for a voluntary program designed to quantify GHG emission reductions. Rule 2700 establishes definitions for the various terms used in Regulation XXVII – Global Climate Change. Rule 2701 provides specific protocols for private parties to follow to generate certified GHG emission reductions for projects within the district. Approved protocols include forest projects, urban tree planting, and manure management. The SCAQMD is currently developing additional protocols for other reduction measures. For a GHG emission reduction project to qualify, it must be verified and certified by the SCAQMD Executive Officer, who has 60 days to approve or deny the Plan to reduce GHG emissions. Upon approval of the Plan, the Executive Officer issues required to issue a certified receipt of the GHG emission reductions within 90 days.

Rule 2702

The SCAQMD adopted Rule 2702 on February 6, 2009, which establishes a voluntary air quality investment program from which SCAQMD can collect funds from parties that desire certified GHG emission reductions, pool those funds, and use them to

purchase or fund GHG emission reduction projects within two years, unless extended by the Governing Board. Priority will be given to projects that result in co-benefit emission reductions of GHG emissions and criteria or toxic air pollutants within environmental justice areas. Further, this voluntary program may compete with the cap-and-trade program identified for implementation in CARB's Scoping Plan, or a Federal cap and trade program.

Rule 3002

The SCAQMD amended Rule 3002 on November 5, 2010 to include facilities that emit greater than 100,000 tons per year of CO_2e are required to apply for a Title V permit by July 1, 2011. A Title V permit is for facilities that are considered major sources of emissions.

Although the SCAQMD is responsible for regional air quality planning efforts, it does not have the authority to directly regulate air quality issues associated with plans and new development projects throughout the South Coast Air Basin. Instead, this is controlled through local jurisdictions in accordance with the California Environmental Quality Act (CEQA). In order to assist local jurisdictions with air quality compliance issues the CEQA Air Quality Handbook (SCAQMD CEQA Handbook) prepared by the SCAQMD (1993) with the most current updates found at http://www.aqmd.gov/ceqa/hdbk.html, was developed in accordance with the projections and programs of the AQMP. The purpose of the SCAQMD CEQA Handbook is to assist Lead Agencies, as well as consultants, project proponents, and other interested parties in evaluating a proposed project's potential air quality impacts. Specifically, the SCAQMD CEQA Handbook explains the procedures that the SCAQMD recommends be followed for the environmental review process required by CEQA. The SCAQMD CEQA Handbook provides direction on how to evaluate potential air quality impacts, how to determine whether these impacts are significant, and how to mitigate these impacts. The SCAQMD intends that by providing this guidance, the air quality impacts of plans and development proposals will be analyzed accurately and consistently throughout the South Coast Air Basin, and adverse impacts will be minimized.

Southern California Association of Governments

The SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino and Imperial Counties and addresses regional issues relating to transportation, the economy, community development and the environment. SCAG is the Federally designated MPO for the majority of the southern California region and is the largest MPO in the nation. With respect to air quality planning, SCAG has prepared the Regional Transportation Plan and Regional Transportation Improvement Plan (RTIP), which addresses regional development and growth forecasts. These plans form the basis for the land use and transportation components of the AQMP, which are utilized in the preparation of air quality forecasts and in the consistency analysis included in the AQMP. The Regional Transportation Plan, Regional Transportation Improvement Plan, and AQMP are based on projections originating within the City and County General Plans.

5. Local – City of Rancho Cucamonga

Local jurisdictions, such as the City of Rancho Cucamonga, have the authority and responsibility to reduce air pollution through its police power and decision-making authority. Specifically, the City is responsible for the assessment and mitigation of air emissions resulting from its land use decisions. The City is also responsible for the implementation of transportation control measures as outlined in the 2016 AQMP. Examples of such measures include bus turnouts, energy-efficient streetlights, and synchronized traffic signals. In accordance with CEQA requirements and the CEQA review process, the City assesses the air quality impacts of new development projects, requires mitigation of potentially significant air quality impacts by conditioning discretionary permits, and monitors and enforces implementation of such mitigation.

In accordance with the CEQA requirements, the City does not, however, have the expertise to develop plans, programs, procedures, and methodologies to ensure that air quality within the City and region will meet federal and state standards. Instead, the County relies on the expertise of the SCAQMD and utilizes the SCAQMD CEQA Handbook as the guidance document for the environmental review of plans and development proposals within its jurisdiction.

The Rancho Cucamonga General Plan Public Safety Element contains the following air quality-related goals and policies that are applicable to the proposed project:

Goal PS-10
Maintain good local air quality, and reduce the local contributions of airborne pollutants to the air basin.

Policies

PS 10.1 Pursue efforts to reduce air pollution and greenhouse gas emissions by implementing effective energy conservation and efficiency measures and promoting the use of renewable energy (e.g., solar, wind, biomass, cogeneration, and hydroelectric power).

PS 10.2 Integrate air quality planning with land use, economic development, and transportation planning.

PS 10.3 Consider surrounding land uses when locating sensitive receptors such as schools, hospitals, and residential uses so they are not unreasonably exposed to uses that generate pollutants considered detrimental to human health.

PS 10.4 Require projects that generate potentially significant levels of air pollutants to incorporate the best available air quality mitigation into the project design, as appropriate.

PS 10.5 Avoid placing sensitive land uses adjacent to heavy industrial areas.

PS 10.6 Implement the policies in the Resource Conservation Chapter that are related to energy resources, energy conservation, and green buildings.

Goal PS-11
Reduce the volume of pollutants generated by motorized vehicles.

Policies

PS 11.1 Implement the policies in the Community Mobility Chapter to foster a healthy and sustainable community and promote transportation choices other than the private automobile.

PS 11.2 Minimize vehicle emissions by encouraging alternative land use patterns that reduce the need for automobile trips.

PS 11.3 Support programs that increase ridesharing, reduce pollutants generated by vehicle use, and meet the transportation control measures recommended by SCAQMD in the most recent Clean Air Plan.

PS 11.4 Support regional and local transportation and housing programs that reduce vehicle emissions by decreasing vehicle miles traveled (VMT).

PS 11.5 Consult with neighboring cities and jurisdictions and regional agencies, including the Southern California Association of Governments (SCAG) and the South Coast Air Quality Management District (SCAQMD), to reduce vehicle emissions.

PS 11.6 Pursue strategies and capital improvements that allow safe routes for children to walk or bike to school to reduce the need for automobile trips.

B. Monitored Air Quality

The air quality at any site is dependent on the regional air quality and local pollutant sources. Regional air quality is determined by the release of pollutants throughout the air basin. Estimates of the existing emissions in the Basin provided in the Final 2016 Air Quality Management Plan prepared by SCAQMD (March 2017) indicate that collectively, mobile sources account for 60 percent of the VOC, 90 percent of the NOx emissions, 95 percent of the CO emissions and 34 percent of directly emitted PM2.5, with another 13 percent of PM2.5 from road dust.

The SCAQMD has divided the South Coast Air Basin into 38 air-monitoring areas with a designated ambient air monitoring station representative of each area. The project site is located in the Southwest San Bernardino Valley Air Monitoring Area (Area 33), which is located in the southwestern portion of San Bernardino County and covers from Rancho Cucamonga on the north, the Riverside County line on the east, the Orange County and Riverside County lines on the south, and the Los Angeles County line on the west. Data was taken from the Upland Station, the nearest monitoring station to the project site. The Upland Station is located approximately 1.7 miles northwest of the project site at 1350 San

Bernardino Road, Upland. Table 5 presents the monitored pollutant levels from these Monitoring Stations.

Table 5 summarizes 2014 through 2016 published monitoring data from the air monitoring stations, which is the most recent 3-year period available. The data shows that during the past few years, the project area has exceeded the ozone standards. However, it should be noted that due to the air monitoring station distance from the project site, recorded air pollution levels at the air monitoring station reflect with varying degrees of accuracy, local air quality conditions at the project site.

Ozone

During the 2014 to 2016 monitoring period, the State 1-hour concentration standard for ozone was exceeded between 34 and 53 days each year over the past three years at the Upland Station. The State 8-hour ozone standard has been exceeded between 60 and 89 days each year over the past three years at the Upland Station. The Federal 8-hour ozone standard was exceeded between 57 and 88 days each year over the past three years at the Upland Station.

Ozone is a secondary pollutant as it is not directly emitted. Ozone is the result of chemical reactions between other pollutants, most importantly hydrocarbons and NO_2, which occur only in the presence of bright sunlight. Pollutants emitted from upwind cities react during transport downwind to produce the oxidant concentrations experienced in the area. Many areas of the SCAQMD contribute to the ozone levels experienced at the monitoring station, with the more significant areas being those directly upwind.

Carbon Monoxide

CO is another important pollutant that is due mainly to motor vehicles. The Upland Station did not record an exceedance of the state or federal 8-hour CO standards for the last three years.

Nitrogen Dioxide

The Upland Station did not record an exceedance of the State or Federal NO_2 standards for the last three years.

Particulate Matter

There was insufficient data for the State 24-hour concentration standards for PM10 at the Upland Station for the past three years. Over the past three years, the Federal 24-hour standards for PM10 were exceeded for only one day in 2016 at the Upland Station.

There was insufficient data for the Federal 24 hour standards for PM2.5 over the past three years at the Upland Station.

According to the EPA, some people are much more sensitive than others to breathing fine particles (PM10 and PM2.5). People with influenza, chronic respiratory and cardiovascular diseases, and the elderly may suffer worsening illness and premature death due to breathing these fine particles. People with bronchitis can expect aggravated symptoms from breathing in fine particles. Children may experience decline in lung function due to breathing in PM10 and PM2.5. Other groups considered sensitive are smokers and people

who cannot breathe well through their noses. Exercising athletes are also considered sensitive, because many breathe through their mouths during exercise.

Table 3

State and Federal Criteria Pollutant Standards

Air Pollutant	Concentration / Averaging Time		Most Relevant Effects
	California Standards	Federal Primary Standards	
Ozone (O_3)	0.09 ppm/1-hour 0.07 ppm/8-hour	0.070 ppm/8-hour	(a) Pulmonary function decrements and localized lung edema in humans and animals; (b) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (c) Increased mortality risk; (d) Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (e) Vegetation damage; (f) Property damage.
Carbon Monoxide (CO)	20.0 ppm/1-hour 9.0 ppm/8-hour	35.0 ppm/1-hour 9.0 ppm/8-hour	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses.
Nitrogen Dioxide (NO_2)	0.18 ppm/1-hour 0.03 ppm/annual	100 ppb/1-hour 0.053 ppm/annual	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration.
Sulfur Dioxide (SO_2)	0.25 ppm/1-hour 0.04 ppm/24-hour	75 ppb/1-hour 0.14 ppm/24-hour	(a) Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma.
Suspended Particulate Matter (PM_{10})	50 µg/m^3/24-hour 20 µg/m^3/annual	150 µg/m^3/24-hour	(a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) Declines in pulmonary function growth in children; (c) Increased risk of premature death from heart or lung diseases in elderly.
Suspended Particulate Matter ($PM_{2.5}$)	12 µg/m^3 / annual	35 µg/m^3/24-hour 15 µg/m^3/annual	
Sulfates	25 µg/m^3/24-hour	No Federal Standards	(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) property damage.
Lead	1.5 µg/m^3/30-day	0.15 µg/m^3/3-month rolling	(a) Learning disabilities; (b) Impairment of blood formation and nerve conduction.
Visibility Reducing Particles	Extinction coefficient of 0.23 per kilometer-visibility of 10 miles or more due to particles when humidity is less than 70 percent.	No Federal Standards	Visibility impairment on days when relative humidity is less than 70 percent.

[1] Source: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf .

Table 4

South Coast Air Basin Attainment Status

Pollutant	State Status[1]	National Status[2]
Ozone	Nonattainment	Nonattainment (Extreme)
Carbon monoxide	Attainment	Attainment/Unclassified
Nitrogen dioxide	Attainment	Attainment/Unclassified
Sulfur dioxide	Attainment	Attainment/Unclassified
PM10	Nonattainment	Attainment (Maintenance)
PM2.5	Nonattainment	Nonattainment (Moderate)

[1] Source of State status: California Air Resources Board 2015.

[2] Source of National status: http://www3.epa.gov/airquality/greenbk/index.html and CARB 2015.

Table 5

Local Area Air Quality Monitoring Summary[1]

Pollutant (Standard)[2]	Year		
	2014	2015	2016
Ozone:			
Maximum 1-Hour Concentration (ppm)	0.126	0.136	0.156
Days > CAAQS (0.09 ppm)	**34**	**49**	**53**
Maximum 8-Hour Concentration (ppm)	0.101	0.106	0.116
Days > NAAQS (0.07 ppm)	**57**	**66**	**88**
Days > CAAQS (0.070 ppm)	**60**	**69**	**89**
Carbon Monoxide:			
Maximum 8-Hour Concentration (ppm)	*	*	*
Days > NAAQS (9 ppm)	0	*	*
Nitrogen Dioxide:			
Maximum 1-Hour Concentration (ppm)	0.0741	0.0716	0.0701
Days > NAAQS (0.25 ppm)	0	0	0
Inhalable Particulates (PM10):			
Maximum 24-Hour Concentration (ug/m^3)	80.8	77.7	184
Days > NAAQS (150 ug/m^3)	0	0	**1**
Days > CAAQS (50 ug/m^3)	*	*	*
Ultra-Fine Particulates (PM2.5):			
Maximum 24-Hour Concentration (pg/m^3)	40.0	73.4	44.9
Days > NAAQS (35 ug/m^3)	*	*	*

[1] Source: http://www.arb.ca.gov/adam/

[2] CAAQS = California Ambient Air Quality Standard; NAAQS = National Ambient Air Quality Standard; ppm = parts per million

Data Obtained from the Upland Monitoring Station unless otherwise noted.

* http://www.arb.ca.gov/adam/ - insufficient (OR no) data available to determine the value

V. AIR QUALITY STANDARDS

A. Regional Air Quality

Many air quality impacts that derive from dispersed mobile sources, which are the dominate pollution generators in the basin, often occurs hours later and miles away after photochemical processes have converted primary exhaust pollutants into secondary contaminants such as ozone. The incremental regional air quality impact of an individual project is generally very small and difficult to measure. Therefore, the SCAQMD has developed significance thresholds based on the volume of pollution emitted rather than on actual ambient air quality because the direct air quality impact of a project is not quantifiable on a regional scale. The SCAQMD CEQA Handbook states that any project in the South Coast Air Basin with daily emissions that exceed any of the identified significance thresholds should be considered as having an individually and cumulatively significant air quality impact. For the purposes to this air quality impact analysis, a regional air quality impact would be considered significant if emissions exceed the SCAQMD significance thresholds identified in Table 6.

B. Local Air Quality

Project-related construction air emissions may have the potential to exceed the State and Federal air quality standards in the project vicinity, even though these pollutant emissions may not be significant enough to create a regional impact to the South Coast Air Basin. In order to assess local air quality impacts the SCAQMD has developed Localized Significant Thresholds (LSTs) to assess the project-related air emissions in the project vicinity. The SCAQMD has also provided Final Localized Significant Threshold Methodology (LST Methodology), June 2003, which details the methodology to analyze local air emission impacts. The Localized Significant Threshold Methodology found that the primary emissions of concern are NO_2, CO, PM10, and PM2.5.

The significance thresholds for the local emissions of NO_2 and CO are determined by subtracting the highest background concentration from the last three years of these pollutants from Table 5 above, from the most restrictive ambient air quality standards for these pollutants that are outlined in the Localized Significant Thresholds. Table 6 shows the ambient air quality standards for NO_2, CO, and PM10 and PM2.5.

C. Toxic Air Contaminants

According to the SCAQMD CEQA Handbook, any project that has the potential to expose the public to toxic air contaminants in excess of the following thresholds would be considered to have a significant air quality impact:

- If the Maximum Incremental Cancer Risk is 10 in one million or greater; or
- Toxic air contaminants from the proposed project would result in a Hazard Index increase of 1 or greater.

In order to determine if the proposed project may have a significant impact related to hazardous air pollutants (HAP), the Health Risk Assessment Guidance for analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis, (Diesel Analysis) prepared by SCAQMD (August 2003) recommends that if the proposed project is anticipated to create hazardous air pollutants through stationary sources or regular operations of diesel trucks on the project site, then the proximity of the nearest receptors to the source of the hazardous air pollutants and the toxicity of the hazardous air pollutants should be analyzed through a comprehensive facility-wide health risk assessment (HRA). The potential for health risks due to project-related diesel particulate matter (DPM) emissions is examined in Section VIII of this report.

D. Odor Impacts

The SCAQMD CEQA Handbook states that an odor impact would occur if the proposed project creates an odor nuisance pursuant to SCAQMD Rule 402, which states:

> "A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.
>
> The provisions of this rule shall not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals."

If the proposed project results in a violation of Rule 402 with regards to odor impacts, then the proposed project would create a significant odor impact.

E. Greenhouse Gases

The CEQA Guidelines recommend that a lead agency consider the following when assessing the significance of impacts from GHG emissions on the environment:

- The extent to which the project may increase (or reduce) GHG emissions as compared to the existing environmental setting;
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;
- The extent to which the project complies with regulations or requirements adopted to implement an adopted statewide, regional, or local plan for the reduction or mitigation of GHG emissions[2].

[2] The Governor's Office of Planning and Research recommendations include a requirement that such a plan must be adopted through a public review process and include specific requirements that reduce or mitigate the project's incremental contribution of GHG emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable, notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

1. Regional - South Coast Air Quality Management District

The project is within the South Coast Air Basin, which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD).

SCAQMD Regulation XXVII, Climate Change. SCAQMD Regulation XXVII currently includes three rules:

- The purpose of Rule 2700 is to define terms and post global warming potentials.
- The purpose of Rule 2701, SoCal Climate Solutions Exchange, is to establish a voluntary program to encourage, quantify, and certify voluntary, high quality certified greenhouse gas emission reductions in the SCAQMD.
- Rule 2702, Greenhouse Gas Reduction Program, was adopted on February 6, 2009. The purpose of this rule is to create a Greenhouse Gas Reduction Program for greenhouse gas emission reductions in the SCAQMD. The SCAQMD will fund projects through contracts in response to requests for proposals or purchase reductions from other parties.

A variety of agencies have developed greenhouse gas emission thresholds and/or have made recommendations for how to identify a threshold. However, the thresholds for projects in the jurisdiction of the SCAQMD remain in flux. The California Air Pollution Control Officers Association explored a variety of threshold approaches, but did not recommend one approach (2008). The ARB recommended approaches for setting interim significance thresholds (California Air Resources Board 2008b), in which a draft industrial project threshold suggests that non-transportation related emissions under 7,000 MTCO2e per year would be less than significant; however, the ARB has not approved those thresholds and has not published anything since then. The Bay Area Air Quality Management District and the San Joaquin Valley Air Pollution Control District have both developed greenhouse gas thresholds. However, those thresholds are not applicable to the project since the project is under the jurisdiction of the SCAQMD. The SCAQMD is in the process of developing thresholds, as discussed below.

SCAQMD Threshold Development. On December 5, 2008, the SCAQMD Governing Board adopted an interim greenhouse gas significance threshold for stationary sources, rules, and plans where the SCAQMD is lead agency (SCAQMD permit threshold). The SCAQMD permit threshold consists of five tiers. However, the SCAQMD is not the lead agency for this project. Therefore, the five permit threshold tiers do not apply to the proposed project.

The SCAQMD is in the process of preparing recommended significance thresholds for greenhouse gases for local lead agency consideration ("SCAQMD draft local agency threshold"); however, the SCAQMD Board has not approved the thresholds as of the date of the Notice of Preparation. The current draft thresholds consist of the following tiered approach:

- Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA.

- Tier 2 consists of determining whether the project is consistent with a greenhouse gas reduction plan. If a project is consistent with a qualifying local greenhouse gas reduction plan, it does not have significant greenhouse gas emissions.
- Tier 3 consists of screening values, which the lead agency can choose, but must be consistent with all projects within its jurisdiction. A project's construction emissions are averaged over 30 years and are added to a project's operational emissions. If a project's emissions are under one of the following screening thresholds, then the project is less than significant:
  - All land use types: 3,000 MTCO2e per year
  - Based on land use type: residential: 3,500 MTCO2e per year; commercial: 1,400 MTCO2e per year; or mixed use: 3,000 MTCO2e per year.
  - Based on land type: Industrial (where SCAQMD is the lead agency), 10,000 MTCO2e per year.
- Tier 4 has the following options:
  - Option 1: Reduce emissions from business as usual (BAU) by a certain percentage; this percentage is currently undefined.
  - Option 2: Early implementation of applicable AB 32 Scoping Plan measures.
  - Option 3, 2020 target for service populations (SP), which includes residents and employees: 4.8 MTCO2e/SP/year for projects and 6.6 MTCO2e/SP/year for plans;
  - Option 3, 2035 target: 3.0 MTCO2e/SP/year for projects and 4.1 MTCO2e/SP/year for plans.
- Tier 5 involves mitigation offsets to achieve target significance threshold.

The SCAQMD's draft threshold uses the Executive Order S-3-05 goal as the basis for the Tier 3 screening level. Achieving the Executive Order's objective would contribute to worldwide efforts to cap carbon dioxide concentrations at 450 ppm, thus stabilizing global climate. Specifically, the Tier 3 screening level for stationary sources is based on an emission capture rate of 90 percent for all new or modified projects. A 90 percent emission capture rate means that 90 percent of total emissions from all new or modified stationary source projects would be subject to a CEQA analysis, including a negative declaration, a mitigated negative declaration, or an environmental impact report, which includes analyzing feasible alternatives and imposing feasible mitigation measures. A GHG significance threshold based on a 90 percent emission capture rate may be more appropriate to address the long-term adverse impacts associated with global climate change because most projects will be required to implement GHG reduction measures. Further, a 90 percent emission capture rate sets the emission threshold low enough to capture a substantial fraction of future stationary source projects that will be constructed to accommodate future statewide population and economic growth, while setting the emission threshold high enough to exclude small projects that will in aggregate contribute a relatively small fraction of the cumulative statewide GHG emissions. This assertion is based on the fact that staff estimates that these GHG emissions would account for slightly less than one percent of future 2050 statewide GHG emissions target (85 MMTCO2eq/year). In addition, these small projects may be subject to future applicable GHG control regulations that would further reduce their overall future contribution to the

statewide GHG inventory. Finally, these small sources are already subject to BACT for criteria pollutants and are more likely to be single-permit facilities, so they are more likely to have few opportunities readily available to reduce GHG emissions from other parts of their facility.

To determine whether the project is significant, this analysis uses the SCAQMD screening annual threshold of 10,000 $MTCO_2e$ for industrial land uses.

2. Local - City of Rancho Cucamonga

The City of Rancho Cucamonga adopted the City of Rancho Cucamonga Sustainable Community Action Plan in April 2017. The Sustainable Community Action Plan is the City's roadmap to both advance in environmental sustainability and reduce greenhouse gas emissions. This Plan identifies the initial steps the City can take in order to begin implementing their sustainability initiatives. The Sustainable Community Action Plan identifies the below GHG reduction targets and goals:

- Reduce emissions to 1990 levels by 2020 (equivalent to 15 percent below 2008 baseline levels), consistent with AB 32
- Reduce emissions to 40 percent below 1990 levels by 2030 (equivalent to 49 percent below 2008 baseline levels), consistent with E.O. B-30-15 and SB 32
- Reduce emissions to 80 percent below 1990 levels by 2050 (equivalent to 83 percent below 2008 baseline levels), consistent with E.O. S-3-05

As identified in the Sustainable Community Action Plan, existing actions, state programs, and the goals, policies, and actions identified in the Sustainable Community Action Plan will reduce GHG emissions in the City of Rancho Cucamonga up to 16.9 percent by 2020.

The City of Rancho Cucamonga General Plan Public Safety Element also contains the following goal and policies aimed at reducing greenhouse gas emissions.

Goal PS-12
Mitigate against climate change.

Policies

PS 12-1 Consult with State agencies, SCAG, and the San Bernardino Associated Governments (SANBAG) to implement AB32 and SB375 by utilizing incentives to facilitate infill and transit-oriented development

PS 12-2 Encourage renewable energy installation, and facilitate green technology and business and a reduction in community-wide energy consumption.

PS 12-3 Encourage development of transit-oriented and infill development, and encourage a mix of uses that foster walking and alternative transportation.

PS 12-4 Provide enhanced bicycling and walking infrastructure, and support public transit, including public bus service, the Metrolink, and the potential for Bus Rapid Transit (BRT).

PS 12-5 Provide green building incentives, assess green building techniques as a formal stage of project review, and develop a green building ordinance or program that addresses both new and existing buildings. Adaptation strategies will also include increased water efficiency in buildings.

PS 12-6 Encourage efforts to reduce waste generation and re-use and support increased recycling and composting opportunities with a focus on large commercial and industrial waste producers.

PS 12-7 Support tree planting, planting more vegetation (including native and drought-resistant planting), and preservation of open space.

PS 12-8 Develop green procurement plans and ensure energy savings in City operations and maintenance.

PS 12-7 Develop energy- or climate change-themed publications and workshops, facilitating energy audits for residents, and establishing partnerships to reduce greenhouse gas emissions. Increase public awareness about climate change, and encourage residents and businesses to become involved in activities and lifestyle changes that help reduce greenhouse gas emissions.

Table 6

SCAQMD Air Quality Significance Thresholds[1]

Mass Daily Thresholds		
Pollutant	Construction (lbs/day)	Operation (lbs/day)
NOx	100	55
VOC	75	55
PM10	150	150
PM2.5	55	55
SOx	150	150
CO	550	550
Lead	3	3

Toxic Air Contaminants, Odor and GHG Thresholds	
TACs	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic & Acute Hazard Index > 1.0 (project increment)
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402
GHG	10,000 MT/yr CO2e for industrial land uses

Ambient Air Quality Standards	
Pollutant	SCAQMD Standards
NO2 -1-hour average	0.18 ppm (338 µg/m^3)
PM10 -24-hour average Construction Operations	 10.4 µg/m^3 2.5 ug/m^3
PM2.5 -24-hour average Construction Operations	 10.4 µg/m^3 2.5 µg/m^3
SO2 1-hour average 24-hour average	 0.25 ppm 0.04 ppm
CO 1-hour average 8-hour average	 20 ppm (23,000 µg/m^3) 9 ppm (10,000 µg/m^3)
Lead 30-day average Rolling 3-month average Quarterly average	 1.5 µg/m^3 0.15 µg/m^3 1.5 µg/m^3

[1] Source: http://www.aqmd.gov/ceqa/handbook/signthres.pdf

VI. SHORT-TERM CONSTRUCTION IMPACTS

Construction activities associated with the proposed project would have the potential to generate air emissions, toxic air contaminant emissions, and odor impacts. Assumptions for the phasing, duration, and required equipment for the construction of the proposed project were obtained from the project applicant. The construction activities for the proposed project are anticipated to include: demolition of approximately 20,000 square feet of existing buildings, site preparation of approximately 7.63 acres to remove existing pavement, grading of approximately 8.09 acres, building construction of a 174,745 square foot warehouse and landscaping of 36,312 square feet, paving of a parking lot with 119 standard parking spaces and 33 trailer parking spaces, and application of architectural coatings.

The proposed project is anticipated to start construction no sooner than the beginning of April 2019 and take approximately 8 months to complete. The project is anticipated to be operational in 2020.

A. Construction-Related Regional Impacts

The construction-related regional air quality impacts have been analyzed for both criteria pollutants and GHGs.

1. Construction-Related Criteria Pollutants Analysis

The following provides a discussion of the methodology used to calculate regional construction air emissions and an analysis of the proposed project's short-term construction emissions for the criteria pollutants.

Methodology

Typical emission rates from construction activities were obtained from CalEEMod Version 2016.3.2. CalEEMod is a computer model published by the SCAQMD for estimating air pollutant emissions. The CalEEMod program uses the EMFAC2014 computer program to calculate the emission rates specific for the eastern portion of Riverside County for construction-related employee vehicle trips and the OFFROAD2014 computer program to calculate emission rates for heavy truck operations. EMFAC2014 and OFFROAD2014 are computer programs generated by CARB that calculates composite emission rates for vehicles. Emission rates are reported by the program in grams per trip and grams per mile or grams per running hour. Using CalEEMod, the peak daily air pollutant emissions during each phase was calculated and presented below. These emissions represent the highest level of emissions for each of the construction phases in terms of air pollutant emissions. The daily construction emissions printouts from CalEEMod are provided in Appendix B.

SCAQMD's Rule 403

The project will be required to comply with existing SCAQMD rules for the reduction of fugitive dust emissions. SCAQMD Rule 403 establishes these procedures. Compliance with this rule is achieved through application of standard best management practices in construction and operation activities, such as application of

water or chemical stabilizers to disturbed soils, managing haul road dust by application of water, covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 mph, sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph and establishing a permanent and stabilizing ground cover on finished sites. In addition, projects that disturb 50 acres or more of soil or move 5,000 cubic yards of materials per day are required to submit a Fugitive Dust Control Plan or a Large Operation Notification Form to SCAQMD. The total project area is approximately 8.09 acres. Therefore, a Fugitive Dust Control Plan or Large Operation Notification would not be required.

SCAQMD's Rule 403 minimum requirements require that the application of the best available dust control measures are used for all grading operations and include the application of water or other soil stabilizers in sufficient quantity to prevent the generation of visible dust plumes. Compliance with Rule 403 would require the use of water trucks during all phases where earth moving operations would occur.

The phases of the construction activities which have been analyzed below for each phase are: (1) demolition, (2) grading, (3) building construction, (4) paving, and (5) application of architectural coatings. Details pertaining to the project's construction timing and the type of equipment modeled for each construction phase are available in the CalEEMod output in Appendix B.

Project Impacts

The construction-related criteria pollutant emissions for each phase are shown below in Table 7. Table 7 shows that none of the project's emissions will exceed regional thresholds. Therefore, a less than significant regional air quality impact would occur from construction of the proposed project.

B. Construction-Related Local Impacts

Construction-related air emissions may have the potential to exceed the State and Federal air quality standards in the project vicinity, even though these pollutant emissions may not be significant enough to create a regional impact to the South Coast Air Basin. The proposed project has been analyzed for the potential local air quality impacts created from: construction-related fugitive dust and diesel emissions; from toxic air contaminants; and from construction-related odor impacts.

1. Local Air Quality Impacts from Construction

The SCAQMD has published a "Fact Sheet for Applying CalEEMod to Localized Significance Thresholds" (South Coast Air Quality Management District 2011b). CalEEMod calculates construction emissions based on the number of equipment hours and the maximum daily disturbance activity possible for each piece of equipment. In order to compare CalEEMod reported emissions against the localized significance threshold lookup tables, the CEQA document should contain in its project design features or its mitigation measures the following parameters:

(1) The off-road equipment list (including type of equipment, horsepower, and hours of operation) assumed for the day of construction activity with maximum emissions.
(2) The maximum number of acres disturbed on the peak day.
(3) Any emission control devices added onto off-road equipment.
(4) Specific dust suppression techniques used on the day of construction activity with maximum emissions.

The CalEEMod output in Appendix B shows the equipment used for this analysis.

As shown in Table 8, the maximum number of acres disturbed in a day would be 3.5 acres during site preparation.

The local air quality emissions from construction were analyzed using the SCAQMD's Mass Rate Localized Significant Threshold Look-up Tables and the methodology described in Localized Significance Threshold Methodology prepared by SCAQMD (revised July 2008). The Look-up Tables were developed by the SCAQMD in order to readily determine if the daily emissions of CO, NOx, PM10, and PM2.5 from the proposed project could result in a significant impact to the local air quality. The emission thresholds were calculated based on the Southwest San Bernardino Valley source receptor area (SRA) 33 and a disturbance value of 3.5 acres per day. Significance threshold for the disturbance value of 3.5 acres interpolated from the 2 acre and 5 acre thresholds. According to LST Methodology, any receptor located closer than 25 meters (82 feet) shall be based on the 25 meter thresholds. The nearest sensitive receptors are the single-family detached residential dwelling units located approximately 50 feet (15 meters) east of the project site; therefore, to be conservative, the SCAQMD Look-up Tables for 25 meters was used. Table 9 details the on-site emissions from the CalEEMod model for the different construction phases and the calculated emissions thresholds.

The data provided in Table 9 shows that none of the analyzed criteria pollutants would exceed the SCAQMD's local emissions thresholds at the nearest sensitive receptors. Therefore, a less than significant local air quality impact would occur from construction of the proposed project.

2. Construction-Related Toxic Air Contaminant Impacts

The greatest potential for toxic air contaminant emissions would be related to diesel particulate emissions associated with heavy equipment operations during construction of the proposed project. According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of "individual cancer risk". "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 30-year lifetime will contract cancer, based on the use of standard risk-assessment methodology. Given the relatively limited number of heavy-duty construction equipment and the short-term construction schedule, the proposed project would not result in a long-term (i.e., 30 years) substantial source of toxic air contaminant emissions and corresponding individual cancer risk. Furthermore, construction-based particulate matter (PM)

emissions (including diesel exhaust emissions) do not exceed any local or regional thresholds. Therefore, no significant short-term toxic air contaminant impacts would occur during construction of the proposed project.

3. Construction-Related Odor Impacts

Potential sources that may emit odors during construction activities include the application of materials such as asphalt pavement and diesel exhaust emissions. The objectionable odors that may be produced during the construction process are of short-term in nature and the odor emissions are expected cease upon the drying or hardening of the odor producing materials. Diesel exhaust and VOCs would be emitted during construction of the project, which are objectionable to some; however, emissions would disperse rapidly from the project site and therefore should not reach an objectionable level at the nearest sensitive receptors. Due to the short-term nature and limited amounts of odor producing materials being utilized, no significant impact related to odors would occur during construction of the proposed project.

Table 7

Construction-Related Regional Pollutant Emissions[1]

Activity	Pollutant Emissions (pounds/day)					
	ROG	NOx	CO	SO_2	PM10	PM2.5
Demolition						
On-Site	3.51	35.78	22.06	0.04	2.43	1.77
Off-Site	0.14	2.08	1.04	0.01	0.31	0.09
Total	**3.66**	**37.86**	**23.10**	**0.05**	**2.74**	**1.86**
Site Preparation						
On-Site	4.34	45.57	22.06	0.04	9.96	6.13
Off-Site	0.11	0.07	0.90	0.00	0.20	0.05
Total	**4.44**	**45.65**	**22.96**	**0.04**	**10.16**	**6.18**
Grading						
On-Site[2]	2.58	28.35	16.29	0.03	4.02	2.61
Off-Site[3]	0.09	0.06	0.75	0.00	0.17	0.05
Total	**2.67**	**28.41**	**17.04**	**0.03**	**4.19**	**2.65**
Building Construction						
On-Site	2.36	21.08	17.16	0.03	1.29	1.21
Off-Site	0.84	5.63	6.74	0.03	1.60	0.46
Total	**3.21**	**26.71**	**23.90**	**0.05**	**2.89**	**1.67**
Paving						
On-Site	2.16	15.24	14.66	0.02	0.82	0.76
Off-Site	0.09	0.06	0.75	0.00	0.17	0.05
Total	**2.25**	**15.31**	**15.41**	**0.02**	**0.99**	**0.80**
Architectural Coating						
On-Site	64.65	1.84	1.84	0.00	0.13	0.13
Off-Site	0.14	0.10	1.15	0.00	0.26	0.07
Total	**64.79**	**1.93**	**2.99**	**0.01**	**0.39**	**0.20**
Total for overlapping phases[4]	**70.24**	**43.95**	**42.30**	**0.08**	**4.27**	**2.68**
SCAQMD Thresholds	**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Thresholds	No	No	No	No	No	No

[1] Source: CalEEMod Version 2016.3.2

[2] On-site emissions from equipment operated on-site that is not operated on public roads.

[3] Off-site emissions from equipment operated on public roads.

[4] Construction, paving and painting phases may overlap.

Table 8

Maximum Number of Acres Disturbed Per Day[1]

Activity	Equipment	Number	Acres/8hr-day	Total Acres
Demolition	Excavators	3	0.5	1.5
	Rubber Tired Dozers	2	0.5	1
Total per phase		-	-	**2.5**
Site Preparation	Rubber Tired Dozers	3	0.5	1.5
	Tractors/Loaders/Backhoes	4	0.5	2
Total per phase		-	-	**3.5**
Grading	Excavators	1	0.5	0.5
	Graders	1	0.5	0.5
	Rubber Tired Dozers	1	0.5	0.5
	Tractors/Loaders/Backhoes	3	0.5	1.5
Total per phase		-	-	**3**

[1] Source: South Coast AQMD, Fact Sheet for Applying CalEEMod to Localized Significance Thresholds, 2011b.

Table 9

Local Construction Emissions at the Nearest Receptor[1]

Phase	On-Site Pollutant Emissions (pounds/day)			
	NOx	CO	PM10	PM2.5
Demolition	35.78	22.06	2.43	1.77
Site Preparation	45.57	22.06	9.96	6.13
Grading	28.35	16.29	4.02	2.61
Building Construction	21.08	17.16	1.29	1.21
Paving	15.24	14.66	0.82	0.76
Architectural Coating	1.84	1.84	0.13	0.13
SCAQMD Threshold for 25 meters[2,3]	**220**	**1,713**	**11**	**7**
Exceeds Threshold?	No	No	No	No

[1] Source: Calculated from CalEEMod and SCAQMD's Mass Rate Look-up Tables for 3.5 acres in SRA 33 Southwest San Bernardino Valley.

[2] The nearest sensitive receptors to the proposed project are located approximately 50 feet east (15 meters); therefore, the 25 meter threshold was use

[3] Significance Threshold for 3.5 acres interpolated from the 2 acre and 5 acre thresholds.

VII. LONG-TERM AIR QUALITY OPERATIONAL IMPACTS

The on-going operation of the proposed project would result in a long-term increase in air quality emissions. This increase would be due to emissions from the project-generated vehicle trips and through operational emissions from the on-going use of the proposed project. The following section provides an analysis of potential long-term air quality impacts due to: regional air quality and local air quality impacts with the on-going operations of the proposed project.

A. Operations-Related Regional Air Quality Impacts

The potential operations-related air emissions have been analyzed below for the criteria pollutants and cumulative impacts.

1. Operations-Related Criteria Pollutant Analysis

The operations-related criteria air quality impacts created by the proposed project have been analyzed through use of the CalEEMod model. The operating emissions were based on the anticipated opening year of 2020. The operations daily emissions printouts from the CalEEMod model are provided in Appendix B. The CalEEMod analyzes operational emissions from area sources, energy usage, and mobile sources, which are discussed below.

Mobile Sources

Mobile sources include emissions from the additional vehicle miles generated from the proposed project. The vehicle trips associated with the proposed project have been analyzed by inputting the project-generated vehicular trips from the 8th Street and Hellman Avenue Warehousing Project (Traffic Impact Analysis) prepared by Kunzman Associates, Inc. (April 2018) into the CalEEMod Model. The Traffic Impact Analysis found that the proposed project will generate 304 total daily vehicle trips. The resulting trip generation rate is 1.74 trips per thousand square feet per day. The program then applies the emission factors for each trip which is provided by the EMFAC2014 model to determine the vehicular traffic pollutant emissions.

The Traffic Impact Analysis found that the proposed warehousing use would create 242 automobile round trips, 11 2-axle truck round trips, 14 3-axle truck round trips, and 37 4+-axle truck round trips per day (non-PCE). The vehicle mix was changed in CalEEMod to match the Traffic Impact Analysis (see Table 10) and the percentages in CalEEMod were changed to 79.57% autos (C-NW) and 20.43% trucks (C-W) to match the overall vehicle percentages given in the Traffic Impact Analysis.

Area Sources

Area sources include emissions from hearths, consumer products, landscape equipment and architectural coatings. Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers, as well as air compressors, generators, and pumps. No changes were made to the CalEEMod default area source parameters.

Energy Usage

Energy usage includes emissions from the generation of electricity and natural gas used on-site. No changes were made to the CalEEMod default energy usage parameters.

Project Impacts

The worst-case summer or winter VOC, NOx, CO, SO_2, PM10, and PM2.5 emissions generated by the proposed project's long-term operations have been calculated and are summarized below in Table 11. Table 11 shows that none of the analyzed criteria pollutants would exceed the regional emissions thresholds. Therefore, a less than significant regional air quality impact would occur from operation of the proposed project.

2. Cumulative Regional Air Quality Impacts

Cumulative projects include local development as well as general growth within the project area. However, as with most development, the greatest source of emissions is from mobile sources, which travel well out of the local area. Therefore, from an air quality standpoint, the cumulative analysis would extend beyond any local projects and when wind patterns are considered, would cover an even larger area. Accordingly, the cumulative analysis for the project's air quality must be generic by nature.

The project area is out of attainment for both ozone and PM10 particulate matter. Construction and operation of cumulative projects will further degrade the local air quality, as well as the air quality of the South Coast Air Basin. The greatest cumulative impact on the quality of regional air cell will be the incremental addition of pollutants mainly from increased traffic volumes from residential, commercial, and industrial development and the use of heavy equipment and trucks associated with the construction of these projects. Air quality will be temporarily degraded during construction activities that occur separately or simultaneously. However, in accordance with the SCAQMD methodology, projects that do not exceed the SCAQMD criteria or can be mitigated to less than criteria levels are not significant and do not add to the overall cumulative impact. With respect to long-term emissions, this project would create a less than significant cumulative impact.

B. Operations-Related Local Air Quality Impacts

Project-related air emissions may have the potential to exceed the State and Federal air quality standards in the project vicinity, even though these pollutant emissions may not be significant enough to create a regional impact to the South Coast Air Basin. The proposed project has been analyzed for the potential local CO emission impacts from the project-generated vehicular trips and from the potential local air quality impacts from on-site operations. The following analysis analyzes the vehicular CO emissions, local impacts from on-site operations, and odor impacts.

1. Local CO Emission Impacts from Project-Generated Vehicular Trips

CO is the pollutant of major concern along roadways because the most notable source of CO is motor vehicles. For this reason, CO concentrations are usually indicative of the local air quality generated by a roadway network and are used as an indicator of potential local air quality impacts. Local air quality impacts can be assessed by comparing future without and with project CO levels to the State and Federal CO standards which were presented in above in Section V.

To determine if the proposed project could cause emission levels in excess of the CO standards discussed above in Section V, a sensitivity analysis is typically conducted to determine the potential for CO "hot spots" at a number of intersections in the general project vicinity. Because of reduced speeds and vehicle queuing, "hot spots" potentially can occur at high traffic volume intersections with a Level of Service E or worse.

The analysis prepared for CO attainment in the South Coast Air Basin by the SCAQMD can be used to assist in evaluating the potential for CO exceedances in the South Coast Air Basin. CO attainment was thoroughly analyzed as part of the SCAQMD's 2003 Air Quality Management Plan (2003 AQMP) and the 1992 Federal Attainment Plan for Carbon Monoxide (1992 CO Plan). As discussed in the 1992 CO Plan, peak carbon monoxide concentrations in the South Coast Air Basin are due to unusual meteorological and topographical conditions, and not due to the impact of particular intersections. Considering the region's unique meteorological conditions and the increasingly stringent CO emissions standards, CO modeling was performed as part of 1992 CO Plan and subsequent plan updates and air quality management plans. In the 1992 CO Plan, a CO hot spot analysis was conducted for four busy intersections in Los Angeles at the peak morning and afternoon time periods. The intersections evaluated included: South Long Beach Boulevard and Imperial Highway (Lynwood); Wilshire Boulevard and Veteran Avenue (Westwood); Sunset Boulevard and Highland Avenue (Hollywood); and La Cienega Boulevard and Century Boulevard (Inglewood). These analyses did not predict a violation of CO standards. The busiest intersection evaluated was that at Wilshire Boulevard and Veteran Avenue, which has a daily traffic volume of approximately 100,000 vehicles per day. The Los Angeles County Metropolitan Transportation Authority evaluated the Level of Service in the vicinity of the Wilshire Boulevard/Veteran Avenue intersection and found it to be Level of Service E during the morning peak hour and Level of Service F during the afternoon peak hour.

The Traffic Impact Analysis showed that the project would only generate a maximum of 304 daily vehicle trips. The intersection with the highest peak hour volume is located at Archibald Avenue and 8th Street and has a volume of 1,545 trips for the Horizon Year (2040) With Project Evening Peak Hour scenario. The 1992 Federal Attainment Plan for Carbon Monoxide (1992 CO Plan) showed that an intersection which has a daily traffic volume of approximately 100,000 vehicles per day would not violate the CO standard. Therefore, as the intersection with the highest traffic volume falls far short of 100,000 vehicles, no CO "hot spot" modeling was performed and no

significant long-term air quality impact is anticipated to local air quality with the on-going use of the proposed project.

2. Local Air Quality Impacts from On-Site Operations

Project-related air emissions from on-site sources such as architectural coatings, landscaping equipment, on-site usage of natural gas appliances as well as the operation of vehicles on-site may have the potential to exceed the State and Federal air quality standards in the project vicinity, even though these pollutant emissions may not be significant enough to create a regional impact to the South Coast Air Basin. The nearest sensitive receptors that may be impacted by the proposed project include the single-family detached residential dwelling units located approximately 50 feet east of the project site (across Hellman Avenue). In addition, multi-family attached residential dwelling units are located approximately 685 feet south and single-family detached residential dwelling units are located approximately 710 feet southeast and southwest of the project site.

The local air quality emissions from on-site operations were analyzed according to the methodology described in Localized Significance Threshold Methodology prepared by SCAQMD (revised July 2008). The Look-up Tables were developed by the SCAQMD in order to readily determine if the daily emissions of CO, NOx, PM10, and PM2.5 from the proposed project could result in a significant impact to the local air quality. Per SCAQMD staff, the 5-acre Look-up Table, which is the largest site available, can be used as a conservative screening analysis for on-site operational emissions to determine whether more-detailed dispersion modeling would be necessary. The proposed project was analyzed based on the Southwest San Bernardino Valley source receptor area (SRA 33) and used the thresholds for a five-acre project site (as the site is approximately 8.09 acres).

Table 12 shows the on-site emissions from the CalEEMod model that includes natural gas usage, landscape maintenance equipment, vehicles operating on-site, and the emissions thresholds. Per LST methodology, mobile emissions include on-site vehicles, which equates to approximately 10 percent of the project-related mobile sources[3]. The data provided in Table 12 shows that the on-going operations of the proposed project would not exceed the local NOx, CO, PM10 and PM2.5 thresholds of significance discussed above in Section V. Therefore, the proposed project would create a less than significant operations-related impact to local air quality due to on-site emissions and no mitigation would be required.

3. Operations-Related Odor Impacts

Potential sources that may emit odors during the on-going operations of the proposed project would include odor emissions from trash storage areas. Due to the

[3] The project site is approximately 0.16 miles in length at its longest point; therefore the on-site mobile source emissions represent approximately 1/43rd of the shortest CalEEMod default distance of 6.9 miles. To be conservative, 1/10th the distance (dividing the mobile source emissions by 10) was used to represent the portion of the overall mobile source emissions that would occur on-site.

distance of the nearest receptors from the proposed trash storage areas and through compliance with SCAQMD's Rule 402 no significant impact related to odors would occur during the on-going operations of the proposed project.

Table 10

CalEEMod Revised Vehicle Mix Parameters for Warehouse Uses

CalEEMod Vehicle Type	Vehicle Mix from Traffic Analysis	CalEEMod Default Mix[1]		CalEEMod Revised Mix[2]	
		Ratio	Number of Vehicles	Ratio	Number of Vehicles
Light Auto	Automobile	0.546	166	0.487	148
Light Truck < 3750 lbs	Automobile	0.038	12	0.034	10
Light Truck 3751-5750 lbs	Automobile	0.179	54	0.160	49
Med Truck 5751-8500 lbs	Automobile	0.123	37	0.110	33
Lite-Heavy Truck 8501-10,000 lbs	2-Axle Truck	0.018	6	0.027	8
Lite-Heavy Truck 10,001-14,000 lbs	2-Axle Truck	0.005	2	0.008	2
Med-Heavy Truck 14,001-33,000 lbs	3-Axle Truck	0.017	5	0.046	14
Heavy-Heavy Truck 33,001-60,000 lbs	4+-Axle Truck	0.061	19	0.123	37
Other Bus	--	0.001	0	0.000	0
Urban Bus	--	0.002	1	0.000	0
Motorcycle	Automobile	0.006	2	0.005	2
School Bus	--	0.001	0	0.000	0
Motor Home	--	0.001	0	0.000	0
Total		**1.0**	**304**	**1.0**	**304**

[1] Source: CalEEMod Version 2016.3.2 default values for Opening year of 2020.

[2] Revised per the vehicle mix provided in the Traffic Impact Analysis of 79.57% Autos, 3.46% 2-Axle Trucks, 4.64% 3-Axle Trucks and 12.33% 4+ Axle

Table 11

Operational Regional Pollutant Emissions[1]

Activity	Pollutant Emissions (pounds/day)					
	ROGs	NOx	CO	SO2	PM10	PM2.5
Area Sources[2]	3.95	0.00	0.04	0.00	0.00	0.00
Energy Usage[3]	0.01	0.10	0.08	0.00	0.01	0.01
Mobile Sources[4]	0.74	8.01	7.85	0.04	2.02	0.57
Total Emissions	**4.70**	**8.11**	**7.97**	**0.04**	**2.03**	**0.57**
SCAQMD Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Threshold?	No	No	No	No	No	No

[1] Source: CalEEMod Version 2016.3.2

[2] Area sources consist of emissions from consumer products, architectural coatings, hearths and landscaping equipment.

[3] Energy usage consists of emissions from generation of electricity and on-site non-hearth natural gas usage.

[4] Mobile sources consist of emissions from vehicles and road dust.

Table 12

Local Operational Emissions at the Nearest Receptors[1]

On-Site Emission Source	On-Site Pollutant Emissions (pounds/day)			
	NOx	CO	PM10	PM2.5
Area Sources[2]	0.00	0.04	0.00	0.00
Energy Usage[3]	0.10	0.08	0.01	0.01
Vehicle Emissions[4]	0.80	0.79	0.20	0.01
Total Emissions	**0.90**	**0.90**	**0.21**	**0.01**
SCAQMD Thresholds[5]	**270**	**2,193**	**4**	**2**
Exceeds Threshold?	No	No	No	No

[1] Source: Calculated from CalEEMod and SCAQMD's Mass Rate Look-up Tables for five acres in Southwest San Bernardino Valley (SRA 33).

[2] Area sources consist of emissions from consumer products, architectural coatings, and landscaping equipment.

[3] Energy usage consists of emissions from on-site natural gas usage.

[4] Per LST methodology, mobile source emissions do not need to be included except for land use emissions and on-site vehicle emissions. It is estimated that approximately 10% of mobile emissions will occur on the project site.

[5] The nearest sensitive receptors are the single-family detached resdiential dwelling units located approximately 50 feet (~15 meters) east of proposed project; therefore, the 25 meter threshold was used.

VIII. DIESEL EMISSIONS HEALTH RISK ASSESSMENT

The on-going operation of the proposed project would generate toxic air contaminant (TAC) emissions from diesel truck emissions created by the on-going operations of the proposed project. According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 30-year lifetime will contract cancer, based on the use of revised Office of Environmental Health Hazard Assessment (OEHHA) risk-assessment methodology[4]. The 2015 OEHHA guidance states that "Districts are to determine which facilities will prepare an HRA based on a prioritization process outlined in the law. The process by which Districts identify priority facilities for risk assessment involves consideration of potency, toxicity, quantity of emissions, and proximity to sensitive receptors such as hospitals, daycare centers, schools, work-sites, and residences." The Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis prepared by SCAQMD (August 2003) defers to CARB (State) guidance for "technical guidance for diesel toxic impact analyses for various source categories."

The California Air Pollution Control Officers Association (CAPCOA) has developed TAC health risk assessment guidelines to provide consistent, statewide procedures for preparing the health risk assessments required under the Air Toxics "Hot Spots" Act. The title of these guidelines is CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines. The District recommends that lead agencies conduct TAC risk assessments in accordance with the CAPCOA Risk Assessment Guidelines, as supplemented by the District's supplemental guidelines. According to SCAQMD and CAPCOA guidelines, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 30-year lifetime will contract cancer, based on the use of standard risk-assessment methodology.

The nearest sensitive receptors to the project site include the single-family detached residential dwelling units located approximately 50 feet east of the project site (across Hellman Avenue). In addition, multi-family attached residential dwelling units are located approximately 685 feet south and single-family detached residential dwelling units are located approximately 710 feet southeast and southwest of the project site.

The most recent Health Risk Assessment for Proposed Land Use Projects prepared by CAPCOA (July 2009) recommends avoiding siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units (TRUs) per day, or where TRU unit operations exceed 300 hours per week). A summary of the basis for the distance recommendations can be found in the ARB Handbook *Air Quality and Land Use Handbook: A Community Health Perspective*.

[4] In February 2015, the Office of Environmental Health Hazard Assessment updated their "Air Toxics Hot Spots Program, Risk Assessments Guidelines, Guidance Manual for Preparation of Health Risk Assessments; however, the updated OEHHA guidance states in the page footers "do not cite or quote." SCAQMD staff have incorporated the updates into their methodology for SCAQMD's Rules 1401, 1401.1, 1402, and 212, and have updated their HRA Guidance for permitting; however they are still in the process of updating the guidance for CEQA analyses (via working group sessions).

As stated previously, the proposed warehouse use is anticipated to have approximately 62 truck trips per day per the Traffic Impact Analysis. None of these trucks are anticipated to have TRUs. Therefore, this project is not anticipated to accommodate more than 100 trucks per day and a quantitative health risk assessment for the proposed on-site warehouse use is not required.

Significant TAC impacts from the project-related operational DPM sources are not anticipated and no significant long-term operations-related TAC impacts from the proposed project to nearby sensitive receptors would occur.

IX. GLOBAL CLIMATE CHANGE ANALYSIS

The proposed project is anticipated to generate GHG emissions from area sources, energy usage, mobile sources, waste, water, and construction equipment. The following provides the methodology used to calculate the project-related GHG emissions, the project impacts and a consistency analysis of the proposed project with any applicable GHG reduction plans, policies or regulations.

A. Methodology

The CalEEMod Version 2016.3.2 was used to calculate the GHG emissions from the proposed project. The project's emissions were compared to the SCAQMD screening annual threshold of 10,000 $MTCO_2e$ for industrial land uses. As discussed previously, the Rancho Cucamonga Sustainable Community Action Plan was adopted in 2017; therefore, the project's GHG emissions have also been compared to the emission reduction goals in the Sustainable Community Action Plan.

The CalEEMod Annual Output for year 2020 is available in Appendix C. Each source of GHG emissions is described in greater detail below.

1. Area Sources

   Area sources include emissions from hearths, consumer products, landscape equipment and architectural coatings. No changes were made to the default area source parameters.

2. Energy Usage

   Energy usage includes emissions from the generation of electricity and natural gas used on-site. No changes were made to the CalEEMod default energy usage parameters.

3. Mobile Sources

   Mobile sources include emissions from the additional vehicle miles generated from the proposed project. The vehicle trips associated with the proposed project have been analyzed as described above in Section VII. The program then applies the emission factors for each trip which is provided by the EMFAC2014 model to determine the vehicular traffic pollutant emissions.

4. Waste

   Waste includes the GHG emissions generated from the processing of waste from the proposed project as well as the GHG emissions from the waste once it is interred into a landfill. No changes were made to the default waste parameters.

5. Water

Water includes the water used for the interior of the building as well as for landscaping and is based on the GHG emissions associated with the energy used to transport and filter the water. No changes were made to the default water parameters.

6. Construction

The construction-related GHG emissions were also included in the analysis and were based on a 30 year amortization rate as recommended in the SCAQMD GHG Working Group meeting on November 19, 2009. The construction-related GHG emissions were calculated by CalEEMod and detailed above in Section VI.

7. Sequestration

The analysis includes reduction of GHG emissions from the planting of 112 new trees The California Air Pollution Control Officers Association (CAPCOA) states that trees sequester carbon dioxide over 20 years of their life, after that, sequestration is nominal and outweighed by tree maintenance-related emissions. The total sequestration value given in the Annual CalEEMod output (see Appendix C) was divided by 20 years to yield an annual value, which was then subtracted from the project's emissions.

B. Project Greenhouse Gas Emissions

The GHG emissions have been calculated based on the parameters described above for opening year 2020. A summary of the project's emissions are shown below in Table 13 and the CalEEMod Model runs for all modeled years are provided in Appendix C. Table 13 shows that the proposed project's emissions would be approximately 1,052.70 metric tons of CO_2e per year. According to the thresholds of significance established above in Section V above, a cumulative global climate change impact would potentially occur if the GHG emissions created from the on-going operations would exceed the SCAQMD screening annual threshold of 10,000 metric tons per year of CO_2e for industrial land uses. Therefore, operation of the proposed project would not create a significant cumulative impact to global climate change.

C. Greenhouse Gas Plan Consistency

The proposed project would have the potential to conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases. The applicable plan for the proposed project is the Rancho Cucamonga Sustainable Community Action Plan. The Sustainable Community Action Plan identifies the below GHG reduction targets and goals:

- Reduce emissions to 1990 levels by 2020 (equivalent to 15 percent below 2008 baseline levels), consistent with AB 32

- Reduce emissions to 40 percent below 1990 levels by 2030 (equivalent to 49 percent below 2008 baseline levels), consistent with E.O. B-30-15 and SB 32
- Reduce emissions to 80 percent below 1990 levels by 2050 (equivalent to 83 percent below 2008 baseline levels), consistent with E.O. S-3-05.

With similar goals as the Rancho Cucamonga Sustainable Community Action Plan, the SCAQMD also used Executive Order S-3-05 goal as the basis for deriving their screening level thresholds which established the following reduction targets:

- 2010: Reduce greenhouse gas emissions to 2000 levels
- 2020: Reduce greenhouse gas emissions to 1990 levels
- 2050: Reduce greenhouse gas emissions to 80 percent below 1990 levels.

Therefore, as the project's emissions do not exceed the SCAQMD screening annual threshold of 10,000 $MTCO_2e$ for industrial land uses, the project is also in line with the reduction goals specified in Rancho Cucamonga Sustainable Community Action Plan.

SB-32

SB-32 requires the state board to ensure that statewide greenhouse gas emissions are reduced to 40% below the 1990 level by 2030. SCAQMD's thresholds used Executive Order S-3-05 goal as the basis for deriving the screening level. The California Governor issued Executive Order S-3-05, GHG Emission, in June 2005, which established the reduction targets as stated above.

As the SCAQMD uses EO S-3-05 as the basis for their screening level, and EO S-3-05 includes the long-term goal to reduce greenhouse gas emissions to 80 percent below 1990 levels by 2050, the project would also be consistent with the goal of SB 32 (to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030). Therefore, projects that meet the current interim emissions targets/thresholds established by SCAQMD (as described in Section V, Air Quality Standards) would also be on track to meet the reduction targets for 2030. Furthermore, all of the post 2020 reductions in GHG emissions are addressed via regulatory requirements at the State level and the project will be required to comply with these regulations as they come into effect.

Therefore, as the project is in compliance with the goals of the Rancho Cucamonga Sustainable Community Action Plan and is on track to meet the goals of SB-32, the project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases. Furthermore, the project will comply with applicable Green Building Standards and City of Rancho Cucamonga's policies regarding sustainability (as dictated by the City's General Plan). Impacts are considered to be less than significant.

Table 13

Project-Related Greenhouse Gas Emissions[1]

Category	Greenhouse Gas Emissions (Metric Tons/Year)					
	Bio-CO2	NonBio-CO_2	CO_2	CH_4	N_2O	CO_2e
Area Sources[2]	0.00	0.01	0.01	0.00	0.00	0.01
Energy Usage[3]	0.00	157.11	157.11	0.01	0.00	157.72
Mobile Sources[4]	0.00	578.97	578.97	0.03	0.00	579.79
Solid Waste[5]	33.34	0.00	33.34	1.97	0.00	82.61
Water[6]	12.82	167.66	180.48	1.32	0.03	223.26
Construction[7]	0.00	13.22	13.22	0.00	0.00	13.28
Sequestration[8]						-3.96
Total Emissions	46.16	916.97	963.13	3.34	0.03	**1,052.70**
SCAQMD Industrial Threshold						**10,000**
Exceeds Threshold?						**No**

[1] Source: CalEEMod Version 2016.3.2

[2] Area sources consist of GHG emissions from consumer products, architectural coatings, and landscape equipment.

[3] Energy usage consist of GHG emissions from electricity and natural gas usage.

[4] Mobile sources consist of GHG emissions from vehicles.

[5] Solid waste includes the CO_2 and CH_4 emissions created from the solid waste placed in landfills.

[6] Water includes GHG emissions from electricity used for transport of water and processing of wastewater.

[7] Construction GHG emissions CO2e based on a 30 year amortization rate.

[8] CO2 sequestration from the planting of ~112 new trees (79.2960/20 years [trees' lifetime]).

X. AIR QUALITY COMPLIANCE

The California Environmental Quality Act (CEQA) requires a discussion of any inconsistencies between a proposed project and applicable General Plans and Regional Plans (CEQA Guidelines Section 15125). The regional plan that applies to the proposed project includes the SCAQMD Air Quality Management Plan (AQMP). Therefore, this section discusses any potential inconsistencies of the proposed project with the AQMP.

The purpose of this discussion is to set forth the issues regarding consistency with the assumptions and objectives of the AQMP and discuss whether the proposed project would interfere with the region's ability to comply with Federal and State air quality standards. If the decision-makers determine that the proposed project is inconsistent, the lead agency may consider project modifications or inclusion of mitigation to eliminate the inconsistency.

The SCAQMD CEQA Handbook states that "New or amended General Plan Elements (including land use zoning and density amendments), Specific Plans, and significant projects must be analyzed for consistency with the AQMP." Strict consistency with all aspects of the plan is usually not required. A proposed project should be considered to be consistent with the AQMP if it furthers one or more policies and does not obstruct other policies. The SCAQMD CEQA Handbook identifies two key indicators of consistency:

(1) Whether the project will result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.
(2) Whether the project will exceed the assumptions in the AQMP in 2016 or increments based on the year of project buildout and phase.

Both of these criteria are evaluated in the following sections.

A. Criterion 1 - Increase in the Frequency or Severity of Violations

Based on the air quality modeling analysis contained in this Air Analysis, the short-term construction impacts will not result in significant impacts based on the SCAQMD regional and local thresholds of significance. This Air Analysis also found that long-term operations impacts will not result in significant impacts based on the SCAQMD regional and local thresholds of significance.

Therefore, the proposed project is not anticipated to contribute to the exceedance of any air pollutant concentration standards and is found to be consistent with the AQMP for the first criterion.

B. Criterion 2 - Exceed Assumptions in the AQMP?

Consistency with the AQMP assumptions is determined by performing an analysis of the proposed project with the assumptions in the AQMP. The emphasis of this criterion is to insure that the analyses conducted for the proposed project are based on the same forecasts as the AQMP. The 2016-2040 Regional Transportation/Sustainable Communities

Strategy prepared by SCAG (2016) includes chapters on: the challenges in a changing region, creating a plan for our future, and the road to greater mobility and sustainable growth. These chapters currently respond directly to federal and state requirements placed on SCAG. Local governments are required to use these as the basis of their plans for purposes of consistency with applicable regional plans under CEQA. For this project, the City of Rancho Cucamonga General Plan defines the assumptions that are represented in the AQMP.

The project site is currently designated as General Industrial (0.50-0.60 FAR) in the City of Rancho Cucamonga General Plan. The proposed project is the development of the project site with warehouse land uses. Therefore, the proposed project includes industrial uses and, it would not exceed the AQMP assumptions for the project site and is found to be consistent with the AQMP for the second criterion.

Based on the above, the proposed project would not conflict with the implementation of the SCAQMD AQMP. Therefore, impacts are considered to be less than significant impact.

XI. MITIGATION MEASURES

A. Construction Measures

The project is required to comply with SCAQMD Rule 403 - Fugitive Dust.

No construction mitigation is required.

B. Operational Measures

No operational mitigation is required.

XII. REFERENCES

California Air Resources Board

2008 Resolution 08-43

2008 Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act

2008 Climate Change Scoping Plan, a framework for change.

2011 Supplement to the AB 32 Scoping Plan Functional Equivalent Document

2013 Almanac of Emissions and Air Quality. Source: https://www.arb.ca.gov/aqd/almanac/almanac13/almanac13.htm

2014 First Update to the Climate Change Scoping Plan, Building on the Framework Pursuant to AB32, the California Global Warming Solutions Act of 2006. May.

2017 Historical Air Quality, Top 4 Summary

2017 California's 2017 Climate Change Scoping Plan. November.

City of Rancho Cucamonga

2010 Rancho Cucamonga General Plan. May 19.

2017 Rancho Cucamonga Sustainable Community Action Plan. April.

Governor's Office of Planning and Research

2008 CEQA and Climate: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review

2009 CEQA Guideline Sections to be Added or Amended

Intergovernmental Panel on Climate Change (IPCC).

2014 IPCC Fifth Assessment Report, Climate Change 2014: Synthesis Report

Kunzman Associates, Inc.

2018 8th Street and Hellman Avenue Warehousing Project Traffic Impact Analysis. April 17.

Office of Environmental Health Hazard Assessment

2015 Air Toxics Hot Spots Program Risk Assessment Guidelines

South Coast Air Quality Management District

1993 CEQA Air Quality Handbook

2005 Rule 403 Fugitive Dust

2007 2007 Air Quality Management Plan

2008 Final Localized Significance Threshold Methodology, Revised

2012 Final 2012 Air Quality Management Plan

2016 2016 Air Quality Management Plan

Southern California Association of Governments

2012 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy

U.S. Environmental Protection Agency (EPA)

2017 Understanding Global Warming Potentials (Source: https://www.epa.gov/ghgemissions/understanding-global-warming-potentials)

U.S. Geological Survey

2011 Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California

APPENDICES

Appendix A – Glossary of Terms

Appendix B – CalEEMod Model Daily Emissions Printouts

Appendix C – CalEEMod Model Annual Emissions Printouts

APPENDIX A

Glossary of Terms

AQMP	Air Quality Management Plan
BACT	Best Available Control Technologies
CAAQS	California Ambient Air Quality Standards
CalEPA	California Environmental Protection Agency
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCAR	California Climate Action Registry
CEQA	California Environmental Quality Act
CFCs	Chlorofluorocarbons
CH_4	Methane
CNG	Compressed natural gas
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DPM	Diesel particulate matter
EPA	U.S. Environmental Protection Agency
GHG	Greenhouse gas
GWP	Global warming potential
HIDPM	Hazard Index Diesel Particulate Matter
HFCs	Hydrofluorocarbons
IPCC	International Panel on Climate Change
LCFS	Low Carbon Fuel Standard
LST	Localized Significant Thresholds
$MTCO_2e$	Metric tons of carbon dioxide equivalent
$MMTCO_2e$	Million metric tons of carbon dioxide equivalent
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NOx	Nitrogen Oxides
NO_2	Nitrogen dioxide
N_2O	Nitrous oxide
O_3	Ozone
OPR	Governor's Office of Planning and Research
PFCs	Perfluorocarbons
PM	Particle matter
PM10	Particles that are less than 10 micrometers in diameter
PM2.5	Particles that are less than 2.5 micrometers in diameter
PMI	Point of maximum impact
PPM	Parts per million
PPB	Parts per billion
ROG	Reactive organic gases
RTIP	Regional Transportation Improvement Plan
RTP	Regional Transportation Plan
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments

SCAQMD	South Coast Air Quality Management District
SF_6	Sulfur hexafluoride
SIP	State Implementation Plan
SOx	Sulfur Oxides
TAC	Toxic air contaminants
VOC	Volatile organic compounds

APPENDIX B

CalEEMod Model Daily Emissions Printouts

7405b 8th Street & Hellman Ave

San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	174.75	1000sqft	4.01	174,750.00	0
Other Non-Asphalt Surfaces	36.31	1000sqft	0.83	36,312.00	0
Parking Lot	152.00	Space	3.25	60,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

7405b 8th Street & Hellman Ave - San Bernardino-South Coast County, Summer

Project Characteristics -

Land Use - Site is ~8.09 acres w/ a 174.745 TSF warehouse, 152 parking spaces (includes 119 standard parking stalls & 33 trailer parking stalls), 36,312 sf landscaping, & remainder (~1.88 acres as paving).

Construction Phase - Construction anticipated to start April 2019 and take approximately 8 months. Project is to be operational in 2020.

Demolition - Demolition of existing ~20,000 sf of buidlings.

Grading - Site is 8.09 acres and is to be balanced. ~7.63 acres of existing paving to be removed during site prep (as existing buildings cover the other ~0.46 acres).

Vehicle Trips - Per TIA, 1.74 trips/TSF/day & vehicle percentage changed to 79.6 autos (C-NW) & 20.4 trucks (C-W).

Sequestration - Per the landscape plan, ~112 trees to be planted on-site.

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation - Site is ~1.14 miles southwest of downtown portion of Rancho Cucamonga & ~0.37 miles east of Omnitrans Rte 80 stop Vineyard at 8th. 174,745sf /1,030 = ~170emp /8.09 ac = 20.97 emp/acre.

Water Mitigation - Per CalGreen Standards and water-efficient irrigation systems.

Waste Mitigation - AB 347 requires each jurisdiction in CA to divert at least 75% of their waste away from landfills by 2020.

Fleet Mix - Revised vehicle mix per TIA of 79.57% autos, 3.46% 2-axle trucks, 4.64% 3 axle trucks, & 12.33% 4+ axle trucks.

Architectural Coating - SCAQMD Rule 1113 limits architectural coatings to 50 g/L VOC. Emissions modeled at 50 g/L VOC for buildings and 100 g/L VOC for parking lot striping.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	12.00
tblConstructionPhase	NumDays	10.00	6.00
tblConstructionPhase	NumDays	20.00	12.00
tblConstructionPhase	NumDays	230.00	142.00
tblConstructionPhase	NumDays	20.00	12.00
tblConstructionPhase	NumDays	20.00	13.00
tblFleetMix	HHD	0.06	0.12
tblFleetMix	LDA	0.55	0.49

tblFleetMix	LDT1	0.04	0.03
tblFleetMix	LDT2	0.18	0.16
tblFleetMix	LHD1	0.02	0.03
tblFleetMix	LHD2	5.4600e-003	7.9080e-003
tblFleetMix	MCY	6.1170e-003	5.4550e-003
tblFleetMix	MDV	0.12	0.11
tblFleetMix	MH	1.0820e-003	0.00
tblFleetMix	MHD	0.02	0.05
tblFleetMix	OBUS	1.3370e-003	0.00
tblFleetMix	SBUS	8.1700e-004	0.00
tblFleetMix	UBUS	1.6570e-003	0.00
tblGrading	AcresOfGrading	6.00	8.09
tblGrading	AcresOfGrading	0.00	7.63
tblLandUse	LandUseSquareFeet	36,310.00	36,312.00
tblLandUse	LotAcreage	1.37	3.25
tblSequestration	NumberOfNewTrees	0.00	112.00
tblVehicleTrips	CNW_TTP	41.00	79.60
tblVehicleTrips	CW_TTP	59.00	20.40
tblVehicleTrips	ST_TR	1.68	1.74
tblVehicleTrips	SU_TR	1.68	1.74
tblVehicleTrips	WD_TR	1.68	1.74

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	64.7855	45.6437	23.9001	0.0526	19.6161	2.3917	22.0078	10.1297	2.2004	12.3300	0.0000	5,217.5090	5,217.5090	1.1987	0.0000	5,236.5982
Maximum	**64.7855**	**45.6437**	**23.9001**	**0.0526**	**19.6161**	**2.3917**	**22.0078**	**10.1297**	**2.2004**	**12.3300**	**0.0000**	**5,217.5090**	**5,217.5090**	**1.1987**	**0.0000**	**5,236.5982**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	64.7855	45.6437	23.9001	0.0526	7.7730	2.3917	10.1647	3.9831	2.2004	6.1835	0.0000	5,217.5090	5,217.5090	1.1987	0.0000	5,236.5982
Maximum	**64.7855**	**45.6437**	**23.9001**	**0.0526**	**7.7730**	**2.3917**	**10.1647**	**3.9831**	**2.2004**	**6.1835**	**0.0000**	**5,217.5090**	**5,217.5090**	**1.1987**	**0.0000**	**5,236.5982**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**60.37**	**0.00**	**53.81**	**60.68**	**0.00**	**49.85**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.9492	3.4000e-004	0.0373	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		0.0795	0.0795	2.1000e-004		0.0848
Energy	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3409	114.3409	2.1900e-003	2.1000e-003	115.0203
Mobile	0.7401	8.0127	7.8508	0.0358	1.9816	0.0360	2.0176	0.5329	0.0341	0.5669		3,678.3654	3,678.3654	0.1955		3,683.2535
Total	**4.6997**	**8.1083**	**7.9681**	**0.0364**	**1.9816**	**0.0433**	**2.0249**	**0.5329**	**0.0414**	**0.5743**		**3,792.7857**	**3,792.7857**	**0.1979**	**2.1000e-003**	**3,798.3586**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.9492	3.4000e-004	0.0373	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		0.0795	0.0795	2.1000e-004		0.0848
Energy	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3409	114.3409	2.1900e-003	2.1000e-003	115.0203
Mobile	0.6651	7.0741	6.0758	0.0274	1.4202	0.0265	1.4467	0.3819	0.0251	0.4070		2,824.3677	2,824.3677	0.1732		2,828.6971
Total	**4.6248**	**7.1697**	**6.1931**	**0.0280**	**1.4202**	**0.0339**	**1.4541**	**0.3819**	**0.0325**	**0.4144**		**2,938.7881**	**2,938.7881**	**0.1756**	**2.1000e-003**	**2,943.8022**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**1.59**	**11.58**	**22.28**	**22.97**	**28.33**	**21.75**	**28.19**	**28.33**	**21.55**	**27.84**	**0.00**	**22.52**	**22.52**	**11.29**	**0.00**	**22.50**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/1/2019	4/16/2019	5	12	
2	Site Preparation	Site Preparation	4/17/2019	4/24/2019	5	6	
3	Grading	Grading	4/25/2019	5/10/2019	5	12	
4	Building Construction	Building Construction	5/11/2019	11/26/2019	5	142	
5	Paving	Paving	11/27/2019	12/12/2019	5	12	
6	Architectural Coating	Architectural Coating	12/13/2019	12/31/2019	5	13	

Acres of Grading (Site Preparation Phase): 7.63

Acres of Grading (Grading Phase): 8.09

Acres of Paving: 4.08

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 262,125; Non-Residential Outdoor: 87,375; Striped Parking Area: 5,827 (Architectural Coating – sqft)

OffRoad Equipment

7405b 8th Street & Hellman Ave - San Bernardino-South Coast County, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	91.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	114.00	45.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	23.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.6406	0.0000	1.6406	0.2484	0.0000	0.2484			0.0000			0.0000
Off-Road	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697		3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**	**1.6406**	**1.7949**	**3.4355**	**0.2484**	**1.6697**	**1.9181**		**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

3.2 Demolition - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0508	2.0026	0.2899	6.0100e-003	0.1327	6.7200e-003	0.1394	0.0364	6.4300e-003	0.0428		637.9502	637.9502	0.0350		638.8263
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0889	0.0592	0.7477	1.7600e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		174.9624	174.9624	5.8700e-003		175.1091
Total	**0.1397**	**2.0618**	**1.0376**	**7.7700e-003**	**0.3004**	**7.8500e-003**	**0.3082**	**0.0809**	**7.4700e-003**	**0.0883**		**812.9126**	**812.9126**	**0.0409**		**813.9353**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6398	0.0000	0.6398	0.0969	0.0000	0.0969			0.0000			0.0000
Off-Road	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697	0.0000	3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**	**0.6398**	**1.7949**	**2.4347**	**0.0969**	**1.6697**	**1.7666**	**0.0000**	**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

3.2 Demolition - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0508	2.0026	0.2899	6.0100e-003	0.1327	6.7200e-003	0.1394	0.0364	6.4300e-003	0.0428		637.9502	637.9502	0.0350		638.8263
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0889	0.0592	0.7477	1.7600e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		174.9624	174.9624	5.8700e-003		175.1091
Total	**0.1397**	**2.0618**	**1.0376**	**7.7700e-003**	**0.3004**	**7.8500e-003**	**0.3082**	**0.0809**	**7.4700e-003**	**0.0883**		**812.9126**	**812.9126**	**0.0409**		**813.9353**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.4149	0.0000	19.4149	10.0763	0.0000	10.0763			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991		3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**19.4149**	**2.3904**	**21.8052**	**10.0763**	**2.1991**	**12.2754**		**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

3.3 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1067	0.0710	0.8973	2.1100e-003	0.2012	1.3500e-003	0.2026	0.0534	1.2500e-003	0.0546		209.9549	209.9549	7.0400e-003		210.1309
Total	**0.1067**	**0.0710**	**0.8973**	**2.1100e-003**	**0.2012**	**1.3500e-003**	**0.2026**	**0.0534**	**1.2500e-003**	**0.0546**		**209.9549**	**209.9549**	**7.0400e-003**		**210.1309**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.5718	0.0000	7.5718	3.9298	0.0000	3.9298			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991	0.0000	3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**7.5718**	**2.3904**	**9.9622**	**3.9298**	**2.1991**	**6.1289**	**0.0000**	**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

3.3 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1067	0.0710	0.8973	2.1100e-003	0.2012	1.3500e-003	0.2026	0.0534	1.2500e-003	0.0546		209.9549	209.9549	7.0400e-003		210.1309
Total	**0.1067**	**0.0710**	**0.8973**	**2.1100e-003**	**0.2012**	**1.3500e-003**	**0.2026**	**0.0534**	**1.2500e-003**	**0.0546**		**209.9549**	**209.9549**	**7.0400e-003**		**210.1309**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.7370	0.0000	6.7370	3.3874	0.0000	3.3874			0.0000			0.0000
Off-Road	2.5805	28.3480	16.2934	0.0297		1.3974	1.3974		1.2856	1.2856		2,936.8068	2,936.8068	0.9292		2,960.0361
Total	**2.5805**	**28.3480**	**16.2934**	**0.0297**	**6.7370**	**1.3974**	**8.1344**	**3.3874**	**1.2856**	**4.6730**		**2,936.8068**	**2,936.8068**	**0.9292**		**2,960.0361**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0889	0.0592	0.7477	1.7600e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		174.9624	174.9624	5.8700e-003		175.1091
Total	**0.0889**	**0.0592**	**0.7477**	**1.7600e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**174.9624**	**174.9624**	**5.8700e-003**		**175.1091**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6275	0.0000	2.6275	1.3211	0.0000	1.3211			0.0000			0.0000
Off-Road	2.5805	28.3480	16.2934	0.0297		1.3974	1.3974		1.2856	1.2856	0.0000	2,936.8068	2,936.8068	0.9292		2,960.0361
Total	**2.5805**	**28.3480**	**16.2934**	**0.0297**	**2.6275**	**1.3974**	**4.0248**	**1.3211**	**1.2856**	**2.6067**	**0.0000**	**2,936.8068**	**2,936.8068**	**0.9292**		**2,960.0361**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0889	0.0592	0.7477	1.7600e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		174.9624	174.9624	5.8700e-003		175.1091
Total	**0.0889**	**0.0592**	**0.7477**	**1.7600e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**174.9624**	**174.9624**	**5.8700e-003**		**175.1091**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.5 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1614	5.1816	1.0537	0.0123	0.2882	0.0324	0.3206	0.0830	0.0310	0.1140		1,296.2147	1,296.2147	0.0877		1,298.4059
Worker	0.6759	0.4496	5.6827	0.0134	1.2743	8.5700e-003	1.2828	0.3379	7.8900e-003	0.3458		1,329.7141	1,329.7141	0.0446		1,330.8288
Total	**0.8373**	**5.6312**	**6.7363**	**0.0257**	**1.5625**	**0.0410**	**1.6035**	**0.4209**	**0.0389**	**0.4598**		**2,625.9288**	**2,625.9288**	**0.1322**		**2,629.2347**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.5 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1614	5.1816	1.0537	0.0123	0.2882	0.0324	0.3206	0.0830	0.0310	0.1140		1,296.2147	1,296.2147	0.0877		1,298.4059
Worker	0.6759	0.4496	5.6827	0.0134	1.2743	8.5700e-003	1.2828	0.3379	7.8900e-003	0.3458		1,329.7141	1,329.7141	0.0446		1,330.8288
Total	**0.8373**	**5.6312**	**6.7363**	**0.0257**	**1.5625**	**0.0410**	**1.6035**	**0.4209**	**0.0389**	**0.4598**		**2,625.9288**	**2,625.9288**	**0.1322**		**2,629.2347**

3.6 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.7096					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.1640**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.6 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0889	0.0592	0.7477	1.7600e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		174.9624	174.9624	5.8700e-003		175.1091
Total	**0.0889**	**0.0592**	**0.7477**	**1.7600e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**174.9624**	**174.9624**	**5.8700e-003**		**175.1091**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.7096					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.1640**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.6 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0889	0.0592	0.7477	1.7600e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		174.9624	174.9624	5.8700e-003		175.1091
Total	**0.0889**	**0.0592**	**0.7477**	**1.7600e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**174.9624**	**174.9624**	**5.8700e-003**		**175.1091**

3.7 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	64.3827					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		282.0423
Total	**64.6491**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**282.0423**

3.7 Architectural Coating - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1364	0.0907	1.1465	2.7000e-003	0.2571	1.7300e-003	0.2588	0.0682	1.5900e-003	0.0698		268.2757	268.2757	9.0000e-003		268.5006
Total	**0.1364**	**0.0907**	**1.1465**	**2.7000e-003**	**0.2571**	**1.7300e-003**	**0.2588**	**0.0682**	**1.5900e-003**	**0.0698**		**268.2757**	**268.2757**	**9.0000e-003**		**268.5006**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	64.3827					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		282.0423
Total	**64.6491**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**282.0423**

3.7 Architectural Coating - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1364	0.0907	1.1465	2.7000e-003	0.2571	1.7300e-003	0.2588	0.0682	1.5900e-003	0.0698		268.2757	268.2757	9.0000e-003		268.5006
Total	**0.1364**	**0.0907**	**1.1465**	**2.7000e-003**	**0.2571**	**1.7300e-003**	**0.2588**	**0.0682**	**1.5900e-003**	**0.0698**		**268.2757**	**268.2757**	**9.0000e-003**		**268.5006**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Increase Transit Accessibility

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.6651	7.0741	6.0758	0.0274	1.4202	0.0265	1.4467	0.3819	0.0251	0.4070		2,824.3677	2,824.3677	0.1732		2,828.6971
Unmitigated	0.7401	8.0127	7.8508	0.0358	1.9816	0.0360	2.0176	0.5329	0.0341	0.5669		3,678.3654	3,678.3654	0.1955		3,683.2535

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	304.07	304.07	304.07	916,702	656,991
Total	304.07	304.07	304.07	916,702	656,991

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	20.40	0.00	79.60	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.546179	0.037976	0.179086	0.122965	0.018430	0.005460	0.017497	0.061396	0.001337	0.001657	0.006117	0.000817	0.001082
Parking Lot	0.546179	0.037976	0.179086	0.122965	0.018430	0.005460	0.017497	0.061396	0.001337	0.001657	0.006117	0.000817	0.001082
Unrefrigerated Warehouse-No Rail	0.487037	0.033864	0.159694	0.109650	0.026692	0.007908	0.046400	0.123300	0.000000	0.000000	0.005455	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3409	114.3409	2.1900e-003	2.1000e-003	115.0203
NaturalGas Unmitigated	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3409	114.3409	2.1900e-003	2.1000e-003	115.0203

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	971.897	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3409	114.3409	2.1900e-003	2.1000e-003	115.0203
Total		**0.0105**	**0.0953**	**0.0800**	**5.7000e-004**		**7.2400e-003**	**7.2400e-003**		**7.2400e-003**	**7.2400e-003**		**114.3409**	**114.3409**	**2.1900e-003**	**2.1000e-003**	**115.0203**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0.971897	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3409	114.3409	2.1900e-003	2.1000e-003	115.0203
Total		**0.0105**	**0.0953**	**0.0800**	**5.7000e-004**		**7.2400e-003**	**7.2400e-003**		**7.2400e-003**	**7.2400e-003**		**114.3409**	**114.3409**	**2.1900e-003**	**2.1000e-003**	**115.0203**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.9492	3.4000e-004	0.0373	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		0.0795	0.0795	2.1000e-004		0.0848
Unmitigated	3.9492	3.4000e-004	0.0373	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		0.0795	0.0795	2.1000e-004		0.0848

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.4512					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.4945					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.5100e-003	3.4000e-004	0.0373	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		0.0795	0.0795	2.1000e-004		0.0848
Total	**3.9492**	**3.4000e-004**	**0.0373**	**0.0000**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**		**0.0795**	**0.0795**	**2.1000e-004**		**0.0848**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.4512					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.4945					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.5100e-003	3.4000e-004	0.0373	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		0.0795	0.0795	2.1000e-004		0.0848
Total	**3.9492**	**3.4000e-004**	**0.0373**	**0.0000**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**		**0.0795**	**0.0795**	**2.1000e-004**		**0.0848**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

7405b 8th Street & Hellman Ave

San Bernardino-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	174.75	1000sqft	4.01	174,750.00	0
Other Non-Asphalt Surfaces	36.31	1000sqft	0.83	36,312.00	0
Parking Lot	152.00	Space	3.25	60,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

7405b 8th Street & Hellman Ave - San Bernardino-South Coast County, Winter

Project Characteristics -

Land Use - Site is ~8.09 acres w/ a 174.745 TSF warehouse, 152 parking spaces (includes 119 standard parking stalls & 33 trailer parking stalls), 36,312 sf landscaping, & remainder (~1.88 acres as paving).

Construction Phase - Construction anticipated to start April 2019 and take approximately 8 months. Project is to be operational in 2020.

Demolition - Demolition of existing ~20,000 sf of buidlings.

Grading - Site is 8.09 acres and is to be balanced. ~7.63 acres of existing paving to be removed during site prep (as existing buildings cover the other ~0.46 acres).

Vehicle Trips - Per TIA, 1.74 trips/TSF/day & vehicle percentage changed to 79.6 autos (C-NW) & 20.4 trucks (C-W).

Sequestration - Per the landscape plan, ~112 trees to be planted on-site.

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation - Site is ~1.14 miles southwest of downtown portion of Rancho Cucamonga & ~0.37 miles east of Omnitrans Rte 80 stop Vineyard at 8th. 174,745sf /1,030 = ~170emp /8.09 ac = 20.97 emp/acre.

Water Mitigation - Per CalGreen Standards and water-efficient irrigation systems.

Waste Mitigation - AB 347 requires each jurisdiction in CA to divert at least 75% of their waste away from landfills by 2020.

Fleet Mix - Revised vehicle mix per TIA of 79.57% autos, 3.46% 2-axle trucks, 4.64% 3 axle trucks, & 12.33% 4+ axle trucks.

Architectural Coating - SCAQMD Rule 1113 limits architectural coatings to 50 g/L VOC. Emissions modeled at 50 g/L VOC for buildings and 100 g/L VOC for parking lot striping.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	12.00
tblConstructionPhase	NumDays	10.00	6.00
tblConstructionPhase	NumDays	20.00	12.00
tblConstructionPhase	NumDays	230.00	142.00
tblConstructionPhase	NumDays	20.00	12.00
tblConstructionPhase	NumDays	20.00	13.00
tblFleetMix	HHD	0.06	0.12
tblFleetMix	LDA	0.55	0.49

tblFleetMix	LDT1	0.04	0.03
tblFleetMix	LDT2	0.18	0.16
tblFleetMix	LHD1	0.02	0.03
tblFleetMix	LHD2	5.4600e-003	7.9080e-003
tblFleetMix	MCY	6.1170e-003	5.4550e-003
tblFleetMix	MDV	0.12	0.11
tblFleetMix	MH	1.0820e-003	0.00
tblFleetMix	MHD	0.02	0.05
tblFleetMix	OBUS	1.3370e-003	0.00
tblFleetMix	SBUS	8.1700e-004	0.00
tblFleetMix	UBUS	1.6570e-003	0.00
tblGrading	AcresOfGrading	6.00	8.09
tblGrading	AcresOfGrading	0.00	7.63
tblLandUse	LandUseSquareFeet	36,310.00	36,312.00
tblLandUse	LotAcreage	1.37	3.25
tblSequestration	NumberOfNewTrees	0.00	112.00
tblVehicleTrips	CNW_TTP	41.00	79.60
tblVehicleTrips	CW_TTP	59.00	20.40
tblVehicleTrips	ST_TR	1.68	1.74
tblVehicleTrips	SU_TR	1.68	1.74
tblVehicleTrips	WD_TR	1.68	1.74

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	64.7852	45.6475	23.0546	0.0507	19.6161	2.3917	22.0078	10.1297	2.2004	12.3300	0.0000	5,030.7247	5,030.7247	1.1979	0.0000	5,049.9035
Maximum	**64.7852**	**45.6475**	**23.0546**	**0.0507**	**19.6161**	**2.3917**	**22.0078**	**10.1297**	**2.2004**	**12.3300**	**0.0000**	**5,030.7247**	**5,030.7247**	**1.1979**	**0.0000**	**5,049.9035**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	64.7852	45.6475	23.0546	0.0507	7.7730	2.3917	10.1647	3.9831	2.2004	6.1835	0.0000	5,030.7247	5,030.7247	1.1979	0.0000	5,049.9035
Maximum	**64.7852**	**45.6475**	**23.0546**	**0.0507**	**7.7730**	**2.3917**	**10.1647**	**3.9831**	**2.2004**	**6.1835**	**0.0000**	**5,030.7247**	**5,030.7247**	**1.1979**	**0.0000**	**5,049.9035**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**60.37**	**0.00**	**53.81**	**60.68**	**0.00**	**49.85**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.9492	3.4000e-004	0.0373	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		0.0795	0.0795	2.1000e-004		0.0848
Energy	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3409	114.3409	2.1900e-003	2.1000e-003	115.0203
Mobile	0.6667	7.9906	7.1281	0.0333	1.9816	0.0364	2.0180	0.5329	0.0345	0.5673		3,431.8419	3,431.8419	0.2056		3,436.9818
Total	**4.6263**	**8.0862**	**7.2455**	**0.0339**	**1.9816**	**0.0437**	**2.0254**	**0.5329**	**0.0418**	**0.5747**		**3,546.2622**	**3,546.2622**	**0.2080**	**2.1000e-003**	**3,552.0869**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.9492	3.4000e-004	0.0373	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		0.0795	0.0795	2.1000e-004		0.0848
Energy	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3409	114.3409	2.1900e-003	2.1000e-003	115.0203
Mobile	0.5954	7.0072	5.6696	0.0255	1.4202	0.0269	1.4472	0.3819	0.0255	0.4074		2,624.4289	2,624.4289	0.1848		2,629.0488
Total	**4.5551**	**7.1028**	**5.7870**	**0.0260**	**1.4202**	**0.0343**	**1.4545**	**0.3819**	**0.0329**	**0.4148**		**2,738.8492**	**2,738.8492**	**0.1872**	**2.1000e-003**	**2,744.1539**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**1.54**	**12.16**	**20.13**	**23.21**	**28.33**	**21.54**	**28.18**	**28.33**	**21.35**	**27.82**	**0.00**	**22.77**	**22.77**	**10.00**	**0.00**	**22.75**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/1/2019	4/16/2019	5	12	
2	Site Preparation	Site Preparation	4/17/2019	4/24/2019	5	6	
3	Grading	Grading	4/25/2019	5/10/2019	5	12	
4	Building Construction	Building Construction	5/11/2019	11/26/2019	5	142	
5	Paving	Paving	11/27/2019	12/12/2019	5	12	
6	Architectural Coating	Architectural Coating	12/13/2019	12/31/2019	5	13	

Acres of Grading (Site Preparation Phase): 7.63

Acres of Grading (Grading Phase): 8.09

Acres of Paving: 4.08

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 262,125; Non-Residential Outdoor: 87,375; Striped Parking Area: 5,827 (Architectural Coating – sqft)

OffRoad Equipment

7405b 8th Street & Hellman Ave - San Bernardino-South Coast County, Winter

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	91.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	114.00	45.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	23.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.6406	0.0000	1.6406	0.2484	0.0000	0.2484			0.0000			0.0000
Off-Road	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697		3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**	**1.6406**	**1.7949**	**3.4355**	**0.2484**	**1.6697**	**1.9181**		**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

3.2 Demolition - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0531	2.0154	0.3325	5.8600e-003	0.1327	6.8300e-003	0.1396	0.0364	6.5400e-003	0.0429		621.4888	621.4888	0.0380		622.4391
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0888	0.0623	0.6157	1.5800e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		156.9571	156.9571	5.1500e-003		157.0858
Total	**0.1419**	**2.0777**	**0.9482**	**7.4400e-003**	**0.3004**	**7.9600e-003**	**0.3083**	**0.0809**	**7.5800e-003**	**0.0884**		**778.4459**	**778.4459**	**0.0432**		**779.5249**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6398	0.0000	0.6398	0.0969	0.0000	0.0969			0.0000			0.0000
Off-Road	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697	0.0000	3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**	**0.6398**	**1.7949**	**2.4347**	**0.0969**	**1.6697**	**1.7666**	**0.0000**	**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

3.2 Demolition - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0531	2.0154	0.3325	5.8600e-003	0.1327	6.8300e-003	0.1396	0.0364	6.5400e-003	0.0429		621.4888	621.4888	0.0380		622.4391
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0888	0.0623	0.6157	1.5800e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		156.9571	156.9571	5.1500e-003		157.0858
Total	**0.1419**	**2.0777**	**0.9482**	**7.4400e-003**	**0.3004**	**7.9600e-003**	**0.3083**	**0.0809**	**7.5800e-003**	**0.0884**		**778.4459**	**778.4459**	**0.0432**		**779.5249**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.4149	0.0000	19.4149	10.0763	0.0000	10.0763			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991		3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**19.4149**	**2.3904**	**21.8052**	**10.0763**	**2.1991**	**12.2754**		**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

3.3 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1066	0.0747	0.7388	1.8900e-003	0.2012	1.3500e-003	0.2026	0.0534	1.2500e-003	0.0546		188.3485	188.3485	6.1800e-003		188.5030
Total	**0.1066**	**0.0747**	**0.7388**	**1.8900e-003**	**0.2012**	**1.3500e-003**	**0.2026**	**0.0534**	**1.2500e-003**	**0.0546**		**188.3485**	**188.3485**	**6.1800e-003**		**188.5030**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.5718	0.0000	7.5718	3.9298	0.0000	3.9298			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991	0.0000	3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**7.5718**	**2.3904**	**9.9622**	**3.9298**	**2.1991**	**6.1289**	**0.0000**	**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

3.3 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1066	0.0747	0.7388	1.8900e-003	0.2012	1.3500e-003	0.2026	0.0534	1.2500e-003	0.0546		188.3485	188.3485	6.1800e-003		188.5030
Total	**0.1066**	**0.0747**	**0.7388**	**1.8900e-003**	**0.2012**	**1.3500e-003**	**0.2026**	**0.0534**	**1.2500e-003**	**0.0546**		**188.3485**	**188.3485**	**6.1800e-003**		**188.5030**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.7370	0.0000	6.7370	3.3874	0.0000	3.3874			0.0000			0.0000
Off-Road	2.5805	28.3480	16.2934	0.0297		1.3974	1.3974		1.2856	1.2856		2,936.8068	2,936.8068	0.9292		2,960.0361
Total	**2.5805**	**28.3480**	**16.2934**	**0.0297**	**6.7370**	**1.3974**	**8.1344**	**3.3874**	**1.2856**	**4.6730**		**2,936.8068**	**2,936.8068**	**0.9292**		**2,960.0361**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0888	0.0623	0.6157	1.5800e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		156.9571	156.9571	5.1500e-003		157.0858
Total	**0.0888**	**0.0623**	**0.6157**	**1.5800e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**156.9571**	**156.9571**	**5.1500e-003**		**157.0858**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6275	0.0000	2.6275	1.3211	0.0000	1.3211			0.0000			0.0000
Off-Road	2.5805	28.3480	16.2934	0.0297		1.3974	1.3974		1.2856	1.2856	0.0000	2,936.8068	2,936.8068	0.9292		2,960.0361
Total	**2.5805**	**28.3480**	**16.2934**	**0.0297**	**2.6275**	**1.3974**	**4.0248**	**1.3211**	**1.2856**	**2.6067**	**0.0000**	**2,936.8068**	**2,936.8068**	**0.9292**		**2,960.0361**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0888	0.0623	0.6157	1.5800e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		156.9571	156.9571	5.1500e-003		157.0858
Total	**0.0888**	**0.0623**	**0.6157**	**1.5800e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**156.9571**	**156.9571**	**5.1500e-003**		**157.0858**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.5 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1695	5.1519	1.2116	0.0118	0.2882	0.0328	0.3211	0.0830	0.0314	0.1144		1,246.2707	1,246.2707	0.0967		1,248.6878
Worker	0.6748	0.4734	4.6793	0.0120	1.2743	8.5700e-003	1.2828	0.3379	7.8900e-003	0.3458		1,192.8738	1,192.8738	0.0391		1,193.8522
Total	**0.8443**	**5.6252**	**5.8908**	**0.0238**	**1.5625**	**0.0414**	**1.6039**	**0.4209**	**0.0393**	**0.4602**		**2,439.1445**	**2,439.1445**	**0.1358**		**2,442.5400**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.5 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1695	5.1519	1.2116	0.0118	0.2882	0.0328	0.3211	0.0830	0.0314	0.1144		1,246.2707	1,246.2707	0.0967		1,248.6878
Worker	0.6748	0.4734	4.6793	0.0120	1.2743	8.5700e-003	1.2828	0.3379	7.8900e-003	0.3458		1,192.8738	1,192.8738	0.0391		1,193.8522
Total	**0.8443**	**5.6252**	**5.8908**	**0.0238**	**1.5625**	**0.0414**	**1.6039**	**0.4209**	**0.0393**	**0.4602**		**2,439.1445**	**2,439.1445**	**0.1358**		**2,442.5400**

3.6 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.7096					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.1640**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.6 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0888	0.0623	0.6157	1.5800e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		156.9571	156.9571	5.1500e-003		157.0858
Total	**0.0888**	**0.0623**	**0.6157**	**1.5800e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**156.9571**	**156.9571**	**5.1500e-003**		**157.0858**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.7096					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.1640**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.6 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0888	0.0623	0.6157	1.5800e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		156.9571	156.9571	5.1500e-003		157.0858
Total	**0.0888**	**0.0623**	**0.6157**	**1.5800e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**156.9571**	**156.9571**	**5.1500e-003**		**157.0858**

3.7 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	64.3827					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		282.0423
Total	**64.6491**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**282.0423**

3.7 Architectural Coating - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1362	0.0955	0.9441	2.4200e-003	0.2571	1.7300e-003	0.2588	0.0682	1.5900e-003	0.0698		240.6675	240.6675	7.9000e-003		240.8649
Total	**0.1362**	**0.0955**	**0.9441**	**2.4200e-003**	**0.2571**	**1.7300e-003**	**0.2588**	**0.0682**	**1.5900e-003**	**0.0698**		**240.6675**	**240.6675**	**7.9000e-003**		**240.8649**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	64.3827					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		282.0423
Total	**64.6491**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**282.0423**

3.7 Architectural Coating - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1362	0.0955	0.9441	2.4200e-003	0.2571	1.7300e-003	0.2588	0.0682	1.5900e-003	0.0698		240.6675	240.6675	7.9000e-003		240.8649
Total	**0.1362**	**0.0955**	**0.9441**	**2.4200e-003**	**0.2571**	**1.7300e-003**	**0.2588**	**0.0682**	**1.5900e-003**	**0.0698**		**240.6675**	**240.6675**	**7.9000e-003**		**240.8649**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Increase Transit Accessibility

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.5954	7.0072	5.6696	0.0255	1.4202	0.0269	1.4472	0.3819	0.0255	0.4074		2,624.4289	2,624.4289	0.1848		2,629.0488
Unmitigated	0.6667	7.9906	7.1281	0.0333	1.9816	0.0364	2.0180	0.5329	0.0345	0.5673		3,431.8419	3,431.8419	0.2056		3,436.9818

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	304.07	304.07	304.07	916,702	656,991
Total	304.07	304.07	304.07	916,702	656,991

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	20.40	0.00	79.60	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.546179	0.037976	0.179086	0.122965	0.018430	0.005460	0.017497	0.061396	0.001337	0.001657	0.006117	0.000817	0.001082
Parking Lot	0.546179	0.037976	0.179086	0.122965	0.018430	0.005460	0.017497	0.061396	0.001337	0.001657	0.006117	0.000817	0.001082
Unrefrigerated Warehouse-No Rail	0.487037	0.033864	0.159694	0.109650	0.026692	0.007908	0.046400	0.123300	0.000000	0.000000	0.005455	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3409	114.3409	2.1900e-003	2.1000e-003	115.0203
NaturalGas Unmitigated	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3409	114.3409	2.1900e-003	2.1000e-003	115.0203

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	971.897	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3409	114.3409	2.1900e-003	2.1000e-003	115.0203
Total		**0.0105**	**0.0953**	**0.0800**	**5.7000e-004**		**7.2400e-003**	**7.2400e-003**		**7.2400e-003**	**7.2400e-003**		**114.3409**	**114.3409**	**2.1900e-003**	**2.1000e-003**	**115.0203**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0.971897	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3409	114.3409	2.1900e-003	2.1000e-003	115.0203
Total		**0.0105**	**0.0953**	**0.0800**	**5.7000e-004**		**7.2400e-003**	**7.2400e-003**		**7.2400e-003**	**7.2400e-003**		**114.3409**	**114.3409**	**2.1900e-003**	**2.1000e-003**	**115.0203**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.9492	3.4000e-004	0.0373	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		0.0795	0.0795	2.1000e-004		0.0848
Unmitigated	3.9492	3.4000e-004	0.0373	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		0.0795	0.0795	2.1000e-004		0.0848

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.4512					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.4945					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.5100e-003	3.4000e-004	0.0373	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		0.0795	0.0795	2.1000e-004		0.0848
Total	**3.9492**	**3.4000e-004**	**0.0373**	**0.0000**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**		**0.0795**	**0.0795**	**2.1000e-004**		**0.0848**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.4512					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.4945					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.5100e-003	3.4000e-004	0.0373	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		0.0795	0.0795	2.1000e-004		0.0848
Total	**3.9492**	**3.4000e-004**	**0.0373**	**0.0000**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**		**0.0795**	**0.0795**	**2.1000e-004**		**0.0848**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX C

CalEEMod Model Annual Emissions Printouts

7405b 8th Street & Hellman Ave

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	174.75	1000sqft	4.01	174,750.00	0
Other Non-Asphalt Surfaces	36.31	1000sqft	0.83	36,312.00	0
Parking Lot	152.00	Space	3.25	60,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

7405b 8th Street & Hellman Ave - San Bernardino-South Coast County, Annual

Project Characteristics -

Land Use - Site is ~8.09 acres w/ a 174.745 TSF warehouse, 152 parking spaces (includes 119 standard parking stalls & 33 trailer parking stalls), 36,312 sf landscaping, & remainder (~1.88 acres as paving).

Construction Phase - Construction anticipated to start April 2019 and take approximately 8 months. Project is to be operational in 2020.

Demolition - Demolition of existing ~20,000 sf of buidlings.

Grading - Site is 8.09 acres and is to be balanced. ~7.63 acres of existing paving to be removed during site prep (as existing buildings cover the other ~0.46 acres).

Vehicle Trips - Per TIA, 1.74 trips/TSF/day & vehicle percentage changed to 79.6 autos (C-NW) & 20.4 trucks (C-W).

Sequestration - Per the landscape plan, ~112 trees to be planted on-site.

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation - Site is ~1.14 miles southwest of downtown portion of Rancho Cucamonga & ~0.37 miles east of Omnitrans Rte 80 stop Vineyard at 8th. 174,745sf /1,030 = ~170emp /8.09 ac = 20.97 emp/acre.

Water Mitigation - Per CalGreen Standards and water-efficient irrigation systems.

Waste Mitigation - AB 347 requires each jurisdiction in CA to divert at least 75% of their waste away from landfills by 2020.

Fleet Mix - Revised vehicle mix per TIA of 79.57% autos, 3.46% 2-axle trucks, 4.64% 3 axle trucks, & 12.33% 4+ axle trucks.

Architectural Coating - SCAQMD Rule 1113 limits architectural coatings to 50 g/L VOC. Emissions modeled at 50 g/L VOC for buildings and 100 g/L VOC for parking lot striping.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	12.00
tblConstructionPhase	NumDays	10.00	6.00
tblConstructionPhase	NumDays	20.00	12.00
tblConstructionPhase	NumDays	230.00	142.00
tblConstructionPhase	NumDays	20.00	12.00
tblConstructionPhase	NumDays	20.00	13.00
tblFleetMix	HHD	0.06	0.12
tblFleetMix	LDA	0.55	0.49

tblFleetMix	LDT1	0.04	0.03
tblFleetMix	LDT2	0.18	0.16
tblFleetMix	LHD1	0.02	0.03
tblFleetMix	LHD2	5.4600e-003	7.9080e-003
tblFleetMix	MCY	6.1170e-003	5.4550e-003
tblFleetMix	MDV	0.12	0.11
tblFleetMix	MH	1.0820e-003	0.00
tblFleetMix	MHD	0.02	0.05
tblFleetMix	OBUS	1.3370e-003	0.00
tblFleetMix	SBUS	8.1700e-004	0.00
tblFleetMix	UBUS	1.6570e-003	0.00
tblGrading	AcresOfGrading	6.00	8.09
tblGrading	AcresOfGrading	0.00	7.63
tblLandUse	LandUseSquareFeet	36,310.00	36,312.00
tblLandUse	LotAcreage	1.37	3.25
tblSequestration	NumberOfNewTrees	0.00	112.00
tblVehicleTrips	CNW_TTP	41.00	79.60
tblVehicleTrips	CW_TTP	59.00	20.40
tblVehicleTrips	ST_TR	1.68	1.74
tblVehicleTrips	SU_TR	1.68	1.74
tblVehicleTrips	WD_TR	1.68	1.74

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.7084	2.5444	2.0667	4.4100e-003	0.2234	0.1267	0.3501	0.0830	0.1187	0.2017	0.0000	396.5639	396.5639	0.0676	0.0000	398.2545
Maximum	**0.7084**	**2.5444**	**2.0667**	**4.4100e-003**	**0.2234**	**0.1267**	**0.3501**	**0.0830**	**0.1187**	**0.2017**	**0.0000**	**396.5639**	**396.5639**	**0.0676**	**0.0000**	**398.2545**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.7084	2.5444	2.0667	4.4100e-003	0.1572	0.1267	0.2839	0.0513	0.1187	0.1699	0.0000	396.5636	396.5636	0.0676	0.0000	398.2542
Maximum	**0.7084**	**2.5444**	**2.0667**	**4.4100e-003**	**0.1572**	**0.1267**	**0.2839**	**0.0513**	**0.1187**	**0.1699**	**0.0000**	**396.5636**	**396.5636**	**0.0676**	**0.0000**	**398.2542**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**29.63**	**0.00**	**18.91**	**38.23**	**0.00**	**15.74**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	4-1-2019	6-30-2019	1.1026	1.1026
2	7-1-2019	9-30-2019	0.9827	0.9827
		Highest	1.1026	1.1026

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.7205	4.0000e-005	4.6600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.0100e-003	9.0100e-003	2.0000e-005	0.0000	9.6100e-003
Energy	1.9100e-003	0.0174	0.0146	1.0000e-004		1.3200e-003	1.3200e-003		1.3200e-003	1.3200e-003	0.0000	157.1133	157.1133	6.0700e-003	1.5300e-003	157.7202
Mobile	0.1183	1.4858	1.3237	6.2000e-003	0.3540	6.5700e-003	0.3606	0.0954	6.2200e-003	0.1016	0.0000	578.9732	578.9732	0.0328	0.0000	579.7928
Waste						0.0000	0.0000		0.0000	0.0000	33.3433	0.0000	33.3433	1.9705	0.0000	82.6066
Water						0.0000	0.0000		0.0000	0.0000	12.8205	167.6557	180.4762	1.3237	0.0325	223.2613
Total	**0.8407**	**1.5032**	**1.3429**	**6.3000e-003**	**0.3540**	**7.9100e-003**	**0.3619**	**0.0954**	**7.5600e-003**	**0.1029**	**46.1638**	**903.7512**	**949.9150**	**3.3331**	**0.0341**	**1,043.3904**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.7205	4.0000e-005	4.6600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.0100e-003	9.0100e-003	2.0000e-005	0.0000	9.6100e-003
Energy	1.9100e-003	0.0174	0.0146	1.0000e-004		1.3200e-003	1.3200e-003		1.3200e-003	1.3200e-003	0.0000	157.1133	157.1133	6.0700e-003	1.5300e-003	157.7202
Mobile	0.1051	1.3033	1.0459	4.7500e-003	0.2537	4.8500e-003	0.2586	0.0683	4.6000e-003	0.0729	0.0000	444.3565	444.3565	0.0293	0.0000	445.0890
Waste						0.0000	0.0000		0.0000	0.0000	8.3358	0.0000	8.3358	0.4926	0.0000	20.6517
Water						0.0000	0.0000		0.0000	0.0000	10.2564	134.1245	144.3810	1.0590	0.0260	178.6090
Total	**0.8275**	**1.3208**	**1.0652**	**4.8500e-003**	**0.2537**	**6.1900e-003**	**0.2599**	**0.0683**	**5.9400e-003**	**0.0743**	**18.5922**	**735.6034**	**754.1956**	**1.5870**	**0.0276**	**802.0795**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**1.57**	**12.14**	**20.68**	**23.02**	**28.33**	**21.74**	**28.19**	**28.33**	**21.43**	**27.82**	**59.73**	**18.61**	**20.60**	**52.39**	**19.09**	**23.13**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
New Trees	79.2960
Total	**79.2960**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/1/2019	4/16/2019	5	12	
2	Site Preparation	Site Preparation	4/17/2019	4/24/2019	5	6	
3	Grading	Grading	4/25/2019	5/10/2019	5	12	
4	Building Construction	Building Construction	5/11/2019	11/26/2019	5	142	
5	Paving	Paving	11/27/2019	12/12/2019	5	12	
6	Architectural Coating	Architectural Coating	12/13/2019	12/31/2019	5	13	

Acres of Grading (Site Preparation Phase): 7.63

Acres of Grading (Grading Phase): 8.09

Acres of Paving: 4.08

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 262,125; Non-Residential Outdoor: 87,375; Striped Parking Area: 5,827 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	91.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	114.00	45.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	23.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.8400e-003	0.0000	9.8400e-003	1.4900e-003	0.0000	1.4900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0211	0.2147	0.1324	2.3000e-004		0.0108	0.0108		0.0100	0.0100	0.0000	20.7758	20.7758	5.7800e-003	0.0000	20.9203
Total	**0.0211**	**0.2147**	**0.1324**	**2.3000e-004**	**9.8400e-003**	**0.0108**	**0.0206**	**1.4900e-003**	**0.0100**	**0.0115**	**0.0000**	**20.7758**	**20.7758**	**5.7800e-003**	**0.0000**	**20.9203**

3.2 Demolition - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.1000e-004	0.0123	1.8500e-003	4.0000e-005	7.8000e-004	4.0000e-005	8.2000e-004	2.2000e-004	4.0000e-005	2.5000e-004	0.0000	3.4348	3.4348	2.0000e-004	0.0000	3.4398
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.9000e-004	3.8800e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8731	0.8731	3.0000e-005	0.0000	0.8738
Total	**7.9000e-004**	**0.0127**	**5.7300e-003**	**5.0000e-005**	**1.7700e-003**	**5.0000e-005**	**1.8100e-003**	**4.8000e-004**	**5.0000e-005**	**5.2000e-004**	**0.0000**	**4.3079**	**4.3079**	**2.3000e-004**	**0.0000**	**4.3135**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					3.8400e-003	0.0000	3.8400e-003	5.8000e-004	0.0000	5.8000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0211	0.2147	0.1324	2.3000e-004		0.0108	0.0108		0.0100	0.0100	0.0000	20.7758	20.7758	5.7800e-003	0.0000	20.9203
Total	**0.0211**	**0.2147**	**0.1324**	**2.3000e-004**	**3.8400e-003**	**0.0108**	**0.0146**	**5.8000e-004**	**0.0100**	**0.0106**	**0.0000**	**20.7758**	**20.7758**	**5.7800e-003**	**0.0000**	**20.9203**

3.2 Demolition - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.1000e-004	0.0123	1.8500e-003	4.0000e-005	7.8000e-004	4.0000e-005	8.2000e-004	2.2000e-004	4.0000e-005	2.5000e-004	0.0000	3.4348	3.4348	2.0000e-004	0.0000	3.4398
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.9000e-004	3.8800e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8731	0.8731	3.0000e-005	0.0000	0.8738
Total	**7.9000e-004**	**0.0127**	**5.7300e-003**	**5.0000e-005**	**1.7700e-003**	**5.0000e-005**	**1.8100e-003**	**4.8000e-004**	**5.0000e-005**	**5.2000e-004**	**0.0000**	**4.3079**	**4.3079**	**2.3000e-004**	**0.0000**	**4.3135**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0582	0.0000	0.0582	0.0302	0.0000	0.0302	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0130	0.1367	0.0662	1.1000e-004		7.1700e-003	7.1700e-003		6.6000e-003	6.6000e-003	0.0000	10.2506	10.2506	3.2400e-003	0.0000	10.3317
Total	**0.0130**	**0.1367**	**0.0662**	**1.1000e-004**	**0.0582**	**7.1700e-003**	**0.0654**	**0.0302**	**6.6000e-003**	**0.0368**	**0.0000**	**10.2506**	**10.2506**	**3.2400e-003**	**0.0000**	**10.3317**

3.3 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9000e-004	2.4000e-004	2.3300e-003	1.0000e-005	5.9000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5238	0.5238	2.0000e-005	0.0000	0.5243
Total	**2.9000e-004**	**2.4000e-004**	**2.3300e-003**	**1.0000e-005**	**5.9000e-004**	**0.0000**	**6.0000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.5238**	**0.5238**	**2.0000e-005**	**0.0000**	**0.5243**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0227	0.0000	0.0227	0.0118	0.0000	0.0118	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0130	0.1367	0.0662	1.1000e-004		7.1700e-003	7.1700e-003		6.6000e-003	6.6000e-003	0.0000	10.2506	10.2506	3.2400e-003	0.0000	10.3317
Total	**0.0130**	**0.1367**	**0.0662**	**1.1000e-004**	**0.0227**	**7.1700e-003**	**0.0299**	**0.0118**	**6.6000e-003**	**0.0184**	**0.0000**	**10.2506**	**10.2506**	**3.2400e-003**	**0.0000**	**10.3317**

3.3 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9000e-004	2.4000e-004	2.3300e-003	1.0000e-005	5.9000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5238	0.5238	2.0000e-005	0.0000	0.5243
Total	**2.9000e-004**	**2.4000e-004**	**2.3300e-003**	**1.0000e-005**	**5.9000e-004**	**0.0000**	**6.0000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.5238**	**0.5238**	**2.0000e-005**	**0.0000**	**0.5243**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0404	0.0000	0.0404	0.0203	0.0000	0.0203	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0155	0.1701	0.0978	1.8000e-004		8.3800e-003	8.3800e-003		7.7100e-003	7.7100e-003	0.0000	15.9854	15.9854	5.0600e-003	0.0000	16.1118
Total	**0.0155**	**0.1701**	**0.0978**	**1.8000e-004**	**0.0404**	**8.3800e-003**	**0.0488**	**0.0203**	**7.7100e-003**	**0.0280**	**0.0000**	**15.9854**	**15.9854**	**5.0600e-003**	**0.0000**	**16.1118**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.9000e-004	3.8800e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8731	0.8731	3.0000e-005	0.0000	0.8738
Total	**4.8000e-004**	**3.9000e-004**	**3.8800e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8731**	**0.8731**	**3.0000e-005**	**0.0000**	**0.8738**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0158	0.0000	0.0158	7.9300e-003	0.0000	7.9300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0155	0.1701	0.0978	1.8000e-004		8.3800e-003	8.3800e-003		7.7100e-003	7.7100e-003	0.0000	15.9853	15.9853	5.0600e-003	0.0000	16.1118
Total	**0.0155**	**0.1701**	**0.0978**	**1.8000e-004**	**0.0158**	**8.3800e-003**	**0.0241**	**7.9300e-003**	**7.7100e-003**	**0.0156**	**0.0000**	**15.9853**	**15.9853**	**5.0600e-003**	**0.0000**	**16.1118**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.9000e-004	3.8800e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8731	0.8731	3.0000e-005	0.0000	0.8738
Total	**4.8000e-004**	**3.9000e-004**	**3.8800e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8731**	**0.8731**	**3.0000e-005**	**0.0000**	**0.8738**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1676	1.4966	1.2186	1.9100e-003		0.0916	0.0916		0.0861	0.0861	0.0000	166.9240	166.9240	0.0407	0.0000	167.9406
Total	**0.1676**	**1.4966**	**1.2186**	**1.9100e-003**		**0.0916**	**0.0916**		**0.0861**	**0.0861**	**0.0000**	**166.9240**	**166.9240**	**0.0407**	**0.0000**	**167.9406**

3.5 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0117	0.3731	0.0809	8.6000e-004	0.0201	2.3100e-003	0.0225	5.8100e-003	2.2100e-003	8.0300e-003	0.0000	82.1383	82.1383	5.9100e-003	0.0000	82.2861
Worker	0.0434	0.0354	0.3487	8.7000e-004	0.0888	6.1000e-004	0.0894	0.0236	5.6000e-004	0.0241	0.0000	78.5171	78.5171	2.5900e-003	0.0000	78.5819
Total	**0.0551**	**0.4085**	**0.4295**	**1.7300e-003**	**0.1089**	**2.9200e-003**	**0.1118**	**0.0294**	**2.7700e-003**	**0.0322**	**0.0000**	**160.6553**	**160.6553**	**8.5000e-003**	**0.0000**	**160.8680**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1676	1.4966	1.2186	1.9100e-003		0.0916	0.0916		0.0861	0.0861	0.0000	166.9238	166.9238	0.0407	0.0000	167.9404
Total	**0.1676**	**1.4966**	**1.2186**	**1.9100e-003**		**0.0916**	**0.0916**		**0.0861**	**0.0861**	**0.0000**	**166.9238**	**166.9238**	**0.0407**	**0.0000**	**167.9404**

3.5 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0117	0.3731	0.0809	8.6000e-004	0.0201	2.3100e-003	0.0225	5.8100e-003	2.2100e-003	8.0300e-003	0.0000	82.1383	82.1383	5.9100e-003	0.0000	82.2861
Worker	0.0434	0.0354	0.3487	8.7000e-004	0.0888	6.1000e-004	0.0894	0.0236	5.6000e-004	0.0241	0.0000	78.5171	78.5171	2.5900e-003	0.0000	78.5819
Total	**0.0551**	**0.4085**	**0.4295**	**1.7300e-003**	**0.1089**	**2.9200e-003**	**0.1118**	**0.0294**	**2.7700e-003**	**0.0322**	**0.0000**	**160.6553**	**160.6553**	**8.5000e-003**	**0.0000**	**160.8680**

3.6 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.7300e-003	0.0915	0.0880	1.4000e-004		4.9500e-003	4.9500e-003		4.5500e-003	4.5500e-003	0.0000	12.2851	12.2851	3.8900e-003	0.0000	12.3823
Paving	4.2600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0130**	**0.0915**	**0.0880**	**1.4000e-004**		**4.9500e-003**	**4.9500e-003**		**4.5500e-003**	**4.5500e-003**	**0.0000**	**12.2851**	**12.2851**	**3.8900e-003**	**0.0000**	**12.3823**

3.6 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.9000e-004	3.8800e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8731	0.8731	3.0000e-005	0.0000	0.8738
Total	**4.8000e-004**	**3.9000e-004**	**3.8800e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8731**	**0.8731**	**3.0000e-005**	**0.0000**	**0.8738**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.7300e-003	0.0915	0.0880	1.4000e-004		4.9500e-003	4.9500e-003		4.5500e-003	4.5500e-003	0.0000	12.2851	12.2851	3.8900e-003	0.0000	12.3823
Paving	4.2600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0130**	**0.0915**	**0.0880**	**1.4000e-004**		**4.9500e-003**	**4.9500e-003**		**4.5500e-003**	**4.5500e-003**	**0.0000**	**12.2851**	**12.2851**	**3.8900e-003**	**0.0000**	**12.3823**

3.6 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.9000e-004	3.8800e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8731	0.8731	3.0000e-005	0.0000	0.8738
Total	**4.8000e-004**	**3.9000e-004**	**3.8800e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8731**	**0.8731**	**3.0000e-005**	**0.0000**	**0.8738**

3.7 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.4185					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7300e-003	0.0119	0.0120	2.0000e-005		8.4000e-004	8.4000e-004		8.4000e-004	8.4000e-004	0.0000	1.6596	1.6596	1.4000e-004	0.0000	1.6631
Total	**0.4202**	**0.0119**	**0.0120**	**2.0000e-005**		**8.4000e-004**	**8.4000e-004**		**8.4000e-004**	**8.4000e-004**	**0.0000**	**1.6596**	**1.6596**	**1.4000e-004**	**0.0000**	**1.6631**

3.7 Architectural Coating - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.0000e-004	6.5000e-004	6.4400e-003	2.0000e-005	1.6400e-003	1.0000e-005	1.6500e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.4503	1.4503	5.0000e-005	0.0000	1.4514
Total	**8.0000e-004**	**6.5000e-004**	**6.4400e-003**	**2.0000e-005**	**1.6400e-003**	**1.0000e-005**	**1.6500e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.4503**	**1.4503**	**5.0000e-005**	**0.0000**	**1.4514**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.4185					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7300e-003	0.0119	0.0120	2.0000e-005		8.4000e-004	8.4000e-004		8.4000e-004	8.4000e-004	0.0000	1.6596	1.6596	1.4000e-004	0.0000	1.6631
Total	**0.4202**	**0.0119**	**0.0120**	**2.0000e-005**		**8.4000e-004**	**8.4000e-004**		**8.4000e-004**	**8.4000e-004**	**0.0000**	**1.6596**	**1.6596**	**1.4000e-004**	**0.0000**	**1.6631**

3.7 Architectural Coating - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.0000e-004	6.5000e-004	6.4400e-003	2.0000e-005	1.6400e-003	1.0000e-005	1.6500e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.4503	1.4503	5.0000e-005	0.0000	1.4514
Total	**8.0000e-004**	**6.5000e-004**	**6.4400e-003**	**2.0000e-005**	**1.6400e-003**	**1.0000e-005**	**1.6500e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.4503**	**1.4503**	**5.0000e-005**	**0.0000**	**1.4514**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Increase Transit Accessibility

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1051	1.3033	1.0459	4.7500e-003	0.2537	4.8500e-003	0.2586	0.0683	4.6000e-003	0.0729	0.0000	444.3565	444.3565	0.0293	0.0000	445.0890
Unmitigated	0.1183	1.4858	1.3237	6.2000e-003	0.3540	6.5700e-003	0.3606	0.0954	6.2200e-003	0.1016	0.0000	578.9732	578.9732	0.0328	0.0000	579.7928

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	304.07	304.07	304.07	916,702	656,991
Total	304.07	304.07	304.07	916,702	656,991

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	20.40	0.00	79.60	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.546179	0.037976	0.179086	0.122965	0.018430	0.005460	0.017497	0.061396	0.001337	0.001657	0.006117	0.000817	0.001082
Parking Lot	0.546179	0.037976	0.179086	0.122965	0.018430	0.005460	0.017497	0.061396	0.001337	0.001657	0.006117	0.000817	0.001082
Unrefrigerated Warehouse-No Rail	0.487037	0.033864	0.159694	0.109650	0.026692	0.007908	0.046400	0.123300	0.000000	0.000000	0.005455	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	138.1829	138.1829	5.7000e-003	1.1800e-003	138.6773
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	138.1829	138.1829	5.7000e-003	1.1800e-003	138.6773
NaturalGas Mitigated	1.9100e-003	0.0174	0.0146	1.0000e-004		1.3200e-003	1.3200e-003		1.3200e-003	1.3200e-003	0.0000	18.9304	18.9304	3.6000e-004	3.5000e-004	19.0429
NaturalGas Unmitigated	1.9100e-003	0.0174	0.0146	1.0000e-004		1.3200e-003	1.3200e-003		1.3200e-003	1.3200e-003	0.0000	18.9304	18.9304	3.6000e-004	3.5000e-004	19.0429

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	354742	1.9100e-003	0.0174	0.0146	1.0000e-004		1.3200e-003	1.3200e-003		1.3200e-003	1.3200e-003	0.0000	18.9304	18.9304	3.6000e-004	3.5000e-004	19.0429
Total		**1.9100e-003**	**0.0174**	**0.0146**	**1.0000e-004**		**1.3200e-003**	**1.3200e-003**		**1.3200e-003**	**1.3200e-003**	**0.0000**	**18.9304**	**18.9304**	**3.6000e-004**	**3.5000e-004**	**19.0429**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	354742	1.9100e-003	0.0174	0.0146	1.0000e-004		1.3200e-003	1.3200e-003		1.3200e-003	1.3200e-003	0.0000	18.9304	18.9304	3.6000e-004	3.5000e-004	19.0429
Total		**1.9100e-003**	**0.0174**	**0.0146**	**1.0000e-004**		**1.3200e-003**	**1.3200e-003**		**1.3200e-003**	**1.3200e-003**	**0.0000**	**18.9304**	**18.9304**	**3.6000e-004**	**3.5000e-004**	**19.0429**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	21280	6.7803	2.8000e-004	6.0000e-005	6.8045
Unrefrigerated Warehouse-No Rail	412410	131.4027	5.4200e-003	1.1200e-003	131.8728
Total		**138.1829**	**5.7000e-003**	**1.1800e-003**	**138.6773**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	21280	6.7803	2.8000e-004	6.0000e-005	6.8045
Unrefrigerated Warehouse-No Rail	412410	131.4027	5.4200e-003	1.1200e-003	131.8728
Total		**138.1829**	**5.7000e-003**	**1.1800e-003**	**138.6773**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.7205	4.0000e-005	4.6600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.0100e-003	9.0100e-003	2.0000e-005	0.0000	9.6100e-003
Unmitigated	0.7205	4.0000e-005	4.6600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.0100e-003	9.0100e-003	2.0000e-005	0.0000	9.6100e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0824					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.6377					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.4000e-004	4.0000e-005	4.6600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.0100e-003	9.0100e-003	2.0000e-005	0.0000	9.6100e-003
Total	**0.7205**	**4.0000e-005**	**4.6600e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**9.0100e-003**	**9.0100e-003**	**2.0000e-005**	**0.0000**	**9.6100e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0824					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.6377					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.4000e-004	4.0000e-005	4.6600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.0100e-003	9.0100e-003	2.0000e-005	0.0000	9.6100e-003
Total	**0.7205**	**4.0000e-005**	**4.6600e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**9.0100e-003**	**9.0100e-003**	**2.0000e-005**	**0.0000**	**9.6100e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	144.3810	1.0590	0.0260	178.6090
Unmitigated	180.4762	1.3237	0.0325	223.2613

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	40.4109 / 0	180.4762	1.3237	0.0325	223.2613
Total		**180.4762**	**1.3237**	**0.0325**	**223.2613**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	32.3287 / 0	144.3810	1.0590	0.0260	178.6090
Total		**144.3810**	**1.0590**	**0.0260**	**178.6090**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	8.3358	0.4926	0.0000	20.6517
Unmitigated	33.3433	1.9705	0.0000	82.6066

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	164.26	33.3433	1.9705	0.0000	82.6066
Total		**33.3433**	**1.9705**	**0.0000**	**82.6066**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	41.065	8.3358	0.4926	0.0000	20.6517
Total		**8.3358**	**0.4926**	**0.0000**	**20.6517**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	79.2960	0.0000	0.0000	79.2960

11.2 Net New Trees

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Miscellaneous	112	79.2960	0.0000	0.0000	79.2960
Total		**79.2960**	**0.0000**	**0.0000**	**79.2960**

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Rancho Cucamonga Warehouse - South Coast AQMD Air District, Summer

Rancho Cucamonga Warehouse

South Coast AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	174.75	1000sqft	4.01	174,745.00	0
Parking Lot	152.00	Space	1.37	60,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction times are estimated

Demolition -

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	45.00
tblConstructionPhase	NumDays	230.00	86.00
tblConstructionPhase	NumDays	20.00	23.00
tblConstructionPhase	NumDays	20.00	23.00
tblConstructionPhase	NumDays	20.00	21.00
tblConstructionPhase	NumDays	10.00	20.00
tblConstructionPhase	PhaseEndDate	10/22/2019	5/31/2019
tblConstructionPhase	PhaseEndDate	8/27/2019	2/28/2019
tblConstructionPhase	PhaseEndDate	8/28/2018	8/31/2018
tblConstructionPhase	PhaseEndDate	10/9/2018	10/31/2018
tblConstructionPhase	PhaseEndDate	9/24/2019	3/31/2019
tblConstructionPhase	PhaseEndDate	9/11/2018	9/30/2018
tblConstructionPhase	PhaseStartDate	9/25/2019	4/1/2019
tblConstructionPhase	PhaseStartDate	10/10/2018	11/1/2018
tblConstructionPhase	PhaseStartDate	9/12/2018	10/1/2018
tblConstructionPhase	PhaseStartDate	8/28/2019	3/1/2019
tblConstructionPhase	PhaseStartDate	8/29/2018	9/1/2018
tblGrading	AcresOfGrading	11.50	10.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	4.6597	48.2683	23.7248	0.0493	18.2675	2.5785	20.8460	9.9840	2.3722	12.3563	0.0000	4,914.8596	4,914.8596	1.2003	0.0000	4,933.7909

2019	36.7377	25.8787	22.6910	0.0488	1.3562	1.3280	2.6842	0.3653	1.2489	1.6143	0.0000	4,838.0161	4,838.0161	0.7392	0.0000	4,856.4956
Maximum	**36.7377**	**48.2683**	**23.7248**	**0.0493**	**18.2675**	**2.5785**	**20.8460**	**9.9840**	**2.3722**	**12.3563**	**0.0000**	**4,914.8596**	**4,914.8596**	**1.2003**	**0.0000**	**4,933.7909**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	4.6597	48.2683	23.7248	0.0493	7.2470	2.5785	9.8256	3.9263	2.3722	6.2986	0.0000	4,914.8596	4,914.8596	1.2003	0.0000	4,933.7909
2019	36.7377	25.8787	22.6910	0.0488	1.3562	1.3280	2.6842	0.3653	1.2489	1.6143	0.0000	4,838.0161	4,838.0161	0.7392	0.0000	4,856.4956
Maximum	**36.7377**	**48.2683**	**23.7248**	**0.0493**	**7.2470**	**2.5785**	**9.8256**	**3.9263**	**2.3722**	**6.2986**	**0.0000**	**4,914.8596**	**4,914.8596**	**1.2003**	**0.0000**	**4,933.7909**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**56.16**	**0.00**	**46.84**	**58.53**	**0.00**	**43.36**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.9331	3.1000e-004	0.0336	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0715	0.0715	1.9000e-004		0.0763
Energy	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3376	114.3376	2.1900e-003	2.1000e-003	115.0170
Mobile	0.6595	3.4641	9.7435	0.0340	2.6753	0.0331	2.7083	0.7158	0.0310	0.7469		3,451.3147	3,451.3147	0.1664		3,455.4747

Total	**4.6031**	**3.5597**	**9.8571**	**0.0346**	**2.6753**	**0.0404**	**2.7157**	**0.7158**	**0.0384**	**0.7543**		**3,565.7238**	**3,565.7238**	**0.1688**	**2.1000e-003**	**3,570.5681**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.9331	3.1000e-004	0.0336	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0715	0.0715	1.9000e-004		0.0763
Energy	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3376	114.3376	2.1900e-003	2.1000e-003	115.0170
Mobile	0.6400	3.3257	9.2192	0.0320	2.5113	0.0312	2.5425	0.6720	0.0292	0.7012		3,249.6134	3,249.6134	0.1577		3,253.5566
Total	**4.5835**	**3.4213**	**9.3328**	**0.0326**	**2.5113**	**0.0385**	**2.5498**	**0.6720**	**0.0366**	**0.7086**		**3,364.0225**	**3,364.0225**	**0.1601**	**2.1000e-003**	**3,368.6500**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.42**	**3.89**	**5.32**	**5.76**	**6.13**	**4.73**	**6.11**	**6.13**	**4.69**	**6.06**	**0.00**	**5.66**	**5.66**	**5.14**	**0.00**	**5.66**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	8/1/2018	8/31/2018	5	23	
2	Site Preparation	Site Preparation	9/1/2018	9/30/2018	5	20	
3	Grading	Grading	10/1/2018	10/31/2018	5	23	
4	Building Construction	Building Construction	11/1/2018	2/28/2019	5	86	
5	Paving	Paving	3/1/2019	3/31/2019	5	21	
6	Architectural Coating	Architectural Coating	4/1/2019	5/31/2019	5	45	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 1.37

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 262,118; Non-Residential Outdoor: 87,373; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	1	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	74.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Grading	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	99.00	39.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6986	0.0000	0.6986	0.1058	0.0000	0.1058			0.0000			0.0000
Off-Road	3.7190	38.3225	22.3040	0.0388		1.9386	1.9386		1.8048	1.8048		3,871.7665	3,871.7665	1.0667		3,898.4344
Total	**3.7190**	**38.3225**	**22.3040**	**0.0388**	**0.6986**	**1.9386**	**2.6372**	**0.1058**	**1.8048**	**1.9106**		**3,871.7665**	**3,871.7665**	**1.0667**		**3,898.4344**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0279	0.9906	0.1834	2.5600e-003	0.0562	3.8100e-003	0.0600	0.0154	3.6400e-003	0.0191		275.6616	275.6616	0.0189		276.1330
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Worker	0.0808	0.0580	0.7526	1.8400e-003	0.1677	1.3400e-003	0.1690	0.0445	1.2300e-003	0.0457		182.9028	182.9028	6.2400e-003		183.0587
Total	**0.1087**	**1.0486**	**0.9361**	**4.4000e-003**	**0.2239**	**5.1500e-003**	**0.2290**	**0.0599**	**4.8700e-003**	**0.0648**		**458.5644**	**458.5644**	**0.0251**		**459.1916**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2725	0.0000	0.2725	0.0413	0.0000	0.0413			0.0000			0.0000
Off-Road	3.7190	38.3225	22.3040	0.0388		1.9386	1.9386		1.8048	1.8048	0.0000	3,871.7665	3,871.7665	1.0667		3,898.4344
Total	**3.7190**	**38.3225**	**22.3040**	**0.0388**	**0.2725**	**1.9386**	**2.2110**	**0.0413**	**1.8048**	**1.8461**	**0.0000**	**3,871.7665**	**3,871.7665**	**1.0667**		**3,898.4344**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0279	0.9906	0.1834	2.5600e-003	0.0562	3.8100e-003	0.0600	0.0154	3.6400e-003	0.0191		275.6616	275.6616	0.0189		276.1330
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0808	0.0580	0.7526	1.8400e-003	0.1677	1.3400e-003	0.1690	0.0445	1.2300e-003	0.0457		182.9028	182.9028	6.2400e-003		183.0587
Total	**0.1087**	**1.0486**	**0.9361**	**4.4000e-003**	**0.2239**	**5.1500e-003**	**0.2290**	**0.0599**	**4.8700e-003**	**0.0648**		**458.5644**	**458.5644**	**0.0251**		**459.1916**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.5627	48.1988	22.4763	0.0380		2.5769	2.5769		2.3708	2.3708		3,831.6239	3,831.6239	1.1928		3,861.4448
Total	**4.5627**	**48.1988**	**22.4763**	**0.0380**	**18.0663**	**2.5769**	**20.6432**	**9.9307**	**2.3708**	**12.3014**		**3,831.6239**	**3,831.6239**	**1.1928**		**3,861.4448**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0970	0.0695	0.9032	2.2100e-003	0.2012	1.6000e-003	0.2028	0.0534	1.4800e-003	0.0548		219.4833	219.4833	7.4800e-003		219.6704
Total	**0.0970**	**0.0695**	**0.9032**	**2.2100e-003**	**0.2012**	**1.6000e-003**	**0.2028**	**0.0534**	**1.4800e-003**	**0.0548**		**219.4833**	**219.4833**	**7.4800e-003**		**219.6704**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	4.5627	48.1988	22.4763	0.0380		2.5769	2.5769		2.3708	2.3708	0.0000	3,831.6239	3,831.6239	1.1928		3,861.4448
Total	**4.5627**	**48.1988**	**22.4763**	**0.0380**	**7.0458**	**2.5769**	**9.6228**	**3.8730**	**2.3708**	**6.2437**	**0.0000**	**3,831.6239**	**3,831.6239**	**1.1928**		**3,861.4448**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0970	0.0695	0.9032	2.2100e-003	0.2012	1.6000e-003	0.2028	0.0534	1.4800e-003	0.0548		219.4833	219.4833	7.4800e-003		219.6704
Total	**0.0970**	**0.0695**	**0.9032**	**2.2100e-003**	**0.2012**	**1.6000e-003**	**0.2028**	**0.0534**	**1.4800e-003**	**0.0548**		**219.4833**	**219.4833**	**7.4800e-003**		**219.6704**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.4832	0.0000	6.4832	3.3600	0.0000	3.3600			0.0000			0.0000
Off-Road	2.7733	30.6725	16.5770	0.0297		1.5513	1.5513		1.4272	1.4272		2,988.0216	2,988.0216	0.9302		3,011.2769
Total	**2.7733**	**30.6725**	**16.5770**	**0.0297**	**6.4832**	**1.5513**	**8.0345**	**3.3600**	**1.4272**	**4.7872**		**2,988.0216**	**2,988.0216**	**0.9302**		**3,011.2769**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0808	0.0580	0.7526	1.8400e-003	0.1677	1.3400e-003	0.1690	0.0445	1.2300e-003	0.0457		182.9028	182.9028	6.2400e-003		183.0587
Total	**0.0808**	**0.0580**	**0.7526**	**1.8400e-003**	**0.1677**	**1.3400e-003**	**0.1690**	**0.0445**	**1.2300e-003**	**0.0457**		**182.9028**	**182.9028**	**6.2400e-003**		**183.0587**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.5284	0.0000	2.5284	1.3104	0.0000	1.3104			0.0000			0.0000
Off-Road	2.7733	30.6725	16.5770	0.0297		1.5513	1.5513		1.4272	1.4272	0.0000	2,988.0216	2,988.0216	0.9302		3,011.2769
Total	**2.7733**	**30.6725**	**16.5770**	**0.0297**	**2.5284**	**1.5513**	**4.0798**	**1.3104**	**1.4272**	**2.7376**	**0.0000**	**2,988.0216**	**2,988.0216**	**0.9302**		**3,011.2769**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0808	0.0580	0.7526	1.8400e-003	0.1677	1.3400e-003	0.1690	0.0445	1.2300e-003	0.0457		182.9028	182.9028	6.2400e-003		183.0587
Total	**0.0808**	**0.0580**	**0.7526**	**1.8400e-003**	**0.1677**	**1.3400e-003**	**0.1690**	**0.0445**	**1.2300e-003**	**0.0457**		**182.9028**	**182.9028**	**6.2400e-003**		**183.0587**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Off-Road	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099		2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**		**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1660	4.7262	1.1770	0.0102	0.2496	0.0345	0.2841	0.0719	0.0330	0.1049		1,086.7663	1,086.7663	0.0740		1,088.6155
Worker	0.5334	0.3825	4.9674	0.0121	1.1066	8.8200e-003	1.1154	0.2935	8.1300e-003	0.3016		1,207.1581	1,207.1581	0.0412		1,208.1872

Total	**0.6994**	**5.1086**	**6.1444**	**0.0223**	**1.3562**	**0.0434**	**1.3996**	**0.3653**	**0.0412**	**0.4065**		**2,293.9245**	**2,293.9245**	**0.1151**		**2,296.8026**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099	0.0000	2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**	**0.0000**	**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1660	4.7262	1.1770	0.0102	0.2496	0.0345	0.2841	0.0719	0.0330	0.1049		1,086.7663	1,086.7663	0.0740		1,088.6155
Worker	0.5334	0.3825	4.9674	0.0121	1.1066	8.8200e-003	1.1154	0.2935	8.1300e-003	0.3016		1,207.1581	1,207.1581	0.0412		1,208.1872
Total	**0.6994**	**5.1086**	**6.1444**	**0.0223**	**1.3562**	**0.0434**	**1.3996**	**0.3653**	**0.0412**	**0.4065**		**2,293.9245**	**2,293.9245**	**0.1151**		**2,296.8026**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1504	4.4625	1.0788	0.0101	0.2496	0.0296	0.2792	0.0719	0.0283	0.1001		1,077.2568	1,077.2568	0.0713		1,079.0388
Worker	0.4849	0.3374	4.4484	0.0117	1.1066	8.6100e-003	1.1152	0.2935	7.9300e-003	0.3014		1,169.1791	1,169.1791	0.0366		1,170.0933
Total	**0.6352**	**4.7999**	**5.5272**	**0.0219**	**1.3562**	**0.0382**	**1.3944**	**0.3653**	**0.0362**	**0.4016**		**2,246.4360**	**2,246.4360**	**0.1079**		**2,249.1321**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1504	4.4625	1.0788	0.0101	0.2496	0.0296	0.2792	0.0719	0.0283	0.1001		1,077.2568	1,077.2568	0.0713		1,079.0388
Worker	0.4849	0.3374	4.4484	0.0117	1.1066	8.6100e-003	1.1152	0.2935	7.9300e-003	0.3014		1,169.1791	1,169.1791	0.0366		1,170.0933
Total	**0.6352**	**4.7999**	**5.5272**	**0.0219**	**1.3562**	**0.0382**	**1.3944**	**0.3653**	**0.0362**	**0.4016**		**2,246.4360**	**2,246.4360**	**0.1079**		**2,249.1321**

3.6 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.1709					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6254**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0735	0.0511	0.6740	1.7800e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		177.1484	177.1484	5.5400e-003		177.2869
Total	**0.0735**	**0.0511**	**0.6740**	**1.7800e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**177.1484**	**177.1484**	**5.5400e-003**		**177.2869**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.1709					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6254**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0735	0.0511	0.6740	1.7800e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		177.1484	177.1484	5.5400e-003		177.2869
Total	**0.0735**	**0.0511**	**0.6740**	**1.7800e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**177.1484**	**177.1484**	**5.5400e-003**		**177.2869**

3.7 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Archit. Coating	36.3733					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		282.0423
Total	**36.6398**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**282.0423**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0980	0.0682	0.8987	2.3700e-003	0.2236	1.7400e-003	0.2253	0.0593	1.6000e-003	0.0609		236.1978	236.1978	7.3900e-003		236.3825

Total	**0.0980**	**0.0682**	**0.8987**	**2.3700e-003**	**0.2236**	**1.7400e-003**	**0.2253**	**0.0593**	**1.6000e-003**	**0.0609**		**236.1978**	**236.1978**	**7.3900e-003**		**236.3825**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	36.3733					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		282.0423
Total	**36.6398**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**282.0423**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0980	0.0682	0.8987	2.3700e-003	0.2236	1.7400e-003	0.2253	0.0593	1.6000e-003	0.0609		236.1978	236.1978	7.3900e-003		236.3825
Total	**0.0980**	**0.0682**	**0.8987**	**2.3700e-003**	**0.2236**	**1.7400e-003**	**0.2253**	**0.0593**	**1.6000e-003**	**0.0609**		**236.1978**	**236.1978**	**7.3900e-003**		**236.3825**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Diversity

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.6400	3.3257	9.2192	0.0320	2.5113	0.0312	2.5425	0.6720	0.0292	0.7012		3,249.6134	3,249.6134	0.1577		3,253.5566
Unmitigated	0.6595	3.4641	9.7435	0.0340	2.6753	0.0331	2.7083	0.7158	0.0310	0.7469		3,451.3147	3,451.3147	0.1664		3,455.4747

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	293.57	293.57	293.57	1,258,165	1,181,064
Total	293.57	293.57	293.57	1,258,165	1,181,064

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No Rail	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.547828	0.043645	0.199892	0.122290	0.016774	0.005862	0.020637	0.032653	0.002037	0.001944	0.004777	0.000705	0.000956
Unrefrigerated Warehouse-No Rail	0.547828	0.043645	0.199892	0.122290	0.016774	0.005862	0.020637	0.032653	0.002037	0.001944	0.004777	0.000705	0.000956

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install High Efficiency Lighting

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3376	114.3376	2.1900e-003	2.1000e-003	115.0170
NaturalGas Unmitigated	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3376	114.3376	2.1900e-003	2.1000e-003	115.0170

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	971.869	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3376	114.3376	2.1900e-003	2.1000e-003	115.0170
Total		**0.0105**	**0.0953**	**0.0800**	**5.7000e-004**		**7.2400e-003**	**7.2400e-003**		**7.2400e-003**	**7.2400e-003**		**114.3376**	**114.3376**	**2.1900e-003**	**2.1000e-003**	**115.0170**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0.971869	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3376	114.3376	2.1900e-003	2.1000e-003	115.0170
Total		**0.0105**	**0.0953**	**0.0800**	**5.7000e-004**		**7.2400e-003**	**7.2400e-003**		**7.2400e-003**	**7.2400e-003**		**114.3376**	**114.3376**	**2.1900e-003**	**2.1000e-003**	**115.0170**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.9331	3.1000e-004	0.0336	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0715	0.0715	1.9000e-004		0.0763
Unmitigated	3.9331	3.1000e-004	0.0336	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0715	0.0715	1.9000e-004		0.0763

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

SubCategory	lb/day										lb/day					
Architectural Coating	0.4484					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.4815					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.1600e-003	3.1000e-004	0.0336	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0715	0.0715	1.9000e-004		0.0763
Total	**3.9331**	**3.1000e-004**	**0.0336**	**0.0000**		**1.2000e-004**	**1.2000e-004**		**1.2000e-004**	**1.2000e-004**		**0.0715**	**0.0715**	**1.9000e-004**		**0.0763**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.4484					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.4815					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.1600e-003	3.1000e-004	0.0336	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0715	0.0715	1.9000e-004		0.0763
Total	**3.9331**	**3.1000e-004**	**0.0336**	**0.0000**		**1.2000e-004**	**1.2000e-004**		**1.2000e-004**	**1.2000e-004**		**0.0715**	**0.0715**	**1.9000e-004**		**0.0763**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Rancho Cucamonga Warehouse - South Coast AQMD Air District, Summer

Rancho Cucamonga Warehouse

South Coast AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	174.75	1000sqft	4.01	174,745.00	0
Parking Lot	152.00	Space	1.37	60,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction times are estimated

Demolition -

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	45.00
tblConstructionPhase	NumDays	230.00	86.00
tblConstructionPhase	NumDays	20.00	23.00
tblConstructionPhase	NumDays	20.00	23.00
tblConstructionPhase	NumDays	20.00	21.00
tblConstructionPhase	NumDays	10.00	20.00
tblConstructionPhase	PhaseEndDate	10/22/2019	5/31/2019
tblConstructionPhase	PhaseEndDate	8/27/2019	2/28/2019
tblConstructionPhase	PhaseEndDate	8/28/2018	8/31/2018
tblConstructionPhase	PhaseEndDate	10/9/2018	10/31/2018
tblConstructionPhase	PhaseEndDate	9/24/2019	3/31/2019
tblConstructionPhase	PhaseEndDate	9/11/2018	9/30/2018
tblConstructionPhase	PhaseStartDate	9/25/2019	4/1/2019
tblConstructionPhase	PhaseStartDate	10/10/2018	11/1/2018
tblConstructionPhase	PhaseStartDate	9/12/2018	10/1/2018
tblConstructionPhase	PhaseStartDate	8/28/2019	3/1/2019
tblConstructionPhase	PhaseStartDate	8/29/2018	9/1/2018
tblGrading	AcresOfGrading	11.50	10.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	4.6597	48.2683	23.7248	0.0493	18.2675	2.5785	20.8460	9.9840	2.3722	12.3563	0.0000	4,914.8596	4,914.8596	1.2003	0.0000	4,933.7909

2019	36.7377	25.8787	22.6910	0.0488	1.3562	1.3280	2.6842	0.3653	1.2489	1.6143	0.0000	4,838.0161	4,838.0161	0.7392	0.0000	4,856.4956
Maximum	**36.7377**	**48.2683**	**23.7248**	**0.0493**	**18.2675**	**2.5785**	**20.8460**	**9.9840**	**2.3722**	**12.3563**	**0.0000**	**4,914.8596**	**4,914.8596**	**1.2003**	**0.0000**	**4,933.7909**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	4.6597	48.2683	23.7248	0.0493	7.2470	2.5785	9.8256	3.9263	2.3722	6.2986	0.0000	4,914.8596	4,914.8596	1.2003	0.0000	4,933.7909
2019	36.7377	25.8787	22.6910	0.0488	1.3562	1.3280	2.6842	0.3653	1.2489	1.6143	0.0000	4,838.0161	4,838.0161	0.7392	0.0000	4,856.4956
Maximum	**36.7377**	**48.2683**	**23.7248**	**0.0493**	**7.2470**	**2.5785**	**9.8256**	**3.9263**	**2.3722**	**6.2986**	**0.0000**	**4,914.8596**	**4,914.8596**	**1.2003**	**0.0000**	**4,933.7909**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**56.16**	**0.00**	**46.84**	**58.53**	**0.00**	**43.36**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.9331	3.1000e-004	0.0336	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0715	0.0715	1.9000e-004		0.0763
Energy	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3376	114.3376	2.1900e-003	2.1000e-003	115.0170
Mobile	0.6595	3.4641	9.7435	0.0340	2.6753	0.0331	2.7083	0.7158	0.0310	0.7469		3,451.3147	3,451.3147	0.1664		3,455.4747

Total	**4.6031**	**3.5597**	**9.8571**	**0.0346**	**2.6753**	**0.0404**	**2.7157**	**0.7158**	**0.0384**	**0.7543**		**3,565.7238**	**3,565.7238**	**0.1688**	**2.1000e-003**	**3,570.5681**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.9331	3.1000e-004	0.0336	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0715	0.0715	1.9000e-004		0.0763
Energy	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3376	114.3376	2.1900e-003	2.1000e-003	115.0170
Mobile	0.6400	3.3257	9.2192	0.0320	2.5113	0.0312	2.5425	0.6720	0.0292	0.7012		3,249.6134	3,249.6134	0.1577		3,253.5566
Total	**4.5835**	**3.4213**	**9.3328**	**0.0326**	**2.5113**	**0.0385**	**2.5498**	**0.6720**	**0.0366**	**0.7086**		**3,364.0225**	**3,364.0225**	**0.1601**	**2.1000e-003**	**3,368.6500**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.42**	**3.89**	**5.32**	**5.76**	**6.13**	**4.73**	**6.11**	**6.13**	**4.69**	**6.06**	**0.00**	**5.66**	**5.66**	**5.14**	**0.00**	**5.66**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	8/1/2018	8/31/2018	5	23	
2	Site Preparation	Site Preparation	9/1/2018	9/30/2018	5	20	
3	Grading	Grading	10/1/2018	10/31/2018	5	23	
4	Building Construction	Building Construction	11/1/2018	2/28/2019	5	86	
5	Paving	Paving	3/1/2019	3/31/2019	5	21	
6	Architectural Coating	Architectural Coating	4/1/2019	5/31/2019	5	45	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 1.37

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 262,118; Non-Residential Outdoor: 87,373; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	1	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	74.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Grading	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	99.00	39.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6986	0.0000	0.6986	0.1058	0.0000	0.1058			0.0000			0.0000
Off-Road	3.7190	38.3225	22.3040	0.0388		1.9386	1.9386		1.8048	1.8048		3,871.7665	3,871.7665	1.0667		3,898.4344
Total	**3.7190**	**38.3225**	**22.3040**	**0.0388**	**0.6986**	**1.9386**	**2.6372**	**0.1058**	**1.8048**	**1.9106**		**3,871.7665**	**3,871.7665**	**1.0667**		**3,898.4344**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0279	0.9906	0.1834	2.5600e-003	0.0562	3.8100e-003	0.0600	0.0154	3.6400e-003	0.0191		275.6616	275.6616	0.0189		276.1330
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Worker	0.0808	0.0580	0.7526	1.8400e-003	0.1677	1.3400e-003	0.1690	0.0445	1.2300e-003	0.0457		182.9028	182.9028	6.2400e-003		183.0587
Total	**0.1087**	**1.0486**	**0.9361**	**4.4000e-003**	**0.2239**	**5.1500e-003**	**0.2290**	**0.0599**	**4.8700e-003**	**0.0648**		**458.5644**	**458.5644**	**0.0251**		**459.1916**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2725	0.0000	0.2725	0.0413	0.0000	0.0413			0.0000			0.0000
Off-Road	3.7190	38.3225	22.3040	0.0388		1.9386	1.9386		1.8048	1.8048	0.0000	3,871.7665	3,871.7665	1.0667		3,898.4344
Total	**3.7190**	**38.3225**	**22.3040**	**0.0388**	**0.2725**	**1.9386**	**2.2110**	**0.0413**	**1.8048**	**1.8461**	**0.0000**	**3,871.7665**	**3,871.7665**	**1.0667**		**3,898.4344**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0279	0.9906	0.1834	2.5600e-003	0.0562	3.8100e-003	0.0600	0.0154	3.6400e-003	0.0191		275.6616	275.6616	0.0189		276.1330
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0808	0.0580	0.7526	1.8400e-003	0.1677	1.3400e-003	0.1690	0.0445	1.2300e-003	0.0457		182.9028	182.9028	6.2400e-003		183.0587
Total	**0.1087**	**1.0486**	**0.9361**	**4.4000e-003**	**0.2239**	**5.1500e-003**	**0.2290**	**0.0599**	**4.8700e-003**	**0.0648**		**458.5644**	**458.5644**	**0.0251**		**459.1916**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.5627	48.1988	22.4763	0.0380		2.5769	2.5769		2.3708	2.3708		3,831.6239	3,831.6239	1.1928		3,861.4448
Total	**4.5627**	**48.1988**	**22.4763**	**0.0380**	**18.0663**	**2.5769**	**20.6432**	**9.9307**	**2.3708**	**12.3014**		**3,831.6239**	**3,831.6239**	**1.1928**		**3,861.4448**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0970	0.0695	0.9032	2.2100e-003	0.2012	1.6000e-003	0.2028	0.0534	1.4800e-003	0.0548		219.4833	219.4833	7.4800e-003		219.6704
Total	**0.0970**	**0.0695**	**0.9032**	**2.2100e-003**	**0.2012**	**1.6000e-003**	**0.2028**	**0.0534**	**1.4800e-003**	**0.0548**		**219.4833**	**219.4833**	**7.4800e-003**		**219.6704**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	4.5627	48.1988	22.4763	0.0380		2.5769	2.5769		2.3708	2.3708	0.0000	3,831.6239	3,831.6239	1.1928		3,861.4448
Total	**4.5627**	**48.1988**	**22.4763**	**0.0380**	**7.0458**	**2.5769**	**9.6228**	**3.8730**	**2.3708**	**6.2437**	**0.0000**	**3,831.6239**	**3,831.6239**	**1.1928**		**3,861.4448**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0970	0.0695	0.9032	2.2100e-003	0.2012	1.6000e-003	0.2028	0.0534	1.4800e-003	0.0548		219.4833	219.4833	7.4800e-003		219.6704
Total	**0.0970**	**0.0695**	**0.9032**	**2.2100e-003**	**0.2012**	**1.6000e-003**	**0.2028**	**0.0534**	**1.4800e-003**	**0.0548**		**219.4833**	**219.4833**	**7.4800e-003**		**219.6704**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.4832	0.0000	6.4832	3.3600	0.0000	3.3600			0.0000			0.0000
Off-Road	2.7733	30.6725	16.5770	0.0297		1.5513	1.5513		1.4272	1.4272		2,988.0216	2,988.0216	0.9302		3,011.2769
Total	**2.7733**	**30.6725**	**16.5770**	**0.0297**	**6.4832**	**1.5513**	**8.0345**	**3.3600**	**1.4272**	**4.7872**		**2,988.0216**	**2,988.0216**	**0.9302**		**3,011.2769**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0808	0.0580	0.7526	1.8400e-003	0.1677	1.3400e-003	0.1690	0.0445	1.2300e-003	0.0457		182.9028	182.9028	6.2400e-003		183.0587
Total	**0.0808**	**0.0580**	**0.7526**	**1.8400e-003**	**0.1677**	**1.3400e-003**	**0.1690**	**0.0445**	**1.2300e-003**	**0.0457**		**182.9028**	**182.9028**	**6.2400e-003**		**183.0587**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.5284	0.0000	2.5284	1.3104	0.0000	1.3104			0.0000			0.0000
Off-Road	2.7733	30.6725	16.5770	0.0297		1.5513	1.5513		1.4272	1.4272	0.0000	2,988.0216	2,988.0216	0.9302		3,011.2769
Total	**2.7733**	**30.6725**	**16.5770**	**0.0297**	**2.5284**	**1.5513**	**4.0798**	**1.3104**	**1.4272**	**2.7376**	**0.0000**	**2,988.0216**	**2,988.0216**	**0.9302**		**3,011.2769**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0808	0.0580	0.7526	1.8400e-003	0.1677	1.3400e-003	0.1690	0.0445	1.2300e-003	0.0457		182.9028	182.9028	6.2400e-003		183.0587
Total	**0.0808**	**0.0580**	**0.7526**	**1.8400e-003**	**0.1677**	**1.3400e-003**	**0.1690**	**0.0445**	**1.2300e-003**	**0.0457**		**182.9028**	**182.9028**	**6.2400e-003**		**183.0587**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Off-Road	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099		2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**		**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1660	4.7262	1.1770	0.0102	0.2496	0.0345	0.2841	0.0719	0.0330	0.1049		1,086.7663	1,086.7663	0.0740		1,088.6155
Worker	0.5334	0.3825	4.9674	0.0121	1.1066	8.8200e-003	1.1154	0.2935	8.1300e-003	0.3016		1,207.1581	1,207.1581	0.0412		1,208.1872

Total	**0.6994**	**5.1086**	**6.1444**	**0.0223**	**1.3562**	**0.0434**	**1.3996**	**0.3653**	**0.0412**	**0.4065**		**2,293.9245**	**2,293.9245**	**0.1151**		**2,296.8026**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099	0.0000	2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**	**0.0000**	**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1660	4.7262	1.1770	0.0102	0.2496	0.0345	0.2841	0.0719	0.0330	0.1049		1,086.7663	1,086.7663	0.0740		1,088.6155
Worker	0.5334	0.3825	4.9674	0.0121	1.1066	8.8200e-003	1.1154	0.2935	8.1300e-003	0.3016		1,207.1581	1,207.1581	0.0412		1,208.1872
Total	**0.6994**	**5.1086**	**6.1444**	**0.0223**	**1.3562**	**0.0434**	**1.3996**	**0.3653**	**0.0412**	**0.4065**		**2,293.9245**	**2,293.9245**	**0.1151**		**2,296.8026**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1504	4.4625	1.0788	0.0101	0.2496	0.0296	0.2792	0.0719	0.0283	0.1001		1,077.2568	1,077.2568	0.0713		1,079.0388
Worker	0.4849	0.3374	4.4484	0.0117	1.1066	8.6100e-003	1.1152	0.2935	7.9300e-003	0.3014		1,169.1791	1,169.1791	0.0366		1,170.0933
Total	**0.6352**	**4.7999**	**5.5272**	**0.0219**	**1.3562**	**0.0382**	**1.3944**	**0.3653**	**0.0362**	**0.4016**		**2,246.4360**	**2,246.4360**	**0.1079**		**2,249.1321**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1504	4.4625	1.0788	0.0101	0.2496	0.0296	0.2792	0.0719	0.0283	0.1001		1,077.2568	1,077.2568	0.0713		1,079.0388
Worker	0.4849	0.3374	4.4484	0.0117	1.1066	8.6100e-003	1.1152	0.2935	7.9300e-003	0.3014		1,169.1791	1,169.1791	0.0366		1,170.0933
Total	**0.6352**	**4.7999**	**5.5272**	**0.0219**	**1.3562**	**0.0382**	**1.3944**	**0.3653**	**0.0362**	**0.4016**		**2,246.4360**	**2,246.4360**	**0.1079**		**2,249.1321**

3.6 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.1709					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6254**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0735	0.0511	0.6740	1.7800e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		177.1484	177.1484	5.5400e-003		177.2869
Total	**0.0735**	**0.0511**	**0.6740**	**1.7800e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**177.1484**	**177.1484**	**5.5400e-003**		**177.2869**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.1709					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6254**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0735	0.0511	0.6740	1.7800e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		177.1484	177.1484	5.5400e-003		177.2869
Total	**0.0735**	**0.0511**	**0.6740**	**1.7800e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**177.1484**	**177.1484**	**5.5400e-003**		**177.2869**

3.7 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Archit. Coating	36.3733					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		282.0423
Total	**36.6398**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**282.0423**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0980	0.0682	0.8987	2.3700e-003	0.2236	1.7400e-003	0.2253	0.0593	1.6000e-003	0.0609		236.1978	236.1978	7.3900e-003		236.3825

Total	**0.0980**	**0.0682**	**0.8987**	**2.3700e-003**	**0.2236**	**1.7400e-003**	**0.2253**	**0.0593**	**1.6000e-003**	**0.0609**		**236.1978**	**236.1978**	**7.3900e-003**		**236.3825**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	36.3733					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		282.0423
Total	**36.6398**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**282.0423**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0980	0.0682	0.8987	2.3700e-003	0.2236	1.7400e-003	0.2253	0.0593	1.6000e-003	0.0609		236.1978	236.1978	7.3900e-003		236.3825
Total	**0.0980**	**0.0682**	**0.8987**	**2.3700e-003**	**0.2236**	**1.7400e-003**	**0.2253**	**0.0593**	**1.6000e-003**	**0.0609**		**236.1978**	**236.1978**	**7.3900e-003**		**236.3825**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Diversity

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.6400	3.3257	9.2192	0.0320	2.5113	0.0312	2.5425	0.6720	0.0292	0.7012		3,249.6134	3,249.6134	0.1577		3,253.5566
Unmitigated	0.6595	3.4641	9.7435	0.0340	2.6753	0.0331	2.7083	0.7158	0.0310	0.7469		3,451.3147	3,451.3147	0.1664		3,455.4747

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	293.57	293.57	293.57	1,258,165	1,181,064
Total	293.57	293.57	293.57	1,258,165	1,181,064

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No Rail	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.547828	0.043645	0.199892	0.122290	0.016774	0.005862	0.020637	0.032653	0.002037	0.001944	0.004777	0.000705	0.000956
Unrefrigerated Warehouse-No Rail	0.547828	0.043645	0.199892	0.122290	0.016774	0.005862	0.020637	0.032653	0.002037	0.001944	0.004777	0.000705	0.000956

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install High Efficiency Lighting

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3376	114.3376	2.1900e-003	2.1000e-003	115.0170
NaturalGas Unmitigated	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3376	114.3376	2.1900e-003	2.1000e-003	115.0170

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	971.869	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3376	114.3376	2.1900e-003	2.1000e-003	115.0170
Total		**0.0105**	**0.0953**	**0.0800**	**5.7000e-004**		**7.2400e-003**	**7.2400e-003**		**7.2400e-003**	**7.2400e-003**		**114.3376**	**114.3376**	**2.1900e-003**	**2.1000e-003**	**115.0170**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0.971869	0.0105	0.0953	0.0800	5.7000e-004		7.2400e-003	7.2400e-003		7.2400e-003	7.2400e-003		114.3376	114.3376	2.1900e-003	2.1000e-003	115.0170
Total		**0.0105**	**0.0953**	**0.0800**	**5.7000e-004**		**7.2400e-003**	**7.2400e-003**		**7.2400e-003**	**7.2400e-003**		**114.3376**	**114.3376**	**2.1900e-003**	**2.1000e-003**	**115.0170**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.9331	3.1000e-004	0.0336	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0715	0.0715	1.9000e-004		0.0763
Unmitigated	3.9331	3.1000e-004	0.0336	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0715	0.0715	1.9000e-004		0.0763

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

SubCategory	lb/day										lb/day					
Architectural Coating	0.4484					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.4815					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.1600e-003	3.1000e-004	0.0336	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0715	0.0715	1.9000e-004		0.0763
Total	**3.9331**	**3.1000e-004**	**0.0336**	**0.0000**		**1.2000e-004**	**1.2000e-004**		**1.2000e-004**	**1.2000e-004**		**0.0715**	**0.0715**	**1.9000e-004**		**0.0763**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.4484					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.4815					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.1600e-003	3.1000e-004	0.0336	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0715	0.0715	1.9000e-004		0.0763
Total	**3.9331**	**3.1000e-004**	**0.0336**	**0.0000**		**1.2000e-004**	**1.2000e-004**		**1.2000e-004**	**1.2000e-004**		**0.0715**	**0.0715**	**1.9000e-004**		**0.0763**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Rancho Cucamonga Cumulative Development - South Coast AQMD Air District, Summer

Rancho Cucamonga Cumulative Development

South Coast AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	213.00	Dwelling Unit	69.16	383,400.00	609
Strip Mall	25.60	1000sqft	0.59	25,595.00	0
Refrigerated Warehouse-No Rail	174.75	1000sqft	4.01	174,745.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2021
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction times are estimated.

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	75.00	87.00
tblConstructionPhase	NumDays	1,110.00	132.00
tblConstructionPhase	NumDays	70.00	43.00
tblConstructionPhase	NumDays	110.00	43.00
tblConstructionPhase	NumDays	75.00	43.00
tblConstructionPhase	NumDays	40.00	43.00
tblConstructionPhase	PhaseEndDate	9/2/2024	6/30/2020
tblConstructionPhase	PhaseEndDate	2/5/2024	12/31/2019
tblConstructionPhase	PhaseEndDate	4/8/2019	2/28/2019
tblConstructionPhase	PhaseEndDate	11/4/2019	6/30/2019
tblConstructionPhase	PhaseEndDate	5/20/2024	2/29/2020
tblConstructionPhase	PhaseEndDate	6/3/2019	4/30/2019
tblConstructionPhase	PhaseStartDate	5/21/2024	3/1/2020
tblConstructionPhase	PhaseStartDate	11/5/2019	7/1/2019
tblConstructionPhase	PhaseStartDate	6/4/2019	5/1/2019
tblConstructionPhase	PhaseStartDate	2/6/2024	1/1/2020
tblConstructionPhase	PhaseStartDate	4/9/2019	3/1/2019
tblGrading	AcresOfGrading	107.50	275.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					

2019	4.8369	54.5883	34.2754	0.0644	18.2675	2.3919	20.6594	9.9840	2.2006	12.1846	0.0000	6,376.2173	6,376.2173	1.9500	0.0000	6,424.9679
2020	49.3086	14.1112	15.2653	0.0245	0.3577	0.7541	0.9217	0.0949	0.6937	0.7382	0.0000	2,379.3961	2,379.3961	0.7190	0.0000	2,397.3701
Maximum	**49.3086**	**54.5883**	**34.2754**	**0.0644**	**18.2675**	**2.3919**	**20.6594**	**9.9840**	**2.2006**	**12.1846**	**0.0000**	**6,376.2173**	**6,376.2173**	**1.9500**	**0.0000**	**6,424.9679**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.8369	54.5883	34.2754	0.0644	7.2470	2.3919	9.6390	3.9263	2.2006	6.1269	0.0000	6,376.2173	6,376.2173	1.9500	0.0000	6,424.9679
2020	49.3086	14.1112	15.2653	0.0245	0.3577	0.7541	0.9217	0.0949	0.6937	0.7382	0.0000	2,379.3961	2,379.3961	0.7190	0.0000	2,397.3701
Maximum	**49.3086**	**54.5883**	**34.2754**	**0.0644**	**7.2470**	**2.3919**	**9.6390**	**3.9263**	**2.2006**	**6.1269**	**0.0000**	**6,376.2173**	**6,376.2173**	**1.9500**	**0.0000**	**6,424.9679**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**59.17**	**0.00**	**51.07**	**60.10**	**0.00**	**46.88**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	69.0733	4.6229	125.9530	0.2773		16.3679	16.3679		16.3679	16.3679	1,995.1536	3,865.6855	5,860.8391	5.9807	0.1354	6,050.7112
Energy	0.4615	4.0901	2.7537	0.0252		0.3188	0.3188		0.3188	0.3188		5,034.1989	5,034.1989	0.0965	0.0923	5,064.1146

Mobile	6.2771	31.0983	79.8304	0.2853	22.6014	0.2228	22.8242	6.0474	0.2081	6.2555		29,025.8948	29,025.8948	1.4043		29,061.0029
Total	**75.8119**	**39.8113**	**208.5371**	**0.5878**	**22.6014**	**16.9095**	**39.5109**	**6.0474**	**16.8948**	**22.9422**	**1,995.1536**	**37,925.7791**	**39,920.9328**	**7.4815**	**0.2277**	**40,175.8287**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	13.6318	3.3834	18.9847	0.0212		0.3543	0.3543		0.3543	0.3543	0.0000	4,091.2149	4,091.2149	0.1086	0.0744	4,116.1081
Energy	0.4615	4.0901	2.7537	0.0252		0.3188	0.3188		0.3188	0.3188		5,034.1989	5,034.1989	0.0965	0.0923	5,064.1146
Mobile	5.7458	27.4744	65.4333	0.2278	17.7299	0.1794	17.9093	4.7439	0.1675	4.9115		23,185.8416	23,185.8416	1.1631		23,214.9189
Total	**19.8391**	**34.9479**	**87.1717**	**0.2742**	**17.7299**	**0.8525**	**18.5824**	**4.7439**	**0.8406**	**5.5845**	**0.0000**	**32,311.2554**	**32,311.2554**	**1.3682**	**0.1667**	**32,395.1416**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**73.83**	**12.22**	**58.20**	**53.34**	**21.55**	**94.96**	**52.97**	**21.55**	**95.02**	**75.66**	**100.00**	**14.80**	**19.06**	**81.71**	**26.79**	**19.37**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2019	2/28/2019	5	43	
2	Site Preparation	Site Preparation	3/1/2019	4/30/2019	5	43	
3	Grading	Grading	5/1/2019	6/30/2019	5	43	
4	Building Construction	Building Construction	7/1/2019	12/31/2019	5	132	
5	Paving	Paving	1/1/2020	2/29/2020	5	43	
6	Architectural Coating	Architectural Coating	3/1/2020	6/30/2020	5	87	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 275

Acres of Paving: 0

Residential Indoor: 776,385; Residential Outdoor: 258,795; Non-Residential Indoor: 300,510; Non-Residential Outdoor: 100,170; Striped

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	158.00	56.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	32.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697		3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**		**1.7949**	**1.7949**		**1.6697**	**1.6697**		**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0735	0.0511	0.6740	1.7800e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		177.1484	177.1484	5.5400e-003		177.2869
Total	**0.0735**	**0.0511**	**0.6740**	**1.7800e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**177.1484**	**177.1484**	**5.5400e-003**		**177.2869**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697	0.0000	3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**		**1.7949**	**1.7949**		**1.6697**	**1.6697**	**0.0000**	**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0735	0.0511	0.6740	1.7800e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		177.1484	177.1484	5.5400e-003		177.2869

Total	**0.0735**	**0.0511**	**0.6740**	**1.7800e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**177.1484**	**177.1484**	**5.5400e-003**		**177.2869**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991		3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**18.0663**	**2.3904**	**20.4566**	**9.9307**	**2.1991**	**12.1298**		**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0882	0.0613	0.8088	2.1400e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4400e-003	0.0548		212.5780	212.5780	6.6500e-003		212.7442
Total	**0.0882**	**0.0613**	**0.8088**	**2.1400e-003**	**0.2012**	**1.5700e-003**	**0.2028**	**0.0534**	**1.4400e-003**	**0.0548**		**212.5780**	**212.5780**	**6.6500e-003**		**212.7442**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991	0.0000	3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**7.0458**	**2.3904**	**9.4362**	**3.8730**	**2.1991**	**6.0721**	**0.0000**	**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0882	0.0613	0.8088	2.1400e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4400e-003	0.0548		212.5780	212.5780	6.6500e-003		212.7442
Total	**0.0882**	**0.0613**	**0.8088**	**2.1400e-003**	**0.2012**	**1.5700e-003**	**0.2028**	**0.0534**	**1.4400e-003**	**0.0548**		**212.5780**	**212.5780**	**6.6500e-003**		**212.7442**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Fugitive Dust					12.8044	0.0000	12.8044	4.0426	0.0000	4.0426			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920		6,140.0195	6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**12.8044**	**2.3827**	**15.1870**	**4.0426**	**2.1920**	**6.2346**		**6,140.0195**	**6,140.0195**	**1.9426**		**6,188.5854**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0980	0.0682	0.8987	2.3700e-003	0.2236	1.7400e-003	0.2253	0.0593	1.6000e-003	0.0609		236.1978	236.1978	7.3900e-003		236.3825
Total	**0.0980**	**0.0682**	**0.8987**	**2.3700e-003**	**0.2236**	**1.7400e-003**	**0.2253**	**0.0593**	**1.6000e-003**	**0.0609**		**236.1978**	**236.1978**	**7.3900e-003**		**236.3825**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9937	0.0000	4.9937	1.5766	0.0000	1.5766			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920	0.0000	6,140.0195	6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**4.9937**	**2.3827**	**7.3764**	**1.5766**	**2.1920**	**3.7686**	**0.0000**	**6,140.0195**	**6,140.0195**	**1.9426**		**6,188.5854**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0980	0.0682	0.8987	2.3700e-003	0.2236	1.7400e-003	0.2253	0.0593	1.6000e-003	0.0609		236.1978	236.1978	7.3900e-003		236.3825
Total	**0.0980**	**0.0682**	**0.8987**	**2.3700e-003**	**0.2236**	**1.7400e-003**	**0.2253**	**0.0593**	**1.6000e-003**	**0.0609**		**236.1978**	**236.1978**	**7.3900e-003**		**236.3825**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2159	6.4077	1.5490	0.0145	0.3584	0.0424	0.4009	0.1032	0.0406	0.1438		1,546.8303	1,546.8303	0.1024		1,549.3891
Worker	0.7738	0.5385	7.0995	0.0187	1.7661	0.0138	1.7798	0.4684	0.0127	0.4810		1,865.9627	1,865.9627	0.0584		1,867.4216
Total	**0.9897**	**6.9462**	**8.6485**	**0.0333**	**2.1245**	**0.0562**	**2.1807**	**0.5716**	**0.0533**	**0.6248**		**3,412.7930**	**3,412.7930**	**0.1607**		**3,416.8107**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2159	6.4077	1.5490	0.0145	0.3584	0.0424	0.4009	0.1032	0.0406	0.1438		1,546.8303	1,546.8303	0.1024		1,549.3891
Worker	0.7738	0.5385	7.0995	0.0187	1.7661	0.0138	1.7798	0.4684	0.0127	0.4810		1,865.9627	1,865.9627	0.0584		1,867.4216

Total	**0.9897**	**6.9462**	**8.6485**	**0.0333**	**2.1245**	**0.0562**	**2.1807**	**0.5716**	**0.0533**	**0.6248**		**3,412.7930**	**3,412.7930**	**0.1607**		**3,416.8107**

3.6 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926		2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3566**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**		**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0679	0.0456	0.6132	1.7200e-003	0.1677	1.2700e-003	0.1689	0.0445	1.1700e-003	0.0456		171.6626	171.6626	4.9400e-003		171.7860
Total	**0.0679**	**0.0456**	**0.6132**	**1.7200e-003**	**0.1677**	**1.2700e-003**	**0.1689**	**0.0445**	**1.1700e-003**	**0.0456**		**171.6626**	**171.6626**	**4.9400e-003**		**171.7860**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926	0.0000	2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3566**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**	**0.0000**	**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0679	0.0456	0.6132	1.7200e-003	0.1677	1.2700e-003	0.1689	0.0445	1.1700e-003	0.0456		171.6626	171.6626	4.9400e-003		171.7860
Total	**0.0679**	**0.0456**	**0.6132**	**1.7200e-003**	**0.1677**	**1.2700e-003**	**0.1689**	**0.0445**	**1.1700e-003**	**0.0456**		**171.6626**	**171.6626**	**4.9400e-003**		**171.7860**

3.7 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Archit. Coating	48.9216					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**49.1638**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1448	0.0973	1.3082	3.6800e-003	0.3577	2.7100e-003	0.3604	0.0949	2.5000e-003	0.0974		366.2136	366.2136	0.0105		366.4768
Total	**0.1448**	**0.0973**	**1.3082**	**3.6800e-003**	**0.3577**	**2.7100e-003**	**0.3604**	**0.0949**	**2.5000e-003**	**0.0974**		**366.2136**	**366.2136**	**0.0105**		**366.4768**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	48.9216					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**49.1638**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1448	0.0973	1.3082	3.6800e-003	0.3577	2.7100e-003	0.3604	0.0949	2.5000e-003	0.0974		366.2136	366.2136	0.0105		366.4768
Total	**0.1448**	**0.0973**	**1.3082**	**3.6800e-003**	**0.3577**	**2.7100e-003**	**0.3604**	**0.0949**	**2.5000e-003**	**0.0974**		**366.2136**	**366.2136**	**0.0105**		**366.4768**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Diversity

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.7458	27.4744	65.4333	0.2278	17.7299	0.1794	17.9093	4.7439	0.1675	4.9115		23,185.8416	23,185.8416	1.1631		23,214.9189
Unmitigated	6.2771	31.0983	79.8304	0.2853	22.6014	0.2228	22.8242	6.0474	0.2081	6.2555		29,025.8948	29,025.8948	1.4043		29,061.0029

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Refrigerated Warehouse-No Rail	293.57	293.57	293.57	1,258,165	986,978
Single Family Housing	2,027.76	2,110.83	1836.06	6,876,135	5,394,041
Strip Mall	1,134.37	1,076.01	522.91	1,976,191	1,550,239
Total	3,455.70	3,480.42	2,652.54	10,110,490	7,931,259

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Refrigerated Warehouse-No Rail	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Refrigerated Warehouse-No Rail	0.548858	0.043235	0.200706	0.120309	0.016131	0.005851	0.021034	0.033479	0.002070	0.001877	0.004817	0.000707	0.000925
Single Family Housing	0.548858	0.043235	0.200706	0.120309	0.016131	0.005851	0.021034	0.033479	0.002070	0.001877	0.004817	0.000707	0.000925
Strip Mall	0.548858	0.043235	0.200706	0.120309	0.016131	0.005851	0.021034	0.033479	0.002070	0.001877	0.004817	0.000707	0.000925

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install High Efficiency Lighting

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
NaturalGas Mitigated	0.4615	4.0901	2.7537	0.0252		0.3188	0.3188		0.3188	0.3188		5,034.1989	5,034.1989	0.0965	0.0923	5,064.1146
NaturalGas Unmitigated	0.4615	4.0901	2.7537	0.0252		0.3188	0.3188		0.3188	0.3188		5,034.1989	5,034.1989	0.0965	0.0923	5,064.1146

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Refrigerated Warehouse-No Rail	24780.3	0.2672	2.4294	2.0407	0.0146		0.1846	0.1846		0.1846	0.1846		2,915.3267	2,915.3267	0.0559	0.0535	2,932.6511
Single Family Housing	17854.7	0.1926	1.6454	0.7002	0.0105		0.1330	0.1330		0.1330	0.1330		2,100.5576	2,100.5576	0.0403	0.0385	2,113.0402
Strip Mall	155.674	1.6800e-003	0.0153	0.0128	9.0000e-005		1.1600e-003	1.1600e-003		1.1600e-003	1.1600e-003		18.3146	18.3146	3.5000e-004	3.4000e-004	18.4234
Total		**0.4615**	**4.0901**	**2.7537**	**0.0252**		**0.3188**	**0.3188**		**0.3188**	**0.3188**		**5,034.1989**	**5,034.1989**	**0.0965**	**0.0923**	**5,064.1146**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Refrigerated Warehouse-No Rail	24.7803	0.2672	2.4294	2.0407	0.0146		0.1846	0.1846		0.1846	0.1846		2,915.3267	2,915.3267	0.0559	0.0535	2,932.6511
Single Family Housing	17.8547	0.1926	1.6454	0.7002	0.0105		0.1330	0.1330		0.1330	0.1330		2,100.5576	2,100.5576	0.0403	0.0385	2,113.0402
Strip Mall	0.155674	1.6800e-003	0.0153	0.0128	9.0000e-005		1.1600e-003	1.1600e-003		1.1600e-003	1.1600e-003		18.3146	18.3146	3.5000e-004	3.4000e-004	18.4234

Total		**0.4615**	**4.0901**	**2.7537**	**0.0252**		**0.3188**	**0.3188**		**0.3188**	**0.3188**		**5,034.1989**	**5,034.1989**	**0.0965**	**0.0923**	**5,064.1146**

6.0 Area Detail

6.1 Mitigation Measures Area

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	13.6318	3.3834	18.9847	0.0212		0.3543	0.3543		0.3543	0.3543	0.0000	4,091.2149	4,091.2149	0.1086	0.0744	4,116.1081
Unmitigated	69.0733	4.6229	125.9530	0.2773		16.3679	16.3679		16.3679	16.3679	1,995.1536	3,865.6855	5,860.8391	5.9807	0.1354	6,050.7112

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.1661					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.5581					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	55.8137	4.4194	108.3215	0.2763		16.2707	16.2707		16.2707	16.2707	1,995.1536	3,834.0000	5,829.1536	5.9499	0.1354	6,018.2562
Landscaping	0.5355	0.2035	17.6315	9.3000e-004		0.0972	0.0972		0.0972	0.0972		31.6855	31.6855	0.0308		32.4550

Total	**69.0733**	**4.6229**	**125.9530**	**0.2773**		**16.3679**	**16.3679**		**16.3679**	**16.3679**	**1,995.1536**	**3,865.6855**	**5,860.8391**	**5.9807**	**0.1354**	**6,050.7112**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.1661					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.5581					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.3721	3.1800	1.3532	0.0203		0.2571	0.2571		0.2571	0.2571	0.0000	4,059.5294	4,059.5294	0.0778	0.0744	4,083.6532
Landscaping	0.5355	0.2035	17.6315	9.3000e-004		0.0972	0.0972		0.0972	0.0972		31.6855	31.6855	0.0308		32.4550
Total	**13.6318**	**3.3834**	**18.9847**	**0.0212**		**0.3543**	**0.3543**		**0.3543**	**0.3543**	**0.0000**	**4,091.2149**	**4,091.2149**	**0.1086**	**0.0744**	**4,116.1082**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Rancho Cucamonga Cumulative Development - South Coast AQMD Air District, Summer

Rancho Cucamonga Cumulative Development

South Coast AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	213.00	Dwelling Unit	69.16	383,400.00	609
Strip Mall	25.60	1000sqft	0.59	25,595.00	0
Refrigerated Warehouse-No Rail	174.75	1000sqft	4.01	174,745.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2021
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction times are estimated.

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	75.00	87.00
tblConstructionPhase	NumDays	1,110.00	132.00
tblConstructionPhase	NumDays	70.00	43.00
tblConstructionPhase	NumDays	110.00	43.00
tblConstructionPhase	NumDays	75.00	43.00
tblConstructionPhase	NumDays	40.00	43.00
tblConstructionPhase	PhaseEndDate	9/2/2024	6/30/2020
tblConstructionPhase	PhaseEndDate	2/5/2024	12/31/2019
tblConstructionPhase	PhaseEndDate	4/8/2019	2/28/2019
tblConstructionPhase	PhaseEndDate	11/4/2019	6/30/2019
tblConstructionPhase	PhaseEndDate	5/20/2024	2/29/2020
tblConstructionPhase	PhaseEndDate	6/3/2019	4/30/2019
tblConstructionPhase	PhaseStartDate	5/21/2024	3/1/2020
tblConstructionPhase	PhaseStartDate	11/5/2019	7/1/2019
tblConstructionPhase	PhaseStartDate	6/4/2019	5/1/2019
tblConstructionPhase	PhaseStartDate	2/6/2024	1/1/2020
tblConstructionPhase	PhaseStartDate	4/9/2019	3/1/2019
tblGrading	AcresOfGrading	107.50	275.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					

2019	4.8369	54.5883	34.2754	0.0644	18.2675	2.3919	20.6594	9.9840	2.2006	12.1846	0.0000	6,376.2173	6,376.2173	1.9500	0.0000	6,424.9679
2020	49.3086	14.1112	15.2653	0.0245	0.3577	0.7541	0.9217	0.0949	0.6937	0.7382	0.0000	2,379.3961	2,379.3961	0.7190	0.0000	2,397.3701
Maximum	**49.3086**	**54.5883**	**34.2754**	**0.0644**	**18.2675**	**2.3919**	**20.6594**	**9.9840**	**2.2006**	**12.1846**	**0.0000**	**6,376.2173**	**6,376.2173**	**1.9500**	**0.0000**	**6,424.9679**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.8369	54.5883	34.2754	0.0644	7.2470	2.3919	9.6390	3.9263	2.2006	6.1269	0.0000	6,376.2173	6,376.2173	1.9500	0.0000	6,424.9679
2020	49.3086	14.1112	15.2653	0.0245	0.3577	0.7541	0.9217	0.0949	0.6937	0.7382	0.0000	2,379.3961	2,379.3961	0.7190	0.0000	2,397.3701
Maximum	**49.3086**	**54.5883**	**34.2754**	**0.0644**	**7.2470**	**2.3919**	**9.6390**	**3.9263**	**2.2006**	**6.1269**	**0.0000**	**6,376.2173**	**6,376.2173**	**1.9500**	**0.0000**	**6,424.9679**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**59.17**	**0.00**	**51.07**	**60.10**	**0.00**	**46.88**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	69.0733	4.6229	125.9530	0.2773		16.3679	16.3679		16.3679	16.3679	1,995.1536	3,865.6855	5,860.8391	5.9807	0.1354	6,050.7112
Energy	0.4615	4.0901	2.7537	0.0252		0.3188	0.3188		0.3188	0.3188		5,034.1989	5,034.1989	0.0965	0.0923	5,064.1146

Mobile	6.2771	31.0983	79.8304	0.2853	22.6014	0.2228	22.8242	6.0474	0.2081	6.2555		29,025.8948	29,025.8948	1.4043		29,061.0029
Total	**75.8119**	**39.8113**	**208.5371**	**0.5878**	**22.6014**	**16.9095**	**39.5109**	**6.0474**	**16.8948**	**22.9422**	**1,995.1536**	**37,925.7791**	**39,920.9328**	**7.4815**	**0.2277**	**40,175.8287**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	13.6318	3.3834	18.9847	0.0212		0.3543	0.3543		0.3543	0.3543	0.0000	4,091.2149	4,091.2149	0.1086	0.0744	4,116.1081
Energy	0.4615	4.0901	2.7537	0.0252		0.3188	0.3188		0.3188	0.3188		5,034.1989	5,034.1989	0.0965	0.0923	5,064.1146
Mobile	5.7458	27.4744	65.4333	0.2278	17.7299	0.1794	17.9093	4.7439	0.1675	4.9115		23,185.8416	23,185.8416	1.1631		23,214.9189
Total	**19.8391**	**34.9479**	**87.1717**	**0.2742**	**17.7299**	**0.8525**	**18.5824**	**4.7439**	**0.8406**	**5.5845**	**0.0000**	**32,311.2554**	**32,311.2554**	**1.3682**	**0.1667**	**32,395.1416**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**73.83**	**12.22**	**58.20**	**53.34**	**21.55**	**94.96**	**52.97**	**21.55**	**95.02**	**75.66**	**100.00**	**14.80**	**19.06**	**81.71**	**26.79**	**19.37**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2019	2/28/2019	5	43	
2	Site Preparation	Site Preparation	3/1/2019	4/30/2019	5	43	
3	Grading	Grading	5/1/2019	6/30/2019	5	43	
4	Building Construction	Building Construction	7/1/2019	12/31/2019	5	132	
5	Paving	Paving	1/1/2020	2/29/2020	5	43	
6	Architectural Coating	Architectural Coating	3/1/2020	6/30/2020	5	87	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 275

Acres of Paving: 0

Residential Indoor: 776,385; Residential Outdoor: 258,795; Non-Residential Indoor: 300,510; Non-Residential Outdoor: 100,170; Striped

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	158.00	56.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	32.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697		3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**		**1.7949**	**1.7949**		**1.6697**	**1.6697**		**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0735	0.0511	0.6740	1.7800e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		177.1484	177.1484	5.5400e-003		177.2869
Total	**0.0735**	**0.0511**	**0.6740**	**1.7800e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**177.1484**	**177.1484**	**5.5400e-003**		**177.2869**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697	0.0000	3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**		**1.7949**	**1.7949**		**1.6697**	**1.6697**	**0.0000**	**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0735	0.0511	0.6740	1.7800e-003	0.1677	1.3000e-003	0.1690	0.0445	1.2000e-003	0.0457		177.1484	177.1484	5.5400e-003		177.2869

Total	**0.0735**	**0.0511**	**0.6740**	**1.7800e-003**	**0.1677**	**1.3000e-003**	**0.1690**	**0.0445**	**1.2000e-003**	**0.0457**		**177.1484**	**177.1484**	**5.5400e-003**		**177.2869**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991		3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**18.0663**	**2.3904**	**20.4566**	**9.9307**	**2.1991**	**12.1298**		**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0882	0.0613	0.8088	2.1400e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4400e-003	0.0548		212.5780	212.5780	6.6500e-003		212.7442
Total	**0.0882**	**0.0613**	**0.8088**	**2.1400e-003**	**0.2012**	**1.5700e-003**	**0.2028**	**0.0534**	**1.4400e-003**	**0.0548**		**212.5780**	**212.5780**	**6.6500e-003**		**212.7442**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991	0.0000	3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**7.0458**	**2.3904**	**9.4362**	**3.8730**	**2.1991**	**6.0721**	**0.0000**	**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0882	0.0613	0.8088	2.1400e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4400e-003	0.0548		212.5780	212.5780	6.6500e-003		212.7442
Total	**0.0882**	**0.0613**	**0.8088**	**2.1400e-003**	**0.2012**	**1.5700e-003**	**0.2028**	**0.0534**	**1.4400e-003**	**0.0548**		**212.5780**	**212.5780**	**6.6500e-003**		**212.7442**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Fugitive Dust					12.8044	0.0000	12.8044	4.0426	0.0000	4.0426			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920		6,140.0195	6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**12.8044**	**2.3827**	**15.1870**	**4.0426**	**2.1920**	**6.2346**		**6,140.0195**	**6,140.0195**	**1.9426**		**6,188.5854**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0980	0.0682	0.8987	2.3700e-003	0.2236	1.7400e-003	0.2253	0.0593	1.6000e-003	0.0609		236.1978	236.1978	7.3900e-003		236.3825
Total	**0.0980**	**0.0682**	**0.8987**	**2.3700e-003**	**0.2236**	**1.7400e-003**	**0.2253**	**0.0593**	**1.6000e-003**	**0.0609**		**236.1978**	**236.1978**	**7.3900e-003**		**236.3825**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9937	0.0000	4.9937	1.5766	0.0000	1.5766			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920	0.0000	6,140.0195	6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**4.9937**	**2.3827**	**7.3764**	**1.5766**	**2.1920**	**3.7686**	**0.0000**	**6,140.0195**	**6,140.0195**	**1.9426**		**6,188.5854**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0980	0.0682	0.8987	2.3700e-003	0.2236	1.7400e-003	0.2253	0.0593	1.6000e-003	0.0609		236.1978	236.1978	7.3900e-003		236.3825
Total	**0.0980**	**0.0682**	**0.8987**	**2.3700e-003**	**0.2236**	**1.7400e-003**	**0.2253**	**0.0593**	**1.6000e-003**	**0.0609**		**236.1978**	**236.1978**	**7.3900e-003**		**236.3825**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2159	6.4077	1.5490	0.0145	0.3584	0.0424	0.4009	0.1032	0.0406	0.1438		1,546.8303	1,546.8303	0.1024		1,549.3891
Worker	0.7738	0.5385	7.0995	0.0187	1.7661	0.0138	1.7798	0.4684	0.0127	0.4810		1,865.9627	1,865.9627	0.0584		1,867.4216
Total	**0.9897**	**6.9462**	**8.6485**	**0.0333**	**2.1245**	**0.0562**	**2.1807**	**0.5716**	**0.0533**	**0.6248**		**3,412.7930**	**3,412.7930**	**0.1607**		**3,416.8107**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2159	6.4077	1.5490	0.0145	0.3584	0.0424	0.4009	0.1032	0.0406	0.1438		1,546.8303	1,546.8303	0.1024		1,549.3891
Worker	0.7738	0.5385	7.0995	0.0187	1.7661	0.0138	1.7798	0.4684	0.0127	0.4810		1,865.9627	1,865.9627	0.0584		1,867.4216

Total	**0.9897**	**6.9462**	**8.6485**	**0.0333**	**2.1245**	**0.0562**	**2.1807**	**0.5716**	**0.0533**	**0.6248**		**3,412.7930**	**3,412.7930**	**0.1607**		**3,416.8107**

3.6 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926		2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3566**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**		**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0679	0.0456	0.6132	1.7200e-003	0.1677	1.2700e-003	0.1689	0.0445	1.1700e-003	0.0456		171.6626	171.6626	4.9400e-003		171.7860
Total	**0.0679**	**0.0456**	**0.6132**	**1.7200e-003**	**0.1677**	**1.2700e-003**	**0.1689**	**0.0445**	**1.1700e-003**	**0.0456**		**171.6626**	**171.6626**	**4.9400e-003**		**171.7860**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926	0.0000	2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3566**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**	**0.0000**	**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0679	0.0456	0.6132	1.7200e-003	0.1677	1.2700e-003	0.1689	0.0445	1.1700e-003	0.0456		171.6626	171.6626	4.9400e-003		171.7860
Total	**0.0679**	**0.0456**	**0.6132**	**1.7200e-003**	**0.1677**	**1.2700e-003**	**0.1689**	**0.0445**	**1.1700e-003**	**0.0456**		**171.6626**	**171.6626**	**4.9400e-003**		**171.7860**

3.7 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Archit. Coating	48.9216					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**49.1638**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1448	0.0973	1.3082	3.6800e-003	0.3577	2.7100e-003	0.3604	0.0949	2.5000e-003	0.0974		366.2136	366.2136	0.0105		366.4768
Total	**0.1448**	**0.0973**	**1.3082**	**3.6800e-003**	**0.3577**	**2.7100e-003**	**0.3604**	**0.0949**	**2.5000e-003**	**0.0974**		**366.2136**	**366.2136**	**0.0105**		**366.4768**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	48.9216					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**49.1638**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1448	0.0973	1.3082	3.6800e-003	0.3577	2.7100e-003	0.3604	0.0949	2.5000e-003	0.0974		366.2136	366.2136	0.0105		366.4768
Total	**0.1448**	**0.0973**	**1.3082**	**3.6800e-003**	**0.3577**	**2.7100e-003**	**0.3604**	**0.0949**	**2.5000e-003**	**0.0974**		**366.2136**	**366.2136**	**0.0105**		**366.4768**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Diversity

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.7458	27.4744	65.4333	0.2278	17.7299	0.1794	17.9093	4.7439	0.1675	4.9115		23,185.8416	23,185.8416	1.1631		23,214.9189
Unmitigated	6.2771	31.0983	79.8304	0.2853	22.6014	0.2228	22.8242	6.0474	0.2081	6.2555		29,025.8948	29,025.8948	1.4043		29,061.0029

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Refrigerated Warehouse-No Rail	293.57	293.57	293.57	1,258,165	986,978
Single Family Housing	2,027.76	2,110.83	1836.06	6,876,135	5,394,041
Strip Mall	1,134.37	1,076.01	522.91	1,976,191	1,550,239
Total	3,455.70	3,480.42	2,652.54	10,110,490	7,931,259

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Refrigerated Warehouse-No Rail	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Refrigerated Warehouse-No Rail	0.548858	0.043235	0.200706	0.120309	0.016131	0.005851	0.021034	0.033479	0.002070	0.001877	0.004817	0.000707	0.000925
Single Family Housing	0.548858	0.043235	0.200706	0.120309	0.016131	0.005851	0.021034	0.033479	0.002070	0.001877	0.004817	0.000707	0.000925
Strip Mall	0.548858	0.043235	0.200706	0.120309	0.016131	0.005851	0.021034	0.033479	0.002070	0.001877	0.004817	0.000707	0.000925

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install High Efficiency Lighting

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
NaturalGas Mitigated	0.4615	4.0901	2.7537	0.0252		0.3188	0.3188		0.3188	0.3188		5,034.1989	5,034.1989	0.0965	0.0923	5,064.1146
NaturalGas Unmitigated	0.4615	4.0901	2.7537	0.0252		0.3188	0.3188		0.3188	0.3188		5,034.1989	5,034.1989	0.0965	0.0923	5,064.1146

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Refrigerated Warehouse-No Rail	24780.3	0.2672	2.4294	2.0407	0.0146		0.1846	0.1846		0.1846	0.1846		2,915.3267	2,915.3267	0.0559	0.0535	2,932.6511
Single Family Housing	17854.7	0.1926	1.6454	0.7002	0.0105		0.1330	0.1330		0.1330	0.1330		2,100.5576	2,100.5576	0.0403	0.0385	2,113.0402
Strip Mall	155.674	1.6800e-003	0.0153	0.0128	9.0000e-005		1.1600e-003	1.1600e-003		1.1600e-003	1.1600e-003		18.3146	18.3146	3.5000e-004	3.4000e-004	18.4234
Total		**0.4615**	**4.0901**	**2.7537**	**0.0252**		**0.3188**	**0.3188**		**0.3188**	**0.3188**		**5,034.1989**	**5,034.1989**	**0.0965**	**0.0923**	**5,064.1146**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Refrigerated Warehouse-No Rail	24.7803	0.2672	2.4294	2.0407	0.0146		0.1846	0.1846		0.1846	0.1846		2,915.3267	2,915.3267	0.0559	0.0535	2,932.6511
Single Family Housing	17.8547	0.1926	1.6454	0.7002	0.0105		0.1330	0.1330		0.1330	0.1330		2,100.5576	2,100.5576	0.0403	0.0385	2,113.0402
Strip Mall	0.155674	1.6800e-003	0.0153	0.0128	9.0000e-005		1.1600e-003	1.1600e-003		1.1600e-003	1.1600e-003		18.3146	18.3146	3.5000e-004	3.4000e-004	18.4234

Total		**0.4615**	**4.0901**	**2.7537**	**0.0252**		**0.3188**	**0.3188**		**0.3188**	**0.3188**		**5,034.1989**	**5,034.1989**	**0.0965**	**0.0923**	**5,064.1146**

6.0 Area Detail

6.1 Mitigation Measures Area

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	13.6318	3.3834	18.9847	0.0212		0.3543	0.3543		0.3543	0.3543	0.0000	4,091.2149	4,091.2149	0.1086	0.0744	4,116.1081
Unmitigated	69.0733	4.6229	125.9530	0.2773		16.3679	16.3679		16.3679	16.3679	1,995.1536	3,865.6855	5,860.8391	5.9807	0.1354	6,050.7112

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.1661					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.5581					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	55.8137	4.4194	108.3215	0.2763		16.2707	16.2707		16.2707	16.2707	1,995.1536	3,834.0000	5,829.1536	5.9499	0.1354	6,018.2562
Landscaping	0.5355	0.2035	17.6315	9.3000e-004		0.0972	0.0972		0.0972	0.0972		31.6855	31.6855	0.0308		32.4550

Total	**69.0733**	**4.6229**	**125.9530**	**0.2773**		**16.3679**	**16.3679**		**16.3679**	**16.3679**	**1,995.1536**	**3,865.6855**	**5,860.8391**	**5.9807**	**0.1354**	**6,050.7112**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.1661					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.5581					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.3721	3.1800	1.3532	0.0203		0.2571	0.2571		0.2571	0.2571	0.0000	4,059.5294	4,059.5294	0.0778	0.0744	4,083.6532
Landscaping	0.5355	0.2035	17.6315	9.3000e-004		0.0972	0.0972		0.0972	0.0972		31.6855	31.6855	0.0308		32.4550
Total	**13.6318**	**3.3834**	**18.9847**	**0.0212**		**0.3543**	**0.3543**		**0.3543**	**0.3543**	**0.0000**	**4,091.2149**	**4,091.2149**	**0.1086**	**0.0744**	**4,116.1082**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Print Form

Summary Form for Electronic Document Submittal

Form F

Lead agencies may include 15 hardcopies of this document when submitting electronic copies of Environmental Impact Reports, Negative Declarations, Mitigated Negative Declarations, or Notices of Preparation to the State Clearinghouse (SCH). The SCH also accepts other summaries, such as EIR Executive Summaries prepared pursuant to CEQA Guidelines Section 15123. Please include one copy of the Notice of Completion Form (NOC) with your submission and attach the summary to each electronic copy of the document.

SCH #: _____

Project Title: Overton Moore Warehouse

Lead Agency: City of Rancho Cucamonga

Contact Name: Tom Grahn

Email: tom.grahn@cityofrc.us Phone Number: (909) 774-4312

Project Location: Rancho Cucamonga (*City*) San Bernardino (*County*)

Project Decription (Proposed actions, location, and/or consequences).

Design Review DRC2018-00119.

The applicant proposes development of a 174,745 square foot industrial warehouse building on 8.09 acres in the General Industrial (GI) District, at the southwest corner of Hellman Avenue and Eighth Street, located at 9000 Hellman Avenue; APN: 0209-151-36.

Identify the project's significant or potentially significant effects and briefly describe any proposed mitigation measures that would reduce or avoid that effect.

Air Quality - Construction and operational mitigations.
Cultural Resources - Protocols if and when cultural resources are discovered during project development.
Geology and Soils - Protocols for water and soil treatment during project development.
Greenhouse Gas Emissions - Greenhouse gas reduction protocols.
Noise - Construction and operational mitigations for exterior and interior noise reduction measures.

If applicable, describe any of the project's areas of controversy known to the Lead Agency, including issues raised by agencies and the public.

Not applicable.

Provide a list of the responsible or trustee agencies for the project.

See attached agency list.

Company	FirstName	LastName	Address1	City	State	PostalCode					
THE FOLLOWING AGENCIES SHOULD BE CONSIDERED FOR ALL PROJECTS											
County of San Bernardino	Clerk of the Board of Supervisors		385 North Arrowhead, 2nd Floor	San Bernardino	CA	92415					
County of San Bernardino Department of Public Works	Mr. Michael Perry	Environmental Management	825 East Third Street, Room 123	San Bernardino	CA	92415-0835					
Cucamonga Valley Water District			10440 Ashford Street	Rancho Cucamonga	CA	91730-3057					
Golden State Environmental Justice Alliance			P O Box 79222	Corona	CA	92877	[redacted]				
Habitat Defense Council	Kirkland	West	P O Box 76824	Corona	CA	92877	[redacted]				
California Regional Water Quality Board 8	Santa Ana	Region	3737 Main Street, Suite 500	Riverside	CA	92501					
Southern California Gas Company	Planning	Supervisor	1981 Lugonia Avenue	Redlands	CA	92374					
South Coast Air Quality Management District	Local Government CEQA	Program Supervisor	21865 Copley Drive	Diamond Bar	CA	91765					
Edison Local Public Affairs	Ms. Jennifer	Shaw	7951 Redwood Avenue	Fontana	CA	92336					
Southern California Edison Company Third Party Environmental Review	Ms. Karen	Cadavona	2244 Walnut Grove Avenue, Quad 4C 472A	Rosemead	CA	91770					
Inland Empire Utilities Agency	Mr. Jason	Pivovaroff	P O Box 9020	Chino Hills	CA	91709					
Verizon	Ms. Kim	Bray	P O Box 725	Chino	CA	91708					
Department of Transportation	Development	Review	464 West Fourth Street, MS 722	San Bernardino	CA	92407-1400					
Forecasting/IGR-CEQA Review Department of Transportation	Mr. Daniel	Kopulsky	464 West Fourth Street, 6th Floor, MS 722	San Bernardino	CA	92401-1400					
U.S. Fish & Wildlife Service	Ms. Karin	Cleary-Rose	777 East Tahquitz Canyon Way, Suite 208	Palm Springs	CA	92262					
California Department of Fish and Wildlife	Mr. Jeff	Brandt	3602 Inland Empire Boulevard, Suite C-220	Ontario	CA	91764					
Rancho Cucamonga Fire Protection	Chief	Ryan	10500 Civic Center Drive	Rancho Cucamonga	CA	91730	Inter-Office				
Rancho Cucamonga Substation	Captain	Mahoney	10510 Civic Center Drive	Rancho Cucamonga	CA	91730	Inter-Office				
Richards, Watson & Gershon	Mr. Nick	Ghirelli	355 South Grand Avenue, 40th Floor	Los Angeles	CA	90071-3101					
Chaffey Joint Union High School District	Director of	Business Services	211 West 5th Street	Ontario	CA	91761					
Etiwanda School District	Mr. Shawn	Judson	6061 East Avenue	Etiwanda	CA	91739					
Cucamonga School District	Superintendent		8776 Archibald Avenue	Rancho Cucamonga	CA	91730					
Alta Loma School District	Superintendent		9390 Base Line Road	Rancho Cucamonga	CA	91701					
Central School District	Superintendent		10601 Church Street, Suite 112	Rancho Cucamonga	CA	91730					
Chaffey Community College District	Dr. Henry D	Shannon Ph D	5885 Haven Avenue	Rancho Cucamonga	CA	91737					
Burrtec			9890 Cherry Avenue	Fontana	CA	92335					
Charter			10766 Foothill Boulevard, #170	Rancho Cucamonga	CA	91730					
	JoAnn	Henkel	[redacted]	[redacted]	CA	91737	**Resident				
	Rick	Lambert	[redacted]		CA	91737	**Resident				
	Cynthia	Neubrech	[redacted]		CA	91737	**Resident				
	Dr JoAnn	Yanez	[redacted]		CA	91737	**Resident				
	Anne	Moulton	[redacted]		CA	91730	**Resident				
	Laura	Doll					**Resident				
	Joann	Gratchn					**Resident				
	Barbara J	Rivera	[redacted]		CA	91701	**Resident				
	Deborah	Grossberg	[redacted]		CA	91737	**Resident				
	Matthew	Riveros	[redacted]		CA	91737	**Resident				
	Angie	Autrey	[redacted]		CA	91701	**Resident				
	Jane	Kennedy					**Resident				
	Christine	Sabala	[redacted]		CA	91739	**Resident				
State Clearinghouse			P O Box 3044	Sacramento	CA	95812-3044	15 copies NOC form Summary form				
THE FOLLOWING AGENCIES WILL REQUIRE A DISCRETIONARY DECISION BASED UPON THE PROJECT											
Native American Heritage Commission			915 Capitol Mall, Room 288	Sacramento	CA	95814					
Department of Forestry			P O Box 944246	Sacramento	CA	94244-2460					
California Energy Commission			1516 Ninth Street, MS-15	Sacramento	CA	95814					
Division of Environmental Health			P O Box 942732	Sacramento	CA	94234-7320					
Caltrans	Planning		P O Box 942874	Sacramento	CA	[redacted]					
Caltrans	Division of Aeronautics		P O Box 942874	Sacramento	CA	94274-0001					
Department of Health Services	Public Water	Supply Branch	714 P Street	Sacramento	CA	95814					
Division of Water Quality			P O Box 100	Sacramento	CA	95814					
Division of Water Rights			901 P Street	Sacramento	CA	95814					
Division of Clean Water Programs			P O Box 944212	Sacramento	CA	94244-2120					
State Water Resources Control Board			P O Box 100	Sacramento	CA	95812-0100					
Long Range Planning and Analysis Division	California Highway	Patrol	2555 First Avenue	Sacramento	CA	95818					
Department of General Services			400 P Street, Suite 5100	Sacramento	CA	95814					
Office of Environmental Health Hazard Assess			1001 I Street	Sacramento	CA	95814					
Department of Fish and Game			1220 N Street	Sacramento	CA	95814					
Department of Water Resources			1416 Ninth Street Room 449	Sacramento	CA	95814					

Department of Toxic Substances Control			P O Box 806	Sacramento	CA	95812-0806					
California Integrated Waste Management Board			P O Box 4025	Sacramento	CA	95812-4025					
Air Resources Board			1001 I Street	Sacramento	CA	95814					
California Environmental Protection Agency			P O Box 2815	Sacramento	CA	95812-2815					
State Lands Commission			100 Howe Avenue, Suite 100-S	Sacramento	CA	95825					
Reclamation Board			1416 Ninth Street, Room 706	Sacramento	CA	95814					
Public Utilities Commission			505 Van Ness Avenue	San Francisco	CA	94102					
Department of Parks & Recreation			P O Box 942896	Sacramento	CA	94296-0001					
Office of Historic Preservation			P O Box 942896	Sacramento	CA	94296-0001					
City of Upland Development Services	Ms Tonya	Pace	460 North Euclid Avenue	Upland	CA	91786					
Mines and Mineral Resources	Department of	Conservation	801 K Street, MS-08-38	Sacramento	CA	95814					
Metropolitan Water District	Brenda S	Marines (5-307)	700 North Alameda	Los Angeles	CA	90012					
City of Fontana Planning Manager	Mr Zai	AbuBaka	8353 Sierra Ave	Fontana	CA	92335					
City of Ontario Planning Director	Mr Scott	Murphy	303 East B Street	Ontario	CA	91764					
San Bernardino County Planning Department	Director of	Planning	385 North Arrowhead Avenue	San Bernardino	CA	92415-0182					
Southern California Assoc of Governments	Mr Eric	Vail	818 West 7th Street, 12th Floor	Los Angeles	CA	90017					
San Bernardino Council of Governments	Mr Steven	Smith	1170 West 3rd Street, 2nd Floor	San Bernardino	CA	92410-1715					
Metrolink			One Gateway Plaza, 12th Floor	Los Angeles	CA	90012					
San Bernardino Flood Control District	Mr Ken	Miller	825 East 3rd Street	San Bernardino	CA	92415-0835					
California Geological Survey	Headquarters/Office of the	State Geologist	801 K Street, MS 12-30	Sacramento	CA	95814					

City of Rancho Cucamonga

MITIGATED NEGATIVE DECLARATION

The following Mitigated Negative Declaration is being circulated for public review in accordance with the California Environmental Quality Act Section 21091 and 21092 of the Public Resources Code.

Project File No.: Design Review DRC2018-00119

Public Review Period Closes: March 13, 2019

Project Name: Overton Moore Warehouse **Project Applicant:**

Overton Moore Properties
19300 Hamilton Avenue Suite 200
Gardena, CA 90248

Project Location (also see attached map): Located in the General Industrial (GI) District at the southwest corner of Hellman Avenue and Eighth Street, located at 9000 Hellman Avenue - APN: 0209-151-36.

Project Description: The proposed development of a 174,745 square-foot warehouse on an 8.09-acre site (352,428 square feet) located on the southwest corner of 8th Street and Hellman Avenue. The new building would consist of 160,245 square feet of warehousing, 12,000 square feet of office space, and 2,500 square feet of office mezzanine. A total of 21 dock high doors would be provided along the new building's southern elevation. In addition, 119 parking spaces and 31 trailer parking spaces would be provided in the northern and southern portions of the project site, respectively. Access to the project site would be provided by a driveway located along the west side of Hellman Avenue and two driveways located along the south side of 8th Street. Lastly, a total of 36,312 square feet of landscaping would be provided.

FINDING

This is to advise that the City of Rancho Cucamonga, acting as the lead agency, has conducted an Initial Study to determine if the project may have a significant effect on the environment and is proposing this Mitigated Negative Declaration based upon the following finding:

The Initial Study identified potentially significant effects but:

(1) Revisions in the project plans or proposals made or agreed to by the applicant before this proposed Mitigated Negative Declaration was released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur, and

(2) There is no substantial evidence before the agency that the project, as revised, may have a significant effect on the environment.

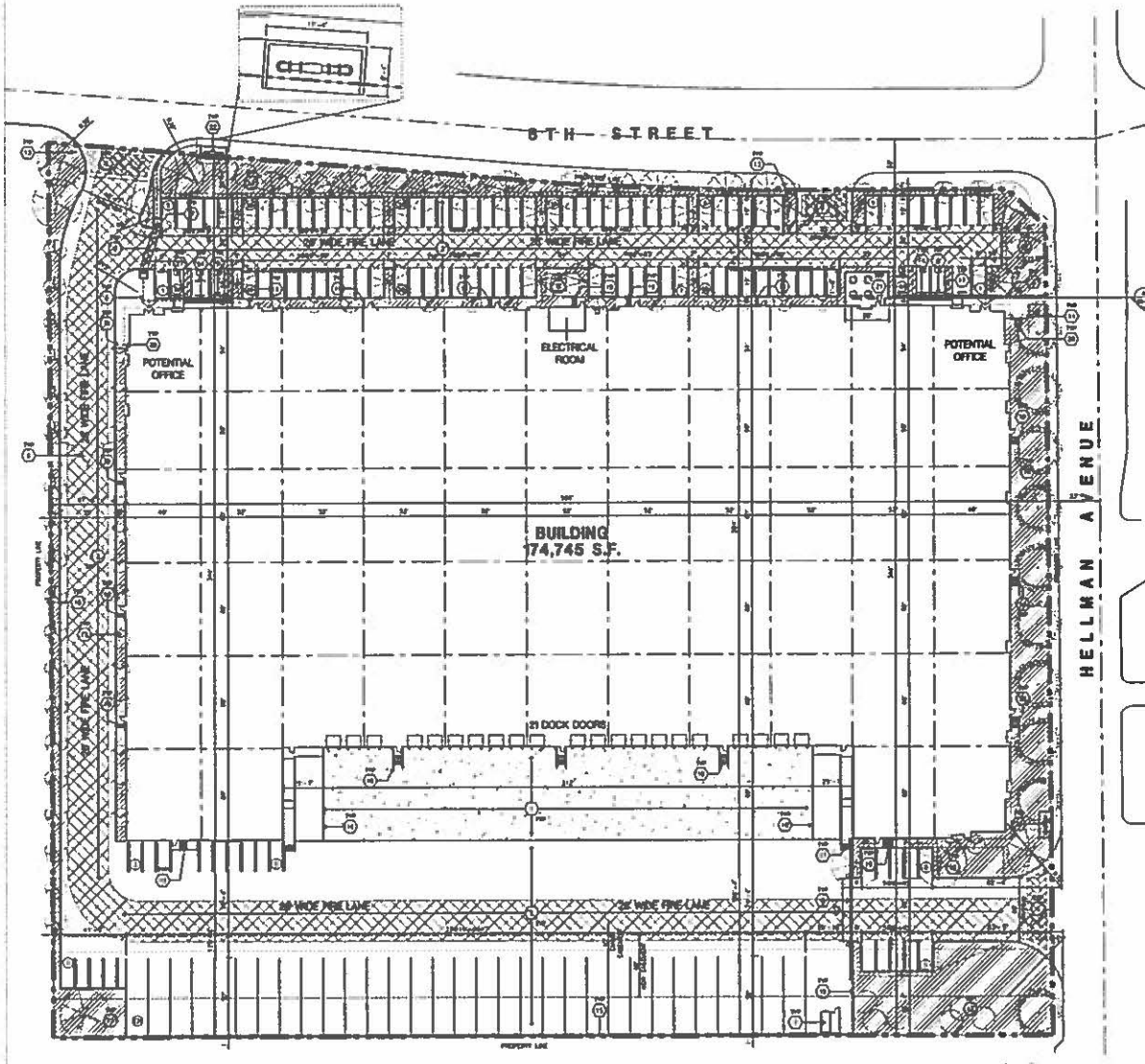
If adopted, the Mitigated Negative Declaration means that an Environmental Impact Report will not be required. The factual and analytical basis for this finding is included in the attached Initial Study. The project file and all related documents are available for review at the City of Rancho Cucamonga Planning Department at 10500 Civic Center Drive (909) 477-2750 or Fax (909) 477-2847.

NOTICE

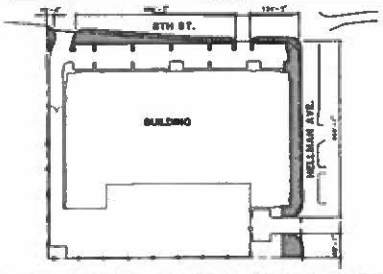
The public is invited to comment on the proposed Mitigated Negative Declaration during the review period.

March 13, 2019
Date of Determination

Adopted By



OVERALL SITE PLAN (A) 1"=30'-0"



LANDSCAPE CALCULATION

REQUIRED

8th STREET (20' AVERAGE)

HELLMAN AVE (20' AVERAGE)

PROVIDED

8th STREET

13,712.5 SQ.FT

HELLMAN AVE

17,875 SQ.FT

PROJECT INFORMATION

Owner / Applicant

FLP RANCHO CUCAMONGA LLC
c/o OMP
HERB S. HAMILTON AVE.
GARDENA, CA 90248
TEL : 310-354-2400

Applicant Representative

HPA, INC.
14831 Bonbon Avenue, Ste.
Fifield Valley, CA
92532
tel: 949-453-1778
fax: 949-453-1881
email: hpa@hpacorp.com

Construction Type

CONCRETE TILT-UP BUILDING

BUILDING OCCUPANCY: S-1 / B
CONSTRUCTION TYPE: II-B

FIRE SYSTEM

APN:

Project Address

HELLMAN AVE
RANCHO CUCAMONGA, CA

Code Analysis

2016 CALIFORNIA BUILDING CODE
2016 CALIFORNIA PLUMBING CODE
2016 CALIFORNIA MECHANICAL CODE
2016 CALIFORNIA ELECTRICAL CODE
2016 CALIFORNIA FIRE CODE
2016 CALIFORNIA ENERGY CODE
2016 CALIFORNIA GREEN BUILDING STANDARDS

Zoning

GENERAL INDUSTRIAL (GI)

Legal Description

THE LAND REFERRED TO IN THIS COMMITMENT IS SITUATED IN THE CITY OF RANCHO CUCAMONGA, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

PARCEL 1:

THE EAST 1/2 OF THE EAST 1/2 OF LOT 3, SECTION 25, TOWNSHIP 1 SOUTH, RANGE 7 WEST, RANCHO CUCAMONGA LANDS, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 4, PAGE 9 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPT ANY PORTION THEREOF INCLUDED WITHIN THE EAST 1/2 OF SAID LOT 3

EXCEPT THAT PORTION DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE WEST LINE OF HELLMAN AVENUE 60.00 FEET WIDE AND THE SOUTH LINE OF SAID LOT 3; THENCE, WEST 3.00 FEET ALONG SAID SOUTH LINE TO ITS INTERSECTION WITH A LINE THAT IS PARALLEL WITH THE 3.00 FEET WESTERLY OF SAID WEST LINE; THENCE NORTH ALONG SAID PARALLEL LINE TO THE BEGINNING OF A TANGENT CURVE, CONCAVE TO THE SOUTHEAST AND HAVING A RADIUS OF 20.00 FEET; THENCE NORTHERLY ALONG SAID CURVE TO A POINT OF TANGENCY WITH A LINE THAT IS PARALLEL WITH AND 60.00 FEET SOUTH OF THE SOUTH LINE OF THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY'S RIGHT OF WAY; THENCE WESTERLY ALONG SAID PARALLEL LINE TO ITS INTERSECTION WITH THE WEST LINE OF THE EAST 1/2 OF SAID LOT 3; THENCE NORTHERLY ALONG SAID WEST LINE OF THE EAST 1/2 OF SAID LOT 3 TO ITS INTERSECTION WITH THE SOUTH LINE OF SAID ATCHISON, TOPEKA AND SANTA FE RAILWAY RIGHT OF WAY; THENCE EASTERLY ALONG SAID SOUTH LINE AND ITS EASTERLY PROLONGATION TO ITS INTERSECTION WITH THE WEST LINE OF SAID LOT 3, SAID WEST LINE OF LOT 3 FOR THE PURPOSE OF THIS DESCRIPTION BEING THE WEST LINE OF HELLMAN AVENUE; THENCE SOUTH ALONG THE WEST LINE OF SAID LOT 3 TO THE POINT OF BEGINNING, AND AS AND BEARINGS HEREON DESCRIBED ARE MEASURED FROM THE CENTER LINE OF HELLMAN STREETS AS SHOWN ON SAID MAP

PARCEL 2:

THE WEST 1/2 OF THE EAST 1/2 OF LOT 3, SECTION 25, TOWNSHIP 1 SOUTH, RANGE 7 WEST, RANCHO CUCAMONGA LANDS, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 4, OF MAPS, PAGE 9, RECORDS OF SAID COUNTY

EXCEPT THAT PORTION DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE CENTER LINE OF HELLMAN AVENUE WITH THE EASTERLY PROLONGATION OF THE SOUTH LINE OF SAID LOT 3; THENCE WESTERLY ALONG THE SAID PROLONGATION AND SOUTH LINE TO AN INTERSECTION WITH A LINE THAT IS PARALLEL WITH AND 33.00 FEET WEST OF SAID CENTER LINE OF HELLMAN AVENUE; THENCE NORTHERLY ALONG SAID PARALLEL LINE TO AN INTERSECTION WITH A LINE THAT IS PARALLEL WITH AND 60.00 FEET SOUTH OF THE SOUTH LINE OF THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY RIGHT OF WAY; THENCE WESTERLY ALONG SAID PARALLEL LINE TO AN INTERSECTION WITH THE WEST LINE OF SAID EAST 1/2 OF LOT 3; THENCE NORTHERLY ALONG SAID WEST LINE TO AN INTERSECTION WITH SAID SOUTH LINE OF THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY RIGHT OF WAY; THENCE EASTERLY ALONG SAID SOUTH LINE, AND ITS PROLONGATION, TO AN INTERSECTION WITH THE AFORESAID CENTER LINE OF HELLMAN AVENUE; THENCE SOUTHERLY ALONG SAID CENTER LINE TO THE POINT OF BEGINNING.

SITE PLAN KEYNOTES

1. HEAVY BROOM FINISH CONCRETE PAVEMENT
2. ASPHALT CONCRETE (AC) PAVING.
3. CONCRETE WALKWAY, MEDIUM BROOM FINISH
4. LANDSCAPE AREAS TO BE CONSTRUCTED.
5. 7'-0"x5'-0"x6" THICK CONCRETE EXTERIOR LANDING PAD TYP. OF ALL EXTERIOR MAN DOORS TO LANDSCAPED AREAS. FINISH TO BE MEDIUM BROOM FINISH.
6. PROVIDE 4" HIGH METAL CURBS AT MAN-DOOR FOR FIRE DEPARTMENT CLEARANCE, PER DETAILS
7. TRASH ENCLOSURE PER CITY STANDARD
8. APPROXIMATE LOCATION OF TRANSFORMER
9. PRE-CAST CONCRETE WHEEL STOP
10. CONCRETE FILLED GUARD POST @ 3'-0" O.C. @ 6'-0" O.C. IN DESIGNATED PARKING AREA
11. DESIGNATED PARKING AREA
12. LANDSCAPE. ALL LANDSCAPE AREAS INDICATED BY SHADING
13. ACCESSIBLE RAMP SIGN
14. ACCESSIBLE PARKING STALL SIGN
15. 6' HIGH METAL FENCE
16. 42" HIGH CONCRETE GUARDWALL
17. RELOCATED SIGNS
18. EXTERIOR METAL SIGN WITH CLEARANCE AND MARKING
19. EXTERIOR CONCRETE SIGN WITH CLEARANCE AND MARKING
20. EXTERIOR SIGN BACK
21. EXPLORE PARKING AREA WITH VEHICLE AND SIGNS.
22. APPROXIMATE LOCATION OF FIRE AND SIDE PAINTED CURBS WITH 6" HIGH METAL FENCE AND VINYL MARKING

SITE PLAN GENERAL NOTES

1. SEE SOILS REPORT PREPARED BY [illegible] FOR SOILS ENGINEERING AND GEOLOGICAL RECOMMENDATIONS.
2. ALL DIMENSIONS ARE TO THE FACE OF CONCRETE WALL, FACE OF CONCRETE CURB OR BACK OF CURB U.N.O.
3. SEE "C" PLANS FOR ALL CONCRETE CURBS, GUTTERS AND SWALES.
4. SEE "L" PLANS FOR ALL LANDSCAPE AND IRRIGATION.
5. ALL EXTERIOR LIGHTING SHALL BE DIRECTED AWAY FROM ADJACENT PROPERTIES.
6. SEE "E" DRAWINGS FOR POINT OF CONNECTIONS TO UTILITIES.
7. PROVIDE PAINTED CROSSWALK PER CITY STANDARDS.
8. CONTRACTOR TO REFER TO "C" DRAWINGS FOR ALL HORIZONTAL CONTROL DIMENSIONS. SEE PLANS AND PER ENGINEER AND GRADING CONTROL PLANS.
9. SEE "C" DRAWINGS FOR FINISH GRADE ELEVATIONS.
10. CONCRETE SIDEWALKS TO BE A MINIMUM OF 4" THICK W/ FIBER REINFORCEMENT AT 5'-0" EXPANSION/CONSTRUCTION JOINTS SHALL BE A MINIMUM 1/2" IN WIDTH EXPANSION JOINTS TO HAVE CONSTRUCTION EXPANSION FILLER MATERIAL OF 1/2" POWER TROWEL OR A HAND GROOVE RADIUS OF 1/2".
11. FINAL LANDSCAPING AND PAVING SHALL BE APPROVED BY FIRE DEPARTMENT PRIOR TO FINAL INSPECTION.
12. CONSTRUCTION DOCUMENTS PERTAINING TO THE LANDSCAPE AND IRRIGATION OF THE PROJECT SITE SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT AND APPROVED BY PUBLIC FACILITIES DEVELOPMENT PRIOR TO ISSUANCE OF BUILDING PERMITS.
13. PRIOR TO FINAL CITY INSPECTION, THE LANDSCAPE ARCHITECT SHALL SUBMIT A CERTIFICATE OF COMPLETION TO PUBLIC FACILITIES DEVELOPMENT.
14. ALL LANDSCAPE AND IRRIGATION DESIGNS SHALL MEET CURRENT CITY STANDARDS AS LISTED IN GUIDELINES OF AS OBTAINED FROM PUBLIC FACILITIES DEVELOPMENT.
15. LANDSCAPED AREAS SHALL BE DELINEATED WITH A MINIMUM SIX INCHES (6") HIGH CURB.

VICINITY MAP



SITE LEGEND

- CONCRETE PAVING SEE "C" DRAWING FOR THICKNESS
- ASPHALT CONCRETE PAVING SEE "C" DRAWING FOR THICKNESS
- DEPRESSED AREA (SEE "C" FOR GRADES)
- ACCESSIBLE PARKING STALL (12'-0" X 18'-0") + 5'-0" W/ ACCESSIBLE AISLE
- ACCESSIBLE PARKING SIGN STALL (12'-0" X 18'-0") + 5'-0" W/ ACCESSIBLE AISLE
- LANDSCAPED AREA
- PATH OF TRAVEL
- 26' FIRE ACCESS ROADWAY
- EXISTING PUBLIC FIRE HYDRANT
- PROPOSED FIRE HYDRANT LOCATION

PROJECT DATA



CAUTION - IF THIS SHEET IS NOT 24"x36" IT IS A REDUCED PRINT

HPA architecture

HPA, INC.
14831 Bonbon Avenue, Ste.
Fifield Valley, CA
92532
tel: 949-453-1778
fax: 949-453-1881
email: hpa@hpacorp.com

Owner:
FLP RANCHO CUCAMONGA LLC
c/o
OMP
HERB S. HAMILTON AVE.
GARDENA, CA 90248
TEL : 310-354-2400

Project:

RANCHO CUCAMONGA INDUSTRIAL CENTER

RANCHO CUCAMONGA, CA

Consultants:

Civil	[illegible]
Structural	-
Mechanical	-
Plumbing	-
Electrical	-
Landscape	HUNTER LANDSCAPE
Geotechnical	-
Soils Engineer	-

Title	Overall Site Plan
Project Number	16427
Drawn by	MB
Date	12-01-16
Revisions	

DAB-A1.1

INITIAL STUDY
AND
MITIGATED NEGATIVE DECLARATION

CITY OF RANCHO CUCAMONGA
OVERTON MOORE WAREHOUSE
9000 HELLMAN AVENUE

LEAD AGENCY:

CITY OF RANCHO CUCAMONGA
PLANNING DEPARTMENT
10500 CIVIC CENTER DRIVE
RANCHO CUCAMONGA, CALIFORNIA 91730

REPORT PREPARED BY:

BLODGETT BAYLOSIS ENVIRONMENTAL PLANNING
2211 SOUTH HACIENDA BOULEVARD, SUITE 107
HACIENDA HEIGHTS, CALIFORNIA 91745

JANUARY 30, 2019

RCMG 001

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MITIGATED NEGATIVE DECLARATION

PROJECT NAME: Overton Moore Warehouse.

PROJECT ADDRESS: 9000 Hellman Avenue, Rancho Cucamonga, California 90670.

APPLICANT: FLP Rancho Cucamonga LLC. 19300 South Hamilton Avenue, Suite 200, Gardena, California 90248.

CITY AND COUNTY: Rancho Cucamonga, San Bernardino County.

DESCRIPTION: The City of Rancho Cucamonga, in its capacity as the Lead Agency, is considering an application to permit the construction of a 174,745 square-foot warehouse on a 8.09-acre site (352,428 square feet) located on the southwest corner of 8th Street and Hellman Avenue. The new building would consist of 160,245 square feet of warehousing, 12,000 square feet of office space, and 2,500 square feet of office mezzanine. A total of 21 dock high doors would be provided along the new building's southern elevation. In addition, 119 parking spaces and 31 trailer parking spaces would be provided in the northern and southern portions of the project site, respectively. Access to the project site would be provided by a driveway located along the west side of Hellman Avenue and two driveways located along the south side of 8th Street. Lastly, a total of 36,312 square feet of landscaping would be provided.

FINDINGS: The environmental analysis provided in the attached Initial Study indicates that the proposed project would not result in any significant adverse environmental impacts. For this reason, the City of Rancho Cucamonga determined that a *Mitigated Negative Declaration* is the appropriate CEQA document for the proposed project. The following findings may also be made based on the analysis contained in the attached Initial Study:

- The proposed project *will not* have the potential to degrade the quality of the environment.
- The proposed project *will not* have the potential to achieve short-term goals to the disadvantage of long-term environmental goals.
- The proposed project *will not* have impacts that are individually limited, but cumulatively considerable, when considering planned or proposed development in the City.
- The proposed project *will not* have environmental effects that will adversely affect humans, either directly or indirectly.

The environmental analysis is provided in the attached Initial Study prepared for the proposed project. The project is also described in greater detail in the attached Initial Study.

_____ _____

Bryan Hamilton – Consultant to the City of Rancho Cucamonga Date

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SECTION 1 INTRODUCTION

1.1 PURPOSE OF THE INITIAL STUDY

The City of Rancho Cucamonga, in its capacity as the Lead Agency, is considering an application to permit the construction of a 174,745 square-foot warehouse on a 8.09-acre site (352,428 square feet) located on the southwest corner of 8th Street and Hellman Avenue. The new building would consist of 160,245 square feet of warehousing, 12,000 square feet of office space, and 2,500 square feet of office mezzanine. A total of 21 dock high doors would be provided along the new building's southern elevation. In addition, 119 parking spaces and 31 trailer parking spaces would be provided in the northern and southern portions of the project site, respectively. Access to the project site would be provided by a driveway located along the west side of Hellman Avenue and two driveways located along the south side of 8th Street. Lastly, a total of 36,312 square feet of landscaping would be provided. The project proponent is FLP Rancho Cucamonga LLC, 19300 South Hamilton Avenue, Suite 200, Gardena, California 90248.

The City of Rancho Cucamonga is the designated *Lead Agency* for the proposed project and would be responsible for the project's environmental review.[1] The construction and operation of the proposed project will need to undergo a Design Review (DR). The purpose of the Design Review is to ensure that development projects comply with all applicable local design guidelines, standards, and ordinances; to minimize adverse effects on surrounding properties and the environment; and to maintain consistency with the General Plan. According to Section 17.118.020 of the City's Municipal Code, any addition, remodeling, relocation, or construction requiring a building permit within any district is subject to site development review, minor design review, or design review. The Design Review consists of a Design Review Board which includes two members of the Planning Commission and two members of the Planning Department.

The aforementioned action, together with the proposed development, is considered to be a project pursuant to the California Environmental Quality Act (CEQA).[2] As part of the proposed project's environmental review, the City of Rancho Cucamonga authorized the preparation of this Initial Study. Although this Initial Study was prepared with consultant support, the analysis, conclusions, and findings made as part of its preparation fully represent the independent judgment and analysis of the City of Rancho Cucamonga, in its capacity as the Lead Agency. The primary purpose of CEQA is to ensure that decision-makers and the public understand the environmental impacts of the proposed project and that decision-makers have considered such impacts before considering approval of the project. Pursuant to the CEQA Guidelines, purposes of this Initial Study include the following:

- To provide the City information to use as the basis for deciding whether to prepare an environmental impact report (EIR), mitigated negative declaration, or negative declaration;
- To facilitate the project's environmental assessment early in the design and development of the project;

[1] California, State of. *California Public Resources Code. Division 13, Chapter 2.5. Definitions*. as Amended 2001. §21067.

[2] California, State of. *Title 14. California Code of Regulations. Chapter 3. Guidelines for the Implementation of the California Environmental Quality Act*. as Amended 1998 (CEQA Guidelines). §15060 (b).

- To eliminate unnecessary EIRs;
- To determine the nature and extent of any impacts associated with the proposed project; and,
- To enable modification of the project to mitigate significant impacts of the project.[3]

The City also determined, as part of this Initial Study's preparation, that a Mitigated Negative Declaration is the appropriate environmental document for the project's environmental review pursuant to CEQA. This Initial Study and the *Notice of Intent to Adopt a Mitigated Negative Declaration* will be forwarded to responsible agencies, trustee agencies, and the public for review and comment. A 20-day public review period will be provided to allow these agencies and other interested parties to comment on the proposed project and the findings of this Initial Study.[4] This 20-day public review period is required pursuant Section 15073 of the State CEQA Guidelines. Under that Section of the CEQA Guidelines, a lead agency shall provide a public review period pursuant to Section 15105 of not less than 20 days. When a proposed negative declaration or mitigated negative declaration and initial study are submitted to the State Clearinghouse for review by state agencies, the public review period shall not be less than 30 days, unless a shorter period is approved by the State Clearinghouse under Section 15105(d). The CEQA Guidelines indicate the type of projects that are required to be sent up to the State Clearinghouse for review. According to Section 15205 of the CEQA Guidelines, the following environmental documents shall be submitted to the State Clearinghouse for review by state agencies:

- Draft EIRs and Negative Declarations prepared by a state agency where such agency is a Lead Agency.

- Draft EIRs and Negative Declarations prepared by a public agency where a state agency is a Responsible Agency, Trustee Agency, or otherwise has jurisdiction by law with respect to the project.

- Draft EIRs and Negative Declarations on projects identified in Section 15206 as being of statewide, regional, or area wide significance.

- Draft EISs, environmental assessments, and findings of no significant impact prepared pursuant to NEPA, the Federal Guidelines (Title 40 CFR, Part 1500, commencing with Section 1500.1).

The proposed project does not meet any of the aforementioned criteria, including the criteria for a regionally significant project. As stated in Section 15206 of the CEQA Guidelines, a draft EIR or negative declaration prepared by any public agency on a project described in this section shall be submitted to the State Clearinghouse and should be submitted also to the appropriate metropolitan area council of governments for review and comment.

[3] California, State of, *Title 14. California Code of Regulations. Chapter 3. Guidelines for the Implementation of the California Environmental Quality Act* as Amended 2016. (CEQA Guidelines) § 15063(c).

[4] California, State of. *California Public Resources Code. Section 21091 (b).*

Questions and/or comments should be submitted to the following individual:

Thomas Grahn, Associate Planner
City of Rancho Cucamonga Planning Department
10500 Civic Center Drive
Rancho Cucamonga, California 91730

1.2 INITIAL STUDY'S ORGANIZATION

The following annotated outline summarizes the contents of this Initial Study:

- *Section 1 Introduction,* provides the procedural context surrounding this Initial Study's preparation and insight into its composition. This section also includes a checklist that summarizes the findings of this Initial Study.

- *Section 2 Project Description,* provides an overview of the existing environment as it relates to the project site and describes the proposed project's physical and operational characteristics. The project description also provides background into the site's location and environmental setting. This background information was collected during the field survey that was conducted for the project site. The field survey was conducted by Mr. Marc Blodgett and Mr. Bryan Hamilton of Blodgett Baylosis Environmental Planning on March 30, 2018. The field survey took one day to complete and involved the recording of the site's conditions, taking photographs, and collecting noise measurements.

- *Section* 3 *Environmental Analysis,* includes an analysis of potential impacts associated with the proposed project's construction and the subsequent operation.

- *Section 4 Findings,* indicates the conclusions of the environmental analysis and the Mandatory Findings of Significance. In addition, this section includes the Mitigation Monitoring and Reporting Program (MMRP).

- *Section 5 References,* identifies the sources used in the preparation of this Initial Study.

1.3 INITIAL STUDY CHECKLIST

The environmental analysis provided in Section 3 of this Initial Study indicates that the proposed project would not result in any unmitigable, significant impacts on the environment. For this reason, the City of Rancho Cucamonga determined that a Mitigated Negative Declaration is the appropriate CEQA document for the proposed project. The findings of this Initial Study are summarized in Table 1-1 provided on the following pages.

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
SECTION 3.1 AESTHETIC IMPACTS. *Would the project:*				
a) Have a substantial adverse effect on a scenic vista?			X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?			X	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			X	
SECTION 3.2 AGRICULTURE & FORESTRY RESOURCES IMPACTS. *Would the project:*				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act Contract?				X
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined in Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				X
d) Result in the loss of forest land or conversion of forest land to a non-forest use?				X
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forest land to non-forest use?				X
SECTION 3.3 AIR QUALITY IMPACTS. *Would the project:*				
a) Conflict with or obstruct implementation of the applicable air quality plan?			X	
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			X	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?			X	
d) Expose sensitive receptors to substantial pollutant concentrations?			X	
e) Create objectionable odors affecting a substantial number of people?			X	

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
SECTION 3.4 BIOLOGICAL RESOURCES IMPACTS. *Would the project:*				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife, or U. S. Fish and Wildlife Service?				X
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?				X
c) Have a substantial adverse effect on Federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				X
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory life corridors, or impede the use of native wildlife nursery sites?				X
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			X	
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?				X
SECTION 3.5 CULTURAL RESOURCES IMPACTS. *Would the project:*				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?				X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?		X		
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X		
d) Disturb any human remains, including those interred outside of formal cemeteries?		X		
SECTION 3.6 GEOLOGY & SOILS IMPACTS. *Would the project:*				

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: • Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. • Strong seismic ground–shaking? • Seismic-related ground failure, including liquefaction? • Landslides?			X	
b) Result in substantial soil erosion or the loss of topsoil?			X	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			X	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?			X	
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				X
SECTION 3.7 GREENHOUSE GAS EMISSIONS IMPACTS. *Would the project:*				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?		X		
SECTION 3.8 HAZARDS & HAZARDOUS MATERIALS IMPACTS. *Would the project:*				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			X	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project result in a safety hazard for people residing or working in the project area?				X

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g) Impair implementation of or physically interfere with, an adopted emergency response plan or emergency evacuation plan?				X
h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?			X	
SECTION 3.9 HYDROLOGY & WATER QUALITY IMPACTS. *Would the project:*				
a) Violate any water quality standards or waste discharge requirements?			X	
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?			X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?				X
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?				X
e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?			X	
f) Otherwise substantially degrade water quality?				X
g) Place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				X
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X
j) Inundation by seiche, tsunami, or mudflow?				X
SECTION 3.10 LAND USE & PLANNING IMPACTS. *Would the project:*				
a) Physically divide an established community?				X

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Conflict with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?			**X**	
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				**X**
SECTION 3.11 MINERAL RESOURCES IMPACTS. *Would the project:*				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State?				**X**
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?				**X**
SECTION 3.12 NOISE IMPACTS. *Would the project result in:*				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			**X**	
b) Exposure of people to or generation of excessive groundborne vibration or groundborne noise levels?		**X**		
c) A substantial permanent increase in ambient noise levels in the project vicinity above noise levels existing without the project?			**X**	
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		**X**		
e) For a project located with an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				**X**
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				**X**
SECTION 3.13 POPULATION & HOUSING IMPACTS. *Would the project:*				
a) Induce substantial growth in an area either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				**X**
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				**X**
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere				**X**

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
SECTION 3.14 PUBLIC SERVICES IMPACTS. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which would cause significant environmental impacts in order to maintain acceptable service ratios, response times, or other performance objectives in any of the following areas:*				
a) Fire protection services?			X	
b) Police protection services?			X	
c) School services?			X	
d) Parks?				X
e) Other governmental services?			X	
SECTION 3.15 RECREATION IMPACTS. *Would the project:*				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X
SECTION 3.16 TRANSPORTATION & CIRCULATION IMPACTS. *Would the project:*				
a) Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?			X	
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?			X	
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in the location that results in substantial safety risks?				X
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)		X		
e) Result in inadequate emergency access?				X
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?			X	

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
SECTION 3.17 TRIBAL CULTURAL RESOURCES IMPACTS. *Would the project cause a substantial adverse change in the significance of a tribal cultural resources, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:*				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k).		**X**		
b) A resource determined by the Lead Agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the Lead Agency shall consider the significance of the resource to a California Native tribe.			**X**	
SECTION 3.18 UTILITIES & SERVICE SYSTEMS IMPACTS. *Would the project:*				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?			**X**	
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			**X**	
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			**X**	
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?			**X**	
e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			**X**	
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?			**X**	
g) Comply with Federal, State, and local statutes and regulations related to solid waste?				**X**
SECTION 3.19 MANDATORY FINDINGS OF SIGNIFICANCE. *The approval and subsequent implementation of the proposed project:*				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?			**X**	

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			**X**	
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?		**X**		

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SECTION 2 PROJECT DESCRIPTION

2.1 PROJECT OVERVIEW

The City of Rancho Cucamonga, in its capacity as the Lead Agency, is considering an application to permit the construction of a 174,745 square-foot warehouse on a 8.09-acre site (352,428 square feet) located on the southwest corner of 8th Street and Hellman Avenue. The new building would consist of 160,245 square feet of warehousing, 12,000 square feet of office space, and 2,500 square feet of office mezzanine. A total of 21 dock high doors would be provided along the new building's southern elevation. In addition, 119 parking spaces and 31 trailer parking spaces would be provided. Parking areas would be provided within the northern and southern portions of the project site, respectively. Access to the project site would be provided by a single driveway located along the west side of Hellman Avenue and two driveways located along the south side of 8th Street. Lastly, a total of 36,312 square feet of landscaping would be provided.[5] The project is described in greater detail in Section 2.4.

2.2 PROJECT LOCATION

The project site is located within the southwest portion of the City of Rancho Cucamonga. The City of Rancho Cucamonga is located approximately 37 miles northeast of Downtown Los Angeles and 12 miles west of the City of San Bernardino. Rancho Cucamonga is bounded on the north by the San Gabriel Mountains; on the east by the City of Fontana and unincorporated San Bernardino County; on the south by the City of Ontario; and on the west by the City of Upland and unincorporated San Bernardino County. Major physiographic features located in the vicinity of the City include the San Gabriel Mountains, which extend along the City's northern border in an east-west orientation. Regional access to Rancho Cucamonga is possible from two area freeways: the Ontario Freeway (I-15) and the Foothill Freeway (I-210). The I-15 Freeway traverses the southeast corner of the City in a southwest to northeast orientation. The I-210 freeway traverses the northern half of the City in an east-west orientation.[6] The location of Rancho Cucamonga in a regional context is shown in Exhibit 2-1. A citywide map is provided in Exhibit 2-2.

The project site is located at the southwest corner of 8th Street and Hellman Avenue. The site's legal address is 9000 Hellman Avenue. The site's corresponding Assessor Parcel Number (APN) is 0209-151-36-0-000. Major roadways near the project site include: Foothill Boulevard, located one mile north of the site; Archibald Avenue, located 0.50 mile east of the site; 4th Street, located 0.86 mile south of the site; and, Vineyard Avenue, located 0.37 mile to the west of the site.[7] A local map is provided in Exhibit 2-3.

[5] HPA Architecture. *Overall Site Plan*. Plan packet dated January 25, 2018.

[6] Google Earth. Website accessed March 29, 2018.

[7] Ibid.

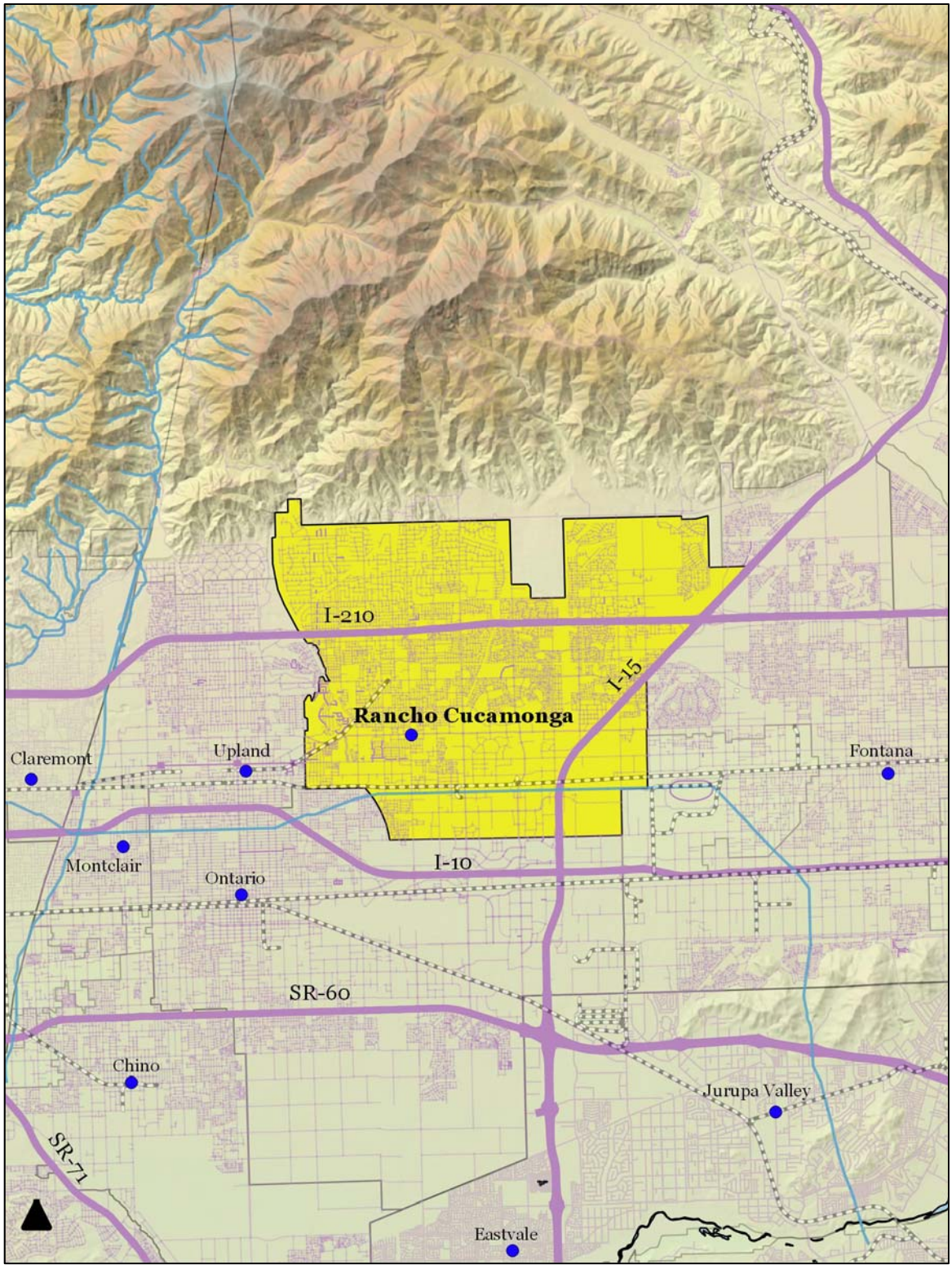


EXHIBIT 2-1
REGIONAL MAP
SOURCE: QUANTUM GIS

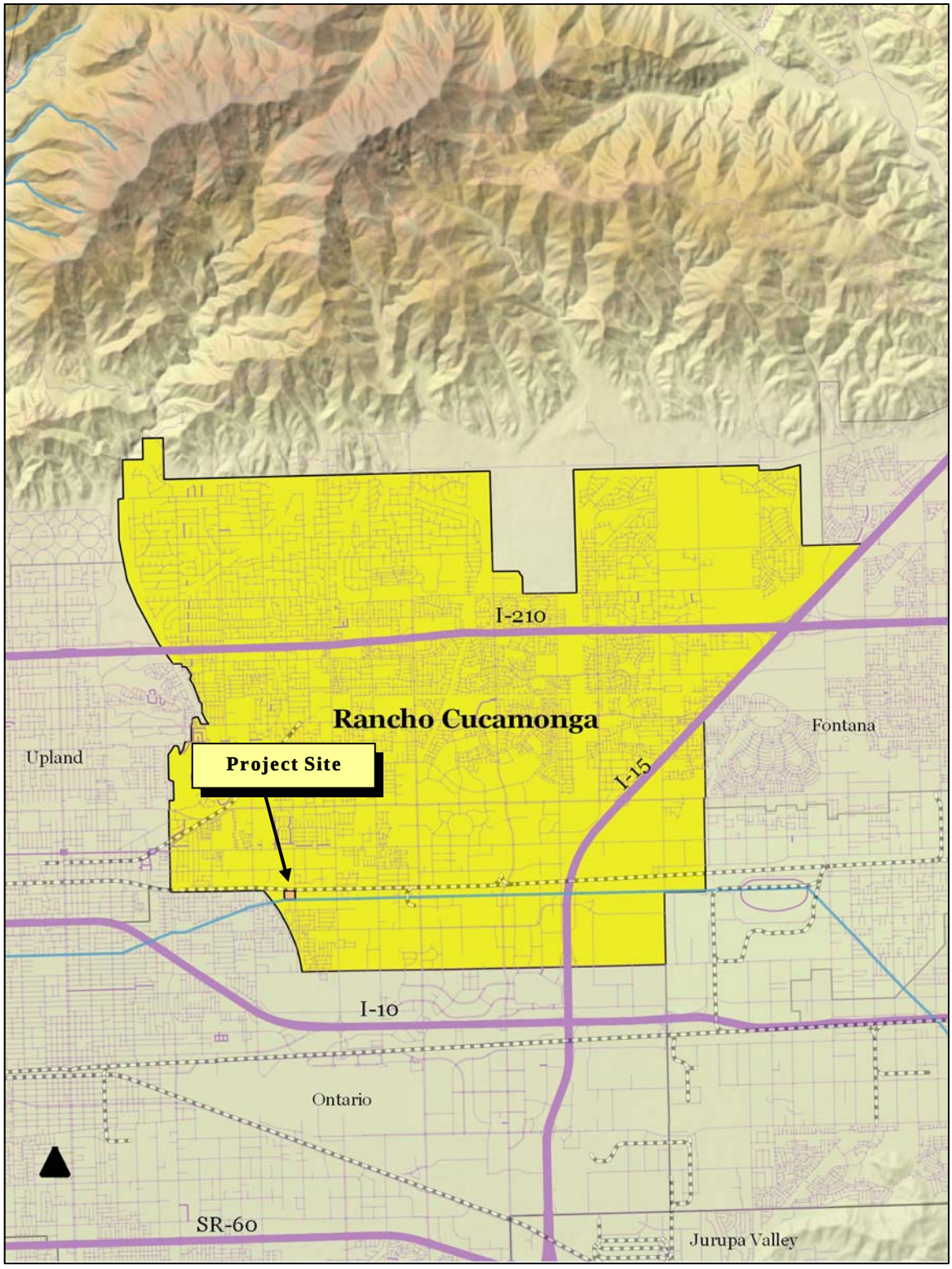


EXHIBIT 2-2
CITYWIDE MAP
SOURCE: QUANTUM GIS

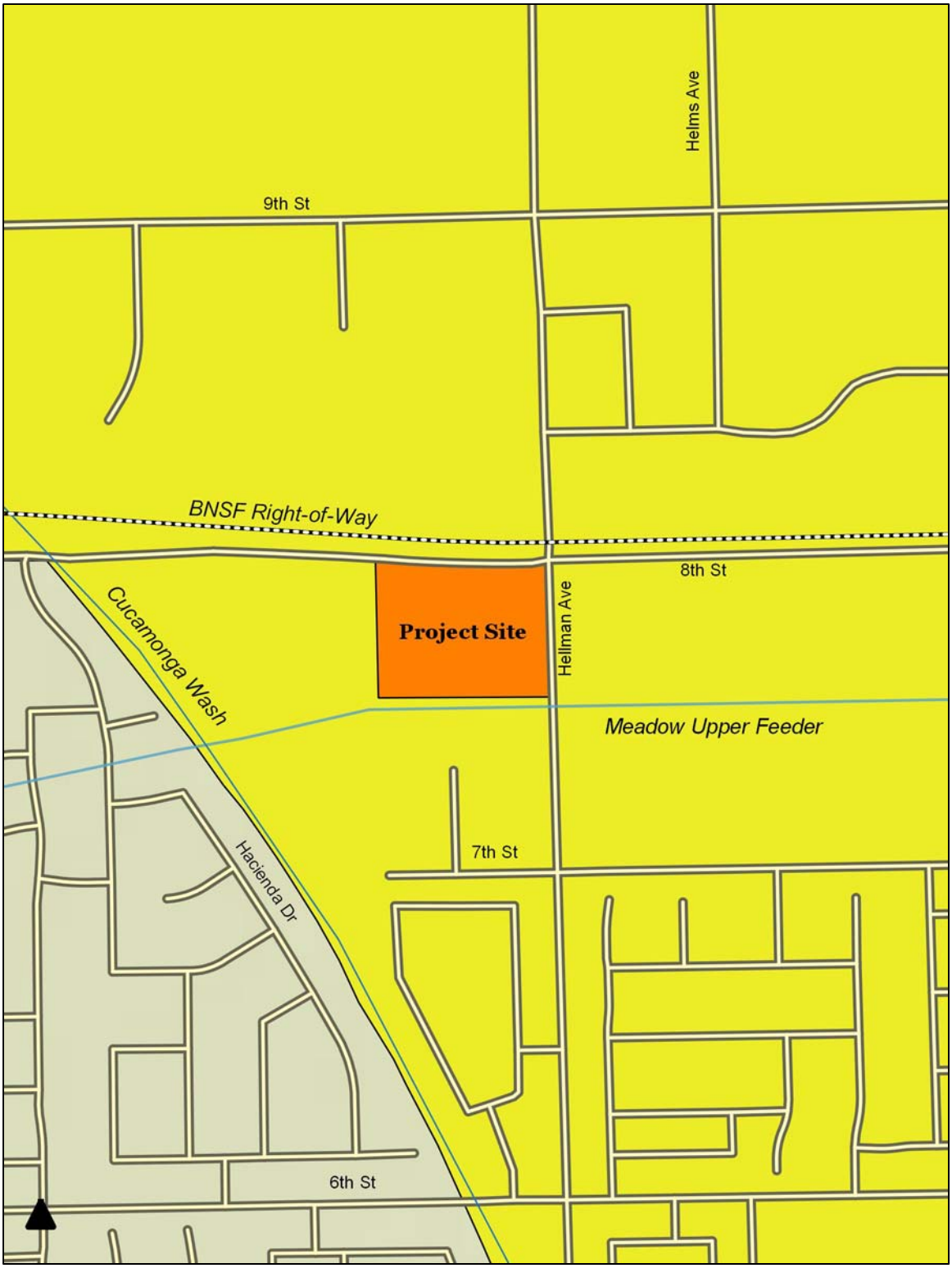


EXHIBIT 2-3
VICINITY MAP
SOURCE: QUANTUM GIS

2.3 ENVIRONMENTAL SETTING

The project site is located within a largely industrial area though a residential area is located to the east of the project site. An aerial photograph depicting the project site and the immediate area is provided in Exhibit 2-4. Photographs of the project site are also provided in Exhibit 2-4. Existing uses found in the vicinity of the project site are summarized below: [8]

- *North of the project site.* 8th Street extends along the project site's northern boundary in an east to west orientation. A railroad right-of-way is located just north of 8th Street in an east to west orientation. Undeveloped open space is located further north.

- *South of the project site.* A business park abuts the project site to the south. This business park is located at the northwest corner of 7th Street and Hellman Avenue.

- *East of the project site.* Single-family dwelling units occupy frontage along the east side of Hellman Avenue, opposite the project site. Various industrial uses are located further east.

- *West of the project site.* A warehouse complex abuts the site to the west. The Cucamonga Channel extends along the west side of this warehouse complex in a northwest to southeast orientation. The Cucamonga Channel is located between 607 and 820 feet to the west of the project site.[9]

The project site is currently occupied by Frontier Communications, which is currently using the site for outdoor storage and repair of equipment. The site is dominated by dilapidated surface parking and contains multiple light standards, fleet vehicles, storage containers, bins, other miscellaneous equipment, and vehicles with ancillary administrative office. Lastly, the site is fenced off by a chain link fence with added barbed wire. A small 400 square-foot patch of landscaping is present along the project site's frontage with Hellman Avenue. This patch of landscaping consists of grass and shrubs and is located adjacent to two tan colored buildings. These two buildings were constructed in 1980 and have a maximum height of 18 feet and total 16,324 square feet of floor area.[10] The two buildings exhibit minimal architectural features such as façade articulation, prominent entryways, and the screening of rooftop equipment. In addition, these buildings appear to be pre-fabricated and assembled on-site. Small signs depicting "Frontier Communications" are currently integrated into the façades of both buildings. These two buildings are located within the southeast portion of the site and are set back approximately 115 feet from the site's southern property line. There are no pole signs or monument signs present on-site. In addition, there are no trees located within the site's boundaries.

[8] Blodgett Baylosis Environmental Planning. *Field Survey*. Survey was conducted on March 30, 2018.

[9] Google Earth. Website accessed April 2, 2018.

[10] San Bernardino County Office of the Assessor. *Property Information Management System Characteristics Report For Parcel 0209-151-36-0000*. Report dated April 2, 2018.



NORTH

EXHIBIT 2-4
AERIAL PHOTOGRAPH
SOURCE: GOOGLE MAPS

2.4 PROJECT DESCRIPTION

2.4.1 PHYSICAL CHARACTERISTICS OF THE PROPOSED PROJECT

The proposed project involves the construction and operation of a new warehouse within an 8.09-acre site. The proposed project would consist of the following elements:

- *Project Site*. The 8.09-acre (352,428 square feet) project site has a maximum lot width (east to west) of 621 feet and a maximum lot depth (north to south) of 538 feet. Once complete, the new warehouse would have a floor area ratio (FAR) of 0.49 to 1.0 and a lot coverage of 48 percent.[11]

- *Warehouse*. The new 174,745 square-foot warehouse building would have a width (east to west) of 566 feet, a depth (north to south) of 344 feet, and a maximum height of 40 feet. Of the total floor area, 160,245 square feet would consist of warehousing space; 12,000 square feet would consist of office space; and 2,500 square feet would consist of mezzanine. Office space would be located within the northwest and northeast corners of the building. A total of 23 dock high doors would be installed along the building's southern elevation.[12]

- *Parking and Access*. A total of 119 parking spaces would be provided. Of the total number of spaces that would be provided, seven would be reserved for handicapped individuals. In addition, 33 trailer parking spaces would also be provided. Parking areas would be located within the north and south sides of the project site. Access to the project site would be made possible by three new driveways: a single 40-foot wide driveway on the west side of Hellman Avenue, a 40 feet and three inches wide driveway located on the south side of 8th Street, and by a 26-foot wide driveway located on the south side of 8th Street. The 26-foot wide driveway would be restricted to passenger vehicles only and no trucks would access the site from this driveway. In addition, this driveway would be restricted to right turns in and right turns out exclusively. Meanwhile, the two 40-foot wide driveways would be full access driveways.[13]

- *Landscaping*. Approximately 36,312 square feet of landscaping would be planted. Landscaping would occupy 10.3 percent of the site and would be located along the site's northern, western, and eastern property lines. Landscaping would also be provided along the building's north, west, and east facing elevations. Landscaping is divided into four categories: trees, shrubs, accent plants, and groundcover. The species that would be planted would consist of drought tolerant species consistent with those identified by the City. The specific species and quantity that would be planted is further described below:

    - *Trees*. A total of seven different tree species would be incorporated into the project's design. These seven species consist of a bottle tree; 11 London Pane Trees; 24 Chitalpas;

[11] HPA Architecture. *Overall Site Plan*. Plan packet dated January 25, 2018.

[12] Ibid.

[13] Ibid.

26 Brisbane Boxes; 29 Lavender Crape Myrtles; 12 Southern Magnolias; and 10 Afghan Pines.

- *Shrubs*. The Applicant would utilize 11 different species of shrubs. These 11 species of shrub consist of 191 Texas Privets; 191 Pineapple Guavas; 191 Strawberry Trees; 50 Baja Fairy Dusters; 115 Lavenders; 298 Dwarf Bottlebrushes; 164 Texas Rangers; 143 Coffeeberries; 201 Autumn Sages; 337 Feathery Cassias; and 584 Coast Rosemaries.

- *Accent Plants*. The Applicant would utilize accent plants to provide emphasis on certain building or site features such as entryways or walkways. These accent plants would consist of 13 Agaves; 24 Century Plants; and 106 Red Yuccas.

- *Groundcover (low-lying plants)*. The final category of landscaping includes groundcover, or low-lying plants, vines, or grass. These plants include Trailing Acacia; Huntington Carpet Rosemary; Pink Muhly; Star Jasmine; and the Red Groundcover Rose.[14]

- *Signage*. No monument or pole signs are proposed for the project. The only signs that would be used would consist of accessible entry signs and handicapped parking signs. The two 40-foot wide driveways would be controlled by stop signs. Neither of the aforementioned signs would be illuminated. Any signage requested by the future tenants would be incorporated into the façade of the building. Therefore, the future tenant would need to adhere to Section 17.74.030(A)(1)(a) of the City of Rancho Cucamonga Municipal Code. According to that section of the Code:

  "Applicability. A sign permit shall be required for all permanent signs (building attached or freestanding) prior to erection, relocation, alteration, or replacement of a sign, unless otherwise exempted by this chapter. The process for application, review, and decision regarding a sign permit shall be as established in section 17.74.030.B (Review Procedures) below. A sign permit shall not be required for general maintenance of existing signs or the replacement of the sign face (including message) when the area of the sign is not being changed and a building permit is not required (e.g., the replacement of a sign face on a can sign)."

  The future tenant must prepare a Sign Plan for the City to approve prior to the installation of any signage. This Sign Plan is required pursuant to the aforementioned Code. All future building signage must conform to City requirements with respect to illumination and design standards.[15]

- *Lighting*. The light fixtures that would be installed would consist of DSX1 LED lights. A total of 22 lights would be provided, of which 17 would be installed along the building's façade, and five would be installed along the site's western and southern property lines. No lighting would be provided along the site's frontage with Hellman Avenue. The light fixtures that would be installed along the site's western and southern property lines would be shielded and directed towards the ground

[14] Hunter Landscape. *Preliminary Landscape Plan*. Plan dated January 19, 2018.

[15] HPA Architecture. *Overall Site Plan*. Plan packet dated January 25, 2018.

surface.[16] These light fixtures would be free standing and would have a maximum height of 25 feet. The light fixtures that would be provided along the building's façade would consist of wall packs.

- *Architecture*. The proposed warehouse would consist of concrete tilt-up panels and would be Type III-B construction. The building would feature modern architecture consisting of articulated facades, blue glazed windows, and neutral colors. The colors that would be applied to the concrete tilt-up panels include white, network gray, and grizzle gray. The mullions, or physical dividers that segment window panes, would be anodized with a clear coat. In addition, metal canopies would be integrated into the building design. Detailed descriptions of the four elevations are provided below:

    - *North facing elevation*. The north facing elevation would receive substantial façade treatments due to its visibility along the 8th Street public right-of-way. The northwest and northeast corners of the building would be colored grizzle gray, while the building's parapet would be a lighter gray color. The northern elevation would also contain the most windows. Furthermore, the north facing façade would be segmented into nine sections by eight, six-foot wide façade indents, of which six would be mostly filled in with glass windows. The two remaining façade indents would not be equipped with windows and would feature the grizzle gray colored paint. The office entryways would be located along the building's north facing elevation.

    - *South facing elevation*. The building's south facing elevation would contain all of the dock high doors. The south facing façade would be segmented into five sections by three façade indents. The western indent would have a width of 363 feet and a depth of 60 feet. This indent would accommodate the dock high doors. The southeast corner of the building would feature blue glazed windows and grizzly gray paint.

    - *West facing elevation*. The west facing elevation would be segmented into five sections by four façade indents. These façade indents would be painted grizzly gray. The northwest corner of the building would feature blue glazed windows and grizzly gray paint.

    - *East facing elevation*. The east facing elevation would receive substantial façade treatments due to its visibility along the Hellman Avenue public right-of-way. The east facing elevation would be divided into seven sections by six façade indents. All six of the façade indents would consist of glass windows. The northeast and southeast corners of the building would be colored with grizzly gray colored paint.[17]

[16] HPA Architecture. *Overall Site Plan*. Plan packet dated January 25, 2018.

[17] Ibid.

- *Stormwater Appurtenances.* The project would include the use of two Stormtech SC-740 stormwater chambers, grate inlet filters, and curb inlet filters.[18] These chambers consist of a polypropylene corrugated chamber (resembling a tube-like structure), filter fabric, and a stone bottom. Water accumulates within the isolator row as it simultaneously permeates through the filter fabric. Solid contaminants such as rubbish, debris, leaves, sediment, and other particles are captured from the runoff by the fabric. From there, water would percolate through the stone bottom into the ground. The project would also include grate and curb inlet filters. These filters consist of stainless steel mesh, which traps sediment and allows filtered water to be conveyed through the local storm drains. The two Stormtech chambers would be located within the northern and southern portions of the site. A total of 170 underground chambers would be provided in the northern portion of the site, while an additional 420 underground chambers would be provided in the southern portion of the site.[19]

The site plan is shown in Exhibit 2-5. Conceptual elevations for the project are shown in Exhibit 2-6. Finally, the preliminary landscape plan is provided in Exhibit 2-7. A project summary table is shown in Table 2-1.

Table 2-1
Project Summary Table

Project Element	Description
Total Site Area	8.09-acres (352,428 sq. ft.)
Total Floor Area	174,745 sq. ft.
Warehousing Floor Area	160,245 sq. ft.
Office Floor Area	12,000 sq. ft.
Office Floor Area	2,500 sq. ft.
Floor Area Ratio (FAR) and Lot Coverage	0.49 to 1.00 and 48%
Warehouse Building Maximum Height	40 feet
Total Parking	119 spaces
Standard Parking	112 spaces
Handicapped Parking	7 spaces
Trailer Parking	33 spaces
Dock High Doors	23 doors
Total Number of Light Fixtures	22 total
Number of Parking Lot Light Fixtures	5 total
Wall Light Fixtures	17 total
Signage	Four signs (2 stops signs and 2 handicapped parking signs)
Landscaping	36,312 sq. ft.
% of Site that would be Impervious	89%
% of Site that would be Pervious	11%

Source: HPA Architecture. *Overall Site Plan*. Plan packet dated January 25, 2018

[18] Thienes Engineering, Inc. *Preliminary Water Quality Management Plan*. Plan dated January 24, 2018.

[19] Thienes Engineering, Inc. *Conceptual Utility Plan*. Plan dated January 24, 2018.

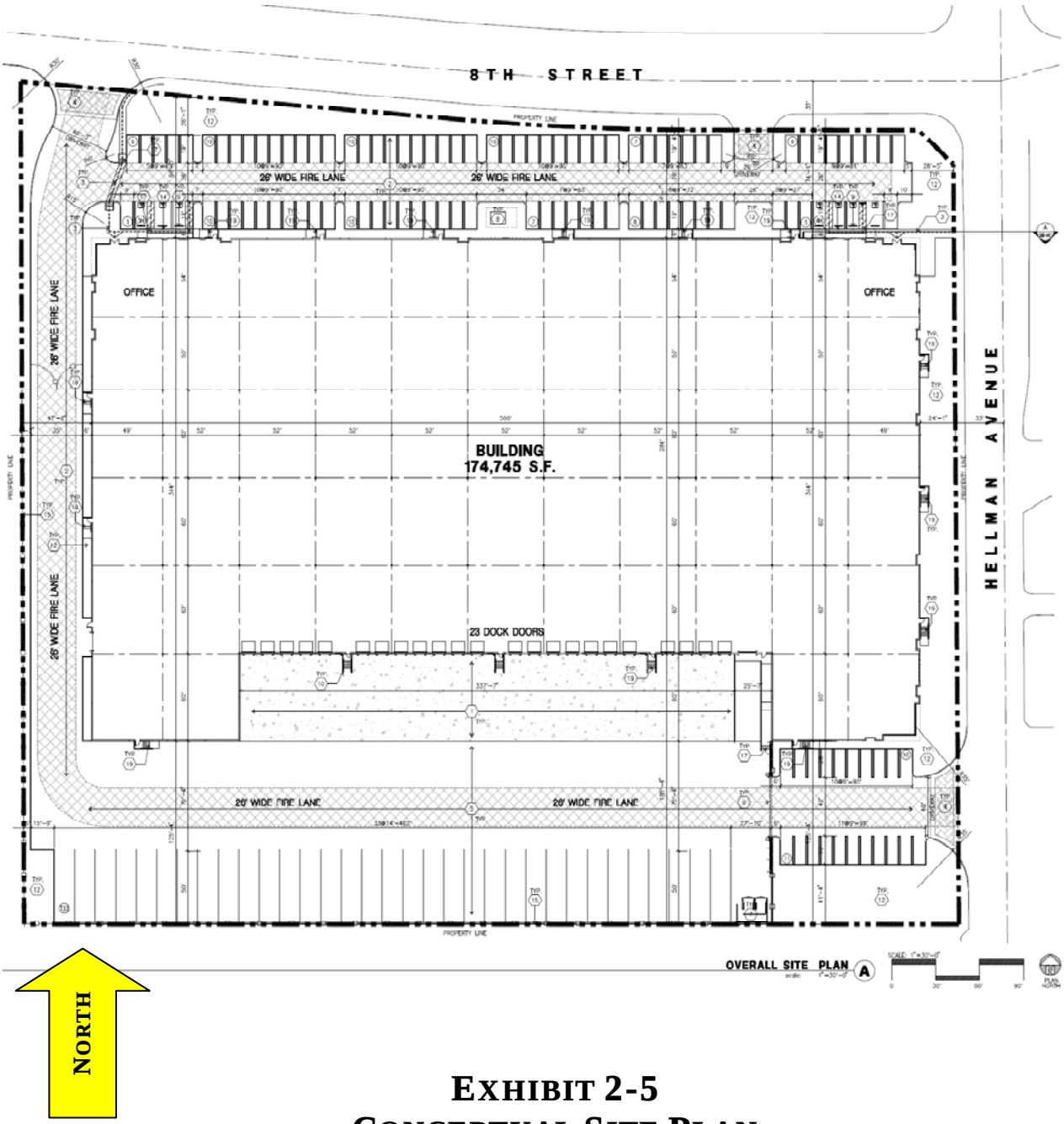


EXHIBIT 2-5
CONCEPTUAL SITE PLAN
SOURCE: HPA ARCHITECTURE

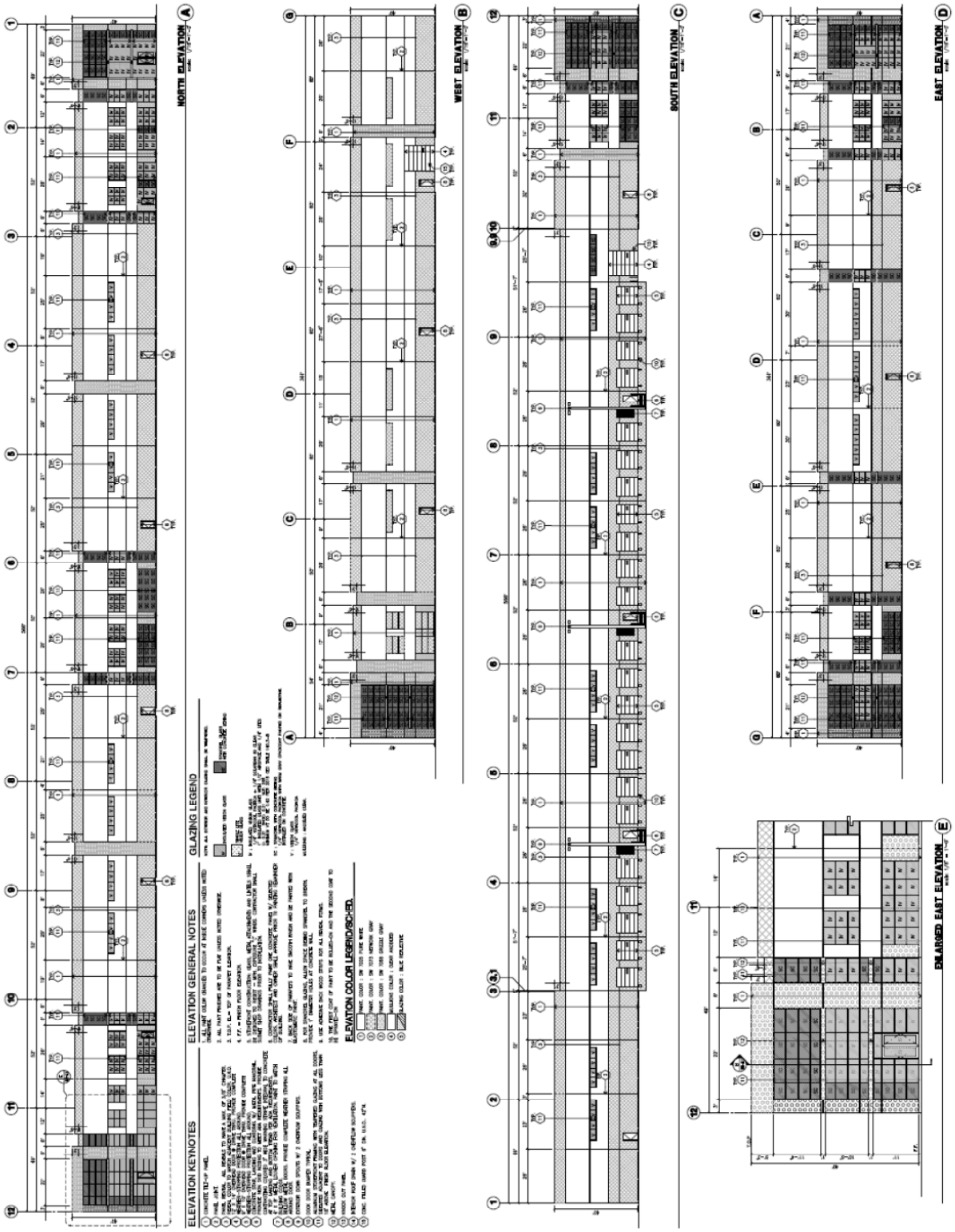


EXHIBIT 2-6
CONCEPTUAL BUILDING ELEVATIONS
SOURCE: HPA ARCHITECTURE

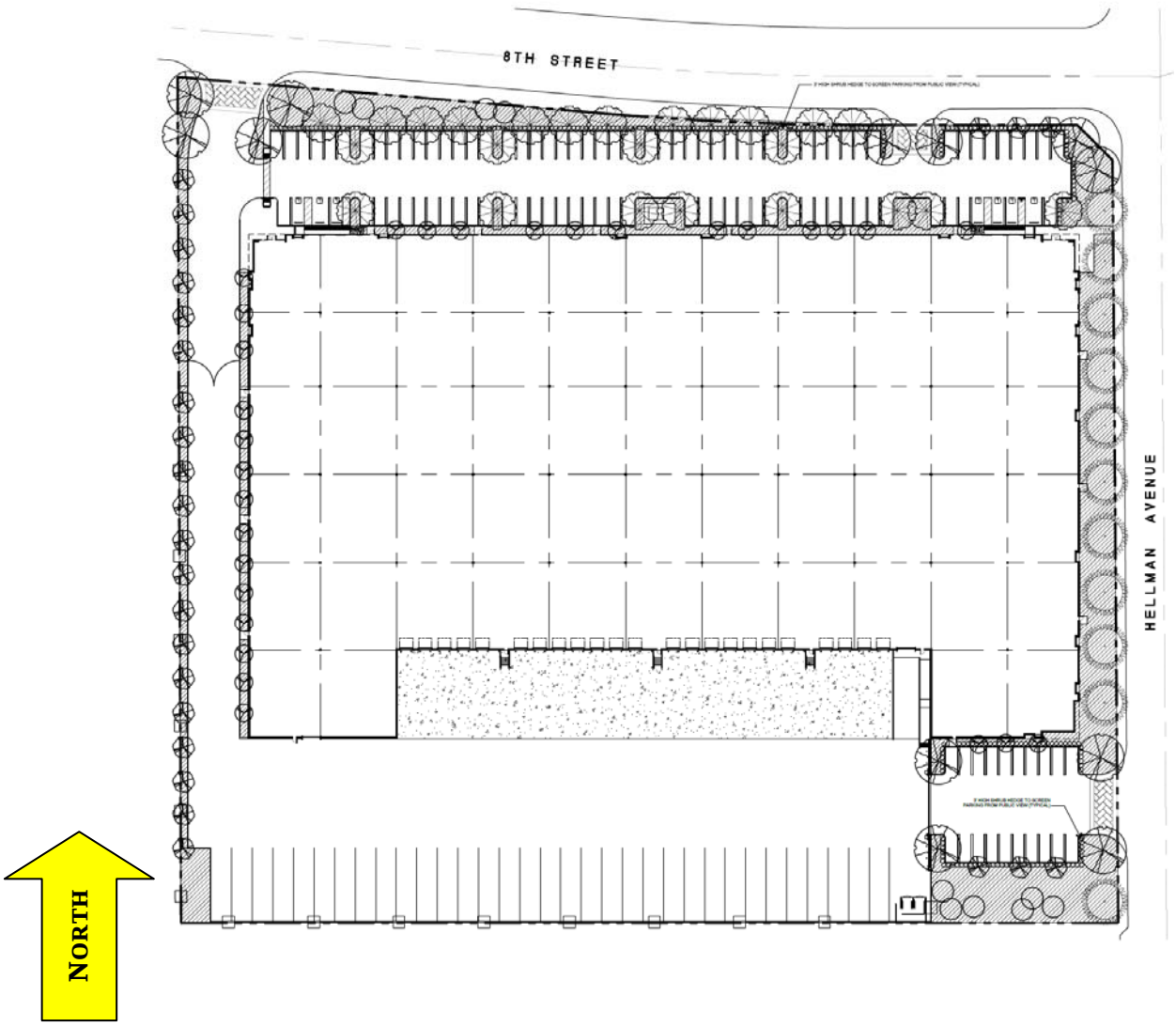


EXHIBIT 2-7
PRELIMINARY LANDSCAPE PLAN
SOURCE: HUNTER LANDSCAPE

2.4.2 CONSTRUCTION CHARACTERISTICS

The construction of the proposed project would take approximately 11 months to complete. Construction is anticipated to begin in January of 2019 and would conclude no later than January of 2020. The project would be constructed in one 11-month long phase. The key stages of construction are outlined below:

- *Demolition*. The existing on-site improvements would be demolished and removed during this stage of construction. The demolition process would comply with Title 8, Chapter 8.19, Section 8.19.280 – Construction and Demolition Waste of the City's Municipal Code. According to that Section of the Municipal Code, at least 50 to 75 percent of waste tonnage including concrete and asphalt and 15 percent of waste tonnage excluding concrete and asphalt must be diverted from area landfills. In addition, the project Applicant must submit and completed "Form CD-1 Waste Management and Recycling Plan" to the engineering services department in order to obtain a building or demolition permit. Construction and demolition debris would be hauled away by Burrtec, where this waste would be sorted and processed at their West Valley Materials Recovery Facility (WVMRF) located in the City of Fontana. The haul trucks would be required to utilize 8th Street and Vineyard Avenue. In addition, none of the materials would be re-used since the building would consist of pre-fabricated concrete tilt-up panels. This phase would take approximately one month to complete.

- *Site Preparation*. The project site would be readied for the construction of the proposed project. This stage of construction would take approximately one month to complete.

- *Grading*. This stage of construction would involve the grading and excavation of the site. The total cut and fill would be 17,233 cubic yards, respectively. By balancing the earth on-site, the Applicant is minimizing the amount of fill that would have to be imported to the project site. In addition, trenching would be undertaken to accommodate the building footings, utility lines, and other underground infrastructure such as stormwater appurtenances and double check detector assemblies, which would be installed during this phase as well. The type of utility lines that would be installed would consist of new HDPE storm drain pipes that would convey surface runoff to the new stormwater appurtenances. This phase would take approximately one month to complete.

- *Utilities*. The installation of new utility lines and stormwater appurtenances will occur during this stage of construction. A description of the new infrastructure that will be installed is provided below. These descriptions are organized by direction:

    - *Northern Portion of Site*. The following infrastructure improvements will be located within the northern portion of the project site: a 12 inch storm drain; two drain inserts; 170 underground infiltration chambers; a 10 inch Double Check Detector Assembly (DCDA); a 12 inch fire line extending north from the DCDA into the 8th Street centerline; an 18 inch storm drain; and a storm drain manhole.

- *Southern Portion of Site*. The following infrastructure improvements will be located within the southern portion of the project site: an 18 inch storm drain; two storm drain manholes; six drain inserts; a 12 inch storm drain; a 24 inch storm drain; and 428 underground infiltration chambers.

- *Eastern Portion of Site*. The infrastructure improvements that will be located within the eastern portion of the project site include a 10 inch Double Check Detector Assembly (DCDA) and a three inch PVC water pipe.

- *Western Portion of Site*. The following infrastructure improvements will be located within the western portion of the project site: an 18 inch storm drain; a storm drain manhole; a catch basin drain insert; and an eight inch lateral sewer line.

- *Off-site*. The project Applicant will remove a water meter located along Hellman Avenue. In addition, the Applicant will be installing a storm drain connection pipe that will connect to an existing 120 inch concrete pipe located within the Hellman Avenue center line.

- *Construction*. The new warehouse building would be erected during this stage of construction. This phase would take approximately four months to complete.

- *Paving*. The site would be paved during this stage of construction. Paving will include parking areas and sidewalks. Equipment on-site during this phase would include cement and motor mixers, pavers, rollers, other paving equipment. This phase would take approximately one month to complete.

- *Landscaping and Finishing*. This stage of construction would involve the planting of landscaping, painting of the warehouse, and the completion of the on-site improvements. This phase would last approximately three months.

2.4.3 OPERATIONAL CHARACTERISTICS

The specific business and/or tenant(s) that would ultimately occupy the proposed buildings are not known at this time. Any prospective use must be either permitted by right or conditionally permitted under the City of Rancho Cucamonga Zoning Ordinance. Table 17.30.030-1 of the City's Municipal Code depicts uses that are permitted by right as well as uses that require additional permits such as a Conditional Use Permit. According to Table 17.30.030-1, the following warehousing operations are permitted either by right or with a Conditional Use Permit:

- *Wholesale, Storage, and Distribution — Light*. Activities typically include, but are not limited to, wholesaling, storage, and warehousing services and storage and wholesale to retailers from the premises of finished goods and food products. Activities under this classification shall be conducted in enclosed buildings and occupy 50,000 square feet or less of building space. Retail sales from the premises may occur when approved by a conditional use permit.

- *Wholesale, Storage, and Distribution — Medium*. Activities typically include, but are not limited to, wholesale, storage, and warehousing services; moving and storage services; storage and wholesaling to retailers from the premises of finished goods and food products; and distribution facilities for large-scale retail firms. Activities under this classification shall be conducted in enclosed buildings and occupy greater than 50,000 square feet of building space. Included are multi-tenant or speculative buildings with over 50,000 square feet of warehouse space.

- *Wholesale, Storage, and Distribution — Heavy*. Activities typically include, but are not limited to, warehousing, storage, freight handling, shipping, trucking services and terminals, and storage and wholesaling from the premises of unfinished, raw, or semi-refined products requiring further processing, fabrication, or manufacturing. Typical uses include, but are not limited to, trucking firms, and the wholesaling of metals, minerals, and agricultural products. Outdoor storage is permitted.

Although the tenant for the project is not yet known, the project as proposed falls into the *Wholesale, Storage, and Distribution — Medium* category and is permitted by right. The operating hours of the potential business or businesses that may ultimately occupy the building are also unknown at this time. The proposed project is anticipated to add up to 115 new jobs based on a ratio of one employee per 1,518 square feet of floor area.[20] Nevertheless, the project would have an adequate supply of parking to accommodate demand from new employees.

2.5 DISCRETIONARY ACTIONS

A Discretionary Action is an action taken by a government agency (for this project, the government agency is the City of Rancho Cucamonga) that calls for an exercise of judgment in deciding whether to approve a project. The proposed project would require the approval of the following discretionary actions:

- A Design Review (DR). The purpose of the Design Review is to ensure that development projects comply with all applicable local design guidelines, standards, and ordinances; to minimize adverse effects on surrounding properties and the environment; and to maintain consistency with the General Plan. This requirement is discretionary and not ministerial since the design review must be approved by an appointed body (Design Review Board) of the City.

- Approval of the Mitigated Negative Declaration (MND) and Mitigation Monitoring and Reporting Program (MMRP).

[20] The Natelson Company, Inc. *Employment Density Study Summary Report*. October 31, 2001.

SECTION 3 ENVIRONMENTAL ANALYSIS

This section of the Initial Study prepared for the proposed project analyzes the potential environmental impacts that may result from the proposed project's implementation. The issue areas evaluated in this Initial Study include the following:

- Aesthetics (Section 3.1);
- Agricultural & Forestry Resources (Section 3.2);
- Air Quality (Section 3.3);
- Biological Resources (Section 3.4);
- Cultural Resources (Section 3.5);
- Geology & Soils (Section 3.6);
- Greenhouse Gas Emissions; (Section 3.7);
- Hazards & Hazardous Materials (Section 3.8);
- Hydrology & Water Quality (Section 3.9);
- Land Use (Section 3.10);
- Mineral Resources (Section 3.11);
- Noise (Section 3.12);
- Population & Housing (Section 3.13);
- Public Services (Section 3.14);
- Recreation (Section 3.15);
- Transportation & Circulation (Section 3.16);
- Tribal Cultural Resources (Section 3.17);
- Utilities (Section 3.18); and,
- Mandatory Findings (Section 3.19).

Under each issue area, a description of the thresholds of significance is provided. These thresholds would assist in making a determination as to whether there is a potential for significant impacts on the environment. The analysis considers both the short-term (construction-related) and long-term (operational) impacts associated with the proposed project's implementation, and where appropriate, the cumulative impacts. To each question, there are four possible responses:

- *No Impact*. The proposed project will not result in any adverse environmental impacts.

- *Less than Significant Impact*. The proposed project may have the potential for affecting the environment, although these impacts will be below levels or thresholds that the City of Rancho Cucamonga or other responsible agencies consider to be significant.

- *Less than Significant Impact with Mitigation*. The proposed project may have the potential to generate a significant impact on the environment. However, the level of impact may be reduced to levels that are less than significant with the implementation of the recommended mitigation measures.

- *Potentially Significant Impact*. The proposed project may result in environmental impacts that are significant. This finding will require the preparation of an environmental impact report (EIR).

3.1 AESTHETICS

3.1.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant aesthetic impact if it would:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or,
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

3.1.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Have a substantial adverse effect on a scenic vista? ● Less than Significant Impact.

The dominant scenic views from the project site include the views of the San Gabriel Mountains, located approximately five miles to the north of the site. Views of the San Gabriel Mountains are minimally obstructed when facing north along Hellman Avenue and within the project site. Once constructed, the proposed warehouse would not restrict views of the San Gabriel Mountains from anywhere in and around the site as well as from the nearby residential units due to the distance and size of the mountains and the height and mass of the proposed warehouse. The size and massing of the proposed warehouse will not be great enough to obstruct any scenic views. In addition, many of the aforementioned mountains extend more than 4,000 feet above sea level. Therefore, views of these mountains will continue to be available since the project cannot physically obstruct views of the San Gabriel Mountains.

Views of the San Bernardino Mountains, located approximately 15 miles northeast of the project site, are not available since the existing streetscape and development obstruct the line-of-sight between the site and the San Bernardino Mountains. This conclusion is supported by the field survey that was conducted for the project by the preparers of this IS/MND. Views of the aforementioned vistas are limited from various points throughout the site and surrounding areas. In addition, views of these mountains from the nearby residential units will not be affected by the project since the project site is located west of the aforementioned residential development, outside of the line of sight between the San Bernardino Mountains and the nearby residential units.

Lastly, limited views of the Santa Ana Mountains are available facing south along the adjacent streets and from within the project site. Views of the Santa Ana Mountains are restricted by the existing

streetscape and development. Furthermore, views of these mountains from the nearby residential units will not be obstructed by the project since the project site is not located within the line of sight of the Santa Ana Mountains and the nearby residential units. In addition, the size and massing of the proposed project will not be great enough to obstruct any scenic views of the Santa Ana Mountains. In addition, many of the aforementioned mountains extend more than 2,000 feet above sea level. As a result, less than significant would occur.

B. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway? ● No Impact.

According to the California Department of Transportation (Caltrans), neither Hellman Avenue nor 8th Street are designated scenic highways.[21] The City's General Plan does not identify any scenic roadways in the area. The closest designated scenic highway to the project site is a 16 mile segment of the Rim of the World Scenic Byway (CA 38), located 44 miles to the northeast of the site. In addition, there are no trees or plants located on-site and the project site does not contain any scenic rock outcroppings.[22] Lastly, the project site does not contain any buildings listed in the State or National registrar (refer to Section 3.5). As a result, no impacts would occur.

C. Substantially degrade the existing visual character or quality of the site and its surroundings? ● Less than Significant Impact.

The site is presently developed and is occupied by Frontier Communications for outdoor storage. The site is dominated by dilapidated surface parking. The two structures that occupy the site were constructed in the early 1980's and feature an outdated façade lacking in articulation. Lastly, the site is fenced off by a chain link fence with added barbed wire. Once complete, the project would represent a substantial visual improvement over the existing conditions. The project would feature modern architecture, façade treatments, and a neutral color scheme (grey and white walls and blue glazed windows). In addition, the size and mass of the proposed development would be consistent with the other warehouses located in the site's vicinity. The City's Resource Conservation Element contains the following policy as it related to maintaining scenic quality:

- *Policy RC-1.2.* Develop measures to preserve and enhance important views along north-south roadways, open space corridors, and at other key locations where there are significant views of scenic resources. Major scenic resources include the San Gabriel and San Bernardino Mountains and foothills, vistas of the City from hillside areas, and other views of special vegetation and permanent open space features. Site planning measures in conjunction with the designation of significant views can enhance the visual environment.[23]

[21] California Department of Transportation. *Official Designated Scenic Highways*. www.dot.ca.gov.

[22] Blodgett Baylosis Environmental Planning. *Field Survey*. Survey was conducted on March 30, 2018.

[23] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Resource Conservation Element*. Plan adopted May 19, 2010.

The proposed project would not conflict with the aforementioned General Plan policy. The proposed building would be set back at least 74 feet from 8th Street, 24 feet from Hellman Avenue, and 185 feet from the site's southern property line. In addition, the new building would occupy 48 percent of the site. The setbacks would alleviate any future loss in mountain views by preventing the building from abutting the property line. Furthermore, there are no city views or views of special vegetation or open space areas. The implementation of the proposed project would not affect views of the San Gabriel Mountains, San Bernardino Mountains, or Santa Ana Mountains because the project site is not located within the line-of-sight of the aforementioned physiographic features and the nearby residential development.

Views of the San Gabriel Mountains are minimally obstructed when facing north along Hellman Avenue and within the project site. Once constructed, the proposed warehouse would not restrict views of the San Gabriel Mountains from anywhere in and around the site due to the distance and size of the mountains and the height and mass of the proposed warehouse. Meanwhile, views of the San Bernardino Mountains, located approximately 15 miles northeast of the project site, are not available since the existing streetscape and development obstruct the line-of-sight between the site and the San Bernardino Mountains. Lastly, limited views of the Santa Ana Mountains are available facing south along the adjacent streets and from within the project site. These views of the Santa Ana Mountains are restricted by the existing streetscape and development. As a result, the potential impacts would be less than significant.

D. *Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? ● Less than Significant Impact.*

The light fixtures that would be installed would consist of DSX1 LED lights. A total of 22 lights would be provided, of which 17 would be installed along the building's façade, and five would be installed along the site's western and southern property lines. No lighting would be provided along the site's frontage with Hellman Avenue.

Exterior lighting can be a nuisance to adjacent land uses that are sensitive to this lighting. This nuisance lighting is referred to as *light trespass* which is typically defined as the presence of unwanted light on properties located adjacent to the source of lighting. The residential development located along the east side of Hellman Avenue is the closest light sensitive receptor to the project site.[24] The predominant source of light impacts would be related to the exterior lighting and building lighting. The project Applicant would be required to adhere to the following provisions outlined in Section 17.58.050 of the City's Municipal Code. These requirements shall apply to all outdoor lighting:

- (A.) *Nuisance prevention*. All outdoor lighting shall be designed, located, installed, directed downward or toward structures, fully shielded, and maintained in order to prevent glare, light trespass, and light pollution.

[24] Blodgett Baylosis Environmental Planning. *Field Survey*. Survey was conducted on March 30, 2018.

- (B.) *Maintenance*. Fixtures and lighting shall be maintained in good working order and in a manner that serves the original design intent.

    1. Burnt-out and broken light bulbs shall be replaced.

    2. Lighting fixtures shall remain free of graffiti and rust.

    3. Painted light fixtures shall be maintained to minimize chipping or peeling.

- (C.) *Shielding*. Except as otherwise exempt, all outdoor lighting shall be recessed and/or constructed with full downward shielding in order to reduce light and glare impacts on trespass to adjoining properties and public rights-of-way. Each fixture shall be directed downward and away from adjoining properties and public rights-of-way, so that no light fixture directly illuminates an area outside of the project site intended to be illuminated.

Adherence to the City's Municipal Code would be sufficient in addressing daytime or nighttime light trespass impacts. As indicated in Section 2.4.1, the light standards that would be installed along the site's western and southern property lines would be shielded and directed towards the ground surface.[25] Glare is related to light trespass and is defined as visual discomfort resulting from high contrast in brightness levels. Glare-related impacts can adversely affect day or nighttime views. As with lighting trespass, glare is of most concern if it would adversely affect sensitive land use or driver's vision. The exterior façade would consist of non-reflective materials, such as concrete. In addition, the windows would be comprised of blue reflective glazing, which reduces glare over other transparent surfaces. As a result, no daytime glare-related impacts are anticipated.

Nighttime glare and illumination has the potential to result in potentially significant impacts to sensitive receptors. Many sources of light contribute to the ambient nighttime lighting conditions. These sources of nighttime light include street lights, security lighting, wall packs, and vehicular headlights. The proposed project would not introduce nighttime lighting that could potentially impact nearby sensitive receptors. The project site is located within a predominantly industrial area, though legal non-conforming residential units occupying the frontage along Hellman Avenue, east of the project site. These residential units would not be exposed to spillover lighting during the evening hours because no lighting would be provided along the site's frontage with Hellman Avenue. Lighting would be provided only along the site's western and southern property lines and would be shielded and directed towards the ground surface. As a result, the project's potential impacts would be less than significant.

3.1.3 CUMULATIVE IMPACTS

Typically, aesthetic impacts are site-specific. As indicated in the previous sections, the proposed project would not restrict scenic views along Hellman Avenue, damage or interfere with any scenic resources or highways, degrade the visual character of the project site and surrounding areas, or result

[25] Blodgett Baylosis Environmental Planning. *Field Survey*. Survey was conducted on March 30, 2018.

in significant light and glare impacts; therefore, no cumulative impacts would occur as part of the proposed project's implementation.

3.1.4 MITIGATION MEASURES

The preceding analysis concluded that the project would not require any mitigation.

3.2 AGRICULTURE & FORESTRY RESOURCES

3.2.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on agricultural resources if it results in any of the following:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;
- Conflict with existing zoning for agricultural use, or a Williamson Act contract;
- Conflict with existing zoning for or cause rezoning of, land (as defined in Public Resources Code section 12220(g)), timberland (as defined in Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?);
- Result in the loss of forest land or conversion of forest land to a non-forest use; or,
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forest land to non-forest use.

3.2.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? ● No Impact.

According to the California Department of Conservation, the project site does not contain any areas of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance.[26] The site is located within a built-up urban area.[27] In addition, the project site is developed in its entirety in industrial uses. Since the implementation of the proposed project would not involve the conversion of prime farmland,

[26] California Department of Conservation, Division of Land Resource Protection, Farmland Mapping, and Monitoring Program. *California Important Farmland Finder*. https://maps.conservation.ca.gov/DLRP/CIFF/

[27] Ibid.

unique farmland, or farmland of statewide importance to urban uses, no impacts would occur.

B. Conflict with existing zoning for agricultural use or a Williamson Act Contract? ● No Impact.

The project site is currently zoned as GI (*General Industrial*). According to the City's zoning code, agricultural and animal-related uses are not permitted within the GI zone.[28] The proposed project would not require a zone change and no loss in land zoned for/or permitting agricultural uses would occur. Furthermore, the property is being used for outdoor storage and there are no agricultural uses located within the site that would be affected by the project's implementation. In addition, according to the California Department of Conservation Division of Land Resource Protection, the project site is not subject to a Williamson Act Contract.[29] As a result, no impacts on existing Williamson Act Contracts would result from the proposed project's implementation.

C. Conflict with existing zoning for or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined in Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))? ● No impact.

The project site is located in the midst of a larger urban area and no forest lands are located within the site. The City of Rancho Cucamonga General Plan Resource Conservation Element identifies conservation areas located in the northern portion of the City adjacent to the San Gabriel/San Bernardino Mountains.[30] The project's construction would be restricted to the designated site and no impacts to conservation lands would occur. The site is entirely paved over and there are no timberland resources present on-site. As a result, no impacts on forest land or timber resources would result from the proposed project's implementation.

D. Result in the loss of forest land or conversion of forest land to a non-forest use? ● No Impact.

No forest lands are located within or in the vicinity of the project site. The applicable zoning designation (GI) does not preserve forest land. In addition, the project would be restricted to the site and would not affect the San Bernardino National Forest located north of the City. As a result, no loss or conversion of forest lands to urban uses would result from the proposed project's implementation and no impacts would occur.

[28] City of Rancho Cucamonga Municipal Code. *Table 17.30.030-1: Allowed Land Uses and Permit Requirements by Base Zoning District*. Site accessed April 2, 2018.

[29] California Department of Conservation. *State of California Williamson Act Contract Land.* ftp://ftp.consrv.ca.gov/pub/dlrp/WA/2012%20Statewide%20Map/WA_2012_8x11.pdf

[30] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Resource Conservation Element Figure RC-4-Sensitive Biological Resources.* Plan adopted May 19, 2010.

E. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forest land to non-forest use? ● No Impact.

The project would not involve the disruption or damage of the existing environment that would result in a loss of farmland to nonagricultural use or conversion of forest land to non-forest use because the project site is not located in close proximity to farm land or forest land. As a result, no impacts would result from the implementation of the proposed project.

3.2.3 CUMULATIVE IMPACTS

Typically, agriculture and forestry impacts are site-specific. The analysis determined that there are no agricultural or forestry resources in the project area and that the implementation of the proposed project would not result in any impacts on these resources. As a result, no cumulative impacts on agriculture or forestry resources would occur.

3.2.4 MITIGATION MEASURES

The analysis of agricultural and forestry resources indicated that no impacts on these resources would occur as part of the proposed project's implementation. As a result, no mitigation is required.

3.3 AIR QUALITY

3.3.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project will normally be deemed to have a significant environmental impact on air quality, if it results in any of the following:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or,
- Create objectionable odors affecting a substantial number of people.

The South Coast Air Quality Management District (SCAQMD) has established quantitative thresholds for short-term (construction) emissions and long-term (operational) emissions for the following criteria pollutants:

- *Ozone (O_3)* is a nearly colorless gas that irritates the lungs, damages materials, and vegetation. Ozone is formed by photochemical reaction (when nitrogen dioxide is broken down by sunlight).

- *Carbon monoxide (CO)* is a colorless, odorless toxic gas that interferes with the transfer of oxygen to the brain and is produced by the incomplete combustion of carbon-containing fuels emitted as vehicle exhaust.

- *Nitrogen dioxide (NO_2)* is a yellowish-brown gas, which at high levels can cause breathing difficulties. NO_2 is formed when nitric oxide (a pollutant from burning processes) combines with oxygen.

- *Sulfur dioxide* (SO_2) is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Health effects include acute respiratory symptoms and difficulty in breathing for children.

- *PM_{10} and $PM_{2.5}$* refers to particulate matter less than ten microns and two and one-half microns in diameter, respectively. Particulates of this size cause a greater health risk than larger-sized particles since fine particles can more easily cause irritation.

Projects in the South Coast Air Basin (SCAB) generating construction-related emissions that exceed any of the following emissions thresholds are considered to be significant under CEQA:

- 75 pounds per day or 2.50 tons per quarter of reactive organic compounds;
- 100 pounds per day or 2.50 tons per quarter of nitrogen dioxide;
- 550 pounds per day or 24.75 tons per quarter of carbon monoxide;
- 150 pounds per day or 6.75 tons per quarter of PM_{10};
- 55 pounds per day or 2.43 tons per quarter of $PM_{2.5}$; or,
- 150 pounds per day or 6.75 tons per quarter of sulfur oxides.

A project would have a significant effect on air quality if any of the following operational emissions thresholds for criteria pollutants are exceeded:

- 55 pounds per day of reactive organic compounds;
- 55 pounds per day of nitrogen dioxide;
- 550 pounds per day of carbon monoxide;
- 150 pounds per day of PM_{10};
- 55 pounds per day of $PM_{2.5}$; or,
- 150 pounds per day of sulfur oxides.

3.3.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Conflict with or obstruct implementation of the applicable air quality plan? ● Less than Significant Impact.

The project area is located within the South Coast Air Basin, which covers a 6,600 square-mile area within Los Angeles, the non-desert portions of Los Angeles County, Riverside County, and San Bernardino County.[31] Measures to improve regional air quality are outlined in the SCAQMD's Air Quality Management Plan (AQMP).[32] The most recent AQMP was adopted in 2017 and was jointly prepared with the California Air Resources Board (CARB) and the Southern California Association of Governments (SCAG).[33] The AQMP will help the SCAQMD maintain focus on the air quality impacts of major projects associated with goods movement, land use, energy efficiency, and other key areas of growth. Key elements of the 2016 AQMP include enhancements to existing programs to meet the 24-hour $PM_{2.5}$ Federal health standard and a proposed plan of action to reduce ground-level ozone. The primary criteria pollutants that remain non-attainment in the local area include $PM_{2.5}$ and ozone. Specific criteria for determining a project's conformity with the AQMP is defined in Section 12.3 of the SCAQMD's CEQA Air Quality Handbook. The Air Quality Handbook refers to the following criteria as a means to determine a project's conformity with the AQMP:[34]

- *Consistency Criteria 1* refers to a proposed project's potential for resulting in an increase in the frequency or severity of an existing air quality violation or its potential for contributing to the continuation of an existing air quality violation.

- *Consistency Criteria 2* refers to a proposed project's potential for exceeding the assumptions included in the AQMP or other regional growth projections relevant to the AQMP's implementation.

In terms of Criteria 1, the proposed project's long-term (operational) airborne emissions would be below levels that the SCAQMD considers to be a significant impact (refer to the analysis included in the next section where the long-term stationary and mobile emissions for the proposed project are summarized in Table 3-2). The project would also conform to Consistency Criteria 1 since the project's construction emissions would be below the thresholds of significance established by the SCAQMD (the project's construction emissions are summarized in Table 3-1). The proposed project would also conform to Consistency Criteria 2 since it would not exceed the employment assumptions presented in the 2016 AQMP. In addition, the project's operational emissions are well within the emissions projections indentified in the 2016 AQMP. According to the AQMP, the SCAG region is projected to see a 12 percent growth in population, 16 percent growth in housing units, 23 percent growth in employment, and eight percent growth in vehicle miles traveled between 2012 and 2031. The SCAG region is expected to add 1.5 million new jobs through the year 2031. The proposed project would add

[31] South Coast Air Quality Management District, *Final 2016 Air Quality Plan*. Adopted March 2017.

[32] Ibid.

[33] Ibid.

[34] South Coast Air Quality Management District. *CEQA Air Quality Handbook*. April 1993.

approximately 115 new jobs. The number of new jobs that would be added has been accounted for by SCAG and in the AQMP.[35] In addition, the project's operational emissions would be well within the emissions projections identified in the most recent AQMP. As shown in Table 3-5 of the Final 2016 AQMP, the future 2031 daily operational emissions *with* the estimated population, employment, and VMT growth projections are estimated to be: 345 tons per day of VOCs; 214 tons per day of NOx; 1,188 tons per day of CO; 18 tons per day of Sox; and 65 tons per day of $PM_{2.5}$. The project's operational emissions would be well within the emissions projections estimated in the AQMP. Since the proposed project would not be in violation of either Consistency Criteria, the project's potential impacts are considered to be less than significant.

B. Violate any air quality standard or contribute substantially to an existing or projected air quality violation? ● Less than Significant Impact.

The entire construction period for the proposed project is expected to last for approximately 11 months (refer to Section 2.4.3) and would include demolition, grading, site preparation, construction of the warehouse, and the finishing of the project (pavement areas, painting, and planting of landscaping). The analysis of daily construction and operational emissions was prepared utilizing the California Emissions Estimator Model (CalEEMod V.2016.3.2). The assumptions regarding the construction phases and the length of construction followed those identified herein in Section 2.4.3. These CalEEMod worksheets are provided in Appendix A. As shown in Table 3-1, daily construction emissions are not anticipated to exceed the SCAQMD's significance thresholds.

Table 3-1
Estimated Daily Construction Emissions

Construction Phase	ROG	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$
Demolition (on-site)	3.71	38.32	22.30	0.03	2.63	1.91
Demolition (off-site)	0.10	1.04	0.93	--	0.22	0.06
Total Demolition	**3.81**	**39.36**	**23.23**	**0.03**	**2.85**	**1.97**
Site Preparation (on-site)	4.56	48.19	22.47	0.03	9.62	6.24
Site Preparation (off-site)	0.09	0.06	0.90	--	0.20	0.05
Total Site Preparation	**4.65**	**48.25**	**23.37**	**0.03**	**9.82**	**6.29**
Grading (on-site)	2.77	30.67	16.57	0.02	4.07	2.73
Grading (off-site)	0.08	0.05	0.75	--	0.16	0.04
Total Grading	**2.85**	**30.72**	**17.32**	**0.02**	**4.23**	**2.77**
Building Construction (on-site) 2018	2.67	23.39	17.58	0.02	1.49	1.40
Building Construction (off-site) 2018	0.69	5.10	6.14	0.02	1.39	0.40
Total Building Construction 2018	**3.36**	**28.49**	**23.82**	**0.04**	**2.88**	**1.80**
Building Construction (on-site) 2019	2.36	21.07	17.16	0.02	1.28	1.21
Building Construction (off-site) 2019	0.63	4.79	5.52	0.02	1.39	0.40
Total Building Construction 2019	**2.99**	**25.86**	**22.68**	**0.04**	**2.67**	**1.61**
Paving	1.62	15.24	14.66	0.02	0.82	0.75
Paving	0.07	0.05	0.67	--	0.16	0.04
Total Paving	**1.69**	**15.29**	**15.33**	**0.02**	**0.98**	**0.79**

[35] South Coast Air Quality Management District, *Final 2016 Air Quality Plan*, Adopted March 10, 2017.

Table 3-1
Estimated Daily Construction Emissions

Construction Phase	ROG	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$
Architectural Coatings (on-site)	36.63	1.83	1.84	--	0.12	0.12
Architectural Coatings (off-site)	0.09	0.06	0.89	--	0.22	0.06
Total Architectural Coatings	**36.72**	**1.89**	**2.73**	**--**	**0.34**	**0.18**
Maximum Daily Emissions	**36.73**	**48.26**	**23.72**	**0.04**	**9.82**	**6.29**
Daily Thresholds	**75**	**100**	**55o**	**150**	**150**	**55**
Significant Impact?	**No**	**No**	**No**	**No**	**No**	**No**

Source: California Air Resources Board CalEEMod [computer program].

According to Table 3-1, the project's construction emissions would be below thresholds of significance. As indicated previously, the project area is located in a non-attainment area for ozone and particulates, the project would be required to adhere to all SCAQMD regulations related to fugitive dust generation and other construction-related emissions. According to SCAQMD Regulation 403, all unpaved demolition and construction areas shall be regularly watered up to three times per day during excavation, grading, and construction as required (depending on temperature, soil moisture, wind, etc.). Watering could reduce fugitive dust by as much as 55 percent. Rule 403 also requires that temporary dust covers be used on any piles of excavated or imported earth to reduce wind-blown dust. In addition, all clearing, earthmoving, or excavation activities must be discontinued during periods of high winds (i.e. greater than 15 mph), so as to prevent excessive amounts of fugitive dust. Finally, the contractors must comply with other SCAQMD regulations governing equipment idling and emissions controls. The aforementioned SCAQMD regulations are standard conditions required for every construction project undertaken in the City as well as in the cities and counties governed by the SCAQMD.

The long-term air quality impacts associated with the proposed project include mobile emissions from vehicular traffic; area emissions from cleaning products and the operation of landscaping equipment; and off-site stationary emissions associated with the off-site generation and consumption of energy (natural gas). The analysis of long-term operational impacts summarized in Table 3-2, also used the CalEEMod computer model developed for the SCAQMD. The analysis summarized in Table 3-2 indicates that the operational (long-term) emissions would be below the SCAQMD's daily emissions thresholds.

Table 3-2
Estimated Operational Emissions in lbs/day - Unmitigated

Emission Source	ROG	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$
Area-wide (lbs/day)	3.93	--	0.03	--	--	--
Energy (lbs/day)	0.01	0.09	0.08	--	--	--
Mobile (lbs/day)	0.65	3.46	9.74	0.03	2.70	0.74
Total (lbs/day)	**4.60**	**3.55**	**9.85**	**0.03**	**2.71**	**0.75**
Daily Thresholds	**55**	**55**	**55o**	**15o**	**15o**	**55**
Significant Impact?	**No**	**No**	**No**	**No**	**No**	**No**

Source: California Air Resources Board CalEEMod [computer program].

As indicated in Table 3-2, the projected long-term emissions are below thresholds considered to represent a significant impact. As a result, the potential impacts are considered to be less than significant.

C. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? ● Less than Significant Impact.

According to the City, there are 18 related projects located within the Traffic Impact Analysis' study area. However, there are three related projects located within one mile of the project site. These three related projects are as follows: Crestwood Homes, 31 single-family units; three retail buildings; and the Vintner, which includes 182 single-family units and 7,615 square feet of retail. The combined operational emissions from the four projects (including the proposed project) would still be below the thresholds of significance established by the SCAQMD (the CalEEMod worksheets for the cumulative emissions are provided in Appendix A). The four project's cumulative operational emissions are listed below. These emissions are compared to the thresholds of significance established by the SCAQMD for the designated criteria pollutants.

- *Reactive Organic Gasses (ROG).* Estimated operational emissions: 19.83 pounds per day; threshold of significance: 55 pounds per day.

- *Nitric Oxide (NOx).* Estimated operational emissions: 34.94 pounds per day; threshold of significance: 55 pounds per day.

- *Carbon Monoxide (CO).* Estimated operational emissions: 87.17 pounds per day; threshold of significance: 550 pounds per day.

- *Sulfur Dioxide (SO2).* Estimated operational emissions: 0.27 pounds per day; threshold of significance: 150 pounds per day.

- *Particulate Matter (PM10).* Estimated operational emissions: 18.58 pounds per day; threshold of significance: 150 pounds per day.

- *Particulate Matter (PM2.5).* Estimated operational emissions: 5.58 pounds per day; threshold of significance: 55 pounds per day.

Since the cumulative air quality emissions are under the thresholds of significance established by the SCAQMD, the potential air quality impacts are considered to be less than significant.

D. Expose sensitive receptors to substantial pollutant concentrations? ● Less than Significant Impact.

Most vehicles generate carbon monoxide (CO) as part of the tail-pipe emissions and high concentrations of CO along busy roadways and congested intersections are a concern. The areas surrounding the most congested intersections are often found to contain high levels of CO that exceed applicable standards and are referred to as *hot-spots*. Three variables influence the creation of a CO hot-spot: traffic volumes, traffic congestion, and the background CO concentrations for the source receptor area. Typically, a CO hot-spot may occur near a street intersection that is experiencing severe congestion (a LOS E or LOS F) where idling vehicles result in ground level concentrations of carbon monoxide. However, within the last decade, decreasing background levels of pollutant concentrations and more effective vehicle emission controls have significantly reduced the potential for the creation of hot-spots. The SCAQMD stated in its CEQA Handbook that a CO hot-spot would not likely develop at an intersection operating at LOS C or better. Since the Handbook was written, there have been new CO emissions controls added to vehicles and reformulated fuels are now sold in the SCAB. These new automobile emissions controls, along with the reformulated fuels, have resulted in a lowering of both ambient CO concentrations and vehicle emissions.

It is estimated that the project would generate approximately 398 daily trips in passenger car equivalents, 39 passenger car equivalent trips of which would occur during the morning peak hour and 42 passenger car equivalent trips of which would occur during the evening peak hour.[36] As indicated in Section 3.16.2.A, the project generated less than 50 peak hour trips at the study intersections and project trips did not result in a significant impact at the study intersections. No study intersections were reduced from the pre-project from Level of Service D or better to the "with Project" of Level of Service E or worse for Existing plus Project traffic conditions.[37] Since the project would not result in a degradation of any other study intersection's level of service, the likelihood of a CO hot-spot developing at this intersection is considered remote. Therefore, the project's impacts would be less than significant with respect to CO hot-spots.

Sensitive receptors refer to land uses and/or activities that are especially sensitive to poor air quality and typically include homes, schools, playgrounds, hospitals, convalescent homes, and other facilities where children or the elderly may congregate.[38] These population groups are generally more sensitive to poor air quality. The closest sensitive receptors to the project site include the residential units located along the east side of Hellman Avenue. These nearby sensitive receptors are shown in Exhibit 3-1. The SCAQMD requires that CEQA air quality analyses indicate whether a proposed project would result in an exceedance of *localized emissions thresholds* or LSTs. LSTs only apply to short-term (construction) emissions at a fixed location and do not include off-site or area-wide emissions. The pollutants that are the focus of the LST analysis include the conversion of NO_x to NO_2; carbon monoxide (CO) emissions from construction; PM_{10} emissions from construction; and $PM_{2.5}$ emissions from construction. For purposes of the LST analysis, the receptor distance used was 25 meters. Based

[36] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018. (This report is available in Appendix F)

[37] Ibid.

[38] South Coast Air Quality Management District. *CEQA Air Quality Handbook, Appendix 9*. As amended 2017.

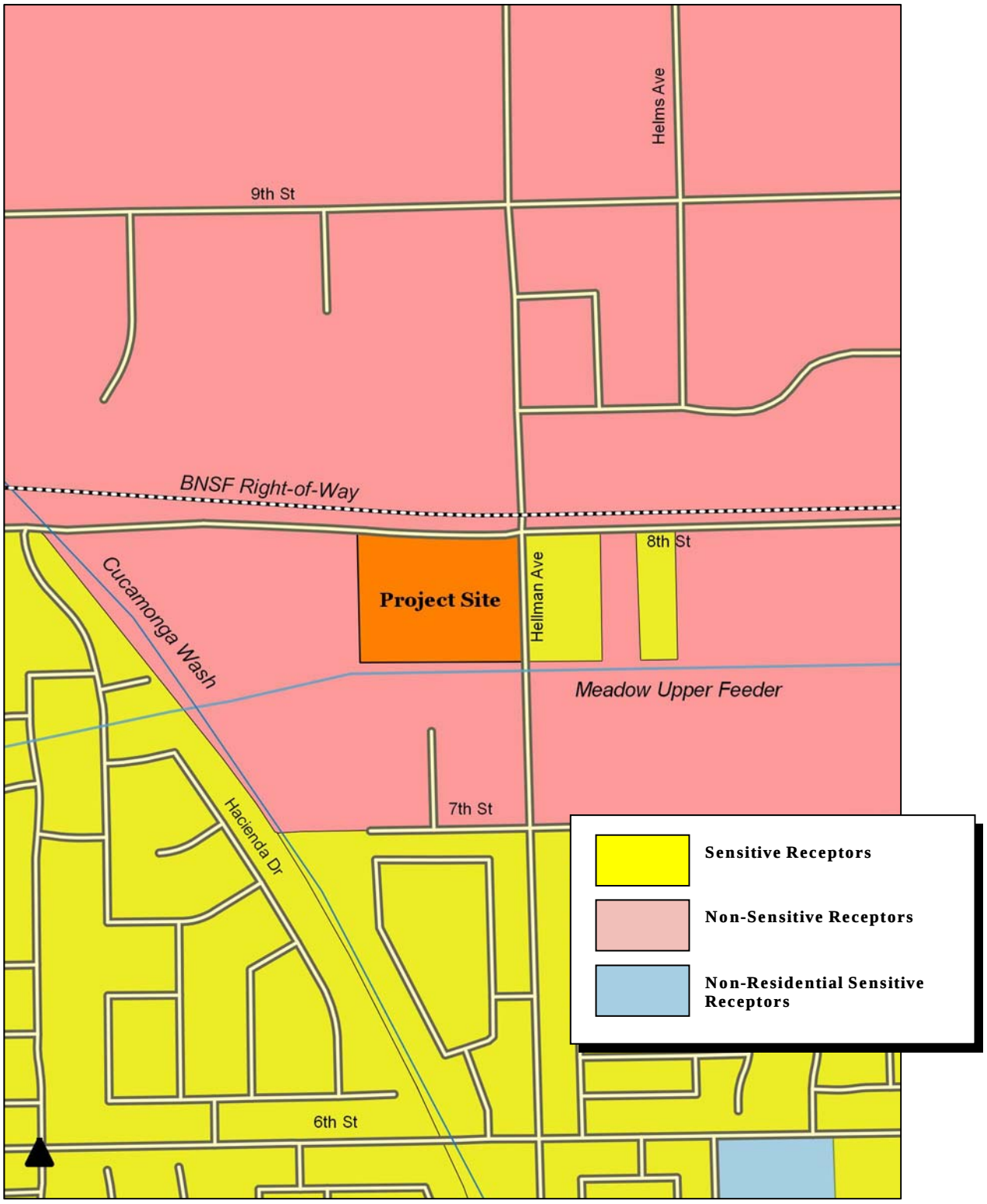


EXHIBIT 3-1
NEARBY SENSITIVE RECEPTORS
SOURCE: QUANTUM GIS

on the analysis of LST impacts summarized above in Table 3-3, the potential impacts would be less than significant.

Table 3-3
Local Significance Thresholds Exceedance SRA 32 for 5-Acre Sites (the site is 8.09 acres)

Emissions	Project Emissions (lbs/day)	Type	Allowable Emissions Threshold (lbs/day) and a Specified Distance from Receptor (in meters)				
			25	50	100	200	500
NO_2	48.26	Construction	**270**	303	378	486	778
CO	23.72	Construction	**2,193**	2,978	5,188	9,611	29,410
PM_{10}	9.82	Construction	**16**	50	80	140	322
$PM_{2.5}$	6.29	Construction	**9**	12	21	45	170

The emissions generated by the construction of the proposed project would not exceed the LSTs identified above. Further analysis of the CalEEMod worksheets indicated that the primary source of construction PM emissions is fugitive dust. Adherence to additional mandatory Rule 403 regulations would reduce fugitive dust emissions to levels that are less than significant.

E. Create objectionable odors affecting a substantial number of people? ● Less than Significant Impact.

The SCAQMD has identified those land uses that are typically associated with odor complaints. These uses include activities involving livestock, rendering facilities, food processing plants, chemical plants, composting activities, refineries, landfills, and businesses involved in fiberglass molding.[39] The project is a proposal to construct and operate a warehouse. As designed, the proposed project would not be involved in any of the aforementioned odor-generating activities. Given the nature of the intended use, no operational impacts related to odors are anticipated with the proposed project.

Future truck drivers must adhere to Title 13 - §2485 of the California Code of Regulations, which limits the idling of diesel powered vehicles to less than five minutes. Adherence to the aforementioned standard condition would minimize odor impacts from diesel trucks. In addition, the project's contractors must adhere to SCAQMD Rule 403 regulations, which significantly reduce the generation of fugitive dust. Adherence to Rule 403 Regulations and Title 13 - §2485 of the California Code of Regulations would reduce potential impacts to levels that are less than significant.

[39] South Coast Air Quality Management District. *CEQA Air Quality Handbook, Appendix 9*. As amended 2017.

An Air Quality, Global Climate Change, and Health Risk Assessment Impact Analysis was prepared by Kunzman Associates, Inc. for the proposed project. This report is presented in Appendix B. The on-going operation of the proposed project would generate toxic air contaminant (TAC) emissions from diesel truck emissions created by the on-going operations of the proposed project.[40] According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 30-year lifetime would contract cancer, based on the use of revised Office of Environmental Health Hazard Assessment (OEHHA) risk-assessment methodology. The 2015 OEHHA guidance states that "Districts are to determine which facilities would prepare an HRA based on a prioritization process outlined in the law. The process by which Districts identify priority facilities for risk assessment involves consideration of potency, toxicity, quantity of emissions, and proximity to sensitive receptors such as hospitals, daycare centers, schools, work-sites, and residences." The Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis prepared by SCAQMD (August 2003) defers to CARB (State) guidance for "technical guidance for diesel toxic impact analyses for various source categories."

The California Air Pollution Control Officers Association (CAPCOA) has developed TAC health risk assessment guidelines to provide consistent, statewide procedures for preparing the health risk assessments required under the Air Toxics "Hot Spots" Act. The title of these guidelines is CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines. The District recommends that lead agencies conduct TAC risk assessments in accordance with the CAPCOA Risk Assessment Guidelines, as supplemented by the District's supplemental guidelines. According to SCAQMD and CAPCOA guidelines, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 30-year lifetime would contract cancer, based on the use of standard risk-assessment methodology.[41]

The nearest sensitive receptors to the project site include the single-family detached residential dwelling units located east of the project site along the east side of Hellman Avenue. In addition, multi-family attached residential dwelling units are located approximately 685 feet south and single-family detached residential dwelling units are located approximately 710 feet southeast and southwest of the project site.

The most recent Health Risk Assessment for Proposed Land Use Projects prepared by CAPCOA (July 2009) recommends avoiding siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units (TRUs) per day, or where TRU unit operations exceed 300 hours per week). A

[40] Kunzman Associates, Inc. *Air Quality, Global Climate Change, and Health Risk Assessment Impact Analysis*. Report dated May 22, 2018.

[41] Ibid.

summary of the basis for the distance recommendations can be found in the ARB Handbook *Air Quality and Land Use Handbook: A Community Health Perspective*.[42]

As stated previously, the proposed warehouse use is anticipated to have approximately 62 truck trips per day per the Traffic Impact Analysis. None of these trucks are anticipated to have TRUs. Therefore, this project is not anticipated to accommodate more than 100 trucks per day and a quantitative health risk assessment for the proposed on-site warehouse use is not required. Significant TAC impacts from the project-related operational DPM sources are not anticipated and no significant long-term operations-related TAC impacts from the proposed project to nearby sensitive receptors would occur.[43] As a result, the potential impacts are considered to be less than significant.

3.3.3 CUMULATIVE IMPACTS

The proposed project's implementation would not result in any new exceedance of air pollution standards nor contribute significantly to an existing air quality violation. In addition, the combined operational emissions from the four projects (including the proposed project) would still be below the thresholds of significance established by the SCAQMD (the CalEEMod worksheets for the cumulative emissions are provided in Appendix A).

3.3.4 MITIGATION MEASURES

The analysis of air quality impacts indicated that no impacts on these resources would occur as part of the proposed project's implementation. As a result, no mitigation is required.

3.4 BIOLOGICAL RESOURCES

3.4.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant adverse impact on biological resources if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife, or U. S. Fish and Wildlife Service;

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service;

[42] Kunzman Associates, Inc. *Air Quality, Global Climate Change, and Health Risk Assessment Impact Analysis*. Report dated May 22, 2018. (This report is provided in Appendix B).

[43] Ibid.

- Have a substantial adverse effect on Federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;

- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory life corridors, or impede the use of native wildlife nursery sites;

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or,

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

3.4.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife, or U. S. Fish and Wildlife Service? ● No Impact.

As indicated previously, the project site is currently occupied by Frontier Communications, which is currently using the site for outdoor storage and repair of equipment. The site is dominated by dilapidated surface parking, though a small 400 square-foot patch of landscaping is present along the project site's frontage with Hellman Avenue. This patch of landscaping consists of grass and shrubs and is located adjacent to two tan colored buildings. These two buildings were constructed in 1980 and have a maximum height of 18 feet and total 16,324 square feet of floor area.

A review of the California Department of Fish and Wildlife (CDFW) California Natural Biodiversity Database (CNDDB) Bios Viewer for the Guasti Quadrangle indicated that there are six threatened or endangered species located within the Guasti Quadrangle (the project site is located within the Guasti Quadrangle).[44] These species include the coastal California Gnatcatcher, the Delhi Sands flower-loving fly, the San Bernardino kangaroo rat, Stephen's kangaroo rat, pacific pocket mouse, and California black rail.[45] The proposed project would not have an impact on the aforementioned species because there is no suitable riparian or native habitat (coastal sage scrub and chaparral) located within, or in the vicinity of, the project site.[46] There site is not underlain by Delhi sandy soils (Delhi sandy soils are required to support Delhi Sands flower-loving fly populations) and the ground is paved over, thus

[44] California Department of Fish and Wildlife. *Bios Viewer*. https://map.dfg.ca.gov/bios/?tool=cnddbQuick.

[45] Ibid.

[46] Audubon. California Gnatcatcher (Polioptila californica). https://www.audubon.org/field-guide/bird/california-gnatcatcher;
The IUCN Redlist of Threatened Species. Dipodomys stephensi. http://www.iucnredlist.org/details/6682/0;
Center for Biological Diversity. San Bernardino Kangaroo Rat.
http://www.biologicaldiversity.org/species/mammals/San_Bernardino_kangaroo_rat/natural_history.html;
All About Birds. Black Rail. https://www.allaboutbirds.org/guide/Black_Rail/overview

reducing the likelihood of encountering populations of Delhi Sands flower-loving flies.[47] Populations of pacific pocket mice would not be found on-site since these species live within coastal dunes.[48]

An additional search was conducted using the California Native Plant Society's Inventory of Rare and Endangered Plants to ascertain any rare or endangered plant species which may occur in the Guasti Quadrangle. The search yielded four results. The following four plants have been identified in the Guasti Quadrangle: Parry's spineflower, Brand's star phacelia, Prostrate Vernal Pool Navarretia, and the San Bernardino aster.[49] None of these plants were encountered during the field survey that was conducted by the preparers of this IS/MND. As indicated previously, the only vegetation that is present on-site consists of non-native introduced species typically used as ornamental landscaping. As a result, no impacts on any candidate, sensitive, or special status species would result.

B. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? ● No Impact.

The field survey that was conducted for this project by the preparers of this IS/MND indicated that there are no wetlands or riparian habitat present on-site. This conclusion is also supported by a review of the U.S. Fish and Wildlife Service National Wetlands Inventory, Wetlands Mapper.[50] The Cucamonga Wash is the closest wetland habitat to the project site (refer to Exhibit 2-3). This wash is located 665 feet to the west of the project site. The Cucamonga Wash is classified as a Riverine habitat, which includes all wetlands and deepwater habitats contained within a channel.[51] The project's construction would be restricted to the project site and would not fill in, alter the course of, or otherwise affect the Cucamonga. In addition, there are no designated "blue line streams" located within the project site. Finally, the project site is fully developed and only a 400 square-foot patch of landscaping is present on-site. As a result, no impacts on natural or riparian habitats would result from the proposed project's implementation.

[47] Xerces Society. Flies: Delhi Sands flower-loving fly (Rhaphiomidas terminatus abdominalis). https://xerces.org/delhi-sands-flower-loving-fly/

[48] U.S. Fish and Wildlife Service. Pacific Pocket Mouse - 5 Year Review: Summary and Evaluation. https://ecos.fws.gov/docs/five_year_review/doc3552.pdf.

[49] California Native Plant Society, Rare Plant Program. 2018. Inventory of Rare and Endangered Plants of California. http://www.rareplants.cnps.org.

[50] United States Fish and Wildlife Service. *National Wetlands Inventory*. https://www.fws.gov/Wetlands/data/Mapper.html

[51] Ibid.

C. Have a substantial adverse effect on Federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? ● No Impact.

As indicated in the previous subsection, the project site and adjacent developed properties do not contain any natural wetland and/or riparian habitat.[52] As a result, the proposed project would not impact any protected wetland area or designated blue-line stream and no impacts would occur.

D. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory life corridors, or impede the use of native wildlife nursery sites? ● No Impact.

The site is presently developed and contains no natural hydrological features or native vegetation.[53] A small 400 square-foot patch of landscaping is present along the project site's frontage with Hellman Avenue. This patch of landscaping consists of grass and ornamental shrubs. In addition, there are no trees located on-site that would provide nesting habitat and no migratory or nesting birds were observed on-site. Constant disturbance (noise and vibration) from vehicles travelling on the adjacent roadways limit the site's utility as a migration corridor. Since the site is surrounded by development on all sides and lacks suitable habitat, the site's utility as a migration corridor is restricted. Therefore, no impacts would result from the implementation of the proposed project.

E. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? ● Less than Significant Impact.

Title 17 (Development Code) Chapter 17.80 of the City of Rancho Cucamonga municipal code serves as the City's Tree Preservation Ordinance.[54] The purpose of the Tree Preservation Ordinance is to protect trees, considered to be a community resource, from indiscriminate cutting or removal. Provisions within Chapter 17.80 are specifically intended to protect and expand the eucalyptus windrows. These windrows provide a cumulative value as a windbreak system, and it is the intent of this chapter to perpetuate this system through protection of selected blue gum eucalyptus windrows and expansion of the system through planting of new spotted gum eucalyptus windrows along the established grid pattern, as development occurs. In addition, Section 17.16.080 - Tree Removal Permit establishes protection for "heritage trees" on private property. The City defines a heritage tree as any tree which meets at least one of the following criteria:

1. All eucalyptus windrows;

2. Any tree in excess of 30 feet in height and having a single trunk diameter at breast height (DBH) of 20 inches or more as measured 4½ feet from ground level;

[52] United States Fish and Wildlife Service. *National Wetlands Inventory*. https://www.fws.gov/Wetlands/data/Mapper.html

[53] Blodgett Baylosis Environmental Planning. *Field Survey*. Survey was conducted March 30, 2018.

[54] Rancho Cucamonga, City of, Municipal Code. *Title IX General Regulations, Chapter 96 Streets and Sidewalks, Street Trees.*

3. Multi-trunk trees having a total diameter at breast height (DBH) of 30 inches or more as measured 4½ feet from ground level;

4. A stand of trees the nature of which makes each dependent upon the others for survival; or

5. Any other tree as may be deemed historically or culturally significant by the planning director because of age, size, condition, location, or aesthetic qualities.

The permit requirements include:

1. No person, firm, or corporation shall remove, relocate, or destroy any heritage tree within the city limits, including an applicant for a building permit, without first obtaining a tree removal permit from the planning director.

2. No tree removal permit shall be issued for the removal of any heritage tree on any lot associated with a proposal for development, unless all discretionary approvals have been obtained from the city, or unless an emergency waiver is granted pursuant to section 17.16.080.H.

There are no trees located on-site. A small 400 square-foot patch of landscaping is present along the project site's frontage with Hellman Avenue. This patch of landscaping consists of grass and ornamental shrubs. In addition, the project Applicant would plant 36,312 square feet of landscaping. Since the project's implementation would not require the removal of any protected tree, the potential impacts are considered to be less than significant.

F. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? ● No Impact.

The proposed project would not impact an adopted or approved local, regional, or State habitat conservation plan because the proposed project is located in the midst of an urban area. The project site is located outside of any open space and/or conservation areas identified in the City's General Plan.[55] Therefore, no impacts would occur.

3.4.3 CUMULATIVE IMPACTS

Typically, impacts to biological resources are site-specific. The analysis determined that the proposed project would not involve any incremental loss or degradation of protected habitat. As a result, no cumulative impacts would occur.

[55] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Resource Conservation Element Figure RC-1 Open Space and Conservation Plan.* Plan adopted May 19, 2010.

3.4.4 MITIGATION MEASURES

The analysis of biological resources impacts indicated that no impacts on these resources would occur as part of the proposed project's implementation. As a result, no mitigation is required.

3.5 CULTURAL RESOURCES

3.5.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may have a significant impact on cultural resources if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5;
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or,
- Disturb any human remains, including those interred outside of formal cemeteries.

3.5.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. *Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5? ● No Impact.*

Historic structures and sites are defined by local, State, and Federal criteria. A site or structure may be historically significant if it is locally protected through a local general plan or historic preservation ordinance. A site or structure may be historically significant according to State or Federal criteria even if the locality does not recognize such significance. The State, through the State Historic Preservation Office (SHPO), maintains an inventory of those sites and structures that are considered to be historically significant. Finally, the U.S. Department of Interior has established specific Federal guidelines and criteria that indicate the manner in which a site, structure, or district is to be defined as having historic significance and in the determination of its eligibility for listing on the National Register of Historic Places.[56] To be considered eligible for the National Register, a property's significance may be determined if the property is associated with events, activities, or developments that were important in the past, with the lives of people who were important in the past, or represents significant architectural, landscape, or engineering elements.[57]

[56] U.S. Department of the Interior, National Park Service. *National Register of Historic Places*. http://nrhp.focus.nps.gov. 2010.

[57] Ibid.

State historic preservation regulations include the statutes and guidelines contained in the California Environmental Quality Act (CEQA) and the Public Resources Code (PRC). A historical resource includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript, that is historically or archaeologically significant. The State regulations that govern historic resources and structures include Public Resources Code (PRC) Section 5024.1 and CEQA Guidelines Sections 15064.5(a) and 15064.5(b). According to Section 5024.1(c) of the State Public Resources Code:

(c) A resource may be listed as an historical resource in the California Register if it meets any of the following National Register of Historic Places criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

(2) Is associated with the lives of persons important in our past.

(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

(4) Has yielded, or may be likely to yield, information important in prehistory or history.

According to the City's General Plan, the Casa de Rancho Cucamonga (Rains House Museum) located at 8810 Hemlock Street is the only building in Rancho Cucamonga on the National Register of Historic Places. In addition, the buildings that occupy the project site are not present on the list of historic resources identified by the State Office of Historic Preservation (SHPO).[58] Furthermore, the buildings that occupy the site do not meet any of the criteria of a historic structure identified above. The buildings are currently used by Frontier Communications and no historical events have occurred within either building. No persons of significance currently reside within the property, or have resided within the property. Furthermore, the building was erected in 1980 (per the San Bernardino County Tax Assessor) and since the building is less than 45 years old, the building does not require consideration for historic significance since not enough time has passed to determine the building's significance.

In 1978, the City adopted the Historic Preservation Commission Ordinance to "designate, preserve, protect, enhance, and perpetuate those historic structures and sites which contribute to the cultural and aesthetic benefit of Rancho Cucamonga." The Ordinance established a Historic Preservation Commission to review applications for Landmark designation, review plans for physical alterations or change of use to Landmarks, and maintain the register of Landmarks. Pursuant to the Ordinance, a Landmark Designation Program was established. The City has designated many Landmarks and Points of Interest within Rancho Cucamonga and the Sphere of Influence. The project's implementation would not affect any of the locally designated historic resources. The site is occupied by an outdoor storage yard and two structures and all construction activities would be restricted to the designated

[58] California Department of Parks and Recreation. *California Historical Resources*. Website http:// ohp.parks.ca.gov/ ListedResources. Website accessed in September 8, 2017.

site. Since the project's implementation would not impact any Federal, State, or locally designated historic resources, no impacts would occur.

B. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? ● Less than Significant Impact with Mitigation.

The City of Rancho Cucamonga area was occupied during the Late Prehistoric Period by the Native American societies commonly known to anthropologists as the Gabrielino. The City in named after the Gabrielino village of Kukamo or Cucamonga, which was located in the eastern extreme of the tribe's territory. The name is thought to come from a Gabrielino word meaning "sandy place." The term "Gabrielino" identifies those Native Americans who were under the control of the Spanish Mission San Gabriel. The overwhelming number of people here were of the same ethnic nationality and language group who generally referred to themselves as Tongva. Their territory included the entire Los Angeles Basin and extended from northern Orange County north to the San Fernando Valley in Los Angeles County and eastward to the Riverside and San Bernardino area. It also included the watersheds of the Los Angeles, San Gabriel, and Santa Ana Rivers. The language of the group is derived from the Takic family, part of the Uto-Aztecan linguistic stock. The Gabrielino/Tongva arrived in the Los Angeles Basin prior to 500 BCE, gradually displacing the indigenous peoples. Large, permanent villages were established in the fertile lowlands along rivers and streams and in sheltered areas along the coast. Eventually, Gabrielino territory encompassed the greater Los Angeles Basin, the coastal regions from Topanga Canyon in the north to perhaps as far south as Aliso Creek, as well as the islands of San Clemente, San Nicholas, and Santa Catalina. The subsistence economy of the Gabrielino was one of hunting and gathering. A wide variety of tools and implements were employed by the Gabrielino to gather, collect, and process food resources.

As indicated in Section 2.4, the total cut and fill would be 17,233 cubic yards, respectively. In addition, trenching would be undertaken to accommodate the building footings, utility lines, and other underground infrastructure such as stormwater appurtenances and double check detector assemblies, which would be installed during this phase as well. Although the project site is located in the midst of an urban area, the project site is situated in an area of high archaeological significance. In addition, the project's implementation would require a total cut and fill of 17,233 cubic yards. AB-52 consultation was undertaken by the Lead Agency and so far, only one response for consultation was received. Mr. Andrew Salas, Chairman of the Gabrielino Band of Mission Indians, Kizh Nation, extended an offer for consultation. Mitigation was identified during the consultation period. This mitigation is provided in Section 3.17 and will reduce potential impacts to tribal resources to levels that are less than significant.

In conformance with CEQA Guidelines Section 15064.5, a Phase I Cultural Resources Assessment (MIG Hogle-Ireland, 2016) was performed on the project site. In conjunction with the South Central Coastal Information Center at California State University, Fullerton, the California Historical Resources Information was also consulted. No potentially significant cultural resources were identified during the cultural resource survey of the project site. Nevertheless, the following mitigation is required:

Mitigation Measure No. 1 (Cultural Resources). In the event that potentially significant archaeological materials are encountered during project related construction activities, all work must be halted in the vicinity of the archaeological discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the archaeological resource.

As well, Health and Safety Code 7050.5, CEQA 15064.5(e), and Public Resources Code 5097.98 mandate the process to be followed in the unlikely event of an accidental discovery of any human remains in a location other than a dedicated cemetery. Adherence to the abovementioned mitigation will reduce potential impacts to levels that are less than significant.

C. *Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? ● Less than Significant Impact with Mitigation.*

No paleontological resources or geologic features are anticipated to be encountered during the project's construction phase due to the amount of disturbance that has occurred to accommodate the existing development. The soils that underlie the project site are alluvial in nature. Alluvial deposits are typically quaternary in age (from two million years ago to the present day) and span the two most recent geologic epochs, the Pleistocene and the Holocene.[59] According to the Resource Element of the City's General Plan, the soils and geologic formations within the City have a low potential to contain significant paleontological resources.[60] Nevertheless, in the event that previously unidentified paleontological resources are encountered, the following mitigation will be required:

Mitigation Measure No. 2 (Cultural Resources). If previously unidentified paleontological resources are unearthed during construction, work shall cease within 50 feet of the find and the project Applicant must retain a qualified paleontologist, approved by the City, to assess the significance of the find. If a find is determined to be significant, the Lead Agency and the paleontologist will determine appropriate avoidance measures or other appropriate mitigation. All significant fossil materials recovered will be, as necessary and at the discretion of the qualified paleontologist, subject to scientific analysis, professional museum curation, and documentation according to current professional standards.

Adherence to the aforementioned mitigation will ensure that potential impacts remain at levels that are considered to be less than significant.

D. *Disturb any human remains, including those interred outside of formal cemeteries? ● Less than Significant Impact with Mitigation.*

There are no dedicated cemeteries located within the vicinity of the project site.[61] Ontario Cemetery Association is located approximately four miles to the southwest of the project site.[62] The proposed

[59] United States Geological Survey. *What is the Quaternary?* http://geomaps.wr.usgs.gov/sfgeo/quaternary/stories/what_is.html

[60] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Resource Conservation Element*. Plan adopted May 19, 2010.

[61] Google Earth. Website accessed April 5, 2018.

project would be restricted to the project site and would not affect any dedicated cemeteries. Notwithstanding, in the unlikely event that remains are uncovered by construction crews, all excavation and grading activities shall be halted and the San Bernardino County Sheriff would be contacted (the Department would then contact the County Coroner). This is a standard condition under California Health and Safety Code Section 7050.5(b), which is re-iterated as mitigation below:

> *Mitigation Measure No. 3 (Cultural Resources*). In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with (b) Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains. If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission. In the event that human remains are uncovered, the City and the applicant/developer shall immediately contact the County of San Bernardino Coroner and the Consulting Tribes. If the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four (24) hours of the determination, as required by California Health and Safety Code § 7050.5 (c). The NAHC-identified Most Likely Descendant (MLD), shall be allowed, under California Public Resources Code § 5097.98 (a), to (1) inspect the site of the discovery and (2) make determinations as to how the human remains and funerary objects shall be treated and disposed of with appropriate dignity. The MLD, City and applicant/developer agree to discuss in good faith what constitutes "appropriate dignity" as that term is used in the applicable statutes. The MLD shall complete its inspection and make recommendations within forty-eight (48) hours of receiving notification from either the applicant/developer or the NAHC, as required by California Public Resources Code § 5097.98.

In addition, Title 14; Chapter 3; Article 5; Section 15064.5 of CEQA would apply in terms of the identification of significant archaeological resources and their salvage. Therefore, the potential impacts are considered to be less than significant with the implementation of the abovementioned mitigation.

[62] Google Earth. Website accessed April 5, 2018.

3.5.3 CUMULATIVE IMPACTS

The potential environmental impacts related to cultural resources are site-specific. Furthermore, the analysis herein determined that the proposed project would not result in any significant impacts on cultural resources. As a result, no cumulative impacts would occur.

3.5.4 MITIGATION MEASURES

In the event that previously unidentified paleontological or archeological resources are encountered, the following mitigation will be required:

Mitigation Measure No. 1 (Cultural Resources). In the event that potentially significant archaeological materials are encountered during project related construction activities, all work must be halted in the vicinity of the archaeological discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the archaeological resource.

Mitigation Measure No. 2 (Cultural Resources). If previously unidentified paleontological resources are unearthed during construction, work shall cease within 50 feet of the find and the project Applicant must retain a qualified paleontologist, approved by the City, to assess the significance of the find. If a find is determined to be significant, the Lead Agency and the paleontologist will determine appropriate avoidance measures or other appropriate mitigation. All significant fossil materials recovered will be, as necessary and at the discretion of the qualified paleontologist, subject to scientific analysis, professional museum curation, and documentation according to current professional standards.

Mitigation Measure No. 3 (Cultural Resources). In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with (b) Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains. If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission. In the event that human remains are uncovered, the City and the applicant/developer shall immediately contact the County of San Bernardino Coroner and the Consulting Tribes. If the Coroner recognizes the human remains to be

those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four (24) hours of the determination, as required by California Health and Safety Code § 7050.5 (c). The NAHC-identified Most Likely Descendant (MLD), shall be allowed, under California Public Resources Code § 5097.98 (a), to (1) inspect the site of the discovery and (2) make determinations as to how the human remains and funerary objects shall be treated and disposed of with appropriate dignity. The MLD, City and applicant/developer agree to discuss in good faith what constitutes "appropriate dignity" as that term is used in the applicable statutes. The MLD shall complete its inspection and make recommendations within forty-eight (48) hours of receiving notification from either the applicant/developer or the NAHC, as required by California Public Resources Code § 5097.98.

3.6 GEOLOGY & SOILS

3.6.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on the environment if it would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. Strong seismic ground–shaking? Seismic-related ground failure, including liquefaction? Landslides;

- Result in substantial soil erosion or the loss of topsoil;

- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;

- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property; or,

- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

3.6.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. Strong seismic ground–shaking? Seismic-related ground failure, including liquefaction? Landslides? ● Less than Significant Impact.

The City of Rancho Cucamonga is located in a seismically active region. Earthquakes from several active and potentially active faults in the Southern California region could affect the proposed project site. In 1972, the Alquist-Priolo Earthquake Zoning Act was passed in response to the damage sustained in the 1971 San Fernando Earthquake.[63] The Alquist-Priolo Earthquake Fault Zoning Act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults.[64] A list of cities and counties subject to the Alquist-Priolo Earthquake Fault Zones is available on the State's Department of Conservation website. The City of Rancho Cucamonga is on the list.[65]

The nearest fault is the Cucamonga Fault (which is part of the larger Sierra Madre Fault Zone), located approximately five miles to the north of the project site. The potential impacts from fault rupture are considered no greater for the project site than for the surrounding areas. Surface ruptures are visible instances of horizontal or vertical displacement, or a combination of the two. The proposed warehouse would be constructed in compliance with the 2016 Building Code, which contains standards for building design to minimize the impacts from fault rupture. Therefore, the potential impacts resulting from fault rupture are anticipated to be less than significant. The potential impacts in regards to ground shaking would also be considered to be less than significant. The intensity of ground shaking depends on the intensity of the earthquake, the duration of shaking, soil conditions, type of building, and distance from epicenter or fault. The proposed warehouse would be constructed in compliance with the 2016 Building Code, which contains standards for building design to minimize the impacts from ground shaking.

Other potential seismic issues include ground failure and liquefaction. Ground failure is the loss in stability of the ground and includes landslides, liquefaction, and lateral spreading. The project site is not located in an area that is subject to liquefaction. According to the United States Geological Survey, liquefaction is the process by which water-saturated sediment temporarily loses strength and acts as a fluid. Essentially, liquefaction is the process by which the ground soil loses strength due to an increase in water pressure following seismic activity. Lastly, the project site is not subject to the risk of landslides because there are no hills or mountains within the vicinity of the project site. Lateral

[63] California Department of Conservation. *What is the Alquist-Priolo Act.* http://www.conservation.ca.gov/cgs/rghm/ap/Pages/main.aspx.

[64] Ibid.

[65] California Department of Conservation. *Table 4, Cities and Counties Affected by Alquist Priolo Earthquake Fault Zones as of January 2010.* http://www.conservation.ca.gov/cgs/rghm/ap/Pages/affected.aspx

spreading is a phenomenon that is characterized by the horizontal, or lateral, movement of the ground. Lateral spreading could be liquefaction induced or can be the result of excess moisture within the underlying soils. Liquefaction induced lateral spreading would not affect the proposed development because the site is not located in an area that is subject to liquefaction. Therefore, lateral spreading caused by liquefaction would not affect the project. The underlying soils are not prone to shrinking and swelling (refer to Section 3.6.2.D). As a result, the potential impacts in regards to liquefaction and landslides are less than significant.

B. Result in substantial soil erosion or the loss of topsoil? ● Less than Significant Impact.

Southern California Geotechnical prepared a Geotechnical Study for the proposed project. This Geotechnical Study is available as a reference in the Appendices for the WQMP, which is located in Appendix D. According to the Geotechnical Report, the project site is underlain with artificial fill soils.[66] The site is, and would continue to be level and no slope failure or landslide impacts are anticipated to occur. Once operational, the project site would be paved over and landscaped, which would minimize soil erosion. The project's construction would not result in substantial soil erosion or the loss of topsoil since the project Applicant would be required to adhere to Article V – Construction Requirements of Chapter 19.20 – Municipal Separate Storm Sewer System. According to Section 19.20.230:

> "All construction projects which could potentially have an adverse impact on the city's municipal separate storm sewer system or waters of the state shall install and/or implement appropriate construction and post-construction best management practices (BMPs), as listed in their water quality management plan (WQMP) or the California Storm Water Best Management Practice Handbook, to reduce pollutants to the maximum extent practicable or to the extent required by law."

In addition, Section 19.20.240 would also apply for the project:

- (A). Any developer/owner engaging in construction activities which disturb five acres or more of land shall apply for coverage under the general stormwater permit for construction activity with the state water resources control board (SWRCB). Any developer/owner engaging in construction activities which disturb less than five acres but are part of a larger common plan of development or sale that is greater than five acres must also apply for coverage under the general stormwater permit for construction activity with the state water resources control board (SWRCB). The owner of the land where the construction activity is occurring is responsible for obtaining coverage under the permit. Owners may obtain coverage under the general permit by completing a notice of intent form (NOI) and mailing the form along with a vicinity map and the appropriate fee to the office of the state water resources control board. The NOI form and checklist of items to submit to the state is available from the state water resources control board in Sacramento, California or from the city's engineering department,

[66] Southern California Geotechnical. *Geotechnical Investigation for Proposed Warehouse*. Report dated February 23, 2017.

environmental section. In addition, the owner shall also prepare a stormwater pollution prevention plan (SWPPP) in accordance with state requirements.

- (B). Prior to obtaining any city-issued grading and/or construction permits, the developer/owner shall provide evidence of compliance with the general construction permit by providing a copy of the waste discharger's identification number (WDID) to the city's engineering department.

The use of construction Best Management Practices (BMPs) identified in the mandatory WQMP (which is presented in Appendix D) and SWPPP would prevent soil erosion and the discharge of sediment into the local storm drains during the project's construction phase. As a result, the impacts would be less than significant.

C. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? ● Less than Significant Impact.

According to the Geotechnical Report, the project site is underlain with artificial fill soils.[67] These soils possess low strengths, varying densities, and unfavorable consolidation/collapse characteristics.[68] Therefore, the project Applicant would be required to excavate approximately 3,451 square feet of fill and recompact the outgoing fill in order to make it capable of supporting the development. Once complete, the project would not destabilize the new soils since the site would be graded, leveled, and covered over with pavement and landscaping. In addition, the new fill soils would be capable of supporting the proposed project.

The site is, and would continue to be level and no slope failure or landslide impacts are anticipated to occur. Once operational, the project site would be paved over and landscaped, which would minimize soil erosion. Furthermore, no soil erosion would occur during the project's construction since the project Applicant would be required to adhere to Article V – Construction Requirements of Chapter 19.20 – Municipal Separate Storm Sewer System. Lateral spreading is a phenomenon that is characterized by the horizontal, or lateral, movement of the ground. Lateral spreading could be liquefaction induced or can be the result of excess moisture within the underlying soils. Liquefaction induced lateral spreading would not affect the proposed warehouse development because the site is not located in an area that is subject to liquefaction. Therefore, lateral spreading caused by liquefaction would not affect the project. The underlying fill soils are prone to shrinking-swelling. Soils that exhibit certain shrink swell characteristics become sticky when wet and expand according to the moisture content present at the time. Since the soils have a potential for shrinking and swelling, the Applicant would remove and replace the underlying fill soils that are prone to the aforementioned phenomena. Thus, lateral spreading resulting from an influx of groundwater is slim. In addition, groundwater is

[67] Southern California Geotechnical. *Geotechnical Investigation for Proposed Warehouse*. Report dated February 23, 2017. (Refer to Appendix C).

[68] Ibid.

located between 260 and 300 feet below ground surface (BGS).[69]

The soils that underlie the project site are prone to subsidence. Subsidence occurs via soil shrinkage and is triggered by a significant reduction in an underlying groundwater table, thus causing the earth on top to sink.[70] No groundwater would be drained to accommodate the construction of the proposed project. In addition, the project would not result in the direct extraction of groundwater located below ground surface (BGS). As stated previously, the underlying fill soils would be removed and replaced. Therefore, the likelihood of on-site subsidence is considered to be remote. As a result, the potential impacts are anticipated to be less than significant.

D. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property? ● Less than Significant Impact.

According to the Geotechnical Report, the project site is underlain with artificial fill soils.[71] These soils possess low strengths, varying densities, and unfavorable consolidation/collapse characteristics.[72] The Applicant is proposing to remove approximately 3,451 cubic yards of soils prone to shrinking and subsidence. These soils would be replaced with fill capable of supporting the new construction. As a result, the potential impacts are considered to be less than significant.

E. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water? ● No Impact.

No septic tanks would be used as part of proposed project. As a result, no impacts associated with the use of septic tanks would occur as part of the proposed project's implementation.

3.6.3 CUMULATIVE IMPACTS

Typically, impacts to geology and soils are site-specific. The analysis herein determined that the proposed project would not result in significant impacts related to ground shaking, liquefaction, landslides, soil erosion, lateral spreading, or subsidence. As a result, no cumulative impacts would occur.

3.6.4 MITIGATION MEASURES

The analysis determined that no mitigation measures were required since the potential impacts with regards to geology and soils are considered to be less than significant.

[69] Ardent Environmental Group, Inc. *Phase I Environmental Site Assessment*. Report dated February 14, 2018.

[70] Subsidence Support. *What Causes House Subsidence?* http://www.subsidencesupport.co.uk/what-causes-subsidence.html

[71] Southern California Geotechnical. *Geotechnical Investigation for Proposed Warehouse*. Report dated February 23, 2017.

[72] Ibid.

3.7 GREENHOUSE GAS EMISSIONS

3.7.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant adverse impact on greenhouse gas emissions if it would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; and,

- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

3.7.2 ENVIRONMENTAL ANALYSIS

A. *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? ● Less than Significant Impact.*

The State of California requires CEQA documents to include an evaluation of greenhouse gas (GHG) emissions, or gases that trap heat in the atmosphere. GHG are emitted by both natural processes and human activities. Examples of GHG that are produced both by natural and industrial processes include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The accumulation of GHG in the atmosphere regulates the earth's temperature. Without these natural GHG, the Earth's surface would be about 61°F cooler.[73] However, emissions from fossil fuel combustion have elevated the concentrations of GHG in the atmosphere to above natural levels. The SCAQMD has established a draft threshold of significance of 10,000 metric tons of CO_2E ($MTCO_2E$) per year for new development.

Table 3-4 summarizes annual greenhouse gas (CO_2E) emissions from the proposed project. Carbon dioxide equivalent, or CO_2E, is a term that is used for describing different greenhouses gases in a common and collective unit. The CalEEMod V.2016.3.2 was used to calculate the project's construction and operational GHG emissions. These CalEEMod worksheets are provided in Appendix A. The GHG emissions estimates reflect what a warehouse of the same location and description would generate once fully operational. The type of activities that may be undertaken once the project is operational have been predicted and accounted for in the model for the selected land use type. As indicated in Table 3-4, the CO_2E total for the project is 3,368 pounds per day or 1.52 $MTCO_2E$ per day. This translates into an annual emission of 555 $MTCO_2E$, which is below the aforementioned thresholds.

[73] California, State of. OPR Technical Advisory – CEQA and Climate Change: Addressing Climate Change through the California Environmental Quality Act (CEQA) Review. June 19, 2008.

Table 3-4
Greenhouse Gas Emissions Inventory

Source	GHG Emissions (Lbs/Day)			
	CO_2	CH_4	N_2O	CO_2E
Long-term Area Emissions	0.07	--	--	0.07
Long-term Energy Emissions	114.33	--	--	115.01
Long-term Mobile Emissions	3,249.61	0.15	--	3,253.55
Total Long-term Emissions	**3,364.02**	**0.16**	**--**	**3,368.65**
Total Long-term Emissions (MTCO2e)				**555 $MTCO_2E$ per year**
Thresholds of Significance				**10,000 $MTCO_2E$ per year**

Source: CalEEMod V.2016.3.2

It is important to note that the project is an "infill" development, which is seen as an important strategy in combating the release of GHG emissions. Infill development provides a regional benefit in terms of a reduction in Vehicle Miles Traveled (VMT) since the project is consistent with the regional and State sustainable growth objectives identified in the State's Strategic Growth Council (SGC).[74] Infill development reduces VMT by recycling existing undeveloped or underutilized properties located in established urban areas. When development is located in a more rural setting, such as further east in the desert areas, employees, patrons, visitors, and residents may have to travel farther since rural development is often located a significant distance from employment, entertainment, and population centers. Consequently, this distance is reduced when development is located in urban areas since employment, entertainment, and population centers tend to be set in more established communities. As a result, the potential impacts are considered to be less than significant.

B. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases? ● Less than Significant Impact with Mitigation.

The City of Rancho Cucamonga is preparing a Sustainable Community Action Plan (SCAP), which is a plan to facilitate improvements to community health, promote economic vitality, reduce greenhouse gas emissions, and reduce water and energy consumption. The proposed project would be required to implement the mitigation measures identified in Section 3.6 of the SCAP. These mitigation measures would reduce the project's electricity consumption. In addition, the project is consistent with the following goals outlined in the SCAP:

- LU 1.4 Promote bicycle parking and alternative transportation amenities in mixed-use, multifamily, and commercial development. The project would include bicycle parking.

The City's 2010 General Plan also contains policies which would aid in the reduction in of GHG. The project is consistent with the following General Plan policies:

[74] California Strategic Growth Council. http://www.sgc.ca.gov/Initiatives/infill-development.html. Promoting and enabling sustainable infill development is a principal objective of the SGC because of its consistency with the State Planning Priorities and because infill furthers many of the goals of all of the Council's member agencies.

- Policy LU-10.1: Continue to require implementation of the City's Water Efficient Ordinance, which should be reviewed and updated periodically. The project would include water efficient fixtures and drought-tolerant landscaping.

- Policy PS-12.7: Support tree planting, planting more vegetation (including native and drought-resistant planting), and preservation of open space. The project site contains two trees and a minimal amount of ruderal vegetation. Once complete, the site would contain 36,312 square feet of landscaping.

The project would also feature 135 Bristolite skylights, which would allow natural daylight to illuminate the building's interior.[75] The project's operational GHG emissions would also be below the thresholds of significance established by the SCAQMD. However, in order to ensure further conformity with the City's GHG reduction and sustainability goals, the following mitigation is required:

> *Mitigation Measure No. 4 (Greenhouse Gas Emissions*). Preferential parking spaces for electric or fuel efficient vehicles must be provided.

Adherence to the above-mentioned mitigation will strengthen the project's compliance with City goals and policies. As a result, less than significant impacts will occur.

3.7.3 CUMULATIVE IMPACTS

According to the City, there are 18 related projects located within the Traffic Impact Analysis' study area. However, there are three related projects located within one mile of the project site. These three related projects are as follows: Crestwood Homes, 31 single-family units; three retail buildings; and the Vintner, which includes 182 single-family units and 7,615 square feet of retail. The combined operational emissions from the four projects (including the proposed project) would still be below the thresholds of significance established by the SCAQMD (the CalEEMod worksheets for the cumulative emissions are provided in Appendix A). It is important to note that these four projects are classified as "infill" development, which is seen as an important strategy in combating the release of GHG emissions. Typically, vehicle emissions constitute the largest portion of CO_2E emissions. The location of these four related projects in the City of Rancho Cucamonga would reduce overall VMT since these projects would be located closer to major population, employment, and entertainment centers. In contrast, the overall VMT would increase if these projects were located in undeveloped portions of San Bernardino and Riverside Counties.

3.7.4 MITIGATION MEASURES

The preceding analysis concluded that the following mitigation is required:

> *Mitigation Measure No. 4 (Greenhouse Gas Emissions*). Preferential parking spaces for electric or fuel efficient vehicles must be provided.

[75] HPA Architecture. *Overall Site Plan*. Plan packet dated January 25, 2018.

3.8 HAZARDS & HAZARDOUS MATERIALS

3.8.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on risk of upset and human health if it would:

- Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials;

- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment;

- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area;

- For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area;

- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or,

- Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

3.8.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. *Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials? ● Less than Significant Impact.*

A Phase I Environmental Assessment was prepared for the project site by Ardent Environmental Group. This Phase I report is provided in Appendix C. According to the Phase I report, the eastern portion of the site was first developed in 1966, while the western portion of the site was developed in 1985. The site has been used as a telecommunications maintenance yard and for the storage of fleet

vehicles. As part of the maintenance activities, fueling and maintenance of fleet vehicles included the use of underground storage tanks (USTs). These USTs were removed and replaced with aboveground storage tanks (ASTs). The previous on-site USTs included one 10,000-gallon gasoline UST and a 500-gallon waste oil UST. The 10,000 gallon UST was removed in 1986 and replaced with a 12,000-gallon gasoline UST.[76] This 12,000-gallon replacement gasoline UST was removed in 1999 and replaced with a 12,000-gallon gasoline UST. This replacement UST was removed in 2011.

The four USTs were removed under the direction and oversight of the San Bernardino County Fire Department (SBCFD) and impacted soils were remediated by excavation. Laboratory results of confirmation samples showed no detectable to low concentrations of residual contaminates. Based on these results, no further action (NFA) letters or case closure status were issued by the SBCFD. Ardent has reviewed these data and concur with the regulatory agency that no further work is necessary. Based on these results, these former environmental issues would no longer be considered an environmental concern to the site.[77] The Vehicle Maintenance Building contains three inactive underground hydraulic lifts, one active underground hydraulic lift, and two above-ground electric lifts. In 1988, a subsurface investigation and subsequent remedial effort was completed associated with a leaking underground hydraulic oil line. The excavation activities removed a majority of the impacted soil, but some impacted materials were left in-place beneath the eastern building foundation. The documentation report was unclear as to whether confirmation samples were collected and analyzed. Based on this information, the former hydraulic leak and underground hydraulic lifts would still be considered an environmental concern to the site.[78]

A former clarifier and leach field were reportedly located northwest of the Vehicle Maintenance Building and were assumed to have been connected to this building. Due to the lack of investigations completed around this feature, the former clarifier and leach field would be considered an environmental concern to the site. As noted above, solvents are typically used for cleaning and degreasing purposes. Due to the possible solvent use in the Vehicle Maintenance Building, a possible environmental and vapor intrusion issue may be present. In addition, an existing car wash and clarifier are located immediately east of the Vehicle Maintenance Building. The car wash and clarifier would be considered an environmental concern to the site since solvents are typically used for cleaning and degreasing purposes. Due to the possible solvent use in the car wash area, a possible environmental and vapor intrusion issue may be present. Furthermore, the project site was listed as a small quantity generator of hazardous waste, including chlorinated solvents. Solvents are typically used for parts cleaning and degreasing purposes. Due to the possible solvent uses in the Vehicle Maintenance Building, former clarifier and leach field, and existing car wash and clarifier, a possible vapor intrusion issue may be present.[79]

[76] Ardent Environmental Group, Inc. *Phase I Environmental Site Assessment*. Report dated February 14, 2018.

[77] Ibid.

[78] Ibid.

[79] Ardent Environmental Group, Inc. *Subsurface Investigation Report*. Report dated March 16, 2017.

A Phase II report was subsequently prepared for the project site (refer to Appendix C). Based on the results of a Phase I Environmental Site Assessment (ESA), Ardent Environmental Group, Inc. (Ardent) presented a list of potential environmental concerns at the site. Soil samples were collected in the vicinity of inactive features and soil gas samples were collected to assess whether a possible vapor intrusion issue was present.[80] Based on the results of the subsurface investigations, the following conclusions were drawn:

- *Inactive Leach Field and Clarifier* – Based on laboratory results, there is a low likelihood that elevated concentrations of petroleum hydrocarbons and/or volatile organic compounds (VOCs) are present in soil and soil gas in the vicinity of the inactive leach field and clarifier that would pose a threat to groundwater or present a possible risk to human health through vapor intrusion.

- *Two Inactive Hydraulic Lifts* – Based on laboratory results, there is a low likelihood that elevated concentrations of petroleum hydrocarbons, and VOCs are present in soil in the vicinity of the two inactive hydraulic lifts that would pose a threat to groundwater. The low concentrations of petroleum hydrocarbons (up to 10 milligrams per kilogram [mg/kg]) detected near one of the lifts do not need to be remediated.

- *1988 Hydraulic Oil Release* – Based on laboratory results, the majority of the petroleum hydrocarbon-impacted soils associated with the 1988 hydraulic oil release appear to have been adequately remediated. The remaining contaminants associated with boring HA-3C are limited in extent and localized in the vicinity of this boring. The extent of impacted soils remaining is estimated in an area measuring approximately four feet, by five feet, by five feet deep, with a volume of approximately four cubic yards. This area is currently located beneath the eastern footing of the Vehicle Maintenance Building.

- *Possible Vapor Intrusion Issue* – Based on laboratory results, there is a low likelihood that elevated concentrations of VOCs are present in soil gas in the vicinity of the Vehicle Maintenance Building and active car wash area that would pose a possible risk to human health through vapor intrusion.[81]

Based on the findings of this investigation, Ardent recommends no additional investigations or remediation at this time. Following demolition of the Vehicle Maintenance Building, the small area of impacted soils associated with boring HA-3C should be excavated and removed from the site.[82] The Applicant is proposing to remove approximately 17,233 cubic yards of earth. This would include the removal of aforementioned impacted soils associated with boring HA-3C. As a result, the potential impacts are considered to be less than significant.

[80] Ardent Environmental Group, Inc. *Subsurface Investigation Report*. Report dated March 16, 2017.

[81] Ibid.

[82] Ibid.

B. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? ● Less than Significant Impact.

The project site was first developed in 1966. Due to the age of the structures that are present on-site, lead based paint or asbestos containing materials may be present. Lead based paint and/or asbestos containing materials would be removed by a certified abatement contractor. The removal of lead based paint and/or asbestos containing materials would be done in accordance with SCAQMD Rule 1403-Asbestos Emissions from Demolition/Renovation Activities. Due to the nature of the proposed project (a warehouse), no hazardous materials would be used on-site beyond those which are used for routine cleaning and maintenance. Should the project's future tenant require the use, transport, storage, or handling of hazardous materials, they would need to file for a Conditional Use Permit (CUP) application with the City. As a result, the potential impacts are considered to be less than significant.

C. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? ● No Impact.

There are no schools located within one-quarter of a mile from the project site. The closest schools to the site are Chaffey Adult School and Arroyo Elementary School, located 0.41 mile and 0.67 mile to the southwest of the site, respectively. As a result, the proposed project would not create a hazard to any local school and no impacts are anticipated.

D. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? ● No Impact.

The *Cortese List*, also referred to as the Hazardous Waste and Substances Sites List or the California Superfund List, is a planning document used by the State and other local agencies to comply with CEQA requirements that require the provision of information regarding the location of hazardous materials release sites. California Government Code section 65962.5 requires the California Environmental Protection Agency to develop and update the Cortese List on annually basis. The list is maintained as part of the DTSC's Brownfields and Environmental Restoration Program referred to as EnviroStor. A search was conducted through the California Department of Toxic Substances Control Envirostor website to identify whether the project site is listed in the database as a Cortese site. The project site is not identified as a Cortese site.[83] Therefore, no impacts would occur.

[83] CalEPA. *DTSC's Hazardous Waste and Substances Site List - Site Cleanup (Cortese List).* http://www.dtsc.ca.gov/SiteCleanup/Cortese_List.cfm

E. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area? ● No Impact.

The project site is not located within two miles of a public use airport. Ontario Airport is located 2.29 miles south of the project site.[84] The project site is not located within the Runway Protection Zone (RPZ) of the aforementioned airport.[85] In addition, the proposed project would not penetrate the designated slopes for any of the aforementioned airports. Essentially, the proposed project would not introduce a building that would interfere with the approach and take-off of airplanes utilizing any of the aforementioned airports and would not risk the safety of the people working in the project area. Furthermore, the project site is not located within any 60 Community Noise Equivalent Level (CNEL) contour line boundaries. As a result, the proposed project would not present a safety or noise hazard related to aircraft or airport operations at a public use airport to people residing or working in the project area and no impacts would occur.

F. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area? ● No Impact.

The project site is not located within two miles of a private airstrip.[86] As a result, no impacts are associated with the proposed project's implementation.

G. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? ● No Impact.

At no time would Hellman Avenue or 8th Street be completely closed to traffic. All construction staging must occur on-site. As a result, no impacts are associated with the proposed project's implementation.

H. Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands? ● Less than Significant Impact.

The area surrounding the project site is urban and there are no areas containing natural vegetation that could lead to a wildfire.[87] In addition, the project site is located outside of the City's fire hazard severity zone, or any areas where there is natural vegetation that may represent a significant wildfire risk.[88] The project site is located 3.33 miles to the southeast from the closest fire hazard severity zone. Since the project site is located outside of a fire hazard severity zone, the potential impacts are considered to be

[84] Google Earth. Site accessed April 16, 2018.

[85] The Ontario Plan. *Map 2-2, Compatibility Policy Map: Safety Zones.* http://www.ontarioplan.org/wp-content/uploads/sites/4/2015/05/policy-map-2-2.pdf

[86] Google Earth. Site accessed October 22, 2018.

[87] Ibid.

[88] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Public Health and Safety Element Figure PS-1 Fire Hazard Severity Zones.* Plan adopted May 19, 2010.

less than significant.

3.8.3 CUMULATIVE IMPACTS

According to the City, there are 18 related projects located within the Traffic Impact Analysis' study area. However, there are three related projects located within one mile of the project site. These three related projects are as follows: Crestwood Homes, 31 single-family units; three retail buildings; and the Vintner, which includes 182 single-family units and 7,615 square feet of retail. The combined operational emissions from the four projects (including the proposed project) would still be below the thresholds of significance established by the SCAQMD (the CalEEMod worksheets for the cumulative emissions are provided in Appendix A). The potential impacts related to hazardous materials are site specific. As a result, no significant cumulative impacts related to hazards or hazardous materials would result from the proposed project's implementation.

3.8.4 MITIGATION MEASURES

The preceding analysis concluded that no mitigation measures were necessary since the implementation of the proposed project would not result in potentially significant impacts in regards to hazards and hazardous materials.

3.9 HYDROLOGY & WATER QUALITY

3.9.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant environmental impact on water resources or water quality if it would:

- Violate any water quality standards or waste discharge requirements;

- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;

- Otherwise substantially degrade water quality;

- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;

- Place within a 100-year flood hazard area structures which would impede or redirect flood flows;

- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or,

- Inundation by seiche, tsunami, or mudflow.

3.9.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Violate any water quality standards or waste discharge requirements? ● Less than Significant Impact.

A Water Quality Management Plan (WQMP) was prepared for the project by Thienes Engineering, Inc. pursuant to Section 19.20.260 of the City of Rancho Cucamonga Municipal Code. A WQMP is required of new development/redevelopment projects specified in the chapter. The WQMP must outline appropriate non-structural and structural Best Management Practices (BMPs), including stormwater infiltration and treatment devices, which would be implemented and installed to prevent pollutants from being discharged into the City's municipal separate storm sewer system, during and after construction. The WQMP is presented in Appendix D.

The WQMP recommended the inclusion of two Stormtech SC-740 stormwater chambers, grate inlet filters, and curb inlet filters.[89] The Stormtech SC-740 chambers would be installed below ground surface (BGS). These chambers consist of a polypropylene corrugated chamber (resembling a tube-like structure), filter fabric, and a stone bottom. Water accumulates within the isolator row as it simultaneously permeates through the filter fabric. Solid contaminants such as rubbish, debris, leaves, sediment, and other particles are captured from the runoff by the fabric. From there, water would percolate through the stone bottom into the ground. The project would also include grate and curb inlet filters. These filters consist of stainless steel mesh, which traps sediment and allows filtered water to be conveyed through the local storm drains.

Adherence to the construction and post-construction BMPs identified above and in the mandatory WQMP would filter out contaminants of concern (oil, grease, debris, leaves, etc.), minimize the discharge of contaminated runoff into the adjacent streets, local storm drains, and the underlying

[89] Thienes Engineering, Inc. *Preliminary Water Quality Management Plan*. Plan dated January 24, 2018.

groundwater table. Once constructed, the project would not create excess runoff that would exceed the capacity of the existing storm water drainage system. The project site in its current state is 100 percent impervious; following construction, ten percent of the site would be covered in pervious surfaces. As a result, the potential impacts are considered to be less than significant.

B. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)? ● Less than Significant Impact.

The grading that would be done would not extend to depths required to encounter groundwater. The total cut and fill would be 17,233 cubic yards, respectively. In addition, trenching would be undertaken to accommodate the building footings, utility lines, and other underground infrastructure such as stormwater appurtenances and double check detector assemblies, which would be installed during this phase as well. According to the Phase I report (which is provided in Appendix C), groundwater is estimated to be present between 260 and 300 feet below ground surface.[90] Therefore no direct construction related impacts to groundwater supplies, or groundwater recharge activities would occur. The project would continue to be connected to the City's water lines and would not result in a direct decrease in underlying groundwater supplies. Furthermore, the project's contractors would be required to adhere to the applicable Best Management Practices (BMPs) for the construction site. Adherence to the required BMPs would restrict the discharge of contaminated runoff into the local storm drain system. As a result, the impacts are anticipated to be less than significant.

C. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site)? ● No Impact.

The project's construction would be restricted to the designated project site and the project would not alter the course of any stream or river that would lead to on- or off-site siltation or erosion. The Cucamonga Wash is the body of water to the project site (refer to Exhibit 2-3). This wash is located 665 feet to the west of the project site.[91] Once implemented, the proposed project would change the site's drainage characteristics. A majority of the project site is covered over in impervious surfaces. Currently, stormwater runoff is discharged off-site into local storm drains. Following construction, 11 percent of the site would consist of pervious surfaces.

A Water Quality Management Plan (WQMP) was prepared for the project by Thienes Engineering, Inc. pursuant to Section 19.20.260 of the City of Rancho Cucamonga Municipal Code (this report is provided in Appendix D). The WQMP recommended the inclusion of two Stormtech SC-740

[90] Ardent Environmental Group, Inc. *Phase I Environmental Site Assessment.* Report dated February 14, 2018. (Refer to Appendix C).

[91] Google Earth. Website accessed April 20, 2018.

stormwater chambers, grate inlet filters, and curb inlet filters.[92] These post-construction BMPs would filter out contaminants of concern, allow runoff to percolate into the ground, and would also result in the controlled discharge of excess runoff off-site. As a result, no impacts related to off-site erosion or siltation would occur. In addition, the Applicant would be required to adhere to the construction Best Management Practices (BMPs) outlined in the mandatory SWPPP. Since runoff would be contained on-site during the project's construction and occupation, no off-site erosion would occur and no mitigation measures are required.

D. *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? ● No Impact.*

The project's construction would be restricted to the designated project site and the project would not alter the course of any stream or river that would lead to on- or off-site flooding. The Cucamonga Wash is the body of water to the project site (refer to Exhibit 2-3). This wash is located 665 feet to the west of the project site. Once implemented, the proposed project would change the site's drainage characteristics. A majority of the project site is covered over in impervious surfaces. Currently, stormwater runoff is discharged off-site into local storm drains. Following construction, 11 percent of the site would consist of pervious surfaces. Since runoff would be contained on-site during the project's construction and occupation, no off-site erosion or flooding would occur and no mitigation measures are required.

E. *Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? ● Less than Significant Impact.*

As indicated previously, the WQMP (refer to Appendix D) recommended the inclusion of two Stormtech SC-740 stormwater chambers, grate inlet filters, and curb inlet filters.[93] The Stormtech SC-740 chambers would be installed below ground surface (BGS). These chambers consist of a polypropylene corrugated chamber (resembling a tube-like structure), filter fabric, and a stone bottom. Water accumulates within the isolator row as it simultaneously permeates through the filter fabric. Solid contaminants such as rubbish, debris, leaves, sediment, and other particles are captured from the runoff by the fabric. From there, water would percolate through the stone bottom into the ground. The project would also include grate and curb inlet filters. These filters consist of stainless steel mesh, which traps sediment and allows filtered water to be conveyed through the local storm drains. The inclusion of these BMPs would allow the project to conform to Federal, State, and local requirements governing water quality and stormwater discharge. Therefore, the project's implementation would not substantially increase the rate or amount of surface runoff; create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems; or provide additional sources of polluted runoff. As a result, the potential impacts are considered to be less than significant and no mitigation is required.

[92] Thienes Engineering, Inc. *Preliminary Water Quality Management Plan*. Plan dated January 24, 2018.

[93] Ibid.

F. Otherwise substantially degrade water quality? ● No Impact.

The proposed project is currently in compliance with Title 19, Chapter 19.20 of the City of Rancho Cucamonga Municipal Code. Title 19, Chapter 19.20 of the City of Rancho Cucamonga Municipal Code is responsible for implementing the NPDES and MS4 stormwater runoff requirements. In addition, the project's construction and operation would not interfere with any groundwater management or recharge plan. As a result, no impacts are anticipated.

G. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map? ● No Impact.

According to the Federal Emergency Management Agency (FEMA) flood insurance maps obtained for the City of Rancho Cucamonga, the proposed project site is located in Zone X.[94] This flood zone has an annual probability of flooding of less than 0.2 percent and represents areas outside the 500-year flood plain. Thus, properties located in Zone X are not located within a 100-year flood plain.[95] In addition, the project is a request to construct and operate a warehouse building and no residential development is contemplated as part of this application. As a result, no impacts with respect to the placement of housing within a 100-year flood hazard area would occur.

H. Place within a 100-year flood hazard area structures which would impede or redirect flood flows? ● No Impact.

As stated in the previous subsection, the project site is located in Zone X.[96] This flood zone has an annual probability of flooding of less than 0.2 percent and represents areas outside the 500-year flood plain. Thus, properties located in Zone X are not located within a 100-year flood plain.[97] In addition, the project is a request to construct and operate a warehouse building and no residential development is contemplated as part of this application. As a result, no impacts with respect to the placement of structures within a 100-year flood hazard area would occur.

I. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam? ● No Impact.

The project site is located outside of the Cucamonga Creek inundation area.[98] Furthermore, the project site is located outside of the Alta Loma Basin inundation area.[99] As a result, the project would not

[94] Federal Emergency Management Agency (FEMA). *FEMA Flood Map*. https://map1.msc.fema.gov/idms/IntraView.cgi?KEY=4145033&IFIT=1

[95] FEMA. *Flood Zones, Definition/Description*. http://www.fema.gov/floodplain-management/flood-zones

[96] Federal Emergency Management Agency (FEMA). *FEMA Flood Map*. https://map1.msc.fema.gov/idms/IntraView.cgi?KEY=4145033&IFIT=1

[97] FEMA. *Flood Zones, Definition/Description*. http://www.fema.gov/floodplain-management/flood-zones

[98] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Public Health and Safety Element Figure PS-6 Dam Inundation Hazards*. Plan adopted May 19, 2010.

[99] Ibid.

expose people or structures to a significant risk of loss, injury, or death as a consequence of flooding or inundation and no impacts are expected to occur.

J. Inundation by seiche, tsunami, or mudflow? ● No Impact.

The proposed project site is not located in an area that is subject to inundation by seiche or tsunami. A seiche in the Cucamonga Wash is not likely to happen due to the current level of channelization and volume of water present. In addition, the project site is located inland approximately 37 miles from the Pacific Ocean and the project site would not be exposed to the effects of a tsunami.[100] As a result, no impacts are anticipated to occur.

3.9.3 CUMULATIVE IMPACTS

Impacts related to hydrology and water quality are typically site-specific. The analysis determined that the implementation of the proposed project would not result in any impacts related to water and hydrology impacts. As a result, no cumulative impacts are anticipated.

3.9.4 MITIGATION MEASURES

The analysis indicated that the proposed project would not result in any hydrological, stormwater runoff, or water quality impacts. As a result, no mitigation is required.

3.10 LAND USE & PLANNING

3.10.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on land use and development if it would:

- Physically divide an established community;
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; or,
- Conflict with any applicable habitat conservation plan or natural community conservation plan.

[100] Google Earth. Website accessed March 19, 2018.

3.10.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Physically divide an established community? ● No Impact.

The project site is located within a largely industrial area though a residential area is located to the east of the project site. Existing uses found in the vicinity of the project site are summarized below: [101]

- *North of the project site.* 8th Street extends along the project site's northern boundary in an east to west orientation. A railroad right-of-way is located just north of 8th Street in an east to west orientation. Undeveloped open space is located further north.

- *South of the project site.* A business park abuts the project site to the south. This business park is located at the northwest corner of 7th Street and Hellman Avenue.

- *East of the project site.* Single-family dwelling units occupy frontage along the east side of Hellman Avenue, opposite the project site. Various industrial uses are located further east.

- *West of the project site.* A warehouse complex abuts the site to the west. The Cucamonga Channel extends along the west side of this warehouse complex in a northwest to southeast orientation. The Cucamonga Channel is located between 607 and 820 feet to the west of the project site.[102]

The issue is specifically concerned with the expansion of an inconsistent land use into an established neighborhood assuming that an "established community" refers to a residential neighborhood. The proposed industrial use would continue to be confined within the project site's boundaries. The nearest residential land uses are located to the east of the site on the east side of Hellman Avenue. The project's implementation would not affect these legal non-conforming residential homes. As a result, the project would not lead to any division of an existing established neighborhood and no impacts would occur.

B. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect? ● Less than Significant Impact.

The project site is currently zoned as *General Industrial (*GI) (refer to Exhibit 3-2 for the zoning map). The project site's General Plan land use designation is *General Industrial (*refer to Exhibit 3-3 for the General Plan land use map). The project would be required to undergo Design Review (DR) to ensure the project's conformity with the applicable design guidelines and development standards. No other discretionary actions are required to accommodate the proposed project. Table 3-5 depicts the proposed project's conformity with the City's GI zoning standards.

[101] Blodgett Baylosis Environmental Planning. *Field Survey*. Survey was conducted on March 30, 2018.

[102] Google Earth. Website accessed April 2, 2018.

Table 3-5
The Project Conformity with the City's Zoning Standards

Description	City Requirements	Project Element	Conforms?
Maximum Building Height	75 feet	40 feet	Yes
Maximum Lot Coverage	50 to 60%	49%	Yes
Front Yard Setback	25 feet	26 feet	Yes
Hellman Avenue Setback	25 feet	25 feet	Yes
Landscaping Required	10%	36,312 sq. ft.	Yes

Source: City of Rancho Cucamonga Municipal Code

As shown in the table, the project conforms to the City's development standards established for the GI zone. As stated previously, the project site's General Plan land use designation is *General Industrial* (GI). According to the City's General Plan, the General Industrial designation permits a wide range of industrial activities that include manufacturing, assembling, fabrication, wholesale supply, heavy commercial, green technology, and office uses. Where adjacent to residential uses, properties designated *General Industrial* should be designed for office uses, or site planning should incorporate buffering techniques to minimize noise and traffic impacts associated with the industrial activity.[103] The project site is located in an area that is predominantly industrial, though single-family residential units occupy frontage along the east side of Hellman Avenue opposite the project site. These sensitive receptors are located 119 feet to the east of the future warehouse.

The project's future tenant has not been identified. However, the tenant would likely be involved in general warehousing and distribution. The building's proposed configuration would mitigate many potentially significant impacts with respect to light and glare, air quality, and noise. As indicated in Section 2.4.1, the light standards that would be installed along the site's western and southern property lines would be shielded and directed towards the ground surface.[104] No lighting would be provided along the proposed building's east facing elevation. In addition, no lighting would be installed along the site's eastern property line. Noise emanating from the loading areas would not affect any nearby sensitive receptors due to the principles of *spreading loss*.

[103] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Land Use Element*. Plan adopted May 19, 2010.

[104] Google Earth. Website accessed April 26, 2018.

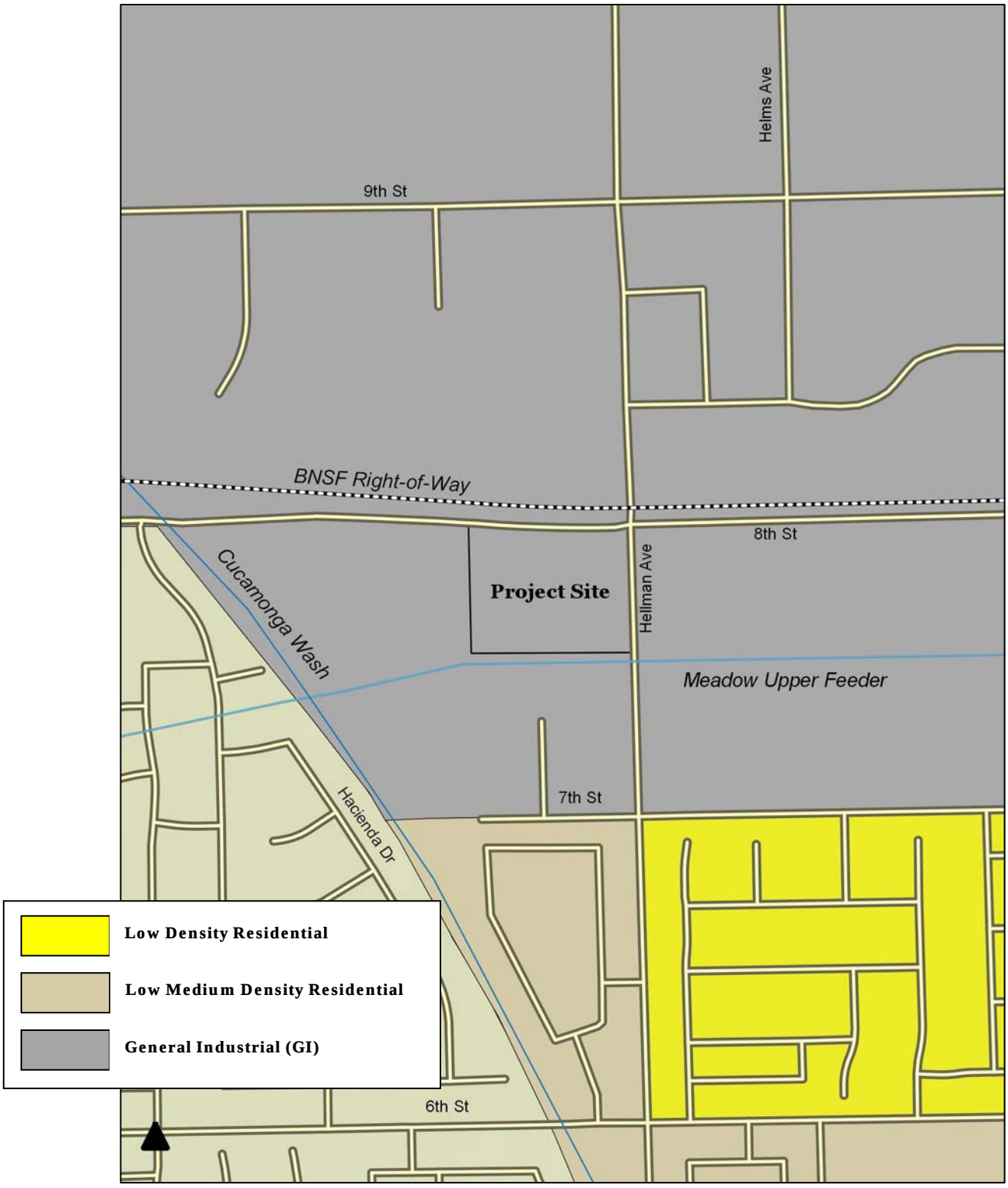


EXHIBIT 3-2
ZONING MAP
SOURCE: CITY OF RANCHO CUCAMONGA

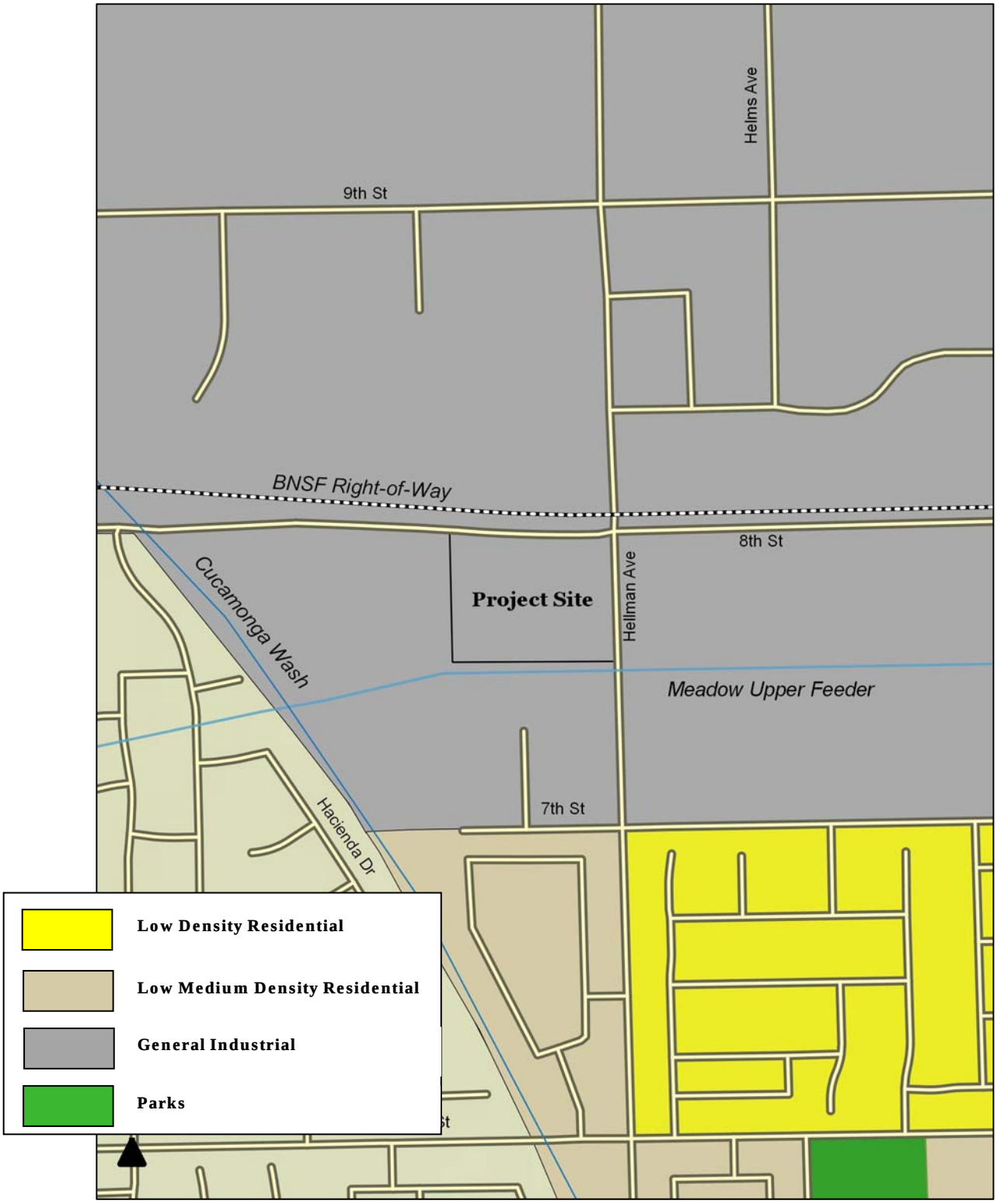


EXHIBIT 3-3
GENERAL PLAN LAND USE MAP
SOURCE: CITY OF RANCHO CUCAMONGA

Furthermore, the dock high doors would be provided along the building's south facing elevation, oriented away from the aforementioned residential. Operational noise generated from the truck loading areas would also be reduced by the warehouse building since objects located within the line-of-sight between the source and a point would lead to the attenuation of noise. The southeast portion of the building would extend 60 feet beyond the dock doors, thereby screening the loading areas from the public right-of-way. The building itself may reduce noise levels generated within the loading areas by up to 13 dBA. The same principals of spreading loss and attenuation may also apply to TACs emitted from idling trucks. Lastly, the inclusion of a landscape buffer along the site's eastern property line would further mitigate potential noise and air quality impacts. In addition, the proposed project conforms to the following General Plan policies:

- *Promote development that is sustainable in its use of land and that limits impacts to natural resources, energy, and air and water quality.* The proposed project would be constructed in accordance with Title 24 Part 11 (California Green Building Code or CalGreen) of the California Code of Regulations. The project would include drought-tolerant landscaping, energy efficient light fixtures and appliances, as well as bicycle parking. The project would also feature 135 Bristolite skylights, which would allow natural daylight to illuminate the building's interior.

- *Encourage new development projects to build on vacant infill sites within a built-out area, and/or redevelop previously developed properties that are underutilized.* The project site is currently occupied by two buildings. These two buildings were constructed in 1980 and have a maximum height of 18 feet and total 16,324 square feet of floor area. The two buildings exhibit minimal architectural features such as façade articulation, prominent entryways, and the screening of rooftop equipment. In addition, these buildings appear to be pre-fabricated and assembled on-site. The project site appears to be used for the storage and maintenance of fleet vehicles. Once complete, the project would provide up to 115 new jobs. In addition, the improvements that would be undertaken for the project site, including the erection of the new warehouse and the inclusion of upgraded infrastructure and landscaping, would improve the value of the property and may lead to an increase in property values in the vicinity of the project site.

- *Continue to require implementation of the City's Water Efficiency Ordinance, which should be reviewed and updated periodically.* The project would include drought-tolerant landscaping and water efficient fixtures.

The project site is located within the Southwest Rancho Cucamonga Focus Area. According to the Land Use Element of the City's General Plan, the Southwest Focus Area is bordered to the south by the City of Ontario and to the west by the City of Upland. The area is divided north from the south by a Metrolink rail line that runs adjacent to 8th Street. Uses in the focus area are primarily light industrial and warehousing, but planned residential neighborhoods border the area to the southwest and the northeast.[105] The Land Use Element of the City's General Plan identified three goals for this Focus

[105] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Land Use Element.* Plan adopted May 19, 2010.

Area. The goals that are identified in the Plan, as well as the project's conformity to these goals are outlined below:

- *Allowing for the development of commercial and community services needed by the adjacent residential neighborhoods.* The project does not conform to this Focus Area goal. The project is industrial in nature and is not intended to serve the nearby residential units. Nevertheless, the project is consistent with the underlying zoning and the General Plan designation for the site.

- *Implementing community design improvements and reducing truck traffic impacts on the residential neighborhoods.* Design recommendations were identified in the Traffic Impact Analysis and are reiterated as mitigation measures in Section 3.16. The implementation of these mitigation measures would improve circulation and roadway safety along 8th Street and Hellman Avenue.

- *Encouraging the re-use and rehabilitation of historic or high-quality buildings to the greatest extent possible.* The project does not conform to this Focus Area goal. The project site is presently occupied by two buildings that were erected in 1980. These two buildings are neither historic, nor aesthetically pleasing and would not be incorporated into the project's design.

As shown in Figure 17.114.010-1 of Section 17.114.010 – Special Planning Area Map in the City's Development Code, the project site is not located within any Specific Plan, Master Plan, or Planned Community overlay zone.[106] Since the project is consistent with the site's underlying zoning and General Plan land use designation, the potential impacts are considered to be less than significant.

C. Conflict with any applicable habitat conservation plan or natural community conservation plan?
● No Impact.

The proposed project would not impact an adopted or approved local, regional, or State habitat conservation plan because the proposed project is located in the midst of an urban area. The project site is located outside of any open space and/or conservation areas identified in the City's General Plan.[107] Therefore, no impacts would occur.

3.10.3 CUMULATIVE IMPACTS

Typically, land use and planning impacts are considered to be site-specific. The analysis determined that the proposed project would not result in any significant land use impacts. As a result, no cumulative land use impacts would occur as part of the proposed project's implementation

[106] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Land Use Element*. Plan adopted May 19, 2010.

[107] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Resource Conservation Element Figure RC-1 Open Space and Conservation Plan*. Plan adopted May 19, 2010.

3.10.4 MITIGATION MEASURES

The analysis determined that no significant impacts on land use and planning would result from the implementation of the proposed project. As a result, no mitigation measures are required.

3.11 MINERAL RESOURCES

3.11.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant adverse impact on energy and mineral resources if it would:

- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or,

- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

3.11.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State? ● No Impact.

The project site is not located in a Significant Mineral Aggregate Resource Area (SMARA) nor is it located in an area with active mineral extraction activities. A review of California Division of Oil, Gas, and Geothermal Resources well finder indicates that there are no wells located in the vicinity of the project site.[108] In addition, according to SMARA, study area maps prepared by the California Geological Survey, the project site is located within Mineral Resources Zone (MRZ) 2.[109] Areas located within MRZ 2 may contain significant mineral deposits and are often concentrated along creeks and washes.[110]

The site is 100 percent developed and is currently being used as a maintenance and fleet vehicle storage yard by Frontier Communications. There are no active mineral extraction activities occurring on-site or in the adjacent properties. As a result, no impacts to mineral resources would occur.

[108] California, State of. Department of Conservation. *California Oil, Gas, and Geothermal Resources Well Finder. https://maps.conservation.ca.gov/doggr/wellfinder/#close*

[109] BonTerra Consulting. *Rancho Cucamonga General Plan Update Draft Environmental Impact Report– Exhibit 4.11-1 Mineral Land Classification.* Report dated February 16, 2010.

[110] Ibid.

B. Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan? ● No Impact.

As previously mentioned, no mineral, oil, or energy extraction and/or generation activities are located within the project site. Moreover, the proposed project would not interfere with any resource extraction activity. Therefore, no impacts would result from the implementation of the proposed project.

3.11.3 CUMULATIVE IMPACTS

The potential impacts on mineral resources are site-specific. Furthermore, the analysis determined that the proposed project would not result in any impacts on mineral resources. As a result, no cumulative impacts would occur.

3.11.4 MITIGATION MEASURES

The analysis of potential impacts related to mineral resources indicated that no impacts would result from the proposed project's approval and subsequent implementation. As a result, no mitigation measures are required.

3.12 NOISE

3.12.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on the environment if it would:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- A substantial permanent increase in ambient noise levels in the vicinity of the project above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels; or,

- For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels.

3.12.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? ● Less than Significant Impact.

The most commonly used unit for measuring the level of sound is the decibel (dB). Zero on the decibel scale represents the lowest limit of sound that can be heard by humans. The eardrum may rupture at 140 dB. In general, an increase of between 3.0 dB and 5.0 dB in the ambient noise level is considered to represent the threshold for human sensitivity. In other words, increases in ambient noise levels of 3.0 dB or less are not generally perceptible to persons with average hearing abilities.[111] Noise levels that are associated with common, everyday activities are illustrated in Exhibit 3-4.

Noise levels may also be expressed as dBA where an "A" weighting has been incorporated into the measurement metric to account for increased human sensitivity to noise. The A-weighted measurements correlate well with the perceived nose levels at lower frequencies. Noise may be generated from a point source, such as a piece of construction equipment, or from a line source, such as a road containing moving vehicles. Because the area of the sound wave increases as the sound gets further and further from the source, less energy strikes any given point over the surface area of the wave. This phenomenon is known as *spreading loss*. Due to spreading loss, noise decreases with distance. The ambient noise environment along Hellman Avenue and 8th Street are dominated by noise emanating from vehicles traveling down the street.

An *Extec* Digital Sound Meter was used to conduct the noise measurements. A series of 100 discrete noise measurements were recorded along the west side of Hellman Avenue (these noise measurements are provided in Appendix E). The measurements were taken Friday morning March 30, 2018 at 9:45 AM. Table 3-6 indicates the variation in noise levels over time during the measurement period. As indicated previously, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time the noise level is less than this level. The average noise levels during the measurement period were 55.6 dBA.

[111] Bugliarello, et. al., *The Impact of Noise Pollution,* Chapter 127, 1975.

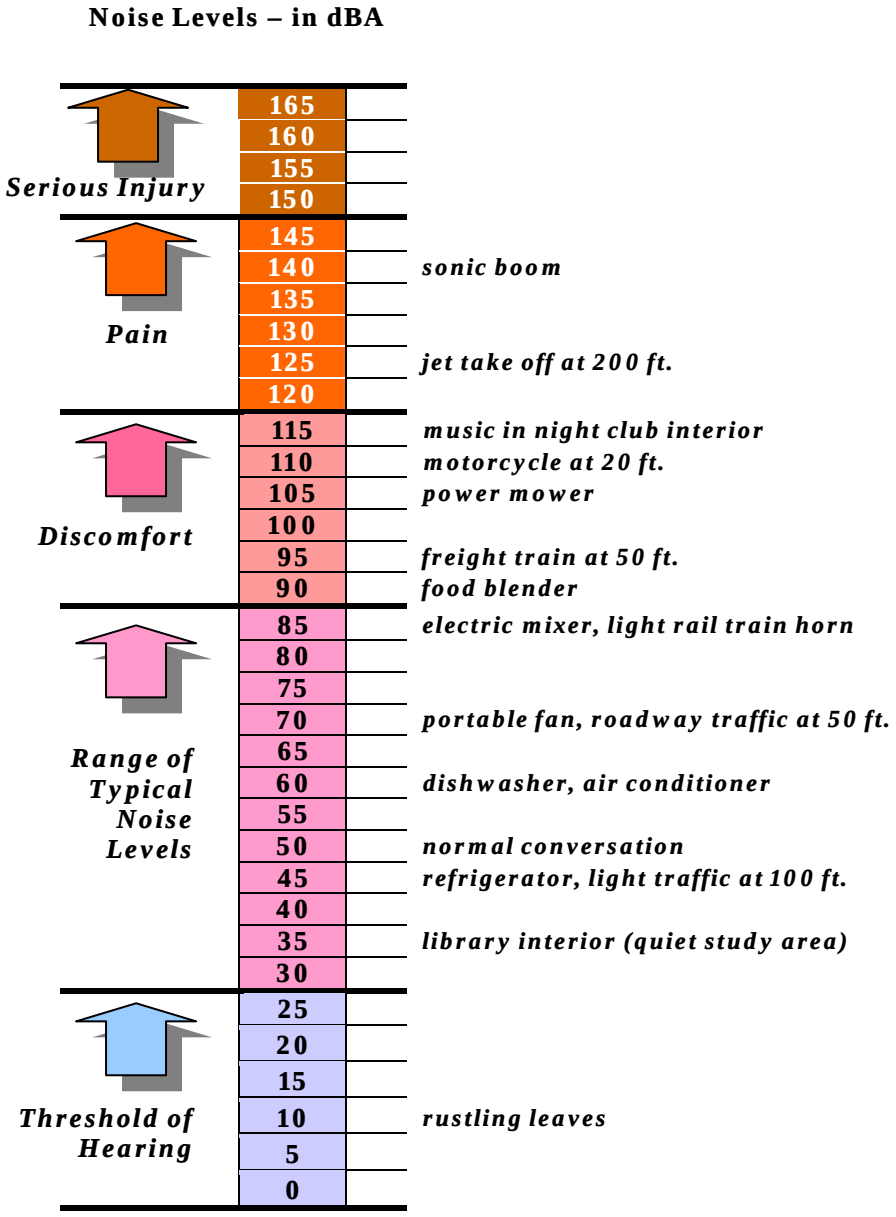


EXHIBIT 3-4
TYPICAL NOISE SOURCES AND LOUDNESS SCALE
Source: Blodgett Baylosis Environmental Planning

Table 3-6
Noise Measurement Results

Noise Metric	Noise Level (dBA) along the West Side of Hellman Avenue
L_{max} (Maximum Noise Level)	76.9 dBA
L^{99} (Noise levels <99% of time)	76.8 dBA
L^{90} (Noise levels <90% of time)	63.3 dBA
L^{75} (Noise levels <75% of time)	56.7 dBA
L^{50} (Noise levels <50% of time)	54.0 dBA
L_{min} (Minimum Noise Level)	48.3 dBA
Average Noise Level	55.6 dBA

Source: Blodgett Baylosis Environmental Planning.
Measurements were taken in April 2018

As indicated in Table 3-7, the ambient noise environment along Hellman Avenue is typical for a roadway located within a residential neighborhood. Ambient noise levels would spike over 70 dBA following the passage of a truck.

Future sources of noise generated on-site would include noise from vehicles traveling to and from the project and noise emanating from back-up alarms, roll-up doors, forklifts, and other equipment. Noise generated within the parking lot would include people shouting/laughing, which averages 64.5 dBA; car door slamming, which averages 62.5 dBA; car idling, which averages 61 dBA; car starting, which averages 59.5 dBA; and people talking, which averages 41 dBA. All of these averages were taken at a distance of 50 feet from the source. This information is based on actual parking lot noise measurements taken by Blodgett Baylosis Environmental Planning.

The operation of the proposed project would not expose future employees to excessive noise levels because the project is not considered to be a noise sensitive land use. As stated above, the average ambient noise level recorded along Hellman Avenue was 55.6 dBA. These noise levels would decrease as the distance from Hellman Avenue increases. The proposed warehouse would be setback 24 feet from Hellman Avenue. In addition, much of the daily operations would occur within the warehouse buildings or within the loading areas located along the south side of the warehouse. The City of Rancho Cucamonga Municipal Code has established performance standards for industrial uses. According to the Municipal Code, the maximum permitted noise level anywhere on the project site is 80 dBA.[112] Additionally, the California Occupational Noise Control Standards contained in the California Code of Regulations, Title 8, Industrial Relations, Chapter 4, outline permissible noise exposure at a workplace which include a maximum noise exposure level of 90 dBA for more than eight hours in any workday. Finally, future tenants must comply with all Occupation Health and Safety Administration (OSHA) requirements regarding noise control. Adherence to the above-mentioned operational regulations would protect employees from excessive noise levels.

[112] Rancho Cucamonga Municipal Code. *Table 17.66.110-1 Industrial Performance Standards*. Site accessed April 26, 2018.

Noise emanating from the project site would not affect any nearby sensitive receptors due to the principles of *spreading loss*. The closest sensitive receptors are located along the east side of Hellman Avenue, 119 feet to the east of the future warehouse.[113] This distance includes the 24 foot setback that would be provided along the project site's eastern property line. In addition, the project's loading areas and dock high doors would be located 125 feet west of the site's eastern boundary. Overall, the project's loading areas and truck doors would be located 244 feet west of the above-mentioned residential. The distance between the project's loading areas and truck doors would naturally aid the reduction of noise levels since noise levels decrease with distance. Therefore, operational noise is expected to decrease by 15 dBA based on the principles of spreading loss.

Furthermore, the dock high doors would be provided along the building's south facing elevation, oriented away from the aforementioned residential. Operational noise generated from the truck loading areas would also be reduced by the warehouse building since objects located within the line-of-sight between the source and a point would lead to the attenuation of noise. The southeast portion of the building would extend 60 feet beyond the dock doors, thereby screening the loading areas from the public right-of-way. The building itself may reduce noise levels generated within the loading areas by up to 13 dBA.[114] As a result, the proposed project would not expose sensitive receptors and employees to excessive noise levels due to the two factors described above and the impacts are anticipated to be less than significant.

B. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels? ● Less than Significant Impact with Mitigation.

The construction of the proposed project would result in the generation of vibration and noise, though the vibrations and noise generated during the project's construction would not adversely impact the nearby residential sensitive receptors. The background vibration velocity level in residential areas is usually around 50 vibration velocity level (VdB). The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity of 75 VdB is the approximately dividing line between barely perceptible and distinctly perceptible levels for many people. Sources within buildings such as operation of mechanical equipment, movement of people, or the slamming of doors causes most perceptible indoor vibration. Construction activities may result in varying degrees of ground vibration, depending on the types of equipment, the characteristics of the soil, and the age and construction of nearby buildings. The operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance.

Buildings located in the vicinity of the construction site respond to these vibrations with varying results ranging from no perceptible effects, low rumbling sounds and discernible vibrations at moderate levels, and actual building damage at the highest levels. Ground vibrations associated with construction activities using modern construction methods and equipment rarely reach the levels that result in damage to nearby buildings though vibration related to construction activities may be discernible in

[113] Google Earth. Website accessed April 26, 2018.

[114] Based on our experiences collecting noise measurements from areas that are located within the line-of site of a noise source and from areas whose line-of-sight with a noise source is obstructed by an existing building. The difference between the readings from the two different locations (taken within the same site or area) is calculated.

areas located near the construction site. A possible exception is in older buildings where special care must be taken to avoid damage.

Table 3-7 summarizes the levels of vibration and the usual effect on people and buildings. The U.S. Department of Transportation (U.S. DOT) has guidelines for vibration levels from construction related to their activities, and recommends that the maximum peak-particle-velocity (PPV) levels remain below 0.05 inches per second at the nearest structures. PPV refers to the movement within the ground of molecular particles and not surface movement. Vibration levels above 0.5 inches per second have the potential to cause architectural damage to normal dwellings. The U.S. DOT also states that vibration levels above 0.015 inches per second (in/sec) are sometimes perceptible to people, and the level at which vibration becomes an irritation to people is 0.64 inches per second.

Table 3-7
Common Effects of Construction Vibration

Peak Particle Velocity (in/sec)	Effects on Humans	Effects on Buildings
<0.005	Imperceptible	No effect on buildings
0.005 to 0.015	Barely perceptible	No effect on buildings
0.02 to 0.05	Level at which continuous vibrations begin to annoy occupants of nearby buildings	No effect on buildings
0.1 to 0.5	Vibrations considered unacceptable for persons exposed to continuous or long-term vibration.	Minimal potential for damage to weak or sensitive structures
0.5 to 1.0	Vibrations considered bothersome by most people, however tolerable if short-term in length	Threshold at which there is a risk of architectural damage to buildings with plastered ceilings and walls. Some risk to ancient monuments and ruins.
>3.0	Vibration is unpleasant	Potential for architectural damage and possible minor structural damage

Source: U.S. Department of Transportation

Typical levels from vibration generally do not have the potential for any structural damage. Some construction activities, such as pile driving and blasting, can produce vibration levels that may have the potential to damage some vibration sensitive structures if performed within 50 to 100 feet of the structure. The reason that normal construction vibration does not result in structural damage has to do with several issues, including the frequency vibration and magnitude of construction related vibration. Unlike earthquakes, which produce vibration at very low frequencies and have a high potential for structural damage, most construction vibration is in the mid- to upper- frequency range, and therefore has a lower potential for structural damage. Approximately 17,233 cubic yards of cut and fill would be required to accommodate the new warehouse. This process will involve the use of excavators to remove the underlying fill; loaders to load asphalt, rocks, demolition debris, and dirt onto haul trucks; and of haul trucks to transport construction and demolition waste. The removal of 17,233 cubic yards of fill would require an estimated 861 haul trucks assuming a tandem haul truck has a capacity of 20 cubic yards. The project's implementation would not require deep foundations since the underlying fill soils

would be removed and the proposed warehouse would have a maximum height of 40 feet. The warehouse would be constructed over a shallow foundation that would extend no more than three to four feet bgs. The use of shallow foundations precludes the use of pile drivers or any auger type equipment. However, other vibration generating equipment would be used on-site during construction. As stated above, the project would require the use of excavators, loaders, bulldozers, and haul trucks.

Various types of construction equipment have been measured under a wide variety of construction activities with an average of source levels reported in terms of velocity levels as shown in Table 3-8. Although the table gives one level for each piece of equipment, it should be noted that there is a considerable variation in reported ground vibration levels from construction activities. The data in Table 3-7 does provide a reasonable estimate for a wide range of soil conditions. Based on Transit Noise and Vibration Impact Assessment (FTA, May 2006), a vibration level of 102 VdB (vibration decibels, or 0.5 inches per second [in/sec]) (FTA, May 2006) is considered safe and would not result in any construction vibration damage.

Table 3-8
Vibration Source Levels for Typical Construction Equipment

Construction Equipment		PPV @25 ft. (inches/sec.)	Vibration (VdB) @ 25 ft.
Pile Driver (impact)	Upper range	1.58	112
	Typical	0.644	104
Pile Drive (Sonic)	Upper range	0.734	105
	Typical	0.170	93
Clam Shovel Drop		0.202	94
Large Bulldozer		0.089	87
Caisson Drilling		0.089	87
Loaded Trucks		0.076	86
Small Bulldozer		0.035	79

Source: Noise and Vibration During Construction

Vibration resulting from the operation of empty haul trucks may affect the residents located east of the project site. Strict adherence to the mitigation described later in this subsection would reduce the number of units and residents potentially affected by ground-borne vibration generated by empty haul trucks. As indicated previously, the project site is located 55 feet from the nearest residential property lines. The project site's eastern boundary is located 95 feet from the nearest unit. The construction of the warehouse will take place 119 feet to the west of the aforementioned sensitive receptors (this includes the 24-foot wide set back). Meanwhile, the demolition of the two existing buildings will occur 110 feet from the nearby residential units. The distance from construction activity and the nearby

sensitive receptors will attenuate vibrations caused by the construction equipment. Furthermore, the mitigation provided below will ensure that no residential units would be exposed to vibrations resulting from empty haul trucks:

> *Mitigation Measure No. 5 (Noise*). Haul trucks will be prohibited from travelling to the site using Hellman Avenue. All haul trucks must access the site from 8th Street.

Adherence to the above-mentioned mitigation will reduce potential vibration impacts to levels that are less than significant. Once operational, the proposed project will not generate excessive ground-borne noise because the project will not require the use of equipment capable of creating ground-borne noise. The project will be required to adhere to all pertinent City noise control regulations. In addition, the cumulative traffic associated with the proposed project will not be great enough to result in a measurable or perceptible increase in traffic noise (it typically requires a doubling of traffic volumes to increase the ambient noise levels to 3.0 dBA or greater).

C. *A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? ● Less than Significant Impact.*

A traffic noise prediction model was operated for the nearest segment of Hellman Avenue to determine the projected noise exposure levels from traffic noise. The worksheets for this model are shown in Appendix E. The noise prediction model utilizes a number of independent variables to predict LDN (the average 24-hour day and nighttime noise level), including existing traffic volumes, nature of the ground surface (defined as hardscape or softscape), roadway grade, and the receptor distance from the roadway centerline. The traffic noise levels are depicted using noise "contours" that define the traffic noise levels within the contour. The LDN for the existing conditions was calculated using the existing traffic volumes presented in the traffic analysis. According to the model, the existing LDN along Hellman Avenue is 70 dBA. When adding the daily trips from the proposed project, the LDN for Savanna Street will remain unchanged (70 dBA). The overall increase in ambient noise level would not be readily apparent to an individual with normal hearing. This typically requires a doubling of traffic volumes to generate a change in ambient noise volumes of between 3.0 and 5.0 dBA. Therefore, the traffic noise impacts resulting from the proposed project's occupancy are deemed to be less than significant.

D. *A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? ● Less than Significant Impact with Mitigation*

Noise levels associated with various types of construction equipment are summarized in Exhibit 3-5. The noise levels are those that would be expected at a distance of 50 feet from the noise source. Composite construction noise is best characterized in a study prepared by Bolt, Beranek, and Newman. In the study, the noisiest phases of construction are anticipated to be 89 dBA as measured at a distance of 50 feet from the construction activity. As indicated previously, the nearest noise sensitive receptors are the residential units located along the east side of Hellman Avenue, opposite the project site. Therefore, the highest noise level to reach the residential neighborhood to the east is approximately 77 dBA. Construction activities will be in compliance with City noise standards, which are provided in

Title 17, Article 4, Chapter 17.66, Section 17.66.050 of the City's Municipal Code. According to Section 17.66.050.D.4,

> a. *When adjacent to a residential land use, school, church or similar type of use, the noise generating activity does not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a national holiday, and provided noise levels created do not exceed the noise standard of 65 dBA when measured at the adjacent property line.*

The abovementioned provision related to construction will apply to the proposed project. In addition, mitigation measures are required which will further reduce construction noise:

> *Mitigation Measure No. 6 (Noise*). The Applicant must ensure that the contractors use construction equipment that includes working mufflers and other sound suppression equipment as a means to reduce machinery noise.
>
> *Mitigation Measure No. 7 (Noise*). The Applicant must notify residents along Hellman Avenue opposite the project site regarding construction times and local contact information. The notice shall include the name and phone number of the local contact person residents may call to complain about noise. This notice must also be placed along the project site's eastern and northern boundaries. Upon receipt of a complaint, the contractor must respond immediately by reducing noise to meet Code requirements. In addition, copies of all complaints and subsequent communication between the affected residents and contractors must be forwarded to the City's Community Development Director.

E. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? ● No Impact.

The project site is not located within two miles of a public use airport. Ontario Airport is located 2.29 miles south of the project site.[115] The project site is not located within the Runway Protection Zone (RPZ) of the aforementioned airport.[116] Furthermore, the project site is not located within any 60 Community Noise Equivalent Level (CNEL) contour line boundaries. As a result, the proposed project will not present a safety or noise hazard related to aircraft or airport operations at a public use airport to people residing or working in the project area and no impacts would occur.

[115] Google Earth. Site accessed April 16, 2018.

[116] The Ontario Plan. *Map 2-2, Compatibility Policy Map: Safety Zones.* http://www.ontarioplan.org/wp-content/uploads/sites/4/2015/05/policy-map-2-2.pdf

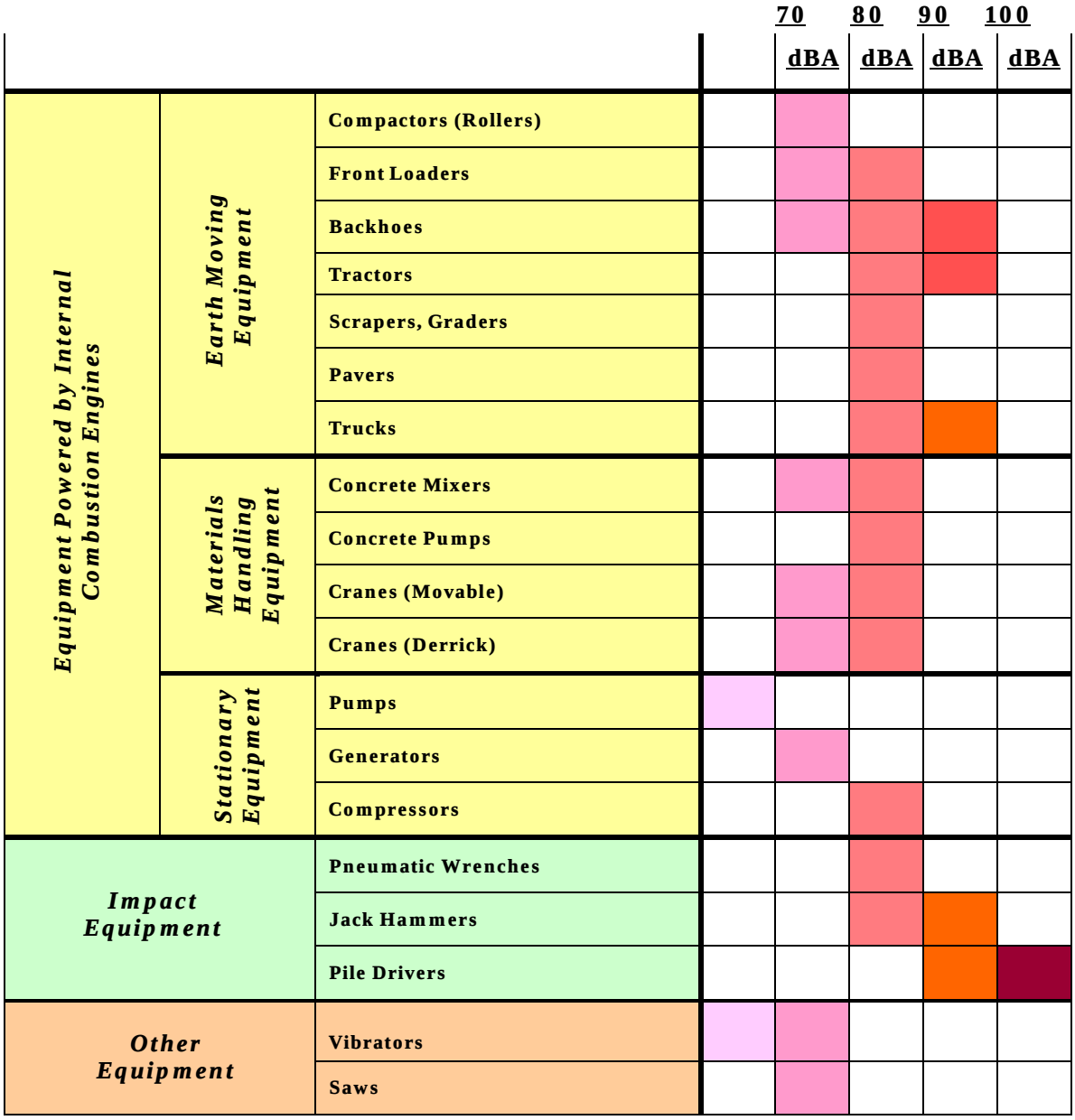


EXHIBIT 3-5
TYPICAL CONSTRUCTION NOISE LEVELS
Source: Blodgett Baylosis Environmental Planning

F. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? ● No Impact.

The project site is not located within two miles of a private airstrip.[117] As a result, no impacts are associated with the proposed project's implementation.

3.12.3 CUMULATIVE IMPACTS

The number of trips that will be added to the adjacent roadways by the proposed project as well as by the related projects will not result in a doubling of traffic volumes. In addition, the related projects are not located in the immediate vicinity of the proposed project. The separation of the four projects will eliminate the concentration of noise generating activities that would result in an increase in cumulative noise levels.

3.12.4 MITIGATION MEASURES

The proposed project will require the following mitigation measures:

Mitigation Measure No. 5 (Noise). Haul trucks will be prohibited from travelling to the site using Hellman Avenue. All haul trucks must access the site from 8th Street.

Mitigation Measure No. 6 (Noise). The Applicant must ensure that the contractors use construction equipment that includes working mufflers and other sound suppression equipment as a means to reduce machinery noise.

Mitigation Measure No. 7 (Noise). The Applicant must notify residents along Hellman Avenue opposite the project site regarding construction times and local contact information. The notice shall include the name and phone number of the local contact person residents may call to complain about noise. This notice must also be placed along the project site's eastern and northern boundaries. Upon receipt of a complaint, the contractor must respond immediately by reducing noise to meet Code requirements. In addition, copies of all complaints and subsequent communication between the affected residents and contractors must be forwarded to the City's Community Development Director.

3.13 POPULATION & HOUSING

3.13.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on housing and population if it would:

[117] Google Earth. Site accessed October 22, 2018.

- Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure);

- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere; or,

- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

3.13.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? ● No Impact.

The proposed project is an infill development that will utilize existing roadways and infrastructure. The new utility lines that will be provided will not extend into undeveloped areas and will not result in unplanned growth. According to the Growth Forecast Appendix prepared by SCAG for the 2016-2040 RTP/SCS, the City of Rancho Cucamonga is projected to add a total of 34,700 new jobs through the year 2040.[118] The proposed project is anticipated to add up to 115 new jobs based on a ratio of one employee per 1,518 square feet of floor area.[119] The project will not lead to any direct increase in the City's population since no housing units are proposed. In addition, the project will not lead to any indirect increase in the City's population since the proposed project is an infill development that will utilize the existing roadways. Furthermore, the new infrastructure that will be provided (storm drains and stormwater appurtenances) will not extend into undeveloped areas and will not expand services into areas that have not been previously served. These new utilities will not result in unplanned growth since they will only serve the project site. As a result, no impacts would occur.

B. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere? ● No Impact.

No housing units will be displaced as a result of the proposed project's implementation. The site is occupied by Frontier Communications and is currently being used as a storage and maintenance yard. Therefore, no impacts would result.

C. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? ● No Impact.

As indicated in the previous section (Section 3.13.B), there are no dwelling units located on, or persons residing within, the boundaries of project site. In addition, there are no homes that would be

[118] Southern California Association of Governments. *Regional Transportation Plan/Sustainable Communities Strategy 2016-2040. Demographics & Growth Forecast.* April 2016.

[119] The Natelson Company, Inc. *Employment Density Study Summary Report.* October 31, 2001.

dislocated as part of the proposed project's implementation. Since no housing units or persons would be dislocated as part of the proposed project's implementation, no impacts would occur.

3.13.3 CUMULATIVE IMPACTS

According to the City, there are 18 related projects located within the Traffic Impact Analysis' study area. These are cumulative projects that were analyzed in the Traffic Impact Analysis that is provided in Appendix F. However, there are three related projects located within one mile of the project site. These three related projects are as follows: Crestwood Homes, 31 single-family units; three retail buildings; and the Vintner, which includes 182 single-family units and 7,615 square feet of retail. According to the Growth Forecast Appendix prepared by SCAG for the 2016-2040 RTP/SCS, the City of Rancho Cucamonga is projected to add a total of 7,400 new jobs through the year 2040. In addition, the City's population is expected to grow by 5,100 new residents.[120] The number of jobs and new residents that will be created by the project and related projects has been accounted for by the SCAG. These projects will utilize existing infrastructure including sewer and water lines, roadways, and storm drains. In addition, there will be no citywide loss in housing. As a result, no cumulative impacts will occur.

3.13.4 MITIGATION MEASURES

The analysis of potential population and housing impacts indicated that no significant impacts would result from the proposed project's approval and subsequent implementation. As a result, no mitigation is required.

3.14 PUBLIC SERVICES

3.14.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on public services if it:

- Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for *fire protection services*;

- Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for *police protection services*;

[120] Southern California Association of Governments. *Demographics & Growth Forecast. Regional Transportation Plan 2016-2040.* April 2016.

- Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for *school services*;

- Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for *parks;* or,

- Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for *other government services.*

3.14.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for* fire protection services*? ● Less than Significant Impact.*

The City of Rancho Cucamonga Fire District provides fire prevention and emergency medical services within the City. Over 120 full- and part-time Fire District employees serve nearly 170,000 residents in a 50 square-mile area. The District provides wildland fire protection, emergency medical services (EMS), hazardous materials response, and technical rescue. The Fire Department operates from seven stations, though the closest first response station to the project site is the San Bernardino Road located 1.25 miles to the northeast along the north side of San Bernardino Road.[121] The Fire Department currently reviews all new development plans, and future development will be required to conform to all fire protection and prevention requirements, including, but not limited to, building setbacks, emergency access, and fire flow (or the flow rate of water that is available for extinguishing fires). The project Applicant must be able to demonstrate sufficient fire flow. The proposed project would only place an incremental demand on fire services since the project will be constructed with strict adherence to all pertinent building and fire codes. In addition, the project's implementation will not affect response times or department capacity.[122] As a result, the potential impacts are considered to be less than significant.

[121] Google Earth. Website accessed April 19, 2018.

[122] Phone call conversation with Mr. Rob Ball, Fire Marshall of the Rancho Cucamonga Fire District. Phone call occurred on October 25, 2018.

B. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for police protection*? ● Less than Significant Impact.*

The City of Rancho Cucamonga contracts its services with the San Bernardino County Sheriff's Department. The Sheriff's Department provides a full range of specialty and support services that would not be available in small municipal police departments, including: homicide investigations, helicopter patrol, narcotics investigations, Special Enforcement Team (SWAT), media relations, crime lab services, and bomb and arson teams, among others. The San Bernardino County Sheriff's Department operates the Police Department and provides response services, criminal investigation services, traffic enforcement, and preventive patrol with the main police facility located at the City's Civic Center. There is also a sub-station located within the Victoria Gardens Shopping Center and one satellite office located at Vineyard Avenue and Base Line Road.[123] The closest first response station to the project site is the police station located within the City's Civic Center. The station is located 1.78 miles to the northeast of the project site.

The proposed project would only place an incremental demand on police protection services since the project is not anticipated to be an attractor for crime due to the lack of unsecure open space. The Sheriff's Department will review the site plan for the proposed project to ensure that the development adheres to the Department requirements. Specifically, all security gates, monitoring systems, alarms, and walls will be under department review. Adherence to the abovementioned requirement will reduce potential impacts to levels that are less than significant.

C. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for school services*? ● Less than Significant Impact.*

Due to the nature of the proposed project (warehousing), no direct school enrollment impacts affecting school services will occur. The proposed project will not directly increase demand for school services. Any potential population growth that would lead to an increase in demand for school services will be indirect and would result from permanent employment growth. As a result, less than significant school-related impacts are anticipated to occur.

[123] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Public Health and Safety Element*. Plan adopted May 19, 2010.

D. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for parks? ● No Impact.

The proposed project will not result in a direct demand for park facilities since the project is industrial. As a result, no changes in the demand for local parks and recreation facilities are anticipated and no impacts are anticipated.

E. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for other governmental services*? ● Less than Significant Impact.*

No new governmental services will be needed, and the proposed project is not expected to have any impact on existing governmental services. The proposed project will not directly increase demand for governmental services. As a result, less than significant impacts are anticipated.

3.14.3 CUMULATIVE IMPACTS

According to the City, there are 18 related projects located within the Traffic Impact Analysis' study area. However, there are three related projects located within one mile of the project site. These three related projects are as follows: Crestwood Homes, 31 single-family units; three retail buildings; and the Vintner, which includes 182 single-family units and 7,615 square feet of retail. The four related projects as well as the proposed project will lead to an increase in demand for police and fire services. This increase in demand may significantly impact both departments; however, the payment of development fees will ensure both departments have adequate resources to accommodate the additional demand. As a result, no cumulative impacts are anticipated.

3.14.4 MITIGATION MEASURES

The analysis determined that the proposed project would not result in any significant impact on public services. As a result, no mitigation is required.

3.15 RECREATION

3.15.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on the environment if it:

- Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or,

- Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

3.15.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? ● No Impact.

The City of Rancho Cucamonga Community Services Department operates 31 parks, six community centers, one equestrian facility, and the Epicenter and Adult Sports Complex.[124] Due to the nature of the proposed project, no increase in the usage of City parks and recreational facilities is anticipated to occur. The closest park to the project site is Golden Oak Park, located 0.43 mile to the southeast of the project site. The proposed warehouse development will be constructed within the confines of the project site and the proposed project will not physically impact the aforementioned park. Since the project will not result in an increase in demand for parks and recreational services, no impacts will occur.

B. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? ● No Impact.

The proposed project will not result in a direct demand for park facilities. As a result, no changes in the demand for local parks and recreation facilities are anticipated and no impacts are anticipated.

3.15.3 CUMULATIVE IMPACTS

According to the City, there are 18 related projects located within the Traffic Impact Analysis' study area. However, there are three related projects located within one mile of the project site. These three related projects are as follows: Crestwood Homes, 31 single-family units; three retail buildings; and the Vintner, which includes 182 single-family units and 7,615 square feet of retail. Only one of the three related projects as well as the project itself will not have an impact on parks and recreational services. The remaining two related projects include a residential component. These projects may lead to an increase in demand for parks and community services. However, the payment of all pertinent park development or Quimby act fees will reduce potential cumulative impacts to levels that are less than significant.

[124] City of Rancho Cucamonga Community Services Department. *Interactive Parks and Facilities Map*. https://www.cityofrc.us/cityhall/cs/parks/map.asp

3.15.4 MITIGATION MEASURES

The analysis determined that the proposed project would not result in any significant impact on recreational facilities and services. As a result, no mitigation is required.

3.16 TRANSPORTATION/TRAFFIC

3.16.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project will normally have a significant impact on traffic and circulation if it would:

- Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;

- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;

- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in the location that results in substantial safety risks;

- Substantially increases hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);

- Result in inadequate emergency access; or,

- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

3.16.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A Traffic Impact Analysis was prepared for the Applicant by Kunzman Associates, Inc. This report is presented in Appendix F. The purpose of this focused traffic analysis is to provide an assessment of the traffic impacts resulting from the development of the proposed 8th Street and Hellman Avenue warehousing project and to identify the traffic mitigation measures necessary to maintain the established Level of Service standard for the elements of the impacted roadway system. The traffic issues related to the proposed land use and development have been evaluated in the context of the California Environmental Quality Act (CEQA).

The City of Rancho Cucamonga is the lead agency responsible for preparation of the focused traffic analysis, in accordance with California Environmental Quality Act authorizing legislation. This report analyzes traffic impacts for the anticipated opening date with occupancy of the development in Opening Year (2020), at which time it will be generating trips at its full potential. This report also analyzes potential project traffic impacts for Horizon Year (2040) traffic conditions. The following analysis years are considered in this report:[125]

- Existing (2018) Traffic Conditions;
- Existing Plus Project Traffic Conditions;
- Opening Year (2020) Without and With Project Traffic Conditions; and,
- Horizon Year (2040) Without and With Project Traffic Conditions.

This study has been prepared in accordance with the guidelines contained in the San Bernardino County Congestion Management Program (2016 Update), including input parameters for Highway Capacity Manual calculations, saturation flow rates, and study intersections. Identification of the study area was based on the forecast contribution of peak hour project generated trips on the roadway segments near the project site. Based on the guidelines for preparation of a Traffic Impact Analysis, arterial facilities are required to be included in the analysis when the anticipated project trip contribution equals or exceeds 50 two-way trips during the peak hours; freeway segments are required to be included when the anticipated project trip contribution equals or exceeds 100 two-way peak hour trips. No analysis is typically required further than five miles from the project site.[126]

Existing intersection traffic conditions were established through morning and evening peak hour intersection turning movement counts obtained by Kunzman Associates, Inc. in March 2018 (see Appendix C). In addition, truck classification counts were conducted at the study intersections. The existing percent of trucks were used in the conversion of trucks to passenger car equivalents. The San Bernardino Transportation Analysis Model (SBTAM) has generally been used to evaluate the regional distribution of project trips. A select zone (trip distribution) analysis was performed using the San Bernardino Transportation Analysis Model with the assistance of the San Bernardino Associated Governments staff. The socioeconomic data inputs to the San Bernardino Transportation Analysis Model are representative of the planned project development intensity.[127]

The average daily traffic volume forecasts have been determined using the growth increment approach on the San Bernardino Transportation Analysis Model Year 2012 and Year 2040 average daily traffic volume forecasts (see Appendix D). Appendix E contains the traffic model plots. The technique used to assess the performance of an intersection is known as the intersection delay methodology based on the procedures contained in the Highway Capacity Manual (Transportation Research Board). The

[125] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

[126] Ibid.

[127] Ibid.

methodology compares the traffic volumes using the intersection to the capacity of the intersection to calculate the delay associated with associated with the traffic control at the intersection. The intersection delay is then correlated to a performance measure known as Level of Service based on the following thresholds:

Table 3-9
Level of Service Thresholds

Level of Service	Intersection Control Delay (seconds/vehicle)	
	Signalized Intersection	Unsignalized Intersection
A	≤ 10.0	≤ 10.0
B	> 10.0 to≤ 20.0	> 10.0 to ≤ 15.0
C	> 20.0 to ≤ 35.0	> 15.0 to ≤ 25.0
D	> 35.0 to ≤ 55.0	> 25.0 to ≤ 35.0
E	> 55.0 to ≤ 80.0	> 35.0 to ≤ 50.0
F	> 80.0	> 50.0

Source: Highway Capacity Manual (Transportation Research Board)

Level of Service is used to qualitatively describe the performance of a roadway facility, ranging from Level of Service A (free-flow conditions) to Level of Service F (extreme congestion and system failure). Input parameters such as saturation flow rates and default values for Highway Capacity Manual calculations were used in accordance with the guidelines contained in the San Bernardino County Congestion Management Program (2016 Update).

The City of Rancho Cucamonga General Plan Circulation Element has established Level of Service D as the minimum acceptable Level of Service for the City's transportation system. Roadway facilities operating at Level of Service E or F are considered deficient. Based on the City-established performance standards, a project traffic impact is considered significant if the proposed project causes or worsens Level of Service E or F. To reduce a potential impact to a less than significant level, feasible mitigation measures should be identified that will maintain the acceptable Level of Service. If a project is forecast to worsen a facility already operating at Level of Service E or F under pre-project conditions, proposed mitigation measures should maintain operation of the impacted facility at pre-project conditions. Mitigation measures can be in many forms, including addition of lanes, traffic control modification, or demand management measures. If no feasible mitigation measures can be identified for a significantly impacted facility, the impact will remain significant and unavoidable.[128]

A. *Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit? ● Less than Significant Impact.*

Local street access is provided by Vineyard Avenue, Hellman Avenue, Archibald Avenue, Arrow Route,

[128] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

8th Street, and 6th Street. Regional access to the project site is provided by the I-10 Freeway, which is located approximately 1.5 miles to the south. Based on the City-approved scoping agreement, the study area consists of the following intersections presented in Table 3-10.

Table 3-10
Study Area Intersections

No.	Study Intersection	Jurisdiction
1	Vineyard Avenue (NS) at 8th Street (EW)	Rancho Cucamonga
2	Project West Driveway (NS) at 8th Street (EW)	Rancho Cucamonga
3	Project East Driveway (NS) at 8th Street (EW)	Rancho Cucamonga
4	Hellman Avenue (NS) at Arrow Route (EW)	Rancho Cucamonga
5	Hellman Avenue (NS) at 8th Street (EW)	Rancho Cucamonga
6	Hellman Avenue (NS) at Project South Driveway (EW)	Rancho Cucamonga
7	Hellman Avenue (NS) at 6th Street (EW)	Rancho Cucamonga
8	Archibald Avenue (NS) at 8th Street (EW)	Rancho Cucamonga

Source: Kunzman Associates, Inc.

Exhibit 3-6 shows the project location map as well as the locations of the eight study area intersections. Exhibit 3-7 identifies the existing roadway conditions based on a field survey of the study area; the existing number of through lanes for roadways and the intersection geometry and controls are identified.

Exhibit 3-8 depicts the existing average daily traffic volumes. The existing average daily traffic volumes have been factored from peak hour intersection turning movement volumes using the following formula for each intersection leg:

- PM Peak Hour (Approach Volume + Exit Volume) x 11.5 = Leg Volume.[129]

Exhibit 3-9 and Exhibit 3-10 show the existing morning and evening peak hour intersection turning movement volumes, respectively. Existing peak hour intersection turning movement volumes are based upon morning and evening peak period intersection turning movement counts conducted in April 2018 during typical weekday conditions. The morning peak period was counted between 7:00 AM and 9:00 AM; the evening peak period was counted between 4:00 PM and 6:00 PM. The actual peak hour within the peak period is the four consecutive 15-minute periods with the highest total volume when all movements are added together. Thus, the weekday evening peak hour at one intersection may be 4:45 PM to 5:45 PM if those four consecutive 15-minute periods have the highest combined volume. Intersection turning movement count worksheets are provided in Appendix C of this traffic report. The peak hour traffic counts were converted into Passenger Car Equivalent (PCE) trips in accordance with the San Bernardino County Congestion Management Program recommendations (1.5 PCEs for large 2-axle vehicles, 2.0 PCEs for 3-axle trucks, and 3.0 PCEs for trucks with four or more axles). The peak hour factors used for intersection delay calculations are based the measured peak hour factors obtained from existing traffic counts.

[129] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

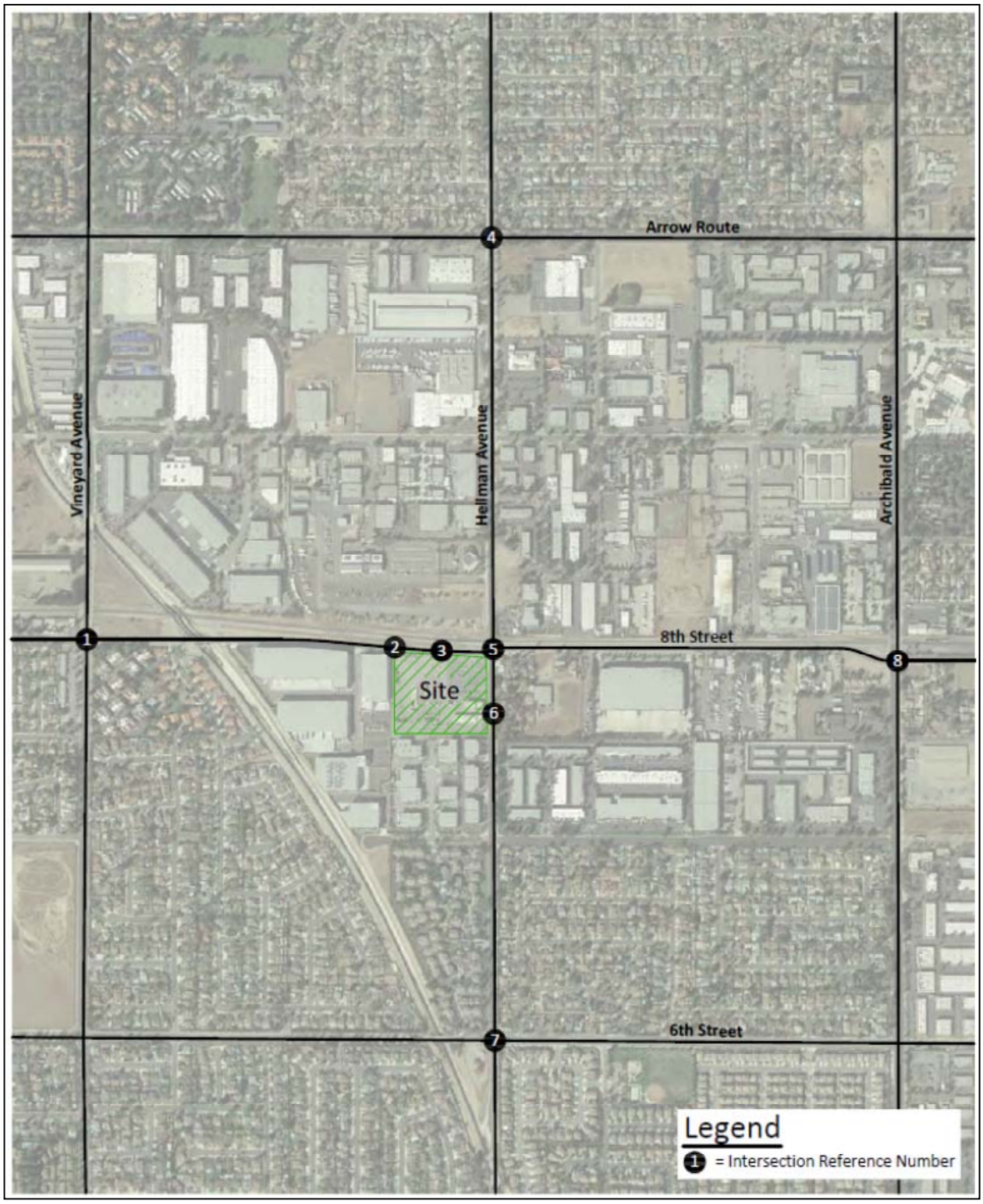


EXHIBIT 3-6
PROJECT LOCATION MAP
SOURCE: KUNZMAN ASSOCIATES, INC.

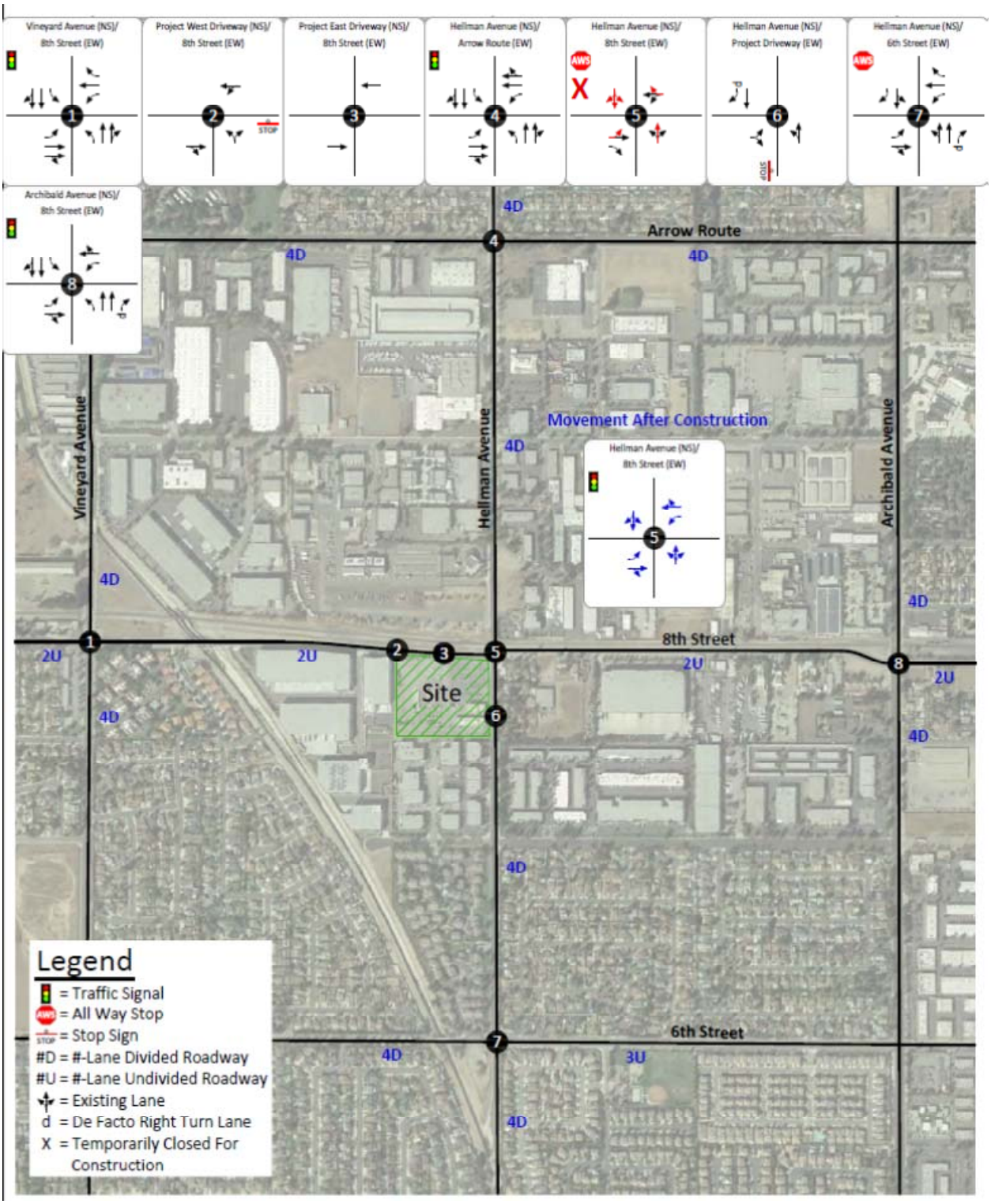


EXHIBIT 3-7
EXISTING LANE GEOMETRY AND INTERSECTION TRAFFIC CONTROLS
SOURCE: KUNZMAN ASSOCIATES, INC.

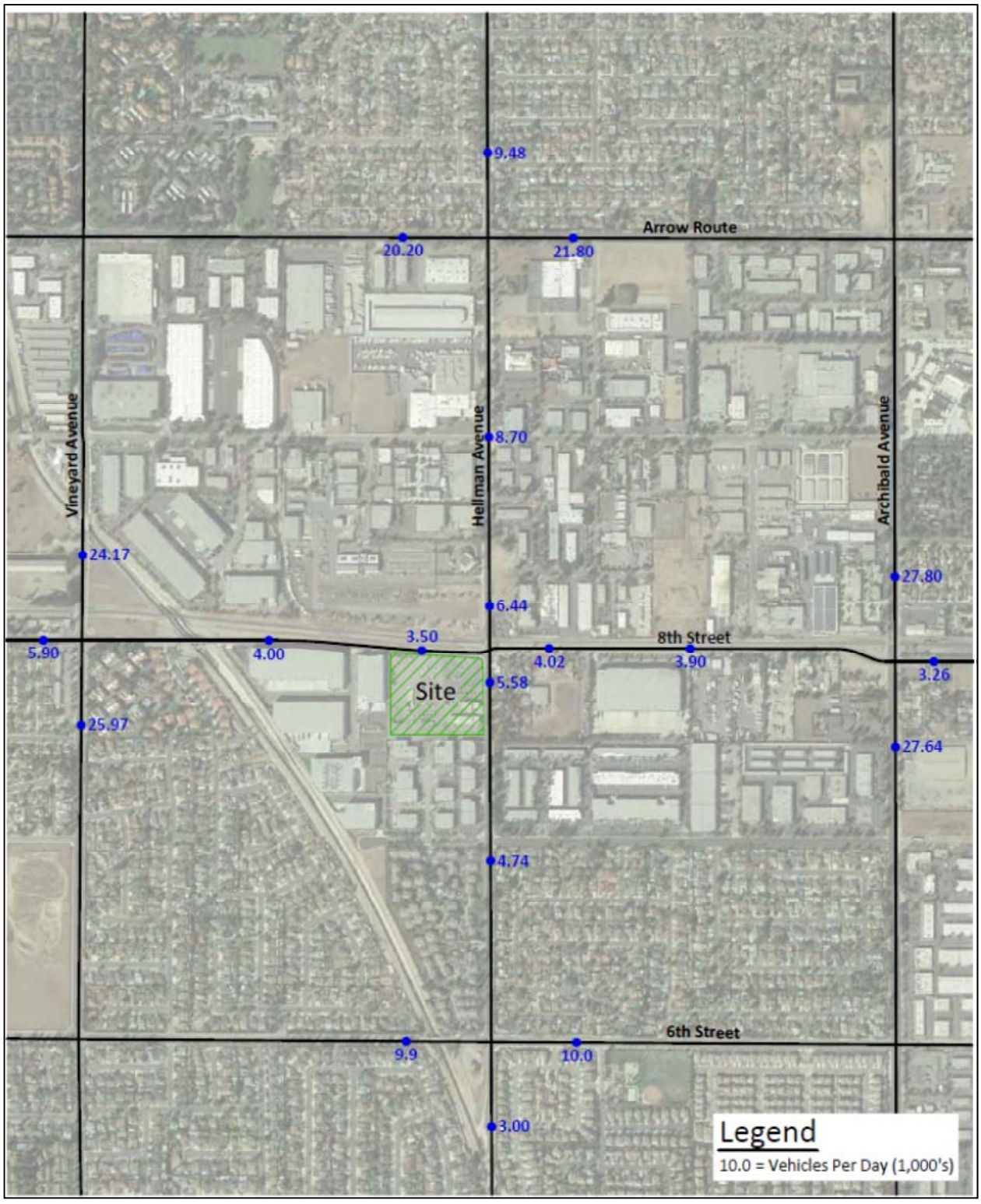


EXHIBIT 3-8
EXISTING AVERAGE DAILY TRAFFIC VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

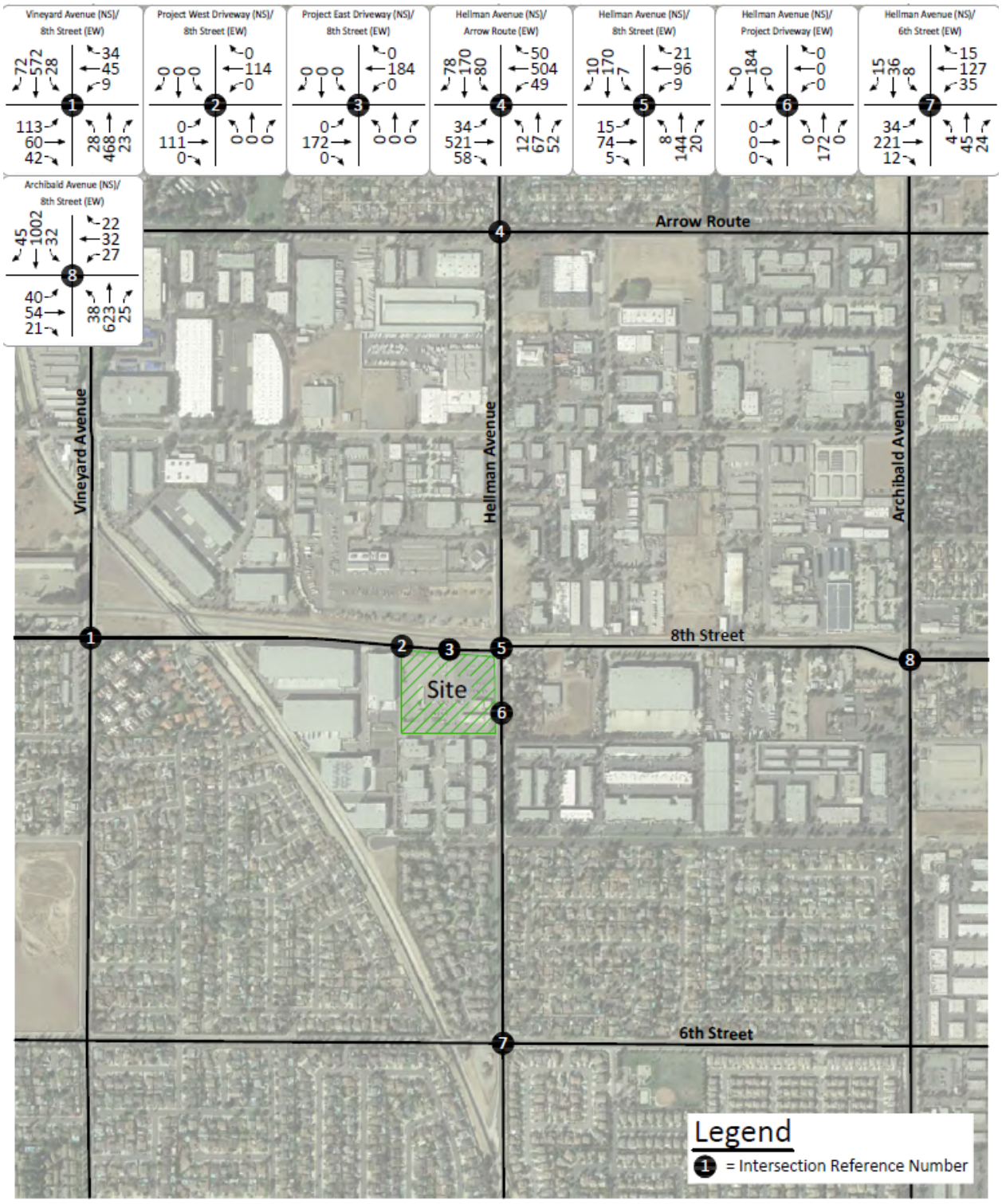


EXHIBIT 3-9
EXISTING MORNING PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

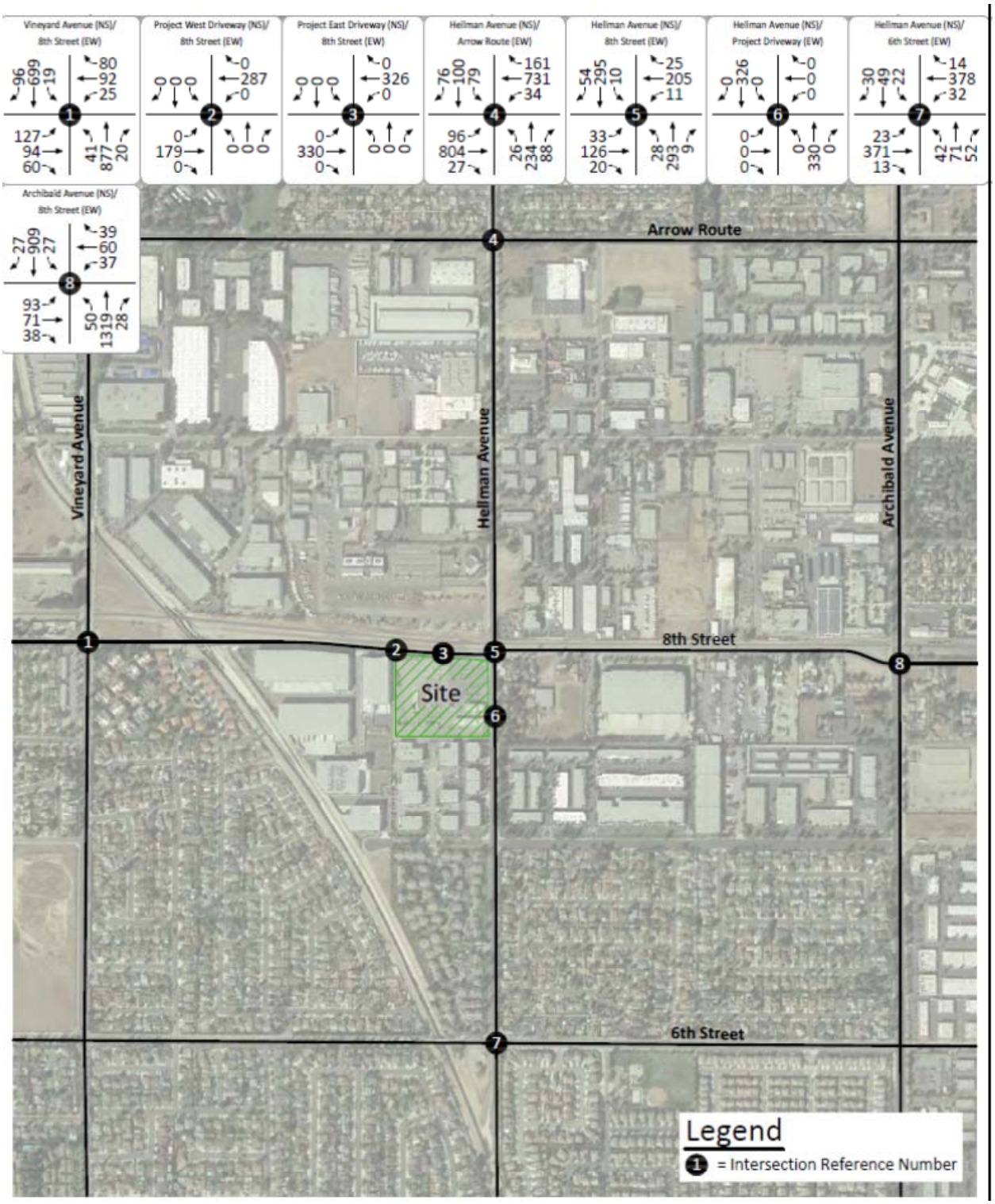


EXHIBIT 3-10
EXISTING EVENING PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

The peak hour traffic counts were converted into Passenger Car Equivalent (PCE) trips in accordance with the San Bernardino County Congestion Management Program recommendations (1.5 PCEs for large 2-axle vehicles, 2.0 PCEs for 3-axle trucks, and 3.0 PCEs for trucks with four or more axles). The peak hour factors used for intersection delay calculations are based the measured peak hour factors obtained from existing traffic counts.

The Hellman Avenue and 8th Street intersection is currently under construction with an estimated completion date of June 2018 for roadway widening and traffic signal installation. The Existing plus Project traffic conditions assume that the intersection will be operational at the currently proposed configuration as provided by the plans for this Capital Improvement Program project (see Appendix G). Historical intersection turning movement counts for the Hellman Avenue and 8th Street intersection in conjunction with the San Bernardino Transportation Analysis Model data were used to determine the Existing intersection turning movement volumes for the Hellman Avenue and 8th Street intersection. The morning and evening peak hour Levels of Service for existing traffic conditions have been calculated and are shown in Table 3-11. The study intersections currently operate within acceptable Levels of Service during the peak hours for existing traffic conditions.

Table 3-11
Existing Intersection Capacity Utilization/Delay and Level of Service

Intersection	Traffic Control	Intersection Approach Lanes												Peak Hour Delay-LOS		Peak Hour V/C-LOS	
		Northbound			Southbound			Eastbound			Westbound						
		L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
Vineyard Avenue (NS) at:																	
8th Street (EW) -# 1	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1	1	11.4	B	13.1	B
Hellman Avenue (NS) at:																	
Arrow Route (EW) - #4	TS													20.3	C	19.2	B
8th Street (EW) - #5	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	22.8	C	40.7	D
6th Street (EW) - #7	AWS													10.4	B	21.9	C
Archibald Avenue (NS) at:																	
8th Street (EW) - #8	TS	1	2	d	1	1.5	0.5	1	0.5	0.5	1	0.5	0.5	8.8	A	12.6	B

The trips generated by the project are determined by multiplying an appropriate trip generation rate by the quantity of land use. Trip generation rates are predicated on the assumption that energy costs, the availability of roadway capacity, the availability of vehicles to drive, and life styles remain similar to what are known today. A major change in these variables may affect trip generation rates.

Trip generation rates were determined for daily trips, morning peak hour inbound and outbound trips, and evening peak hour inbound and outbound trips for the proposed land use. By multiplying the trip generation rates by the land use quantity, the traffic volumes are determined. Table 3-11 shows the project trip generation based upon rates obtained from the Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017 and the City of Fontana, Truck Trip Generation Study, August 2003. In addition, the project trips generated were converted into passenger car equivalents. Table 3-12 summarizes the project trip generation forecast. The project trip generation

has been calculated in total number of vehicle trips as well as passenger car equivalent trips. As shown in Table 3-12, the proposed project is forecast to generate approximately 398 daily trips in passenger car equivalents, 39 passenger car equivalent trips of which will occur during the morning peak hour and 42 passenger car equivalent trips of which will occur during the evening peak hour.[130]

Table 3-12
Project Trip Generation Estimated Based on Project Operational Characteristics

Proposed Project						Vehicle Trips						
						AM Peak Hour			PM Peak Hour			
Land Use	Source	Quantity	Units	PCE Factor	Vehicle Percent	Inbound	Outbound	Total	Inbound	Outbound	Total	Daily
Trip Generation Rates:												
Warehouse						0.13	0.04	0.17	0.05	0.14	0.19	1.74
Truck Trip Generation	ITE 150	--	TSF	--	20.43%	0.03	0.01	0.04	0.01	0.03	0.04	0.36
Car Trip Generation					79.57%	0.10	0.03	0.14	0.04	0.11	0.15	1.39
Vehicle Trips Generated:												
Vehicle Total Trips	--	174.745	TSF	--		23	7	30	9	24	33	304
Truck Vehicle Trips					20.43%	5	1	6	2	5	7	62
Car Vehicle Trips					79.57%	18	6	24	7	19	26	242
PCE Trips Generated:												
2 Axle Trucks	Fontana	--	--	1.5	3.46%	1	0	1	0	1	1	16
3 Axle Trucks				2.0	4.64%	2	1	3	1	2	3	28
4+ Axle Trucks				3.0	12.33%	8	3	11	3	9	12	112
Truck Subtotal	--	--	PCE	--	20.43%	11	4	15	4	12	16	156
Car Subtotal			PCE		79.57%	18	6	24	7	19	26	242
PCE Total Trips	--	**174.745**	**TSF**	--	--	**29**	**10**	**39**	**11**	**31**	**42**	**398**

Source: Kunzman Associates, Inc.

A trip generation comparison has been completed between the previous existing land use (utility) and the proposed land use (warehousing). The previous land use (utility) generates approximately 212 daily trips, 37 trips of which will occur during the morning peak hour and 36 trips of which will occur during the evening peak hour.[131]

Based upon the comparison the previous land use vs. proposed land use, the proposed project is projected to generate approximately 92 more daily vehicle trips, seven less vehicle trips during the morning peak hour and three less vehicle trips during the evening peak hour. When the proposed project trips are converted to passenger car equivalents, the proposed project is projected to generate approximately 186 more daily passenger car equivalent trips, two more passenger car equivalent trips

[130] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

[131] Ibid.

during the morning peak hour and six more passenger car equivalent trips during the evening peak hour.[132]

In order to provide a conservative analysis, the trip generation credits for the previous land use were not subtracted from the study area. The net project trip generation could provide a reduction in study area traffic volumes. Exhibit 3-11 and 3-12 show the forecast outbound and inbound directional distributions of the project generated trips, respectively. The project trip distributions are based on review of existing traffic volume data, surrounding land uses, and the local and regional roadway facilities in the project vicinity. Based on the identified trip generation and distributions, project average daily traffic volumes have been calculated and shown on Exhibit 3-13. Morning and evening peak hour intersection turning movement volumes expected from the project are shown on Exhibit 3-14 and 3-15, respectively.

No analysis is required further than five miles from the project site. The roadway elements that must be analyzed are dependent on both the analysis year (Opening Year) and project generated traffic volumes. The identification of the study area, and the intersections and highway segments requiring analysis, was based on an estimate of the two-way traffic volumes on the roadway segments near the project site. All arterial segments are required to be included in the analysis when the anticipated project volume equals or exceeds 50 two-way trips in the peak hours. The requirement is 100 two-way peak hour trips for freeways.

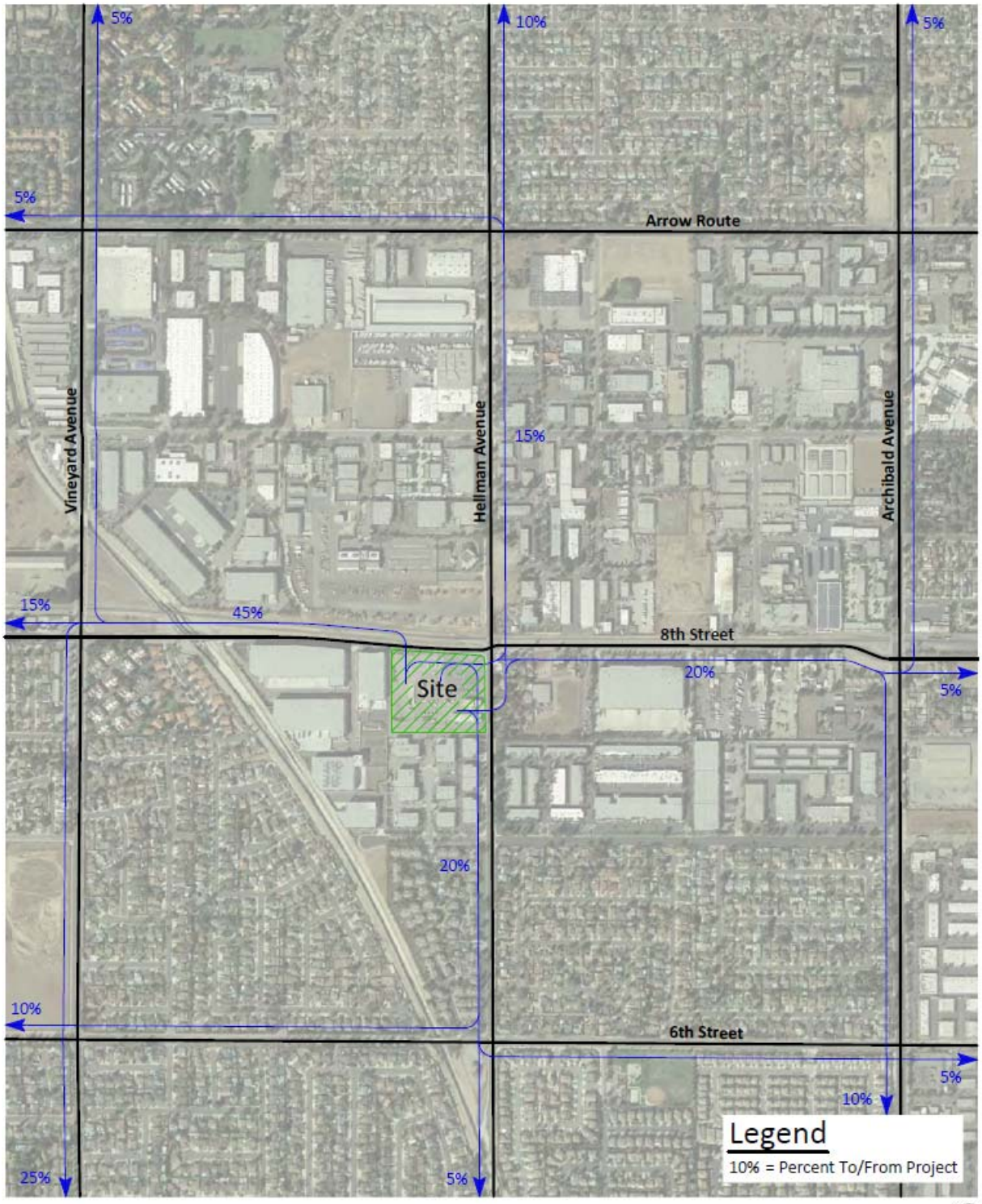
As shown on Exhibit 3-16, the project does not contribute greater than the freeway threshold volume of 100 two-way peak hour trips to the I-10 Freeway. The project does not contribute trips greater than the arterial link threshold volume of 50 two-way trips during the morning and evening peak hours in adjacent jurisdictions. This means that the City of Rancho Cucamonga is not required to notify the adjacent jurisdictions and provide a copy of the focused traffic analysis, once the document is accepted by the City of Rancho Cucamonga. The purpose of this notification is to allow the adjacent jurisdictions to identify opportunities to make improvements to intersections concurrent with adjacent development, at considerably less cost and disruption than would occur if it were done after-the-fact.[133]

To assess background traffic conditions, existing traffic volumes are used with traffic model data to project future Horizon Year (2040) traffic volumes and Opening Year (2020) traffic volumes. For analysis purposes in this report, the Opening Year is 2020.[134] To assess background traffic conditions, existing traffic volumes are combined with ambient growth, and cumulative development trips. The opening year for analysis purposes in this report is 2020. To account for ambient growth on roadways, Opening Year (2020) traffic volumes have been calculated based on a "conservative" 2.0 percent annual growth rate of existing traffic volumes over a two-year period. Potential developments within the study area are included in the analysis if they are not currently built, they are approved, their approval has not expired, and they would contribute trips to the study intersections.

[132] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

[133] Ibid.

[134] Ibid.



KUNZMAN ASSOCIATES, INC.

EXHIBIT 3-11
PROJECT TRIP DISTRIBUTION - CARS

SOURCE: KUNZMAN ASSOCIATES, INC.

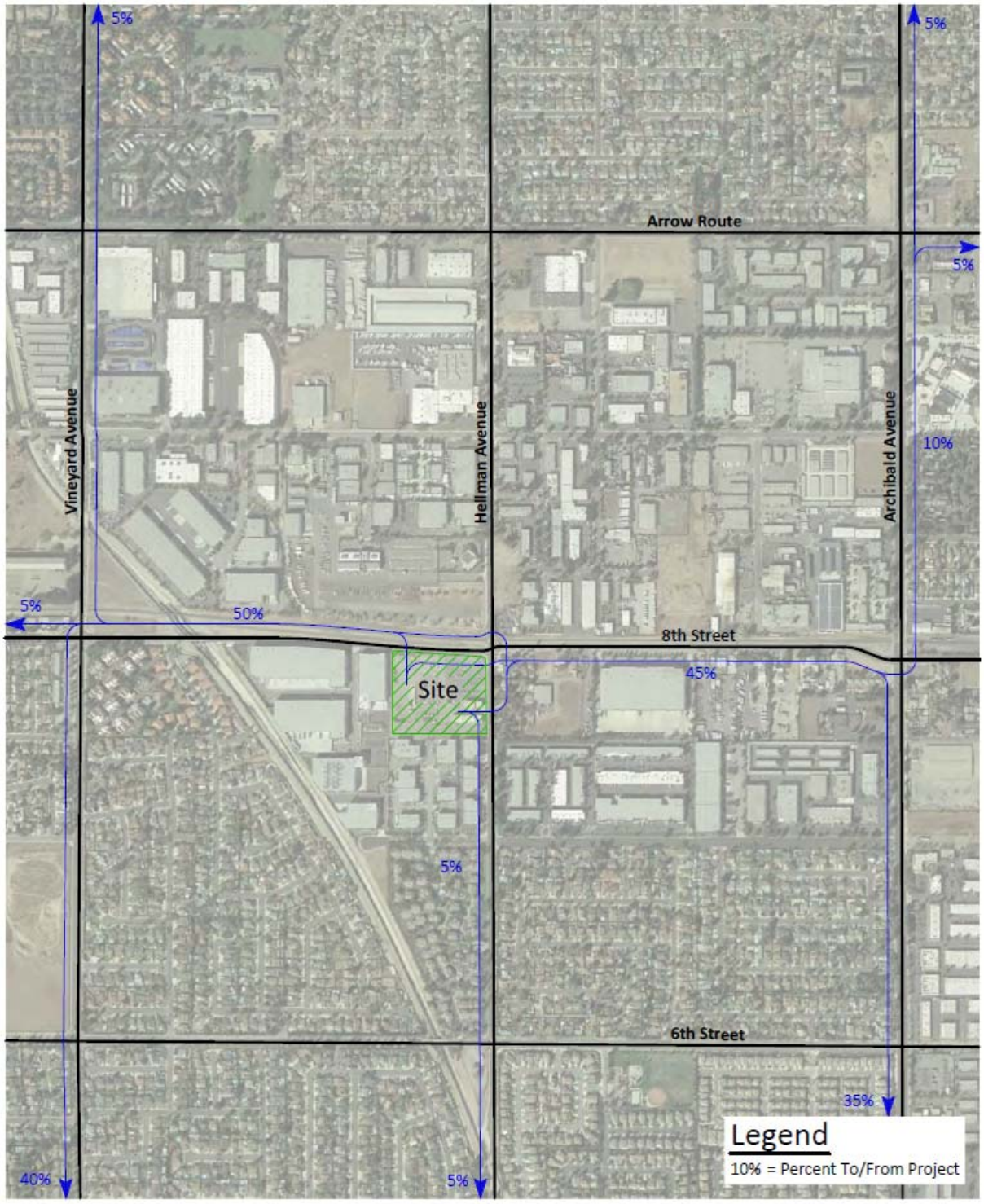


EXHIBIT 3-12
PROJECT TRIP DISTRIBUTION - TRUCKS
SOURCE: KUNZMAN ASSOCIATES, INC.

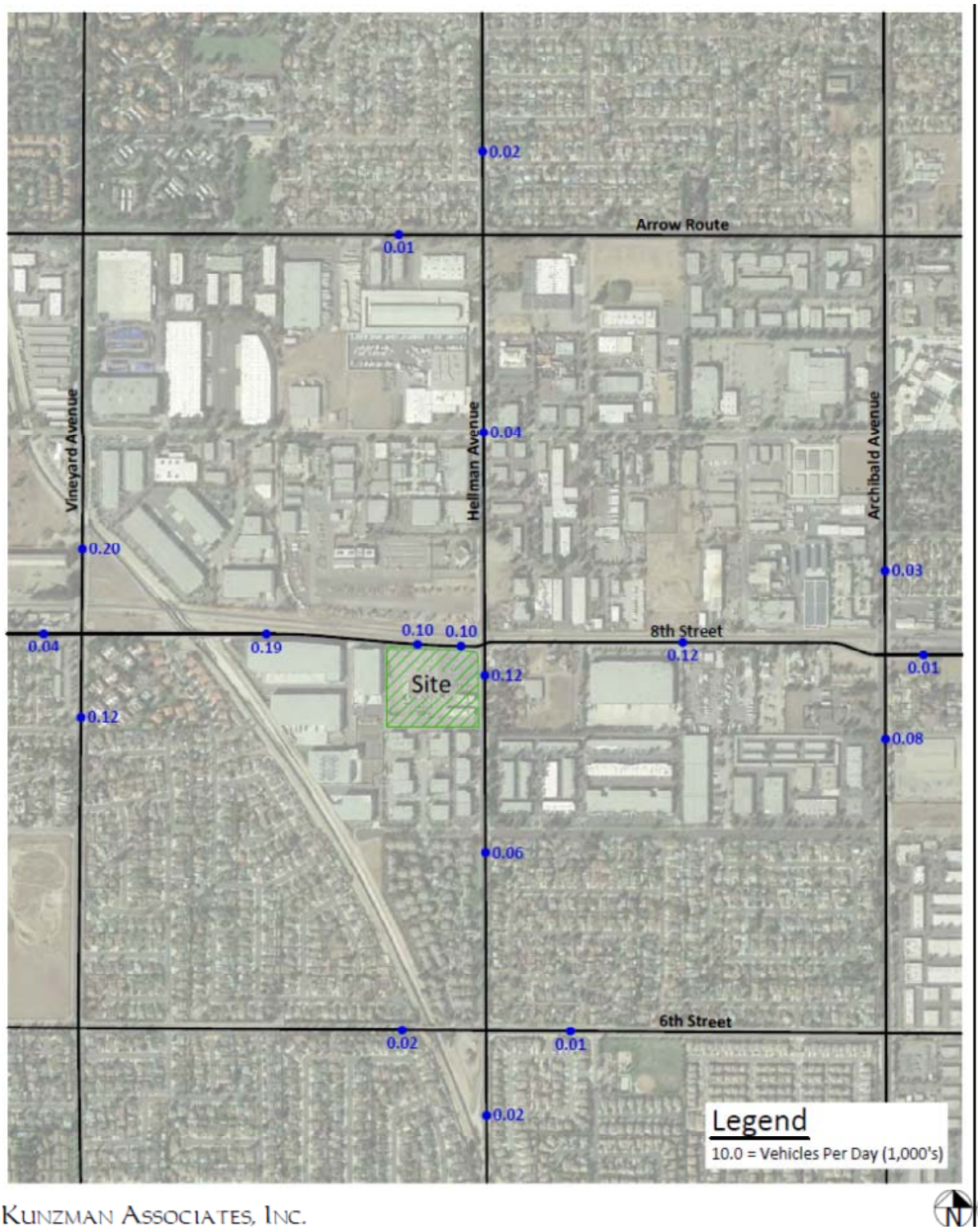


EXHIBIT 3-13
PROJECT AVERAGE DAILY TRAFFIC VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

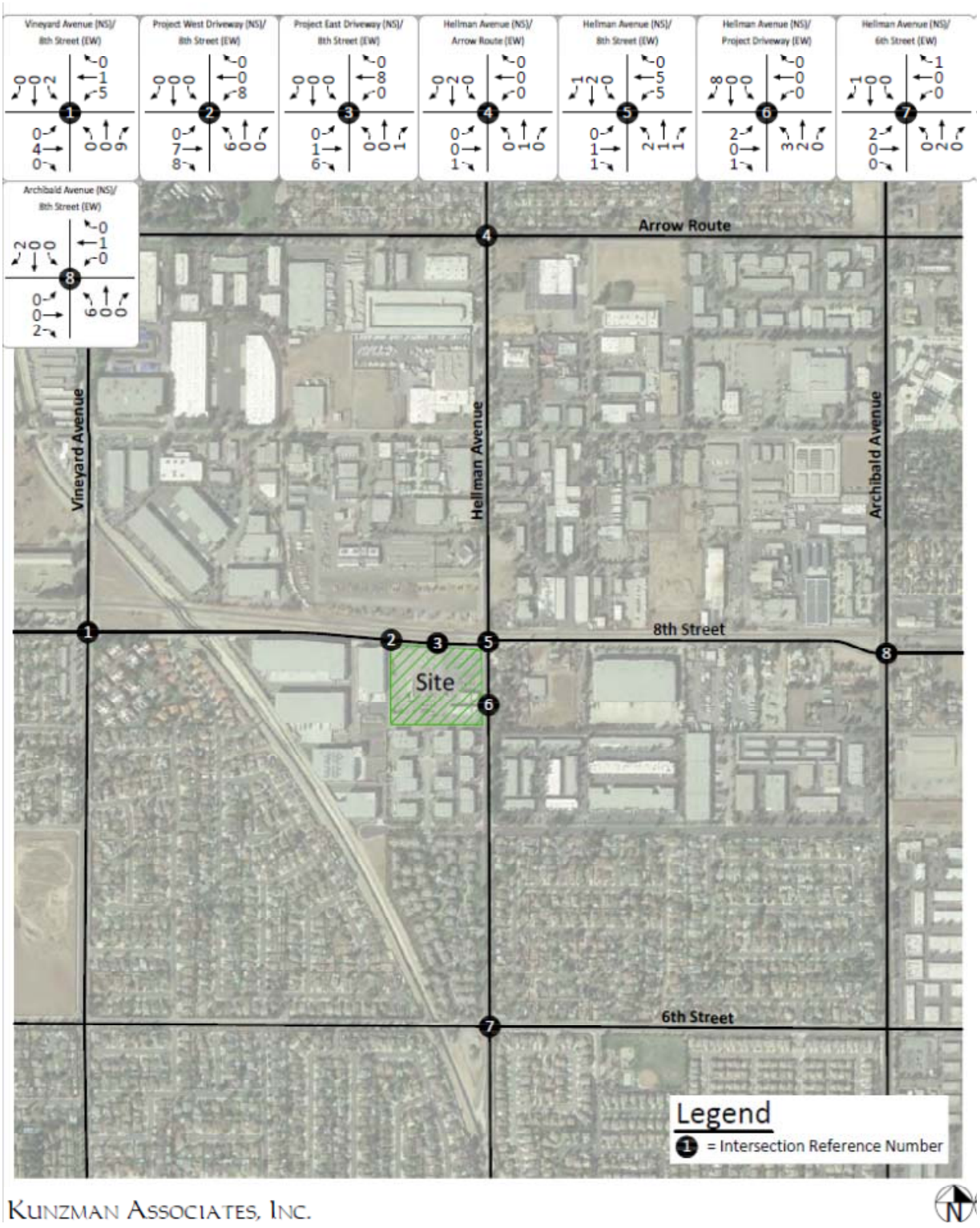


EXHIBIT 3-14
PROJECT AM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES
SOURCE: KUNZMAN ASSOCIATES, INC.

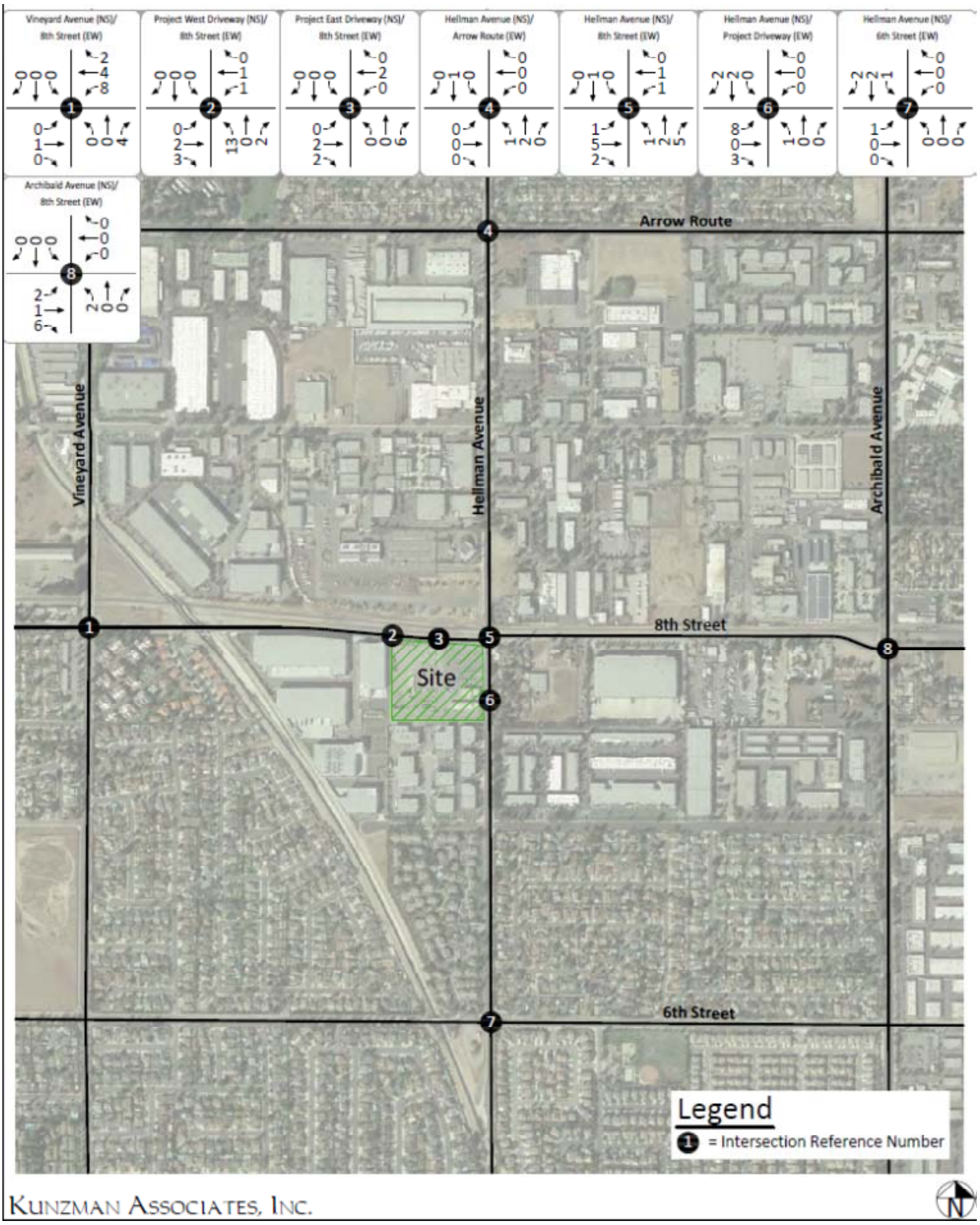


EXHIBIT 3-15
PROJECT PM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES
SOURCE: KUNZMAN ASSOCIATES, INC.

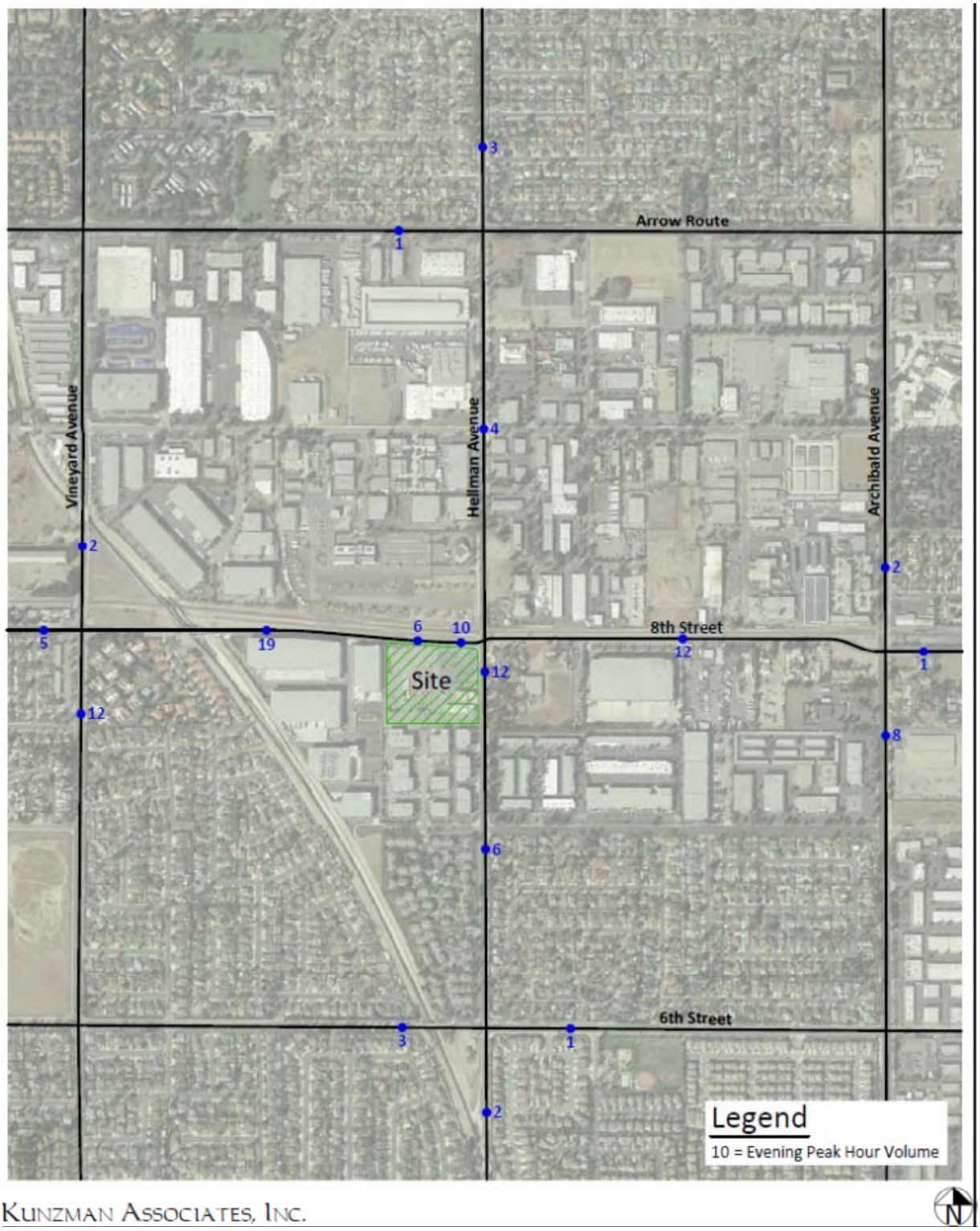


EXHIBIT 3-16
PROJECT TRIP CONTRIBUTION TEST VOLUMES
SOURCE: KUNZMAN ASSOCIATES, INC.

The City of Rancho Cucamonga staff provided a list of cumulative development in the study area (see Exhibit 3-17). In order to provide a "conservative" analysis, the cumulative development has been added to future traffic conditions. Exhibit 3-18 shows the cumulative development average daily traffic volumes. Cumulative development morning and evening peak hour intersection turning movement volumes are shown on Exhibit 3-19 and 3-20, respectively.

Horizon Year (2040) Without Project traffic conditions represent full build-out of the City of Rancho Cucamonga according to the General Plan Land Use Element. The current San Bernardino Transportation Analysis Model was used to derive Horizon Year (2040) traffic volumes. In accordance with post-processing procedures contained in the Congestion Management Program, the future traffic volume forecasts have been determined using the growth increment approach on the Year 2012 and Year 2040 traffic volume forecasts. This difference defines the growth in traffic over the 28-year period. The incremental growth in traffic volumes have been factored to reflect the forecast growth between existing conditions (Year 2018) and Year 2040. For this purpose, linear growth between the Year 2012 base condition and the forecast Year 2040 condition was assumed. Since the increment between Year 2018 and Year 2040 is 24 years of the 28 year time frame, a factor of 0.78 (i.e., 22/28) was used.[135]

To derive intersection turning movement volumes, the traffic growth forecasts were further refined using a spreadsheet program developed by the Federal Highway Administration and consistent with traffic forecasting procedures outlined in the National Cooperative Highway Research Program Report 255. The spreadsheet program uses a linear programming algorithm to calculate future individual turning movements based on the relationship of existing intersection turning movements and forecast model growth by approach. The forecast turning movements developed by the spreadsheet program were reviewed for reasonableness and adjusted as necessary to ensure minimum traffic growth. The end results of the post-processing procedures described are future traffic volumes suitable for analysis. The growth increment calculation and post-processed intersection turning movement volume worksheets are contained in Appendix D of this traffic report. Appendix E of this traffic report contains the traffic model plots.

The traffic volumes for Existing plus Project traffic conditions have been derived by adding the project generated trips to existing traffic volumes. Existing plus project average daily traffic volumes are shown on Exhibit 3-21. Existing plus Project morning and evening peak hour intersection turning movement volumes are shown on Exhibit 3-22 and 3-23, respectively.

To assess Opening Year (2020) Without Project traffic conditions, existing traffic volumes are combined with ambient growth and other development trips. Opening year (2020) without project average daily traffic volumes are shown on Exhibit 3-24. Opening year (2020) without project morning evening peak hour intersection turning movement volumes are shown on Exhibit 3-25 and 3-26, respectively.

[135] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

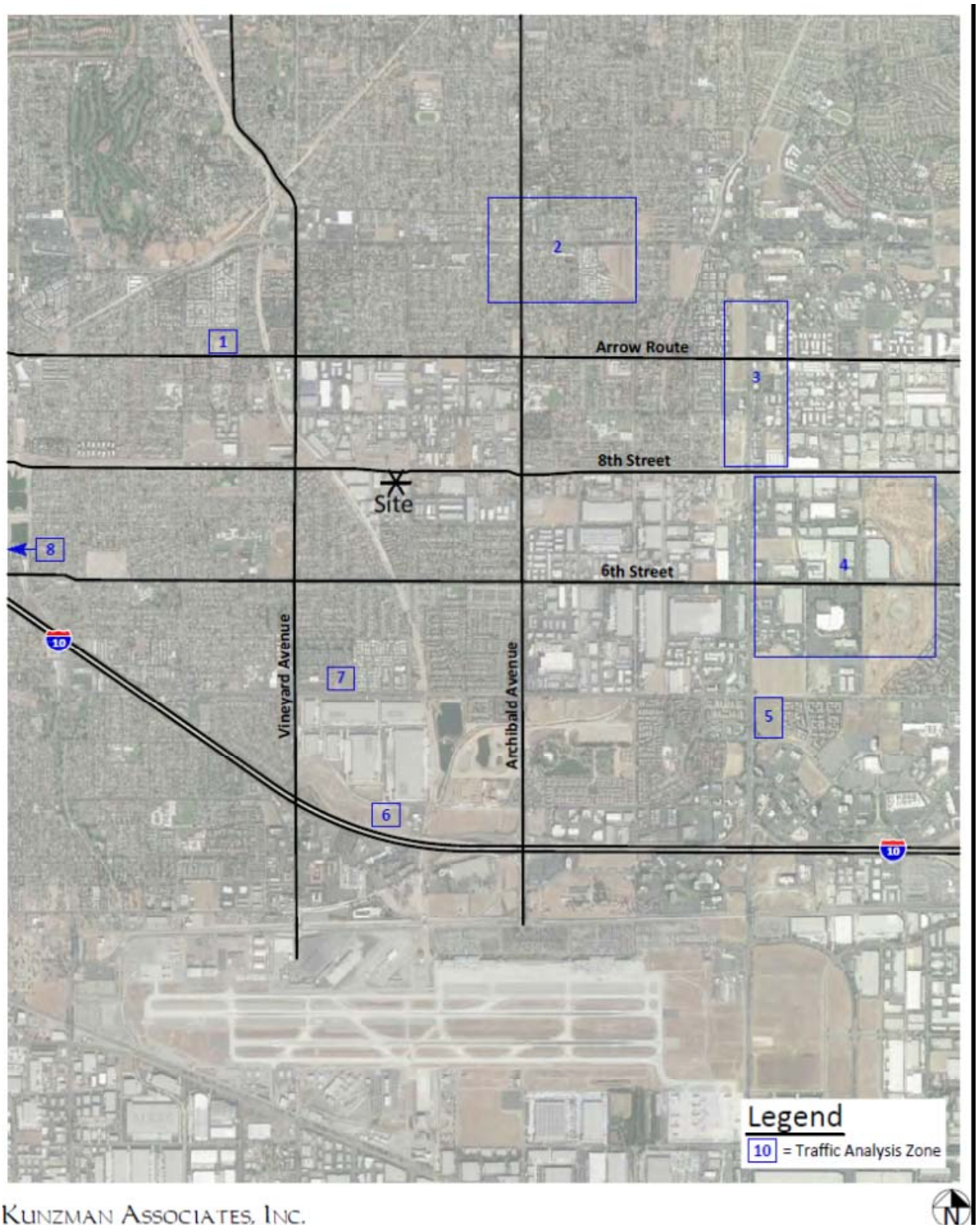
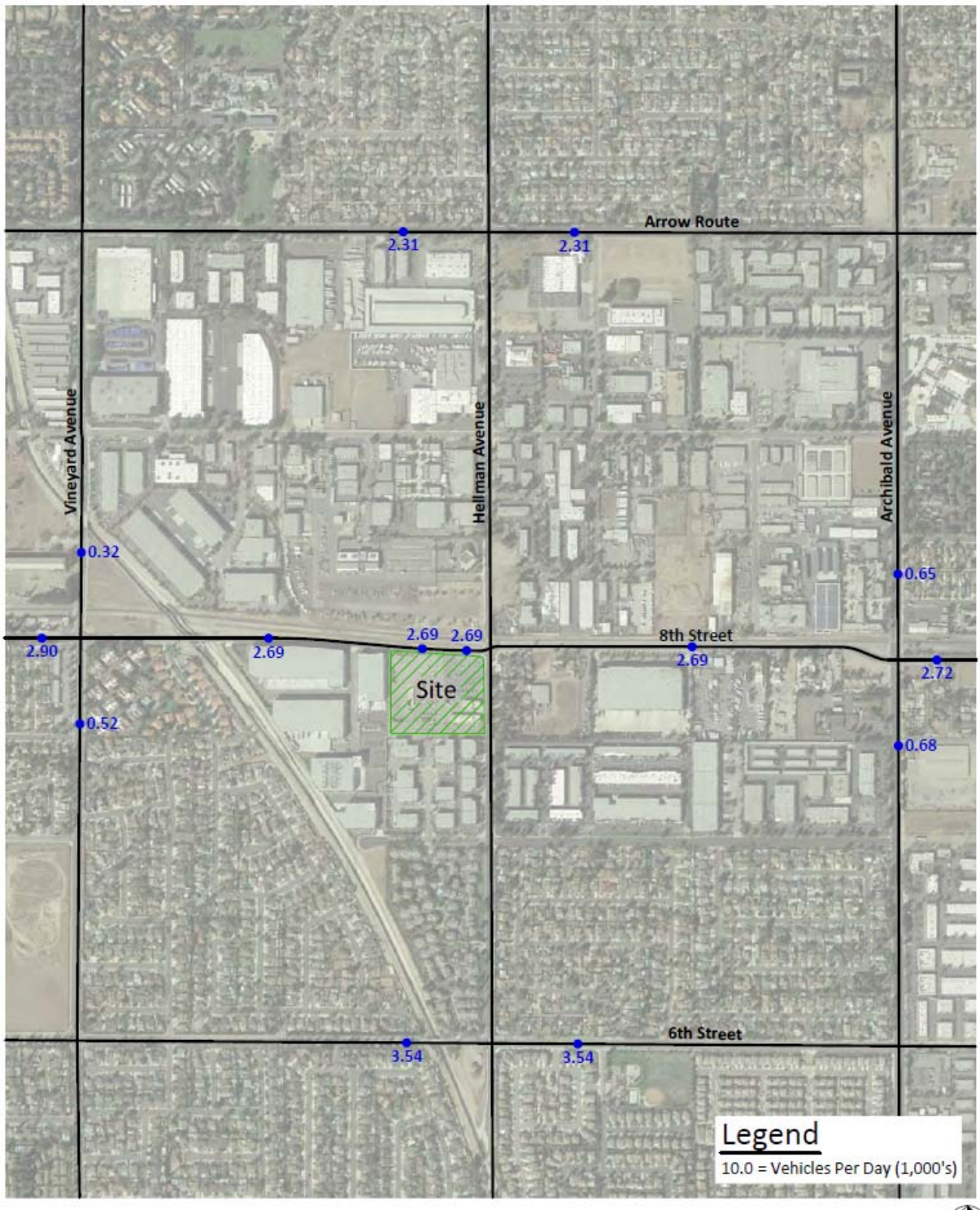


EXHIBIT 3-17
OTHER DEVELOPMENT TRAFFIC ANALYSIS ZONE MAP
SOURCE: KUNZMAN ASSOCIATES, INC.



KUNZMAN ASSOCIATES, INC.

EXHIBIT 3-18
OTHER DEVELOPMENT AVERAGE DAILY TRAFFIC VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

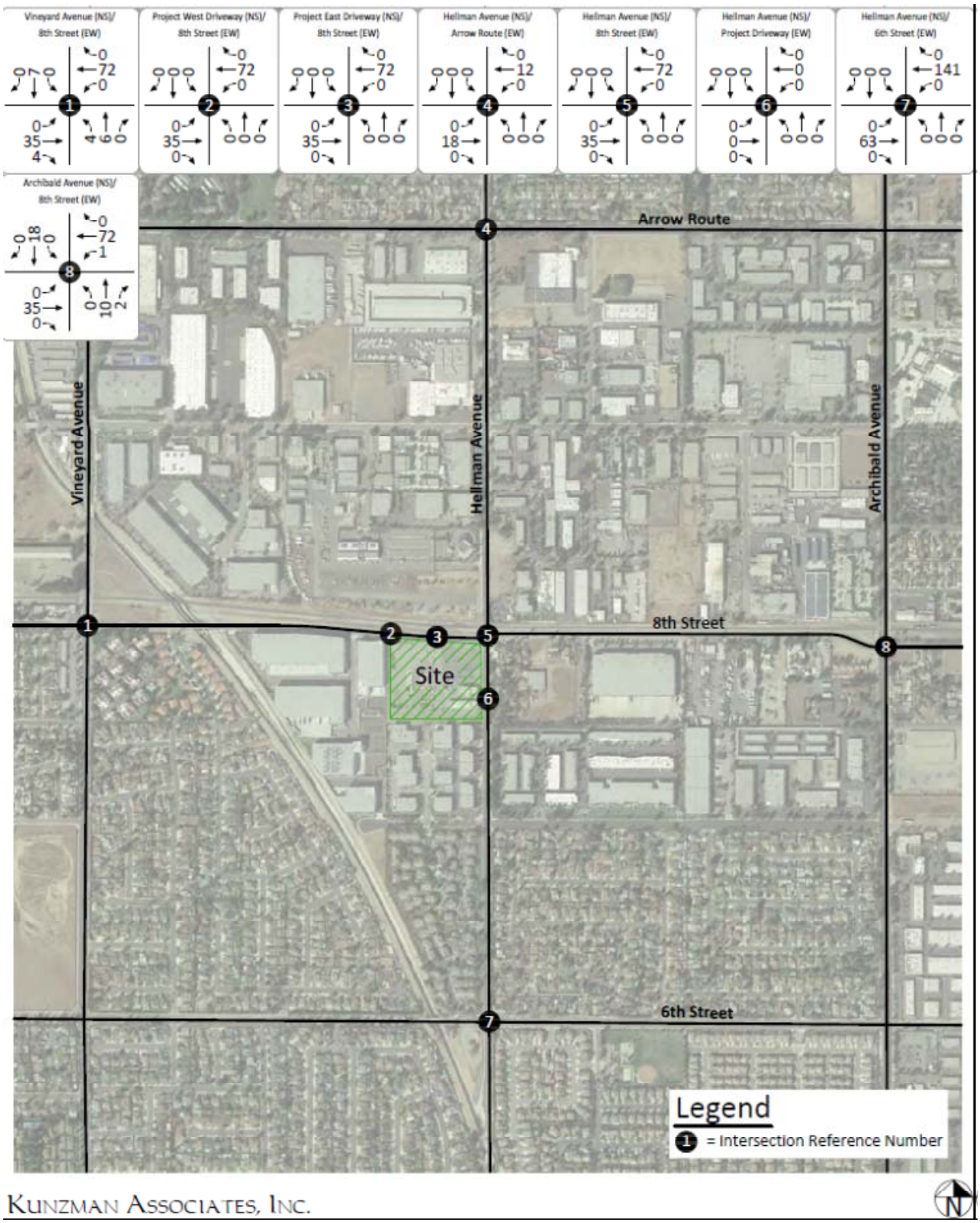


EXHIBIT 3-19
OTHER DEVELOPMENT AM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

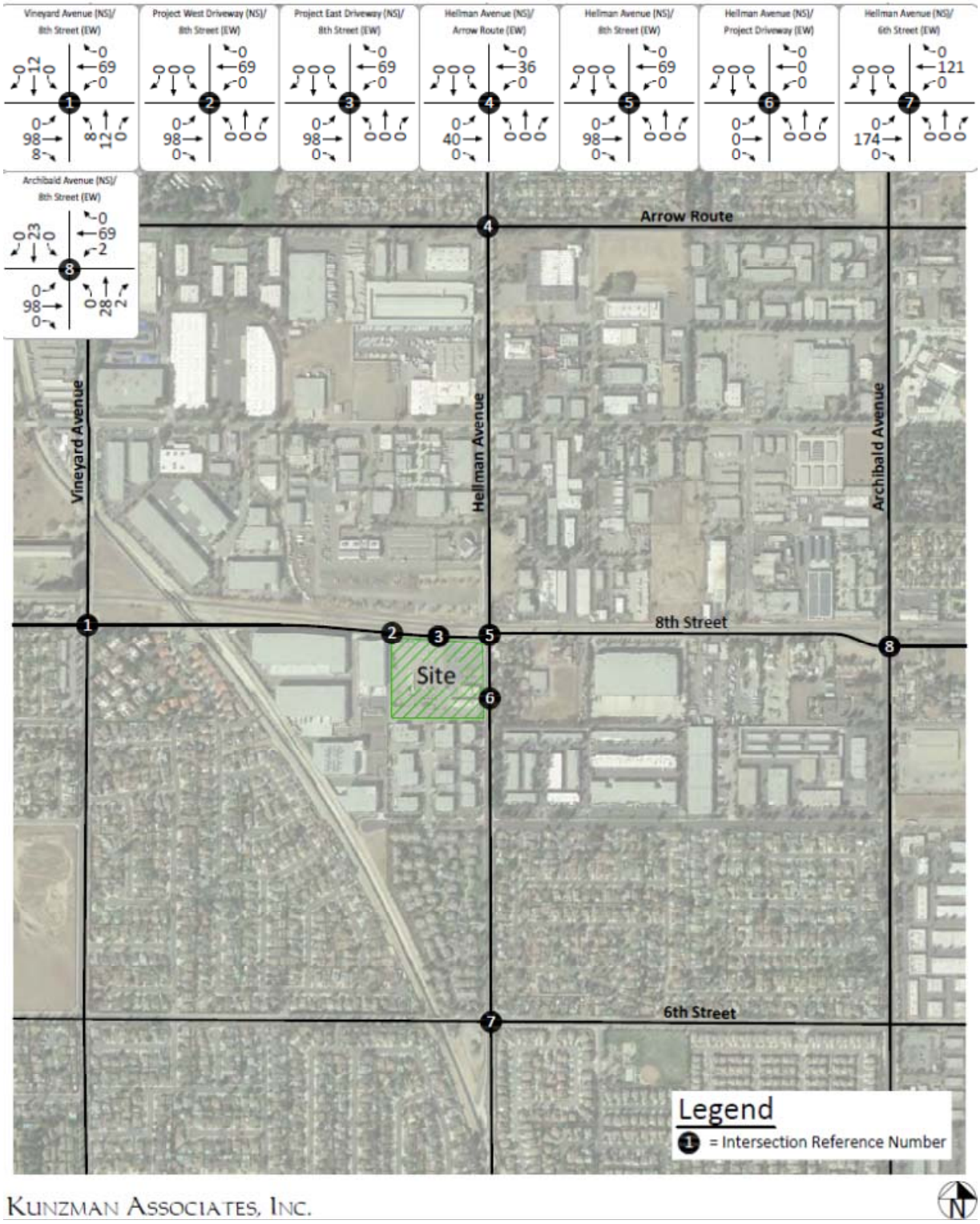


EXHIBIT 3-20
OTHER DEVELOPMENT PM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

To assess Opening year (2020) with project traffic conditions, project generated trips are added to Opening year (2020) without project traffic volumes. Opening Year (2020) With Project average daily traffic volumes are shown on Exhibit 3-27. Opening Year (2020) With Project morning and evening peak hour intersection turning movement volumes are shown on Exhibit 3-28 and 3-29, respectively.

Horizon Year (2040) Without Project average daily traffic volumes are shown on Exhibit 3-30. Horizon Year (2040) Without Project morning and evening peak hour intersection turning movement volumes are shown on Exhibit 3-31 and 3-32, respectively. To assess Horizon Year (2040) With Project traffic conditions, project generated trips are added to Horizon Year (2040) Without Project traffic volumes. Horizon Year (2040) With Project average daily traffic volumes are shown on Exhibit 3-33. Horizon Year (2040) With Project evening peak hour intersection turning movement volumes are shown on Exhibit 3-34 and 3-35, respectively.[136]

The Hellman Avenue and 8th Street intersection is currently under construction with an estimated completion date of June 2018 for roadway widening and traffic signal installation. The Existing plus Project traffic conditions assume that the intersection will be operational at the currently proposed configuration as provided by the plans for this Capital Improvement Program project (see Appendix G). The Existing plus Project delay and Levels of Service for the study intersections are shown in Table 3-14. Table 3-14 shows delay values based on the lane geometries at the study intersections without and with improvements.

[136] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

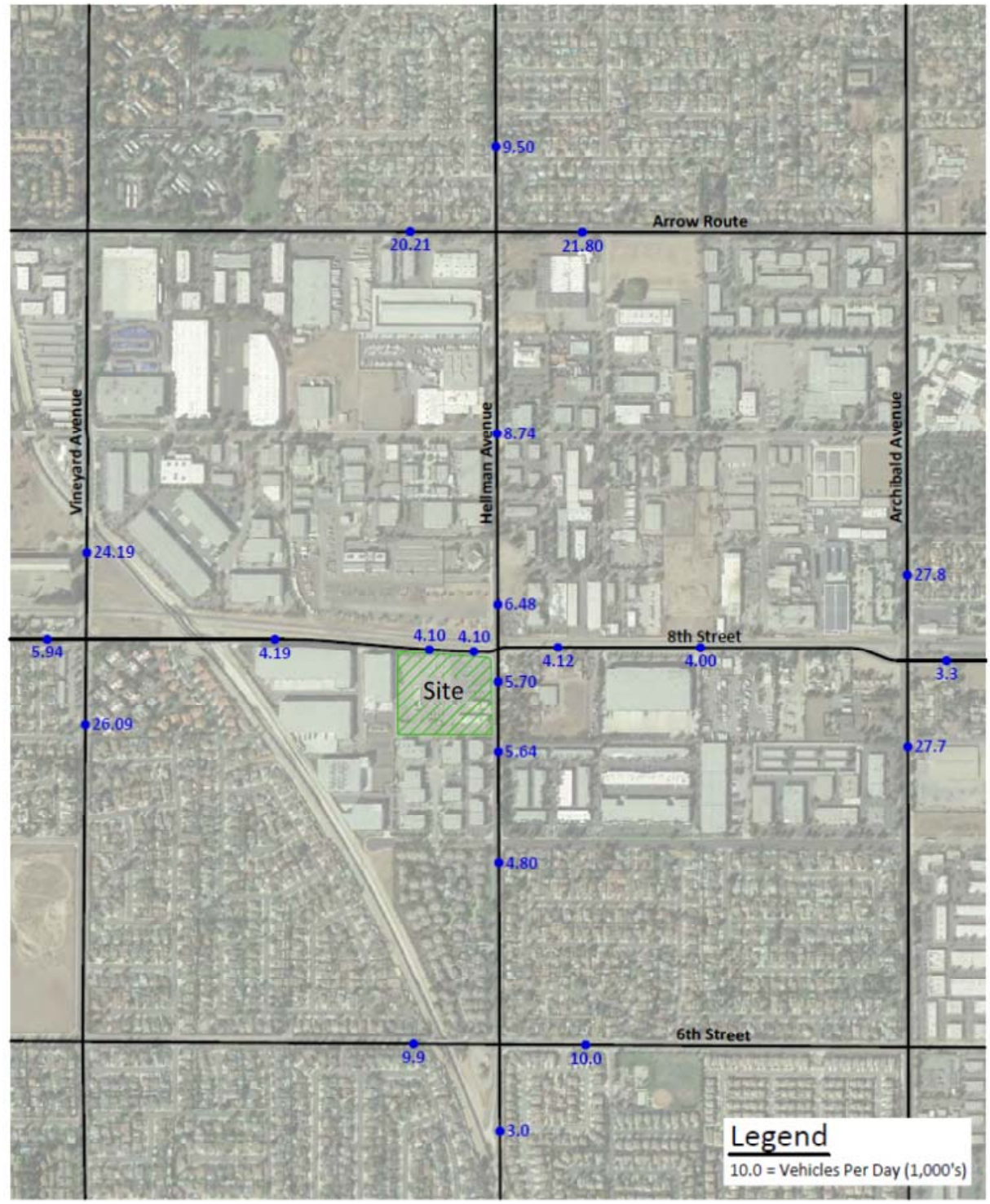


EXHIBIT 3-21
EXISTING PLUS PROJECT AVERAGE DAILY TRAFFIC VOLUMES
SOURCE: KUNZMAN ASSOCIATES, INC.

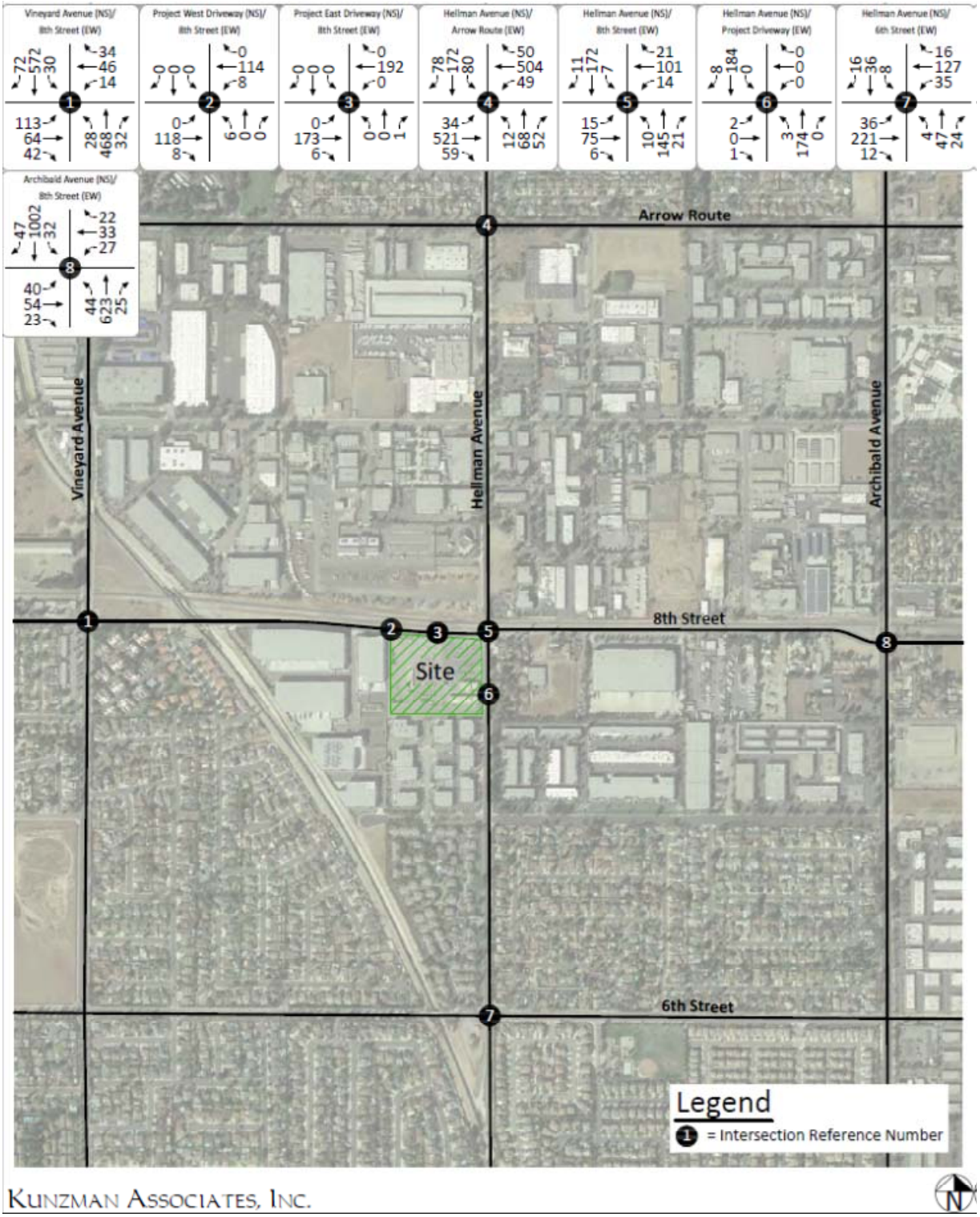


EXHIBIT 3-22
EXISTING PLUS PROJECT AM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

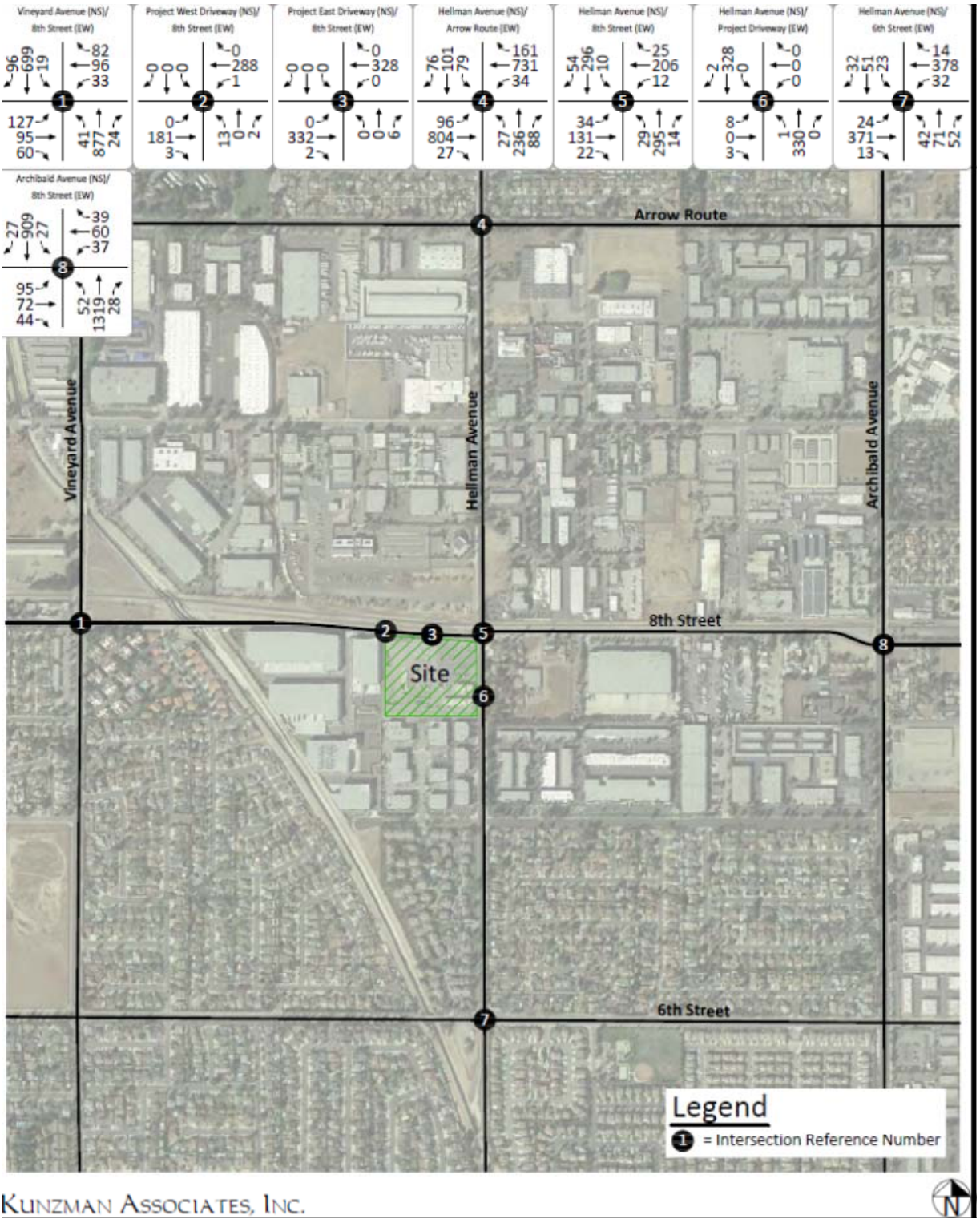


EXHIBIT 3-23
EXISTING PLUS PROJECT PM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

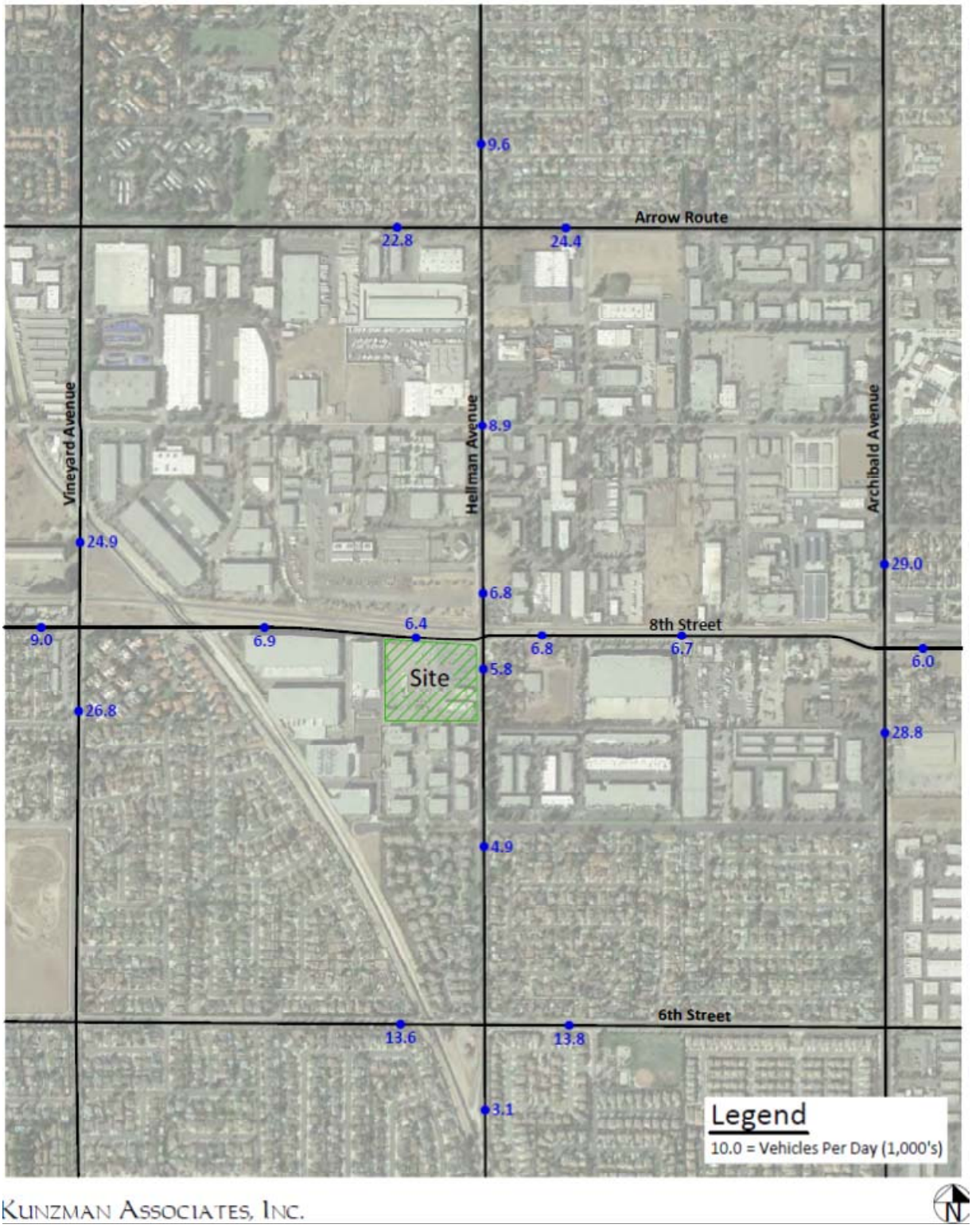


EXHIBIT 3-24
OPENING YEAR (2020) WITHOUT PROJECT AVERAGE DAILY TRAFFIC VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

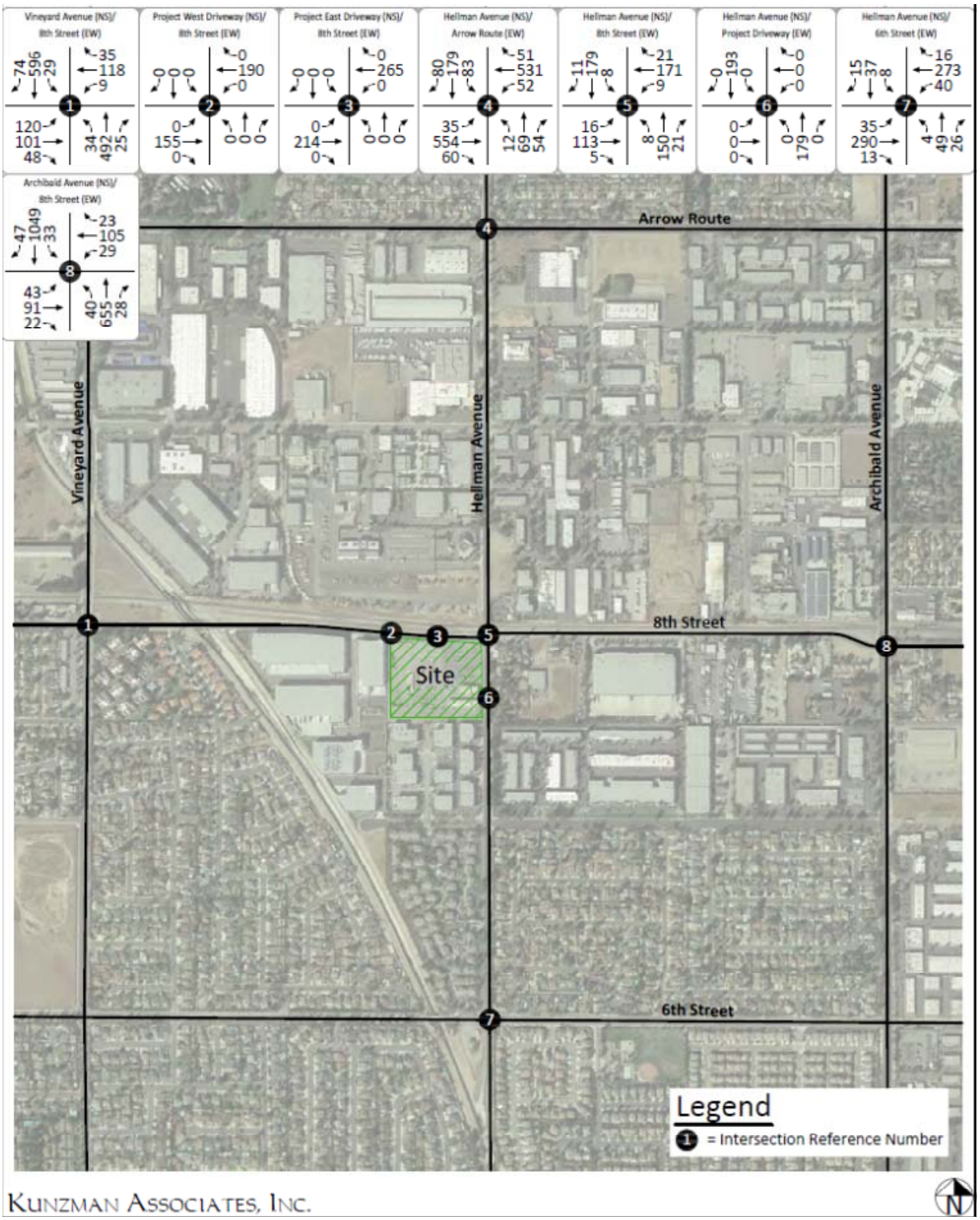


EXHIBIT 3-25
OPENING YEAR (2020) WITHOUT PROJECT AM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

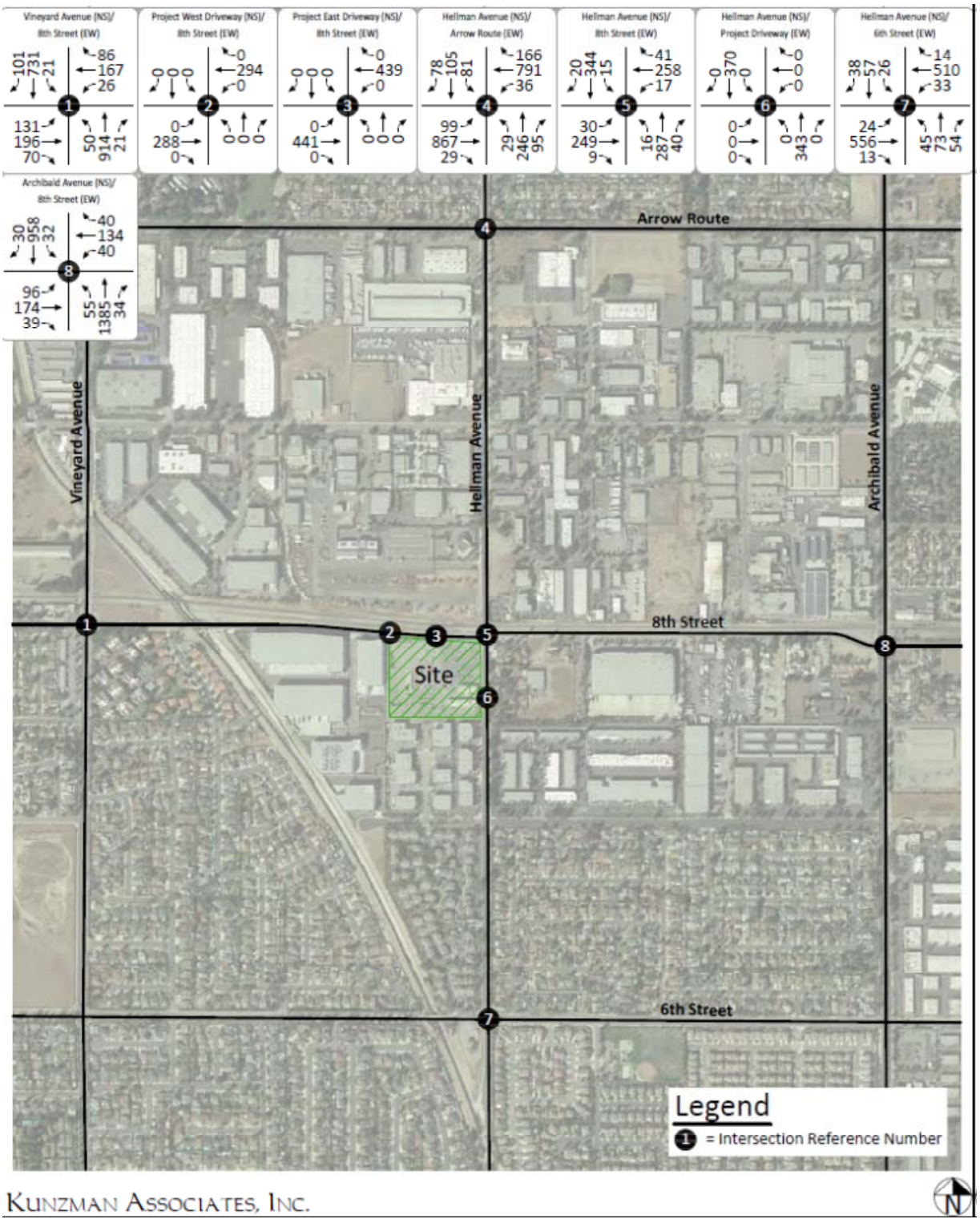


EXHIBIT 3-26
OPENING YEAR (2020) WITHOUT PROJECT PM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

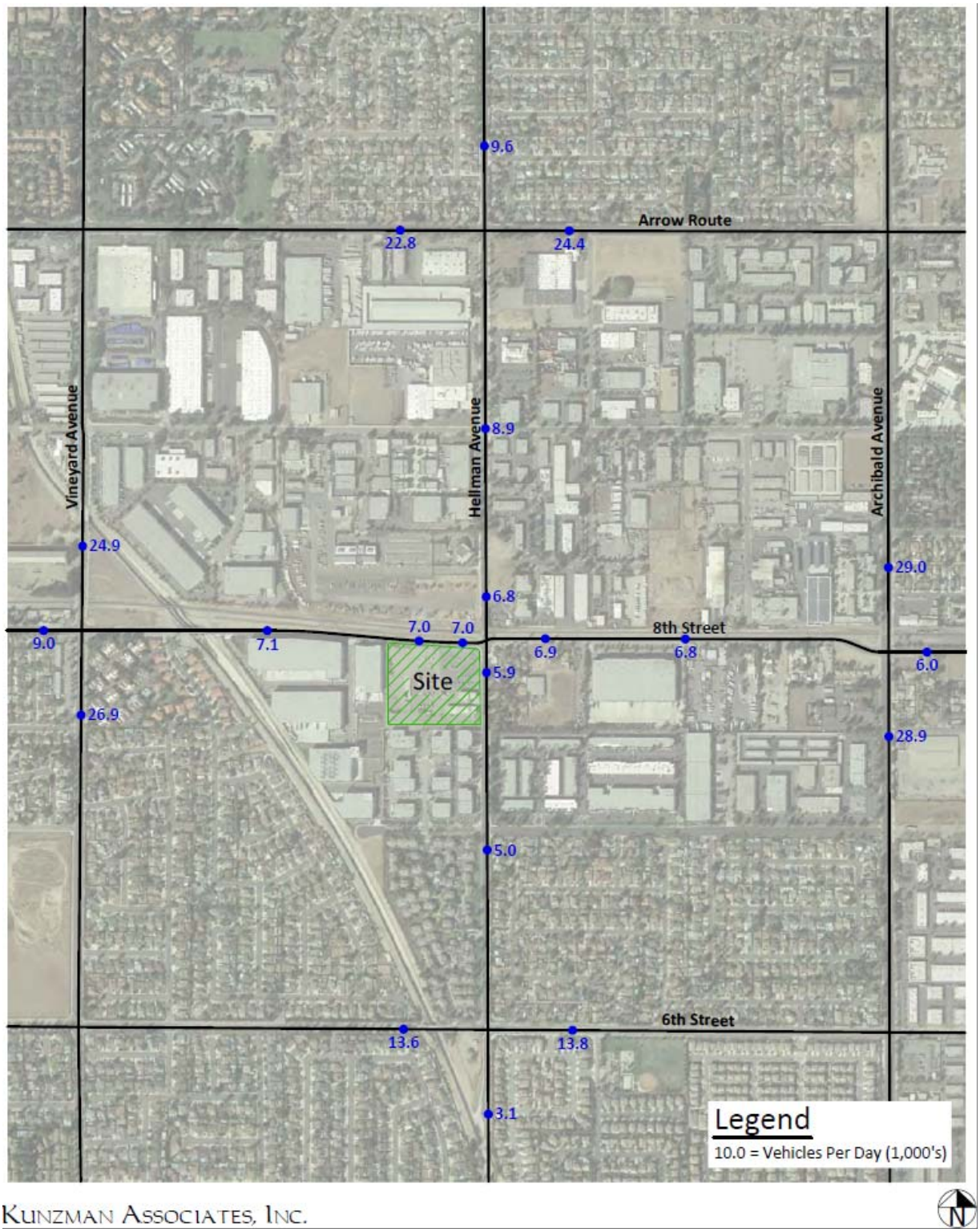


EXHIBIT 3-27
OPENING YEAR (2020) WITH PROJECT AVERAGE DAILY TRAFFIC VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

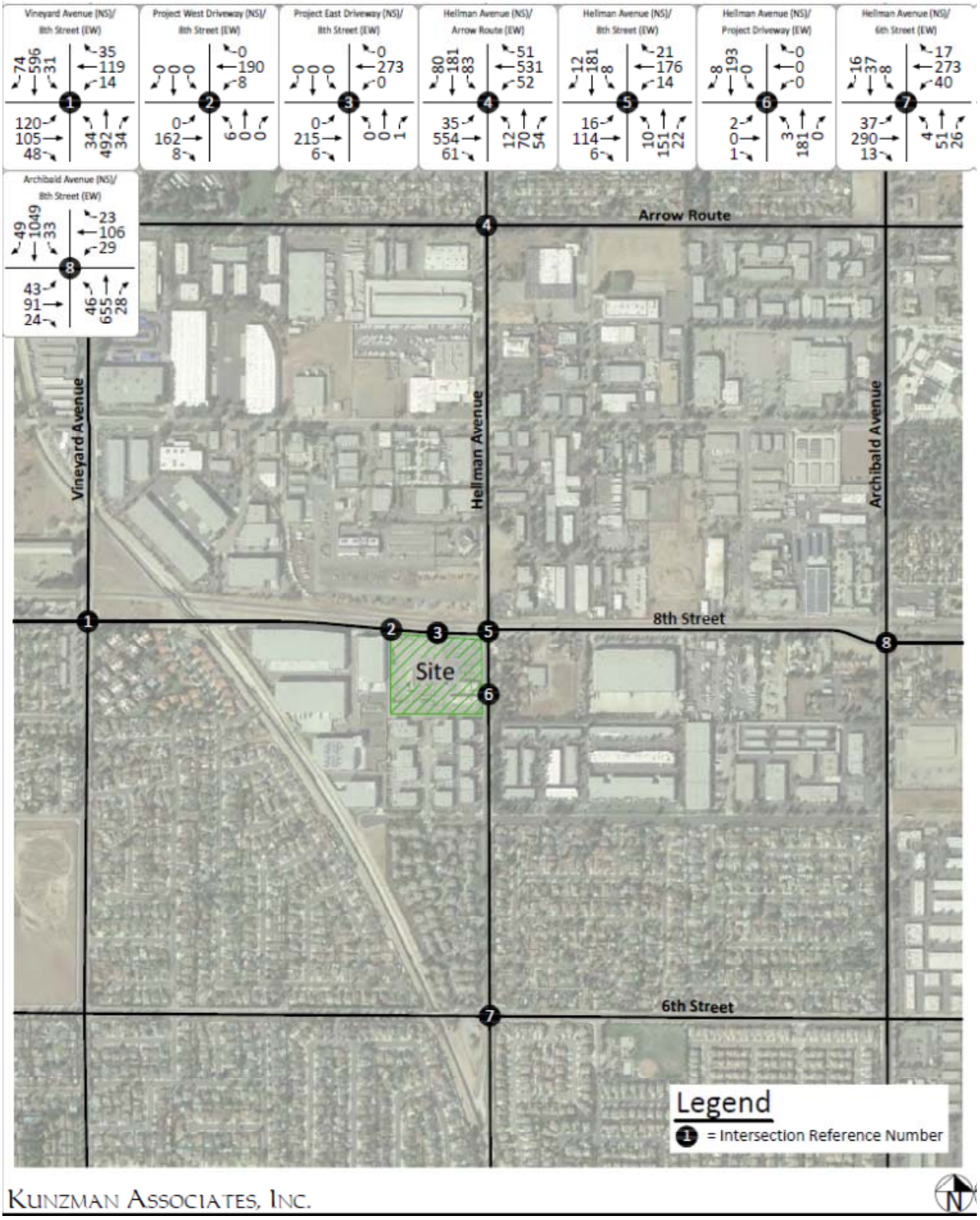
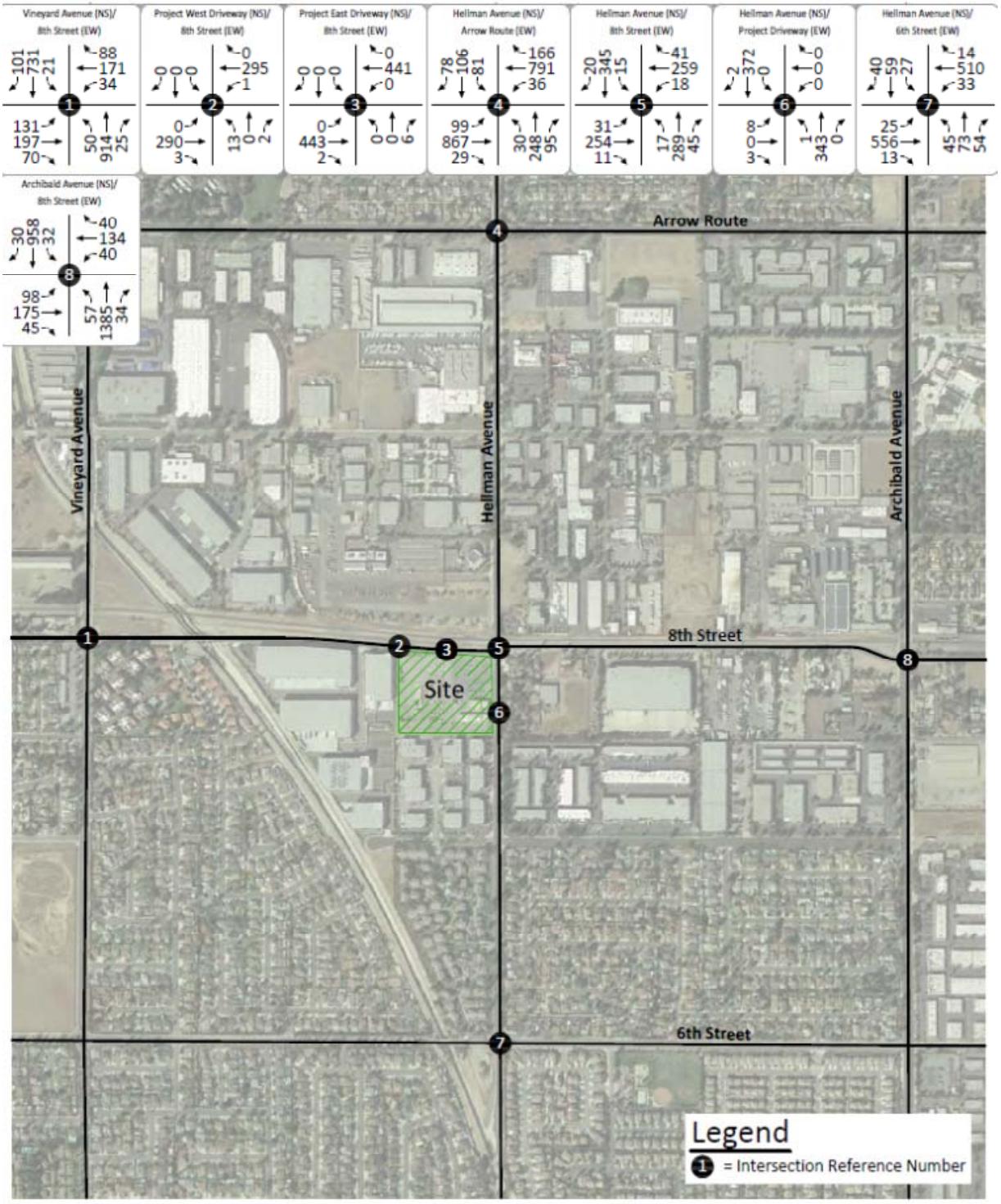


EXHIBIT 3-28
OPENING YEAR (2020) WITH PROJECT AM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.



KUNZMAN ASSOCIATES, INC.

EXHIBIT 3-29
OPENING YEAR (2020) WITH PROJECT PM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

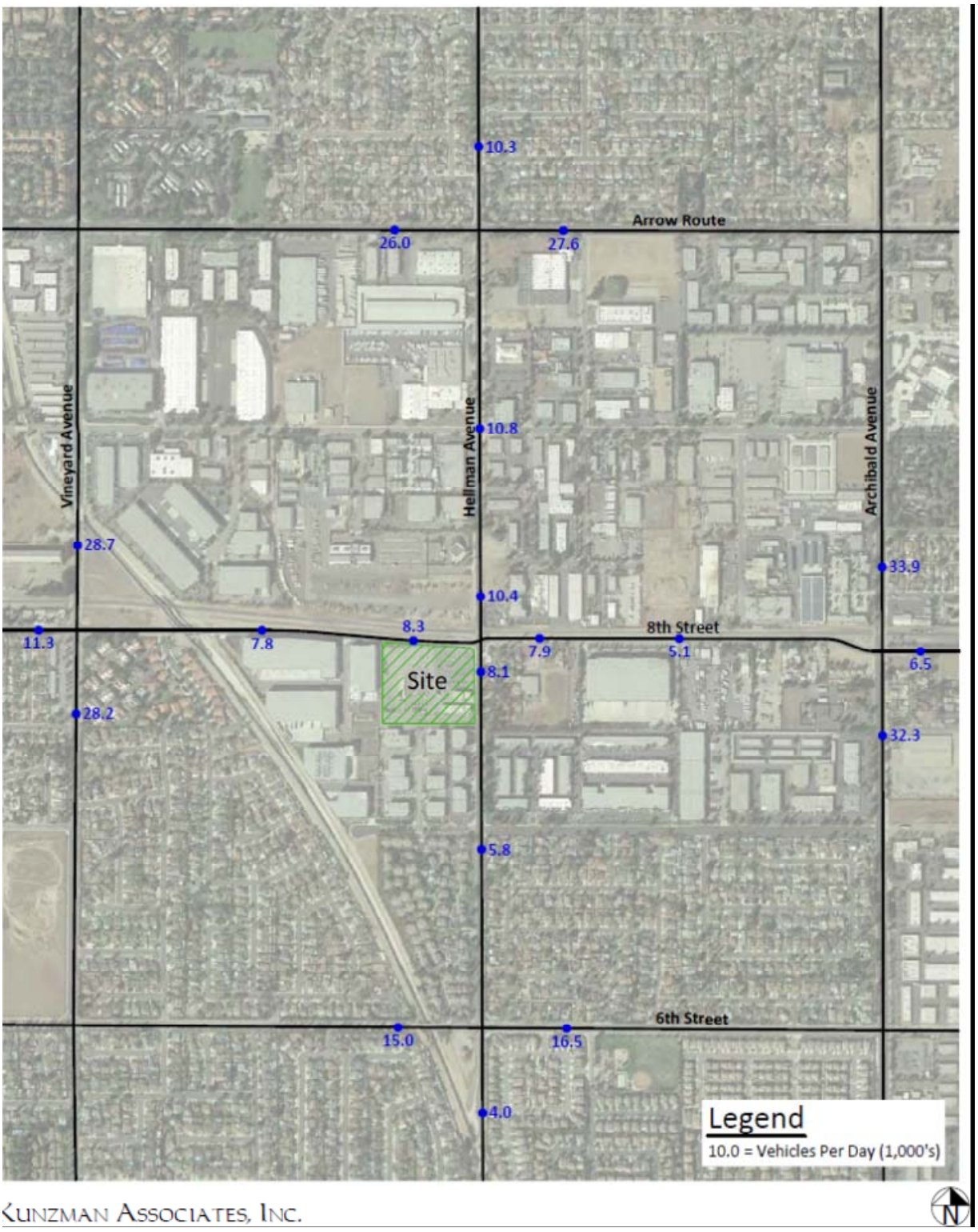
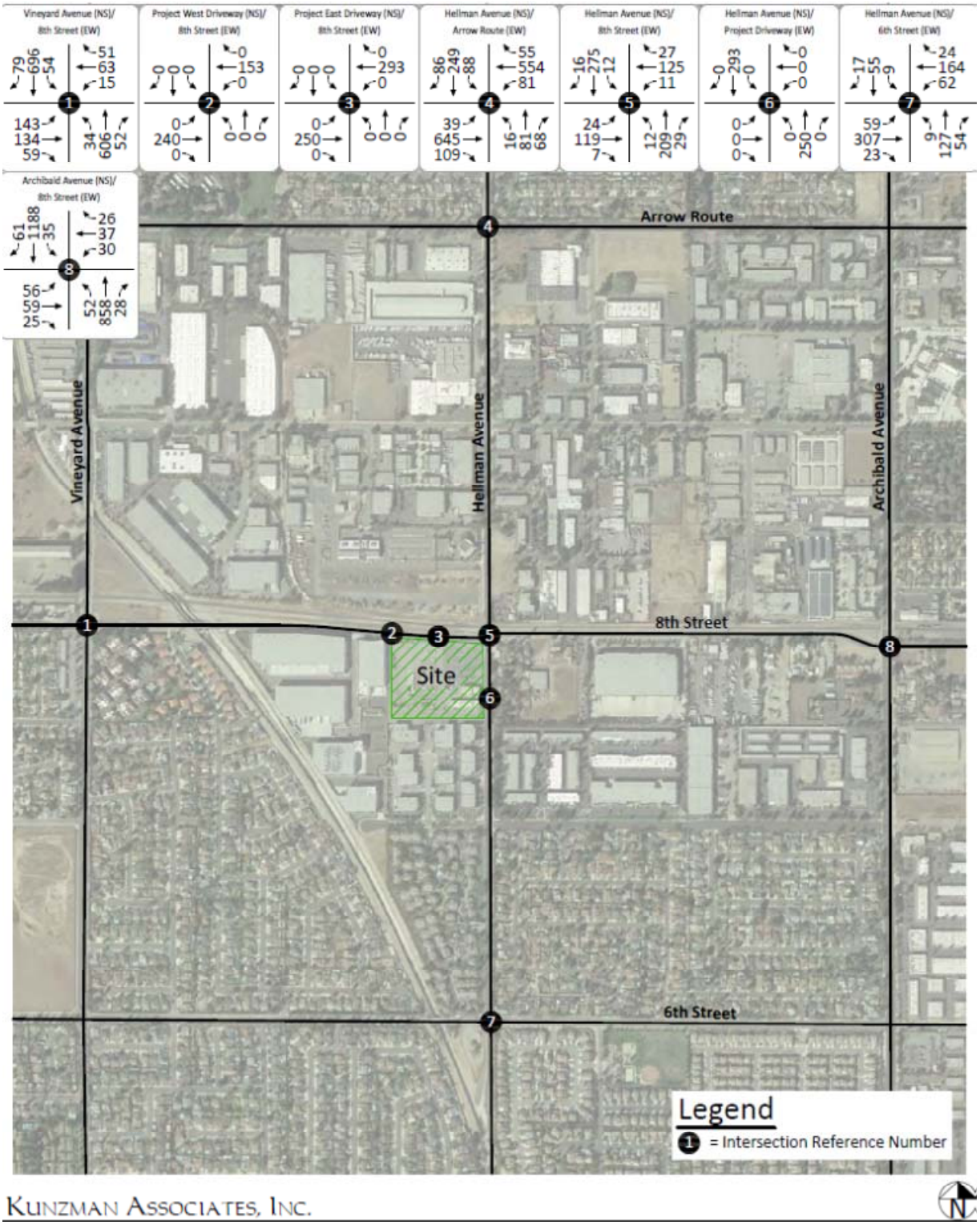


EXHIBIT 3-30
HORIZON YEAR (2040) WITHOUT PROJECT AVERAGE DAILY TRAFFIC VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.



KUNZMAN ASSOCIATES, INC.

EXHIBIT 3-31
HORIZON YEAR (2040) WITHOUT PROJECT AM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

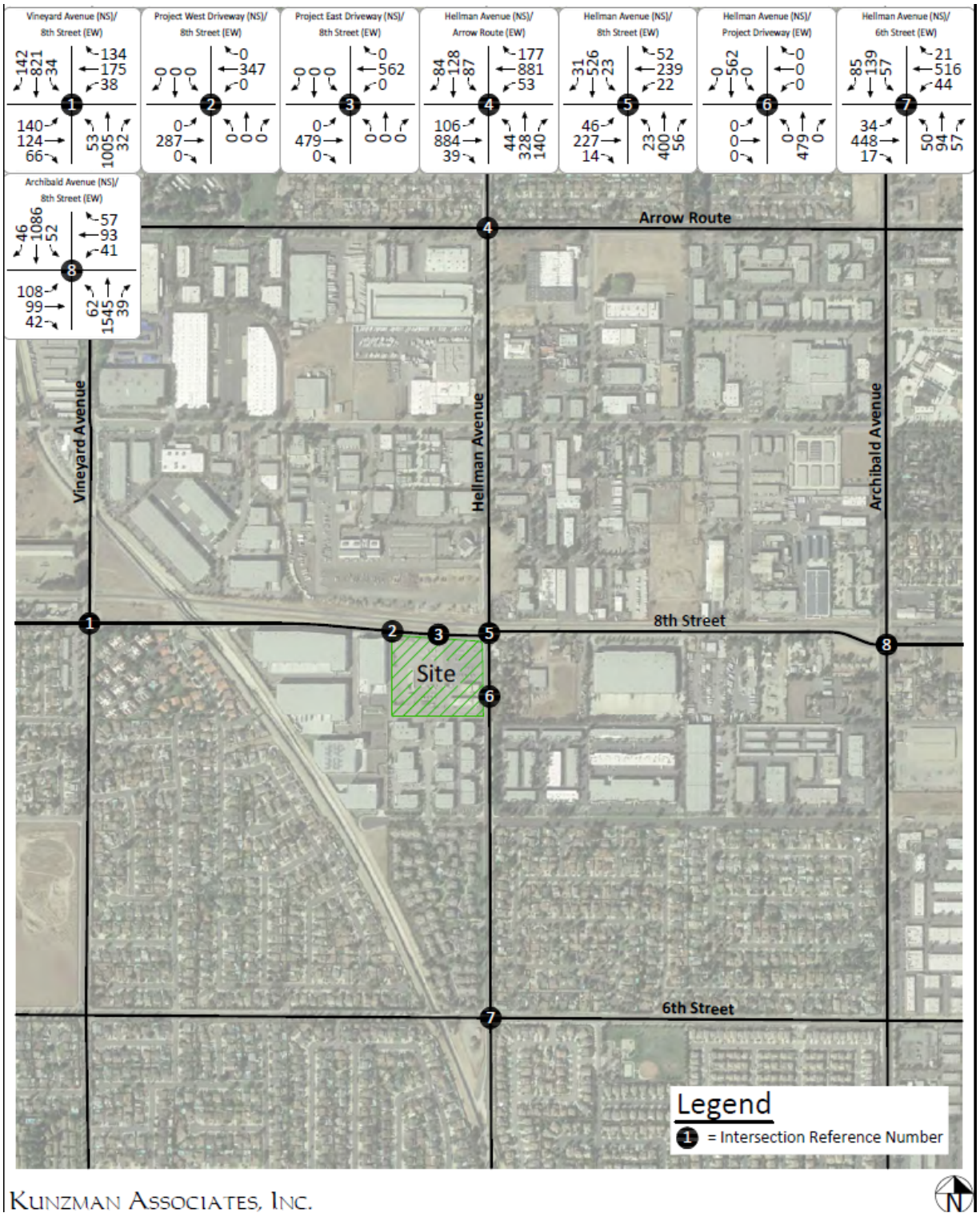
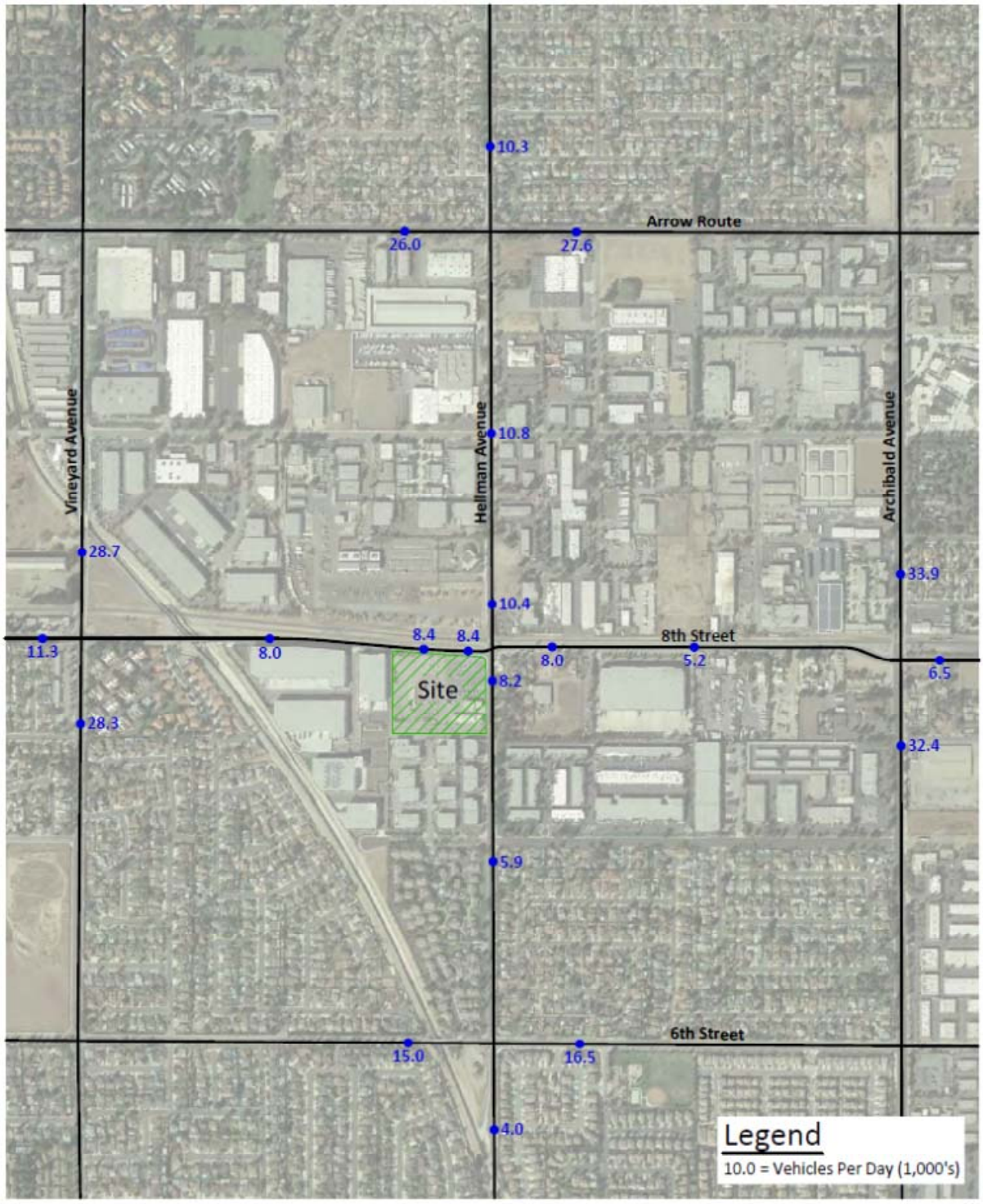


EXHIBIT 3-32
HORIZON YEAR (2040) WITHOUT PROJECT PM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.



KUNZMAN ASSOCIATES, INC.

EXHIBIT 3-33
HORIZON YEAR (2040) WITH PROJECT AVERAGE DAILY TRAFFIC VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

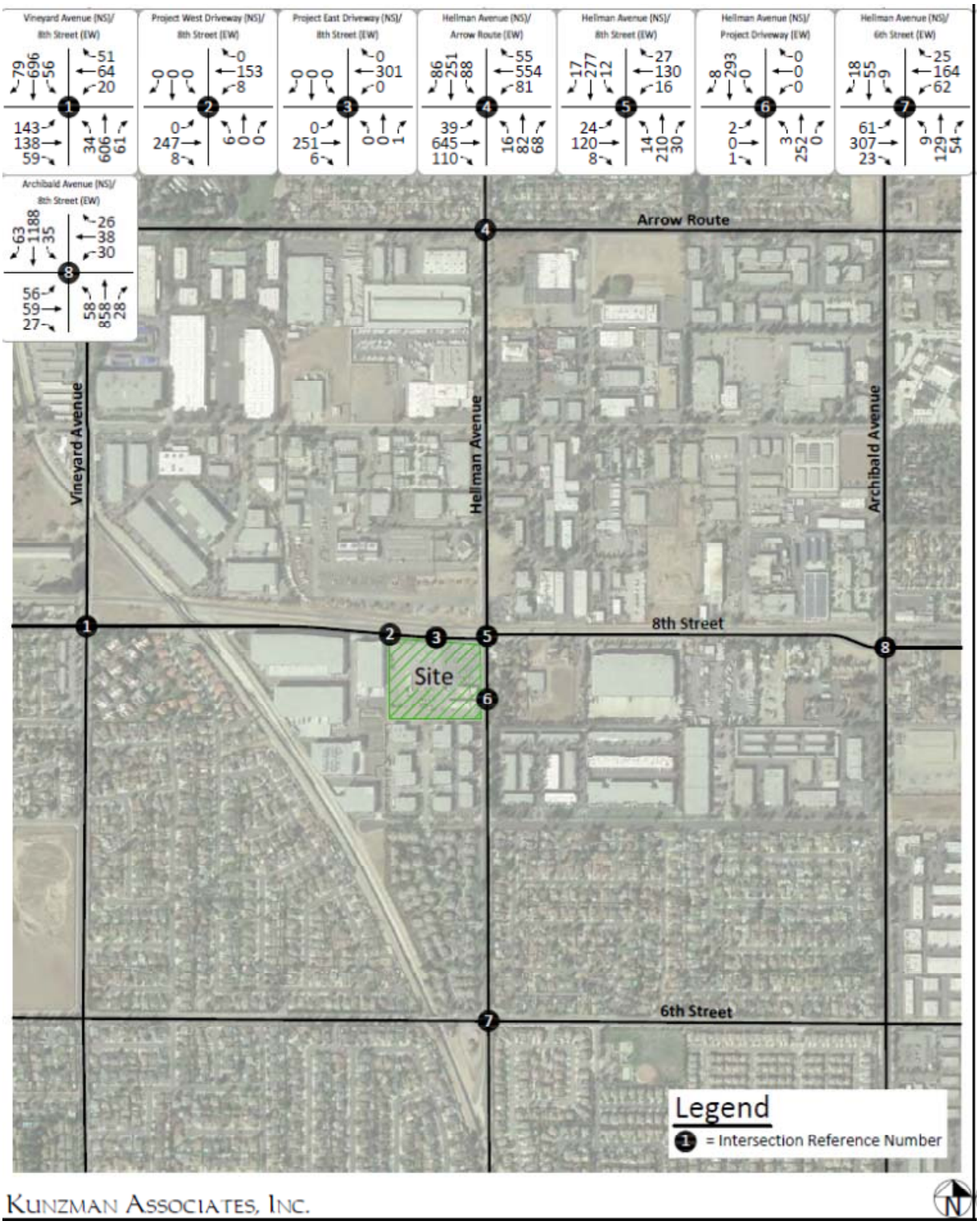


EXHIBIT 3-34
HORIZON YEAR (2040) WITH PROJECT AM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

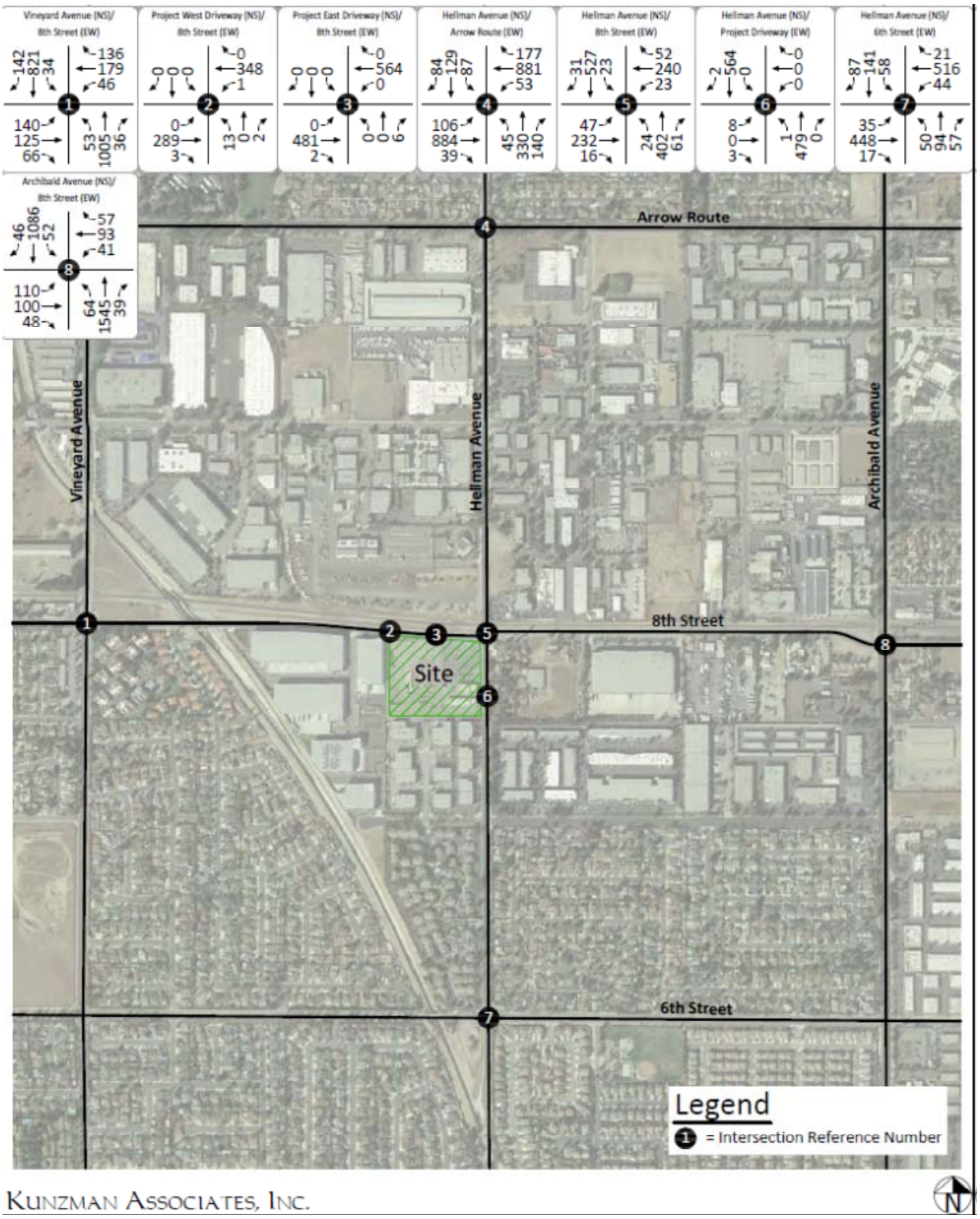


EXHIBIT 3-35
HORIZON YEAR (2040) WITH PROJECT PM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

Table 3-13
Existing Plus Project Levels of Service for the Study Intersections

Intersection	Traffic Control	Intersection Approach Lanes												Peak Hour Delay – Level of Service			
		Northbound			Southbound			Eastbound			Westbound			Existing Without Project		Existing With Project	
		L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
Vineyard Avenue (NS) at: 8th Street (EW) -# 1	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1	1	11.4- B	13.1-B	11.5-B	13.2-B
Project West Access (NS) at: 8th Street (EW) -# 2	CSS	0.5	0	0.5	0	0	0	0	0.5	0.5	0.5	0.5	0	--	--	10.1-B	12.1-B
Project East Access (NS) at: 8th Street (EW) -# 3	CSS	0.5	0	0.5	0	0	0	0	0.5	0.5	0	1	0	--	--	9.2-A	10.3-B
Hellman Avenue (NS) at:																	
Arrow Route (EW) - #4	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	20.3-C	19.2-B	20.3-C	19.2-B
8th Street (EW) - #5	TS	0	1	0	0	1	0	1	0.5	0.5	1	0.5	0.5	22.8-C	40.7-D	23.2-C	41.5-D
Project South Access (EW) - #6	CSS	0.5	0.5	0	0	0.5	0.5	0.5	0	0.5	0	0	0	--	--	10.9-B	14.3-B
6th Street (EW) - #7	AWS	0.5	1.5	d	d	0.5	1	1	0.5	0.5	1	1	1	10.4-B	21.9-C	10.4-B	22.1-C
Archibald Avenue (NS) at: 8th Street (EW) - #8	TS	1	2	d	1	1.5	0.5	1	0.5	0.5	1	0.5	0.5	8.8-A	12.6-B	9.0-A	12.7-B

As shown in Table 3-13, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the morning and evening peak hours for Existing plus Project traffic conditions; therefore, the proposed project is forecast to result in no significant impacts at the study intersections for Existing plus Project traffic conditions.[137] The Opening Year (2020) Without Project delay and Levels of Service for the study intersections are shown in Table 3-14. Table 3-14 shows delay values based on lane geometries at the study intersections without and with improvements. As shown in Table 3-14 for Opening Year (2020) Without Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements:

Hellman Avenue (NS) at:

6th Street (EW) - #7.

[137] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

The Hellman Avenue and 6th Street intersection is programmed for the installation of a traffic signal per the City of Rancho Cucamonga Capital Improvement Program. For Opening Year (2020) and Horizon Year (2040) traffic conditions, the traffic signal is shown as a funded improvement.[138]

Table 3-14
Opening Year (2020) Intersection Delay and Levels of Service

Intersection	Traffic Control	Intersection Approach Lanes												Peak Hour Delay – Level of Service			
		Northbound			Southbound			Eastbound			Westbound			Without Project		With Project	
		L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
Vineyard Avenue (NS) at: 8th Street (EW) -# 1	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1	1	13.0- B	14.8-B	13.1-B	14.9B
Project West Access (NS) at: 8th Street (EW) -# 2	CSS	0.5	0	0.5	0	0	0	0	0.5	0.5	0.5	0.5	0	--	--	11.1-B	13.4-B
Project East Access (NS) at: 8th Street (EW) -# 3	CSS	0.5	0	0.5	0	0	0	0	0.5	0.5	0	1	0	--	--	9.5-A	11.2-B
Hellman Avenue (NS) at:																	
Arrow Route (EW) - #4	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	20.2-C	19.4-B	20.2-C	19.4-B
8th Street (EW) - #5	TS	0	1	0	0	1	0	1	0.5	0.5	1	0.5	0.5	24.1-C	49.0-D	24.3-C	50.1-D
Project South Access (EW) - #6	CSS	0.5	0.5	0	0	0.5	0.5	0.5	0	0.5	0	0	0	--	--	11.1-B	15.1-B
6th Street (EW) - #7	AWS	0.5	1.5	d	0.5	0.5	1	1	0.5	0.5	1	1	1	14.4-B	86.8-F	14.4-B	87.4-F
- With Improvements	TS	0.5	1.5	d	0.5	0.5	1	1	0.5	0.5	1	1	1	19.3-B	18.1-B	19.3-B	18.1-B
Archibald Avenue (NS) at: 8th Street (EW) - #8	TS	1	2	d	1	1.5	0.5	1	0.5	0.5	1	0.5	0.5	11.5-B	14.8-B	11.7-B	14.7-B

The Opening Year (2020) With Project delay and Levels of Service for the study intersections are shown in Table 3-15. Table 3-15 shows delay values based on the lane geometries at the study intersections without and with improvements. As shown in Table 3-15 for Opening Year (2020) With Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements:[139]

[138] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018

[139] Ibid.

Hellman Avenue (NS) at:

6th Street (EW) - #7

The Hellman Avenue and 6th Street intersection is programmed for the installation of a traffic signal per the City of Rancho Cucamonga Capital Improvement Program. For Opening Year (2020) and Horizon Year (2040) traffic conditions, the traffic signal is shown as a funded improvement.[140]

The Horizon Year (2040) Without Project delay and Levels of Service for the study intersections are shown in Table 3-15. Table 3-15 shows delay values based on the lane geometries at the study intersections without and with improvements.

Table 3-15
Horizon Year (2040) Intersection Delay and Levels of Service

Intersection	Traffic Control	Intersection Approach Lanes												Peak Hour Delay – Level of Service			
		Northbound			Southbound			Eastbound			Westbound			Without Project		With Project	
		L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
Vineyard Avenue (NS) at: 8th Street (EW) -# 1	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1	1	13.1- B	15.4-B	13.2-B	15.5-B
Project West Access (NS) at: 8th Street (EW) -# 2	CSS	0.5	0	0.5	0	0	0	0	0.5	0.5	0.5	0.5	0	--	--	11.3-B	13.8-B
Project East Access (NS) at: 8th Street (EW) -# 3	CSS	0.5	0	0.5	0	0	0	0	0.5	0.5	0	1	0	--	--	9.6-A	11.4-B
Hellman Avenue (NS) at:																	
Arrow Route (EW) - #4	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	19.1-B	19.5-B	19.1-B	19.5-B
8th Street (EW) - #5	TS	0	1	0	0	1	0	1	0.5	0.5	1	0.5	0.5	24.6-C	51.6-D	24.9-C	52.4-D
Project South Access (EW) - #6	CSS	0.5	0.5	0	0	0.5	0.5	0.5	0	0.5	0	0	0	--	--	12.6-B	20.8-C
6th Street (EW) - #7	AWS	0.5	1.5	d	0.5	0.5	1	1	0.5	0.5	1	1	1	12.7-B	74.8-F	12.7-B	75.2-F
- With Improvements	TS	0.5	1.5	d	0.5	0.5	1	1	0.5	0.5	1	1	1	--	--	--	--
Archibald Avenue (NS) at: 8th Street (EW) - #8	TS	1	2	d	1	1.5	0.5	1	0.5	0.5	1	0.5	0.5	9.8-B	16.9-B	9.9-A	17.1-B

[140] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

As shown in Table 3-16 for Horizon Year (2040) Without Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements:

Hellman Avenue (NS) at:

6th Street (EW) - #7

The Hellman Avenue and 6th Street intersection is programmed for the installation of a traffic signal per the City of Rancho Cucamonga Capital Improvement Program. For Opening Year (2020) and Horizon Year (2040) traffic conditions, the traffic signal is shown as a funded improvement.[141]

The Horizon Year (2040) With Project delay and Levels of Service for the study intersections are shown in Table 3-16. Table 3-16 shows delay values based on the lane geometries at the study intersections without and with improvements. As shown in Table 3-16 for Horizon Year (2040) Without Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements:

Hellman Avenue (NS) at:

6th Street (EW) - #7

The Hellman Avenue and 6th Street intersection is programmed for the installation of a traffic signal per the City of Rancho Cucamonga Capital Improvement Program. For Opening Year (2020) and Horizon Year (2040) traffic conditions, the traffic signal is shown as a funded improvement.[142] For "With Project" traffic conditions, the project generated less than 50 peak hour trips at the study intersections and project trips did not result in a significant impact at the study intersections. No study intersections were reduced from the pre-project from Level of Service D or better to the "With Project" of Level of Service E or worse for Existing plus Project traffic conditions.[143] As a result, the potential impacts are considered to be less than significant.

B. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways? ● Less than Significant Impact.

The Traffic Impact Analysis that was prepared indicated that the project's traffic would not impact any San Bernardino Congestion Management Plan (CMP) intersection. As a result, the potential impacts are considered to be less than significant.

[141] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

[142] Ibid.

[143] Ibid.

C. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in the location that results in substantial safety risks? ● No Impact.

The project site is not located within an approach or take-off aircraft safety zone for the Ontario Airport (refer to Section 3.12.2.E). As a result, no impacts are anticipated.

D. Substantially increases hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? ● Less than Significant Impact with Mitigation.

Project access is proposed to be provided via two driveways on 8th Street and one driveway on Hellman Avenue. The project east driveway on 8th Street shall be restricted to right turns in/ out only (cars only). Off-site roadway improvements were identified to eliminate any anticipated roadway operational deficiencies for which the project contributes a significant impact throughout the study area. On-site improvements and improvements adjacent to the site will be required in conjunction with the proposed development to ensure adequate circulation within the project itself.[144] The following off-site mitigation is required:

Mitigation Measure No. 8 (Transportation). The proposed project must contribute through the City of Ranch Cucamonga Development Impact Fee (DIF) program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016).

Site-specific circulation and access recommendations are depicted on Exhibit 3-36. These recommendations are reiterated as mitigation measures below:

Mitigation Measure No. 9 (Transportation). The Applicant must construct and/or repair Hellman Avenue from the west project boundary to 8th Street at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

Mitigation Measure No. 10 (Transportation). The Applicant must construct and/or repair 8th Street from Hellman Avenue to the south project boundary at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

Mitigation Measure No. 11 (Transportation). The Applicant must ensure that on-site traffic signing and striping is implemented in conjunction with detailed construction plans for the project. On-site traffic control plans must comply with the California Manual of Uniform Traffic Control Devices (2014).

[144] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

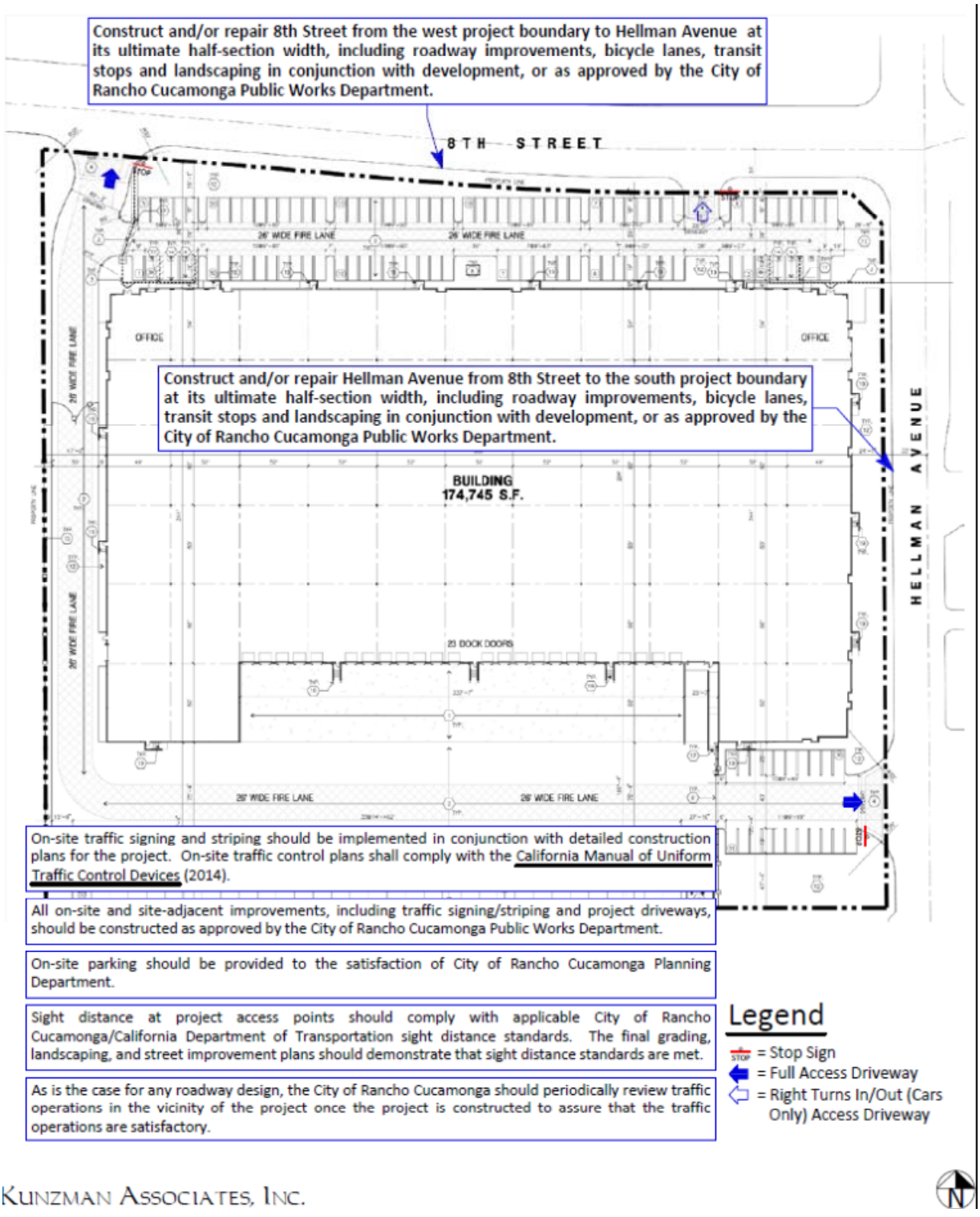


EXHIBIT 3-36
ON-SITE MITIGATION MEASURES
SOURCE: KUNZMAN ASSOCIATES, INC.

Mitigation Measure No. 12 (Transportation). The Applicant must ensure that all on-site and site-adjacent improvements, including traffic signing/striping and project driveways, be constructed as approved by the City of Rancho Cucamonga Public Works Department.

Sight distance at project access points should comply with applicable City of Rancho Cucamonga/California Department of Transportation sight distance standards. The final grading, landscaping, and street improvement plans should demonstrate that sight distance standards are met. As is the case for any roadway design, the City of Rancho Cucamonga should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory. Adherence to the ab0vementioned mitigation will reduce impacts to levels that are less than significant.

E. Result in inadequate emergency access? ● No Impact.

The project would not affect emergency access to any adjacent parcels. At no time will any local streets or parcels be closed to traffic. As a result, the proposed project's implementation will not result in any impacts.

F. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities? ● Less than Significant Impact.

The Applicant will provide new pedestrian facilities (sidewalks), bicycle lanes, and a transit stop as part of the project's approval. As a result, the potential impacts are considered to be less than significant.

3.16.3 CUMULATIVE IMPACTS

The future development contemplated as part of the proposed project's implementation would not result in significant traffic impacts. The project would be required to contribute to the City's Development Impact Fee program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016).

3.16.4 MITIGATION MEASURES

The analysis determined that following mitigation measures are required:

Mitigation Measure No. 8 (Transportation). The proposed project must contribute through the City of Ranch Cucamonga Development Impact Fee (DIF) program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016).

Site-specific circulation and access recommendations are depicted on Exhibit 3-36. These recommendations are reiterated as mitigation measures below:

Mitigation Measure No. 9 (Transportation). The Applicant must construct and/or repair Hellman Avenue from the west project boundary to 8th Street at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

Mitigation Measure No. 10 (Transportation). The Applicant must construct and/or repair 8th Street from Hellman Avenue to the south project boundary at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

Mitigation Measure No. 11 (Transportation). The Applicant must ensure that on-site traffic signing and striping is implemented in conjunction with detailed construction plans for the project. On-site traffic control plans must comply with the California Manual of Uniform Traffic Control Devices (2014).

Mitigation Measure No. 12 (Transportation). The Applicant must ensure that all on-site and site-adjacent improvements, including traffic signing/striping and project driveways, be constructed as approved by the City of Rancho Cucamonga Public Works Department.

3.17 TRIBAL CULTURAL RESOURCES

3.17.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant adverse impact on tribal cultural resources if it results in:

- A substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k); or,

- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

3.17.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)? ● Less than Significant Impact with Mitigation.

As defined in Public Resources Code 21074 and applying the criteria located in Public Resources Code Section 5024.1(c), the project site has not been identified as a "Historic Resource" per the standards of Rancho Cucamonga Municipal Code Section 2.24 (Historic Preservation). A Phase I Cultural Resources Assessment (MIG Hogle-Ireland, 2016) was performed on the project site. In conjunction with the South Central Coastal Information Center at California State University, Fullerton, the California Historical Resources Information was also consulted. The cultural resources records search indicated that there were no historic resources within the project site and none were identified during the pedestrian survey.

The cultural resources records search identified a total of three cultural resource investigations that have been conducted within a one-mile radius of the project site; these include three man-made resources. The three resources have been classified as residential homes; though none of these units are eligible for listing in either the National Register or the California Register due to room additions, alterations, and extensive remodeling. In addition, these historic resources will not be impacted by the proposed project.

The study also included consultation with Native American Heritage Commission and a requested review of the Sacred Lands Files (SLF) to determine if any recorded Native American sacred sites or locations of religious or ceremonial importance are present within one mile of the project site. The NAHC SLF records search results revealed that there are no known “Native American cultural resources” in the SLF database within the project site. As per NAHC suggested procedure, follow-up letters were sent via certified mail on October 13, 2015 to the eight Native American individuals and organizations identified by the NAHC as being affiliated with the vicinity of the project site to request any additional information they may have about Native American cultural resources that may be affected by the proposed project. As of November 9, 2015, the consultant had received one response concerning the proposed project. The Gabrieleno Band of Mission Indians – Kizh Nation requested that at least one Native American Monitor be present during all ground disturbing activities within the project area. No other responses from the Native American community concerning the proposed project were received. The study concludes with the absence of cultural resources in the current project area and surrounding vicinity, no additional cultural work is recommended.

As required by Senate Bill 18 (SB 18), the City submitted Tribal Consultation Requests for General Plan Amendment DRC2015-00683 to the Soboba Band of Luiseno Indians, the San Manuel Band of Mission Indians, the Gabrieleno Band of Mission Indians – Kizh Nation, the Gabrieleno/Tongva Nation, and the Gabrieleno/Tongva San Gabriel Band of Mission Indians. The notices were mailed on August 25, 2015 and provided for a 90-day comment period ending on November 23, 2015. Of the five tribes who were notified, none submitted a response requesting consultation during the notification period.

As required by Assembly Bill 52 (AB 52), the City submitted Tribal Consultation Requests to the Gabrieleno Band of Mission Indians – Kizh Nation, the Morongo Band of Mission Indians, Soboba Band of Luiseno Indians, the San Manuel Band of Mission Indians, the San Gabriel Band of Mission Indians, and the Torres Martinez Desert Cahuilla Indians following a completeness determination for Design Review DRC2015-00682. The notices were mailed on February 14, 2018 and provided for a 30-day comment period ending on March 19, 2018. Responses were received from two tribes: the San Manuel Band of Mission Indians and the Gabrieleno Band of Mission Indians – Kizh Nation. The San Manuel Band of Mission Indians did not request consultation, but did request that specific conditions related to funerary objects, cultural resources, and historical resources discovered during ground disturbing activities be addressed.

The Gabrieleno Band of Mission Indians – Kizh Nation requested consultation, which was held on March 21, 2018, and their comments are included in the mitigation measures below. Should any undocumented archaeological or cultural resources be discovered during ground disturbing activities, adherence to the mitigation measures listed below will ensure that all impacts will be less than significant:

> *Mitigation Measure No. 13 (Tribal Cultural Resources*). The applicant shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians to discuss Tribal Monitoring of the project during all ground disturbing activities, and any trenching below the initial grade level, to ensure that cultural resources that may be encountered during ground disturbances are protected and preserved for study. The monitor(s) must be approved by the Tribal Representatives and will be present on-site during ground disturbing activities. The Native American Monitor(s) will complete monitoring logs on a daily basis. The logs will provide descriptions of the daily activities, including construction activities, locations, soil, and any cultural materials identified. In addition, the monitor(s) will be required to provide insurance certificates, including liability insurance, for any archaeological resource(s) encountered during grading and excavation activities pertinent to the provisions outlined in the California Environmental Quality Act, California Public Resources Code Division 13, and Section 21083.2 (a) through (k). The on-site monitoring shall end when the project site grading and excavation activities are completed, or when the Tribal Representatives and monitor have indicated that the site has a low potential for archeological resources. The applicant shall submit the results of these consultations to the City prior to issuance of grading permits for the project site.

Mitigation Measure No. 14 (Tribal Cultural Resources). In the event that human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5, and that code shall be enforced for the duration of the project. Prior to the start of ground disturbing activities, the land owner shall arrange a designated site location within the footprint of the project for the respectful reburial of the human remains and/or ceremonial objects. Any discoveries of human skeletal material shall be immediately reported to the County Coroner. The monitor will then notify the Qualified Archaeologist and the construction manager who will call the coroner. Work will continue to be diverted while the coroner determines whether the remains are Native American. The discovery is to be kept confidential and secure to prevent any further disturbance. If Native American, the coroner will notify the NAHC as mandated by state law who will then appoint a Most Likely Descendent. In the case where discovered human remains cannot be fully documented and recovered on the same day, the remains will be covered with muslin cloth and a steel plate that can be moved by heavy equipment placed over the excavation opening to protect the remains. If this type of steel plate is not available, a 24 hour guard should be posted outside of working hours. The Tribe(s) will make every effort to recommend diverting the project and keeping the remains in situ and protected. If the project cannot be diverted, it may be determined that burials will be removed. The Tribe(s) will work closely with the Qualified Archaeologist to ensure that the excavation is treated carefully, ethically, and respectfully. If data recovery is approved by the Tribe(s), documentation shall be taken which includes at a minimum detailed descriptive notes and sketches. Additional types of documentation shall be approved by the Tribe(s) for data recovery purposes. Cremations will either be removed in bulk or by means as necessary to ensure completely recovery of all material. If the discovery of human remains includes 4 or more burials, the location is considered a cemetery and a separate treatment plan shall be created. The project applicant shall consult with the Tribe(s) regarding avoidance of all cemetery sites. Once complete, a final report of all activities is to be submitted to the NAHC. The Tribe(s) do NOT authorize any scientific study or the utilization of any invasive diagnostics on human remains.

Mitigation Measure No. 15 (Tribal Cultural Resources). In the event that Native American cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior (SOI) standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. The archaeologist shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for input regarding the preservation, retention and final disposition of any discovered cultural resources. The archaeologist shall prepare a mitigation plan and technical resources management report, which shall document the inventory, evaluation, and proposed mitigation of resources within the project area. Additionally, the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians will be contacted if any such find occurs and be provided information and permitted/invited to perform a site visit when the archaeologist makes his/her assessment, so as to provide Tribal input. All archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist and

Native Monitor. If the resources are Native American in origin, the Tribe(s) shall coordinate with the landowner regarding treatment and curation of these resources. Typically, the Tribe(s) will request reburial or preservation for educational purposes. If a resource is determined by the Qualified Archaeologist to constitute a "historical resource" pursuant to CEQA Guidelines Section 15064.5(a) or has a "unique archaeological resource" pursuant to Public Resources Code Section 21083.2(g), the Qualified Archaeologist shall coordinate with the applicant and the City to develop a formal treatment plan that would serve to reduce impacts to the resources. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Sections 21083.2(b) for unique archaeological resources. Preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. Any historic archaeological material that is not Native American in origin shall be curated at a public, non-profit institution with a research interest in the materials, such as the San Bernardino County Museum, if such an institution agrees to accept the material. If no institution accepts the archaeological material, they shall be donated to a local school or historical society in the area for educational purposes.

Mitigation Measure No. 16 (Tribal Cultural Resources). In the event that significant Native American historical resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, an SOI-qualified archaeologist shall be retained to develop a cultural resources Treatment Plan, as well as a Discovery and Monitoring Plan, the drafts of which shall be provided to the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for review and comment. All in-field investigations, assessments, and/or data recovery enacted pursuant to the finalized Treatment Plan shall be monitored by a Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians Tribal Participant(s). The Lead Agency and/or applicant shall, in good faith, consult with Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians on the disposition and treatment of any artifacts or other cultural materials encountered during the project.

Mitigation Measure No. 17 (Tribal Cultural Resources). Non-Native American artifacts shall be inventoried, assessed, and analyzed for cultural affiliation, personal affiliation (prior ownership), function, and temporal placement. Subsequent to analysis and reporting, these artifacts shall be subjected to curation or returned to the Property Owner/Developer, as deemed appropriate. Once ground altering activities have ceased or the Archeologist determines that monitoring activities are no longer necessary, monitoring activities may be discontinued following notification to the City of Rancho Cucamonga Planning Department.

Adherence to the above-mentioned mitigation will ensure that potential impacts to tribal cultural resources remain at levels that are considered to be less than significant.

B. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe? ● Less than Significant Impact.

As stated previously, the City submitted Tribal Consultation Requests for General Plan Amendment DRC2015-00683 to the Soboba Band of Luiseno Indians, the San Manuel Band of Mission Indians, the Gabrieleno Band of Mission Indians – Kizh Nation, the Gabrieleno/Tongva Nation, and the Gabrieleno/Tongva San Gabriel Band of Mission Indians. The notices were mailed on August 25, 2015 and provided for a 90-day comment period ending on November 23, 2015. Of the five tribes who were notified, none submitted a response requesting consultation during the notification period.

In addition, the City submitted AB-52 Tribal Consultation Requests to the Gabrieleno Band of Mission Indians – Kizh Nation, the Morongo Band of Mission Indians, Soboba Band of Luiseno Indians, the San Manuel Band of Mission Indians, the San Gabriel Band of Mission Indians, and the Torres Martinez Desert Cahuilla Indians following a completeness determination for Design Review DRC2015-00682. The notices were mailed on February 14, 2018 and provided for a 30-day comment period ending on March 19, 2018. Responses were received from two tribes: the San Manuel Band of Mission Indians and the Gabrieleno Band of Mission Indians – Kizh Nation. The San Manuel Band of Mission Indians did not request consultation, but did request that specific conditions related to funerary objects, cultural resources, and historical resources discovered during ground disturbing activities be addressed. The Gabrieleno Band of Mission Indians – Kizh Nation requested consultation, which was held on March 21, 2018. Their comments are re-iterated as mitigation measures in the previous subsection. As a result, less than significant impacts are anticipated to occur.

3.17.3 CUMULATIVE IMPACTS

Typically, the impacts to tribal cultural resources are site-specific. The analysis determined that the potential impacts related to tribal cultural resources are considered to be less than significant. As a result, no significant cumulative impacts will occur as part of the implementation of the proposed project.

3.17.4 MITIGATION MEASURES

The analysis of tribal cultural resources indicated that the following mitigation would be required:

Mitigation Measure No. 13 (Tribal Cultural Resources). The applicant shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians to discuss Tribal Monitoring of the project during all ground disturbing activities, and any trenching below the initial grade level, to ensure that cultural resources that may be encountered during ground disturbances are protected and preserved for study. The monitor(s) must be approved by the Tribal Representatives and will be present on-site during ground disturbing activities. The Native American Monitor(s) will complete monitoring logs on a daily basis. The

logs will provide descriptions of the daily activities, including construction activities, locations, soil, and any cultural materials identified. In addition, the monitor(s) will be required to provide insurance certificates, including liability insurance, for any archaeological resource(s) encountered during grading and excavation activities pertinent to the provisions outlined in the California Environmental Quality Act, California Public Resources Code Division 13, and Section 21083.2 (a) through (k). The on-site monitoring shall end when the project site grading and excavation activities are completed, or when the Tribal Representatives and monitor have indicated that the site has a low potential for archeological resources. The applicant shall submit the results of these consultations to the City prior to issuance of grading permits for the project site.

Mitigation Measure No. 14 (Tribal Cultural Resources). In the event that human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5, and that code shall be enforced for the duration of the project. Prior to the start of ground disturbing activities, the land owner shall arrange a designated site location within the footprint of the project for the respectful reburial of the human remains and/or ceremonial objects. Any discoveries of human skeletal material shall be immediately reported to the County Coroner. The monitor will then notify the Qualified Archaeologist and the construction manager who will call the coroner. Work will continue to be diverted while the coroner determines whether the remains are Native American. The discovery is to be kept confidential and secure to prevent any further disturbance. If Native American, the coroner will notify the NAHC as mandated by state law who will then appoint a Most Likely Descendent. In the case where discovered human remains cannot be fully documented and recovered on the same day, the remains will be covered with muslin cloth and a steel plate that can be moved by heavy equipment placed over the excavation opening to protect the remains. If this type of steel plate is not available, a 24 hour guard should be posted outside of working hours. The Tribe(s) will make every effort to recommend diverting the project and keeping the remains in situ and protected. If the project cannot be diverted, it may be determined that burials will be removed. The Tribe(s) will work closely with the Qualified Archaeologist to ensure that the excavation is treated carefully, ethically, and respectfully. If data recovery is approved by the Tribe(s), documentation shall be taken which includes at a minimum detailed descriptive notes and sketches. Additional types of documentation shall be approved by the Tribe(s) for data recovery purposes. Cremations will either be removed in bulk or by means as necessary to ensure completely recovery of all material. If the discovery of human remains includes 4 or more burials, the location is considered a cemetery and a separate treatment plan shall be created. The project applicant shall consult with the Tribe(s) regarding avoidance of all cemetery sites. Once complete, a final report of all activities is to be submitted to the NAHC. The Tribe(s) do NOT authorize any scientific study or the utilization of any invasive diagnostics on human remains.

Mitigation Measure No. 15 (Tribal Cultural Resources). In the event that Native American cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior (SOI) standards shall be hired to assess the find. Work on the other portions of the project outside

of the buffered area may continue during this assessment period. The archaeologist shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for input regarding the preservation, retention and final disposition of any discovered cultural resources. The archaeologist shall prepare a mitigation plan and technical resources management report, which shall document the inventory, evaluation, and proposed mitigation of resources within the project area. Additionally, the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians will be contacted if any such find occurs and be provided information and permitted/invited to perform a site visit when the archaeologist makes his/her assessment, so as to provide Tribal input. All archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist and Native Monitor. If the resources are Native American in origin, the Tribe(s) shall coordinate with the landowner regarding treatment and curation of these resources. Typically, the Tribe(s) will request reburial or preservation for educational purposes. If a resource is determined by the Qualified Archaeologist to constitute a "historical resource" pursuant to CEQA Guidelines Section 15064.5(a) or has a "unique archaeological resource" pursuant to Public Resources Code Section 21083.2(g), the Qualified Archaeologist shall coordinate with the applicant and the City to develop a formal treatment plan that would serve to reduce impacts to the resources. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Sections 21083.2(b) for unique archaeological resources. Preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. Any historic archaeological material that is not Native American in origin shall be curated at a public, non-profit institution with a research interest in the materials, such as the San Bernardino County Museum, if such an institution agrees to accept the material. If no institution accepts the archaeological material, they shall be donated to a local school or historical society in the area for educational purposes.

Mitigation Measure No. 16 (Tribal Cultural Resources). In the event that significant Native American historical resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, an SOI-qualified archaeologist shall be retained to develop a cultural resources Treatment Plan, as well as a Discovery and Monitoring Plan, the drafts of which shall be provided to the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for review and comment. All in-field investigations, assessments, and/or data recovery enacted pursuant to the finalized Treatment Plan shall be monitored by a Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians Tribal Participant(s). The Lead Agency and/or applicant shall, in good faith, consult with Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians on the disposition and treatment of any artifacts or other cultural materials encountered during the project.

Mitigation Measure No. 17 (Tribal Cultural Resources). Non-Native American artifacts shall be inventoried, assessed, and analyzed for cultural affiliation, personal affiliation (prior ownership), function, and temporal placement. Subsequent to analysis and reporting, these artifacts shall be subjected to curation or returned to the Property Owner/Developer, as deemed appropriate. Once ground altering activities have ceased or the Archeologist determines that monitoring activities are no longer necessary, monitoring activities may be discontinued following notification to the City of Rancho Cucamonga Planning Department.

3.18 UTILITIES

3.18.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant adverse impact on utilities if it would:

- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board;
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed;
- Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; or,
- Comply with federal, state, and local statutes and regulations related to solid waste.

3.18.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board? ● Less than Significant Impact.

Wastewater conveyance is handled by the City and Cucamonga Valley Water District, and wastewater is processed by Cucamonga Valley Water District and the Inland Empire Utilities Agency (IEUA). The

Cucamonga Valley Water District oversees the facilities and infrastructure that transport wastewater to treatment plants operated by the IEUA. At IEUA treatment plants, wastewater is subject to tertiary-level water treatment, an advanced process that produces effluent suitable for re-use. The IEUA operates the Wastewater Regional Plant No. 4 located at the intersection of 6th Street and Etiwanda Avenue in Rancho Cucamonga.[145] This Plant has undergone an expansion to increase the design hydraulic domestic sewage (wastewater) treatment capacity to 14 million gallons per day.[146] The plant serves areas of Fontana, Rancho Cucamonga, and San Bernardino County. The plant treats the liquid portion of an average influent wastewater flow of approximately ten million gallons per day.[147]

Table 3-16 indicates the future wastewater generation in gallons per day. According to Table 3-16, the proposed project is expected to generate approximately 1,863 gallons of sewage per day, which is well within the daily average totals for the Wastewater Regional Plant No. 4.

Table 3-16
Wastewater (Effluent) Generation (gals/day)

Use	Unit	Factor	Generation
Warehouse	174,745 sq.ft.	1,863 gallons/unit/day	1,863 gals/day
Total	174,745 sq.ft.		1,863 gals/day

Source: Cucamonga Valley Water District, Engineering & Water Resources Departments
Urban Water Management Plan 2000.

The project will connect to an existing 21-inch sewer line located along Hellman Avenue and to an existing 15-inch sewer line located along 8th Street. The existing sewer lines have sufficient capacity to accommodate the projected flows and adequate sewage collection and treatment are currently available. In addition, the new plumbing fixtures that will be installed will consist of water conserving fixtures as is required by the current City Code requirements, no new or expanded sewage, and/or water treatment facilities will be required to accommodate the proposed project. As a result, the impacts are expected to be less than significant.

B. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? ● Less than Significant Impact.

The demand for water and wastewater treatment services can be accommodated by the existing facilities. As indicated above, the Wastewater Regional Plant No. 4 can process the increase in sewage. Therefore, the potential impacts are considered to be less than significant.

[145] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Public Facilities and Infrastructure Element*. Plan adopted May 19, 2010.

[146] Inland Empire Utilities Agency. *Facilities – Regional Water Recycling Plant No. 4*. https://www.ieua.org/facilities/rp-4/. Website accessed April 30, 2018.

[147] Ibid.

C. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? ● Less than Significant Impact.

A Water Quality Management Plan (WQMP) was prepared for the project by Thienes Engineering, Inc. pursuant to Section 19.20.260 of the City of Rancho Cucamonga Municipal Code. A WQMP is required of new development/redevelopment projects specified in the chapter. The WQMP must outline appropriate non-structural and structural Best Management Practices (BMPs), including stormwater infiltration and treatment devices, which would be implemented and installed to prevent pollutants from being discharged into the City's municipal separate storm sewer system, during and after construction. The WQMP is presented in Appendix D.

The WQMP recommended the inclusion of two Stormtech SC-740 stormwater chambers, grate inlet filters, and curb inlet filters.[148] The Stormtech SC-740 chambers would be installed below ground surface (BGS). These chambers consist of a polypropylene corrugated chamber (resembling a tube-like structure), filter fabric, and a stone bottom. Water accumulates within the isolator row as it simultaneously permeates through the filter fabric. Solid contaminants such as rubbish, debris, leaves, sediment, and other particles are captured from the runoff by the fabric. From there, water would percolate through the stone bottom into the ground. The project would also include grate and curb inlet filters. These filters consist of stainless steel mesh, which traps sediment and allows filtered water to be conveyed through the local storm drains.

Adherence to the construction and post-construction BMPs identified above and in the mandatory WQMP would filter out contaminants of concern (oil, grease, debris, leaves, etc.), minimize the discharge of contaminated runoff into the adjacent streets, local storm drains, and the underlying groundwater table. Once constructed, the project would not create excess runoff that would exceed the capacity of the existing storm water drainage system. The project site in its current state is 100 percent impervious; following construction, ten percent of the site would be covered in pervious surfaces. As a result, the potential impacts are considered to be less than significant.

D. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? ● Less than Significant Impact.

According to the Cucamonga Valley Urban Water Management Plan, the Cucamonga Valley Water District serves a 47 square mile area which includes the City of Rancho Cucamonga, portions of the cities of Upland, Ontario, Fontana, and portions of unincorporated San Bernardino County. Imported water is the District's most significant water supply and can range approximately 35 to 65 percent of the District's water. Sufficient connection capacity exists to meet current and future imported water demands. The District produces groundwater from the two groundwater basins that underlie the District service area: Chino Basin and Cucamonga Basin. In addition to imported water and groundwater, the District has rights to six sources of surface water from the canyons: Cucamonga Canyon, Day/East Canyon, Deer Canyon, Lytle Creek, Smith Canyon Group, and the Golf Course

[148] Thienes Engineering, Inc. *Preliminary Water Quality Management Plan*. Plan dated January 24, 2018.

Tunnel. Currently, water is only utilized from three of the six sources: Cucamonga Canyon, Day/East Canyon, and Deer Canyon.[149]

The Cucamonga Valley Water District's Urban Water Management Plan indicates that the District will have an adequate supply of water to meet projected demand through the year 2035. According to the Urban Water Management Plan, demand for water is projected to reach 63,700 acre-feet per year by the year 2035. The District is anticipated to have a projected supply of 65,700 acre-feet per year by 2035. The report also states that the District will have an adequate supply of water to meet the project demand during a single dry year as well as multiple dry years.[150] As indicated in Table 3-17, the proposed project is projected to consume approximately 1,863 gallons of water on a daily basis.

Table 3-17
Water Consumption (gals/day)

Use	Unit	Factor	Generation
Warehouse	174,745 sq.ft.	1,863 gallons/unit/day	1,863 gals/day
Total	174,745 sq.ft.		1,863 gals/day

Source: Cucamonga Valley Water District, Engineering & Water Resources Departments
Urban Water Management Plan 2000.

The project will connect to an existing 12-inch water line located along Hellman Avenue and an existing 16-inch water line located along 8th Street. The existing water supply facilities and infrastructure will be able accommodate this additional demand. In addition, the warehouse will be equipped with water efficient fixtures and drought tolerant landscaping will be planted throughout the project site. As a result, the impacts are considered to be less than significant.

E. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? ● Less than Significant Impact.

As indicated previously, wastewater conveyance is handled by the City and Cucamonga Valley Water District, and wastewater is processed by Cucamonga Valley Water District and the Inland Empire Utilities Agency (IEUA). The Cucamonga Valley Water District oversees the facilities and infrastructure that transport wastewater to treatment plants operated by the IEUA. At IEUA treatment plants, wastewater is subject to tertiary-level water treatment, an advanced process that produces effluent suitable for re-use. The IEUA operates the Wastewater Regional Plant No. 4 located at the intersection of 6th Street and Etiwanda Avenue in Rancho Cucamonga.[151]

[149] Civiltech Engineering, Inc. *Cucamonga Valley Water District, 2015 Urban Water Management Plan*. June 2016.

[150] Ibid (refer to Tables 10, 43, 46, and 47).

[151] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Public Facilities and Infrastructure Element*. Plan adopted May 19, 2010.

This Plant has undergone an expansion to increase the design hydraulic domestic sewage (wastewater) treatment capacity to 14 million gallons per day.[152] The plant serves areas of Fontana, Rancho Cucamonga, and San Bernardino County. The plant treats the liquid portion of an average influent wastewater flow of approximately ten million gallons per day.[153] According to Table 3-16, the proposed project is expected to generate approximately 1,863 gallons of sewage per day, which is well within the daily average totals for the Wastewater Regional Plant No. 4. As a result, the impacts are expected to be less than significant.

F. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? ● Less than Significant Impact.

The City contracts its waste collection services with Burrtec Waste Industries, who disposes waste collected within the City to the West Valley Materials Recovery Facility in the City of Fontana.[154] This facility is permitted to receive up to 7,500 tons of solid waste on a daily basis.[155] The proposed project is anticipated to generate approximately 1,048 pounds per day of solid waste (refer to Table 3-18 shown below). This amount is not significant and will be accommodated by the aforementioned transfer station. As a result, the potential impacts are considered to be less than significant.

Table 3-18
Solid Waste Generation (lbs/day)

Use	Unit	Factor	Generation
Warehouse	174,745 sq.ft.	6 lbs/ 1,000 sq. ft./day	1,048 lbs/ day
Total	174,745 sq.ft.		1,048 lbs/ day

Source: Blodgett Baylosis Environmental Planning.

G. Comply with federal, state, and local statutes and regulations related to solid waste? ● No Impact.

The proposed project, like all other development in Rancho Cucamonga, will be required to adhere to City and County ordinances with respect to waste reduction and recycling. As a result, no impacts related to State and local statutes governing solid waste are anticipated.

3.18.3 CUMULATIVE IMPACTS

The analysis herein determined that the proposed project would not result in any significant impacts on local utilities. The ability of the existing sewer lines, water lines, and other utilities to accommodate

[152] Inland Empire Utilities Agency. *Facilities – Regional Water Recycling Plant No. 4*. https://www.ieua.org/facilities/rp-4/. Website accessed April 30, 2018.

[153] Ibid.

[154] Phone call with a representative of Burrtec Waste Industries. The phone call took place April 30, 2018.

[155] CalRecycle. *Facility/Site Summary Details- West Valley Materials Recovery Facility*. http://www.calrecycle.ca.gov/SWFacilities/Directory/36-AA-0341/. Site accessed April 30, 2018.

the projected demand from future related projects will require evaluation on a case-by-case basis. As a result, no cumulative impacts on utilities will occur.

3.18.4 MITIGATION MEASURES

The analysis of utilities impacts indicated that no significant impacts would result from the proposed project's approval and subsequent implementation. As a result, no mitigation is required.

3.19 MANDATORY FINDINGS OF SIGNIFICANCE

The following findings can be made regarding the Mandatory Findings of Significance set forth in Section 15065 of the CEQA Guidelines based on the results of this environmental assessment:

- *Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? ● Less than Significant Impact.*

The proposed project will not have the potential to degrade the quality of the environment since the project's air quality emissions will be below the thresholds of significance outlined by the SCAQMD. No impacts to protected species or habitat would result with the implementation of the proposed project. Furthermore, the best management practices identified in the preliminary WQMP will filter out contaminants of concern present in stormwater runoff. The addition of project trips will not negatively impact any local intersection. Lastly, the project will include energy and water efficient appliances and fixtures.

- *Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)? ● Less than Significant Impact.*

According to the City, there are three related projects located within one mile of the project site. The cumulative air quality emissions will be below the thresholds of significance established by the SCAQMD. In addition, the cumulative GHG emissions from the four projects (including the proposed project) will still be below the thresholds of significance established by the SCAQMD (the CalEEMod worksheets for the cumulative emissions are provided in the Appendix).

- *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? ● Less than Significant Impact with Mitigation.*

Daytime and nighttime light and glare from both the proposed project would not contribute any significant impacts since the project must comply with the City's municipal code. The project's operational air quality impacts would be less than significant. However, the project's construction

would have the potential to result in particulate matter emissions which may affect the adjacent sensitive receptors. Therefore, project contractors would be responsible for maintaining compliance with SCAQMD's mandatory Rule 403 regulations, which significantly reduce the generation of fugitive dust. In addition, future truck drivers must adhere to Title 13 - §2485 of the California Code of Regulations, which limits the idling of diesel powered vehicles to less than five minutes. Adherence to the aforementioned standard condition will minimize odor impacts from diesel trucks. Adherence to Rule 403 Regulations and Title 13 - §2485 of the California Code of Regulations will reduce potential impacts to levels that are less than significant. Adherence to the construction noise mitigation provided in the preceding analysis would prevent the exposure of sensitive receptors to excess noise. Lastly, the addition of the project's traffic would not result in a deterioration of any intersection's level of service or the creation of a CO hot-spot. As a result, the potential impacts are considered to be less than significant with adherence to the required mitigation measures.

SECTION 4 CONCLUSIONS

4.1 FINDINGS

The Initial Study determined that the proposed project is not expected to have significant adverse environmental impacts. The following findings can be made regarding the Mandatory Findings of Significance set forth in Section 15065 of the CEQA Guidelines based on the results of this Initial Study:

- The proposed project *will not* have a significant effect on the environment.
- The proposed project *will not* have the potential to achieve short-term goals to the disadvantage of long-term environmental goals.
- The proposed project *will not* have impacts that are individually limited, but cumulatively considerable, when considering planned or proposed development in the immediate vicinity.
- The proposed project *will not* have environmental effects that will adversely affect humans, either directly or indirectly.
- A Mitigation Reporting and Monitoring Program *will be* required.

4.2 MITIGATION MONITORING & REPORTING PROGRAM

4.2.1. OVERVIEW OF THE PROJECT

The City of Rancho Cucamonga, in its capacity as the Lead Agency, is considering an application to permit the construction of a 174,745 square-foot warehouse on a 8.09-acre site (352,428 square feet) located on the southwest corner of 8th Street and Hellman Avenue. The new building will consist of 160,245 square feet of warehousing, 12,000 square feet of office space, and 2,500 square feet of office mezzanine. A total of 21 dock high doors will be provided along the new building's southern elevation. In addition, 119 parking spaces and 31 trailer parking spaces will be provided in the northern and southern portions of the project site, respectively. Access to the project site will be provided by a driveway located along the west side of Hellman Avenue and two driveways located along the south side of 8th Street. Lastly, a total of 36,312 square feet of landscaping will be provided.[156]

4.2.2. FINDINGS RELATED TO MITIGATION MONITORING

Section 21081(a) of the Public Resources Code states that findings must be adopted by the decision-makers coincidental to the approval of a Mitigated Negative Declaration. These findings shall be incorporated as part of the decision-maker's findings of fact, in response to AB-3180. In accordance with the requirements of Section 21081(a) and 21081.6 of the Public Resources Code, the following additional findings may be made:

[156] HPA Architecture. *Overall Site Plan.* Plan packet dated January 25, 2018.

- A mitigation reporting or monitoring program will be required;

- Site plans and/or building plans, submitted for approval by the responsible monitoring agency, shall include the required standard conditions; and,

- An accountable enforcement agency or monitoring agency shall be identified for the mitigations adopted as part of the decision-maker's final determination.

4.2.3. MITIGATION MEASURES

In the event that previously unidentified paleontological or archeological resources are encountered, the following mitigation will be required:

Mitigation Measure No. 1 (Cultural Resources). In the event that potentially significant archaeological materials are encountered during project related construction activities, all work must be halted in the vicinity of the archaeological discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the archaeological resource.

Mitigation Measure No. 2 (Cultural Resources). If previously unidentified paleontological resources are unearthed during construction, work shall cease within 50 feet of the find and the project Applicant must retain a qualified paleontologist, approved by the City, to assess the significance of the find. If a find is determined to be significant, the Lead Agency and the paleontologist will determine appropriate avoidance measures or other appropriate mitigation. All significant fossil materials recovered will be, as necessary and at the discretion of the qualified paleontologist, subject to scientific analysis, professional museum curation, and documentation according to current professional standards.

Mitigation Measure No. 3 (Cultural Resources). In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with (b) Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains. If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission. In the event that human remains are

uncovered, the City and the applicant/developer shall immediately contact the County of San Bernardino Coroner and the Consulting Tribes. If the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four (24) hours of the determination, as required by California Health and Safety Code § 7050.5 (c). The NAHC-identified Most Likely Descendant (MLD), shall be allowed, under California Public Resources Code § 5097.98 (a), to (1) inspect the site of the discovery and (2) make determinations as to how the human remains and funerary objects shall be treated and disposed of with appropriate dignity. The MLD, City and applicant/developer agree to discuss in good faith what constitutes "appropriate dignity" as that term is used in the applicable statutes. The MLD shall complete its inspection and make recommendations within forty-eight (48) hours of receiving notification from either the applicant/developer or the NAHC, as required by California Public Resources Code § 5097.98.

The preceding analysis concluded that the following mitigation is required:

Mitigation Measure No. 4 (Greenhouse Gas Emissions). Preferential parking spaces for electric or fuel efficient vehicles must be provided.

The proposed project will require the following mitigation measures:

Mitigation Measure No. 5 (Noise). Haul trucks will be prohibited from travelling to the site using Hellman Avenue. All haul trucks must access the site from 8th Street.

Mitigation Measure No. 6 (Noise). The Applicant must ensure that the contractors use construction equipment that includes working mufflers and other sound suppression equipment as a means to reduce machinery noise.

Mitigation Measure No. 7 (Noise). The Applicant must notify residents along Hellman Avenue opposite the project site regarding construction times and local contact information. The notice shall include the name and phone number of the local contact person residents may call to complain about noise. This notice must also be placed along the project site's eastern and northern boundaries. Upon receipt of a complaint, the contractor must respond immediately by reducing noise to meet Code requirements. In addition, copies of all complaints and subsequent communication between the affected residents and contractors must be forwarded to the City's Community Development Director.

The analysis determined that following mitigation measures are required:

Mitigation Measure No. 8 (Transportation). The proposed project must contribute through the City of Ranch Cucamonga Development Impact Fee (DIF) program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016).

Site-specific circulation and access recommendations are depicted on Exhibit 3-36. These recommendations are reiterated as mitigation measures below:

Mitigation Measure No. 9 (Transportation). The Applicant must construct and/or repair Hellman Avenue from the west project boundary to 8th Street at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

Mitigation Measure No. 10 (Transportation). The Applicant must construct and/or repair 8th Street from Hellman Avenue to the south project boundary at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

Mitigation Measure No. 11 (Transportation). The Applicant must ensure that on-site traffic signing and striping is implemented in conjunction with detailed construction plans for the project. On-site traffic control plans must comply with the California Manual of Uniform Traffic Control Devices (2014).

Mitigation Measure No. 12 (Transportation). The Applicant must ensure that all on-site and site-adjacent improvements, including traffic signing/striping and project driveways, be constructed as approved by the City of Rancho Cucamonga Public Works Department.

The analysis of tribal cultural resources indicated that the following mitigation would be required:

Mitigation Measure No. 13 (Tribal Cultural Resources). The applicant shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians to discuss Tribal Monitoring of the project during all ground disturbing activities, and any trenching below the initial grade level, to ensure that cultural resources that may be encountered during ground disturbances are protected and preserved for study. The monitor(s) must be approved by the Tribal Representatives and will be present on-site during ground disturbing activities. The Native American Monitor(s) will complete monitoring logs on a daily basis. The logs will provide descriptions of the daily activities, including construction activities, locations, soil, and any cultural materials identified. In addition, the monitor(s) will be required to provide insurance certificates, including liability insurance, for any archaeological resource(s) encountered during grading and excavation activities pertinent to the provisions outlined in the California Environmental Quality Act, California Public Resources Code Division 13, and Section 21083.2 (a) through (k). The on-site monitoring shall end when the project site grading and excavation activities are completed, or when the Tribal Representatives and monitor have indicated that the site has a low potential for archeological resources. The applicant shall submit the results of these consultations to the City prior to issuance of grading permits for the project site.

Mitigation Measure No. 14 (Tribal Cultural Resources). In the event that human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5, and that code shall be enforced for the duration of the project. Prior to the start of ground disturbing activities, the land owner shall arrange a designated site location within the footprint of the project for the respectful reburial of the human remains and/or ceremonial objects. Any discoveries of human skeletal material shall be immediately reported to the County Coroner. The monitor will then notify the Qualified Archaeologist and the construction manager who will call the coroner. Work will continue to be diverted while the coroner determines whether the remains are Native American. The discovery is to be kept confidential and secure to prevent any further disturbance. If Native American, the coroner will notify the NAHC as mandated by state law who will then appoint a Most Likely Descendent. In the case where discovered human remains cannot be fully documented and recovered on the same day, the remains will be covered with muslin cloth and a steel plate that can be moved by heavy equipment placed over the excavation opening to protect the remains. If this type of steel plate is not available, a 24 hour guard should be posted outside of working hours. The Tribe(s) will make every effort to recommend diverting the project and keeping the remains in situ and protected. If the project cannot be diverted, it may be determined that burials will be removed. The Tribe(s) will work closely with the Qualified Archaeologist to ensure that the excavation is treated carefully, ethically, and respectfully. If data recovery is approved by the Tribe(s), documentation shall be taken which includes at a minimum detailed descriptive notes and sketches. Additional types of documentation shall be approved by the Tribe(s) for data recovery purposes. Cremations will either be removed in bulk or by means as necessary to ensure completely recovery of all material. If the discovery of human remains includes 4 or more burials, the location is considered a cemetery and a separate treatment plan shall be created. The project applicant shall consult with the Tribe(s) regarding avoidance of all cemetery sites. Once complete, a final report of all activities are to be submitted to the NAHC. The Tribe(s) do NOT authorize any scientific study or the utilization of any invasive diagnostics on human remains.

Mitigation Measure No. 15 (Tribal Cultural Resources). In the event that Native American cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior (SOI) standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. The archaeologist shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for input regarding the preservation, retention and final disposition of any discovered cultural resources. The archaeologist shall prepare a mitigation plan and technical resources management report, which shall document the inventory, evaluation, and proposed mitigation of resources within the project area. Additionally, the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians will be contacted if any such find occurs and be provided information and permitted/invited to perform a site visit when the archaeologist makes his/her assessment, so as to provide Tribal input. All archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist and

Native Monitor. If the resources are Native American in origin, the Tribe(s) shall coordinate with the landowner regarding treatment and curation of these resources. Typically, the Tribe(s) will request reburial or preservation for educational purposes. If a resource is determined by the Qualified Archaeologist to constitute a "historical resource" pursuant to CEQA Guidelines Section 15064.5(a) or has a "unique archaeological resource" pursuant to Public Resources Code Section 21083.2(g), the Qualified Archaeologist shall coordinate with the applicant and the City to develop a formal treatment plan that would serve to reduce impacts to the resources. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Sections 21083.2(b) for unique archaeological resources. Preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. Any historic archaeological material that is not Native American in origin shall be curated at a public, non-profit institution with a research interest in the materials, such as the San Bernardino County Museum, if such an institution agrees to accept the material. If no institution accepts the archaeological material, they shall be donated to a local school or historical society in the area for educational purposes.

Mitigation Measure No. 16 (Tribal Cultural Resources). In the event that significant Native American historical resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, an SOI-qualified archaeologist shall be retained to develop a cultural resources Treatment Plan, as well as a Discovery and Monitoring Plan, the drafts of which shall be provided to the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for review and comment. All in-field investigations, assessments, and/or data recovery enacted pursuant to the finalized Treatment Plan shall be monitored by a Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians Tribal Participant(s). In addition, the Lead Agency and/or applicant shall, in good faith, consult with Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians on the disposition and treatment of any artifacts or other cultural materials encountered during the project.

Mitigation Measure No. 17 (Tribal Cultural Resources). Non-Native American artifacts shall be inventoried, assessed, and analyzed for cultural affiliation, personal affiliation (prior ownership), function, and temporal placement. Subsequent to analysis and reporting, these artifacts shall be subjected to curation or returned to the Property Owner/Developer, as deemed appropriate. Once ground altering activities have ceased or the Archeologist determines that monitoring activities are no longer necessary, monitoring activities may be discontinued following notification to the City of Rancho Cucamonga Planning Department.

4.2.4. MITIGATION MONITORING

The monitoring and reporting on the implementation of these measures, including the period for implementation, monitoring agency, and the monitoring action, are identified in Table 4.1 provided below and on the following pages.

TABLE 4.1
MITIGATION-MONITORING PROGRAM

Measure	Enforcement Agency	Monitoring Phase	Verification
Mitigation Measure No. 1 (Cultural Resources). In the event that potentially significant archaeological materials are encountered during project related construction activities, all work must be halted in the vicinity of the archaeological discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the archaeological resource.	Planning Department ● *(Applicant is responsible for implementation)*	*During the project's construction phase.* ● Mitigation ends when ground disturbance is completed or otherwise noted by the appointed Monitor(s).	Date: Name & Title:
Mitigation Measure No. 2 (Cultural Resources). If previously unidentified paleontological resources are unearthed during construction, work shall cease within 50 feet of the find and the project Applicant must retain a qualified paleontologist, approved by the City, to assess the significance of the find. If a find is determined to be significant, the Lead Agency and the paleontologist will determine appropriate avoidance measures or other appropriate mitigation. All significant fossil materials recovered will be, as necessary and at the discretion of the qualified paleontologist, subject to scientific analysis, professional museum curation, and documentation according to current professional standards.	Planning Department ● *(Applicant is responsible for implementation)*	*During the project's construction phase.* ● Mitigation ends when ground disturbance is completed or otherwise noted by the appointed Monitor(s).	Date: Name & Title:

TABLE 4.1
MITIGATION-MONITORING PROGRAM

Measure	Enforcement Agency	Monitoring Phase	Verification
Mitigation Measure No. 3 (Cultural Resources). In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with (b) Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains. If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission. In the event that human remains are uncovered, the City and the applicant/developer shall immediately contact the County of San Bernardino Coroner and the Consulting Tribes. If the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four (24) hours of the determination, as required by California Health and Safety Code § 7050.5 (c). The NAHC-identified Most Likely Descendant (MLD), shall be allowed, under California Public Resources Code § 5097.98 (a), to (1) inspect the site of the discovery and (2) make determinations as to how the human remains and funerary objects shall be treated and disposed of with appropriate dignity. The MLD, City and applicant/developer agree to discuss in good faith what constitutes "appropriate dignity" as that term is used in the applicable statutes. The MLD shall complete its inspection and make recommendations within forty-eight (48) hours of receiving notification from either the applicant/developer or the NAHC, as required by California Public Resources Code § 5097.98.	Planning Department ● *(Applicant is responsible for implementation)*	*During the project's construction phase.* ● Mitigation ends when ground disturbance is completed or otherwise noted by the appointed Monitor(s).	Date: Name & Title:

TABLE 4.1
MITIGATION-MONITORING PROGRAM

Measure	Enforcement Agency	Monitoring Phase	Verification
Mitigation Measure No. 4 (Greenhouse Gas Emissions). Preferential parking spaces for electric or fuel efficient vehicles must be provided.	Planning Department and the Chief Building Official ● *(Applicant is responsible for implementation)*	*Prior to the issuance of a Certificate of Occupancy.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No. 5 (Noise). Haul trucks will be prohibited from travelling to the site using Hellman Avenue. All haul trucks must access the site from 8th Street.	Planning Department and Code Enforcement ● *(Applicant is responsible for implementation)*	*During project's construction.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No.6 (Noise). The Applicant must ensure that the contractors use construction equipment that includes working mufflers and other sound suppression equipment as a means to reduce machinery noise.	Planning Department and Code Enforcement ● *(Applicant is responsible for implementation)*	*During project's construction.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No. 7 (Noise). The Applicant must notify residents along Hellman Avenue opposite the project site regarding construction times and local contact information. The notice shall include the name and phone number of the local contact person residents may call to complain about noise. This notice must also be placed along the project site's eastern and northern boundaries. Upon receipt of a complaint, the contractor must respond immediately by reducing noise to meet Code requirements. In addition, copies of all complaints and subsequent communication between the affected residents and contractors must be forwarded to the City's Community Development Director.	Planning Department and Code Enforcement ● *(Applicant is responsible for implementation)*	*During project's construction.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No. 8 (Transportation & Circulation). The proposed project must contribute through the City of Ranch Cucamonga Development Impact Fee (DIF) program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016).	Public Works Department and the City Engineer ● *(Applicant is responsible for implementation)*	*Prior to the issuance of a Certificate of Occupancy.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No. 9 (Transportation & Circulation). The Applicant must construct and/or repair Hellman Avenue from the west project boundary to 8th Street at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.	Public Works Department and the City Engineer ● *(Applicant is responsible for implementation)*	*Prior to the issuance of a Certificate of Occupancy.* ● Mitigation ends when construction is completed.	Date: Name & Title:

TABLE 4.1
MITIGATION-MONITORING PROGRAM

Measure	Enforcement Agency	Monitoring Phase	Verification
Mitigation Measure No. 10 (Transportation & Circulation). The Applicant must construct and/or repair 8th Street from Hellman Avenue to the south project boundary at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.	Public Works Department and the City Engineer ● *(Applicant is responsible for implementation)*	*Prior to the issuance of a Certificate of Occupancy.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No. 11 (Transportation & Circulation). The Applicant must ensure that on-site traffic signing and striping is implemented in conjunction with detailed construction plans for the project. On-site traffic control plans must comply with the California Manual of Uniform Traffic Control Devices (2014).	Public Works Department and the City Engineer ● *(Applicant is responsible for implementation)*	*Prior to the issuance of a Certificate of Occupancy.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No. 12 (Transportation & Circulation). The Applicant must ensure that all on-site and site-adjacent improvements, including traffic signing/striping and project driveways, be constructed as approved by the City of Rancho Cucamonga Public Works Department.	Public Works Department and the City Engineer ● *(Applicant is responsible for implementation)*	*Prior to the issuance of a Certificate of Occupancy.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No. 13 (Tribal Cultural Resources). The applicant shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians to discuss Tribal Monitoring of the project during all ground disturbing activities, and any trenching below the initial grade level, to ensure that cultural resources that may be encountered during ground disturbances are protected and preserved for study. The monitor(s) must be approved by the Tribal Representatives and will be present on-site during ground disturbing activities. The Native American Monitor(s) will complete monitoring logs on a daily basis. The logs will provide descriptions of the daily activities, including construction activities, locations, soil, and any cultural materials identified. In addition, the monitor(s) will be required to provide insurance certificates, including liability insurance, for any archaeological resource(s) encountered during grading and excavation activities pertinent to the provisions outlined in the California Environmental Quality Act, California Public Resources Code Division 13, and Section 21083.2 (a) through (k). The on-site monitoring shall end when the project site grading and excavation activities are completed, or when the Tribal Representatives and monitor have indicated that the site has a low potential for archeological resources. The applicant shall submit the results of these consultations to the City prior to issuance of grading permits for the project site.	Planning Department ● *(Applicant is responsible for implementation)*	*Prior to the start of any construction related activities.* ● Mitigation ends when ground disturbance is completed or otherwise noted by the appointed Native American Monitor(s).	Date: Name & Title:

TABLE 4.1
MITIGATION-MONITORING PROGRAM

Measure	Enforcement Agency	Monitoring Phase	Verification
Mitigation Measure No. 14 (Tribal Cultural Resources). In the event that human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5, and that code shall be enforced for the duration of the project. Prior to the start of ground disturbing activities, the land owner shall arrange a designated site location within the footprint of the project for the respectful reburial of the human remains and/or ceremonial objects. Any discoveries of human skeletal material shall be immediately reported to the County Coroner. The monitor will then notify the Qualified Archaeologist and the construction manager who will call the coroner. Work will continue to be diverted while the coroner determines whether the remains are Native American. The discovery is to be kept confidential and secure to prevent any further disturbance. If Native American, the coroner will notify the NAHC as mandated by state law who will then appoint a Most Likely Descendent. In the case where discovered human remains cannot be fully documented and recovered on the same day, the remains will be covered with muslin cloth and a steel plate that can be moved by heavy equipment placed over the excavation opening to protect the remains. If this type of steel plate is not available, a 24 hour guard should be posted outside of working hours. The Tribe(s) will make every effort to recommend diverting the project and keeping the remains in situ and protected. If the project cannot be diverted, it may be determined that burials will be removed. The Tribe(s) will work closely with the Qualified Archaeologist to ensure that the excavation is treated carefully, ethically, and respectfully. If data recovery is approved by the Tribe(s), documentation shall be taken which includes at a minimum detailed descriptive notes and sketches. Additional types of documentation shall be approved by the Tribe(s) for data recovery purposes. Cremations will either be removed in bulk or by means as necessary to ensure completely recovery of all material. If the discovery of human remains includes 4 or more burials, the location is considered a cemetery and a separate treatment plan shall be created. The project applicant shall consult with the Tribe(s) regarding avoidance of all cemetery sites. Once complete, a final report of all activities are to be submitted to the NAHC. The Tribe(s) do NOT authorize any scientific study or the utilization of any invasive diagnostics on human remains.	Planning Department ● *(Applicant is responsible for implementation)*	*During project's construction.* ● Mitigation ends when ground disturbance is completed or otherwise noted by the appointed Native American Monitor(s).	Date: Name & Title:

TABLE 4.1
MITIGATION-MONITORING PROGRAM

Measure	Enforcement Agency	Monitoring Phase	Verification
Mitigation Measure No. 15 (Tribal Cultural Resources). In the event that Native American cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior (SOI) standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. The archaeologist shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for input regarding the preservation, retention and final disposition of any discovered cultural resources. The archaeologist shall prepare a mitigation plan and technical resources management report, which shall document the inventory, evaluation, and proposed mitigation of resources within the project area. Additionally, the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians will be contacted if any such find occurs and be provided information and permitted/invited to perform a site visit when the archaeologist makes his/her assessment, so as to provide Tribal input. All archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist and Native Monitor. If the resources are Native American in origin, the Tribe(s) shall coordinate with the landowner regarding treatment and curation of these resources. Typically, the Tribe(s) will request reburial or preservation for educational purposes. If a resource is determined by the Qualified Archaeologist to constitute a "historical resource" pursuant to CEQA Guidelines Section 15064.5(a) or has a "unique archaeological resource" pursuant to Public Resources Code Section 21083.2(g), the Qualified Archaeologist shall coordinate with the applicant and the City to develop a formal treatment plan that would serve to reduce impacts to the resources. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Sections 21083.2(b) for unique archaeological resources. Preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. Any historic archaeological material that is not Native American in origin shall be curated at a public, non-profit institution with a research interest in the materials, such as the San Bernardino County Museum, if such an institution agrees to accept the material. If no institution accepts the archaeological material, they shall be donated to a local school or historical society in the area for educational purposes.	Planning Department ● *(Applicant is responsible for implementation)*	*During project's construction.* ● Mitigation ends when ground disturbance is completed or otherwise noted by the appointed Native American Monitor(s).	Date: Name & Title:

TABLE 4.1
MITIGATION-MONITORING PROGRAM

Measure	Enforcement Agency	Monitoring Phase	Verification
Mitigation Measure No. 16 (Tribal Cultural Resources). In the event that significant Native American historical resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, an SOI-qualified archaeologist shall be retained to develop a cultural resources Treatment Plan, as well as a Discovery and Monitoring Plan, the drafts of which shall be provided to the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for review and comment. All in-field investigations, assessments, and/or data recovery enacted pursuant to the finalized Treatment Plan shall be monitored by a Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians Tribal Participant(s). In addition, the Lead Agency and/or applicant shall, in good faith, consult with Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians on the disposition and treatment of any artifacts or other cultural materials encountered during the project.	Planning Department ● *(Applicant is responsible for implementation)*	*During project's construction.* ● Mitigation ends when ground disturbance is completed or otherwise noted by the appointed Native American Monitor(s).	Date: Name & Title:
Mitigation Measure No. 17 (Tribal Cultural Resources). Non-Native American artifacts shall be inventoried, assessed, and analyzed for cultural affiliation, personal affiliation (prior ownership), function, and temporal placement. Subsequent to analysis and reporting, these artifacts shall be subjected to curation or returned to the Property Owner/Developer, as deemed appropriate. Once ground altering activities have ceased or the Archeologist determines that monitoring activities are no longer necessary, monitoring activities may be discontinued following notification to the City of Rancho Cucamonga Planning Department.	Planning Department ● *(Applicant is responsible for implementation)*	*During project's construction and following the completion of ground altering activities.* ● Mitigation ends when ground disturbance is completed.	

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SECTION 5 REFERENCES

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5.2 REFERENCES

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APPENDICES

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MITIGATION MONITORING CHECKLIST (INITIAL STUDY PART III)

Project File No.: DRC2018-00119 **Applicant:** Overton Moore Properties

Initial Study Prepared by: Tom Grahn, Associate Planner **Date**: February 4, 2019

Mitigation Measures No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date /Initials	Sanctions for Non-Compliance
Section 5 – Cultural Resources						
1) In the event that potentially significant archaeological materials are encountered during project related construction activities, all work must be halted in the vicinity of the archaeological discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the archaeological resource.	PD/BO	C	Review of Report	A/D		3/4
2) If previously unidentified paleontological resources are unearthed during construction, work shall cease within 50 feet of the find and the project Applicant must retain a qualified paleontologist, approved by the City, to assess the significance of the find. If a find is determined to be significant, the Lead Agency and the paleontologist will determine appropriate avoidance measures or other appropriate mitigation. All significant fossil materials recovered will be, as necessary and at the discretion of the qualified paleontologist, subject to scientific analysis, professional museum curation, and documentation according to current professional standards.	PD/BO	C	Review of Report	A/D		4
3) In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with (b) Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not	PD/BO	C	Review of Report	A/D		4

Mitigation Measures No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date /Initials	Sanctions for Non-Compliance
subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains. If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission. In the event that human remains are uncovered, the City and the applicant/developer shall immediately contact the County of San Bernardino Coroner and the Consulting Tribes. If the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four (24) hours of the determination, as required by California Health and Safety Code § 7050.5 (c). The NAHC identified Most Likely Descendant (MLD), shall be allowed, under California Public Resources Code § 5097.98 (a), to (1) inspect the site of the discovery and (2) make determinations as to how the human remains and funerary objects shall be treated						

Mitigation Measures No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date /Initials	Sanctions for Non-Compliance
and disposed of with appropriate dignity. The MLD, City and applicant/developer agree to discuss in good faith what constitutes "appropriate dignity" as that term is used in the applicable statutes. The MLD shall complete its inspection and make recommendations within forty-eight (48) hours of receiving notification from either the applicant/developer or the NAHC, as required by California Public Resources Code § 5097.98.						
Section 7 – Greenhouse Gas Emissions						
Cumulative Long Term (Operational) GHG Emissions						
1) Preferential parking spaces for electric or fuel-efficient vehicles must be provided.	BO	A/D	Review of Plans/Operating	C		2/3
Section 12 – Noise						
1) Haul trucks will be prohibited from travelling to the site using Hellman Avenue. All haul trucks must access the site from 8th Street.	PD/BO	B/C	Review of plans	A/C		2/4/7
2) The Applicant must ensure that the contractors use construction equipment that includes working mufflers and other sound suppression equipment as a means to reduce machinery noise.	PD/BO	E	Review of plans	A/C		7
3) The Applicant must notify residents along Hellman Avenue opposite the project site regarding construction times and local contact information. The notice shall include the name and phone number of the local contact person residents may call to complain about noise. This notice must also be placed along the project site's eastern and northern boundaries. Upon receipt of a complaint, the contractor must respond immediately by reducing noise to meet Code requirements. In addition, copies of all complaints and subsequent communication between the affected residents and contractors must be forwarded to the City's Community Development Director.	PD	B	Review of plans	A/C		2/4

Mitigation Measures No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date /Initials	Sanctions for Non-Compliance
Section 16 – Transportation/Traffic						
1) The proposed project must contribute through the City of Ranch Cucamonga Development Impact Fee (DIF) program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016).	A/B	C	Review of Plans	C		2
2) The Applicant must construct and/or repair Hellman Avenue from the west project boundary to 8th Street at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.	A/B	C	Review of Plans	C		2
3) The Applicant must construct and/or repair 8th Street from Hellman Avenue to the south project boundary at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.	A/B	C	Review of Plans	C		2
4) The Applicant must ensure that on-site traffic signing and striping is implemented in conjunction with detailed construction plans for the project. On-site traffic control plans must comply with the California Manual of Uniform Traffic Control Devices (2014).	A/B	C	Review of Plans	C		2
5) The Applicant must ensure that all on-site and site-adjacent improvements, including traffic signing/striping and project driveways, be constructed as approved by the City of Rancho Cucamonga Public Works Department.	A/B	C	Review of Plans	C		2
Section 17 – Tribal Cultural Resources						
1) The applicant shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians to discuss	PD/BO	C	Review of plans	A/D		3/4

Mitigation Measures No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date /Initials	Sanctions for Non-Compliance
Tribal Monitoring of the project during all ground disturbing activities, and any trenching below the initial grade level, to ensure that cultural resources that may be encountered during ground disturbances are protected and preserved for study. The monitor(s) must be approved by the Tribal Representatives and will be present on-site during ground disturbing activities. The Native American Monitor(s) will complete monitoring logs on a daily basis. The logs will provide descriptions of the daily activities, including construction activities, locations, soil, and any cultural materials identified. In addition, the monitor(s) will be required to provide insurance certificates, including liability insurance, for any archaeological resource(s) encountered during grading and excavation activities pertinent to the provisions outlined in the California Environmental Quality Act, California Public Resources Code Division 13, and Section 21083.2 (a) through (k). The on-site monitoring shall end when the project site grading and excavation activities are completed, or when the Tribal Representatives and monitor have indicated that the site has a low potential for archeological resources. The applicant shall submit the results of these consultations to the City prior to issuance of grading permits for the project site.						
2) In the event that human remains, or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5, and that code shall be enforced for the duration of the project. Prior to the start of ground disturbing activities, the land owner shall arrange a designated site location within the footprint of the project for the	PD/BO	C	Review of plans	A/D		3/4

Mitigation Measures No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date /Initials	Sanctions for Non-Compliance
respectful reburial of the human remains and/or ceremonial objects. Any discoveries of human skeletal material shall be immediately reported to the County Coroner. The monitor will then notify the Qualified Archaeologist and the construction manager who will call the coroner. Work will continue to be diverted while the coroner determines whether the remains are Native American. The discovery is to be kept confidential and secure to prevent any further disturbance. If Native American, the coroner will notify the NAHC as mandated by state law who will then appoint a Most Likely Descendent. In the case where discovered human remains cannot be fully documented and recovered on the same day, the remains will be covered with muslin cloth and a steel plate that can be moved by heavy equipment placed over the excavation opening to protect the remains. If this type of steel plate is not available, a 24 hour guard should be posted outside of working hours. The Tribe(s) will make every effort to recommend diverting the project and keeping the remains in situ and protected. If the project cannot be diverted, it may be determined that burials will be removed. The Tribe(s) will work closely with the Qualified Archaeologist to ensure that the excavation is treated carefully, ethically, and respectfully. If data recovery is approved by the Tribe(s), documentation shall be taken which includes at a minimum detailed descriptive notes and sketches. Additional types of documentation shall be approved by the Tribe(s) for data recovery purposes. Cremations will either be removed in bulk or by means as necessary to ensure completely recovery of all material. If the discovery of human remains includes 4 or more burials, the location is considered a cemetery and a separate treatment plan shall be created. The						

Mitigation Measures No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date /Initials	Sanctions for Non-Compliance
project applicant shall consult with the Tribe(s) regarding avoidance of all cemetery sites. Once complete, a final report of all activities is to be submitted to the NAHC. The Tribe(s) do NOT authorize any scientific study or the utilization of any invasive diagnostics on human remains.						
3) In the event that Native American cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior (SOI) standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. The archaeologist shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for input regarding the preservation, retention and final disposition of any discovered cultural resources. The archaeologist shall prepare a mitigation plan and technical resources management report, which shall document the inventory, evaluation, and proposed mitigation of resources within the project area. Additionally, the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians will be contacted if any such find occurs and be provided information and permitted/invited to perform a site visit when the archaeologist makes his/her assessment, so as to provide Tribal input. All archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist and Native Monitor. If the resources are Native American in origin, the Tribe(s) shall coordinate with the landowner regarding treatment and curation of these resources. Typically, the Tribe(s) will request reburial or preservation for educational	PD/BO	C	Review of plans	A/D		3/4

Mitigation Measures No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date /Initials	Sanctions for Non-Compliance
purposes. If a resource is determined by the Qualified Archaeologist to constitute a "historical resource" pursuant to CEQA Guidelines Section 15064.5(a) or has a "unique archaeological resource" pursuant to Public Resources Code Section 21083.2(g), the Qualified Archaeologist shall coordinate with the applicant and the City to develop a formal treatment plan that would serve to reduce impacts to the resources. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Sections 21083.2(b) for unique archaeological resources. Preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. Any historic archaeological material that is not Native American in origin shall be curated at a public, non-profit institution with a research interest in the materials, such as the San Bernardino County Museum, if such an institution agrees to accept the material. If no institution accepts the archaeological material, they shall be donated to a local school or historical society in the area for educational purposes.						
4) In the event that significant Native American historical resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, an SOI-qualified archaeologist shall be retained to develop a cultural resources Treatment Plan, as well as a Discovery and Monitoring Plan, the drafts of which shall be provided to the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for review and	PD/BO	C	Review of plans	A/D		3/4

Mitigation Measures No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date /Initials	Sanctions for Non-Compliance
comment. All in-field investigations, assessments, and/or data Recovery enacted pursuant to the finalized Treatment Plan shall be monitored by a Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians Tribal Participant(s). The Lead Agency and/or applicant shall, in good faith, consult with Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians on the disposition and treatment of any artifacts or other cultural materials encountered during the project..						
5) Non-Native American artifacts shall be inventoried, assessed, and analyzed for cultural affiliation, personal affiliation (prior ownership), function, and temporal placement. Subsequent to analysis and reporting, these artifacts shall be subjected to curation or returned to the Property Owner/Developer, as deemed appropriate. Once ground altering activities have ceased or the Archeologist determines that monitoring activities are no longer necessary, monitoring activities may be discontinued following notification to the City of Rancho Cucamonga Planning Department.	PD/BO	C	Review of plans	A/D		3/4

Key to Checklist Abbreviations

Responsible Person	Monitoring Frequency	Method of Verification	Sanctions
CDD - Community Development Director or designee	A - With Each New Development	A - On-site Inspection	1 - Withhold Recordation of Final Map
PD - Planning Director or designee	B - Prior To Construction	B - Other Agency Permit / Approval	2 - Withhold Grading or Building Permit
CE - City Engineer or designee	C - Throughout Construction	C - Plan Check	3 - Withhold Certificate of Occupancy
BO - Building Official or designee	D - On Completion	D - Separate Submittal (Reports/Studies/ Plans)	4 - Stop Work Order
PO - Police Captain or designee	E - Operating		5 - Retain Deposit or Bonds
FC - Fire Chief or designee			6 - Revoke CUP
			7 - Citation

City of Rancho Cucamonga

MITIGATION MONITORING PROGRAM

Project File No.: Design Review DRC2018-00119.

This Mitigation Monitoring Program (MMP) has been prepared for use in implementing the mitigation measures identified in the Mitigated Negative Declaration for the above-listed project. This program has been prepared in compliance with State law to ensure that adopted mitigation measures are implemented (Section 21081.6 of the Public Resources Code).

Program Components – This MMP contains the following elements:

1. Conditions of approval that act as impact mitigation measures are recorded with the action and the procedure necessary to ensure compliance. The mitigation measure conditions of approval are contained in the adopted Resolution of Approval for the project.
2. A procedure of compliance and verification has been outlined for each action necessary. This procedure designates who will take action, what action will be taken and when, and to whom and when compliance will be reported.
3. The MMP has been designed to provide focused, yet flexible guidelines. As monitoring progresses, changes to compliance procedures may be necessary based upon recommendations by those responsible for the program.

Program Management – The MMP will be in place through all phases of the project. The project planner, assigned by the Planning Director, shall coordinate enforcement of the MMP. The project planner oversees the MMP and reviews the Reporting Forms to ensure they are filled out correctly and proper action is taken on each mitigation. Each City department shall ensure compliance of the conditions (mitigation) that relate to that department.

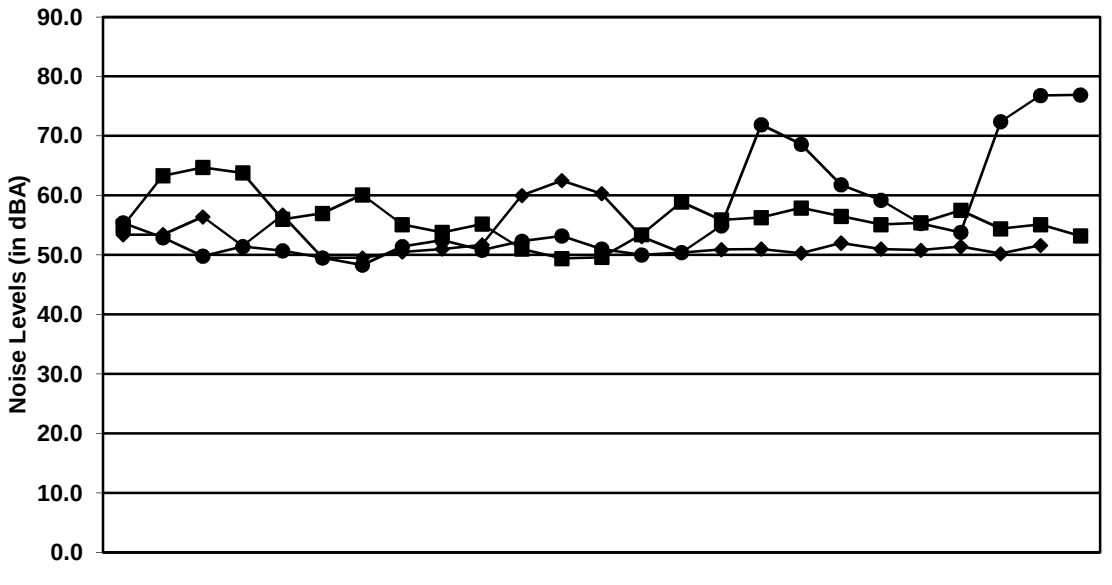
Procedures – The following steps will be followed by the City of Rancho Cucamonga.

1. A fee covering all costs and expenses, including any consultants' fees, incurred by the City in performing monitoring or reporting programs shall be charged to the applicant.
2. A MMP Reporting Form will be prepared for each potentially significant impact and its corresponding mitigation measure identified in the Mitigation Monitoring Checklist, attached hereto. This procedure designates who will take action, what action will be taken and when, and to whom and when compliance will be reported. All monitoring and reporting documentation will be kept in the project file with the department having the original authority for processing the project. Reports will be available from the City upon request at the following address:

City of Rancho Cucamonga – Lead Agency
Planning Department
10500 Civic Center Drive
Rancho Cucamonga, CA 91730

3. Appropriate specialists will be retained if technical expertise beyond the City staff's is needed, as determined by the project planner, or responsible City department, to monitor specific mitigation activities and provide appropriate written approvals to the project planner.
4. The project planner, or responsible City department, will approve, by signature and date, the completion of each action item that was identified on the MMP Reporting Form. After each measure is verified for compliance, no further action is required for the specific phase of development.
5. All MMP Reporting Forms for an impact issue requiring no further monitoring will be signed off as completed by the project planner or responsible City department at the bottom of the MMP Reporting Form.
6. Unanticipated circumstances may arise requiring the refinement or addition of mitigation measures. The project planner is responsible for approving any such refinements or additions. An MMP Reporting Form will be completed by the project planner or responsible City department and a copy provided to the appropriate design, construction, or operational personnel.
7. The project planner or responsible City department has the authority to stop the work of construction contractors if compliance with any aspects of the MMP is not occurring after written notification has been issued. The project planner or responsible City department also has the authority to hold certificates of occupancies if compliance with a mitigation measure attached hereto is not occurring. The project planner or responsible City department has the authority to hold issuance of a business license until all mitigation measures are implemented.
8. Any conditions (mitigation) that require monitoring after project completion shall be the responsibility of the City of Rancho Cucamonga Planning Department. The Department shall require the applicant to post any necessary funds (or other forms of guarantee) with the City. These funds shall be used by the City to retain consultants and/or pay for City staff time to monitor and report on the mitigation measure for the required period of time.
9. In those instances requiring long-term project monitoring, the applicant shall provide the City with a plan for monitoring the mitigation activities at the project site and reporting the monitoring results to the City. Said plan shall identify the reporter as an individual qualified to know whether the particular mitigation measure has been implemented. The monitoring/reporting plan shall conform to the City's MMP and shall be approved by the Community Development Director or Planning Director prior to the issuance of building permits.

Actual Noise Levels During Measurement				Noise Measurement Results in Leq%				
1-25	26-50	51-75	76-100	L%	1-25	26-50	51-75	76-100
54.8	53.4	54.8	55.4	L_{99}	73.0	62.5	64.7	76.9
53.4	53.4	63.3	52.9		70.1	60.3	63.8	76.8
54.2	56.4	64.7	49.8	L_{90}	64.0	60.0	63.3	72.4
73.0	51.5	63.8	51.4		61.8	56.7	60.1	71.9
64.0	56.7	56.0	50.7		60.3	56.4	58.9	68.6
61.8	49.5	57.0	49.5		59.7	53.4	57.9	61.8
55.2	49.5	60.1	48.3		59.5	53.4	57.5	59.2
51.5	50.5	55.1	51.4		56.7	53.1	57.0	55.4
51.2	51.0	53.8	52.5		56.6	52.5	56.5	55.3
53.0	51.7	55.2	50.8		56.3	52.0	56.3	54.9
54.0	60.0	51.0	52.3		56.0	51.7	56.0	53.8
59.7	62.5	49.4	53.2	L_{50}	55.6	51.6	55.9	53.2
70.1	60.3	49.6	51.0		55.2	51.5	55.4	52.9
60.3	53.1	53.4	50.0		54.8	51.4	55.2	52.5
59.5	50.4	58.9	50.4		54.2	51.0	55.1	52.3
56.6	50.9	55.9	54.9		54.2	51.0	55.1	51.4
56.3	51.0	56.3	71.9		54.0	51.0	55.1	51.4
53.0	50.3	57.9	68.6		53.4	50.9	54.8	51.0
52.8	52.0	56.5	61.8		53.4	50.8	54.4	50.8
52.7	51.0	55.1	59.2	L_{25}	53.0	50.5	53.8	50.7
55.6	50.8	55.4	55.3		53.0	50.4	53.4	50.4
54.2	51.4	57.5	53.8		52.8	50.3	53.2	50.0
53.4	50.2	54.4	72.4	L_{10}	52.7	50.2	51.0	49.8
56.7	51.6	55.1	76.8		51.5	49.5	49.6	49.5
56.0	52.5	53.2	76.9		51.2	49.5	49.4	48.3



Noise Measurements for the Eastern Portion of the Site

Source: Blodgett Baylosis Environmental Planning

76.9	
76.8	99%
73.0	
72.4	
71.9	
70.1	
68.6	
64.7	
64.0	
63.8	
63.3	90%
62.5	
61.8	
61.8	
60.3	
60.3	
60.1	
60.0	
59.7	

59.5	
59.2	
58.9	
57.9	
57.5	
57.0	
56.7	75%
56.7	
56.6	
56.5	
56.4	
56.3	
56.3	
56.0	
56.0	
55.9	
55.6	
55.4	
55.4	
55.3	
55.2	
55.2	
55.1	
55.1	
55.1	
54.9	
54.8	
54.8	
54.4	
54.2	
54.2	
54.0	50%
53.8	
53.8	
53.4	
53.4	
53.4	
53.4	
53.4	
53.2	
53.2	
53.1	
53.0	
53.0	
52.9	
52.8	
52.7	
52.5	
52.5	
52.3	
52.0	
51.7	
51.6	
51.5	
51.5	
51.4	
51.4	
51.4	
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49.8
49.6
49.5
49.5
49.5
49.4
48.3

5569.2

55.692

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Christine Sabala
6064 Golden Spur Place
Rancho Cucamonga, CA 91739

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

PROJECT NAME: Overton Moore Warehouse – Design Review DRC2018-00119

PROJECT LOCATION: Located in the General Industrial (GI) District at the southwest corner of Hellman Avenue and Eighth Street, located at 9000 Hellman Avenue - APN: 0209-151-36.

PROJECT DESCRIPTION: The proposed development of a 174,745 square-foot warehouse on an 8.09-acre site (352,428 square feet) located on the southwest corner of 8th Street and Hellman Avenue. The new building would consist of 160,245 square feet of warehousing, 12,000 square feet of office space, and 2,500 square feet of office mezzanine. A total of 21 dock high doors would be provided along the new building's southern elevation. In addition, 119 parking spaces and 31 trailer parking spaces would be provided in the northern and southern portions of the project site, respectively. Access to the project site would be provided by a driveway located along the west side of Hellman Avenue and two driveways located along the south side of 8th Street. Lastly, a total of 36,312 square feet of landscaping would be provided.

After reviewing the Initial Study and any applicable mitigating measures for the project, staff has determined that this project will not have a significant effect on the environment. Accordingly, a Mitigated Negative Declaration has been prepared.

A public hearing will be held by the Planning Commission to consider this proposed Mitigated Negative Declaration on March 13, 2019 at 7:00 p.m. at the Rancho Cucamonga Civic Center, Council Chambers, 10500 Civic Center Drive, Rancho Cucamonga.

Public comments on the Mitigated Negative Declaration will be received by the City beginning on February 6, 2019 through March 13, 2019.

Copies of all relevant material, including the project specifications and all documents referenced in the Mitigated Negative Declaration, are available for public inspection at Rancho Cucamonga Civic Center, Planning Department, 10500 Civic Center Drive, Rancho Cucamonga.

The project site __ is X is not listed on any list of hazardous waste sites prepared pursuant to Government Code Section 65962.5. Any information contained in a Hazardous Waste Substances Statement is attached to this Notice.

Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Barbara J Rivera
5675 Canistel Avenue
Alta Loma, CA 91737

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Deborah Grossberg
9669 Whirlaway Street
Alta Loma, CA 91737

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

PROJECT NAME: Overton Moore Warehouse – Design Review DRC2018-00119

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A public hearing will be held by the Planning Commission to consider this proposed Mitigated Negative Declaration on March 13, 2019 at 7:00 p.m. at the Rancho Cucamonga Civic Center, Council Chambers, 10500 Civic Center Drive, Rancho Cucamonga.

Public comments on the Mitigated Negative Declaration will be received by the City beginning on February 6, 2019 through March 13, 2019.

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The project site __ is X is not listed on any list of hazardous waste sites prepared pursuant to Government Code Section 65962.5. Any information contained in a Hazardous Waste Substances Statement is attached to this Notice.

Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Matthew Riveros
10181 Bristol Drive
Alta Loma, CA 91737

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

PROJECT NAME: Overton Moore Warehouse – Design Review DRC2018-00119

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A public hearing will be held by the Planning Commission to consider this proposed Mitigated Negative Declaration on March 13, 2019 at 7:00 p.m. at the Rancho Cucamonga Civic Center, Council Chambers, 10500 Civic Center Drive, Rancho Cucamonga.

Public comments on the Mitigated Negative Declaration will be received by the City beginning on February 6, 2019 through March 13, 2019.

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The project site __ is X is not listed on any list of hazardous waste sites prepared pursuant to Government Code Section 65962.5. Any information contained in a Hazardous Waste Substances Statement is attached to this Notice.

Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Angie Autrey
10210 Base Line Road, Space 264
Rancho Cucamonga, CA 91701

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

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PROJECT NAME: Overton Moore Warehouse – Design Review DRC2018-00119

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Rick Lambert
6435 Teton Peak Court
Rancho Cucamonga, CA 91730

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

PROJECT NAME: Overton Moore Warehouse – Design Review DRC2018-00119

PROJECT LOCATION: Located in the General Industrial (GI) District at the southwest corner of Hellman Avenue and Eighth Street, located at 9000 Hellman Avenue - APN: 0209-151-36.

PROJECT DESCRIPTION: The proposed development of a 174,745 square-foot warehouse on an 8.09-acre site (352,428 square feet) located on the southwest corner of 8th Street and Hellman Avenue. The new building would consist of 160,245 square feet of warehousing, 12,000 square feet of office space, and 2,500 square feet of office mezzanine. A total of 21 dock high doors would be provided along the new building's southern elevation. In addition, 119 parking spaces and 31 trailer parking spaces would be provided in the northern and southern portions of the project site, respectively. Access to the project site would be provided by a driveway located along the west side of Hellman Avenue and two driveways located along the south side of 8th Street. Lastly, a total of 36,312 square feet of landscaping would be provided.

After reviewing the Initial Study and any applicable mitigating measures for the project, staff has determined that this project will not have a significant effect on the environment. Accordingly, a Mitigated Negative Declaration has been prepared.

A public hearing will be held by the Planning Commission to consider this proposed Mitigated Negative Declaration on March 13, 2019 at 7:00 p.m. at the Rancho Cucamonga Civic Center, Council Chambers, 10500 Civic Center Drive, Rancho Cucamonga.

Public comments on the Mitigated Negative Declaration will be received by the City beginning on February 6, 2019 through March 13, 2019.

Copies of all relevant material, including the project specifications and all documents referenced in the Mitigated Negative Declaration, are available for public inspection at Rancho Cucamonga Civic Center, Planning Department, 10500 Civic Center Drive, Rancho Cucamonga.

The project site __ is X is not listed on any list of hazardous waste sites prepared pursuant to Government Code Section 65962.5. Any information contained in a Hazardous Waste Substances Statement is attached to this Notice.

Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Dr. JoAnn Yanez
10761 Hillside Road
Rancho Cucamonga, CA 91737

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: JoAnn Henkel
6050 San Felipe Court
Alta Loma, CA 91730

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

PROJECT NAME: Overton Moore Warehouse – Design Review DRC2018-00119

PROJECT LOCATION: Located in the General Industrial (GI) District at the southwest corner of Hellman Avenue and Eighth Street, located at 9000 Hellman Avenue - APN: 0209-151-36.

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Superintendent
Central School District
10601 Church Street, Suite 112
Rancho Cucamonga, CA 91730

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

PROJECT NAME: Overton Moore Warehouse – Design Review DRC2018-00119

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Public comments on the Mitigated Negative Declaration will be received by the City beginning on February 6, 2019 through March 13, 2019.

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Burrtec
9890 Cherry Avenue
Fontana, CA 92335

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

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PROJECT LOCATION: Located in the General Industrial (GI) District at the southwest corner of Hellman Avenue and Eighth Street, located at 9000 Hellman Avenue - APN: 0209-151-36.

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Public comments on the Mitigated Negative Declaration will be received by the City beginning on February 6, 2019 through March 13, 2019.

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: State Clearinghouse
P.O. Box 3044
Sacramento, CA 95812-3044

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Mr. Michael Perry
San Bernardino County
Department of Public Works Environmental Management
825 E. Third Street Room 123
San Bernardino, CA 92415-0835

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Cynthia Neubrech
9016 Whirlaway Court
Rancho Cucamonga, CA 91737

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

PROJECT NAME: Overton Moore Warehouse – Design Review DRC2018-00119

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Anne Moulton
10950 Church Street Apt #711
Rancho Cucamonga, CA 91730

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Santa Ana Region
Calif. Reg. Water Quality Control Board #8
3737 Main Street, Suite 500
Riverside, CA 92501

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: South Coast Air Quality Management Distric
Local Government
CEQA Program Supervisor
21865 Copley Drive
Diamond Bar, CA 91765

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

PROJECT NAME: Overton Moore Warehouse – Design Review DRC2018-00119

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Ms. Karen Cadavona
Southern California Edison Company
Third Party Environmental Review
2244 Walnut Grove Ave, Quad 4C 472A
Rosemead, CA 91770

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Ms. Kim Bray
Verizon
P.O. Box 725
Chino, CA 91708

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

PROJECT NAME: Overton Moore Warehouse – Design Review DRC2018-00119

PROJECT LOCATION: Located in the General Industrial (GI) District at the southwest corner of Hellman Avenue and Eighth Street, located at 9000 Hellman Avenue - APN: 0209-151-36.

PROJECT DESCRIPTION: The proposed development of a 174,745 square-foot warehouse on an 8.09-acre site (352,428 square feet) located on the southwest corner of 8th Street and Hellman Avenue. The new building would consist of 160,245 square feet of warehousing, 12,000 square feet of office space, and 2,500 square feet of office mezzanine. A total of 21 dock high doors would be provided along the new building's southern elevation. In addition, 119 parking spaces and 31 trailer parking spaces would be provided in the northern and southern portions of the project site, respectively. Access to the project site would be provided by a driveway located along the west side of Hellman Avenue and two driveways located along the south side of 8th Street. Lastly, a total of 36,312 square feet of landscaping would be provided.

After reviewing the Initial Study and any applicable mitigating measures for the project, staff has determined that this project will not have a significant effect on the environment. Accordingly, a Mitigated Negative Declaration has been prepared.

A public hearing will be held by the Planning Commission to consider this proposed Mitigated Negative Declaration on March 13, 2019 at 7:00 p.m. at the Rancho Cucamonga Civic Center, Council Chambers, 10500 Civic Center Drive, Rancho Cucamonga.

Public comments on the Mitigated Negative Declaration will be received by the City beginning on February 6, 2019 through March 13, 2019.

Copies of all relevant material, including the project specifications and all documents referenced in the Mitigated Negative Declaration, are available for public inspection at Rancho Cucamonga Civic Center, Planning Department, 10500 Civic Center Drive, Rancho Cucamonga.

The project site __ is X is not listed on any list of hazardous waste sites prepared pursuant to Government Code Section 65962.5. Any information contained in a Hazardous Waste Substances Statement is attached to this Notice.

Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Mr. Daniel Kopulsky, Office Chief
Forecasting/IGR-CEQA Review
Department of Transportation
464 West Fourth Street, 6th Floor; MS 722
San Bernardino, CA 92401-1400

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Mr. Jeff Brandt
California Department of Fish and Wildlife
3602 Inland Empire Boulevard
Suite C-220
Ontario, CA 91764

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

PROJECT NAME: Overton Moore Warehouse – Design Review DRC2018-00119

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Director of Business Services
Chaffey Joint Union High School District
211 West 5th Street
Ontario, CA 91761

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

PROJECT NAME: Overton Moore Warehouse – Design Review DRC2018-00119

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Public comments on the Mitigated Negative Declaration will be received by the City beginning on February 6, 2019 through March 13, 2019.

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Clerk of the Board of Supervisors
County of San Bernardino
385 North Arrowhead, 2nd Floor
San Bernardino, CA 92415

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

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Public comments on the Mitigated Negative Declaration will be received by the City beginning on February 6, 2019 through March 13, 2019.

Copies of all relevant material, including the project specifications and all documents referenced in the Mitigated Negative Declaration, are available for public inspection at Rancho Cucamonga Civic Center, Planning Department, 10500 Civic Center Drive, Rancho Cucamonga.

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Date: 2/8/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Cucamonga Valley Water District
10440 Ashford Street
Rancho Cucamonga, CA 91730-3057

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

PROJECT NAME: Overton Moore Warehouse – Design Review DRC2018-00119

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Public comments on the Mitigated Negative Declaration will be received by the City beginning on February 6, 2019 through March 13, 2019.

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Golden State Environmental Justice Alliance
P.O. Box 79222
Corona, CA 92877

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

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Date: 2/8/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Kirkland West
Habitat Defense Council
P.O. Box 78824
Corona, CA 92877

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

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Date: 2/8/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Planning Supervisor
Southern California Gas Company
1981 Lugonia Avenue
Redlands, CA 92374

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

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Date: 2/8/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Ms. Jennifer Shaw
Edison Local Public Affairs
7951 Redwood Avenue
Fontana, CA 92336

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Mr. Jason Pivovaroff
Inland Empire Utilities Agency
P.O. Box 9020
Chino Hills, CA 91709

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Development Review
Department of Transportation
464 West Fourth Street, MS 722
San Bernardino, CA 92407-1400

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

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By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Ms. Karin Cleary-Rose
U.S. Fish & Wildlife Service
777 East Tahquitz Canyon Way, Suite 208
Palm Springs, CA 92262

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

The City of Rancho Cucamonga hereby gives notice that pursuant to the authority and criteria contained in the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the staff has analyzed the request for:

PROJECT NAME: Overton Moore Warehouse – Design Review DRC2018-00119

PROJECT LOCATION: Located in the General Industrial (GI) District at the southwest corner of Hellman Avenue and Eighth Street, located at 9000 Hellman Avenue - APN: 0209-151-36.

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The project site __ is X is not listed on any list of hazardous waste sites prepared pursuant to Government Code Section 65962.5. Any information contained in a Hazardous Waste Substances Statement is attached to this Notice.

Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Chief Rojer
Rancho Cucamonga Fire Protection
10500 Civic Center Drive
Rancho Cucamonga, CA 91730

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

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Date: 2/8/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Captain Mahoney
Rancho Cucamonga Substation
10510 Civic Center Drive
Rancho Cucamonga, CA 91730

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Mr. Nick Ghirelli
Richards, Watson & Gershon
355 South Grand Avenue, 40th Floor
Los Angeles, CA 90071-3101

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Mr. Shawn Judson
Etiwanda School District
6061 East Avenue
Etiwanda, CA 91739

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Superintendent
Cucamonga School District
8776 Archibald Avenue
Rancho Cucamonga, CA 91730

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Superintendent
Alta Loma School District
9390 Base Line Road
Rancho Cucamonga, CA 91701

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

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Date: 2/4/19

By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Dr. Henry D Shannon Ph.D.
Chaffey Community College District
5885 Haven Avenue
Rancho Cucamonga, CA 91737

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

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By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

TO: Charter
10768 Foothill Boulevard, #170
Rancho Cucamonga, CA 91730

FROM: City of Rancho Cucamonga
Planning Department
P. O. Box 807
Rancho Cucamonga, CA 91729

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By: _____
Associate Planner

City Contact Information:
Tom Grahn, Associate Planner
(909) 477-2750 Ext 4312

Phase I Environmental Site Assessment

9000 Hellman Avenue
Rancho Cucamonga, California

Prepared for:
Overton Moore Properties
19300 South Hamilton Avenue, Suite 200
Gardena, California 90248

DRAFT

Prepared by:
Ardent Environmental Group, Inc.
1827 Capital Street, Suite 103
Corona, California 92880

February 14, 2017
Project No. 100835001E

February 14, 2017
Project No. 10835001E

Mr. Jason Hines
Overton Moore Properties
19300 South Hamilton Avenue, Suite 200
Gardena, California 90248

Subject: Phase I Environmental Site Assessment
9000 Hellman Avenue
Rancho Cucamonga, California

Dear Mr. Hines:

Ardent Environmental Group, Inc. (Ardent) has performed a Phase I Environmental Site Assessment (ESA) of the above-referenced property (site). Work was conducted in general accordance with the proposal dated January 13, 2017 between Ardent and Overton Moore Properties. The attached report presents our methodology, findings, opinions, and conclusions regarding the environmental conditions at the site. We appreciate the opportunity to be of service to you on this project. If there are any questions, please feel free to call the undersigned at your convenience.

DRAFT

Sincerely,
Ardent Environmental Group, Inc.

Heidi Heggeness
Staff Geologist

Paul Roberts, P.G.
Principal Geologist

PAR/HH/nw

Distribution: (1) Addressee (electronic copy)

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DRAFT

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EXECUTIVE SUMMARY

Ardent Environmental Group, Inc. (Ardent) was retained by Overton Moore Properties (OMP) to perform a Phase I Environmental Site Assessment (ESA) of the property located at 9000 Hellman Avenue in the city of Rancho Cucamonga, California (site). Frontier Communications Corporation (Frontier) currently owns the site. The site has historically been used by GTE, Verizon, and Frontier as a telecommunication maintenance yard. The telecommunication maintenance yard comprises three main buildings, referred to as the Office and Storage Building, Vehicle Maintenance Building, and car wash, and numerous small outbuildings. OMP is considering purchasing the site as part of a portfolio of Frontier properties located throughout Southern California. Following acquisition, OMP is planning to lease the property back to Frontier for approximately two years, after which, the property will be redeveloped for commercial purposes. Site assessment activities for this report were conducted between January 17, 2017 and February 3, 2017.

In summary, the following findings and conclusions were noted:

- From at least 1938 through 1959, the site was used for agricultural purposes. By 1966, the eastern portion of the site was used as a telecommunication maintenance yard with the Office and Storage Building, Vehicle Maintenance Building, and car wash observed. The western portion of the site remained vacant until approximately 1985, when it was used for parking and storage. The site has been mainly used for office, parking, storage of telecommunication equipment, vehicle maintenance, and car washing activities.
- Groundwater occurs at depths ranging from approximately 260 and 300 feet below the ground surface (bgs) and flows in a southwesterly direction.
- As part of the maintenance activities, fueling and maintenance of fleet vehicles included the use of underground storage tanks (USTs). Throughout the years, these tanks were removed and replaced with aboveground storage tanks (ASTs). The on-site USTs included one 10,000-gallon gasoline UST located northeast of the Vehicle Maintenance Building which was removed in 1986 and replaced with a 12,000-gallon gasoline UST, and a 500-gallon waste oil UST located south of the Vehicle Maintenance Building which was removed in 1986. The 12,000-gallon replacement gasoline UST was removed in 1999 and replaced with a 12,000-gallon gasoline UST located west of the Vehicle Maintenance Building. This UST was removed in 2011. The four USTs were removed under the direction and oversight of the San Bernardino County Fire Department (SBCFD) and impacted soils were remediated by excavation. Laboratory results of confirmation samples showed no detectable to low concentrations of residual contaminates. Based on these results, no further action (NFA) letters or case closure status were issued by the SBCFD. Ardent has reviewed these data and concur with the regulatory agency that no further work is necessary. Based on these results, these former environmental issues would no long be considered an environmental concern to the site. According to American Society for Testing and Materials (ASTM) Standards, these former features would be considered a historical recognized environmental condition (HREC).

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- The Vehicle Maintenance Building contains three inactive underground hydraulic lifts, one active underground hydraulic lift, and two aboveground electric lifts. In 1988, a subsurface investigation and subsequent remedial effort was completed associated with a leaking underground hydraulic oil line. The excavation activities removed a majority of the impacted soil, but some impacted materials were left in-place beneath the eastern building foundation. The documentation report was unclear as to whether confirmation samples were collected and analyzed. Based on this information, the former hydraulic leak and underground hydraulic lifts would still be considered an environmental concern to the site.
- A former clarifier and leach field were reportedly located northwest of the Vehicle Maintenance Building and were assumed to have been connected to this building. Due to the lack of investigations completed around this feature, the former clarifier and leach field would be considered an environmental concern to the site. As noted above, solvents are typically used for cleaning and degreasing purposes. Due to the possible solvent use in the Vehicle Maintenance Building, a possible environmental and vapor intrusion issue may be present.
- An existing car wash and clarifier are located immediately east of the Vehicle Maintenance Building. No investigations have been completed in this area. Based on this information, the car wash and clarifier would be considered an environmental concern to the site. Solvents are typically used for cleaning and degreasing purposes. Due to the possible solvent use in the car wash area, a possible environmental and vapor intrusion issue may be present.
- Verizon was listed as a small quantity generator of hazardous waste, including chlorinated solvents. Solvents are typically used for parts cleaning and degreasing purposes. Due to the possible solvent uses in the Vehicle Maintenance Building, former clarifier and leach field, and existing car wash and clarifier, a possible vapor intrusion issue may be present.
- Numerous 55-galon drums and other containers were noted throughout the site used to contain waste oil, virgin oil, oil filters, and/or other liquid or hazardous materials. Due to the lack of staining or evidence of a release, these containers would not be considered an environmental concern to the site.
- Based on the age of the buildings (1966), asbestos containing building materials (ACMs) and lead-based paint (LBP) may be present.
- No other on- or off-site environmental concerns were noted.

Ardent has performed this Phase I ESA in general conformance with the scope and limitations of the ASTM Practice E 1527-13, ASTM Practice E 2600-15, and the Environmental Protection Agency (EPA) Standards and Practices for All Appropriate Inquiry (AAI), Final Rule (40 CFR, Part 312), for the property located at 9000 Hellman Avenue in the city of Rancho Cucamonga, California. Any limitations or exceptions encountered during completion of this report are stated in Section 1.4. Based on this Phase I ESA, no evidence or indication of recognized environmental conditions (RECs), or conditions indicative of releases or threatened releases of hazardous substances on, at, in, or to the site has been revealed, except for the former clarifier and leach field, car wash (clarifier and possible solvent uses), hydraulic lifts, and remaining hydraulic oils

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associated with the 1988 release. Although not considered an REC in accordance with ASTM Standards, ACMs and LBP may be present in the on-site buildings.

Based on the information obtained during this assessment, Ardent recommends the following:

- Based on the uncertainty of solvent uses in the Vehicle Maintenance Building, former clarifier and leach field, and existing car wash and clarifier, Ardent recommends completing a soil gas survey in these areas of possible solvent uses to assess whether a vapor intrusion issue is present. Soil sampling should also be collected in the area of the former clarifier and leach field and in the vicinity of the 1988 hydraulic oil release.
- Soil sampling should be completed in the vicinity of the former clarifier and leach field, three inactive hydraulic lifts, and former 1988 hydraulic oil release. Based on historical documents, some hydraulic oil-impacted soil is still present beneath the eastern building foundation of the Vehicle Maintenance Building. These soils will need to be excavated and removed following demolition of this building.
- Prior to Frontier vacating the property, all miscellaneous containers of waste, liquids or hazardous substances should be profiled and disposed. All regulatory permits should be closed. All features with possible environmental concerns that will continue to be used by Frontier during its lease should be removed at the end of its lease, including clarifiers, car wash, hydraulic lifts, and ASTs. Following removal, confirmation samples should be collected. If the feature is regulated, the feature should be removed in accordance with current regulatory guidelines and under the direction and oversight of the lead regulatory agency. All impacted media should be remediated to levels that will ensure the protection of the environment (i.e. groundwater) and meet human health risk criteria.
- Following demolition of the Vehicle Maintenance Building, residual hydraulic oil-impacted soil reportedly present under the eastern building foundation should be excavated and removed. Confirmation samples should be collected.
- Prior to demolition, a comprehensive asbestos and LBP survey should be completed. If present, these materials should be removed by a State-licensed abatement contractor.

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1 INTRODUCTION

Ardent Environmental Group, Inc. (Ardent) was retained by Overton Moore Properties (OMP) to perform a Phase I Environmental Site Assessment (ESA) of the property located at 9000 Hellman Avenue in the city of Rancho Cucamonga, California (site; Figure 1). Work was completed in general accordance with the proposal dated January 13, 2017 between OMP and Ardent. Frontier Communications Corporation (Frontier) currently owns the site. The site has historically been used by GTE, Verizon, and Frontier as a telecommunication maintenance yard. The telecommunication maintenance yard comprises three main buildings, referred to as the Office and Storage Building, Vehicle Maintenance Building, and car wash, and numerous small outbuildings. OMP is considering purchasing the site as part of a portfolio of Frontier properties located throughout Southern California. Following acquisition, OMP is planning to lease the property back to Frontier for approximately two years, after which, the property will be redeveloped for commercial purposes. The following sections identify the purpose, the involved parties, the scope of work, and the limitations and exceptions associated with the Phase I ESA.

1.1 Purpose of Phase I ESA

In accordance with the American Society for Testing and Materials (ASTM) E 1527-13 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM Standard E 1527-13), the objective of the Phase I ESA was to identify, to the extent feasible pursuant to ASTM Standard E 1527-13, recognized environmental conditions (RECs), which are defined by ASTM as "…the presence or likely presence of any hazardous substance or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment."

The United States Environmental Protection Agency ("USEPA" or "EPA") has stated that ASTM Standard E 1527-13, is consistent with the Standards and Practices for All Appropriate Inquires (AAI), Final Rule (40 Code of Federal Regulations [CFR], Part 312) and is compliant with the statutory criteria for all appropriate inquires. All appropriate inquires, as defined in the AAI Final Rule, must be conducted by persons seeking the landowner liability protections under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) prior to acquiring a property or seeking or

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receiving federal Brownfields grants under the authorities of CERCLA. The purpose of AAI, as defined in the AAI Final Rule, was to identify releases and threatened releases of hazardous substances which cause or threaten to cause the incurrence of response costs.

As part of this Phase I ESA, Ardent also assessed whether a vapor encroachment condition (VEC) exists at the site. The VEC assessment was completed following the ASTM E 2600-15 Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions (ASTM Standard E 2600-15). The objective of this work was to evaluate whether possible contaminants (e.g. VOCs) are present in soil and/or groundwater in the site vicinity which might pose a possible vapor intrusion into existing or future buildings at the site.

1.2 Involved Parties

Ms. Heidi Heggeness of Ardent conducted the historical research, site reconnaissance, regulatory inquiries, and document review. Mr. Paul Roberts, who meets the definition of an *environmental professional* as set forth in the AAI Final Rule, completed oversight and review.

1.3 Scope of Work

Ardent's scope of work for this Phase I ESA is consistent with ASTM Standard E1527-13 and E-2600-15 and included the activities listed below.

- **Review of User Provided Information** – Review of information regarding title and judicial records for environmental liens or activity and use limitations, recorded environmental liens, actual or specialized knowledge or commonly known information regarding environmental conditions at the site, the relationship of the purchase price of the property to the fair market value, readily available maps, environmental reports, and other environmental documents pertaining to the site, as available and obtained from the user/client.
- **Records Review** – Acquisition and review of records, including federal, state, tribal, and local regulatory agency databases, for the site and for properties located within a specified radius of the site; local regulatory agency files for the site and selected nearby properties of potential environmental concern; physical setting sources, including topographic maps, geologic maps, and geologic and hydrogeologic reference documents; and historic land use information including aerial photographs, historical fire insurance rate maps, building department records, and city directories, as necessary, that are reasonably ascertainable, publicly available, can be obtained within reasonable time and cost, and are practically reviewable.

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- **Vapor Encroachment Condition (VEC)** – Review available regulatory and client provided data to assess Tier 1 non-numeric screening for the site. Ardent evaluated whether contaminants were present in soil and/or groundwater in the site vicinity which might pose a VEC at the site.
- **Site Reconnaissance** – Performance of a site reconnaissance to visually observe the site and any structure(s) located on the site to the extent not obstructed by bodies of water, adjacent buildings, or other obstacles. The purpose of the site reconnaissance is to obtain information indicating the likelihood of identifying RECs in connection with the site, including the general site setting, site usage, use and storage of hazardous materials and petroleum products, disposal of waste products and materials, sources of polychlorinated biphenyls (PCBs), and evidence of releases and possible risks of contamination from activities at adjacent properties.
- **Interviews** – Interviews with site representatives, including owners, occupants, and site managers, regarding the environmental condition of the site to the extent necessary and such persons are available. Interviews with state and/or local government officials as necessary.
- **Report** – Evaluation of the information and data obtained by the Phase I ESA process outlined above and preparation of this Phase I ESA report documenting findings and providing opinions and conclusions regarding possible environmental impacts and RECs at the site.

1.4 Limitations and Exceptions

The environmental services described in this report have been conducted in general accordance with current regulatory guidelines and the standard-of-care exercised by environmental consultants performing similar work in the project area. No warranty, expressed or implied, is made regarding the professional opinions presented in this report.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ardent should be contacted if the reader requires any additional information or has questions regarding the content, interpretations presented, or completeness of this document.

The findings, opinions, and conclusions are based on an analysis of the observed site conditions and the referenced literature. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the site or nearby properties. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by

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changes over which Ardent has no control. Ardent cannot warrant or guarantee that not finding indicators of any particular hazardous material means that this particular hazardous material or any other hazardous materials do not exist on the site. Additional research, including invasive testing, can reduce the uncertainty, but no techniques now commonly employed can eliminate the uncertainty altogether.

1.5 Special Terms and Conditions

As indicated in Section 13.1.5 of ASTM Standard E 1527-13, the following, which is not intended to be all inclusive, represents out-of-scope items with respect to a Phase I ESA: asbestos-containing materials (ACMs), radon, lead-based paint (LBP), lead in drinking water, wetlands, regulatory compliance, cultural and historic risk, industrial hygiene, health and safety, ecological resources, endangered species, indoor air quality unrelated to releases of hazardous substances or petroleum products into the environment, biological agents, and mold. As part of our agreement with the client, Ardent visually assessed site buildings (if present) for possible ACMs, LBP, and mold. In addition, ASTM Standard E 2600-15 supplements the ASTM Standard E 1527-13 to include evaluation of VEC using Tier 1 screening.

This study did not include an evaluation of geotechnical conditions or potential geologic hazards. In addition, Ardent did not address interpretations of zoning regulations, building code requirements, or property title issues.

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1.6 User Reliance

This report may be relied upon and is intended exclusively for use by the client. Any use or reuse of the findings, opinions, and/or conclusions of this report by parties other than the foregoing parties is undertaken at said parties' sole risk.

1.7 Physical Limitations

No physical limitations were encountered during the completion of this Phase I ESA report.

1.8 Data Gaps

No significant data gaps were noted during the preparation of this Phase I ESA report.

2 GENERAL SITE CHARACTERISTICS

The following sections describe the location and the current uses of the site and adjacent properties. A site location map is presented as Figure 1, a site vicinity map is presented as Figure 2, and a site plan is presented as Figure 3. Selected photographs of the site and surrounding properties are provided in Appendix A.

2.1 Location and Legal Description

The site is located on the southwest corner of the intersection of 8th Street and Hellman Avenue in the city of Rancho Cucamonga, county of San Bernardino, California (Figure 1). The site has been assigned the address 9000 Hellman Avenue and the San Bernardino County Tax Assessor's Parcel Number (APN) 0209-151-36-0000. The legal description of the site is provided on the Preliminary Title Report, included in Appendix B.

The site is bounded as shown on Figure 2. The site boundary information was obtained during the site reconnaissance and information provided by the client.

2.2 Site Description and Current Site Uses/Operations

The following paragraphs present a description of the site, the activities being conducted on-site, the heating and cooling systems utilized in the site building, the sewage disposal system, and the potable water provider for the site, if any.

2.2.1 Site Description

The site is a square-shaped property that comprises approximately 8.2-acres. The site is developed with a number of buildings such as the Office and Storage Building, Vehicle Maintenance Building, and car wash, and numerous small outbuildings (Figure 3).

2.2.2 Occupants

The site was occupied by Frontier Communications which uses the site as a telecommunication maintenance yard.

2.2.3 Heating and Cooling Systems

General heating or cooling systems for the on-site building use electricity and natural gas obtained from local utility providers.

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2.2.4 Sewage Disposal/Septic Systems

On-site sewage disposal, such as septic tanks or leach fields, were not observed during the site reconnaissance. As discussed in Section 3.7, a historical septic tank and leach field were reportedly located immediately north of the Vehicle Maintenance Building. The site is currently connected to the municipal sewer system.

2.2.5 Potable Water

Potable water is supplied by the local water purveyor.

2.3 Adjacent Properties

In general, the site vicinity consists of commercial and residential properties (Figure 2). The site is bound to the north by 8th Street, followed by railroad tracks, and vacant land. East of the site and beyond Hellman Avenue are residences. South of the site are commercial facilities including Fire Truck Plus, West Coast Construction, and PSA Printing and Mailing Services.

No above ground storage tanks (ASTs), evidence of underground storage tanks (USTs), or large quantities of possible hazardous materials or wastes were noted being stored by off-site facilities along the site property line. In general, these adjacent properties would not be considered an environmental concern to the site.

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3 USER PROVIDED INFORMATION

The following sections summarize information provided by the user to assist the environmental professional in identifying the possibility of RECs in connection with the site, and to fulfill the user's responsibilities in accordance with Section 6 of ASTM Standard E 1527-13. A copy of the user questionnaire completed by Mr. Jason Hines of OMP is presented in Appendix B.

3.1 Current Title Information

A Preliminary Title Report provided by OMP was reviewed by Ardent. The title report was prepared by First American Title Company National Commercial Services dated January 3, 2017. According to the Preliminary Title Report, the current owner of the site is "General Telephone Company of California, a California corporation." A copy of the Preliminary Title Report is included in Appendix B.

3.2 Environmental Liens or Activity and Use Limitations

Information regarding environmental liens or activity and use limitations (AULs) was not provided to Ardent. Mr. Hines was not aware of any environmental liens or AULs against the site that are filed or recorded under federal, state, or local law. No environmental liens or AULs were noted in the preliminary title report.

3.3 Specialized Knowledge

Mr. Hines indicated that, for purposes of this assessment, the client has no specialized knowledge or experience pertaining to the site or the adjacent properties that are material to RECs in connection with the site.

3.4 Commonly Known or Reasonably Ascertainable Information

Mr. Hines is not aware of commonly known or reasonably ascertainable information pertaining to the site.

3.5 Valuation Reduction for Environmental Issues

In a transaction involving the purchase of a parcel of commercial real estate, the user shall consider the relationship of the purchase price of the property to fair market value of the property if the property was not affected by hazardous substances or petroleum products. Mr. Hines indicated that the purchase price reflects fair market value.

3.6 Reason for Performing Phase I ESA

Ardent was retained by OMP to perform the Phase I ESA as part of its real estate due diligence activities for acquisition of the site.

3.7 Other User Provided Information

As part of this investigation, Ardent was provided a previous Phase I ESA prepared by ATC Group Services LLC (ATC) dated December 12, 2016 (referred to herein as the “ATC Phase I ESA”). The ATC Phase I ESA was recently completed for Frontier in preparation to sell the property. This report was very comprehensive and contained a number of additional reports regarding UST closure and other investigations. Ardent reviewed the ATC Phase I ESA and the attached environmental documents and compared laboratory results of

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previous investigations with current regulatory guidelines. The following presents a summary of the information reviewed. Detailed information and copies of previous reports are presented in Appendix C.

3.7.1 Historical Land Use

The telecommunication maintenance yard comprises three main buildings, referred to as the Office and Storage Building, Vehicle Maintenance Building, and car wash, and numerous small outbuildings.

From at least 1938 through 1959, the site was used for agricultural purposes. By 1966, the eastern portion of the site was used as a telecommunication maintenance yard with the Office and Storage Building, Vehicle Maintenance Building, and car wash observed. The western portion of the site remained vacant until approximately 1985, when it was used for parking and storage. The site has been mainly used for office, parking, storage of telecommunication equipment, vehicle maintenance, and car washing activities.

3.7.2 Underground Storage Tanks

As part of the maintenance activities, fueling and maintenance of fleet vehicles included the use of underground storage tanks (USTs). Throughout the years, these tanks were removed and replaced with aboveground storage tanks (ASTs). The on-site USTs included one 10,000-gallon gasoline UST located northeast of the Vehicle Maintenance Building which was removed in 1986 and replaced with a 12,000-gallon gasoline UST, and a 500-gallon waste oil UST located south of the Vehicle Maintenance Building which was removed in 1986. The 12,000-gallon replacement gasoline UST was removed in 1999 and replaced with a 12,000-gallon gasoline UST located west of the Vehicle Maintenance Building. This UST was removed in 2011. The four USTs were removed under the direction and oversight of the San Bernardino County Fire Department (SBCFD) and impacted soils were remediated by excavation. Laboratory results of confirmation samples showed no detectable to low concentrations of residual contaminates. Based on these results, no further action (NFA) letters or case closure status were issued by the SBCFD. Ardent has reviewed these data and concur with the regulatory agency that no further work is

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necessary. Based on these results, these former environmental issues would no longer be considered an environmental concern to the site. According to American Society for Testing and Materials (ASTM) Standards, these former features would be considered a historical recognized environmental condition (HREC).

3.7.3 Other Possible Environmental Concerns

The Vehicle Maintenance Building contains three underground hydraulic lifts. In 1988, a subsurface investigation and subsequent remedial effort was completed associated with a leaking underground hydraulic oil line. The excavation activities removed a majority of the impacted soil, but some impacted materials were left in-place beneath the eastern building foundation. The documentation report was unclear as to whether confirmation samples were collected and analyzed.

A former clarifier and leach field were reportedly located northwest of the Vehicle Maintenance Building and were assumed to have been connected to this building. Based on the age of the buildings (1966), asbestos containing building materials (ACMs) and lead-based paint (LBP) may be present.

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4 PHYSICAL SETTING

The following sections include discussions of topographic, geologic, and hydrogeologic conditions in the vicinity of the site, based upon our document review and our visual reconnaissance of the site and adjacent areas.

4.1 Site Topography

Based on the review of the United States Geological Survey (USGS) 7.5 Minute Series, Guasti, California, Topographic Quadrangle Map dated 2012, the site has an elevation of approximately 1,090 feet above mean sea level (msl) and slopes to the south.

4.2 Geology

The project area is situated in the Santa Ana River Valley, in the southwestern portion of the Transverse Ranges Geomorphic Province. The geomorphic province encompasses an area that extends 320 miles from Point Arguello and San Miguel Island on the west to the mountains of Joshua Tree National Monument on the east, where the province merges with the Mojave and Colorado deserts. The geomorphic province varies in width from 40 to 60

miles, most of which is characterized by east-west trending mountain ranges that are underlain by a range of Jurassic to older age metamorphic and igneous rocks. The site vicinity is characterized by recent non-marine alluvial deposits forming a veneer over approximately 17,000 feet of interbedded conglomerate, sandstone, and shale. The site is underlain by a thick alluvial deposit that has been derived from the San Gabriel Mountains located approximately 7 miles north of the site.

4.3 Oil and Gas Maps

Based on a review of the Division of Oil, Gas, and Geothermal Resources (DOGGR) online well finder, the site does not lie within or adjacent to an active oil field and no oil or natural gas wells have been drilled on the site or in the immediate site vicinity.

4.4 Site Hydrology

The following sections discuss the site hydrology in terms of both surface waters and groundwater.

4.4.1 Surface Waters

No natural water bodies are located on or adjacent to the site.

4.4.2 Groundwater

The site is located within the greater Chino Groundwater Basin and within the local Chino North Groundwater Management Zone. The Chino Groundwater Basin provides water for municipal, domestic and agricultural uses, as well as industrial services and process supplies. Based on our experience at properties in the site vicinity, groundwater occurs at depths ranging from approximately 260 and 300 feet bgs and flows in a southwesterly direction.

5 HISTORICAL LAND USE

Ardent conducted a historical land use record search for both the site and surrounding areas. This included a review of one or more of the following sources that were found to be both reasonably ascertainable and useful for the purposes of this Phase I ESA: historical aerial photographs, historical fire insurance maps, historical city directories, building permits and plans, topographic maps, property tax records, zoning/land use records, and a review of a prior environmental

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assessment report regarding the site. Ardent used some of the historical land use information provided in the ATC Phase I ESA to summarize the following sections. A copy of this document is provided in Appendix C.

5.1 Summary of Historical Land Use of the Property

From at least 1938 through 1959, the site was used for agricultural purposes. By 1966, the eastern portion of the site was used as a telecommunication maintenance yard with the Office and Storage Building, Vehicle Maintenance Building, and car wash observed. The western portion of the site remained vacant until approximately 1985, when it was used for parking and storage. The site has been mainly used for office, parking, storage of telecommunication equipment, vehicle maintenance, and car washing activities.

5.2 Summary of Historical Land Use of Adjoining Properties

From at least 1938 through the mid-1985s, the surrounding properties were mainly used for agricultural purposes with sporadic residences noted. By the mid-1980s, the surrounding properties began being developed for commercial uses.

5.3 Fire Insurance Rate Maps

Historical Sanborn Fire Insurance Rate Maps (Sanborn maps) were requested from Environmental Data Resources Inc. (EDR) of Shelton, Connecticut. According to EDR, there are no Sanborn maps available for the site or surrounding properties.

5.4 Historical Aerial Photographs

Historical aerial photographs for selected years between 1938 and 2012 were provided by EDR. The following presents a summary of our review.

- **1938, 1949, 1953, and 1959** – The site and adjacent properties to the north, south, and west consisted of agricultural land. Small residential buildings were noted sporadically in the site vicinity.
- **1966, 1975, and 1985** – In 1966 and 1975, only the eastern portion of the site had been developed with the existing Office and Storage Building and Vehicle Maintenance Building. By 1985, the western portion of the site was also being used for equipment storage as part of the telecommunication maintenance yard. By 1985, an increase in commercial development was noted in the site vicinity.

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- **1989, 1994, 2005, 2006, 2009, 2010, and 2012** – The site continued to be used as a telecommunication maintenance yard. The site vicinity continued to increase with commercial development.

5.5 Building Department

The City of Rancho Cucamonga Building and Safety Services Department (RCBSSD) maintains building permits for the site. As presented in the ATC Phase I ESA, the original building permits for the Office and Storage Building and Vehicle Maintenance Building were not provided in the RCBSSD file. As noted above, these buildings were observed on the 1966 aerial photograph. The earliest permits on file were dated 1979 for the construction of small offices and warehouse buildings. A permit to construct a fueling island canopy was dated October 29, 1998. A permit for an AST and associated concrete slab was dated November 10, 1998.

5.6 City Directories

City directories were obtained from EDR for the site and immediate site vicinity. Selected city directories between the years 1922 through 2013 were reviewed. No listings for the site were noted from 1922 through 1970. The first and only listing for the site was in 1975 as an individual (T.W. Johnson and J.H. Mixer).

The site vicinity consisted mainly of residential uses prior to the 1950s, with some retail and commercial uses beginning in the 1980s. No findings either on the site or on immediately adjacent properties that are of potential environmental concern were listed in the directories.

5.7 Historical Topographic Maps

Historical topographic maps for the site were provided by EDR for review. The maps provided for the site were dated 1897, 1900, 1903, 1941, 1944, 1953, 1954, 1966, 1973, 1976, 1981 and 2012. The 1897, 1900, 1903, and 1941 maps show little detail. The 1944, 1953, 1954, and 1966 maps show the site used for agricultural purposes. By 1973, the Office and Maintenance Building and Vehicle Maintenance Building were noted on the site.

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5.8 Interviews

Interviews were conducted by Ardent with key site personnel (e.g., past and present owners, operators, and/or occupants) with the objective of obtaining information indicating RECs in connection with the site. The following are the site personnel interviewed for purposes of this assessment.

5.8.1 Interview with Owner

The Owner was not available during the site reconnaissance.

5.8.2 Interview with Site Manager

During the site reconnaissance, Ardent met with Mr. Joseph Loya, the Property Manager. Findings of this interview are presented throughout the report.

5.8.3 Interviews with Occupant

As noted above, Ardent met with Mr. Loya, representative of Frontier. Findings of this interview are presented throughout the report.

5.8.4 Interviews with Local Government Officials

Representatives of local regulatory agencies were interviewed during completion of this report. The information obtained is presented throughout this report.

5.8.5 Interviews with Others

No other interviews were conducted during this Phase I ESA.

5.9 Previous Reports and Documents

Previous environmental investigations at the site are discussed in Section 3.7.

6 SITE RECONNAISSANCE

The site and site vicinity reconnaissance was performed by Ardent on February 7, 2017. The site reconnaissance involved a walking tour of the site and visual observations of adjoining properties. At the time of the site reconnaissance, the weather was rainy, however no significant weather related obstructions (i.e. puddles) were noted at the site. Selected photographs taken during these activities are included in Appendix A.

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At the time of the site reconnaissance, the site was occupied by Frontier as a telecommunication maintenance yard. Site buildings consisted of an Office and Storage Building, a Vehicle Maintenance Building, a carwash, and numerous storage structures. No active fueling systems were noted.

6.1 Use and Storage of Hazardous Substances and Petroleum Products

A flammables cabinet within the Vehicle Maintenance Building stored various small containers of power steering fluid, WD-40, battery cleaner, etc. An approximately 30-gallon drum of gear oil was located in the vehicle maintenance building. A storage shed located north of the vehicle maintenance building contained two 55-gallon drums, an approximately 30-gallon drum, and three 5-gallon buckets of lubricating grease. A 55-gallon drum of antifreeze was located immediately adjacent to this storage shed. Numerous cylinders of nitrogen were stored along the north boundary of the site. Based on the lack of surficial staining, evidence of a release, and/or type of materials being stored, there is a low likelihood that a significant release has occurred and these features would not be considered an environmental concern to the site.

6.2 Storage and Disposal of Hazardous Wastes

One 55-gallon drum of waste oil, two 55-gallon drums of drained used oil filters, one 55-gallon drum of electronic waste, one 55-gallon drum of waste aerosol cans, one 55-gallon drum of waste coolant, and a parts washer were noted in the Vehicle Maintenance Building. No staining or evidence of leaks were noted around these features. Based on the lack of surficial staining, evidence of a release, and/or type of materials being stored, there is a low likelihood that a significant release has occurred and these features would not be considered an environmental concern to the site.

6.3 Unidentified Substance Containers

No unidentified substance containers were observed site during the site reconnaissance.

6.4 ASTs and Underground Storage Tanks (USTs)

An approximately 250-gallon used oil AST and an approximately 250-gallon new oil AST were located north of the Vehicle Maintenance Building. No staining or evidence of leaks were noted. These features would not be considered an environmental concern to the site.

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No USTs are reportedly present on-site, however four USTs were reportedly formerly located on-site and granted regulatory closure (Figure 3). The canopy associated with the former fuel dispenser island was noted west of the Vehicle Maintenance Building.

6.5 Evidence of Releases

Evidence of chemical releases on the site, such as odors, stressed vegetation, stains, leaks, pools of liquids, and spills, was not observed during the site reconnaissance.

6.6 Polychlorinated Biphenyls (PCBs)

Historically, PCBs (a group of hazardous substances and suspected human carcinogens) were widely used as an additive in cooling oils for electrical components. Typical sources of PCBs can include electrical transformers. A pole-mounted electrical transformer was noted along the east boundary of the site. No staining or evidence of a release were noted, therefore, this transformer does not represent a significant environmental concern to the site.

6.7 Suspect Asbestos-Containing Building Materials (ACM)

The manufacture of most ACM was phased out in the 1970s, ending in 1980. Previously manufactured ACM that were in stock continued to be used through approximately 1981. Some non-friable ACM are still manufactured. In general, buildings constructed after 1981 have a negligible potential to contain friable ACM and a low potential for most non-friable ACM. Based on the age of the site buildings (1966), ACMs may be present.

6.8 Lead Based Paint (LBP)

The manufacture of LBP was phased out in approximately 1978. Based on the age of the site buildings (1966), LBP is likely present.

6.9 Indications of Water Damage or Mold Growth

No visual indications of water damage or visible mold growth were noted.

6.10 Wastewater Systems

A three-stage clarifier associated with the active car wash was located immediately south of the car wash (Figure 3). The former clarifier and leach field, discussed in Section 3.7, were located immediately north of the Vehicle Maintenance Building. It is assumed that the

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former clarifier and leach field were associated and connected to the Vehicle Maintenance Building. Based on the type of wastewater being processed (car wash and maintenance activities), these features would represent an environmental concern to the site.

6.11 Stormwater Systems

Stormwater drains were located throughout the site parking and driveway areas.

6.12 Wells

No wells were observed on-site during the site reconnaissance.

6.13 Other Subsurface Structures

Concrete patches associated with three former underground hydraulic lifts were noted in the Vehicle Maintenance Building. One active underground hydraulic lift was also observed. No investigations have been completed in the vicinity of these features, and therefore, these features would be considered an environmental concern to the site. No other subsurface structures were noted. Two electric aboveground lifts are currently used by Frontier.

6.14 Other Issues

No other on- or off-site issues of environmental concern were noted.

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7 ENVIRONMENTAL DATABASE SEARCH

A computerized environmental information database search was performed by EDR for this Phase I ESA on January 19, 2017. The database search included federal, state, local, and tribal databases. A summary of the environmental databases searched, their corresponding search radii, and number of noted facilities of environmental concern is presented in Appendix E. In addition, a description of the assumptions and approach to the database search is also provided in Appendix E. The review was conducted to evaluate whether the site or properties within the vicinity of the site have been reported as having experienced significant unauthorized releases of hazardous substances or other events with potentially adverse environmental effects.

Two unmapped properties, due to poor or inadequate address information, were identified in the database report. Based on the location and/or database, these listings do not represent a significant environmental concern to the site.

The following paragraphs describe the databases that contain noted properties of environmental concern, and include a discussion of the regulatory status of the facilities and potential environmental impact to the subject site.

7.1 Federal National Priorities List (NPL): Distance Searched – 1 mile

The NPL is the USEPA's database of uncontrolled or abandoned hazardous waste properties identified for priority remedial actions under the Superfund program. This database includes proposed NPL listings.

Neither the site nor properties within a 1-mile radius were listed on this database.

7.2 Federal Delisted NPL: Distance Searched – 0.5 mile

This database contains delisted NPL properties under the Superfund program. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the USEPA uses to delete properties from the NPL. In accordance with 40 Code of Federal Regulations (CFR) 300.425. (e), properties may be deleted from the NPL where no further response is appropriate.

Neither the site nor properties within a 0.5-mile radius were listed on this database.

7.3 Federal Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) List: Distance Searched – 0.5 mile

The CERCLIS database has been replaced by the Superfund Enterprise Management System (SEMS) database, which tracks hazardous waste sites and remedial activities performed in support of the EPA's Superfund Program. This database also includes properties listed on the SEMS-ARCHIVE database for facilities with statuses of No Further Remedial Action Planned (NFRAP).

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Neither the site nor properties in a 0.5-mile radius were listed on the SEMS-ARCHIVE database. The site was not listed on the SEMS database. One property, located approximately 0.16-mile southeast of and potentially crossgradient from the site was listed on the SEMS database. This facility indicated a non-NPL status of "Removal only site (no site assessment work needed)." Based on the distance, direction, depth to groundwater, and regulatory status, this facility would not represent a significant environmental concern to the site.

7.4 Federal Corrective Action Report (CORRACTS): Distance Searched – 1 mile

The USEPA maintains this database of Resource Conservation and Recovery Act (RCRA) facilities that are undergoing corrective action. A corrective action order is issued when there has been a release of hazardous waste or constituents into the environment from a RCRA facility.

The site was not listed on this database. One facility located approximately 0.75-mile east to southeast of and potentially crossgradient from the site was listed on this database. Based on the distance, direction, and depth to groundwater, this facility would not be considered an environmental concern to the site.

7.5 Federal Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal (TSD) Facilities List: Distance Searched – 0.5 mile

The RCRA TSD database (non-CORRACTS) is a compilation by the EPA of facilities that report generation, storage, transportation, treatment, or disposal of hazardous waste.

Neither the site nor properties within a 0.5-mile radius were listed on this database.

7.6 Federal RCRA Generators List: Distance Searched – Site and Adjoining Properties

This list identifies sites that generate hazardous waste as defined by RCRA. Inclusion on this list is for permitting purposes and is not indicative of a release.

Frontier was listed in 2016 as a small quantity generator of hazardous waste, including ignitable wastes. In 2000, Verizon was also listed as a small quantity generator. Verizon's wastes included ignitable, corrosive, and reactive wastes, benzene, PCE, and halogenated

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solvents including PCE, methylene chloride, TCE, 1,1,1-trichloroethane (1,1,1-TCA), Freon 11,and Freon 13. In 1996 GTE was listed as a small quantity generator, and as a large quantity generator in 1985. No listings of GTE's waste were provided in the EDR report. No violations were noted. No adjacent properties were listed as generators of hazardous wastes. No adjoining properties were listed.

7.7 Federal Institutional Control/Engineering Control Registries: Distance Searched – Site

These lists identify properties with engineering and/or institutional controls. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or affect human health. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on the site. Deed restrictions are generally required as part of the institutional controls.

The site was not listed on this database.

7.8 Federal Emergency Response Notification System (ERNS) List: Distance Searched – Site

The ERNS database, maintained by the USEPA, contains information on reported releases of oil and hazardous substances.

The site was not listed on this database.

7.9 Federal Brownfield List: Distance Searched – 0.5 mile

The USEPA Brownfield database, entitled Targeted Brownfield's Assessments (TBA), lists properties for which the USEPA is providing funding and/or technical support for environmental assessments and investigations. The objective of the TBA is to promote cleanup and redevelopment of undesirable properties with environmental issues.

Neither the site nor properties within a 0.5-mile radius were listed in this database.

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7.10 State Calsites Database (Calsites) or State-Equivalent CERCLIS: Distance Searched – 1 mile

The Calsites database, also known as the State-equivalent CERCLIS, is maintained by the Cal-EPA DTSC. This database contains information on AWP and both known and potentially contaminated properties. Two-thirds of these properties have been classified, based on available information, as needing no further action (NFA) by the DTSC. The remaining properties are in various stages of review and remediation to determine if a problem exists. These properties are presented by EDR on the EnviroStor database.

The site was not listed in this database. Seven facilities within 1-mile of the site were listed on this database. Six of the facilities were located at least 0.35-mile from the site in a potentially cross- to downgradient location. The remaining upgradient facility was located approximately 0.78-mile from the site, with a regulatory status of NFA. Based on the distance, direction, depth to groundwater, and regulatory status, these facilities do not represent a significant environmental concern to the site.

7.11 State Solid Waste Landfill Sites (SWLF): Distance Searched – 0.5 mile

The SWLF database consists of open and closed solid waste disposal facilities and transfer stations. The data comes from the Integrated Waste Management Board's Solid Waste Information System (SWIS) and the State Water Resources Control Board (SWRCB) Waste Management Unit Database (WMUD) database.

Neither the site nor properties within a 0.5-mile radius were listed on this database.

7.12 State Leaking Underground Storage Tank (LUST) Lists: Distance Searched – 0.5 mile

The LUST information system is obtained from by the SWRCB and the Regional Water Quality Control Board (RWQCB).

The site was not listed on this database. One facility located approximately 0.35-mile north to northwest of and potentially crossgradient from the site was listed on this database. The facility was listed as "case closed." Based on distance, direction, depth to groundwater and regulatory status, this facility would not represent an environmental concern to the site.

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7.13 State Spills, Leaks, Investigations, and Cleanups (SLIC) List: Distance Searched – 0.5 mile

The SLIC information system is obtained from by the SWRCB and the Regional Water Quality Control Board (RWQCB). Although not required for reporting by ASTM standards, this database provides pertinent information regarding environmental concerns at the site and facilities in the site vicinity.

Neither the site nor properties within a 0.5-mile radius were listed on this database.

7.14 State Underground Storage Tank (UST) and Aboveground Storage Tank (AST) Registration List: Distance Searched – Site and Adjoining Properties

UST and AST databases are provided by the SWRCB. Inclusion on these lists is for permitting purposes and is not indicative of a release.

The site is listed on the UST database. As previously noted, USTs have been used on site. All USTs have been removed and no current USTs are present. The site was not listed in the AST database. No adjoining properties were listed on the AST or UST databases.

7.15 State Voluntary Cleanup Programs (VCPs): Distance Searched – 0.5 mile

The State VCP database lists low threat level properties with either confirmed or unconfirmed releases. Project proponents have requested that the DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Neither the site nor properties within a 0.5-mile radius were listed on this database.

7.16 Indian Reservations: Distance Searched – 1 mile

This list depicts Indian administered lands of the United States that have an area equal to or greater than 640-acres. No Indian Reservations were listed within a 1-mile radius from the site. Due to the lack of Indian Reservations within 1-mile of the site, other tribal database listings required by ASTM and AAI were deemed not applicable. These listings would include tribal-equivalent NPL, CERCLIS, Landfill and/or Solid Waste Disposal, LUST, UST and AST Registrations, Institutional Control/Engineering Control Registries, VCPs, and Brownfields.

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7.17 Other Non-ASTM and AAI Database: Distance Searched – Site

Other databases were included in the EDR report, but are not required by ASTM or AAI. Based on our review, the site was listed on HAZNET, FINDS, CHMIRS, and ECHO. With the exception of CHMIRS, these listings are for permitting purposes or duplicate of other regulatory listings already discussed. These listings are not indicative of a release. The site was listed twice on the CHMIRS listing for accidental spillage (transmission fluid and sewage) which were immediately cleaned up by a contractor. These minor releases would not be considered an environmental concern to the site.

8 REGULATORY RECORDS REVIEW

The RWQCB, DTSC, South Coast Air Quality Management District (SCAQMD), and San Bernardino County Fire Department (SBCFD) are lead regulatory agencies for permitting and regulating USTs, ASTs, LUST cases, and facilities that use, store, or generate hazardous waste or hazardous materials. Ardent requested file information for the site using the current address.

8.1 Regional Water Quality Control Board, Los Angeles Region (RWQCB)

Ardent reviewed information on the GeoTracker website. According to the information on the website, the site was not listed.

8.2 Department of Toxic Substances Control (DTSC)

Ardent reviewed state case file listings on the DTSC's EnviroStor website. According to the DTSC website, the site is not listed.

8.3 South Coast Air Quality Management District (SCAQMD)

Ardent requested records for the site from the SCAQMD website. Verizon is listed with a number of inactive permits to operate the former fuel USTs. No violations were noted.

8.4 San Bernardino County Fire Department (SBCFD)

The SBCFD maintains UST, AST, hazardous waste, and hazardous materials inventory. Ardent attempted to obtain records from the LACDPW website and office. Ardent reviewed the information provided from these files in the ATC Phase I ESA report. The SBCFD files contained a number of reports regarding the removal of the former USTs. These reports are summarized in Section 3.7.

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9 VAPOR ENCROACHMENT CONDITION (VEC)

Ardent completed a VEC study for the site using Tier 1 criteria as recommended by ASTM E 2600-15. The Tier 1 screening identifies surrounding facilities that pose a possible vapor intrusion source to the site based on the results of the Phase I ESA investigations and certain criteria outlined by ASTM. These criteria include a certain distance from the target site (referred to by ASTM as within the "area of concern"); the types of chemicals used (referred to by ASTM as the "chemicals of concern"); and a plume test to determine if the plume associated with a source of contamination is close enough to the site to impact indoor air quality. Based on our review of regulatory records, files, databases, client furnished data, and site reconnaissance activities, a possible vapor intrusion issue is present.

Solvents are typically used for parts cleaning and degreasing purposes. In 2000, Verizon was listed as being a small generator of hazardous wastes, including chlorinated solvents. Due to the possible solvent uses in the Vehicle Maintenance Building, former clarifier and leach field, and existing car wash and clarifier, a possible vapor intrusion issue may be present, and therefore, the site would be considered a potential risk for vapor intrusion as defined by ASTM Standards.

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10 FINDINGS, OPINIONS AND CONCLUSIONS

Based upon the results of this Phase I ESA the following findings, opinions and conclusions are provided.

10.1 Findings and Opinions

The following presents a summary of the findings and opinions associated with this Phase I ESA performed for the site, including known or suspect RECs, controlled RECs, and de minimus environmental conditions (i.e., conditions that generally do not present a material risk of harm to public health or the environment).

- From at least 1938 through 1959, the site was used for agricultural purposes. By 1966, the eastern portion of the site was used as a telecommunication maintenance yard with the Office and Storage Building, Vehicle Maintenance Building, and car wash observed. The western portion of the site remained vacant until approximately 1985, when it was used for parking and storage. The site has been mainly used for office, parking, storage of telecommunication equipment, vehicle maintenance, and car washing activities.

- Groundwater occurs at depths ranging from approximately 260 and 300 feet bgs and flows in a southwesterly direction.
- As part of the maintenance activities, fueling and maintenance of fleet vehicles included the use of USTs. Throughout the years, these tanks were removed and replaced with ASTs. The on-site USTs included one 10,000-gallon gasoline UST located northeast of the Vehicle Maintenance Building which was removed in 1986 and replaced with a 12,000-gallon gasoline UST, and a 500-gallon waste oil UST located south of the Vehicle Maintenance Building which was removed in 1986. The 12,000-gallon replacement gasoline UST was removed in 1999 and replaced with a 12,000-gallon gasoline UST located west of the Vehicle Maintenance Building. This UST was removed in 2011. The four USTs were removed under the direction and oversight of the SBCFD and impacted soils were remediated by excavation. Laboratory results of confirmation samples showed no detectable to low concentrations of residual contaminates. Based on these results, NFA letters or case closure status were issued by the SBCFD. Ardent has reviewed these data and concur with the regulatory agency that no further work is necessary. Based on these results, these former environmental issues would no long be considered an environmental concern to the site. According to ASTM Standards, these former features would be considered a historical recognized environmental condition (HREC).
- The Vehicle Maintenance Building contains three inactive underground hydraulic lifts, one active underground hydraulic lift, and two aboveground electric lifts. In 1988, a subsurface investigation and subsequent remedial effort was completed associated with a leaking underground hydraulic oil line. The excavation activities removed a majority of the impacted soil, but some impacted materials were left in-place beneath the eastern building foundation. The documentation report was unclear as to whether confirmation samples were collected and analyzed. Based on this information, the former hydraulic leak and underground hydraulic lifts would still be considered an environmental concern to the site.
- A former clarifier and leach field were reportedly located northwest of the Vehicle Maintenance Building and were assumed to have been connected to this building. Due to the lack of investigations completed around this feature, the former clarifier and leach field would be considered an environmental concern to the site. As noted above, solvents are typically used for cleaning and degreasing purposes. Due to the possible solvent use in the Vehicle Maintenance Building, a possible environmental and vapor intrusion issue may be present.
- An existing car wash and clarifier are located immediately east of the Vehicle Maintenance Building. No investigations have been completed in this area. Based on this information, the car wash and clarifier would be considered an environmental concern to the site. Solvents are typically used for cleaning and degreasing purposes. Due to the possible solvent use in the car wash area, a possible environmental and vapor intrusion issue may be present.
- Verizon was listed as a small quantity generator of hazardous waste, including chlorinated solvents. Solvents are typically used for parts cleaning and degreasing purposes. Due to the possible solvent uses in the Vehicle Maintenance Building, former clarifier and leach field, and existing car wash and clarifier, a possible vapor intrusion issue may be present.

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- Numerous 55-galon drums and other containers were noted throughout the site used to contain waste oil, virgin oil, oil filters, and/or other liquid or hazardous materials. Due to the lack of staining or evidence of a release, these containers would not be considered an environmental concern to the site.
- Based on the age of the buildings (1966), asbestos containing building materials (ACMs) and lead-based paint (LBP) may be present.
- No other on- or off-site environmental concerns were noted.

10.2 Conclusions

Ardent has performed this Phase I ESA and Document Review in general conformance with the scope and limitations of the ASTM Practice E 1527-13, ASTM Practice E 2600-15, and the EPA Standards and Practices for AAI, Final Rule (40 CFR, Part 312), for the property located at 9000 Hellman Avenue in the city of Rancho Cucamonga, California. Any limitations or exceptions encountered during completion of this report are stated in Section 1.4. Based on this Phase I ESA, no evidence or indication of RECs, or conditions indicative of releases or threatened releases of hazardous substances on, at, in, or to the site has been revealed, except for the former clarifier and leach field, car wash (clarifier and possible solvent uses), hydraulic lifts, and remaining hydraulic oils associated with the 1988 release. Although not considered an REC in accordance with ASTM Standards, ACMs and LBP may be present in the on-site buildings.

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11 RECOMMENDATIONS

Based on the information obtained during this assessment, Ardent recommends the following:

- Based on the uncertainty of solvent uses in the Vehicle Maintenance Building, former clarifier and leach field, and existing car wash and clarifier, Ardent recommends completing a soil gas survey in these areas of possible solvent uses to assess whether a vapor intrusion issue is present. Soil sampling should also be collected in the area of the former clarifier and leach field and in the vicinity of the 1988 hydraulic oil release.
- Soil sampling should be completed in the vicinity of the former clarifier and leach field, three inactive hydraulic lifts, and former 1988 hydraulic oil release. Based on historical documents, some hydraulic oil-impacted soil is still present beneath the eastern building foundation of the Vehicle Maintenance Building. These soils will need to be excavated and removed following demolition of this building.
- Prior to Frontier vacating the property, all miscellaneous containers of waste, liquids or hazardous substances should be profiled and disposed. All regulatory permits should be closed. All features with possible environmental concerns that will continue to be used by Frontier during its lease should be removed at the end of its lease, including clarifiers, car

wash, hydraulic lifts, and ASTs. Following removal, confirmation samples should be collected. If the feature is regulated, the feature should be removed in accordance with current regulatory guidelines and under the direction and oversight of the lead regulatory agency. All impacted media should be remediated to levels that will ensure the protection of the environment (i.e. groundwater) and meet human health risk criteria.

- Following demolition of the Vehicle Maintenance Building, residual hydraulic oil-impacted soil reportedly present under the eastern building foundation should be excavated and removed. Confirmation samples should be collected.
- Prior to demolition, a comprehensive asbestos and LBP survey should be completed. If present, these materials should be removed by a State-licensed abatement contractor.

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12 SELECTED REFERENCES

ATC Group Services, Inc., 2017, Phase I Environmental Site Assessment, Frontier Communication Corporation, Rancho Cucamonga Site, 9000 Hellman Avenue, Rancho Cucamonga, California: Report prepared for Frontier Communications, Tampa, Florida, dated January 20.

Environmental Data Resources, Inc. (EDR), 2017, Radius Map, dated January 19.

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13 QUALIFICATIONS STATEMENT AND SIGNATURE OF ENVIRONMENTAL PROFESSIONAL

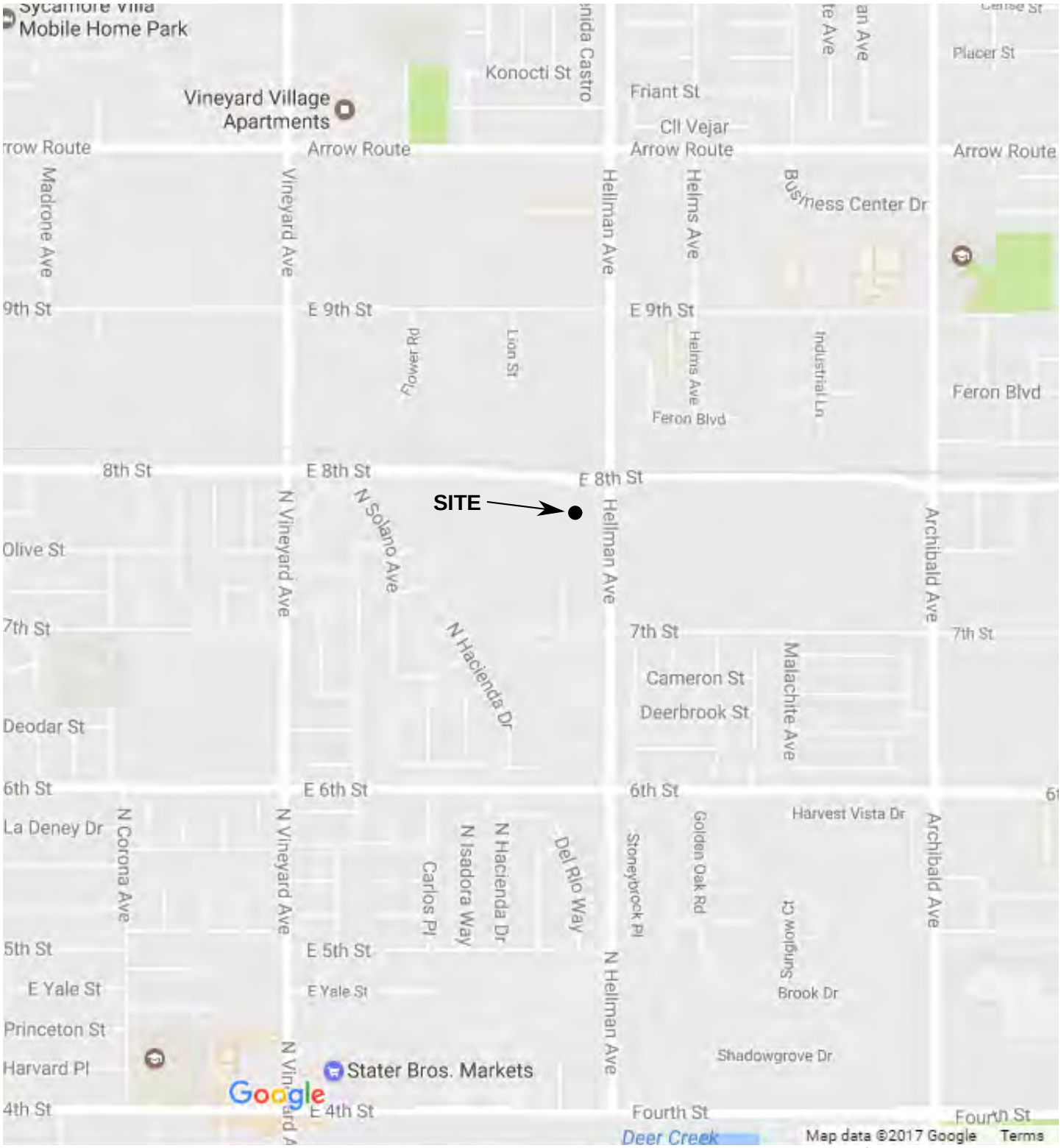
Mr. Paul Roberts states that the Phase I ESA was performed under his direct supervision, and that he has reviewed and approved the report, and the methods and procedures employed in the development of the report conform to the minimum industry standards. Mr. Roberts certifies that Ardent project personnel and subcontractors are properly licensed and/or certified to do the work described herein.

Pursuant to Paragraph 12.13 of the ASTM Standard E1527-13:

I declare that, to the best of my professional knowledge and belief, I meet the definition of *Environmental professional* as defined in §312.10 of 40 CFR 312. I have the specific qualifications based on education, training, and experience to assess a *property* of the nature, history, and setting of the site. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

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Paul Roberts
Principal Geologist



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NO SCALE

NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

ARDENT ENVIRONMENTAL GROUP, INC.	PROJECT NO. **100835001E**	**SITE LOCATION MAP**	FIGURE **1**
	DATE **02/17**	9000 HELLMAN AVENUE RANCHO CUCAMONGA, CALIFORNIA	

1. Vacant Building
2. Fire Truck Plus
   (9020 Rancho Park Court)
3. West Coast Construction
   (9021 Rancho Park Court)
4, PSA Printing and Mailing Services
   (9010 Hellman Avenue)
5. Single Family Residences
6. F & A Auto Body
   (8881 Hellman Avenue)
7. Vacant Land



LEGEND

—— · · —— Approximate Site Boundary

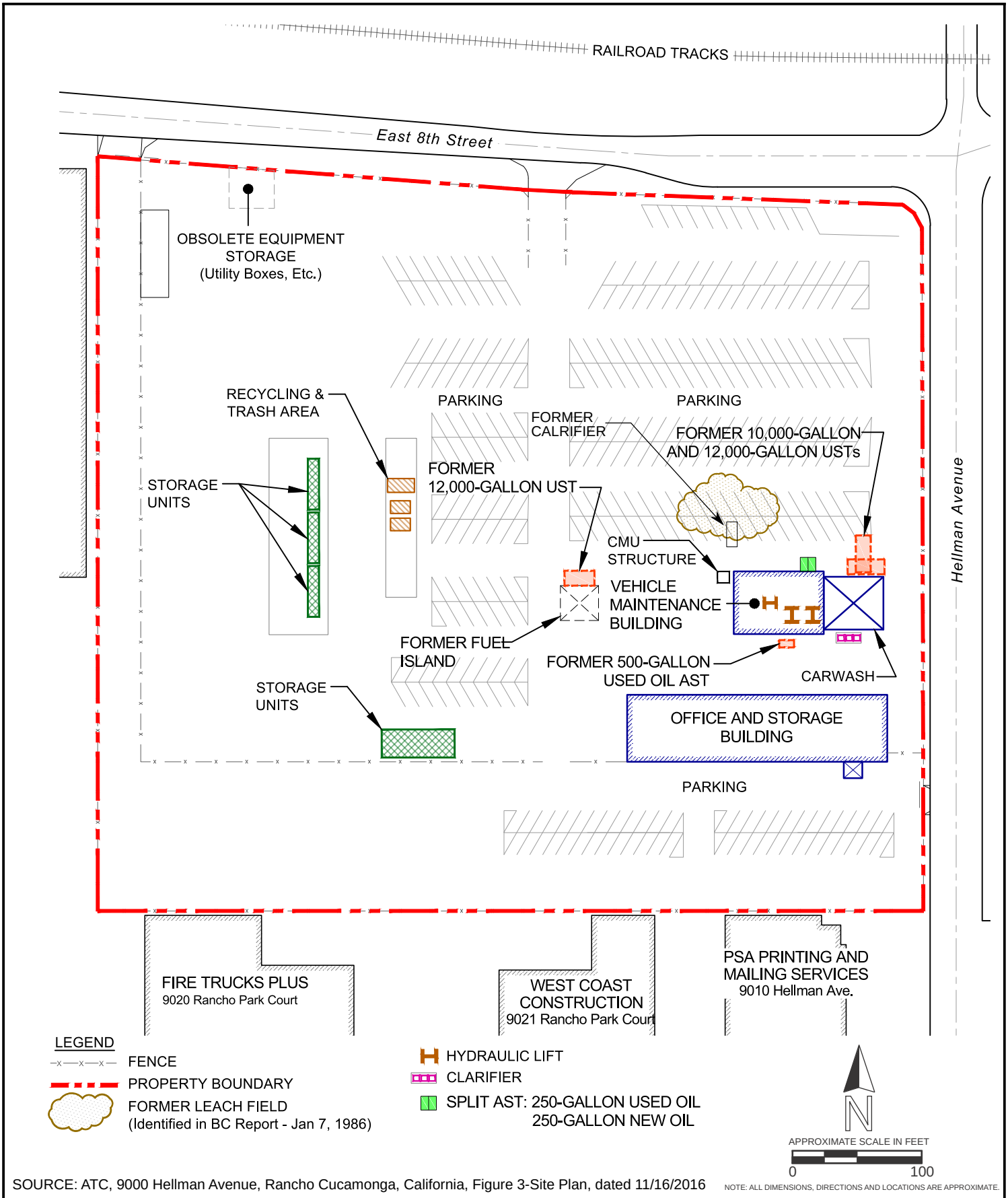
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NO SCALE

NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

ARDENT ENVIRONMENTAL GROUP, INC.

PROJECT NO.	SITE VICINITY MAP	FIGURE
100835001E		2
DATE	9000 HELLMAN AVENUE	
02/17	RANCHO CUCAMONGA, CALIFORNIA	



SOURCE: ATC, 9000 Hellman Avenue, Rancho Cucamonga, California, Figure 3-Site Plan, dated 11/16/2016

NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

ARDENT ENVIRONMENTAL GROUP, INC.

PROJECT NO. **100835001E**	**SITE PLAN**	FIGURE **3**
DATE **02/17**	9000 HELLMAN AVENUE RANCHO CUCAMONGA, CALIFORNIA	

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APPENDIX A

PHOTOGRAPHIC DOCUMENTATION



Photograph No. 1: **Site Office and Storage Building looking northeast from the south portion of the site.**



Photograph No. 2: **Former fuel dispenser island canopy.**



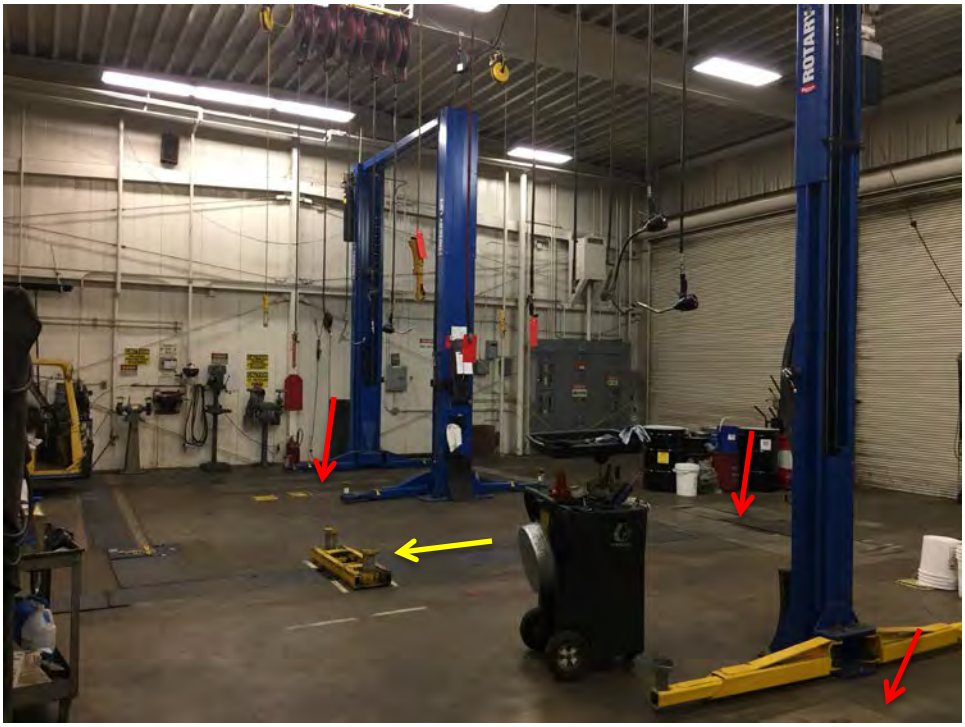
Photograph No. 3: **Site Vehicle Maintenance Building looking east.**



Photograph No. 4: **Typical interior view of the office area within the Office and Storage Building.**



Photograph No. 5: **Typical interior view of the storage area of the Office and Storage Building.**



Photograph No. 6: **Interior view of the Vehicle Maintenance Building. The three former hydraulic underground hoists are indicated by the red arrows and the one active hydraulic underground hoist is indicated by the yellow arrow.**



Photograph No. 7: **Parts washer within the Vehicle Maintenance Building.**



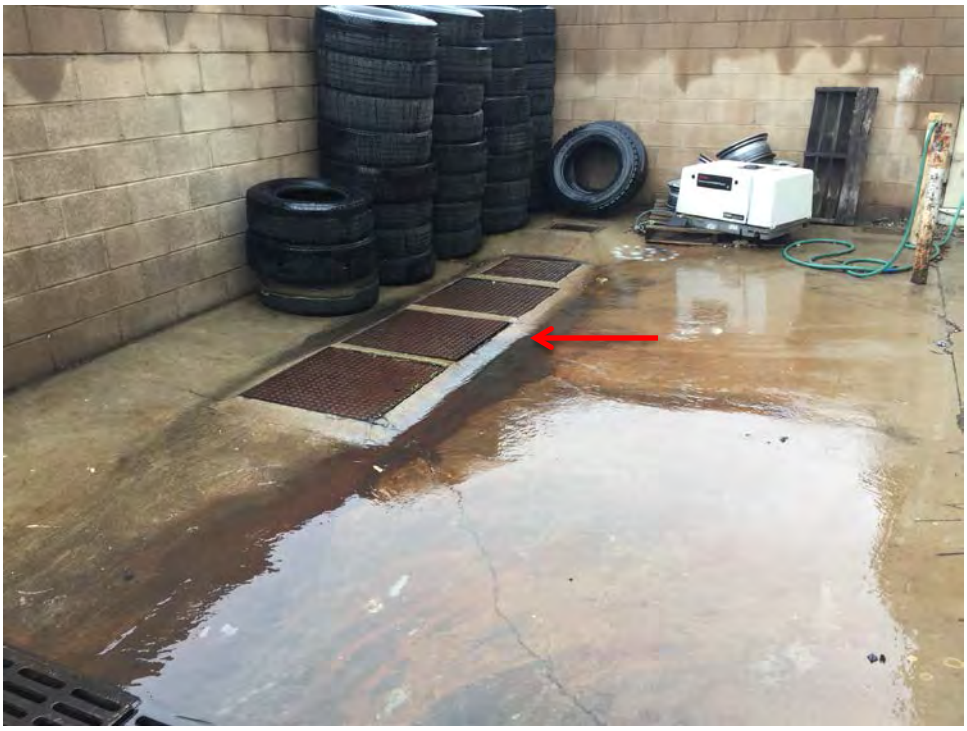
Photograph No. 8: **55-gallon drums of waste oil, used oil filters, used oil filters, waste aerosol cans, and waste coolant within the Vehicle Maintenance Building.**



Photograph No. 9: **250-gallon used oil aboveground storage tank (AST) and 250-gallon new oil AST north of the Vehicle Maintenance Building.**



Photograph No. 10: **Storage shed containing drums of lubricating grease.**



Photograph No. 11: **Clarifier located south of the car wash.**



Photograph No. 12: **Storage yard of the site looking west. The west adjacent commercial building is noted in the background.**



Photograph No. 13: **North adjacent railroad looking north from the north boundary of the site.**



Photograph No. 14: **East adjacent residential development looking northeast from across Hellman Avenue.**

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APPENDIX B

USER PROVIDED INFORMATION

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APPENDIX C

PREVIOUS ENVIRONMENTAL REPORTS

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APPENDIX D

HISTORICAL LAND USE INFORMATION

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APPENDIX E

ENVIRONMENTAL DATABASE REPORT

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APPENDIX F

REGULATORY AGENCY RECORDS

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APPENDIX G

RESUMES

INITIAL STUDY
AND
MITIGATED NEGATIVE DECLARATION

CITY OF RANCHO CUCAMONGA
OVERTON MOORE WAREHOUSE
9000 HELLMAN AVENUE

LEAD AGENCY:

CITY OF RANCHO CUCAMONGA
PLANNING DEPARTMENT
10500 CIVIC CENTER DRIVE
RANCHO CUCAMONGA, CALIFORNIA 91730

REPORT PREPARED BY:

BLODGETT BAYLOSIS ENVIRONMENTAL PLANNING
2211 SOUTH HACIENDA BOULEVARD, SUITE 107
HACIENDA HEIGHTS, CALIFORNIA 91745

JANUARY 30, 2019

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MITIGATED NEGATIVE DECLARATION

PROJECT NAME: Overton Moore Warehouse.

PROJECT ADDRESS: 9000 Hellman Avenue, Rancho Cucamonga, California 90670.

APPLICANT: FLP Rancho Cucamonga LLC. 19300 South Hamilton Avenue, Suite 200, Gardena, California 90248.

CITY AND COUNTY: Rancho Cucamonga, San Bernardino County.

DESCRIPTION: The City of Rancho Cucamonga, in its capacity as the Lead Agency, is considering an application to permit the construction of a 174,745 square-foot warehouse on a 8.09-acre site (352,428 square feet) located on the southwest corner of 8th Street and Hellman Avenue. The new building would consist of 160,245 square feet of warehousing, 12,000 square feet of office space, and 2,500 square feet of office mezzanine. A total of 21 dock high doors would be provided along the new building's southern elevation. In addition, 119 parking spaces and 31 trailer parking spaces would be provided in the northern and southern portions of the project site, respectively. Access to the project site would be provided by a driveway located along the west side of Hellman Avenue and two driveways located along the south side of 8th Street. Lastly, a total of 36,312 square feet of landscaping would be provided.

FINDINGS: The environmental analysis provided in the attached Initial Study indicates that the proposed project would not result in any significant adverse environmental impacts. For this reason, the City of Rancho Cucamonga determined that a *Mitigated Negative Declaration* is the appropriate CEQA document for the proposed project. The following findings may also be made based on the analysis contained in the attached Initial Study:

- The proposed project *will not* have the potential to degrade the quality of the environment.
- The proposed project *will not* have the potential to achieve short-term goals to the disadvantage of long-term environmental goals.
- The proposed project *will not* have impacts that are individually limited, but cumulatively considerable, when considering planned or proposed development in the City.
- The proposed project *will not* have environmental effects that will adversely affect humans, either directly or indirectly.

The environmental analysis is provided in the attached Initial Study prepared for the proposed project. The project is also described in greater detail in the attached Initial Study.

_____ _____

Bryan Hamilton – Consultant to the City of Rancho Cucamonga Date

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SECTION 1 INTRODUCTION

1.1 PURPOSE OF THE INITIAL STUDY

The City of Rancho Cucamonga, in its capacity as the Lead Agency, is considering an application to permit the construction of a 174,745 square-foot warehouse on a 8.09-acre site (352,428 square feet) located on the southwest corner of 8th Street and Hellman Avenue. The new building would consist of 160,245 square feet of warehousing, 12,000 square feet of office space, and 2,500 square feet of office mezzanine. A total of 21 dock high doors would be provided along the new building's southern elevation. In addition, 119 parking spaces and 31 trailer parking spaces would be provided in the northern and southern portions of the project site, respectively. Access to the project site would be provided by a driveway located along the west side of Hellman Avenue and two driveways located along the south side of 8th Street. Lastly, a total of 36,312 square feet of landscaping would be provided. The project proponent is FLP Rancho Cucamonga LLC, 19300 South Hamilton Avenue, Suite 200, Gardena, California 90248.

The City of Rancho Cucamonga is the designated *Lead Agency* for the proposed project and would be responsible for the project's environmental review.[1] The construction and operation of the proposed project will need to undergo a Design Review (DR). The purpose of the Design Review is to ensure that development projects comply with all applicable local design guidelines, standards, and ordinances; to minimize adverse effects on surrounding properties and the environment; and to maintain consistency with the General Plan. According to Section 17.118.020 of the City's Municipal Code, any addition, remodeling, relocation, or construction requiring a building permit within any district is subject to site development review, minor design review, or design review. The Design Review consists of a Design Review Board which includes two members of the Planning Commission and two members of the Planning Department.

The aforementioned action, together with the proposed development, is considered to be a project pursuant to the California Environmental Quality Act (CEQA).[2] As part of the proposed project's environmental review, the City of Rancho Cucamonga authorized the preparation of this Initial Study. Although this Initial Study was prepared with consultant support, the analysis, conclusions, and findings made as part of its preparation fully represent the independent judgment and analysis of the City of Rancho Cucamonga, in its capacity as the Lead Agency. The primary purpose of CEQA is to ensure that decision-makers and the public understand the environmental impacts of the proposed project and that decision-makers have considered such impacts before considering approval of the project. Pursuant to the CEQA Guidelines, purposes of this Initial Study include the following:

- To provide the City information to use as the basis for deciding whether to prepare an environmental impact report (EIR), mitigated negative declaration, or negative declaration;
- To facilitate the project's environmental assessment early in the design and development of the project;

[1] California, State of. *California Public Resources Code. Division 13, Chapter 2.5. Definitions*. as Amended 2001. §21067.

[2] California, State of. *Title 14. California Code of Regulations. Chapter 3. Guidelines for the Implementation of the California Environmental Quality Act*. as Amended 1998 (CEQA Guidelines). §15060 (b).

- To eliminate unnecessary EIRs;
- To determine the nature and extent of any impacts associated with the proposed project; and,
- To enable modification of the project to mitigate significant impacts of the project.[3]

The City also determined, as part of this Initial Study's preparation, that a Mitigated Negative Declaration is the appropriate environmental document for the project's environmental review pursuant to CEQA. This Initial Study and the *Notice of Intent to Adopt a Mitigated Negative Declaration* will be forwarded to responsible agencies, trustee agencies, and the public for review and comment. A 20-day public review period will be provided to allow these agencies and other interested parties to comment on the proposed project and the findings of this Initial Study.[4] This 20-day public review period is required pursuant Section 15073 of the State CEQA Guidelines. Under that Section of the CEQA Guidelines, a lead agency shall provide a public review period pursuant to Section 15105 of not less than 20 days. When a proposed negative declaration or mitigated negative declaration and initial study are submitted to the State Clearinghouse for review by state agencies, the public review period shall not be less than 30 days, unless a shorter period is approved by the State Clearinghouse under Section 15105(d). The CEQA Guidelines indicate the type of projects that are required to be sent up to the State Clearinghouse for review. According to Section 15205 of the CEQA Guidelines, the following environmental documents shall be submitted to the State Clearinghouse for review by state agencies:

- Draft EIRs and Negative Declarations prepared by a state agency where such agency is a Lead Agency.

- Draft EIRs and Negative Declarations prepared by a public agency where a state agency is a Responsible Agency, Trustee Agency, or otherwise has jurisdiction by law with respect to the project.

- Draft EIRs and Negative Declarations on projects identified in Section 15206 as being of statewide, regional, or area wide significance.

- Draft EISs, environmental assessments, and findings of no significant impact prepared pursuant to NEPA, the Federal Guidelines (Title 40 CFR, Part 1500, commencing with Section 1500.1).

The proposed project does not meet any of the aforementioned criteria, including the criteria for a regionally significant project. As stated in Section 15206 of the CEQA Guidelines, a draft EIR or negative declaration prepared by any public agency on a project described in this section shall be submitted to the State Clearinghouse and should be submitted also to the appropriate metropolitan area council of governments for review and comment.

[3] California, State of, *Title 14. California Code of Regulations. Chapter 3. Guidelines for the Implementation of the California Environmental Quality Act* as Amended 2016. (CEQA Guidelines) § 15063(c).

[4] California, State of. *California Public Resources Code. Section 21091 (b).*

Questions and/or comments should be submitted to the following individual:

Thomas Grahn, Associate Planner
City of Rancho Cucamonga Planning Department
10500 Civic Center Drive
Rancho Cucamonga, California 91730

1.2 INITIAL STUDY'S ORGANIZATION

The following annotated outline summarizes the contents of this Initial Study:

- *Section 1 Introduction,* provides the procedural context surrounding this Initial Study's preparation and insight into its composition. This section also includes a checklist that summarizes the findings of this Initial Study.

- *Section 2 Project Description,* provides an overview of the existing environment as it relates to the project site and describes the proposed project's physical and operational characteristics. The project description also provides background into the site's location and environmental setting. This background information was collected during the field survey that was conducted for the project site. The field survey was conducted by Mr. Marc Blodgett and Mr. Bryan Hamilton of Blodgett Baylosis Environmental Planning on March 30, 2018. The field survey took one day to complete and involved the recording of the site's conditions, taking photographs, and collecting noise measurements.

- *Section* 3 *Environmental Analysis,* includes an analysis of potential impacts associated with the proposed project's construction and the subsequent operation.

- *Section 4 Findings,* indicates the conclusions of the environmental analysis and the Mandatory Findings of Significance. In addition, this section includes the Mitigation Monitoring and Reporting Program (MMRP).

- *Section 5 References,* identifies the sources used in the preparation of this Initial Study.

1.3 INITIAL STUDY CHECKLIST

The environmental analysis provided in Section 3 of this Initial Study indicates that the proposed project would not result in any unmitigable, significant impacts on the environment. For this reason, the City of Rancho Cucamonga determined that a Mitigated Negative Declaration is the appropriate CEQA document for the proposed project. The findings of this Initial Study are summarized in Table 1-1 provided on the following pages.

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
SECTION 3.1 AESTHETIC IMPACTS. *Would the project:*				
a) Have a substantial adverse effect on a scenic vista?			X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?			X	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			X	
SECTION 3.2 AGRICULTURE & FORESTRY RESOURCES IMPACTS. *Would the project:*				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act Contract?				X
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined in Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				X
d) Result in the loss of forest land or conversion of forest land to a non-forest use?				X
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forest land to non-forest use?				X
SECTION 3.3 AIR QUALITY IMPACTS. *Would the project:*				
a) Conflict with or obstruct implementation of the applicable air quality plan?			X	
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			X	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?			X	
d) Expose sensitive receptors to substantial pollutant concentrations?			X	
e) Create objectionable odors affecting a substantial number of people?			X	

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
SECTION 3.4 BIOLOGICAL RESOURCES IMPACTS. *Would the project:*				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife, or U. S. Fish and Wildlife Service?				X
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?				X
c) Have a substantial adverse effect on Federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				X
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory life corridors, or impede the use of native wildlife nursery sites?				X
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			X	
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?				X
SECTION 3.5 CULTURAL RESOURCES IMPACTS. *Would the project:*				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?				X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?		X		
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X		
d) Disturb any human remains, including those interred outside of formal cemeteries?		X		
SECTION 3.6 GEOLOGY & SOILS IMPACTS. *Would the project:*				

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: • Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. • Strong seismic ground–shaking? • Seismic-related ground failure, including liquefaction? • Landslides?			X	
b) Result in substantial soil erosion or the loss of topsoil?			X	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			X	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?			X	
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				X
SECTION 3.7 GREENHOUSE GAS EMISSIONS IMPACTS. *Would the project:*				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?		X		
SECTION 3.8 HAZARDS & HAZARDOUS MATERIALS IMPACTS. *Would the project:*				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			X	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project result in a safety hazard for people residing or working in the project area?				X

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g) Impair implementation of or physically interfere with, an adopted emergency response plan or emergency evacuation plan?				X
h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?			X	
SECTION 3.9 HYDROLOGY & WATER QUALITY IMPACTS. *Would the project:*				
a) Violate any water quality standards or waste discharge requirements?			X	
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?			X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?				X
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?				X
e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?			X	
f) Otherwise substantially degrade water quality?				X
g) Place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				X
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X
j) Inundation by seiche, tsunami, or mudflow?				X
SECTION 3.10 LAND USE & PLANNING IMPACTS. *Would the project:*				
a) Physically divide an established community?				X

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Conflict with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?			**X**	
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				**X**
SECTION 3.11 MINERAL RESOURCES IMPACTS. *Would the project:*				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State?				**X**
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?				**X**
SECTION 3.12 NOISE IMPACTS. *Would the project result in:*				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			**X**	
b) Exposure of people to or generation of excessive groundborne vibration or groundborne noise levels?		**X**		
c) A substantial permanent increase in ambient noise levels in the project vicinity above noise levels existing without the project?			**X**	
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		**X**		
e) For a project located with an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				**X**
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				**X**
SECTION 3.13 POPULATION & HOUSING IMPACTS. *Would the project:*				
a) Induce substantial growth in an area either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				**X**
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				**X**
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere				**X**

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
SECTION 3.14 PUBLIC SERVICES IMPACTS. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which would cause significant environmental impacts in order to maintain acceptable service ratios, response times, or other performance objectives in any of the following areas:*				
a) Fire protection services?			X	
b) Police protection services?			X	
c) School services?			X	
d) Parks?				X
e) Other governmental services?			X	
SECTION 3.15 RECREATION IMPACTS. *Would the project:*				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X
SECTION 3.16 TRANSPORTATION & CIRCULATION IMPACTS. *Would the project:*				
a) Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?			X	
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?			X	
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in the location that results in substantial safety risks?				X
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)		X		
e) Result in inadequate emergency access?				X
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?			X	

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
SECTION 3.17 TRIBAL CULTURAL RESOURCES IMPACTS. *Would the project cause a substantial adverse change in the significance of a tribal cultural resources, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:*				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k).		**X**		
b) A resource determined by the Lead Agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the Lead Agency shall consider the significance of the resource to a California Native tribe.			**X**	
SECTION 3.18 UTILITIES & SERVICE SYSTEMS IMPACTS. *Would the project:*				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?			**X**	
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			**X**	
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			**X**	
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?			**X**	
e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			**X**	
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?			**X**	
g) Comply with Federal, State, and local statutes and regulations related to solid waste?				**X**
SECTION 3.19 MANDATORY FINDINGS OF SIGNIFICANCE. *The approval and subsequent implementation of the proposed project:*				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?			**X**	

Table 1-1
Summary (Initial Study Checklist)

Environmental Issue Area Examined	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			**X**	
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?		**X**		

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SECTION 2 PROJECT DESCRIPTION

2.1 PROJECT OVERVIEW

The City of Rancho Cucamonga, in its capacity as the Lead Agency, is considering an application to permit the construction of a 174,745 square-foot warehouse on a 8.09-acre site (352,428 square feet) located on the southwest corner of 8th Street and Hellman Avenue. The new building would consist of 160,245 square feet of warehousing, 12,000 square feet of office space, and 2,500 square feet of office mezzanine. A total of 21 dock high doors would be provided along the new building's southern elevation. In addition, 119 parking spaces and 31 trailer parking spaces would be provided. Parking areas would be provided within the northern and southern portions of the project site, respectively. Access to the project site would be provided by a single driveway located along the west side of Hellman Avenue and two driveways located along the south side of 8th Street. Lastly, a total of 36,312 square feet of landscaping would be provided.[5] The project is described in greater detail in Section 2.4.

2.2 PROJECT LOCATION

The project site is located within the southwest portion of the City of Rancho Cucamonga. The City of Rancho Cucamonga is located approximately 37 miles northeast of Downtown Los Angeles and 12 miles west of the City of San Bernardino. Rancho Cucamonga is bounded on the north by the San Gabriel Mountains; on the east by the City of Fontana and unincorporated San Bernardino County; on the south by the City of Ontario; and on the west by the City of Upland and unincorporated San Bernardino County. Major physiographic features located in the vicinity of the City include the San Gabriel Mountains, which extend along the City's northern border in an east-west orientation. Regional access to Rancho Cucamonga is possible from two area freeways: the Ontario Freeway (I-15) and the Foothill Freeway (I-210). The I-15 Freeway traverses the southeast corner of the City in a southwest to northeast orientation. The I-210 freeway traverses the northern half of the City in an east-west orientation.[6] The location of Rancho Cucamonga in a regional context is shown in Exhibit 2-1. A citywide map is provided in Exhibit 2-2.

The project site is located at the southwest corner of 8th Street and Hellman Avenue. The site's legal address is 9000 Hellman Avenue. The site's corresponding Assessor Parcel Number (APN) is 0209-151-36-0-000. Major roadways near the project site include: Foothill Boulevard, located one mile north of the site; Archibald Avenue, located 0.50 mile east of the site; 4th Street, located 0.86 mile south of the site; and, Vineyard Avenue, located 0.37 mile to the west of the site.[7] A local map is provided in Exhibit 2-3.

[5] HPA Architecture. *Overall Site Plan*. Plan packet dated January 25, 2018.

[6] Google Earth. Website accessed March 29, 2018.

[7] Ibid.

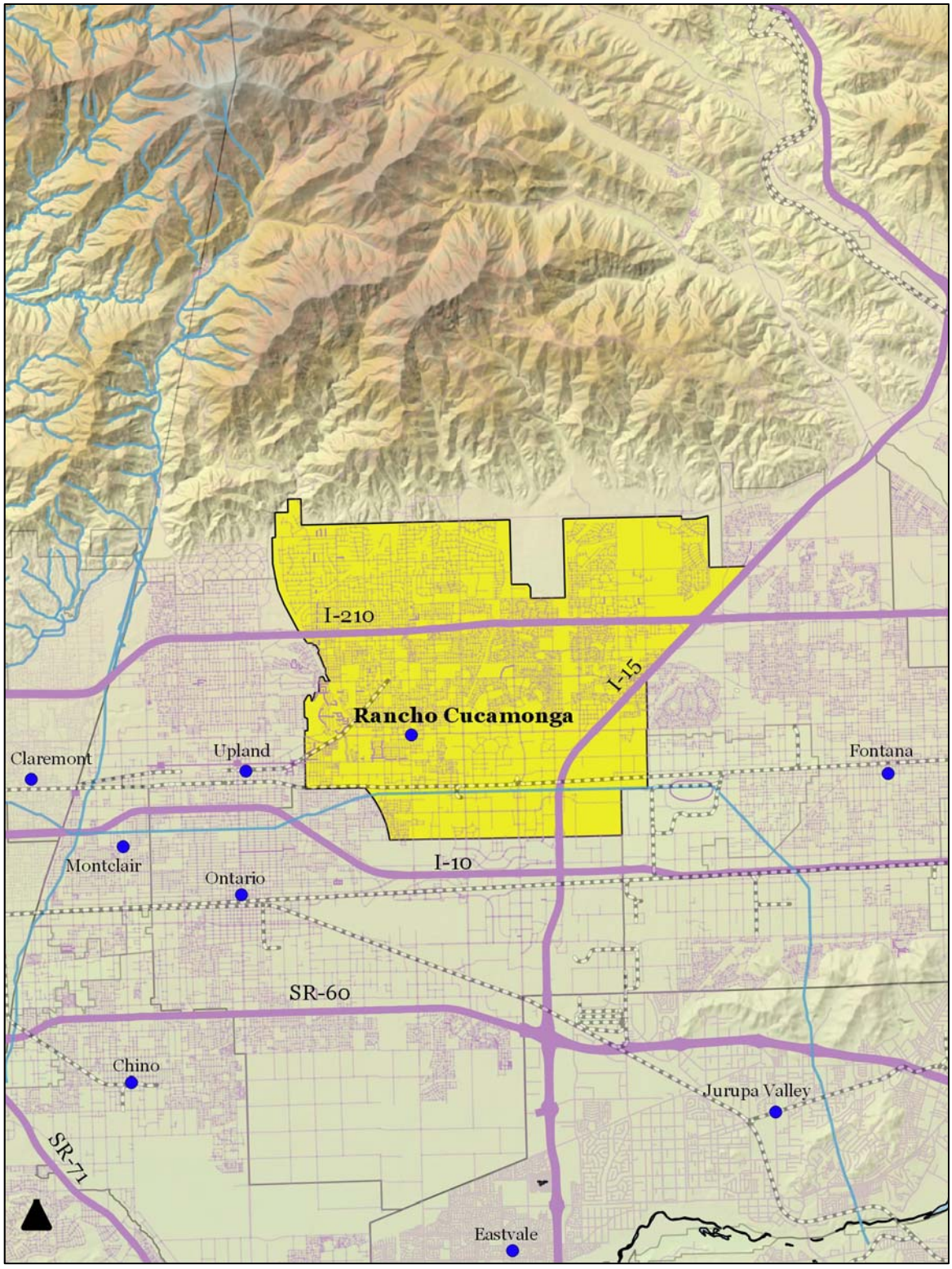


EXHIBIT 2-1
REGIONAL MAP
SOURCE: QUANTUM GIS

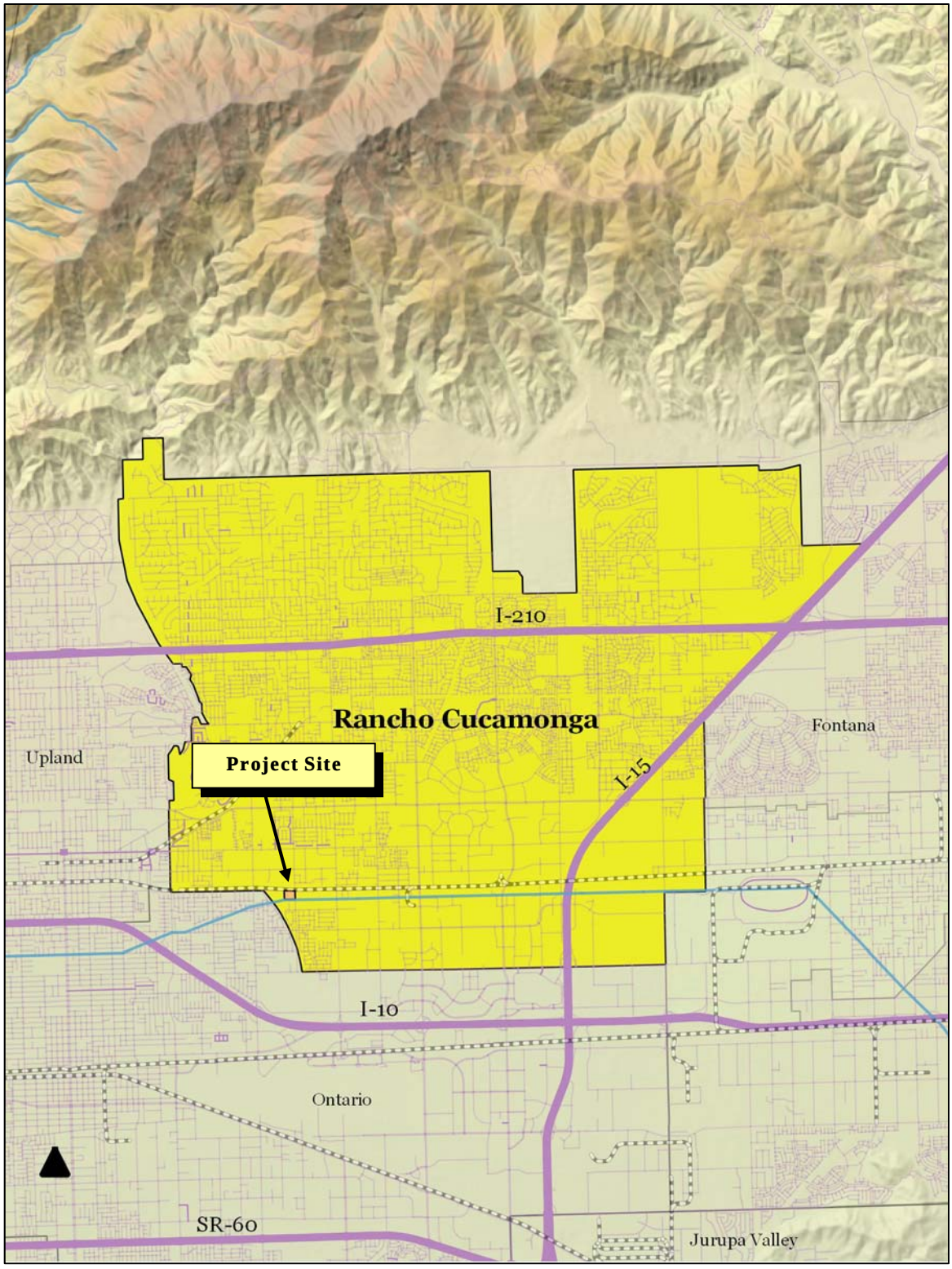


EXHIBIT 2-2
CITYWIDE MAP
SOURCE: QUANTUM GIS

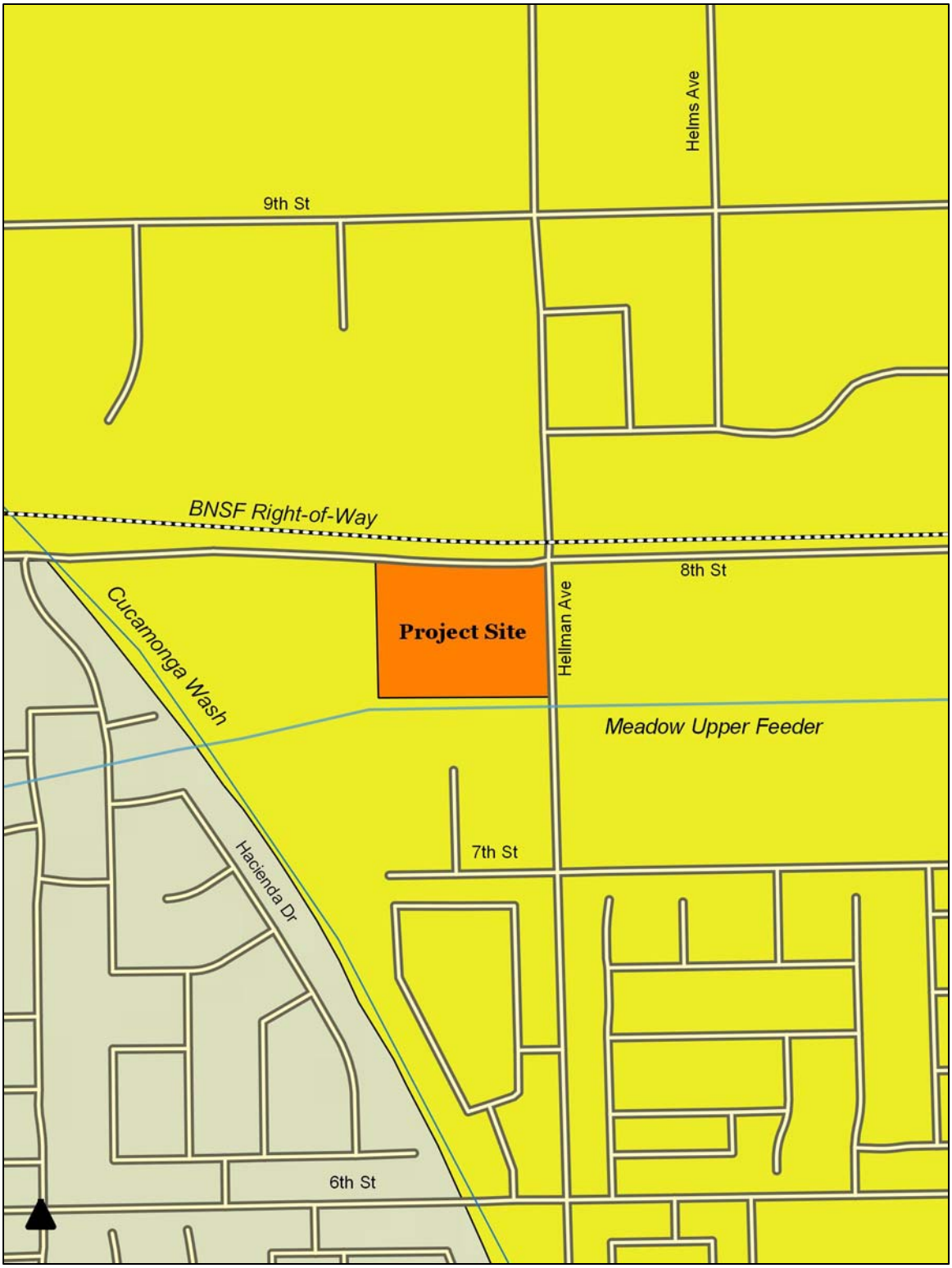


EXHIBIT 2-3
VICINITY MAP
SOURCE: QUANTUM GIS

2.3 ENVIRONMENTAL SETTING

The project site is located within a largely industrial area though a residential area is located to the east of the project site. An aerial photograph depicting the project site and the immediate area is provided in Exhibit 2-4. Photographs of the project site are also provided in Exhibit 2-4. Existing uses found in the vicinity of the project site are summarized below: [8]

- *North of the project site.* 8th Street extends along the project site's northern boundary in an east to west orientation. A railroad right-of-way is located just north of 8th Street in an east to west orientation. Undeveloped open space is located further north.

- *South of the project site.* A business park abuts the project site to the south. This business park is located at the northwest corner of 7th Street and Hellman Avenue.

- *East of the project site.* Single-family dwelling units occupy frontage along the east side of Hellman Avenue, opposite the project site. Various industrial uses are located further east.

- *West of the project site.* A warehouse complex abuts the site to the west. The Cucamonga Channel extends along the west side of this warehouse complex in a northwest to southeast orientation. The Cucamonga Channel is located between 607 and 820 feet to the west of the project site.[9]

The project site is currently occupied by Frontier Communications, which is currently using the site for outdoor storage and repair of equipment. The site is dominated by dilapidated surface parking and contains multiple light standards, fleet vehicles, storage containers, bins, other miscellaneous equipment, and vehicles with ancillary administrative office. Lastly, the site is fenced off by a chain link fence with added barbed wire. A small 400 square-foot patch of landscaping is present along the project site's frontage with Hellman Avenue. This patch of landscaping consists of grass and shrubs and is located adjacent to two tan colored buildings. These two buildings were constructed in 1980 and have a maximum height of 18 feet and total 16,324 square feet of floor area.[10] The two buildings exhibit minimal architectural features such as façade articulation, prominent entryways, and the screening of rooftop equipment. In addition, these buildings appear to be pre-fabricated and assembled on-site. Small signs depicting "Frontier Communications" are currently integrated into the façades of both buildings. These two buildings are located within the southeast portion of the site and are set back approximately 115 feet from the site's southern property line. There are no pole signs or monument signs present on-site. In addition, there are no trees located within the site's boundaries.

[8] Blodgett Baylosis Environmental Planning. *Field Survey*. Survey was conducted on March 30, 2018.

[9] Google Earth. Website accessed April 2, 2018.

[10] San Bernardino County Office of the Assessor. *Property Information Management System Characteristics Report For Parcel 0209-151-36-0000*. Report dated April 2, 2018.



NORTH

EXHIBIT 2-4
AERIAL PHOTOGRAPH
SOURCE: GOOGLE MAPS

2.4 PROJECT DESCRIPTION

2.4.1 PHYSICAL CHARACTERISTICS OF THE PROPOSED PROJECT

The proposed project involves the construction and operation of a new warehouse within an 8.09-acre site. The proposed project would consist of the following elements:

- *Project Site*. The 8.09-acre (352,428 square feet) project site has a maximum lot width (east to west) of 621 feet and a maximum lot depth (north to south) of 538 feet. Once complete, the new warehouse would have a floor area ratio (FAR) of 0.49 to 1.0 and a lot coverage of 48 percent.[11]

- *Warehouse*. The new 174,745 square-foot warehouse building would have a width (east to west) of 566 feet, a depth (north to south) of 344 feet, and a maximum height of 40 feet. Of the total floor area, 160,245 square feet would consist of warehousing space; 12,000 square feet would consist of office space; and 2,500 square feet would consist of mezzanine. Office space would be located within the northwest and northeast corners of the building. A total of 23 dock high doors would be installed along the building's southern elevation.[12]

- *Parking and Access*. A total of 119 parking spaces would be provided. Of the total number of spaces that would be provided, seven would be reserved for handicapped individuals. In addition, 33 trailer parking spaces would also be provided. Parking areas would be located within the north and south sides of the project site. Access to the project site would be made possible by three new driveways: a single 40-foot wide driveway on the west side of Hellman Avenue, a 40 feet and three inches wide driveway located on the south side of 8th Street, and by a 26-foot wide driveway located on the south side of 8th Street. The 26-foot wide driveway would be restricted to passenger vehicles only and no trucks would access the site from this driveway. In addition, this driveway would be restricted to right turns in and right turns out exclusively. Meanwhile, the two 40-foot wide driveways would be full access driveways.[13]

- *Landscaping*. Approximately 36,312 square feet of landscaping would be planted. Landscaping would occupy 10.3 percent of the site and would be located along the site's northern, western, and eastern property lines. Landscaping would also be provided along the building's north, west, and east facing elevations. Landscaping is divided into four categories: trees, shrubs, accent plants, and groundcover. The species that would be planted would consist of drought tolerant species consistent with those identified by the City. The specific species and quantity that would be planted is further described below:

    - *Trees*. A total of seven different tree species would be incorporated into the project's design. These seven species consist of a bottle tree; 11 London Pane Trees; 24 Chitalpas;

[11] HPA Architecture. *Overall Site Plan*. Plan packet dated January 25, 2018.

[12] Ibid.

[13] Ibid.

26 Brisbane Boxes; 29 Lavender Crape Myrtles; 12 Southern Magnolias; and 10 Afghan Pines.

- *Shrubs*. The Applicant would utilize 11 different species of shrubs. These 11 species of shrub consist of 191 Texas Privets; 191 Pineapple Guavas; 191 Strawberry Trees; 50 Baja Fairy Dusters; 115 Lavenders; 298 Dwarf Bottlebrushes; 164 Texas Rangers; 143 Coffeeberries; 201 Autumn Sages; 337 Feathery Cassias; and 584 Coast Rosemaries.

- *Accent Plants*. The Applicant would utilize accent plants to provide emphasis on certain building or site features such as entryways or walkways. These accent plants would consist of 13 Agaves; 24 Century Plants; and 106 Red Yuccas.

- *Groundcover (low-lying plants)*. The final category of landscaping includes groundcover, or low-lying plants, vines, or grass. These plants include Trailing Acacia; Huntington Carpet Rosemary; Pink Muhly; Star Jasmine; and the Red Groundcover Rose.[14]

- *Signage*. No monument or pole signs are proposed for the project. The only signs that would be used would consist of accessible entry signs and handicapped parking signs. The two 40-foot wide driveways would be controlled by stop signs. Neither of the aforementioned signs would be illuminated. Any signage requested by the future tenants would be incorporated into the façade of the building. Therefore, the future tenant would need to adhere to Section 17.74.030(A)(1)(a) of the City of Rancho Cucamonga Municipal Code. According to that section of the Code:

  "Applicability. A sign permit shall be required for all permanent signs (building attached or freestanding) prior to erection, relocation, alteration, or replacement of a sign, unless otherwise exempted by this chapter. The process for application, review, and decision regarding a sign permit shall be as established in section 17.74.030.B (Review Procedures) below. A sign permit shall not be required for general maintenance of existing signs or the replacement of the sign face (including message) when the area of the sign is not being changed and a building permit is not required (e.g., the replacement of a sign face on a can sign)."

  The future tenant must prepare a Sign Plan for the City to approve prior to the installation of any signage. This Sign Plan is required pursuant to the aforementioned Code. All future building signage must conform to City requirements with respect to illumination and design standards.[15]

- *Lighting*. The light fixtures that would be installed would consist of DSX1 LED lights. A total of 22 lights would be provided, of which 17 would be installed along the building's façade, and five would be installed along the site's western and southern property lines. No lighting would be provided along the site's frontage with Hellman Avenue. The light fixtures that would be installed along the site's western and southern property lines would be shielded and directed towards the ground

[14] Hunter Landscape. *Preliminary Landscape Plan*. Plan dated January 19, 2018.

[15] HPA Architecture. *Overall Site Plan*. Plan packet dated January 25, 2018.

surface.[16] These light fixtures would be free standing and would have a maximum height of 25 feet. The light fixtures that would be provided along the building's façade would consist of wall packs.

- *Architecture*. The proposed warehouse would consist of concrete tilt-up panels and would be Type III-B construction. The building would feature modern architecture consisting of articulated facades, blue glazed windows, and neutral colors. The colors that would be applied to the concrete tilt-up panels include white, network gray, and grizzle gray. The mullions, or physical dividers that segment window panes, would be anodized with a clear coat. In addition, metal canopies would be integrated into the building design. Detailed descriptions of the four elevations are provided below:

    - *North facing elevation*. The north facing elevation would receive substantial façade treatments due to its visibility along the 8th Street public right-of-way. The northwest and northeast corners of the building would be colored grizzle gray, while the building's parapet would be a lighter gray color. The northern elevation would also contain the most windows. Furthermore, the north facing façade would be segmented into nine sections by eight, six-foot wide façade indents, of which six would be mostly filled in with glass windows. The two remaining façade indents would not be equipped with windows and would feature the grizzle gray colored paint. The office entryways would be located along the building's north facing elevation.

    - *South facing elevation*. The building's south facing elevation would contain all of the dock high doors. The south facing façade would be segmented into five sections by three façade indents. The western indent would have a width of 363 feet and a depth of 60 feet. This indent would accommodate the dock high doors. The southeast corner of the building would feature blue glazed windows and grizzly gray paint.

    - *West facing elevation*. The west facing elevation would be segmented into five sections by four façade indents. These façade indents would be painted grizzly gray. The northwest corner of the building would feature blue glazed windows and grizzly gray paint.

    - *East facing elevation*. The east facing elevation would receive substantial façade treatments due to its visibility along the Hellman Avenue public right-of-way. The east facing elevation would be divided into seven sections by six façade indents. All six of the façade indents would consist of glass windows. The northeast and southeast corners of the building would be colored with grizzly gray colored paint.[17]

[16] HPA Architecture. *Overall Site Plan*. Plan packet dated January 25, 2018.

[17] Ibid.

- *Stormwater Appurtenances.* The project would include the use of two Stormtech SC-740 stormwater chambers, grate inlet filters, and curb inlet filters.[18] These chambers consist of a polypropylene corrugated chamber (resembling a tube-like structure), filter fabric, and a stone bottom. Water accumulates within the isolator row as it simultaneously permeates through the filter fabric. Solid contaminants such as rubbish, debris, leaves, sediment, and other particles are captured from the runoff by the fabric. From there, water would percolate through the stone bottom into the ground. The project would also include grate and curb inlet filters. These filters consist of stainless steel mesh, which traps sediment and allows filtered water to be conveyed through the local storm drains. The two Stormtech chambers would be located within the northern and southern portions of the site. A total of 170 underground chambers would be provided in the northern portion of the site, while an additional 420 underground chambers would be provided in the southern portion of the site.[19]

The site plan is shown in Exhibit 2-5. Conceptual elevations for the project are shown in Exhibit 2-6. Finally, the preliminary landscape plan is provided in Exhibit 2-7. A project summary table is shown in Table 2-1.

Table 2-1
Project Summary Table

Project Element	Description
Total Site Area	8.09-acres (352,428 sq. ft.)
Total Floor Area	174,745 sq. ft.
Warehousing Floor Area	160,245 sq. ft.
Office Floor Area	12,000 sq. ft.
Office Floor Area	2,500 sq. ft.
Floor Area Ratio (FAR) and Lot Coverage	0.49 to 1.00 and 48%
Warehouse Building Maximum Height	40 feet
Total Parking	119 spaces
Standard Parking	112 spaces
Handicapped Parking	7 spaces
Trailer Parking	33 spaces
Dock High Doors	23 doors
Total Number of Light Fixtures	22 total
Number of Parking Lot Light Fixtures	5 total
Wall Light Fixtures	17 total
Signage	Four signs (2 stops signs and 2 handicapped parking signs)
Landscaping	36,312 sq. ft.
% of Site that would be Impervious	89%
% of Site that would be Pervious	11%

Source: HPA Architecture. *Overall Site Plan*. Plan packet dated January 25, 2018

[18] Thienes Engineering, Inc. *Preliminary Water Quality Management Plan*. Plan dated January 24, 2018.

[19] Thienes Engineering, Inc. *Conceptual Utility Plan*. Plan dated January 24, 2018.

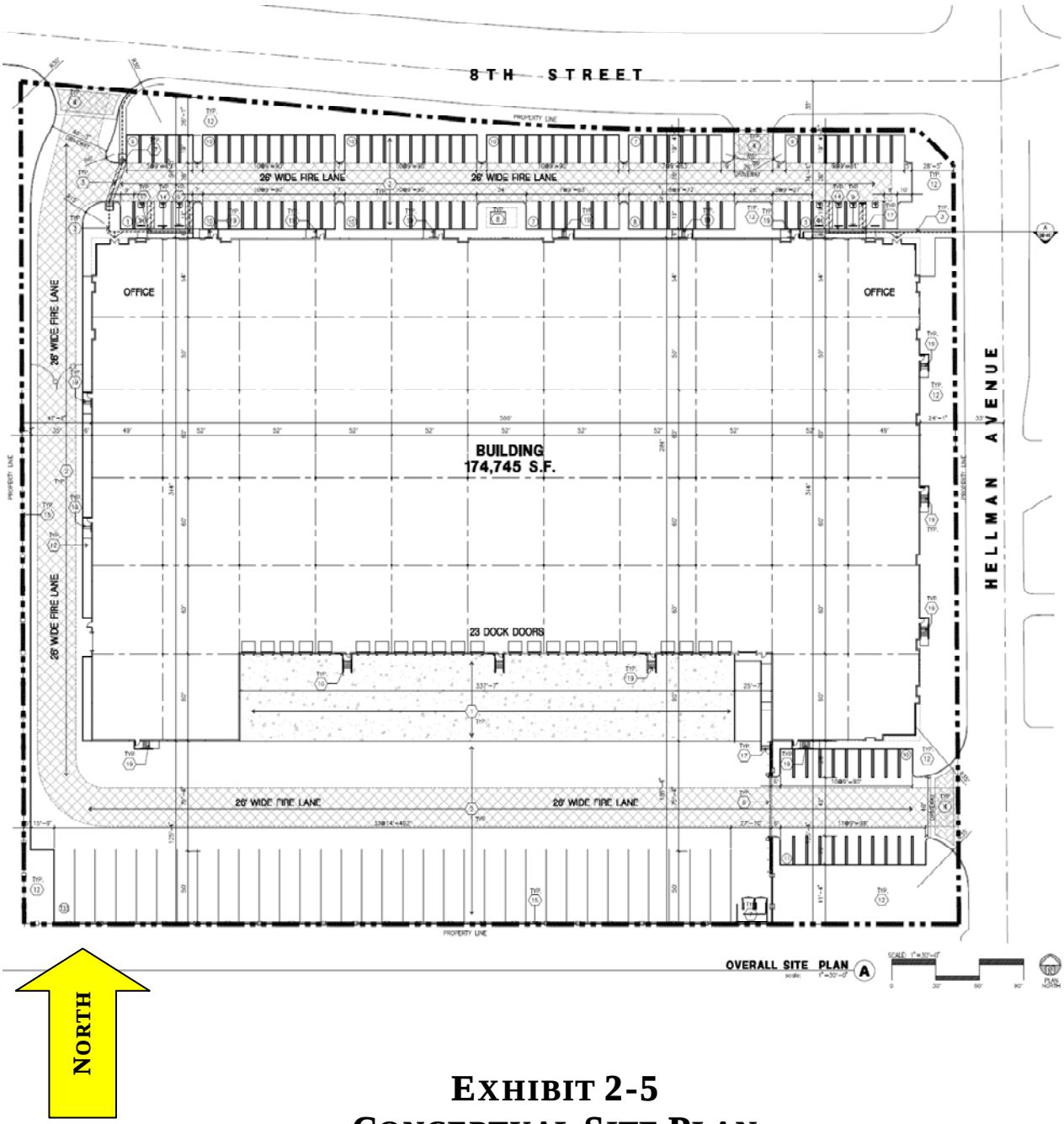


EXHIBIT 2-5
CONCEPTUAL SITE PLAN
SOURCE: HPA ARCHITECTURE

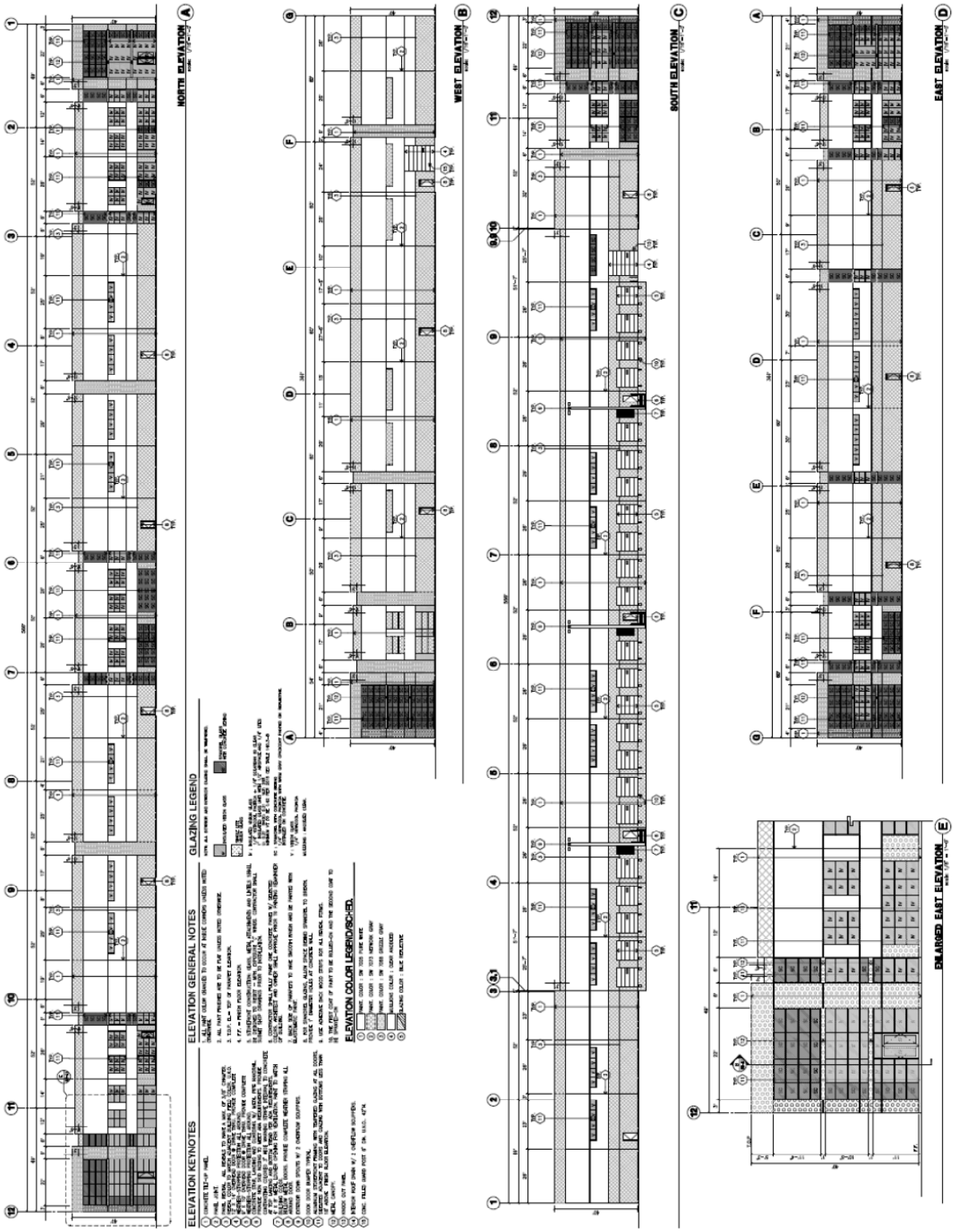


EXHIBIT 2-6
CONCEPTUAL BUILDING ELEVATIONS
SOURCE: HPA ARCHITECTURE

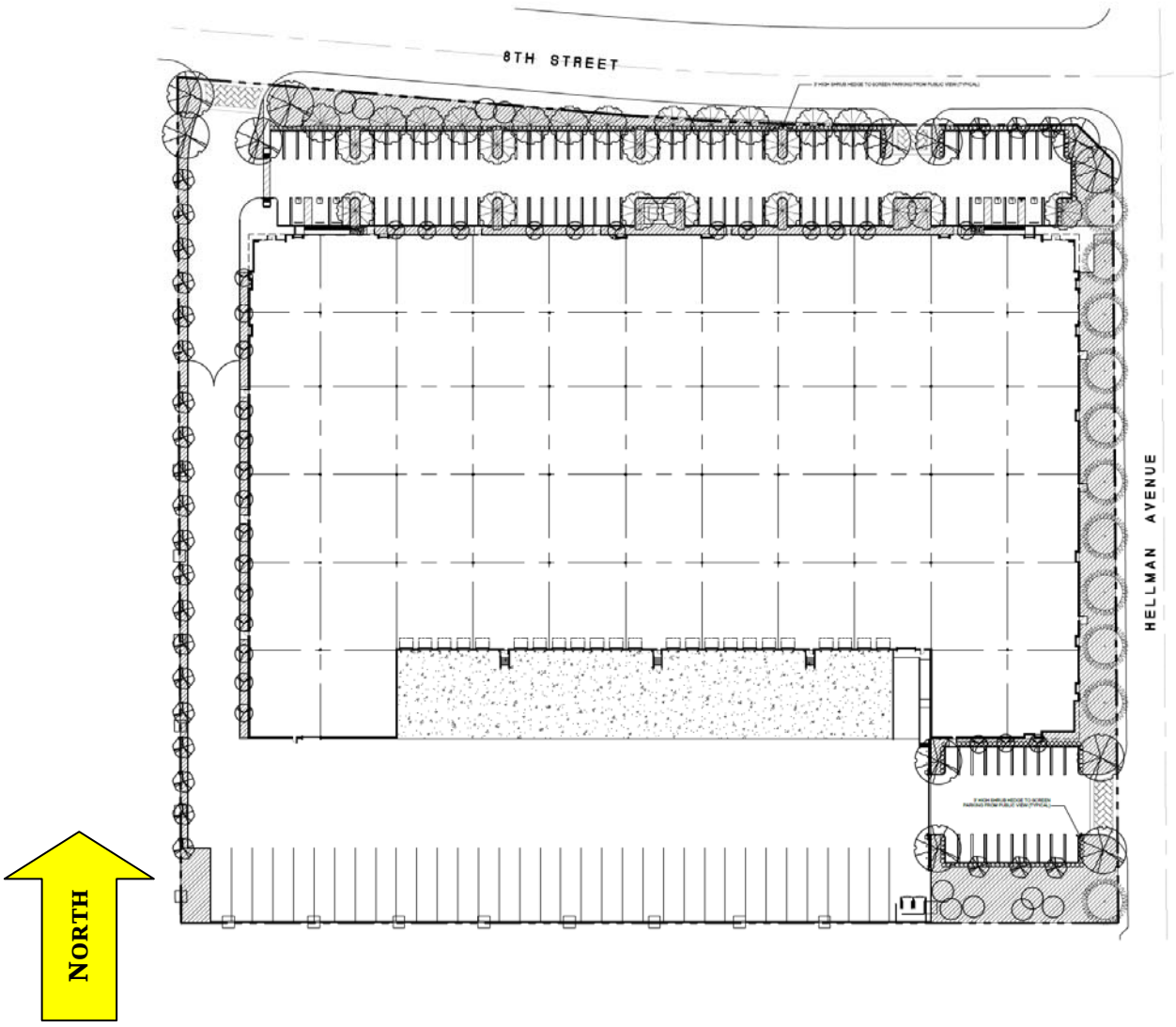


EXHIBIT 2-7
PRELIMINARY LANDSCAPE PLAN
SOURCE: HUNTER LANDSCAPE

2.4.2 CONSTRUCTION CHARACTERISTICS

The construction of the proposed project would take approximately 11 months to complete. Construction is anticipated to begin in January of 2019 and would conclude no later than January of 2020. The project would be constructed in one 11-month long phase. The key stages of construction are outlined below:

- *Demolition*. The existing on-site improvements would be demolished and removed during this stage of construction. The demolition process would comply with Title 8, Chapter 8.19, Section 8.19.280 – Construction and Demolition Waste of the City's Municipal Code. According to that Section of the Municipal Code, at least 50 to 75 percent of waste tonnage including concrete and asphalt and 15 percent of waste tonnage excluding concrete and asphalt must be diverted from area landfills. In addition, the project Applicant must submit and completed "Form CD-1 Waste Management and Recycling Plan" to the engineering services department in order to obtain a building or demolition permit. Construction and demolition debris would be hauled away by Burrtec, where this waste would be sorted and processed at their West Valley Materials Recovery Facility (WVMRF) located in the City of Fontana. The haul trucks would be required to utilize 8th Street and Vineyard Avenue. In addition, none of the materials would be re-used since the building would consist of pre-fabricated concrete tilt-up panels. This phase would take approximately one month to complete.

- *Site Preparation*. The project site would be readied for the construction of the proposed project. This stage of construction would take approximately one month to complete.

- *Grading*. This stage of construction would involve the grading and excavation of the site. The total cut and fill would be 17,233 cubic yards, respectively. By balancing the earth on-site, the Applicant is minimizing the amount of fill that would have to be imported to the project site. In addition, trenching would be undertaken to accommodate the building footings, utility lines, and other underground infrastructure such as stormwater appurtenances and double check detector assemblies, which would be installed during this phase as well. The type of utility lines that would be installed would consist of new HDPE storm drain pipes that would convey surface runoff to the new stormwater appurtenances. This phase would take approximately one month to complete.

- *Utilities*. The installation of new utility lines and stormwater appurtenances will occur during this stage of construction. A description of the new infrastructure that will be installed is provided below. These descriptions are organized by direction:

    - *Northern Portion of Site*. The following infrastructure improvements will be located within the northern portion of the project site: a 12 inch storm drain; two drain inserts; 170 underground infiltration chambers; a 10 inch Double Check Detector Assembly (DCDA); a 12 inch fire line extending north from the DCDA into the 8th Street centerline; an 18 inch storm drain; and a storm drain manhole.

- *Southern Portion of Site*. The following infrastructure improvements will be located within the southern portion of the project site: an 18 inch storm drain; two storm drain manholes; six drain inserts; a 12 inch storm drain; a 24 inch storm drain; and 428 underground infiltration chambers.

- *Eastern Portion of Site*. The infrastructure improvements that will be located within the eastern portion of the project site include a 10 inch Double Check Detector Assembly (DCDA) and a three inch PVC water pipe.

- *Western Portion of Site*. The following infrastructure improvements will be located within the western portion of the project site: an 18 inch storm drain; a storm drain manhole; a catch basin drain insert; and an eight inch lateral sewer line.

- *Off-site*. The project Applicant will remove a water meter located along Hellman Avenue. In addition, the Applicant will be installing a storm drain connection pipe that will connect to an existing 120 inch concrete pipe located within the Hellman Avenue center line.

- *Construction*. The new warehouse building would be erected during this stage of construction. This phase would take approximately four months to complete.

- *Paving*. The site would be paved during this stage of construction. Paving will include parking areas and sidewalks. Equipment on-site during this phase would include cement and motor mixers, pavers, rollers, other paving equipment. This phase would take approximately one month to complete.

- *Landscaping and Finishing*. This stage of construction would involve the planting of landscaping, painting of the warehouse, and the completion of the on-site improvements. This phase would last approximately three months.

2.4.3 OPERATIONAL CHARACTERISTICS

The specific business and/or tenant(s) that would ultimately occupy the proposed buildings are not known at this time. Any prospective use must be either permitted by right or conditionally permitted under the City of Rancho Cucamonga Zoning Ordinance. Table 17.30.030-1 of the City's Municipal Code depicts uses that are permitted by right as well as uses that require additional permits such as a Conditional Use Permit. According to Table 17.30.030-1, the following warehousing operations are permitted either by right or with a Conditional Use Permit:

- *Wholesale, Storage, and Distribution — Light*. Activities typically include, but are not limited to, wholesaling, storage, and warehousing services and storage and wholesale to retailers from the premises of finished goods and food products. Activities under this classification shall be conducted in enclosed buildings and occupy 50,000 square feet or less of building space. Retail sales from the premises may occur when approved by a conditional use permit.

- *Wholesale, Storage, and Distribution — Medium*. Activities typically include, but are not limited to, wholesale, storage, and warehousing services; moving and storage services; storage and wholesaling to retailers from the premises of finished goods and food products; and distribution facilities for large-scale retail firms. Activities under this classification shall be conducted in enclosed buildings and occupy greater than 50,000 square feet of building space. Included are multi-tenant or speculative buildings with over 50,000 square feet of warehouse space.

- *Wholesale, Storage, and Distribution — Heavy*. Activities typically include, but are not limited to, warehousing, storage, freight handling, shipping, trucking services and terminals, and storage and wholesaling from the premises of unfinished, raw, or semi-refined products requiring further processing, fabrication, or manufacturing. Typical uses include, but are not limited to, trucking firms, and the wholesaling of metals, minerals, and agricultural products. Outdoor storage is permitted.

Although the tenant for the project is not yet known, the project as proposed falls into the *Wholesale, Storage, and Distribution — Medium* category and is permitted by right. The operating hours of the potential business or businesses that may ultimately occupy the building are also unknown at this time. The proposed project is anticipated to add up to 115 new jobs based on a ratio of one employee per 1,518 square feet of floor area.[20] Nevertheless, the project would have an adequate supply of parking to accommodate demand from new employees.

2.5 DISCRETIONARY ACTIONS

A Discretionary Action is an action taken by a government agency (for this project, the government agency is the City of Rancho Cucamonga) that calls for an exercise of judgment in deciding whether to approve a project. The proposed project would require the approval of the following discretionary actions:

- A Design Review (DR). The purpose of the Design Review is to ensure that development projects comply with all applicable local design guidelines, standards, and ordinances; to minimize adverse effects on surrounding properties and the environment; and to maintain consistency with the General Plan. This requirement is discretionary and not ministerial since the design review must be approved by an appointed body (Design Review Board) of the City.

- Approval of the Mitigated Negative Declaration (MND) and Mitigation Monitoring and Reporting Program (MMRP).

[20] The Natelson Company, Inc. *Employment Density Study Summary Report*. October 31, 2001.

SECTION 3 ENVIRONMENTAL ANALYSIS

This section of the Initial Study prepared for the proposed project analyzes the potential environmental impacts that may result from the proposed project's implementation. The issue areas evaluated in this Initial Study include the following:

- Aesthetics (Section 3.1);
- Agricultural & Forestry Resources (Section 3.2);
- Air Quality (Section 3.3);
- Biological Resources (Section 3.4);
- Cultural Resources (Section 3.5);
- Geology & Soils (Section 3.6);
- Greenhouse Gas Emissions; (Section 3.7);
- Hazards & Hazardous Materials (Section 3.8);
- Hydrology & Water Quality (Section 3.9);
- Land Use (Section 3.10);
- Mineral Resources (Section 3.11);
- Noise (Section 3.12);
- Population & Housing (Section 3.13);
- Public Services (Section 3.14);
- Recreation (Section 3.15);
- Transportation & Circulation (Section 3.16);
- Tribal Cultural Resources (Section 3.17);
- Utilities (Section 3.18); and,
- Mandatory Findings (Section 3.19).

Under each issue area, a description of the thresholds of significance is provided. These thresholds would assist in making a determination as to whether there is a potential for significant impacts on the environment. The analysis considers both the short-term (construction-related) and long-term (operational) impacts associated with the proposed project's implementation, and where appropriate, the cumulative impacts. To each question, there are four possible responses:

- *No Impact*. The proposed project will not result in any adverse environmental impacts.

- *Less than Significant Impact*. The proposed project may have the potential for affecting the environment, although these impacts will be below levels or thresholds that the City of Rancho Cucamonga or other responsible agencies consider to be significant.

- *Less than Significant Impact with Mitigation*. The proposed project may have the potential to generate a significant impact on the environment. However, the level of impact may be reduced to levels that are less than significant with the implementation of the recommended mitigation measures.

- *Potentially Significant Impact*. The proposed project may result in environmental impacts that are significant. This finding will require the preparation of an environmental impact report (EIR).

3.1 AESTHETICS

3.1.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant aesthetic impact if it would:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or,
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

3.1.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Have a substantial adverse effect on a scenic vista? ● Less than Significant Impact.

The dominant scenic views from the project site include the views of the San Gabriel Mountains, located approximately five miles to the north of the site. Views of the San Gabriel Mountains are minimally obstructed when facing north along Hellman Avenue and within the project site. Once constructed, the proposed warehouse would not restrict views of the San Gabriel Mountains from anywhere in and around the site as well as from the nearby residential units due to the distance and size of the mountains and the height and mass of the proposed warehouse. The size and massing of the proposed warehouse will not be great enough to obstruct any scenic views. In addition, many of the aforementioned mountains extend more than 4,000 feet above sea level. Therefore, views of these mountains will continue to be available since the project cannot physically obstruct views of the San Gabriel Mountains.

Views of the San Bernardino Mountains, located approximately 15 miles northeast of the project site, are not available since the existing streetscape and development obstruct the line-of-sight between the site and the San Bernardino Mountains. This conclusion is supported by the field survey that was conducted for the project by the preparers of this IS/MND. Views of the aforementioned vistas are limited from various points throughout the site and surrounding areas. In addition, views of these mountains from the nearby residential units will not be affected by the project since the project site is located west of the aforementioned residential development, outside of the line of sight between the San Bernardino Mountains and the nearby residential units.

Lastly, limited views of the Santa Ana Mountains are available facing south along the adjacent streets and from within the project site. Views of the Santa Ana Mountains are restricted by the existing

streetscape and development. Furthermore, views of these mountains from the nearby residential units will not be obstructed by the project since the project site is not located within the line of sight of the Santa Ana Mountains and the nearby residential units. In addition, the size and massing of the proposed project will not be great enough to obstruct any scenic views of the Santa Ana Mountains. In addition, many of the aforementioned mountains extend more than 2,000 feet above sea level. As a result, less than significant would occur.

B. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway? ● No Impact.

According to the California Department of Transportation (Caltrans), neither Hellman Avenue nor 8th Street are designated scenic highways.[21] The City's General Plan does not identify any scenic roadways in the area. The closest designated scenic highway to the project site is a 16 mile segment of the Rim of the World Scenic Byway (CA 38), located 44 miles to the northeast of the site. In addition, there are no trees or plants located on-site and the project site does not contain any scenic rock outcroppings.[22] Lastly, the project site does not contain any buildings listed in the State or National registrar (refer to Section 3.5). As a result, no impacts would occur.

C. Substantially degrade the existing visual character or quality of the site and its surroundings? ● Less than Significant Impact.

The site is presently developed and is occupied by Frontier Communications for outdoor storage. The site is dominated by dilapidated surface parking. The two structures that occupy the site were constructed in the early 1980's and feature an outdated façade lacking in articulation. Lastly, the site is fenced off by a chain link fence with added barbed wire. Once complete, the project would represent a substantial visual improvement over the existing conditions. The project would feature modern architecture, façade treatments, and a neutral color scheme (grey and white walls and blue glazed windows). In addition, the size and mass of the proposed development would be consistent with the other warehouses located in the site's vicinity. The City's Resource Conservation Element contains the following policy as it related to maintaining scenic quality:

- *Policy RC-1.2.* Develop measures to preserve and enhance important views along north-south roadways, open space corridors, and at other key locations where there are significant views of scenic resources. Major scenic resources include the San Gabriel and San Bernardino Mountains and foothills, vistas of the City from hillside areas, and other views of special vegetation and permanent open space features. Site planning measures in conjunction with the designation of significant views can enhance the visual environment.[23]

[21] California Department of Transportation. *Official Designated Scenic Highways*. www.dot.ca.gov.

[22] Blodgett Baylosis Environmental Planning. *Field Survey*. Survey was conducted on March 30, 2018.

[23] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Resource Conservation Element*. Plan adopted May 19, 2010.

The proposed project would not conflict with the aforementioned General Plan policy. The proposed building would be set back at least 74 feet from 8th Street, 24 feet from Hellman Avenue, and 185 feet from the site's southern property line. In addition, the new building would occupy 48 percent of the site. The setbacks would alleviate any future loss in mountain views by preventing the building from abutting the property line. Furthermore, there are no city views or views of special vegetation or open space areas. The implementation of the proposed project would not affect views of the San Gabriel Mountains, San Bernardino Mountains, or Santa Ana Mountains because the project site is not located within the line-of-sight of the aforementioned physiographic features and the nearby residential development.

Views of the San Gabriel Mountains are minimally obstructed when facing north along Hellman Avenue and within the project site. Once constructed, the proposed warehouse would not restrict views of the San Gabriel Mountains from anywhere in and around the site due to the distance and size of the mountains and the height and mass of the proposed warehouse. Meanwhile, views of the San Bernardino Mountains, located approximately 15 miles northeast of the project site, are not available since the existing streetscape and development obstruct the line-of-sight between the site and the San Bernardino Mountains. Lastly, limited views of the Santa Ana Mountains are available facing south along the adjacent streets and from within the project site. These views of the Santa Ana Mountains are restricted by the existing streetscape and development. As a result, the potential impacts would be less than significant.

D. *Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? ● Less than Significant Impact.*

The light fixtures that would be installed would consist of DSX1 LED lights. A total of 22 lights would be provided, of which 17 would be installed along the building's façade, and five would be installed along the site's western and southern property lines. No lighting would be provided along the site's frontage with Hellman Avenue.

Exterior lighting can be a nuisance to adjacent land uses that are sensitive to this lighting. This nuisance lighting is referred to as *light trespass* which is typically defined as the presence of unwanted light on properties located adjacent to the source of lighting. The residential development located along the east side of Hellman Avenue is the closest light sensitive receptor to the project site.[24] The predominant source of light impacts would be related to the exterior lighting and building lighting. The project Applicant would be required to adhere to the following provisions outlined in Section 17.58.050 of the City's Municipal Code. These requirements shall apply to all outdoor lighting:

- (A.) *Nuisance prevention*. All outdoor lighting shall be designed, located, installed, directed downward or toward structures, fully shielded, and maintained in order to prevent glare, light trespass, and light pollution.

[24] Blodgett Baylosis Environmental Planning. *Field Survey*. Survey was conducted on March 30, 2018.

- (B.) *Maintenance*. Fixtures and lighting shall be maintained in good working order and in a manner that serves the original design intent.

    1. Burnt-out and broken light bulbs shall be replaced.

    2. Lighting fixtures shall remain free of graffiti and rust.

    3. Painted light fixtures shall be maintained to minimize chipping or peeling.

- (C.) *Shielding*. Except as otherwise exempt, all outdoor lighting shall be recessed and/or constructed with full downward shielding in order to reduce light and glare impacts on trespass to adjoining properties and public rights-of-way. Each fixture shall be directed downward and away from adjoining properties and public rights-of-way, so that no light fixture directly illuminates an area outside of the project site intended to be illuminated.

Adherence to the City's Municipal Code would be sufficient in addressing daytime or nighttime light trespass impacts. As indicated in Section 2.4.1, the light standards that would be installed along the site's western and southern property lines would be shielded and directed towards the ground surface.[25] Glare is related to light trespass and is defined as visual discomfort resulting from high contrast in brightness levels. Glare-related impacts can adversely affect day or nighttime views. As with lighting trespass, glare is of most concern if it would adversely affect sensitive land use or driver's vision. The exterior façade would consist of non-reflective materials, such as concrete. In addition, the windows would be comprised of blue reflective glazing, which reduces glare over other transparent surfaces. As a result, no daytime glare-related impacts are anticipated.

Nighttime glare and illumination has the potential to result in potentially significant impacts to sensitive receptors. Many sources of light contribute to the ambient nighttime lighting conditions. These sources of nighttime light include street lights, security lighting, wall packs, and vehicular headlights. The proposed project would not introduce nighttime lighting that could potentially impact nearby sensitive receptors. The project site is located within a predominantly industrial area, though legal non-conforming residential units occupying the frontage along Hellman Avenue, east of the project site. These residential units would not be exposed to spillover lighting during the evening hours because no lighting would be provided along the site's frontage with Hellman Avenue. Lighting would be provided only along the site's western and southern property lines and would be shielded and directed towards the ground surface. As a result, the project's potential impacts would be less than significant.

3.1.3 CUMULATIVE IMPACTS

Typically, aesthetic impacts are site-specific. As indicated in the previous sections, the proposed project would not restrict scenic views along Hellman Avenue, damage or interfere with any scenic resources or highways, degrade the visual character of the project site and surrounding areas, or result

[25] Blodgett Baylosis Environmental Planning. *Field Survey*. Survey was conducted on March 30, 2018.

in significant light and glare impacts; therefore, no cumulative impacts would occur as part of the proposed project's implementation.

3.1.4 MITIGATION MEASURES

The preceding analysis concluded that the project would not require any mitigation.

3.2 AGRICULTURE & FORESTRY RESOURCES

3.2.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on agricultural resources if it results in any of the following:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;
- Conflict with existing zoning for agricultural use, or a Williamson Act contract;
- Conflict with existing zoning for or cause rezoning of, land (as defined in Public Resources Code section 12220(g)), timberland (as defined in Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?);
- Result in the loss of forest land or conversion of forest land to a non-forest use; or,
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forest land to non-forest use.

3.2.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? ● No Impact.

According to the California Department of Conservation, the project site does not contain any areas of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance.[26] The site is located within a built-up urban area.[27] In addition, the project site is developed in its entirety in industrial uses. Since the implementation of the proposed project would not involve the conversion of prime farmland,

[26] California Department of Conservation, Division of Land Resource Protection, Farmland Mapping, and Monitoring Program. *California Important Farmland Finder*. https://maps.conservation.ca.gov/DLRP/CIFF/

[27] Ibid.

unique farmland, or farmland of statewide importance to urban uses, no impacts would occur.

B. Conflict with existing zoning for agricultural use or a Williamson Act Contract? ● No Impact.

The project site is currently zoned as GI (*General Industrial*). According to the City's zoning code, agricultural and animal-related uses are not permitted within the GI zone.[28] The proposed project would not require a zone change and no loss in land zoned for/or permitting agricultural uses would occur. Furthermore, the property is being used for outdoor storage and there are no agricultural uses located within the site that would be affected by the project's implementation. In addition, according to the California Department of Conservation Division of Land Resource Protection, the project site is not subject to a Williamson Act Contract.[29] As a result, no impacts on existing Williamson Act Contracts would result from the proposed project's implementation.

C. Conflict with existing zoning for or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined in Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))? ● No impact.

The project site is located in the midst of a larger urban area and no forest lands are located within the site. The City of Rancho Cucamonga General Plan Resource Conservation Element identifies conservation areas located in the northern portion of the City adjacent to the San Gabriel/San Bernardino Mountains.[30] The project's construction would be restricted to the designated site and no impacts to conservation lands would occur. The site is entirely paved over and there are no timberland resources present on-site. As a result, no impacts on forest land or timber resources would result from the proposed project's implementation.

D. Result in the loss of forest land or conversion of forest land to a non-forest use? ● No Impact.

No forest lands are located within or in the vicinity of the project site. The applicable zoning designation (GI) does not preserve forest land. In addition, the project would be restricted to the site and would not affect the San Bernardino National Forest located north of the City. As a result, no loss or conversion of forest lands to urban uses would result from the proposed project's implementation and no impacts would occur.

[28] City of Rancho Cucamonga Municipal Code. *Table 17.30.030-1: Allowed Land Uses and Permit Requirements by Base Zoning District*. Site accessed April 2, 2018.

[29] California Department of Conservation. *State of California Williamson Act Contract Land.* ftp://ftp.consrv.ca.gov/pub/dlrp/WA/2012%20Statewide%20Map/WA_2012_8x11.pdf

[30] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Resource Conservation Element Figure RC-4-Sensitive Biological Resources.* Plan adopted May 19, 2010.

E. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forest land to non-forest use? ● No Impact.

The project would not involve the disruption or damage of the existing environment that would result in a loss of farmland to nonagricultural use or conversion of forest land to non-forest use because the project site is not located in close proximity to farm land or forest land. As a result, no impacts would result from the implementation of the proposed project.

3.2.3 CUMULATIVE IMPACTS

Typically, agriculture and forestry impacts are site-specific. The analysis determined that there are no agricultural or forestry resources in the project area and that the implementation of the proposed project would not result in any impacts on these resources. As a result, no cumulative impacts on agriculture or forestry resources would occur.

3.2.4 MITIGATION MEASURES

The analysis of agricultural and forestry resources indicated that no impacts on these resources would occur as part of the proposed project's implementation. As a result, no mitigation is required.

3.3 AIR QUALITY

3.3.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project will normally be deemed to have a significant environmental impact on air quality, if it results in any of the following:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or,
- Create objectionable odors affecting a substantial number of people.

The South Coast Air Quality Management District (SCAQMD) has established quantitative thresholds for short-term (construction) emissions and long-term (operational) emissions for the following criteria pollutants:

- *Ozone (O_3)* is a nearly colorless gas that irritates the lungs, damages materials, and vegetation. Ozone is formed by photochemical reaction (when nitrogen dioxide is broken down by sunlight).

- *Carbon monoxide (CO)* is a colorless, odorless toxic gas that interferes with the transfer of oxygen to the brain and is produced by the incomplete combustion of carbon-containing fuels emitted as vehicle exhaust.

- *Nitrogen dioxide (NO_2)* is a yellowish-brown gas, which at high levels can cause breathing difficulties. NO_2 is formed when nitric oxide (a pollutant from burning processes) combines with oxygen.

- *Sulfur dioxide* (SO_2) is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Health effects include acute respiratory symptoms and difficulty in breathing for children.

- *PM_{10} and $PM_{2.5}$* refers to particulate matter less than ten microns and two and one-half microns in diameter, respectively. Particulates of this size cause a greater health risk than larger-sized particles since fine particles can more easily cause irritation.

Projects in the South Coast Air Basin (SCAB) generating construction-related emissions that exceed any of the following emissions thresholds are considered to be significant under CEQA:

- 75 pounds per day or 2.50 tons per quarter of reactive organic compounds;
- 100 pounds per day or 2.50 tons per quarter of nitrogen dioxide;
- 550 pounds per day or 24.75 tons per quarter of carbon monoxide;
- 150 pounds per day or 6.75 tons per quarter of PM_{10};
- 55 pounds per day or 2.43 tons per quarter of $PM_{2.5}$; or,
- 150 pounds per day or 6.75 tons per quarter of sulfur oxides.

A project would have a significant effect on air quality if any of the following operational emissions thresholds for criteria pollutants are exceeded:

- 55 pounds per day of reactive organic compounds;
- 55 pounds per day of nitrogen dioxide;
- 550 pounds per day of carbon monoxide;
- 150 pounds per day of PM_{10};
- 55 pounds per day of $PM_{2.5}$; or,
- 150 pounds per day of sulfur oxides.

3.3.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Conflict with or obstruct implementation of the applicable air quality plan? ● Less than Significant Impact.

The project area is located within the South Coast Air Basin, which covers a 6,600 square-mile area within Los Angeles, the non-desert portions of Los Angeles County, Riverside County, and San Bernardino County.[31] Measures to improve regional air quality are outlined in the SCAQMD's Air Quality Management Plan (AQMP).[32] The most recent AQMP was adopted in 2017 and was jointly prepared with the California Air Resources Board (CARB) and the Southern California Association of Governments (SCAG).[33] The AQMP will help the SCAQMD maintain focus on the air quality impacts of major projects associated with goods movement, land use, energy efficiency, and other key areas of growth. Key elements of the 2016 AQMP include enhancements to existing programs to meet the 24-hour $PM_{2.5}$ Federal health standard and a proposed plan of action to reduce ground-level ozone. The primary criteria pollutants that remain non-attainment in the local area include $PM_{2.5}$ and ozone. Specific criteria for determining a project's conformity with the AQMP is defined in Section 12.3 of the SCAQMD's CEQA Air Quality Handbook. The Air Quality Handbook refers to the following criteria as a means to determine a project's conformity with the AQMP:[34]

- *Consistency Criteria 1* refers to a proposed project's potential for resulting in an increase in the frequency or severity of an existing air quality violation or its potential for contributing to the continuation of an existing air quality violation.

- *Consistency Criteria 2* refers to a proposed project's potential for exceeding the assumptions included in the AQMP or other regional growth projections relevant to the AQMP's implementation.

In terms of Criteria 1, the proposed project's long-term (operational) airborne emissions would be below levels that the SCAQMD considers to be a significant impact (refer to the analysis included in the next section where the long-term stationary and mobile emissions for the proposed project are summarized in Table 3-2). The project would also conform to Consistency Criteria 1 since the project's construction emissions would be below the thresholds of significance established by the SCAQMD (the project's construction emissions are summarized in Table 3-1). The proposed project would also conform to Consistency Criteria 2 since it would not exceed the employment assumptions presented in the 2016 AQMP. In addition, the project's operational emissions are well within the emissions projections indentified in the 2016 AQMP. According to the AQMP, the SCAG region is projected to see a 12 percent growth in population, 16 percent growth in housing units, 23 percent growth in employment, and eight percent growth in vehicle miles traveled between 2012 and 2031. The SCAG region is expected to add 1.5 million new jobs through the year 2031. The proposed project would add

[31] South Coast Air Quality Management District, *Final 2016 Air Quality Plan*. Adopted March 2017.

[32] Ibid.

[33] Ibid.

[34] South Coast Air Quality Management District. *CEQA Air Quality Handbook*. April 1993.

approximately 115 new jobs. The number of new jobs that would be added has been accounted for by SCAG and in the AQMP.[35] In addition, the project's operational emissions would be well within the emissions projections identified in the most recent AQMP. As shown in Table 3-5 of the Final 2016 AQMP, the future 2031 daily operational emissions *with* the estimated population, employment, and VMT growth projections are estimated to be: 345 tons per day of VOCs; 214 tons per day of NOx; 1,188 tons per day of CO; 18 tons per day of Sox; and 65 tons per day of $PM_{2.5}$. The project's operational emissions would be well within the emissions projections estimated in the AQMP. Since the proposed project would not be in violation of either Consistency Criteria, the project's potential impacts are considered to be less than significant.

B. Violate any air quality standard or contribute substantially to an existing or projected air quality violation? ● Less than Significant Impact.

The entire construction period for the proposed project is expected to last for approximately 11 months (refer to Section 2.4.3) and would include demolition, grading, site preparation, construction of the warehouse, and the finishing of the project (pavement areas, painting, and planting of landscaping). The analysis of daily construction and operational emissions was prepared utilizing the California Emissions Estimator Model (CalEEMod V.2016.3.2). The assumptions regarding the construction phases and the length of construction followed those identified herein in Section 2.4.3. These CalEEMod worksheets are provided in Appendix A. As shown in Table 3-1, daily construction emissions are not anticipated to exceed the SCAQMD's significance thresholds.

Table 3-1
Estimated Daily Construction Emissions

Construction Phase	ROG	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$
Demolition (on-site)	3.71	38.32	22.30	0.03	2.63	1.91
Demolition (off-site)	0.10	1.04	0.93	--	0.22	0.06
Total Demolition	**3.81**	**39.36**	**23.23**	**0.03**	**2.85**	**1.97**
Site Preparation (on-site)	4.56	48.19	22.47	0.03	9.62	6.24
Site Preparation (off-site)	0.09	0.06	0.90	--	0.20	0.05
Total Site Preparation	**4.65**	**48.25**	**23.37**	**0.03**	**9.82**	**6.29**
Grading (on-site)	2.77	30.67	16.57	0.02	4.07	2.73
Grading (off-site)	0.08	0.05	0.75	--	0.16	0.04
Total Grading	**2.85**	**30.72**	**17.32**	**0.02**	**4.23**	**2.77**
Building Construction (on-site) 2018	2.67	23.39	17.58	0.02	1.49	1.40
Building Construction (off-site) 2018	0.69	5.10	6.14	0.02	1.39	0.40
Total Building Construction 2018	**3.36**	**28.49**	**23.82**	**0.04**	**2.88**	**1.80**
Building Construction (on-site) 2019	2.36	21.07	17.16	0.02	1.28	1.21
Building Construction (off-site) 2019	0.63	4.79	5.52	0.02	1.39	0.40
Total Building Construction 2019	**2.99**	**25.86**	**22.68**	**0.04**	**2.67**	**1.61**
Paving	1.62	15.24	14.66	0.02	0.82	0.75
Paving	0.07	0.05	0.67	--	0.16	0.04
Total Paving	**1.69**	**15.29**	**15.33**	**0.02**	**0.98**	**0.79**

[35] South Coast Air Quality Management District, *Final 2016 Air Quality Plan*, Adopted March 10, 2017.

Table 3-1
Estimated Daily Construction Emissions

Construction Phase	ROG	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$
Architectural Coatings (on-site)	36.63	1.83	1.84	--	0.12	0.12
Architectural Coatings (off-site)	0.09	0.06	0.89	--	0.22	0.06
Total Architectural Coatings	**36.72**	**1.89**	**2.73**	**--**	**0.34**	**0.18**
Maximum Daily Emissions	**36.73**	**48.26**	**23.72**	**0.04**	**9.82**	**6.29**
Daily Thresholds	**75**	**100**	**55o**	**150**	**150**	**55**
Significant Impact?	**No**	**No**	**No**	**No**	**No**	**No**

Source: California Air Resources Board CalEEMod [computer program].

According to Table 3-1, the project's construction emissions would be below thresholds of significance. As indicated previously, the project area is located in a non-attainment area for ozone and particulates, the project would be required to adhere to all SCAQMD regulations related to fugitive dust generation and other construction-related emissions. According to SCAQMD Regulation 403, all unpaved demolition and construction areas shall be regularly watered up to three times per day during excavation, grading, and construction as required (depending on temperature, soil moisture, wind, etc.). Watering could reduce fugitive dust by as much as 55 percent. Rule 403 also requires that temporary dust covers be used on any piles of excavated or imported earth to reduce wind-blown dust. In addition, all clearing, earthmoving, or excavation activities must be discontinued during periods of high winds (i.e. greater than 15 mph), so as to prevent excessive amounts of fugitive dust. Finally, the contractors must comply with other SCAQMD regulations governing equipment idling and emissions controls. The aforementioned SCAQMD regulations are standard conditions required for every construction project undertaken in the City as well as in the cities and counties governed by the SCAQMD.

The long-term air quality impacts associated with the proposed project include mobile emissions from vehicular traffic; area emissions from cleaning products and the operation of landscaping equipment; and off-site stationary emissions associated with the off-site generation and consumption of energy (natural gas). The analysis of long-term operational impacts summarized in Table 3-2, also used the CalEEMod computer model developed for the SCAQMD. The analysis summarized in Table 3-2 indicates that the operational (long-term) emissions would be below the SCAQMD's daily emissions thresholds.

Table 3-2
Estimated Operational Emissions in lbs/day - Unmitigated

Emission Source	ROG	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$
Area-wide (lbs/day)	3.93	--	0.03	--	--	--
Energy (lbs/day)	0.01	0.09	0.08	--	--	--
Mobile (lbs/day)	0.65	3.46	9.74	0.03	2.70	0.74
Total (lbs/day)	**4.60**	**3.55**	**9.85**	**0.03**	**2.71**	**0.75**
Daily Thresholds	**55**	**55**	**55o**	**15o**	**15o**	**55**
Significant Impact?	**No**	**No**	**No**	**No**	**No**	**No**

Source: California Air Resources Board CalEEMod [computer program].

As indicated in Table 3-2, the projected long-term emissions are below thresholds considered to represent a significant impact. As a result, the potential impacts are considered to be less than significant.

C. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? ● Less than Significant Impact.

According to the City, there are 18 related projects located within the Traffic Impact Analysis' study area. However, there are three related projects located within one mile of the project site. These three related projects are as follows: Crestwood Homes, 31 single-family units; three retail buildings; and the Vintner, which includes 182 single-family units and 7,615 square feet of retail. The combined operational emissions from the four projects (including the proposed project) would still be below the thresholds of significance established by the SCAQMD (the CalEEMod worksheets for the cumulative emissions are provided in Appendix A). The four project's cumulative operational emissions are listed below. These emissions are compared to the thresholds of significance established by the SCAQMD for the designated criteria pollutants.

- *Reactive Organic Gasses (ROG).* Estimated operational emissions: 19.83 pounds per day; threshold of significance: 55 pounds per day.

- *Nitric Oxide (NOx).* Estimated operational emissions: 34.94 pounds per day; threshold of significance: 55 pounds per day.

- *Carbon Monoxide (CO).* Estimated operational emissions: 87.17 pounds per day; threshold of significance: 550 pounds per day.

- *Sulfur Dioxide (SO2).* Estimated operational emissions: 0.27 pounds per day; threshold of significance: 150 pounds per day.

- *Particulate Matter (PM10).* Estimated operational emissions: 18.58 pounds per day; threshold of significance: 150 pounds per day.

- *Particulate Matter (PM2.5).* Estimated operational emissions: 5.58 pounds per day; threshold of significance: 55 pounds per day.

Since the cumulative air quality emissions are under the thresholds of significance established by the SCAQMD, the potential air quality impacts are considered to be less than significant.

D. Expose sensitive receptors to substantial pollutant concentrations? ● Less than Significant Impact.

Most vehicles generate carbon monoxide (CO) as part of the tail-pipe emissions and high concentrations of CO along busy roadways and congested intersections are a concern. The areas surrounding the most congested intersections are often found to contain high levels of CO that exceed applicable standards and are referred to as *hot-spots*. Three variables influence the creation of a CO hot-spot: traffic volumes, traffic congestion, and the background CO concentrations for the source receptor area. Typically, a CO hot-spot may occur near a street intersection that is experiencing severe congestion (a LOS E or LOS F) where idling vehicles result in ground level concentrations of carbon monoxide. However, within the last decade, decreasing background levels of pollutant concentrations and more effective vehicle emission controls have significantly reduced the potential for the creation of hot-spots. The SCAQMD stated in its CEQA Handbook that a CO hot-spot would not likely develop at an intersection operating at LOS C or better. Since the Handbook was written, there have been new CO emissions controls added to vehicles and reformulated fuels are now sold in the SCAB. These new automobile emissions controls, along with the reformulated fuels, have resulted in a lowering of both ambient CO concentrations and vehicle emissions.

It is estimated that the project would generate approximately 398 daily trips in passenger car equivalents, 39 passenger car equivalent trips of which would occur during the morning peak hour and 42 passenger car equivalent trips of which would occur during the evening peak hour.[36] As indicated in Section 3.16.2.A, the project generated less than 50 peak hour trips at the study intersections and project trips did not result in a significant impact at the study intersections. No study intersections were reduced from the pre-project from Level of Service D or better to the "with Project" of Level of Service E or worse for Existing plus Project traffic conditions.[37] Since the project would not result in a degradation of any other study intersection's level of service, the likelihood of a CO hot-spot developing at this intersection is considered remote. Therefore, the project's impacts would be less than significant with respect to CO hot-spots.

Sensitive receptors refer to land uses and/or activities that are especially sensitive to poor air quality and typically include homes, schools, playgrounds, hospitals, convalescent homes, and other facilities where children or the elderly may congregate.[38] These population groups are generally more sensitive to poor air quality. The closest sensitive receptors to the project site include the residential units located along the east side of Hellman Avenue. These nearby sensitive receptors are shown in Exhibit 3-1. The SCAQMD requires that CEQA air quality analyses indicate whether a proposed project would result in an exceedance of *localized emissions thresholds* or LSTs. LSTs only apply to short-term (construction) emissions at a fixed location and do not include off-site or area-wide emissions. The pollutants that are the focus of the LST analysis include the conversion of NO_x to NO_2; carbon monoxide (CO) emissions from construction; PM_{10} emissions from construction; and $PM_{2.5}$ emissions from construction. For purposes of the LST analysis, the receptor distance used was 25 meters. Based

[36] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018. (This report is available in Appendix F)

[37] Ibid.

[38] South Coast Air Quality Management District. *CEQA Air Quality Handbook, Appendix 9*. As amended 2017.

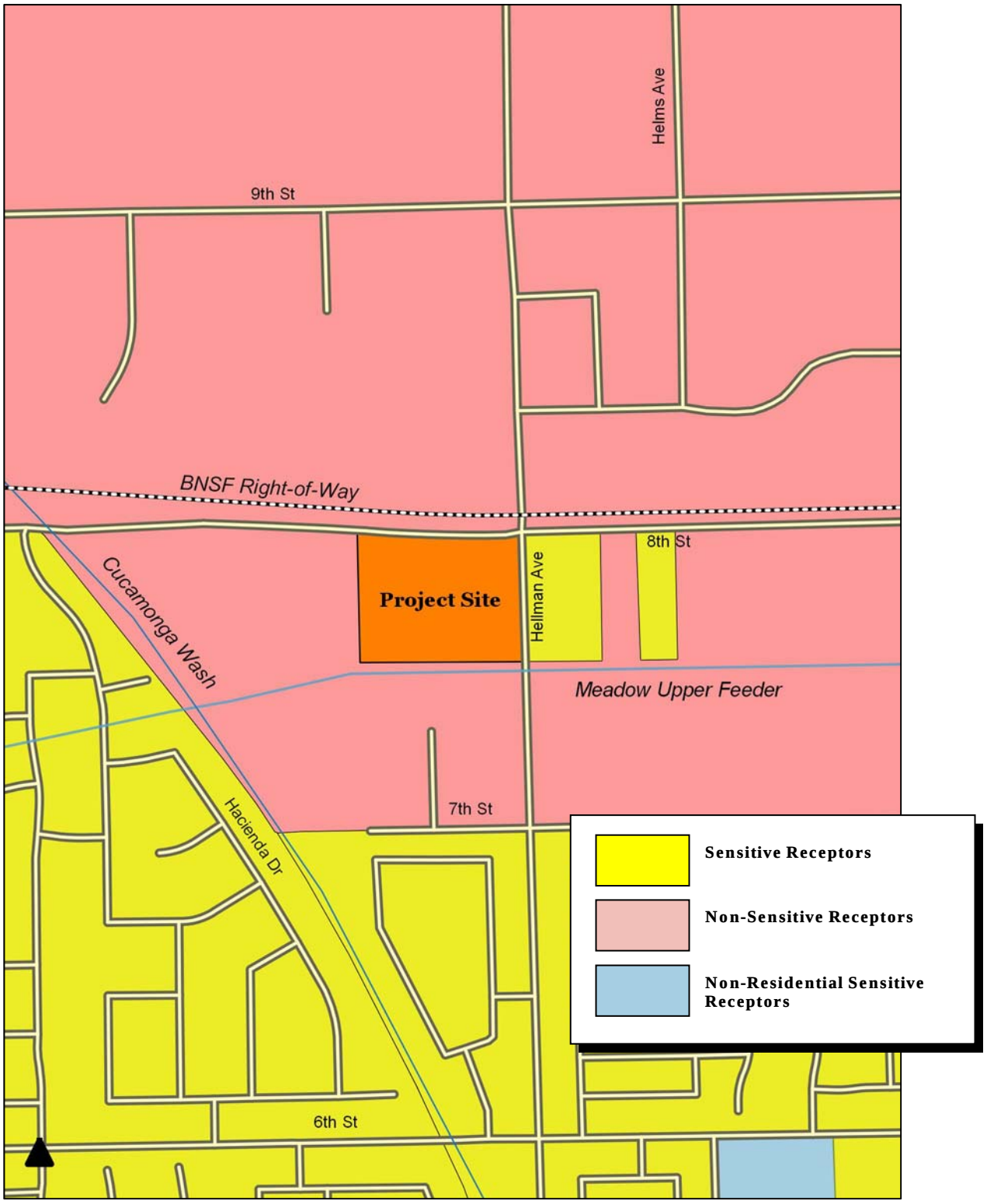


EXHIBIT 3-1
NEARBY SENSITIVE RECEPTORS
SOURCE: QUANTUM GIS

on the analysis of LST impacts summarized above in Table 3-3, the potential impacts would be less than significant.

Table 3-3
Local Significance Thresholds Exceedance SRA 32 for 5-Acre Sites (the site is 8.09 acres)

Emissions	Project Emissions (lbs/day)	Type	Allowable Emissions Threshold (lbs/day) and a Specified Distance from Receptor (in meters)				
			25	50	100	200	500
NO_2	48.26	Construction	**270**	303	378	486	778
CO	23.72	Construction	**2,193**	2,978	5,188	9,611	29,410
PM_{10}	9.82	Construction	**16**	50	80	140	322
$PM_{2.5}$	6.29	Construction	**9**	12	21	45	170

The emissions generated by the construction of the proposed project would not exceed the LSTs identified above. Further analysis of the CalEEMod worksheets indicated that the primary source of construction PM emissions is fugitive dust. Adherence to additional mandatory Rule 403 regulations would reduce fugitive dust emissions to levels that are less than significant.

E. Create objectionable odors affecting a substantial number of people? ● Less than Significant Impact.

The SCAQMD has identified those land uses that are typically associated with odor complaints. These uses include activities involving livestock, rendering facilities, food processing plants, chemical plants, composting activities, refineries, landfills, and businesses involved in fiberglass molding.[39] The project is a proposal to construct and operate a warehouse. As designed, the proposed project would not be involved in any of the aforementioned odor-generating activities. Given the nature of the intended use, no operational impacts related to odors are anticipated with the proposed project.

Future truck drivers must adhere to Title 13 - §2485 of the California Code of Regulations, which limits the idling of diesel powered vehicles to less than five minutes. Adherence to the aforementioned standard condition would minimize odor impacts from diesel trucks. In addition, the project's contractors must adhere to SCAQMD Rule 403 regulations, which significantly reduce the generation of fugitive dust. Adherence to Rule 403 Regulations and Title 13 - §2485 of the California Code of Regulations would reduce potential impacts to levels that are less than significant.

[39] South Coast Air Quality Management District. *CEQA Air Quality Handbook, Appendix 9*. As amended 2017.

An Air Quality, Global Climate Change, and Health Risk Assessment Impact Analysis was prepared by Kunzman Associates, Inc. for the proposed project. This report is presented in Appendix B. The on-going operation of the proposed project would generate toxic air contaminant (TAC) emissions from diesel truck emissions created by the on-going operations of the proposed project.[40] According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 30-year lifetime would contract cancer, based on the use of revised Office of Environmental Health Hazard Assessment (OEHHA) risk-assessment methodology. The 2015 OEHHA guidance states that "Districts are to determine which facilities would prepare an HRA based on a prioritization process outlined in the law. The process by which Districts identify priority facilities for risk assessment involves consideration of potency, toxicity, quantity of emissions, and proximity to sensitive receptors such as hospitals, daycare centers, schools, work-sites, and residences." The Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis prepared by SCAQMD (August 2003) defers to CARB (State) guidance for "technical guidance for diesel toxic impact analyses for various source categories."

The California Air Pollution Control Officers Association (CAPCOA) has developed TAC health risk assessment guidelines to provide consistent, statewide procedures for preparing the health risk assessments required under the Air Toxics "Hot Spots" Act. The title of these guidelines is CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines. The District recommends that lead agencies conduct TAC risk assessments in accordance with the CAPCOA Risk Assessment Guidelines, as supplemented by the District's supplemental guidelines. According to SCAQMD and CAPCOA guidelines, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 30-year lifetime would contract cancer, based on the use of standard risk-assessment methodology.[41]

The nearest sensitive receptors to the project site include the single-family detached residential dwelling units located east of the project site along the east side of Hellman Avenue. In addition, multi-family attached residential dwelling units are located approximately 685 feet south and single-family detached residential dwelling units are located approximately 710 feet southeast and southwest of the project site.

The most recent Health Risk Assessment for Proposed Land Use Projects prepared by CAPCOA (July 2009) recommends avoiding siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units (TRUs) per day, or where TRU unit operations exceed 300 hours per week). A

[40] Kunzman Associates, Inc. *Air Quality, Global Climate Change, and Health Risk Assessment Impact Analysis*. Report dated May 22, 2018.

[41] Ibid.

summary of the basis for the distance recommendations can be found in the ARB Handbook *Air Quality and Land Use Handbook: A Community Health Perspective*.[42]

As stated previously, the proposed warehouse use is anticipated to have approximately 62 truck trips per day per the Traffic Impact Analysis. None of these trucks are anticipated to have TRUs. Therefore, this project is not anticipated to accommodate more than 100 trucks per day and a quantitative health risk assessment for the proposed on-site warehouse use is not required. Significant TAC impacts from the project-related operational DPM sources are not anticipated and no significant long-term operations-related TAC impacts from the proposed project to nearby sensitive receptors would occur.[43] As a result, the potential impacts are considered to be less than significant.

3.3.3 CUMULATIVE IMPACTS

The proposed project's implementation would not result in any new exceedance of air pollution standards nor contribute significantly to an existing air quality violation. In addition, the combined operational emissions from the four projects (including the proposed project) would still be below the thresholds of significance established by the SCAQMD (the CalEEMod worksheets for the cumulative emissions are provided in Appendix A).

3.3.4 MITIGATION MEASURES

The analysis of air quality impacts indicated that no impacts on these resources would occur as part of the proposed project's implementation. As a result, no mitigation is required.

3.4 BIOLOGICAL RESOURCES

3.4.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant adverse impact on biological resources if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife, or U. S. Fish and Wildlife Service;

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service;

[42] Kunzman Associates, Inc. *Air Quality, Global Climate Change, and Health Risk Assessment Impact Analysis*. Report dated May 22, 2018. (This report is provided in Appendix B).

[43] Ibid.

- Have a substantial adverse effect on Federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;

- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory life corridors, or impede the use of native wildlife nursery sites;

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or,

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

3.4.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife, or U. S. Fish and Wildlife Service? ● No Impact.

As indicated previously, the project site is currently occupied by Frontier Communications, which is currently using the site for outdoor storage and repair of equipment. The site is dominated by dilapidated surface parking, though a small 400 square-foot patch of landscaping is present along the project site's frontage with Hellman Avenue. This patch of landscaping consists of grass and shrubs and is located adjacent to two tan colored buildings. These two buildings were constructed in 1980 and have a maximum height of 18 feet and total 16,324 square feet of floor area.

A review of the California Department of Fish and Wildlife (CDFW) California Natural Biodiversity Database (CNDDB) Bios Viewer for the Guasti Quadrangle indicated that there are six threatened or endangered species located within the Guasti Quadrangle (the project site is located within the Guasti Quadrangle).[44] These species include the coastal California Gnatcatcher, the Delhi Sands flower-loving fly, the San Bernardino kangaroo rat, Stephen's kangaroo rat, pacific pocket mouse, and California black rail.[45] The proposed project would not have an impact on the aforementioned species because there is no suitable riparian or native habitat (coastal sage scrub and chaparral) located within, or in the vicinity of, the project site.[46] There site is not underlain by Delhi sandy soils (Delhi sandy soils are required to support Delhi Sands flower-loving fly populations) and the ground is paved over, thus

[44] California Department of Fish and Wildlife. *Bios Viewer*. https://map.dfg.ca.gov/bios/?tool=cnddbQuick.

[45] Ibid.

[46] Audubon. California Gnatcatcher (Polioptila californica). https://www.audubon.org/field-guide/bird/california-gnatcatcher;
The IUCN Redlist of Threatened Species. Dipodomys stephensi. http://www.iucnredlist.org/details/6682/0;
Center for Biological Diversity. San Bernardino Kangaroo Rat.
http://www.biologicaldiversity.org/species/mammals/San_Bernardino_kangaroo_rat/natural_history.html;
All About Birds. Black Rail. https://www.allaboutbirds.org/guide/Black_Rail/overview

reducing the likelihood of encountering populations of Delhi Sands flower-loving flies.[47] Populations of pacific pocket mice would not be found on-site since these species live within coastal dunes.[48]

An additional search was conducted using the California Native Plant Society's Inventory of Rare and Endangered Plants to ascertain any rare or endangered plant species which may occur in the Guasti Quadrangle. The search yielded four results. The following four plants have been identified in the Guasti Quadrangle: Parry's spineflower, Brand's star phacelia, Prostrate Vernal Pool Navarretia, and the San Bernardino aster.[49] None of these plants were encountered during the field survey that was conducted by the preparers of this IS/MND. As indicated previously, the only vegetation that is present on-site consists of non-native introduced species typically used as ornamental landscaping. As a result, no impacts on any candidate, sensitive, or special status species would result.

B. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? ● No Impact.

The field survey that was conducted for this project by the preparers of this IS/MND indicated that there are no wetlands or riparian habitat present on-site. This conclusion is also supported by a review of the U.S. Fish and Wildlife Service National Wetlands Inventory, Wetlands Mapper.[50] The Cucamonga Wash is the closest wetland habitat to the project site (refer to Exhibit 2-3). This wash is located 665 feet to the west of the project site. The Cucamonga Wash is classified as a Riverine habitat, which includes all wetlands and deepwater habitats contained within a channel.[51] The project's construction would be restricted to the project site and would not fill in, alter the course of, or otherwise affect the Cucamonga. In addition, there are no designated "blue line streams" located within the project site. Finally, the project site is fully developed and only a 400 square-foot patch of landscaping is present on-site. As a result, no impacts on natural or riparian habitats would result from the proposed project's implementation.

[47] Xerces Society. Flies: Delhi Sands flower-loving fly (Rhaphiomidas terminatus abdominalis). https://xerces.org/delhi-sands-flower-loving-fly/

[48] U.S. Fish and Wildlife Service. Pacific Pocket Mouse - 5 Year Review: Summary and Evaluation. https://ecos.fws.gov/docs/five_year_review/doc3552.pdf.

[49] California Native Plant Society, Rare Plant Program. 2018. Inventory of Rare and Endangered Plants of California. http://www.rareplants.cnps.org.

[50] United States Fish and Wildlife Service. *National Wetlands Inventory*. https://www.fws.gov/Wetlands/data/Mapper.html

[51] Ibid.

C. Have a substantial adverse effect on Federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? ● No Impact.

As indicated in the previous subsection, the project site and adjacent developed properties do not contain any natural wetland and/or riparian habitat.[52] As a result, the proposed project would not impact any protected wetland area or designated blue-line stream and no impacts would occur.

D. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory life corridors, or impede the use of native wildlife nursery sites? ● No Impact.

The site is presently developed and contains no natural hydrological features or native vegetation.[53] A small 400 square-foot patch of landscaping is present along the project site's frontage with Hellman Avenue. This patch of landscaping consists of grass and ornamental shrubs. In addition, there are no trees located on-site that would provide nesting habitat and no migratory or nesting birds were observed on-site. Constant disturbance (noise and vibration) from vehicles travelling on the adjacent roadways limit the site's utility as a migration corridor. Since the site is surrounded by development on all sides and lacks suitable habitat, the site's utility as a migration corridor is restricted. Therefore, no impacts would result from the implementation of the proposed project.

E. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? ● Less than Significant Impact.

Title 17 (Development Code) Chapter 17.80 of the City of Rancho Cucamonga municipal code serves as the City's Tree Preservation Ordinance.[54] The purpose of the Tree Preservation Ordinance is to protect trees, considered to be a community resource, from indiscriminate cutting or removal. Provisions within Chapter 17.80 are specifically intended to protect and expand the eucalyptus windrows. These windrows provide a cumulative value as a windbreak system, and it is the intent of this chapter to perpetuate this system through protection of selected blue gum eucalyptus windrows and expansion of the system through planting of new spotted gum eucalyptus windrows along the established grid pattern, as development occurs. In addition, Section 17.16.080 - Tree Removal Permit establishes protection for "heritage trees" on private property. The City defines a heritage tree as any tree which meets at least one of the following criteria:

1. All eucalyptus windrows;

2. Any tree in excess of 30 feet in height and having a single trunk diameter at breast height (DBH) of 20 inches or more as measured 4½ feet from ground level;

[52] United States Fish and Wildlife Service. *National Wetlands Inventory*. https://www.fws.gov/Wetlands/data/Mapper.html

[53] Blodgett Baylosis Environmental Planning. *Field Survey*. Survey was conducted March 30, 2018.

[54] Rancho Cucamonga, City of, Municipal Code. *Title IX General Regulations, Chapter 96 Streets and Sidewalks, Street Trees.*

3. Multi-trunk trees having a total diameter at breast height (DBH) of 30 inches or more as measured 4½ feet from ground level;

4. A stand of trees the nature of which makes each dependent upon the others for survival; or

5. Any other tree as may be deemed historically or culturally significant by the planning director because of age, size, condition, location, or aesthetic qualities.

The permit requirements include:

1. No person, firm, or corporation shall remove, relocate, or destroy any heritage tree within the city limits, including an applicant for a building permit, without first obtaining a tree removal permit from the planning director.

2. No tree removal permit shall be issued for the removal of any heritage tree on any lot associated with a proposal for development, unless all discretionary approvals have been obtained from the city, or unless an emergency waiver is granted pursuant to section 17.16.080.H.

There are no trees located on-site. A small 400 square-foot patch of landscaping is present along the project site's frontage with Hellman Avenue. This patch of landscaping consists of grass and ornamental shrubs. In addition, the project Applicant would plant 36,312 square feet of landscaping. Since the project's implementation would not require the removal of any protected tree, the potential impacts are considered to be less than significant.

F. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? ● No Impact.

The proposed project would not impact an adopted or approved local, regional, or State habitat conservation plan because the proposed project is located in the midst of an urban area. The project site is located outside of any open space and/or conservation areas identified in the City's General Plan.[55] Therefore, no impacts would occur.

3.4.3 CUMULATIVE IMPACTS

Typically, impacts to biological resources are site-specific. The analysis determined that the proposed project would not involve any incremental loss or degradation of protected habitat. As a result, no cumulative impacts would occur.

[55] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Resource Conservation Element Figure RC-1 Open Space and Conservation Plan.* Plan adopted May 19, 2010.

3.4.4 MITIGATION MEASURES

The analysis of biological resources impacts indicated that no impacts on these resources would occur as part of the proposed project's implementation. As a result, no mitigation is required.

3.5 CULTURAL RESOURCES

3.5.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may have a significant impact on cultural resources if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5;
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or,
- Disturb any human remains, including those interred outside of formal cemeteries.

3.5.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. *Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5? ● No Impact.*

Historic structures and sites are defined by local, State, and Federal criteria. A site or structure may be historically significant if it is locally protected through a local general plan or historic preservation ordinance. A site or structure may be historically significant according to State or Federal criteria even if the locality does not recognize such significance. The State, through the State Historic Preservation Office (SHPO), maintains an inventory of those sites and structures that are considered to be historically significant. Finally, the U.S. Department of Interior has established specific Federal guidelines and criteria that indicate the manner in which a site, structure, or district is to be defined as having historic significance and in the determination of its eligibility for listing on the National Register of Historic Places.[56] To be considered eligible for the National Register, a property's significance may be determined if the property is associated with events, activities, or developments that were important in the past, with the lives of people who were important in the past, or represents significant architectural, landscape, or engineering elements.[57]

[56] U.S. Department of the Interior, National Park Service. *National Register of Historic Places*. http://nrhp.focus.nps.gov. 2010.

[57] Ibid.

State historic preservation regulations include the statutes and guidelines contained in the California Environmental Quality Act (CEQA) and the Public Resources Code (PRC). A historical resource includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript, that is historically or archaeologically significant. The State regulations that govern historic resources and structures include Public Resources Code (PRC) Section 5024.1 and CEQA Guidelines Sections 15064.5(a) and 15064.5(b). According to Section 5024.1(c) of the State Public Resources Code:

(c) A resource may be listed as an historical resource in the California Register if it meets any of the following National Register of Historic Places criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

(2) Is associated with the lives of persons important in our past.

(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

(4) Has yielded, or may be likely to yield, information important in prehistory or history.

According to the City's General Plan, the Casa de Rancho Cucamonga (Rains House Museum) located at 8810 Hemlock Street is the only building in Rancho Cucamonga on the National Register of Historic Places. In addition, the buildings that occupy the project site are not present on the list of historic resources identified by the State Office of Historic Preservation (SHPO).[58] Furthermore, the buildings that occupy the site do not meet any of the criteria of a historic structure identified above. The buildings are currently used by Frontier Communications and no historical events have occurred within either building. No persons of significance currently reside within the property, or have resided within the property. Furthermore, the building was erected in 1980 (per the San Bernardino County Tax Assessor) and since the building is less than 45 years old, the building does not require consideration for historic significance since not enough time has passed to determine the building's significance.

In 1978, the City adopted the Historic Preservation Commission Ordinance to "designate, preserve, protect, enhance, and perpetuate those historic structures and sites which contribute to the cultural and aesthetic benefit of Rancho Cucamonga." The Ordinance established a Historic Preservation Commission to review applications for Landmark designation, review plans for physical alterations or change of use to Landmarks, and maintain the register of Landmarks. Pursuant to the Ordinance, a Landmark Designation Program was established. The City has designated many Landmarks and Points of Interest within Rancho Cucamonga and the Sphere of Influence. The project's implementation would not affect any of the locally designated historic resources. The site is occupied by an outdoor storage yard and two structures and all construction activities would be restricted to the designated

[58] California Department of Parks and Recreation. *California Historical Resources*. Website http:// ohp.parks.ca.gov/ ListedResources. Website accessed in September 8, 2017.

site. Since the project's implementation would not impact any Federal, State, or locally designated historic resources, no impacts would occur.

B. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? ● Less than Significant Impact with Mitigation.

The City of Rancho Cucamonga area was occupied during the Late Prehistoric Period by the Native American societies commonly known to anthropologists as the Gabrielino. The City in named after the Gabrielino village of Kukamo or Cucamonga, which was located in the eastern extreme of the tribe's territory. The name is thought to come from a Gabrielino word meaning "sandy place." The term "Gabrielino" identifies those Native Americans who were under the control of the Spanish Mission San Gabriel. The overwhelming number of people here were of the same ethnic nationality and language group who generally referred to themselves as Tongva. Their territory included the entire Los Angeles Basin and extended from northern Orange County north to the San Fernando Valley in Los Angeles County and eastward to the Riverside and San Bernardino area. It also included the watersheds of the Los Angeles, San Gabriel, and Santa Ana Rivers. The language of the group is derived from the Takic family, part of the Uto-Aztecan linguistic stock. The Gabrielino/Tongva arrived in the Los Angeles Basin prior to 500 BCE, gradually displacing the indigenous peoples. Large, permanent villages were established in the fertile lowlands along rivers and streams and in sheltered areas along the coast. Eventually, Gabrielino territory encompassed the greater Los Angeles Basin, the coastal regions from Topanga Canyon in the north to perhaps as far south as Aliso Creek, as well as the islands of San Clemente, San Nicholas, and Santa Catalina. The subsistence economy of the Gabrielino was one of hunting and gathering. A wide variety of tools and implements were employed by the Gabrielino to gather, collect, and process food resources.

As indicated in Section 2.4, the total cut and fill would be 17,233 cubic yards, respectively. In addition, trenching would be undertaken to accommodate the building footings, utility lines, and other underground infrastructure such as stormwater appurtenances and double check detector assemblies, which would be installed during this phase as well. Although the project site is located in the midst of an urban area, the project site is situated in an area of high archaeological significance. In addition, the project's implementation would require a total cut and fill of 17,233 cubic yards. AB-52 consultation was undertaken by the Lead Agency and so far, only one response for consultation was received. Mr. Andrew Salas, Chairman of the Gabrielino Band of Mission Indians, Kizh Nation, extended an offer for consultation. Mitigation was identified during the consultation period. This mitigation is provided in Section 3.17 and will reduce potential impacts to tribal resources to levels that are less than significant.

In conformance with CEQA Guidelines Section 15064.5, a Phase I Cultural Resources Assessment (MIG Hogle-Ireland, 2016) was performed on the project site. In conjunction with the South Central Coastal Information Center at California State University, Fullerton, the California Historical Resources Information was also consulted. No potentially significant cultural resources were identified during the cultural resource survey of the project site. Nevertheless, the following mitigation is required:

Mitigation Measure No. 1 (Cultural Resources). In the event that potentially significant archaeological materials are encountered during project related construction activities, all work must be halted in the vicinity of the archaeological discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the archaeological resource.

As well, Health and Safety Code 7050.5, CEQA 15064.5(e), and Public Resources Code 5097.98 mandate the process to be followed in the unlikely event of an accidental discovery of any human remains in a location other than a dedicated cemetery. Adherence to the abovementioned mitigation will reduce potential impacts to levels that are less than significant.

C. *Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? ● Less than Significant Impact with Mitigation.*

No paleontological resources or geologic features are anticipated to be encountered during the project's construction phase due to the amount of disturbance that has occurred to accommodate the existing development. The soils that underlie the project site are alluvial in nature. Alluvial deposits are typically quaternary in age (from two million years ago to the present day) and span the two most recent geologic epochs, the Pleistocene and the Holocene.[59] According to the Resource Element of the City's General Plan, the soils and geologic formations within the City have a low potential to contain significant paleontological resources.[60] Nevertheless, in the event that previously unidentified paleontological resources are encountered, the following mitigation will be required:

Mitigation Measure No. 2 (Cultural Resources). If previously unidentified paleontological resources are unearthed during construction, work shall cease within 50 feet of the find and the project Applicant must retain a qualified paleontologist, approved by the City, to assess the significance of the find. If a find is determined to be significant, the Lead Agency and the paleontologist will determine appropriate avoidance measures or other appropriate mitigation. All significant fossil materials recovered will be, as necessary and at the discretion of the qualified paleontologist, subject to scientific analysis, professional museum curation, and documentation according to current professional standards.

Adherence to the aforementioned mitigation will ensure that potential impacts remain at levels that are considered to be less than significant.

D. *Disturb any human remains, including those interred outside of formal cemeteries? ● Less than Significant Impact with Mitigation.*

There are no dedicated cemeteries located within the vicinity of the project site.[61] Ontario Cemetery Association is located approximately four miles to the southwest of the project site.[62] The proposed

[59] United States Geological Survey. *What is the Quaternary?* http://geomaps.wr.usgs.gov/sfgeo/quaternary/stories/what_is.html

[60] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Resource Conservation Element*. Plan adopted May 19, 2010.

[61] Google Earth. Website accessed April 5, 2018.

project would be restricted to the project site and would not affect any dedicated cemeteries. Notwithstanding, in the unlikely event that remains are uncovered by construction crews, all excavation and grading activities shall be halted and the San Bernardino County Sheriff would be contacted (the Department would then contact the County Coroner). This is a standard condition under California Health and Safety Code Section 7050.5(b), which is re-iterated as mitigation below:

> *Mitigation Measure No. 3 (Cultural Resources*). In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with (b) Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains. If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission. In the event that human remains are uncovered, the City and the applicant/developer shall immediately contact the County of San Bernardino Coroner and the Consulting Tribes. If the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four (24) hours of the determination, as required by California Health and Safety Code § 7050.5 (c). The NAHC-identified Most Likely Descendant (MLD), shall be allowed, under California Public Resources Code § 5097.98 (a), to (1) inspect the site of the discovery and (2) make determinations as to how the human remains and funerary objects shall be treated and disposed of with appropriate dignity. The MLD, City and applicant/developer agree to discuss in good faith what constitutes "appropriate dignity" as that term is used in the applicable statutes. The MLD shall complete its inspection and make recommendations within forty-eight (48) hours of receiving notification from either the applicant/developer or the NAHC, as required by California Public Resources Code § 5097.98.

In addition, Title 14; Chapter 3; Article 5; Section 15064.5 of CEQA would apply in terms of the identification of significant archaeological resources and their salvage. Therefore, the potential impacts are considered to be less than significant with the implementation of the abovementioned mitigation.

[62] Google Earth. Website accessed April 5, 2018.

3.5.3 CUMULATIVE IMPACTS

The potential environmental impacts related to cultural resources are site-specific. Furthermore, the analysis herein determined that the proposed project would not result in any significant impacts on cultural resources. As a result, no cumulative impacts would occur.

3.5.4 MITIGATION MEASURES

In the event that previously unidentified paleontological or archeological resources are encountered, the following mitigation will be required:

Mitigation Measure No. 1 (Cultural Resources). In the event that potentially significant archaeological materials are encountered during project related construction activities, all work must be halted in the vicinity of the archaeological discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the archaeological resource.

Mitigation Measure No. 2 (Cultural Resources). If previously unidentified paleontological resources are unearthed during construction, work shall cease within 50 feet of the find and the project Applicant must retain a qualified paleontologist, approved by the City, to assess the significance of the find. If a find is determined to be significant, the Lead Agency and the paleontologist will determine appropriate avoidance measures or other appropriate mitigation. All significant fossil materials recovered will be, as necessary and at the discretion of the qualified paleontologist, subject to scientific analysis, professional museum curation, and documentation according to current professional standards.

Mitigation Measure No. 3 (Cultural Resources). In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with (b) Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains. If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission. In the event that human remains are uncovered, the City and the applicant/developer shall immediately contact the County of San Bernardino Coroner and the Consulting Tribes. If the Coroner recognizes the human remains to be

those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four (24) hours of the determination, as required by California Health and Safety Code § 7050.5 (c). The NAHC-identified Most Likely Descendant (MLD), shall be allowed, under California Public Resources Code § 5097.98 (a), to (1) inspect the site of the discovery and (2) make determinations as to how the human remains and funerary objects shall be treated and disposed of with appropriate dignity. The MLD, City and applicant/developer agree to discuss in good faith what constitutes "appropriate dignity" as that term is used in the applicable statutes. The MLD shall complete its inspection and make recommendations within forty-eight (48) hours of receiving notification from either the applicant/developer or the NAHC, as required by California Public Resources Code § 5097.98.

3.6 GEOLOGY & SOILS

3.6.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on the environment if it would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. Strong seismic ground–shaking? Seismic-related ground failure, including liquefaction? Landslides;

- Result in substantial soil erosion or the loss of topsoil;

- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;

- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property; or,

- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

3.6.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. Strong seismic ground–shaking? Seismic-related ground failure, including liquefaction? Landslides? ● Less than Significant Impact.

The City of Rancho Cucamonga is located in a seismically active region. Earthquakes from several active and potentially active faults in the Southern California region could affect the proposed project site. In 1972, the Alquist-Priolo Earthquake Zoning Act was passed in response to the damage sustained in the 1971 San Fernando Earthquake.[63] The Alquist-Priolo Earthquake Fault Zoning Act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults.[64] A list of cities and counties subject to the Alquist-Priolo Earthquake Fault Zones is available on the State's Department of Conservation website. The City of Rancho Cucamonga is on the list.[65]

The nearest fault is the Cucamonga Fault (which is part of the larger Sierra Madre Fault Zone), located approximately five miles to the north of the project site. The potential impacts from fault rupture are considered no greater for the project site than for the surrounding areas. Surface ruptures are visible instances of horizontal or vertical displacement, or a combination of the two. The proposed warehouse would be constructed in compliance with the 2016 Building Code, which contains standards for building design to minimize the impacts from fault rupture. Therefore, the potential impacts resulting from fault rupture are anticipated to be less than significant. The potential impacts in regards to ground shaking would also be considered to be less than significant. The intensity of ground shaking depends on the intensity of the earthquake, the duration of shaking, soil conditions, type of building, and distance from epicenter or fault. The proposed warehouse would be constructed in compliance with the 2016 Building Code, which contains standards for building design to minimize the impacts from ground shaking.

Other potential seismic issues include ground failure and liquefaction. Ground failure is the loss in stability of the ground and includes landslides, liquefaction, and lateral spreading. The project site is not located in an area that is subject to liquefaction. According to the United States Geological Survey, liquefaction is the process by which water-saturated sediment temporarily loses strength and acts as a fluid. Essentially, liquefaction is the process by which the ground soil loses strength due to an increase in water pressure following seismic activity. Lastly, the project site is not subject to the risk of landslides because there are no hills or mountains within the vicinity of the project site. Lateral

[63] California Department of Conservation. *What is the Alquist-Priolo Act.* http://www.conservation.ca.gov/cgs/rghm/ap/Pages/main.aspx.

[64] Ibid.

[65] California Department of Conservation. *Table 4, Cities and Counties Affected by Alquist Priolo Earthquake Fault Zones as of January 2010.* http://www.conservation.ca.gov/cgs/rghm/ap/Pages/affected.aspx

spreading is a phenomenon that is characterized by the horizontal, or lateral, movement of the ground. Lateral spreading could be liquefaction induced or can be the result of excess moisture within the underlying soils. Liquefaction induced lateral spreading would not affect the proposed development because the site is not located in an area that is subject to liquefaction. Therefore, lateral spreading caused by liquefaction would not affect the project. The underlying soils are not prone to shrinking and swelling (refer to Section 3.6.2.D). As a result, the potential impacts in regards to liquefaction and landslides are less than significant.

B. Result in substantial soil erosion or the loss of topsoil? ● Less than Significant Impact.

Southern California Geotechnical prepared a Geotechnical Study for the proposed project. This Geotechnical Study is available as a reference in the Appendices for the WQMP, which is located in Appendix D. According to the Geotechnical Report, the project site is underlain with artificial fill soils.[66] The site is, and would continue to be level and no slope failure or landslide impacts are anticipated to occur. Once operational, the project site would be paved over and landscaped, which would minimize soil erosion. The project's construction would not result in substantial soil erosion or the loss of topsoil since the project Applicant would be required to adhere to Article V – Construction Requirements of Chapter 19.20 – Municipal Separate Storm Sewer System. According to Section 19.20.230:

> "All construction projects which could potentially have an adverse impact on the city's municipal separate storm sewer system or waters of the state shall install and/or implement appropriate construction and post-construction best management practices (BMPs), as listed in their water quality management plan (WQMP) or the California Storm Water Best Management Practice Handbook, to reduce pollutants to the maximum extent practicable or to the extent required by law."

In addition, Section 19.20.240 would also apply for the project:

- (A). Any developer/owner engaging in construction activities which disturb five acres or more of land shall apply for coverage under the general stormwater permit for construction activity with the state water resources control board (SWRCB). Any developer/owner engaging in construction activities which disturb less than five acres but are part of a larger common plan of development or sale that is greater than five acres must also apply for coverage under the general stormwater permit for construction activity with the state water resources control board (SWRCB). The owner of the land where the construction activity is occurring is responsible for obtaining coverage under the permit. Owners may obtain coverage under the general permit by completing a notice of intent form (NOI) and mailing the form along with a vicinity map and the appropriate fee to the office of the state water resources control board. The NOI form and checklist of items to submit to the state is available from the state water resources control board in Sacramento, California or from the city's engineering department,

[66] Southern California Geotechnical. *Geotechnical Investigation for Proposed Warehouse*. Report dated February 23, 2017.

environmental section. In addition, the owner shall also prepare a stormwater pollution prevention plan (SWPPP) in accordance with state requirements.

- (B). Prior to obtaining any city-issued grading and/or construction permits, the developer/owner shall provide evidence of compliance with the general construction permit by providing a copy of the waste discharger's identification number (WDID) to the city's engineering department.

The use of construction Best Management Practices (BMPs) identified in the mandatory WQMP (which is presented in Appendix D) and SWPPP would prevent soil erosion and the discharge of sediment into the local storm drains during the project's construction phase. As a result, the impacts would be less than significant.

C. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? ● Less than Significant Impact.

According to the Geotechnical Report, the project site is underlain with artificial fill soils.[67] These soils possess low strengths, varying densities, and unfavorable consolidation/collapse characteristics.[68] Therefore, the project Applicant would be required to excavate approximately 3,451 square feet of fill and recompact the outgoing fill in order to make it capable of supporting the development. Once complete, the project would not destabilize the new soils since the site would be graded, leveled, and covered over with pavement and landscaping. In addition, the new fill soils would be capable of supporting the proposed project.

The site is, and would continue to be level and no slope failure or landslide impacts are anticipated to occur. Once operational, the project site would be paved over and landscaped, which would minimize soil erosion. Furthermore, no soil erosion would occur during the project's construction since the project Applicant would be required to adhere to Article V – Construction Requirements of Chapter 19.20 – Municipal Separate Storm Sewer System. Lateral spreading is a phenomenon that is characterized by the horizontal, or lateral, movement of the ground. Lateral spreading could be liquefaction induced or can be the result of excess moisture within the underlying soils. Liquefaction induced lateral spreading would not affect the proposed warehouse development because the site is not located in an area that is subject to liquefaction. Therefore, lateral spreading caused by liquefaction would not affect the project. The underlying fill soils are prone to shrinking-swelling. Soils that exhibit certain shrink swell characteristics become sticky when wet and expand according to the moisture content present at the time. Since the soils have a potential for shrinking and swelling, the Applicant would remove and replace the underlying fill soils that are prone to the aforementioned phenomena. Thus, lateral spreading resulting from an influx of groundwater is slim. In addition, groundwater is

[67] Southern California Geotechnical. *Geotechnical Investigation for Proposed Warehouse*. Report dated February 23, 2017. (Refer to Appendix C).

[68] Ibid.

located between 260 and 300 feet below ground surface (BGS).[69]

The soils that underlie the project site are prone to subsidence. Subsidence occurs via soil shrinkage and is triggered by a significant reduction in an underlying groundwater table, thus causing the earth on top to sink.[70] No groundwater would be drained to accommodate the construction of the proposed project. In addition, the project would not result in the direct extraction of groundwater located below ground surface (BGS). As stated previously, the underlying fill soils would be removed and replaced. Therefore, the likelihood of on-site subsidence is considered to be remote. As a result, the potential impacts are anticipated to be less than significant.

D. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property? ● Less than Significant Impact.

According to the Geotechnical Report, the project site is underlain with artificial fill soils.[71] These soils possess low strengths, varying densities, and unfavorable consolidation/collapse characteristics.[72] The Applicant is proposing to remove approximately 3,451 cubic yards of soils prone to shrinking and subsidence. These soils would be replaced with fill capable of supporting the new construction. As a result, the potential impacts are considered to be less than significant.

E. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water? ● No Impact.

No septic tanks would be used as part of proposed project. As a result, no impacts associated with the use of septic tanks would occur as part of the proposed project's implementation.

3.6.3 CUMULATIVE IMPACTS

Typically, impacts to geology and soils are site-specific. The analysis herein determined that the proposed project would not result in significant impacts related to ground shaking, liquefaction, landslides, soil erosion, lateral spreading, or subsidence. As a result, no cumulative impacts would occur.

3.6.4 MITIGATION MEASURES

The analysis determined that no mitigation measures were required since the potential impacts with regards to geology and soils are considered to be less than significant.

[69] Ardent Environmental Group, Inc. *Phase I Environmental Site Assessment*. Report dated February 14, 2018.

[70] Subsidence Support. *What Causes House Subsidence?* http://www.subsidencesupport.co.uk/what-causes-subsidence.html

[71] Southern California Geotechnical. *Geotechnical Investigation for Proposed Warehouse*. Report dated February 23, 2017.

[72] Ibid.

3.7 GREENHOUSE GAS EMISSIONS

3.7.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant adverse impact on greenhouse gas emissions if it would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; and,

- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

3.7.2 ENVIRONMENTAL ANALYSIS

A. *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? ● Less than Significant Impact.*

The State of California requires CEQA documents to include an evaluation of greenhouse gas (GHG) emissions, or gases that trap heat in the atmosphere. GHG are emitted by both natural processes and human activities. Examples of GHG that are produced both by natural and industrial processes include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The accumulation of GHG in the atmosphere regulates the earth's temperature. Without these natural GHG, the Earth's surface would be about 61°F cooler.[73] However, emissions from fossil fuel combustion have elevated the concentrations of GHG in the atmosphere to above natural levels. The SCAQMD has established a draft threshold of significance of 10,000 metric tons of CO_2E ($MTCO_2E$) per year for new development.

Table 3-4 summarizes annual greenhouse gas (CO_2E) emissions from the proposed project. Carbon dioxide equivalent, or CO_2E, is a term that is used for describing different greenhouses gases in a common and collective unit. The CalEEMod V.2016.3.2 was used to calculate the project's construction and operational GHG emissions. These CalEEMod worksheets are provided in Appendix A. The GHG emissions estimates reflect what a warehouse of the same location and description would generate once fully operational. The type of activities that may be undertaken once the project is operational have been predicted and accounted for in the model for the selected land use type. As indicated in Table 3-4, the CO_2E total for the project is 3,368 pounds per day or 1.52 $MTCO_2E$ per day. This translates into an annual emission of 555 $MTCO_2E$, which is below the aforementioned thresholds.

[73] California, State of. OPR Technical Advisory – CEQA and Climate Change: Addressing Climate Change through the California Environmental Quality Act (CEQA) Review. June 19, 2008.

Table 3-4
Greenhouse Gas Emissions Inventory

Source	GHG Emissions (Lbs/Day)			
	CO_2	CH_4	N_2O	CO_2E
Long-term Area Emissions	0.07	--	--	0.07
Long-term Energy Emissions	114.33	--	--	115.01
Long-term Mobile Emissions	3,249.61	0.15	--	3,253.55
Total Long-term Emissions	**3,364.02**	**0.16**	**--**	**3,368.65**
Total Long-term Emissions (MTCO2e)				**555 $MTCO_2E$ per year**
Thresholds of Significance				**10,000 $MTCO_2E$ per year**

Source: CalEEMod V.2016.3.2

It is important to note that the project is an "infill" development, which is seen as an important strategy in combating the release of GHG emissions. Infill development provides a regional benefit in terms of a reduction in Vehicle Miles Traveled (VMT) since the project is consistent with the regional and State sustainable growth objectives identified in the State's Strategic Growth Council (SGC).[74] Infill development reduces VMT by recycling existing undeveloped or underutilized properties located in established urban areas. When development is located in a more rural setting, such as further east in the desert areas, employees, patrons, visitors, and residents may have to travel farther since rural development is often located a significant distance from employment, entertainment, and population centers. Consequently, this distance is reduced when development is located in urban areas since employment, entertainment, and population centers tend to be set in more established communities. As a result, the potential impacts are considered to be less than significant.

B. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases? ● Less than Significant Impact with Mitigation.

The City of Rancho Cucamonga is preparing a Sustainable Community Action Plan (SCAP), which is a plan to facilitate improvements to community health, promote economic vitality, reduce greenhouse gas emissions, and reduce water and energy consumption. The proposed project would be required to implement the mitigation measures identified in Section 3.6 of the SCAP. These mitigation measures would reduce the project's electricity consumption. In addition, the project is consistent with the following goals outlined in the SCAP:

- LU 1.4 Promote bicycle parking and alternative transportation amenities in mixed-use, multifamily, and commercial development. The project would include bicycle parking.

The City's 2010 General Plan also contains policies which would aid in the reduction in of GHG. The project is consistent with the following General Plan policies:

[74] California Strategic Growth Council. http://www.sgc.ca.gov/Initiatives/infill-development.html. Promoting and enabling sustainable infill development is a principal objective of the SGC because of its consistency with the State Planning Priorities and because infill furthers many of the goals of all of the Council's member agencies.

- Policy LU-10.1: Continue to require implementation of the City's Water Efficient Ordinance, which should be reviewed and updated periodically. The project would include water efficient fixtures and drought-tolerant landscaping.

- Policy PS-12.7: Support tree planting, planting more vegetation (including native and drought-resistant planting), and preservation of open space. The project site contains two trees and a minimal amount of ruderal vegetation. Once complete, the site would contain 36,312 square feet of landscaping.

The project would also feature 135 Bristolite skylights, which would allow natural daylight to illuminate the building's interior.[75] The project's operational GHG emissions would also be below the thresholds of significance established by the SCAQMD. However, in order to ensure further conformity with the City's GHG reduction and sustainability goals, the following mitigation is required:

> *Mitigation Measure No. 4 (Greenhouse Gas Emissions*). Preferential parking spaces for electric or fuel efficient vehicles must be provided.

Adherence to the above-mentioned mitigation will strengthen the project's compliance with City goals and policies. As a result, less than significant impacts will occur.

3.7.3 CUMULATIVE IMPACTS

According to the City, there are 18 related projects located within the Traffic Impact Analysis' study area. However, there are three related projects located within one mile of the project site. These three related projects are as follows: Crestwood Homes, 31 single-family units; three retail buildings; and the Vintner, which includes 182 single-family units and 7,615 square feet of retail. The combined operational emissions from the four projects (including the proposed project) would still be below the thresholds of significance established by the SCAQMD (the CalEEMod worksheets for the cumulative emissions are provided in Appendix A). It is important to note that these four projects are classified as "infill" development, which is seen as an important strategy in combating the release of GHG emissions. Typically, vehicle emissions constitute the largest portion of CO_2E emissions. The location of these four related projects in the City of Rancho Cucamonga would reduce overall VMT since these projects would be located closer to major population, employment, and entertainment centers. In contrast, the overall VMT would increase if these projects were located in undeveloped portions of San Bernardino and Riverside Counties.

3.7.4 MITIGATION MEASURES

The preceding analysis concluded that the following mitigation is required:

> *Mitigation Measure No. 4 (Greenhouse Gas Emissions*). Preferential parking spaces for electric or fuel efficient vehicles must be provided.

[75] HPA Architecture. *Overall Site Plan*. Plan packet dated January 25, 2018.

3.8 HAZARDS & HAZARDOUS MATERIALS

3.8.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on risk of upset and human health if it would:

- Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials;

- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment;

- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area;

- For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area;

- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or,

- Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

3.8.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. *Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials? ● Less than Significant Impact.*

A Phase I Environmental Assessment was prepared for the project site by Ardent Environmental Group. This Phase I report is provided in Appendix C. According to the Phase I report, the eastern portion of the site was first developed in 1966, while the western portion of the site was developed in 1985. The site has been used as a telecommunications maintenance yard and for the storage of fleet

vehicles. As part of the maintenance activities, fueling and maintenance of fleet vehicles included the use of underground storage tanks (USTs). These USTs were removed and replaced with aboveground storage tanks (ASTs). The previous on-site USTs included one 10,000-gallon gasoline UST and a 500-gallon waste oil UST. The 10,000 gallon UST was removed in 1986 and replaced with a 12,000-gallon gasoline UST.[76] This 12,000-gallon replacement gasoline UST was removed in 1999 and replaced with a 12,000-gallon gasoline UST. This replacement UST was removed in 2011.

The four USTs were removed under the direction and oversight of the San Bernardino County Fire Department (SBCFD) and impacted soils were remediated by excavation. Laboratory results of confirmation samples showed no detectable to low concentrations of residual contaminates. Based on these results, no further action (NFA) letters or case closure status were issued by the SBCFD. Ardent has reviewed these data and concur with the regulatory agency that no further work is necessary. Based on these results, these former environmental issues would no longer be considered an environmental concern to the site.[77] The Vehicle Maintenance Building contains three inactive underground hydraulic lifts, one active underground hydraulic lift, and two above-ground electric lifts. In 1988, a subsurface investigation and subsequent remedial effort was completed associated with a leaking underground hydraulic oil line. The excavation activities removed a majority of the impacted soil, but some impacted materials were left in-place beneath the eastern building foundation. The documentation report was unclear as to whether confirmation samples were collected and analyzed. Based on this information, the former hydraulic leak and underground hydraulic lifts would still be considered an environmental concern to the site.[78]

A former clarifier and leach field were reportedly located northwest of the Vehicle Maintenance Building and were assumed to have been connected to this building. Due to the lack of investigations completed around this feature, the former clarifier and leach field would be considered an environmental concern to the site. As noted above, solvents are typically used for cleaning and degreasing purposes. Due to the possible solvent use in the Vehicle Maintenance Building, a possible environmental and vapor intrusion issue may be present. In addition, an existing car wash and clarifier are located immediately east of the Vehicle Maintenance Building. The car wash and clarifier would be considered an environmental concern to the site since solvents are typically used for cleaning and degreasing purposes. Due to the possible solvent use in the car wash area, a possible environmental and vapor intrusion issue may be present. Furthermore, the project site was listed as a small quantity generator of hazardous waste, including chlorinated solvents. Solvents are typically used for parts cleaning and degreasing purposes. Due to the possible solvent uses in the Vehicle Maintenance Building, former clarifier and leach field, and existing car wash and clarifier, a possible vapor intrusion issue may be present.[79]

[76] Ardent Environmental Group, Inc. *Phase I Environmental Site Assessment*. Report dated February 14, 2018.

[77] Ibid.

[78] Ibid.

[79] Ardent Environmental Group, Inc. *Subsurface Investigation Report*. Report dated March 16, 2017.

A Phase II report was subsequently prepared for the project site (refer to Appendix C). Based on the results of a Phase I Environmental Site Assessment (ESA), Ardent Environmental Group, Inc. (Ardent) presented a list of potential environmental concerns at the site. Soil samples were collected in the vicinity of inactive features and soil gas samples were collected to assess whether a possible vapor intrusion issue was present.[80] Based on the results of the subsurface investigations, the following conclusions were drawn:

- *Inactive Leach Field and Clarifier* – Based on laboratory results, there is a low likelihood that elevated concentrations of petroleum hydrocarbons and/or volatile organic compounds (VOCs) are present in soil and soil gas in the vicinity of the inactive leach field and clarifier that would pose a threat to groundwater or present a possible risk to human health through vapor intrusion.

- *Two Inactive Hydraulic Lifts* – Based on laboratory results, there is a low likelihood that elevated concentrations of petroleum hydrocarbons, and VOCs are present in soil in the vicinity of the two inactive hydraulic lifts that would pose a threat to groundwater. The low concentrations of petroleum hydrocarbons (up to 10 milligrams per kilogram [mg/kg]) detected near one of the lifts do not need to be remediated.

- *1988 Hydraulic Oil Release* – Based on laboratory results, the majority of the petroleum hydrocarbon-impacted soils associated with the 1988 hydraulic oil release appear to have been adequately remediated. The remaining contaminants associated with boring HA-3C are limited in extent and localized in the vicinity of this boring. The extent of impacted soils remaining is estimated in an area measuring approximately four feet, by five feet, by five feet deep, with a volume of approximately four cubic yards. This area is currently located beneath the eastern footing of the Vehicle Maintenance Building.

- *Possible Vapor Intrusion Issue* – Based on laboratory results, there is a low likelihood that elevated concentrations of VOCs are present in soil gas in the vicinity of the Vehicle Maintenance Building and active car wash area that would pose a possible risk to human health through vapor intrusion.[81]

Based on the findings of this investigation, Ardent recommends no additional investigations or remediation at this time. Following demolition of the Vehicle Maintenance Building, the small area of impacted soils associated with boring HA-3C should be excavated and removed from the site.[82] The Applicant is proposing to remove approximately 17,233 cubic yards of earth. This would include the removal of aforementioned impacted soils associated with boring HA-3C. As a result, the potential impacts are considered to be less than significant.

[80] Ardent Environmental Group, Inc. *Subsurface Investigation Report*. Report dated March 16, 2017.

[81] Ibid.

[82] Ibid.

B. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? ● Less than Significant Impact.

The project site was first developed in 1966. Due to the age of the structures that are present on-site, lead based paint or asbestos containing materials may be present. Lead based paint and/or asbestos containing materials would be removed by a certified abatement contractor. The removal of lead based paint and/or asbestos containing materials would be done in accordance with SCAQMD Rule 1403-Asbestos Emissions from Demolition/Renovation Activities. Due to the nature of the proposed project (a warehouse), no hazardous materials would be used on-site beyond those which are used for routine cleaning and maintenance. Should the project's future tenant require the use, transport, storage, or handling of hazardous materials, they would need to file for a Conditional Use Permit (CUP) application with the City. As a result, the potential impacts are considered to be less than significant.

C. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? ● No Impact.

There are no schools located within one-quarter of a mile from the project site. The closest schools to the site are Chaffey Adult School and Arroyo Elementary School, located 0.41 mile and 0.67 mile to the southwest of the site, respectively. As a result, the proposed project would not create a hazard to any local school and no impacts are anticipated.

D. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? ● No Impact.

The *Cortese List*, also referred to as the Hazardous Waste and Substances Sites List or the California Superfund List, is a planning document used by the State and other local agencies to comply with CEQA requirements that require the provision of information regarding the location of hazardous materials release sites. California Government Code section 65962.5 requires the California Environmental Protection Agency to develop and update the Cortese List on annually basis. The list is maintained as part of the DTSC's Brownfields and Environmental Restoration Program referred to as EnviroStor. A search was conducted through the California Department of Toxic Substances Control Envirostor website to identify whether the project site is listed in the database as a Cortese site. The project site is not identified as a Cortese site.[83] Therefore, no impacts would occur.

[83] CalEPA. *DTSC's Hazardous Waste and Substances Site List - Site Cleanup (Cortese List).* http://www.dtsc.ca.gov/SiteCleanup/Cortese_List.cfm

E. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area? ● No Impact.

The project site is not located within two miles of a public use airport. Ontario Airport is located 2.29 miles south of the project site.[84] The project site is not located within the Runway Protection Zone (RPZ) of the aforementioned airport.[85] In addition, the proposed project would not penetrate the designated slopes for any of the aforementioned airports. Essentially, the proposed project would not introduce a building that would interfere with the approach and take-off of airplanes utilizing any of the aforementioned airports and would not risk the safety of the people working in the project area. Furthermore, the project site is not located within any 60 Community Noise Equivalent Level (CNEL) contour line boundaries. As a result, the proposed project would not present a safety or noise hazard related to aircraft or airport operations at a public use airport to people residing or working in the project area and no impacts would occur.

F. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area? ● No Impact.

The project site is not located within two miles of a private airstrip.[86] As a result, no impacts are associated with the proposed project's implementation.

G. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? ● No Impact.

At no time would Hellman Avenue or 8th Street be completely closed to traffic. All construction staging must occur on-site. As a result, no impacts are associated with the proposed project's implementation.

H. Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands? ● Less than Significant Impact.

The area surrounding the project site is urban and there are no areas containing natural vegetation that could lead to a wildfire.[87] In addition, the project site is located outside of the City's fire hazard severity zone, or any areas where there is natural vegetation that may represent a significant wildfire risk.[88] The project site is located 3.33 miles to the southeast from the closest fire hazard severity zone. Since the project site is located outside of a fire hazard severity zone, the potential impacts are considered to be

[84] Google Earth. Site accessed April 16, 2018.

[85] The Ontario Plan. *Map 2-2, Compatibility Policy Map: Safety Zones.* http://www.ontarioplan.org/wp-content/uploads/sites/4/2015/05/policy-map-2-2.pdf

[86] Google Earth. Site accessed October 22, 2018.

[87] Ibid.

[88] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Public Health and Safety Element Figure PS-1 Fire Hazard Severity Zones.* Plan adopted May 19, 2010.

less than significant.

3.8.3 CUMULATIVE IMPACTS

According to the City, there are 18 related projects located within the Traffic Impact Analysis' study area. However, there are three related projects located within one mile of the project site. These three related projects are as follows: Crestwood Homes, 31 single-family units; three retail buildings; and the Vintner, which includes 182 single-family units and 7,615 square feet of retail. The combined operational emissions from the four projects (including the proposed project) would still be below the thresholds of significance established by the SCAQMD (the CalEEMod worksheets for the cumulative emissions are provided in Appendix A). The potential impacts related to hazardous materials are site specific. As a result, no significant cumulative impacts related to hazards or hazardous materials would result from the proposed project's implementation.

3.8.4 MITIGATION MEASURES

The preceding analysis concluded that no mitigation measures were necessary since the implementation of the proposed project would not result in potentially significant impacts in regards to hazards and hazardous materials.

3.9 HYDROLOGY & WATER QUALITY

3.9.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant environmental impact on water resources or water quality if it would:

- Violate any water quality standards or waste discharge requirements;

- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;

- Otherwise substantially degrade water quality;

- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;

- Place within a 100-year flood hazard area structures which would impede or redirect flood flows;

- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or,

- Inundation by seiche, tsunami, or mudflow.

3.9.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Violate any water quality standards or waste discharge requirements? ● Less than Significant Impact.

A Water Quality Management Plan (WQMP) was prepared for the project by Thienes Engineering, Inc. pursuant to Section 19.20.260 of the City of Rancho Cucamonga Municipal Code. A WQMP is required of new development/redevelopment projects specified in the chapter. The WQMP must outline appropriate non-structural and structural Best Management Practices (BMPs), including stormwater infiltration and treatment devices, which would be implemented and installed to prevent pollutants from being discharged into the City's municipal separate storm sewer system, during and after construction. The WQMP is presented in Appendix D.

The WQMP recommended the inclusion of two Stormtech SC-740 stormwater chambers, grate inlet filters, and curb inlet filters.[89] The Stormtech SC-740 chambers would be installed below ground surface (BGS). These chambers consist of a polypropylene corrugated chamber (resembling a tube-like structure), filter fabric, and a stone bottom. Water accumulates within the isolator row as it simultaneously permeates through the filter fabric. Solid contaminants such as rubbish, debris, leaves, sediment, and other particles are captured from the runoff by the fabric. From there, water would percolate through the stone bottom into the ground. The project would also include grate and curb inlet filters. These filters consist of stainless steel mesh, which traps sediment and allows filtered water to be conveyed through the local storm drains.

Adherence to the construction and post-construction BMPs identified above and in the mandatory WQMP would filter out contaminants of concern (oil, grease, debris, leaves, etc.), minimize the discharge of contaminated runoff into the adjacent streets, local storm drains, and the underlying

[89] Thienes Engineering, Inc. *Preliminary Water Quality Management Plan*. Plan dated January 24, 2018.

groundwater table. Once constructed, the project would not create excess runoff that would exceed the capacity of the existing storm water drainage system. The project site in its current state is 100 percent impervious; following construction, ten percent of the site would be covered in pervious surfaces. As a result, the potential impacts are considered to be less than significant.

B. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)? ● Less than Significant Impact.

The grading that would be done would not extend to depths required to encounter groundwater. The total cut and fill would be 17,233 cubic yards, respectively. In addition, trenching would be undertaken to accommodate the building footings, utility lines, and other underground infrastructure such as stormwater appurtenances and double check detector assemblies, which would be installed during this phase as well. According to the Phase I report (which is provided in Appendix C), groundwater is estimated to be present between 260 and 300 feet below ground surface.[90] Therefore no direct construction related impacts to groundwater supplies, or groundwater recharge activities would occur. The project would continue to be connected to the City's water lines and would not result in a direct decrease in underlying groundwater supplies. Furthermore, the project's contractors would be required to adhere to the applicable Best Management Practices (BMPs) for the construction site. Adherence to the required BMPs would restrict the discharge of contaminated runoff into the local storm drain system. As a result, the impacts are anticipated to be less than significant.

C. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site)? ● No Impact.

The project's construction would be restricted to the designated project site and the project would not alter the course of any stream or river that would lead to on- or off-site siltation or erosion. The Cucamonga Wash is the body of water to the project site (refer to Exhibit 2-3). This wash is located 665 feet to the west of the project site.[91] Once implemented, the proposed project would change the site's drainage characteristics. A majority of the project site is covered over in impervious surfaces. Currently, stormwater runoff is discharged off-site into local storm drains. Following construction, 11 percent of the site would consist of pervious surfaces.

A Water Quality Management Plan (WQMP) was prepared for the project by Thienes Engineering, Inc. pursuant to Section 19.20.260 of the City of Rancho Cucamonga Municipal Code (this report is provided in Appendix D). The WQMP recommended the inclusion of two Stormtech SC-740

[90] Ardent Environmental Group, Inc. *Phase I Environmental Site Assessment.* Report dated February 14, 2018. (Refer to Appendix C).

[91] Google Earth. Website accessed April 20, 2018.

stormwater chambers, grate inlet filters, and curb inlet filters.[92] These post-construction BMPs would filter out contaminants of concern, allow runoff to percolate into the ground, and would also result in the controlled discharge of excess runoff off-site. As a result, no impacts related to off-site erosion or siltation would occur. In addition, the Applicant would be required to adhere to the construction Best Management Practices (BMPs) outlined in the mandatory SWPPP. Since runoff would be contained on-site during the project's construction and occupation, no off-site erosion would occur and no mitigation measures are required.

D. *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? ● No Impact.*

The project's construction would be restricted to the designated project site and the project would not alter the course of any stream or river that would lead to on- or off-site flooding. The Cucamonga Wash is the body of water to the project site (refer to Exhibit 2-3). This wash is located 665 feet to the west of the project site. Once implemented, the proposed project would change the site's drainage characteristics. A majority of the project site is covered over in impervious surfaces. Currently, stormwater runoff is discharged off-site into local storm drains. Following construction, 11 percent of the site would consist of pervious surfaces. Since runoff would be contained on-site during the project's construction and occupation, no off-site erosion or flooding would occur and no mitigation measures are required.

E. *Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? ● Less than Significant Impact.*

As indicated previously, the WQMP (refer to Appendix D) recommended the inclusion of two Stormtech SC-740 stormwater chambers, grate inlet filters, and curb inlet filters.[93] The Stormtech SC-740 chambers would be installed below ground surface (BGS). These chambers consist of a polypropylene corrugated chamber (resembling a tube-like structure), filter fabric, and a stone bottom. Water accumulates within the isolator row as it simultaneously permeates through the filter fabric. Solid contaminants such as rubbish, debris, leaves, sediment, and other particles are captured from the runoff by the fabric. From there, water would percolate through the stone bottom into the ground. The project would also include grate and curb inlet filters. These filters consist of stainless steel mesh, which traps sediment and allows filtered water to be conveyed through the local storm drains. The inclusion of these BMPs would allow the project to conform to Federal, State, and local requirements governing water quality and stormwater discharge. Therefore, the project's implementation would not substantially increase the rate or amount of surface runoff; create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems; or provide additional sources of polluted runoff. As a result, the potential impacts are considered to be less than significant and no mitigation is required.

[92] Thienes Engineering, Inc. *Preliminary Water Quality Management Plan*. Plan dated January 24, 2018.

[93] Ibid.

F. Otherwise substantially degrade water quality? ● No Impact.

The proposed project is currently in compliance with Title 19, Chapter 19.20 of the City of Rancho Cucamonga Municipal Code. Title 19, Chapter 19.20 of the City of Rancho Cucamonga Municipal Code is responsible for implementing the NPDES and MS4 stormwater runoff requirements. In addition, the project's construction and operation would not interfere with any groundwater management or recharge plan. As a result, no impacts are anticipated.

G. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map? ● No Impact.

According to the Federal Emergency Management Agency (FEMA) flood insurance maps obtained for the City of Rancho Cucamonga, the proposed project site is located in Zone X.[94] This flood zone has an annual probability of flooding of less than 0.2 percent and represents areas outside the 500-year flood plain. Thus, properties located in Zone X are not located within a 100-year flood plain.[95] In addition, the project is a request to construct and operate a warehouse building and no residential development is contemplated as part of this application. As a result, no impacts with respect to the placement of housing within a 100-year flood hazard area would occur.

H. Place within a 100-year flood hazard area structures which would impede or redirect flood flows? ● No Impact.

As stated in the previous subsection, the project site is located in Zone X.[96] This flood zone has an annual probability of flooding of less than 0.2 percent and represents areas outside the 500-year flood plain. Thus, properties located in Zone X are not located within a 100-year flood plain.[97] In addition, the project is a request to construct and operate a warehouse building and no residential development is contemplated as part of this application. As a result, no impacts with respect to the placement of structures within a 100-year flood hazard area would occur.

I. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam? ● No Impact.

The project site is located outside of the Cucamonga Creek inundation area.[98] Furthermore, the project site is located outside of the Alta Loma Basin inundation area.[99] As a result, the project would not

[94] Federal Emergency Management Agency (FEMA). *FEMA Flood Map*. https://map1.msc.fema.gov/idms/IntraView.cgi?KEY=4145033&IFIT=1

[95] FEMA. *Flood Zones, Definition/Description*. http://www.fema.gov/floodplain-management/flood-zones

[96] Federal Emergency Management Agency (FEMA). *FEMA Flood Map*. https://map1.msc.fema.gov/idms/IntraView.cgi?KEY=4145033&IFIT=1

[97] FEMA. *Flood Zones, Definition/Description*. http://www.fema.gov/floodplain-management/flood-zones

[98] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Public Health and Safety Element Figure PS-6 Dam Inundation Hazards*. Plan adopted May 19, 2010.

[99] Ibid.

expose people or structures to a significant risk of loss, injury, or death as a consequence of flooding or inundation and no impacts are expected to occur.

J. Inundation by seiche, tsunami, or mudflow? ● No Impact.

The proposed project site is not located in an area that is subject to inundation by seiche or tsunami. A seiche in the Cucamonga Wash is not likely to happen due to the current level of channelization and volume of water present. In addition, the project site is located inland approximately 37 miles from the Pacific Ocean and the project site would not be exposed to the effects of a tsunami.[100] As a result, no impacts are anticipated to occur.

3.9.3 CUMULATIVE IMPACTS

Impacts related to hydrology and water quality are typically site-specific. The analysis determined that the implementation of the proposed project would not result in any impacts related to water and hydrology impacts. As a result, no cumulative impacts are anticipated.

3.9.4 MITIGATION MEASURES

The analysis indicated that the proposed project would not result in any hydrological, stormwater runoff, or water quality impacts. As a result, no mitigation is required.

3.10 LAND USE & PLANNING

3.10.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on land use and development if it would:

- Physically divide an established community;
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; or,
- Conflict with any applicable habitat conservation plan or natural community conservation plan.

[100] Google Earth. Website accessed March 19, 2018.

3.10.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Physically divide an established community? ● No Impact.

The project site is located within a largely industrial area though a residential area is located to the east of the project site. Existing uses found in the vicinity of the project site are summarized below: [101]

- *North of the project site.* 8th Street extends along the project site's northern boundary in an east to west orientation. A railroad right-of-way is located just north of 8th Street in an east to west orientation. Undeveloped open space is located further north.

- *South of the project site.* A business park abuts the project site to the south. This business park is located at the northwest corner of 7th Street and Hellman Avenue.

- *East of the project site.* Single-family dwelling units occupy frontage along the east side of Hellman Avenue, opposite the project site. Various industrial uses are located further east.

- *West of the project site.* A warehouse complex abuts the site to the west. The Cucamonga Channel extends along the west side of this warehouse complex in a northwest to southeast orientation. The Cucamonga Channel is located between 607 and 820 feet to the west of the project site.[102]

The issue is specifically concerned with the expansion of an inconsistent land use into an established neighborhood assuming that an "established community" refers to a residential neighborhood. The proposed industrial use would continue to be confined within the project site's boundaries. The nearest residential land uses are located to the east of the site on the east side of Hellman Avenue. The project's implementation would not affect these legal non-conforming residential homes. As a result, the project would not lead to any division of an existing established neighborhood and no impacts would occur.

B. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect? ● Less than Significant Impact.

The project site is currently zoned as *General Industrial (*GI) (refer to Exhibit 3-2 for the zoning map). The project site's General Plan land use designation is *General Industrial (*refer to Exhibit 3-3 for the General Plan land use map). The project would be required to undergo Design Review (DR) to ensure the project's conformity with the applicable design guidelines and development standards. No other discretionary actions are required to accommodate the proposed project. Table 3-5 depicts the proposed project's conformity with the City's GI zoning standards.

[101] Blodgett Baylosis Environmental Planning. *Field Survey*. Survey was conducted on March 30, 2018.

[102] Google Earth. Website accessed April 2, 2018.

Table 3-5
The Project Conformity with the City's Zoning Standards

Description	City Requirements	Project Element	Conforms?
Maximum Building Height	75 feet	40 feet	Yes
Maximum Lot Coverage	50 to 60%	49%	Yes
Front Yard Setback	25 feet	26 feet	Yes
Hellman Avenue Setback	25 feet	25 feet	Yes
Landscaping Required	10%	36,312 sq. ft.	Yes

Source: City of Rancho Cucamonga Municipal Code

As shown in the table, the project conforms to the City's development standards established for the GI zone. As stated previously, the project site's General Plan land use designation is *General Industrial* (GI). According to the City's General Plan, the General Industrial designation permits a wide range of industrial activities that include manufacturing, assembling, fabrication, wholesale supply, heavy commercial, green technology, and office uses. Where adjacent to residential uses, properties designated *General Industrial* should be designed for office uses, or site planning should incorporate buffering techniques to minimize noise and traffic impacts associated with the industrial activity.[103] The project site is located in an area that is predominantly industrial, though single-family residential units occupy frontage along the east side of Hellman Avenue opposite the project site. These sensitive receptors are located 119 feet to the east of the future warehouse.

The project's future tenant has not been identified. However, the tenant would likely be involved in general warehousing and distribution. The building's proposed configuration would mitigate many potentially significant impacts with respect to light and glare, air quality, and noise. As indicated in Section 2.4.1, the light standards that would be installed along the site's western and southern property lines would be shielded and directed towards the ground surface.[104] No lighting would be provided along the proposed building's east facing elevation. In addition, no lighting would be installed along the site's eastern property line. Noise emanating from the loading areas would not affect any nearby sensitive receptors due to the principles of *spreading loss*.

[103] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Land Use Element*. Plan adopted May 19, 2010.

[104] Google Earth. Website accessed April 26, 2018.

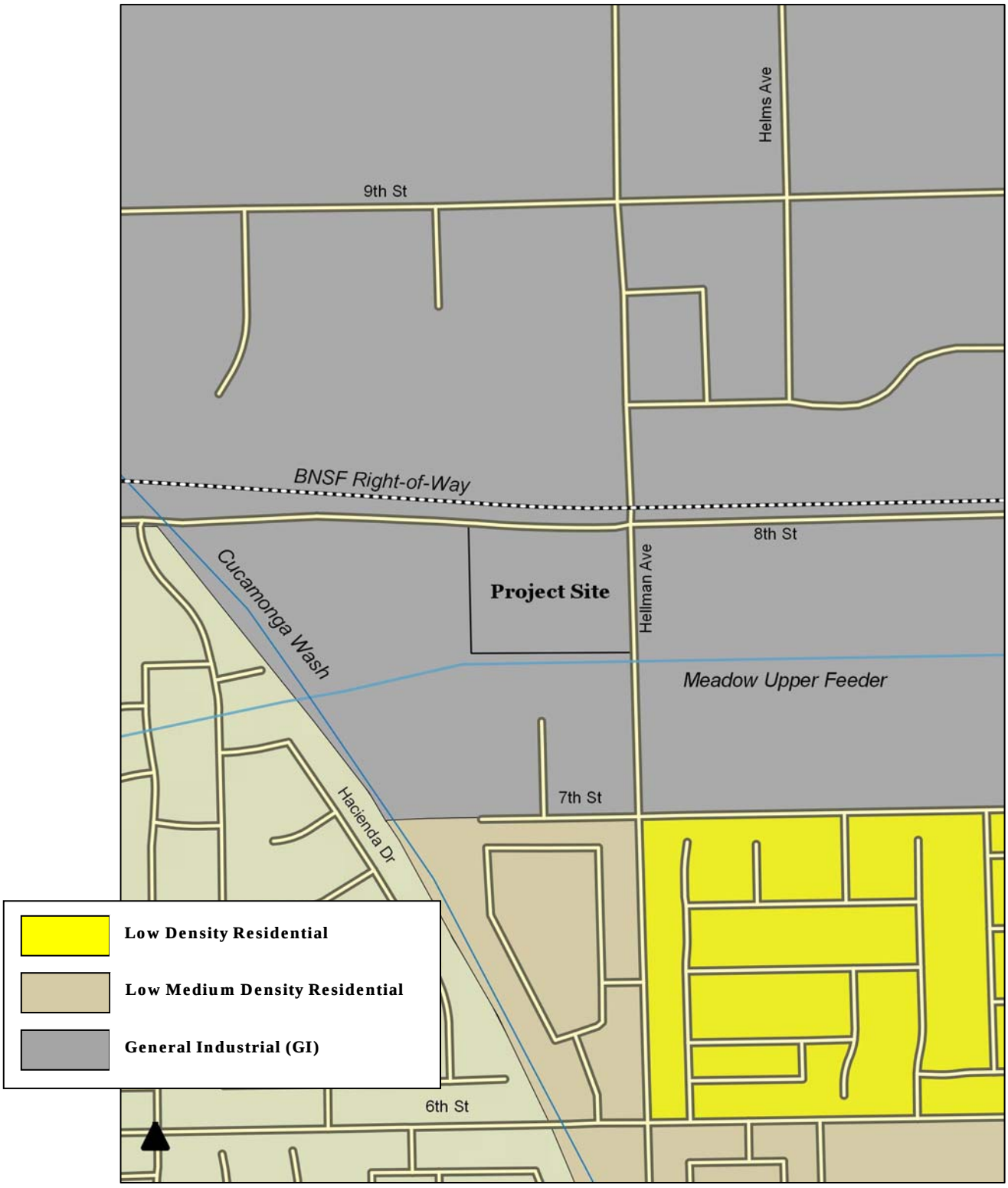


EXHIBIT 3-2
ZONING MAP
SOURCE: CITY OF RANCHO CUCAMONGA

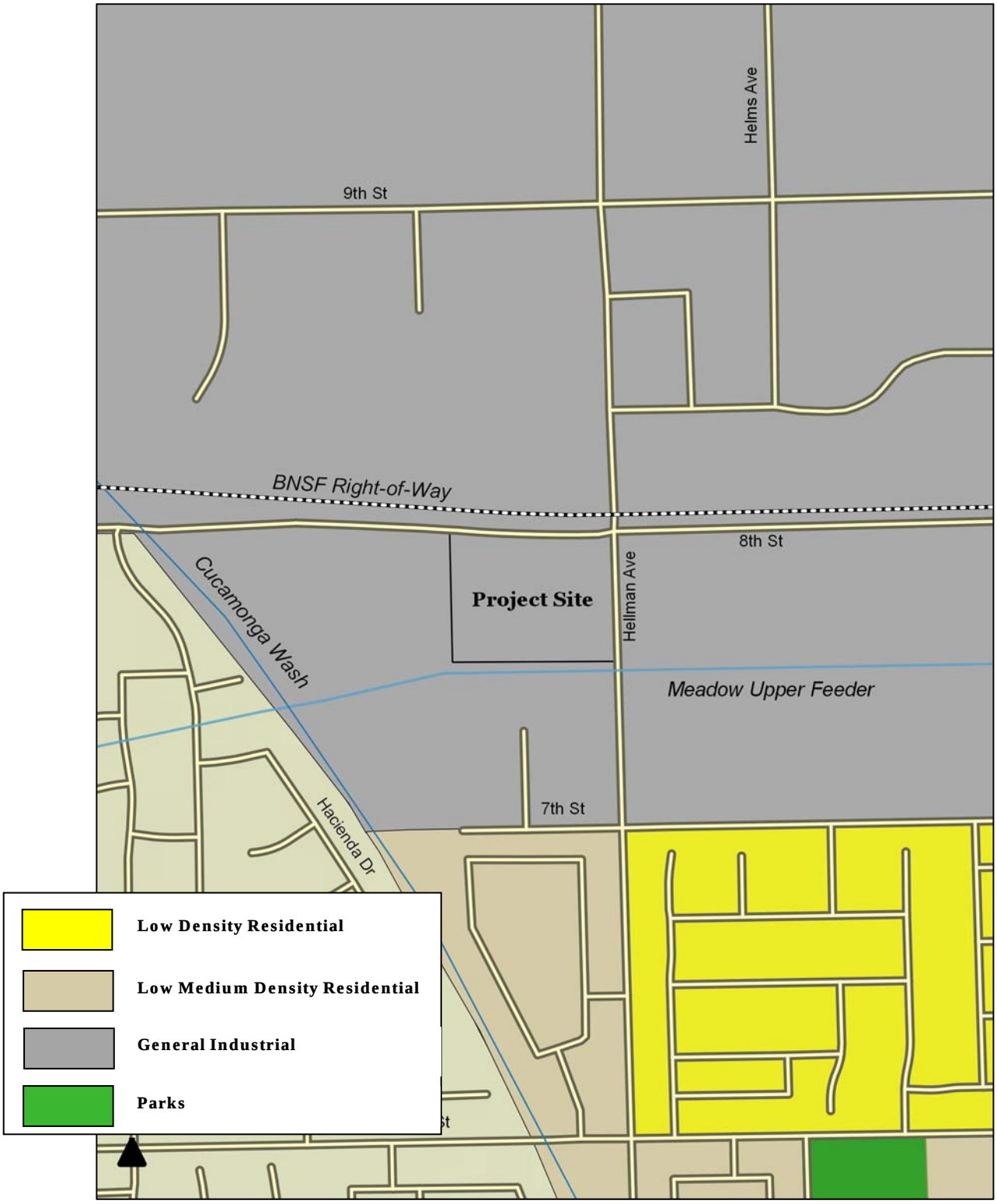


EXHIBIT 3-3
GENERAL PLAN LAND USE MAP
SOURCE: CITY OF RANCHO CUCAMONGA

Furthermore, the dock high doors would be provided along the building's south facing elevation, oriented away from the aforementioned residential. Operational noise generated from the truck loading areas would also be reduced by the warehouse building since objects located within the line-of-sight between the source and a point would lead to the attenuation of noise. The southeast portion of the building would extend 60 feet beyond the dock doors, thereby screening the loading areas from the public right-of-way. The building itself may reduce noise levels generated within the loading areas by up to 13 dBA. The same principals of spreading loss and attenuation may also apply to TACs emitted from idling trucks. Lastly, the inclusion of a landscape buffer along the site's eastern property line would further mitigate potential noise and air quality impacts. In addition, the proposed project conforms to the following General Plan policies:

- *Promote development that is sustainable in its use of land and that limits impacts to natural resources, energy, and air and water quality.* The proposed project would be constructed in accordance with Title 24 Part 11 (California Green Building Code or CalGreen) of the California Code of Regulations. The project would include drought-tolerant landscaping, energy efficient light fixtures and appliances, as well as bicycle parking. The project would also feature 135 Bristolite skylights, which would allow natural daylight to illuminate the building's interior.

- *Encourage new development projects to build on vacant infill sites within a built-out area, and/or redevelop previously developed properties that are underutilized.* The project site is currently occupied by two buildings. These two buildings were constructed in 1980 and have a maximum height of 18 feet and total 16,324 square feet of floor area. The two buildings exhibit minimal architectural features such as façade articulation, prominent entryways, and the screening of rooftop equipment. In addition, these buildings appear to be pre-fabricated and assembled on-site. The project site appears to be used for the storage and maintenance of fleet vehicles. Once complete, the project would provide up to 115 new jobs. In addition, the improvements that would be undertaken for the project site, including the erection of the new warehouse and the inclusion of upgraded infrastructure and landscaping, would improve the value of the property and may lead to an increase in property values in the vicinity of the project site.

- *Continue to require implementation of the City's Water Efficiency Ordinance, which should be reviewed and updated periodically.* The project would include drought-tolerant landscaping and water efficient fixtures.

The project site is located within the Southwest Rancho Cucamonga Focus Area. According to the Land Use Element of the City's General Plan, the Southwest Focus Area is bordered to the south by the City of Ontario and to the west by the City of Upland. The area is divided north from the south by a Metrolink rail line that runs adjacent to 8th Street. Uses in the focus area are primarily light industrial and warehousing, but planned residential neighborhoods border the area to the southwest and the northeast.[105] The Land Use Element of the City's General Plan identified three goals for this Focus

[105] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Land Use Element.* Plan adopted May 19, 2010.

Area. The goals that are identified in the Plan, as well as the project's conformity to these goals are outlined below:

- *Allowing for the development of commercial and community services needed by the adjacent residential neighborhoods.* The project does not conform to this Focus Area goal. The project is industrial in nature and is not intended to serve the nearby residential units. Nevertheless, the project is consistent with the underlying zoning and the General Plan designation for the site.

- *Implementing community design improvements and reducing truck traffic impacts on the residential neighborhoods.* Design recommendations were identified in the Traffic Impact Analysis and are reiterated as mitigation measures in Section 3.16. The implementation of these mitigation measures would improve circulation and roadway safety along 8th Street and Hellman Avenue.

- *Encouraging the re-use and rehabilitation of historic or high-quality buildings to the greatest extent possible.* The project does not conform to this Focus Area goal. The project site is presently occupied by two buildings that were erected in 1980. These two buildings are neither historic, nor aesthetically pleasing and would not be incorporated into the project's design.

As shown in Figure 17.114.010-1 of Section 17.114.010 – Special Planning Area Map in the City's Development Code, the project site is not located within any Specific Plan, Master Plan, or Planned Community overlay zone.[106] Since the project is consistent with the site's underlying zoning and General Plan land use designation, the potential impacts are considered to be less than significant.

C. Conflict with any applicable habitat conservation plan or natural community conservation plan?
● No Impact.

The proposed project would not impact an adopted or approved local, regional, or State habitat conservation plan because the proposed project is located in the midst of an urban area. The project site is located outside of any open space and/or conservation areas identified in the City's General Plan.[107] Therefore, no impacts would occur.

3.10.3 CUMULATIVE IMPACTS

Typically, land use and planning impacts are considered to be site-specific. The analysis determined that the proposed project would not result in any significant land use impacts. As a result, no cumulative land use impacts would occur as part of the proposed project's implementation

[106] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Land Use Element*. Plan adopted May 19, 2010.

[107] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Resource Conservation Element Figure RC-1 Open Space and Conservation Plan*. Plan adopted May 19, 2010.

3.10.4 MITIGATION MEASURES

The analysis determined that no significant impacts on land use and planning would result from the implementation of the proposed project. As a result, no mitigation measures are required.

3.11 MINERAL RESOURCES

3.11.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant adverse impact on energy and mineral resources if it would:

- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or,

- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

3.11.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State? ● No Impact.

The project site is not located in a Significant Mineral Aggregate Resource Area (SMARA) nor is it located in an area with active mineral extraction activities. A review of California Division of Oil, Gas, and Geothermal Resources well finder indicates that there are no wells located in the vicinity of the project site.[108] In addition, according to SMARA, study area maps prepared by the California Geological Survey, the project site is located within Mineral Resources Zone (MRZ) 2.[109] Areas located within MRZ 2 may contain significant mineral deposits and are often concentrated along creeks and washes.[110]

The site is 100 percent developed and is currently being used as a maintenance and fleet vehicle storage yard by Frontier Communications. There are no active mineral extraction activities occurring on-site or in the adjacent properties. As a result, no impacts to mineral resources would occur.

[108] California, State of. Department of Conservation. *California Oil, Gas, and Geothermal Resources Well Finder. https://maps.conservation.ca.gov/doggr/wellfinder/#close*

[109] BonTerra Consulting. *Rancho Cucamonga General Plan Update Draft Environmental Impact Report– Exhibit 4.11-1 Mineral Land Classification.* Report dated February 16, 2010.

[110] Ibid.

B. Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan? ● No Impact.

As previously mentioned, no mineral, oil, or energy extraction and/or generation activities are located within the project site. Moreover, the proposed project would not interfere with any resource extraction activity. Therefore, no impacts would result from the implementation of the proposed project.

3.11.3 CUMULATIVE IMPACTS

The potential impacts on mineral resources are site-specific. Furthermore, the analysis determined that the proposed project would not result in any impacts on mineral resources. As a result, no cumulative impacts would occur.

3.11.4 MITIGATION MEASURES

The analysis of potential impacts related to mineral resources indicated that no impacts would result from the proposed project's approval and subsequent implementation. As a result, no mitigation measures are required.

3.12 NOISE

3.12.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on the environment if it would:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- A substantial permanent increase in ambient noise levels in the vicinity of the project above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels; or,

- For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels.

3.12.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? ● Less than Significant Impact.

The most commonly used unit for measuring the level of sound is the decibel (dB). Zero on the decibel scale represents the lowest limit of sound that can be heard by humans. The eardrum may rupture at 140 dB. In general, an increase of between 3.0 dB and 5.0 dB in the ambient noise level is considered to represent the threshold for human sensitivity. In other words, increases in ambient noise levels of 3.0 dB or less are not generally perceptible to persons with average hearing abilities.[111] Noise levels that are associated with common, everyday activities are illustrated in Exhibit 3-4.

Noise levels may also be expressed as dBA where an "A" weighting has been incorporated into the measurement metric to account for increased human sensitivity to noise. The A-weighted measurements correlate well with the perceived nose levels at lower frequencies. Noise may be generated from a point source, such as a piece of construction equipment, or from a line source, such as a road containing moving vehicles. Because the area of the sound wave increases as the sound gets further and further from the source, less energy strikes any given point over the surface area of the wave. This phenomenon is known as *spreading loss*. Due to spreading loss, noise decreases with distance. The ambient noise environment along Hellman Avenue and 8th Street are dominated by noise emanating from vehicles traveling down the street.

An *Extec* Digital Sound Meter was used to conduct the noise measurements. A series of 100 discrete noise measurements were recorded along the west side of Hellman Avenue (these noise measurements are provided in Appendix E). The measurements were taken Friday morning March 30, 2018 at 9:45 AM. Table 3-6 indicates the variation in noise levels over time during the measurement period. As indicated previously, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time the noise level is less than this level. The average noise levels during the measurement period were 55.6 dBA.

[111] Bugliarello, et. al., *The Impact of Noise Pollution,* Chapter 127, 1975.

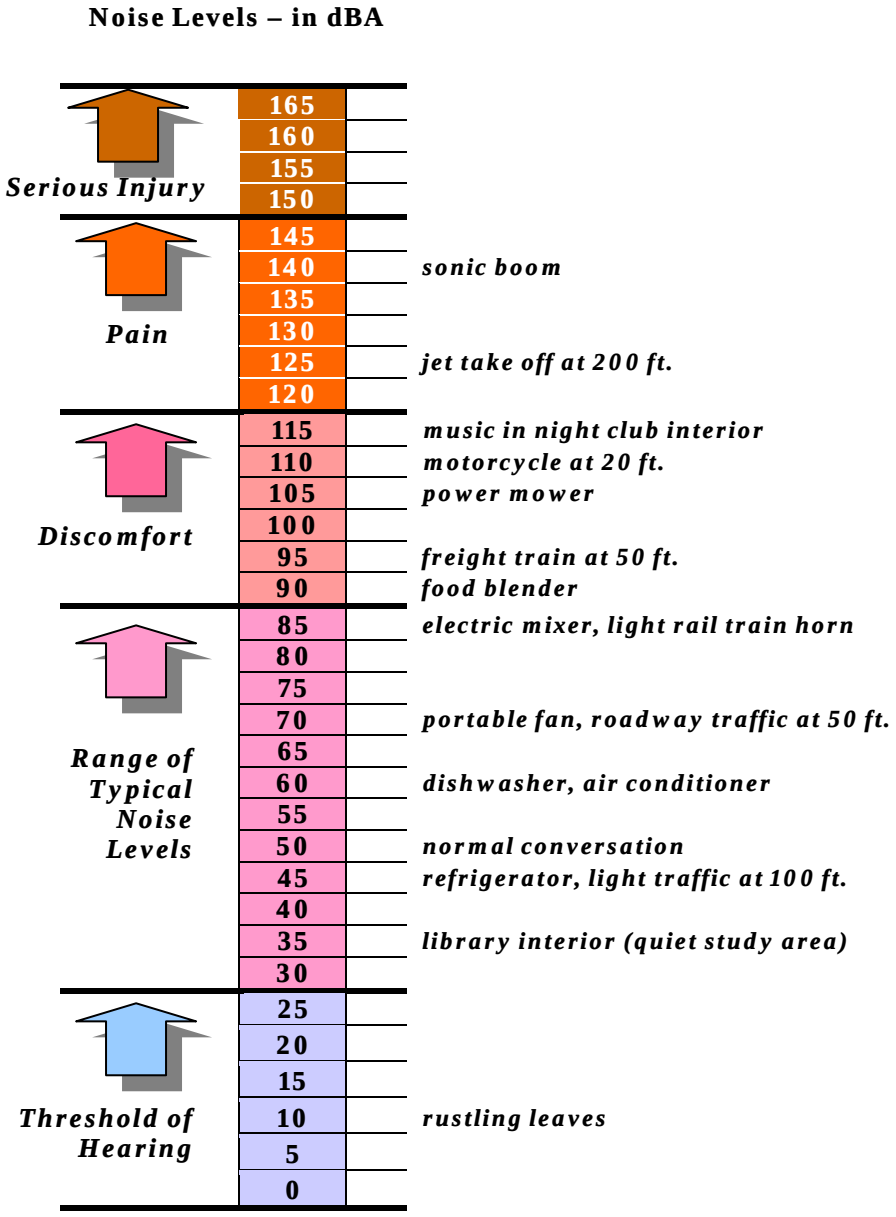


EXHIBIT 3-4
TYPICAL NOISE SOURCES AND LOUDNESS SCALE
Source: Blodgett Baylosis Environmental Planning

Table 3-6
Noise Measurement Results

Noise Metric	Noise Level (dBA) along the West Side of Hellman Avenue
L_{max} (Maximum Noise Level)	76.9 dBA
L^{99} (Noise levels <99% of time)	76.8 dBA
L^{90} (Noise levels <90% of time)	63.3 dBA
L^{75} (Noise levels <75% of time)	56.7 dBA
L^{50} (Noise levels <50% of time)	54.0 dBA
L_{min} (Minimum Noise Level)	48.3 dBA
Average Noise Level	55.6 dBA

Source: Blodgett Baylosis Environmental Planning.
Measurements were taken in April 2018

As indicated in Table 3-7, the ambient noise environment along Hellman Avenue is typical for a roadway located within a residential neighborhood. Ambient noise levels would spike over 70 dBA following the passage of a truck.

Future sources of noise generated on-site would include noise from vehicles traveling to and from the project and noise emanating from back-up alarms, roll-up doors, forklifts, and other equipment. Noise generated within the parking lot would include people shouting/laughing, which averages 64.5 dBA; car door slamming, which averages 62.5 dBA; car idling, which averages 61 dBA; car starting, which averages 59.5 dBA; and people talking, which averages 41 dBA. All of these averages were taken at a distance of 50 feet from the source. This information is based on actual parking lot noise measurements taken by Blodgett Baylosis Environmental Planning.

The operation of the proposed project would not expose future employees to excessive noise levels because the project is not considered to be a noise sensitive land use. As stated above, the average ambient noise level recorded along Hellman Avenue was 55.6 dBA. These noise levels would decrease as the distance from Hellman Avenue increases. The proposed warehouse would be setback 24 feet from Hellman Avenue. In addition, much of the daily operations would occur within the warehouse buildings or within the loading areas located along the south side of the warehouse. The City of Rancho Cucamonga Municipal Code has established performance standards for industrial uses. According to the Municipal Code, the maximum permitted noise level anywhere on the project site is 80 dBA.[112] Additionally, the California Occupational Noise Control Standards contained in the California Code of Regulations, Title 8, Industrial Relations, Chapter 4, outline permissible noise exposure at a workplace which include a maximum noise exposure level of 90 dBA for more than eight hours in any workday. Finally, future tenants must comply with all Occupation Health and Safety Administration (OSHA) requirements regarding noise control. Adherence to the above-mentioned operational regulations would protect employees from excessive noise levels.

[112] Rancho Cucamonga Municipal Code. *Table 17.66.110-1 Industrial Performance Standards*. Site accessed April 26, 2018.

Noise emanating from the project site would not affect any nearby sensitive receptors due to the principles of *spreading loss*. The closest sensitive receptors are located along the east side of Hellman Avenue, 119 feet to the east of the future warehouse.[113] This distance includes the 24 foot setback that would be provided along the project site's eastern property line. In addition, the project's loading areas and dock high doors would be located 125 feet west of the site's eastern boundary. Overall, the project's loading areas and truck doors would be located 244 feet west of the above-mentioned residential. The distance between the project's loading areas and truck doors would naturally aid the reduction of noise levels since noise levels decrease with distance. Therefore, operational noise is expected to decrease by 15 dBA based on the principles of spreading loss.

Furthermore, the dock high doors would be provided along the building's south facing elevation, oriented away from the aforementioned residential. Operational noise generated from the truck loading areas would also be reduced by the warehouse building since objects located within the line-of-sight between the source and a point would lead to the attenuation of noise. The southeast portion of the building would extend 60 feet beyond the dock doors, thereby screening the loading areas from the public right-of-way. The building itself may reduce noise levels generated within the loading areas by up to 13 dBA.[114] As a result, the proposed project would not expose sensitive receptors and employees to excessive noise levels due to the two factors described above and the impacts are anticipated to be less than significant.

B. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels? ● Less than Significant Impact with Mitigation.

The construction of the proposed project would result in the generation of vibration and noise, though the vibrations and noise generated during the project's construction would not adversely impact the nearby residential sensitive receptors. The background vibration velocity level in residential areas is usually around 50 vibration velocity level (VdB). The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity of 75 VdB is the approximately dividing line between barely perceptible and distinctly perceptible levels for many people. Sources within buildings such as operation of mechanical equipment, movement of people, or the slamming of doors causes most perceptible indoor vibration. Construction activities may result in varying degrees of ground vibration, depending on the types of equipment, the characteristics of the soil, and the age and construction of nearby buildings. The operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance.

Buildings located in the vicinity of the construction site respond to these vibrations with varying results ranging from no perceptible effects, low rumbling sounds and discernible vibrations at moderate levels, and actual building damage at the highest levels. Ground vibrations associated with construction activities using modern construction methods and equipment rarely reach the levels that result in damage to nearby buildings though vibration related to construction activities may be discernible in

[113] Google Earth. Website accessed April 26, 2018.

[114] Based on our experiences collecting noise measurements from areas that are located within the line-of site of a noise source and from areas whose line-of-sight with a noise source is obstructed by an existing building. The difference between the readings from the two different locations (taken within the same site or area) is calculated.

areas located near the construction site. A possible exception is in older buildings where special care must be taken to avoid damage.

Table 3-7 summarizes the levels of vibration and the usual effect on people and buildings. The U.S. Department of Transportation (U.S. DOT) has guidelines for vibration levels from construction related to their activities, and recommends that the maximum peak-particle-velocity (PPV) levels remain below 0.05 inches per second at the nearest structures. PPV refers to the movement within the ground of molecular particles and not surface movement. Vibration levels above 0.5 inches per second have the potential to cause architectural damage to normal dwellings. The U.S. DOT also states that vibration levels above 0.015 inches per second (in/sec) are sometimes perceptible to people, and the level at which vibration becomes an irritation to people is 0.64 inches per second.

Table 3-7
Common Effects of Construction Vibration

Peak Particle Velocity (in/sec)	Effects on Humans	Effects on Buildings
<0.005	Imperceptible	No effect on buildings
0.005 to 0.015	Barely perceptible	No effect on buildings
0.02 to 0.05	Level at which continuous vibrations begin to annoy occupants of nearby buildings	No effect on buildings
0.1 to 0.5	Vibrations considered unacceptable for persons exposed to continuous or long-term vibration.	Minimal potential for damage to weak or sensitive structures
0.5 to 1.0	Vibrations considered bothersome by most people, however tolerable if short-term in length	Threshold at which there is a risk of architectural damage to buildings with plastered ceilings and walls. Some risk to ancient monuments and ruins.
>3.0	Vibration is unpleasant	Potential for architectural damage and possible minor structural damage

Source: U.S. Department of Transportation

Typical levels from vibration generally do not have the potential for any structural damage. Some construction activities, such as pile driving and blasting, can produce vibration levels that may have the potential to damage some vibration sensitive structures if performed within 50 to 100 feet of the structure. The reason that normal construction vibration does not result in structural damage has to do with several issues, including the frequency vibration and magnitude of construction related vibration. Unlike earthquakes, which produce vibration at very low frequencies and have a high potential for structural damage, most construction vibration is in the mid- to upper- frequency range, and therefore has a lower potential for structural damage. Approximately 17,233 cubic yards of cut and fill would be required to accommodate the new warehouse. This process will involve the use of excavators to remove the underlying fill; loaders to load asphalt, rocks, demolition debris, and dirt onto haul trucks; and of haul trucks to transport construction and demolition waste. The removal of 17,233 cubic yards of fill would require an estimated 861 haul trucks assuming a tandem haul truck has a capacity of 20 cubic yards. The project's implementation would not require deep foundations since the underlying fill soils

would be removed and the proposed warehouse would have a maximum height of 40 feet. The warehouse would be constructed over a shallow foundation that would extend no more than three to four feet bgs. The use of shallow foundations precludes the use of pile drivers or any auger type equipment. However, other vibration generating equipment would be used on-site during construction. As stated above, the project would require the use of excavators, loaders, bulldozers, and haul trucks.

Various types of construction equipment have been measured under a wide variety of construction activities with an average of source levels reported in terms of velocity levels as shown in Table 3-8. Although the table gives one level for each piece of equipment, it should be noted that there is a considerable variation in reported ground vibration levels from construction activities. The data in Table 3-7 does provide a reasonable estimate for a wide range of soil conditions. Based on Transit Noise and Vibration Impact Assessment (FTA, May 2006), a vibration level of 102 VdB (vibration decibels, or 0.5 inches per second [in/sec]) (FTA, May 2006) is considered safe and would not result in any construction vibration damage.

Table 3-8
Vibration Source Levels for Typical Construction Equipment

Construction Equipment		PPV @25 ft. (inches/sec.)	Vibration (VdB) @ 25 ft.
Pile Driver (impact)	Upper range	1.58	112
	Typical	0.644	104
Pile Drive (Sonic)	Upper range	0.734	105
	Typical	0.170	93
Clam Shovel Drop		0.202	94
Large Bulldozer		0.089	87
Caisson Drilling		0.089	87
Loaded Trucks		0.076	86
Small Bulldozer		0.035	79

Source: Noise and Vibration During Construction

Vibration resulting from the operation of empty haul trucks may affect the residents located east of the project site. Strict adherence to the mitigation described later in this subsection would reduce the number of units and residents potentially affected by ground-borne vibration generated by empty haul trucks. As indicated previously, the project site is located 55 feet from the nearest residential property lines. The project site's eastern boundary is located 95 feet from the nearest unit. The construction of the warehouse will take place 119 feet to the west of the aforementioned sensitive receptors (this includes the 24-foot wide set back). Meanwhile, the demolition of the two existing buildings will occur 110 feet from the nearby residential units. The distance from construction activity and the nearby

sensitive receptors will attenuate vibrations caused by the construction equipment. Furthermore, the mitigation provided below will ensure that no residential units would be exposed to vibrations resulting from empty haul trucks:

> *Mitigation Measure No. 5 (Noise*). Haul trucks will be prohibited from travelling to the site using Hellman Avenue. All haul trucks must access the site from 8th Street.

Adherence to the above-mentioned mitigation will reduce potential vibration impacts to levels that are less than significant. Once operational, the proposed project will not generate excessive ground-borne noise because the project will not require the use of equipment capable of creating ground-borne noise. The project will be required to adhere to all pertinent City noise control regulations. In addition, the cumulative traffic associated with the proposed project will not be great enough to result in a measurable or perceptible increase in traffic noise (it typically requires a doubling of traffic volumes to increase the ambient noise levels to 3.0 dBA or greater).

C. *A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? ● Less than Significant Impact.*

A traffic noise prediction model was operated for the nearest segment of Hellman Avenue to determine the projected noise exposure levels from traffic noise. The worksheets for this model are shown in Appendix E. The noise prediction model utilizes a number of independent variables to predict LDN (the average 24-hour day and nighttime noise level), including existing traffic volumes, nature of the ground surface (defined as hardscape or softscape), roadway grade, and the receptor distance from the roadway centerline. The traffic noise levels are depicted using noise "contours" that define the traffic noise levels within the contour. The LDN for the existing conditions was calculated using the existing traffic volumes presented in the traffic analysis. According to the model, the existing LDN along Hellman Avenue is 70 dBA. When adding the daily trips from the proposed project, the LDN for Savanna Street will remain unchanged (70 dBA). The overall increase in ambient noise level would not be readily apparent to an individual with normal hearing. This typically requires a doubling of traffic volumes to generate a change in ambient noise volumes of between 3.0 and 5.0 dBA. Therefore, the traffic noise impacts resulting from the proposed project's occupancy are deemed to be less than significant.

D. *A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? ● Less than Significant Impact with Mitigation*

Noise levels associated with various types of construction equipment are summarized in Exhibit 3-5. The noise levels are those that would be expected at a distance of 50 feet from the noise source. Composite construction noise is best characterized in a study prepared by Bolt, Beranek, and Newman. In the study, the noisiest phases of construction are anticipated to be 89 dBA as measured at a distance of 50 feet from the construction activity. As indicated previously, the nearest noise sensitive receptors are the residential units located along the east side of Hellman Avenue, opposite the project site. Therefore, the highest noise level to reach the residential neighborhood to the east is approximately 77 dBA. Construction activities will be in compliance with City noise standards, which are provided in

Title 17, Article 4, Chapter 17.66, Section 17.66.050 of the City's Municipal Code. According to Section 17.66.050.D.4,

> a. *When adjacent to a residential land use, school, church or similar type of use, the noise generating activity does not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a national holiday, and provided noise levels created do not exceed the noise standard of 65 dBA when measured at the adjacent property line.*

The abovementioned provision related to construction will apply to the proposed project. In addition, mitigation measures are required which will further reduce construction noise:

> *Mitigation Measure No. 6 (Noise*). The Applicant must ensure that the contractors use construction equipment that includes working mufflers and other sound suppression equipment as a means to reduce machinery noise.
>
> *Mitigation Measure No. 7 (Noise*). The Applicant must notify residents along Hellman Avenue opposite the project site regarding construction times and local contact information. The notice shall include the name and phone number of the local contact person residents may call to complain about noise. This notice must also be placed along the project site's eastern and northern boundaries. Upon receipt of a complaint, the contractor must respond immediately by reducing noise to meet Code requirements. In addition, copies of all complaints and subsequent communication between the affected residents and contractors must be forwarded to the City's Community Development Director.

E. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? ● No Impact.

The project site is not located within two miles of a public use airport. Ontario Airport is located 2.29 miles south of the project site.[115] The project site is not located within the Runway Protection Zone (RPZ) of the aforementioned airport.[116] Furthermore, the project site is not located within any 60 Community Noise Equivalent Level (CNEL) contour line boundaries. As a result, the proposed project will not present a safety or noise hazard related to aircraft or airport operations at a public use airport to people residing or working in the project area and no impacts would occur.

[115] Google Earth. Site accessed April 16, 2018.

[116] The Ontario Plan. *Map 2-2, Compatibility Policy Map: Safety Zones.* http://www.ontarioplan.org/wp-content/uploads/sites/4/2015/05/policy-map-2-2.pdf

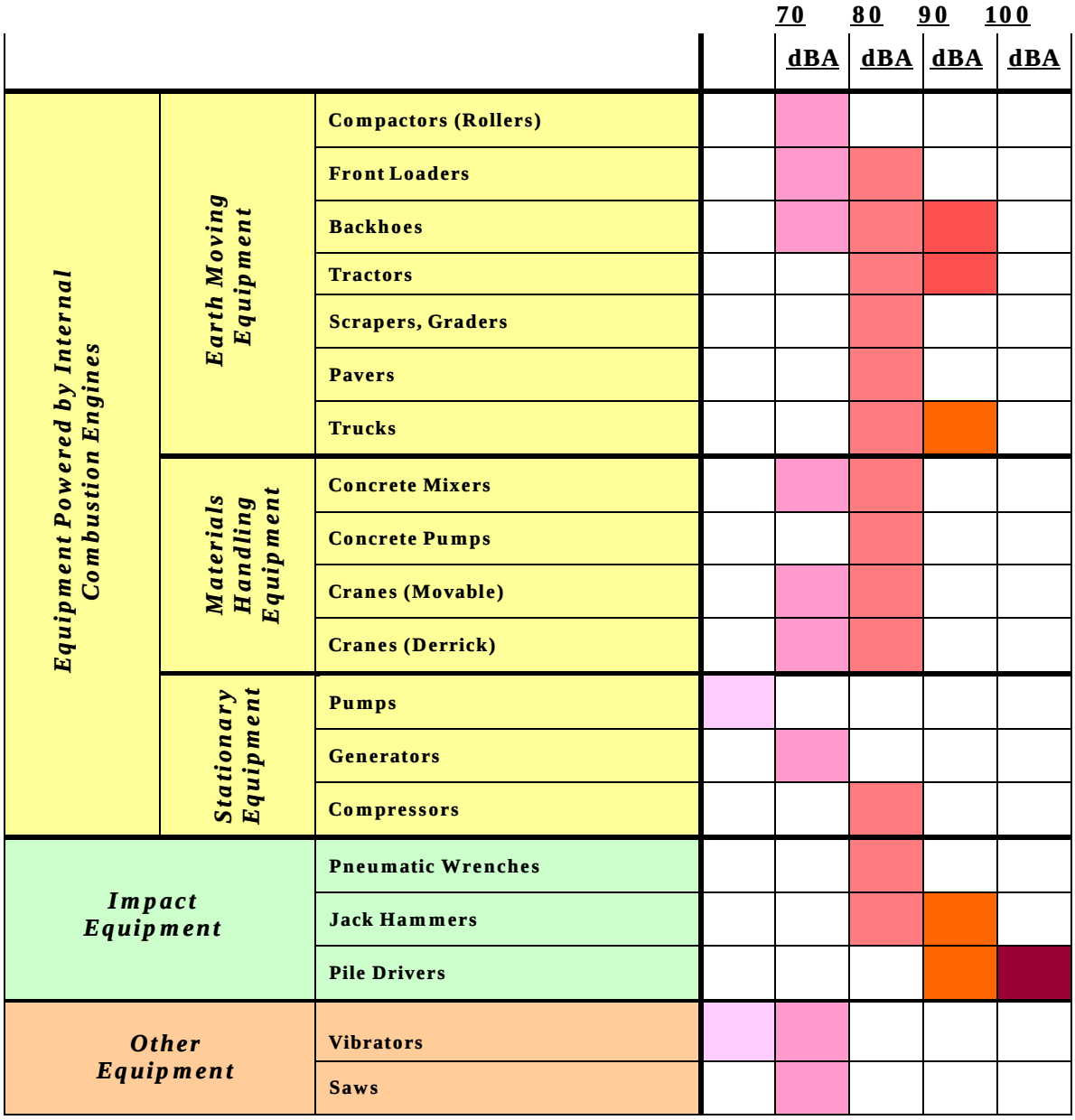


EXHIBIT 3-5
TYPICAL CONSTRUCTION NOISE LEVELS
Source: Blodgett Baylosis Environmental Planning

F. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? ● No Impact.

The project site is not located within two miles of a private airstrip.[117] As a result, no impacts are associated with the proposed project's implementation.

3.12.3 CUMULATIVE IMPACTS

The number of trips that will be added to the adjacent roadways by the proposed project as well as by the related projects will not result in a doubling of traffic volumes. In addition, the related projects are not located in the immediate vicinity of the proposed project. The separation of the four projects will eliminate the concentration of noise generating activities that would result in an increase in cumulative noise levels.

3.12.4 MITIGATION MEASURES

The proposed project will require the following mitigation measures:

Mitigation Measure No. 5 (Noise). Haul trucks will be prohibited from travelling to the site using Hellman Avenue. All haul trucks must access the site from 8th Street.

Mitigation Measure No. 6 (Noise). The Applicant must ensure that the contractors use construction equipment that includes working mufflers and other sound suppression equipment as a means to reduce machinery noise.

Mitigation Measure No. 7 (Noise). The Applicant must notify residents along Hellman Avenue opposite the project site regarding construction times and local contact information. The notice shall include the name and phone number of the local contact person residents may call to complain about noise. This notice must also be placed along the project site's eastern and northern boundaries. Upon receipt of a complaint, the contractor must respond immediately by reducing noise to meet Code requirements. In addition, copies of all complaints and subsequent communication between the affected residents and contractors must be forwarded to the City's Community Development Director.

3.13 POPULATION & HOUSING

3.13.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on housing and population if it would:

[117] Google Earth. Site accessed October 22, 2018.

- Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure);

- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere; or,

- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

3.13.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? ● No Impact.

The proposed project is an infill development that will utilize existing roadways and infrastructure. The new utility lines that will be provided will not extend into undeveloped areas and will not result in unplanned growth. According to the Growth Forecast Appendix prepared by SCAG for the 2016-2040 RTP/SCS, the City of Rancho Cucamonga is projected to add a total of 34,700 new jobs through the year 2040.[118] The proposed project is anticipated to add up to 115 new jobs based on a ratio of one employee per 1,518 square feet of floor area.[119] The project will not lead to any direct increase in the City's population since no housing units are proposed. In addition, the project will not lead to any indirect increase in the City's population since the proposed project is an infill development that will utilize the existing roadways. Furthermore, the new infrastructure that will be provided (storm drains and stormwater appurtenances) will not extend into undeveloped areas and will not expand services into areas that have not been previously served. These new utilities will not result in unplanned growth since they will only serve the project site. As a result, no impacts would occur.

B. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere? ● No Impact.

No housing units will be displaced as a result of the proposed project's implementation. The site is occupied by Frontier Communications and is currently being used as a storage and maintenance yard. Therefore, no impacts would result.

C. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? ● No Impact.

As indicated in the previous section (Section 3.13.B), there are no dwelling units located on, or persons residing within, the boundaries of project site. In addition, there are no homes that would be

[118] Southern California Association of Governments. *Regional Transportation Plan/Sustainable Communities Strategy 2016-2040. Demographics & Growth Forecast.* April 2016.

[119] The Natelson Company, Inc. *Employment Density Study Summary Report.* October 31, 2001.

dislocated as part of the proposed project's implementation. Since no housing units or persons would be dislocated as part of the proposed project's implementation, no impacts would occur.

3.13.3 CUMULATIVE IMPACTS

According to the City, there are 18 related projects located within the Traffic Impact Analysis' study area. These are cumulative projects that were analyzed in the Traffic Impact Analysis that is provided in Appendix F. However, there are three related projects located within one mile of the project site. These three related projects are as follows: Crestwood Homes, 31 single-family units; three retail buildings; and the Vintner, which includes 182 single-family units and 7,615 square feet of retail. According to the Growth Forecast Appendix prepared by SCAG for the 2016-2040 RTP/SCS, the City of Rancho Cucamonga is projected to add a total of 7,400 new jobs through the year 2040. In addition, the City's population is expected to grow by 5,100 new residents.[120] The number of jobs and new residents that will be created by the project and related projects has been accounted for by the SCAG. These projects will utilize existing infrastructure including sewer and water lines, roadways, and storm drains. In addition, there will be no citywide loss in housing. As a result, no cumulative impacts will occur.

3.13.4 MITIGATION MEASURES

The analysis of potential population and housing impacts indicated that no significant impacts would result from the proposed project's approval and subsequent implementation. As a result, no mitigation is required.

3.14 PUBLIC SERVICES

3.14.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on public services if it:

- Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for *fire protection services*;

- Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for *police protection services*;

[120] Southern California Association of Governments. *Demographics & Growth Forecast. Regional Transportation Plan 2016-2040.* April 2016.

- Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for *school services*;

- Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for *parks;* or,

- Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for *other government services.*

3.14.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for* fire protection services*? ● Less than Significant Impact.*

The City of Rancho Cucamonga Fire District provides fire prevention and emergency medical services within the City. Over 120 full- and part-time Fire District employees serve nearly 170,000 residents in a 50 square-mile area. The District provides wildland fire protection, emergency medical services (EMS), hazardous materials response, and technical rescue. The Fire Department operates from seven stations, though the closest first response station to the project site is the San Bernardino Road located 1.25 miles to the northeast along the north side of San Bernardino Road.[121] The Fire Department currently reviews all new development plans, and future development will be required to conform to all fire protection and prevention requirements, including, but not limited to, building setbacks, emergency access, and fire flow (or the flow rate of water that is available for extinguishing fires). The project Applicant must be able to demonstrate sufficient fire flow. The proposed project would only place an incremental demand on fire services since the project will be constructed with strict adherence to all pertinent building and fire codes. In addition, the project's implementation will not affect response times or department capacity.[122] As a result, the potential impacts are considered to be less than significant.

[121] Google Earth. Website accessed April 19, 2018.

[122] Phone call conversation with Mr. Rob Ball, Fire Marshall of the Rancho Cucamonga Fire District. Phone call occurred on October 25, 2018.

B. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for police protection*? ● Less than Significant Impact.*

The City of Rancho Cucamonga contracts its services with the San Bernardino County Sheriff's Department. The Sheriff's Department provides a full range of specialty and support services that would not be available in small municipal police departments, including: homicide investigations, helicopter patrol, narcotics investigations, Special Enforcement Team (SWAT), media relations, crime lab services, and bomb and arson teams, among others. The San Bernardino County Sheriff's Department operates the Police Department and provides response services, criminal investigation services, traffic enforcement, and preventive patrol with the main police facility located at the City's Civic Center. There is also a sub-station located within the Victoria Gardens Shopping Center and one satellite office located at Vineyard Avenue and Base Line Road.[123] The closest first response station to the project site is the police station located within the City's Civic Center. The station is located 1.78 miles to the northeast of the project site.

The proposed project would only place an incremental demand on police protection services since the project is not anticipated to be an attractor for crime due to the lack of unsecure open space. The Sheriff's Department will review the site plan for the proposed project to ensure that the development adheres to the Department requirements. Specifically, all security gates, monitoring systems, alarms, and walls will be under department review. Adherence to the abovementioned requirement will reduce potential impacts to levels that are less than significant.

C. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for school services*? ● Less than Significant Impact.*

Due to the nature of the proposed project (warehousing), no direct school enrollment impacts affecting school services will occur. The proposed project will not directly increase demand for school services. Any potential population growth that would lead to an increase in demand for school services will be indirect and would result from permanent employment growth. As a result, less than significant school-related impacts are anticipated to occur.

[123] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Public Health and Safety Element*. Plan adopted May 19, 2010.

D. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for parks? ● No Impact.

The proposed project will not result in a direct demand for park facilities since the project is industrial. As a result, no changes in the demand for local parks and recreation facilities are anticipated and no impacts are anticipated.

E. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for other governmental services*? ● Less than Significant Impact.*

No new governmental services will be needed, and the proposed project is not expected to have any impact on existing governmental services. The proposed project will not directly increase demand for governmental services. As a result, less than significant impacts are anticipated.

3.14.3 CUMULATIVE IMPACTS

According to the City, there are 18 related projects located within the Traffic Impact Analysis' study area. However, there are three related projects located within one mile of the project site. These three related projects are as follows: Crestwood Homes, 31 single-family units; three retail buildings; and the Vintner, which includes 182 single-family units and 7,615 square feet of retail. The four related projects as well as the proposed project will lead to an increase in demand for police and fire services. This increase in demand may significantly impact both departments; however, the payment of development fees will ensure both departments have adequate resources to accommodate the additional demand. As a result, no cumulative impacts are anticipated.

3.14.4 MITIGATION MEASURES

The analysis determined that the proposed project would not result in any significant impact on public services. As a result, no mitigation is required.

3.15 RECREATION

3.15.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant impact on the environment if it:

- Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or,

- Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

3.15.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? ● No Impact.

The City of Rancho Cucamonga Community Services Department operates 31 parks, six community centers, one equestrian facility, and the Epicenter and Adult Sports Complex.[124] Due to the nature of the proposed project, no increase in the usage of City parks and recreational facilities is anticipated to occur. The closest park to the project site is Golden Oak Park, located 0.43 mile to the southeast of the project site. The proposed warehouse development will be constructed within the confines of the project site and the proposed project will not physically impact the aforementioned park. Since the project will not result in an increase in demand for parks and recreational services, no impacts will occur.

B. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? ● No Impact.

The proposed project will not result in a direct demand for park facilities. As a result, no changes in the demand for local parks and recreation facilities are anticipated and no impacts are anticipated.

3.15.3 CUMULATIVE IMPACTS

According to the City, there are 18 related projects located within the Traffic Impact Analysis' study area. However, there are three related projects located within one mile of the project site. These three related projects are as follows: Crestwood Homes, 31 single-family units; three retail buildings; and the Vintner, which includes 182 single-family units and 7,615 square feet of retail. Only one of the three related projects as well as the project itself will not have an impact on parks and recreational services. The remaining two related projects include a residential component. These projects may lead to an increase in demand for parks and community services. However, the payment of all pertinent park development or Quimby act fees will reduce potential cumulative impacts to levels that are less than significant.

[124] City of Rancho Cucamonga Community Services Department. *Interactive Parks and Facilities Map*. https://www.cityofrc.us/cityhall/cs/parks/map.asp

3.15.4 MITIGATION MEASURES

The analysis determined that the proposed project would not result in any significant impact on recreational facilities and services. As a result, no mitigation is required.

3.16 TRANSPORTATION/TRAFFIC

3.16.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project will normally have a significant impact on traffic and circulation if it would:

- Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;

- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;

- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in the location that results in substantial safety risks;

- Substantially increases hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);

- Result in inadequate emergency access; or,

- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

3.16.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A Traffic Impact Analysis was prepared for the Applicant by Kunzman Associates, Inc. This report is presented in Appendix F. The purpose of this focused traffic analysis is to provide an assessment of the traffic impacts resulting from the development of the proposed 8th Street and Hellman Avenue warehousing project and to identify the traffic mitigation measures necessary to maintain the established Level of Service standard for the elements of the impacted roadway system. The traffic issues related to the proposed land use and development have been evaluated in the context of the California Environmental Quality Act (CEQA).

The City of Rancho Cucamonga is the lead agency responsible for preparation of the focused traffic analysis, in accordance with California Environmental Quality Act authorizing legislation. This report analyzes traffic impacts for the anticipated opening date with occupancy of the development in Opening Year (2020), at which time it will be generating trips at its full potential. This report also analyzes potential project traffic impacts for Horizon Year (2040) traffic conditions. The following analysis years are considered in this report:[125]

- Existing (2018) Traffic Conditions;
- Existing Plus Project Traffic Conditions;
- Opening Year (2020) Without and With Project Traffic Conditions; and,
- Horizon Year (2040) Without and With Project Traffic Conditions.

This study has been prepared in accordance with the guidelines contained in the San Bernardino County Congestion Management Program (2016 Update), including input parameters for Highway Capacity Manual calculations, saturation flow rates, and study intersections. Identification of the study area was based on the forecast contribution of peak hour project generated trips on the roadway segments near the project site. Based on the guidelines for preparation of a Traffic Impact Analysis, arterial facilities are required to be included in the analysis when the anticipated project trip contribution equals or exceeds 50 two-way trips during the peak hours; freeway segments are required to be included when the anticipated project trip contribution equals or exceeds 100 two-way peak hour trips. No analysis is typically required further than five miles from the project site.[126]

Existing intersection traffic conditions were established through morning and evening peak hour intersection turning movement counts obtained by Kunzman Associates, Inc. in March 2018 (see Appendix C). In addition, truck classification counts were conducted at the study intersections. The existing percent of trucks were used in the conversion of trucks to passenger car equivalents. The San Bernardino Transportation Analysis Model (SBTAM) has generally been used to evaluate the regional distribution of project trips. A select zone (trip distribution) analysis was performed using the San Bernardino Transportation Analysis Model with the assistance of the San Bernardino Associated Governments staff. The socioeconomic data inputs to the San Bernardino Transportation Analysis Model are representative of the planned project development intensity.[127]

The average daily traffic volume forecasts have been determined using the growth increment approach on the San Bernardino Transportation Analysis Model Year 2012 and Year 2040 average daily traffic volume forecasts (see Appendix D). Appendix E contains the traffic model plots. The technique used to assess the performance of an intersection is known as the intersection delay methodology based on the procedures contained in the Highway Capacity Manual (Transportation Research Board). The

[125] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

[126] Ibid.

[127] Ibid.

methodology compares the traffic volumes using the intersection to the capacity of the intersection to calculate the delay associated with associated with the traffic control at the intersection. The intersection delay is then correlated to a performance measure known as Level of Service based on the following thresholds:

Table 3-9
Level of Service Thresholds

Level of Service	Intersection Control Delay (seconds/vehicle)	
	Signalized Intersection	Unsignalized Intersection
A	≤ 10.0	≤ 10.0
B	> 10.0 to≤ 20.0	> 10.0 to ≤ 15.0
C	> 20.0 to ≤ 35.0	> 15.0 to ≤ 25.0
D	> 35.0 to ≤ 55.0	> 25.0 to ≤ 35.0
E	> 55.0 to ≤ 80.0	> 35.0 to ≤ 50.0
F	> 80.0	> 50.0

Source: Highway Capacity Manual (Transportation Research Board)

Level of Service is used to qualitatively describe the performance of a roadway facility, ranging from Level of Service A (free-flow conditions) to Level of Service F (extreme congestion and system failure). Input parameters such as saturation flow rates and default values for Highway Capacity Manual calculations were used in accordance with the guidelines contained in the San Bernardino County Congestion Management Program (2016 Update).

The City of Rancho Cucamonga General Plan Circulation Element has established Level of Service D as the minimum acceptable Level of Service for the City's transportation system. Roadway facilities operating at Level of Service E or F are considered deficient. Based on the City-established performance standards, a project traffic impact is considered significant if the proposed project causes or worsens Level of Service E or F. To reduce a potential impact to a less than significant level, feasible mitigation measures should be identified that will maintain the acceptable Level of Service. If a project is forecast to worsen a facility already operating at Level of Service E or F under pre-project conditions, proposed mitigation measures should maintain operation of the impacted facility at pre-project conditions. Mitigation measures can be in many forms, including addition of lanes, traffic control modification, or demand management measures. If no feasible mitigation measures can be identified for a significantly impacted facility, the impact will remain significant and unavoidable.[128]

A. *Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit? ● Less than Significant Impact.*

Local street access is provided by Vineyard Avenue, Hellman Avenue, Archibald Avenue, Arrow Route,

[128] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

8th Street, and 6th Street. Regional access to the project site is provided by the I-10 Freeway, which is located approximately 1.5 miles to the south. Based on the City-approved scoping agreement, the study area consists of the following intersections presented in Table 3-10.

Table 3-10
Study Area Intersections

No.	Study Intersection	Jurisdiction
1	Vineyard Avenue (NS) at 8th Street (EW)	Rancho Cucamonga
2	Project West Driveway (NS) at 8th Street (EW)	Rancho Cucamonga
3	Project East Driveway (NS) at 8th Street (EW)	Rancho Cucamonga
4	Hellman Avenue (NS) at Arrow Route (EW)	Rancho Cucamonga
5	Hellman Avenue (NS) at 8th Street (EW)	Rancho Cucamonga
6	Hellman Avenue (NS) at Project South Driveway (EW)	Rancho Cucamonga
7	Hellman Avenue (NS) at 6th Street (EW)	Rancho Cucamonga
8	Archibald Avenue (NS) at 8th Street (EW)	Rancho Cucamonga

Source: Kunzman Associates, Inc.

Exhibit 3-6 shows the project location map as well as the locations of the eight study area intersections. Exhibit 3-7 identifies the existing roadway conditions based on a field survey of the study area; the existing number of through lanes for roadways and the intersection geometry and controls are identified.

Exhibit 3-8 depicts the existing average daily traffic volumes. The existing average daily traffic volumes have been factored from peak hour intersection turning movement volumes using the following formula for each intersection leg:

- PM Peak Hour (Approach Volume + Exit Volume) x 11.5 = Leg Volume.[129]

Exhibit 3-9 and Exhibit 3-10 show the existing morning and evening peak hour intersection turning movement volumes, respectively. Existing peak hour intersection turning movement volumes are based upon morning and evening peak period intersection turning movement counts conducted in April 2018 during typical weekday conditions. The morning peak period was counted between 7:00 AM and 9:00 AM; the evening peak period was counted between 4:00 PM and 6:00 PM. The actual peak hour within the peak period is the four consecutive 15-minute periods with the highest total volume when all movements are added together. Thus, the weekday evening peak hour at one intersection may be 4:45 PM to 5:45 PM if those four consecutive 15-minute periods have the highest combined volume. Intersection turning movement count worksheets are provided in Appendix C of this traffic report. The peak hour traffic counts were converted into Passenger Car Equivalent (PCE) trips in accordance with the San Bernardino County Congestion Management Program recommendations (1.5 PCEs for large 2-axle vehicles, 2.0 PCEs for 3-axle trucks, and 3.0 PCEs for trucks with four or more axles). The peak hour factors used for intersection delay calculations are based the measured peak hour factors obtained from existing traffic counts.

[129] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

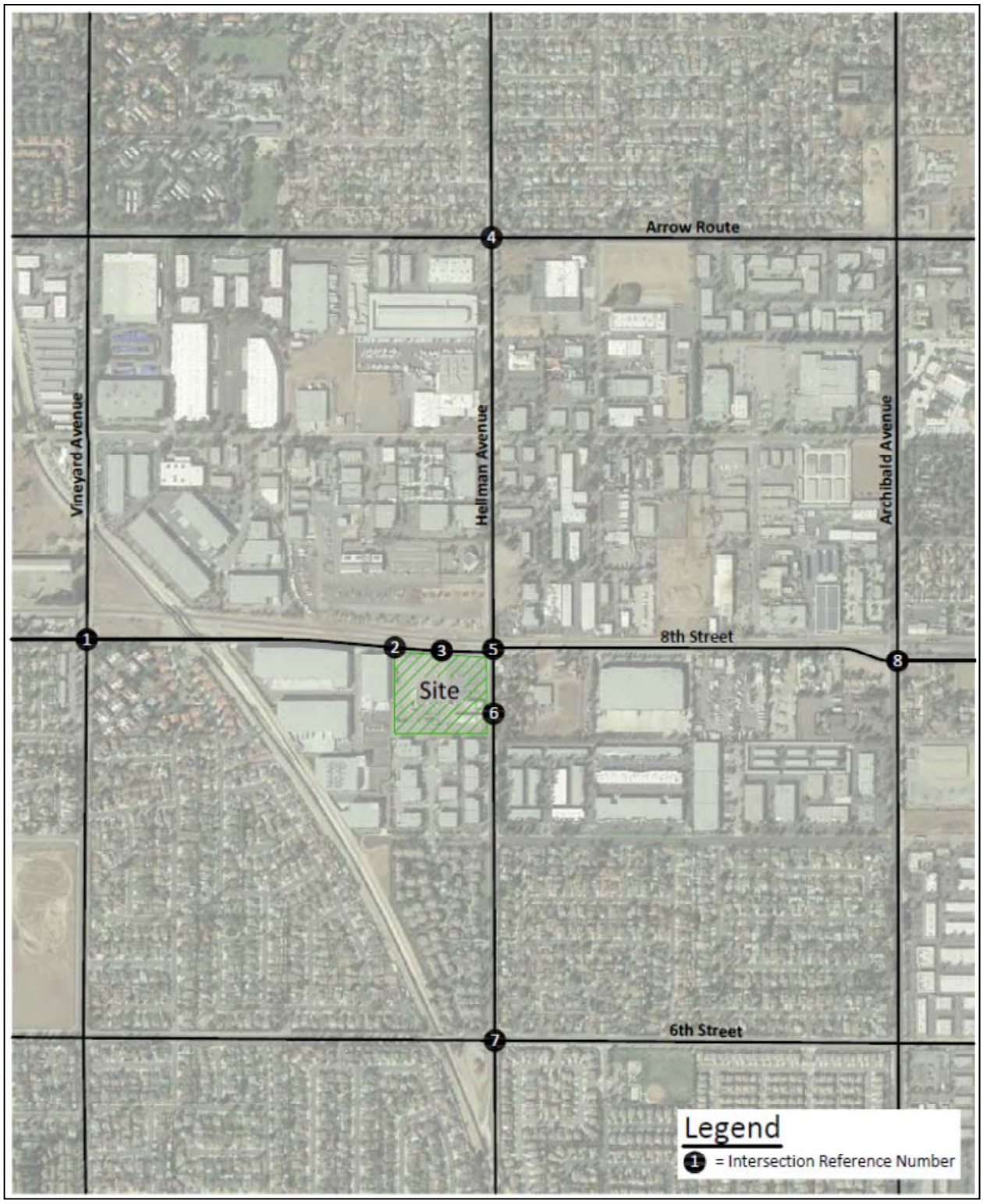


EXHIBIT 3-6
PROJECT LOCATION MAP
SOURCE: KUNZMAN ASSOCIATES, INC.

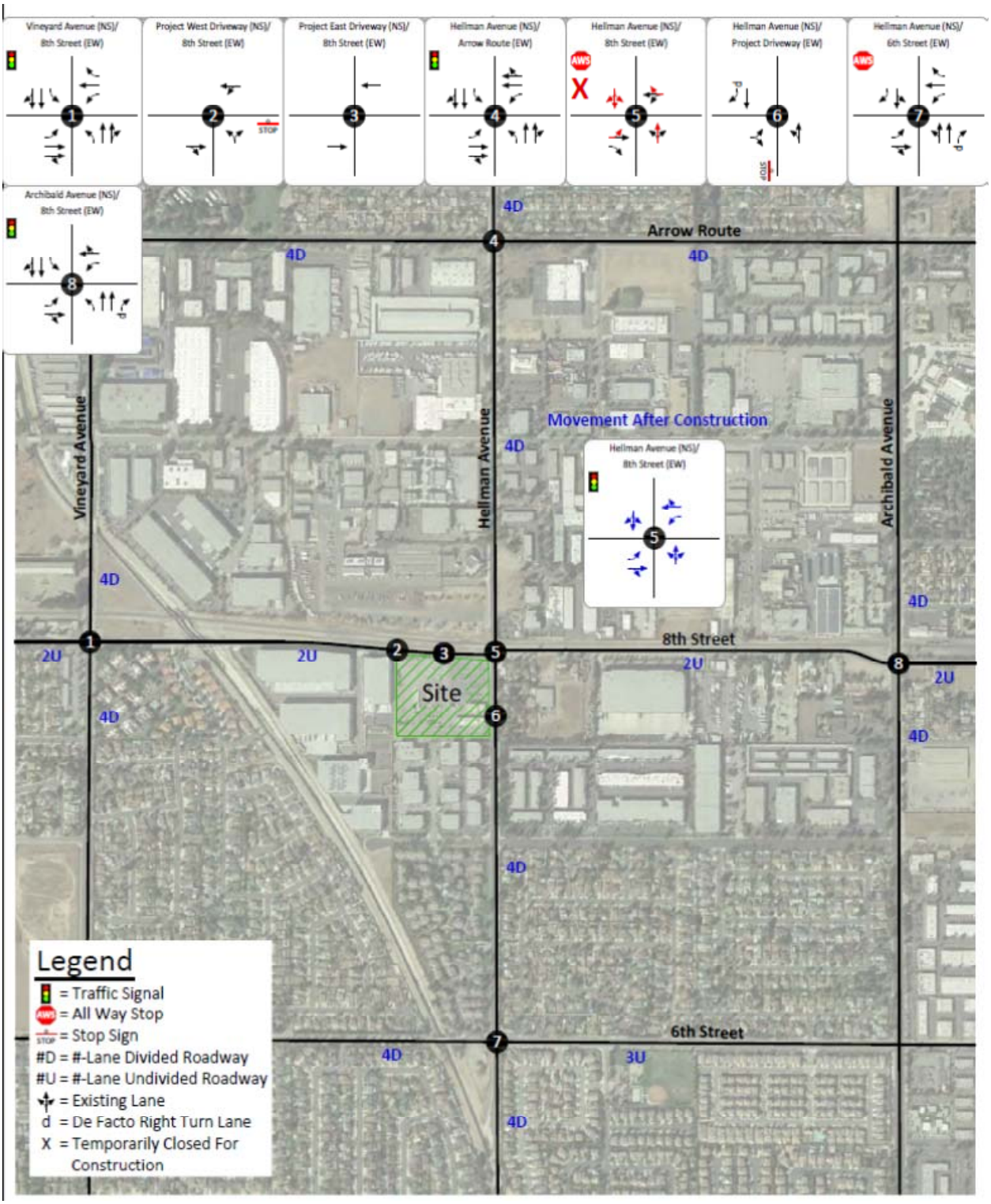


EXHIBIT 3-7
EXISTING LANE GEOMETRY AND INTERSECTION TRAFFIC CONTROLS
SOURCE: KUNZMAN ASSOCIATES, INC.

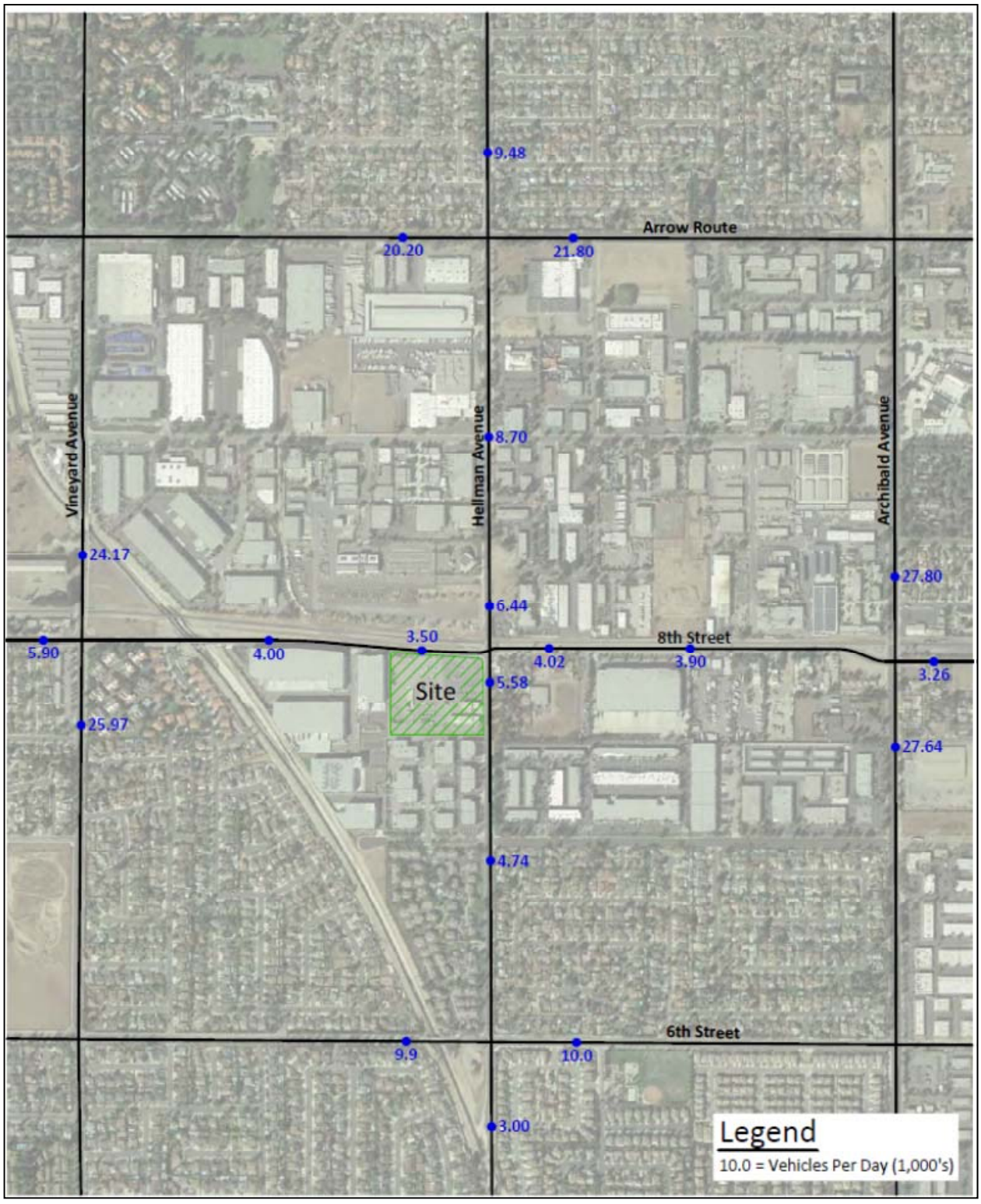


EXHIBIT 3-8
EXISTING AVERAGE DAILY TRAFFIC VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

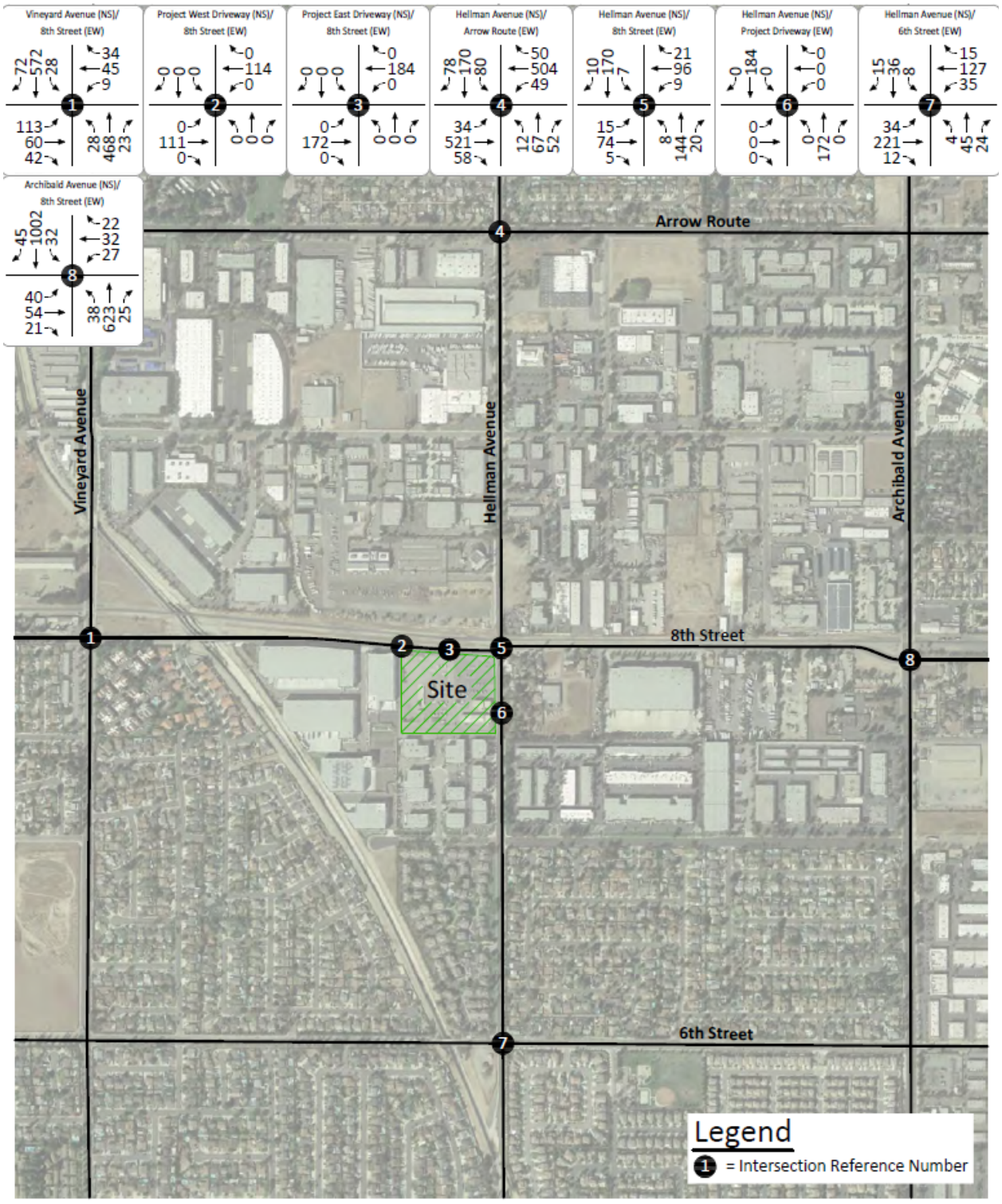


EXHIBIT 3-9
EXISTING MORNING PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

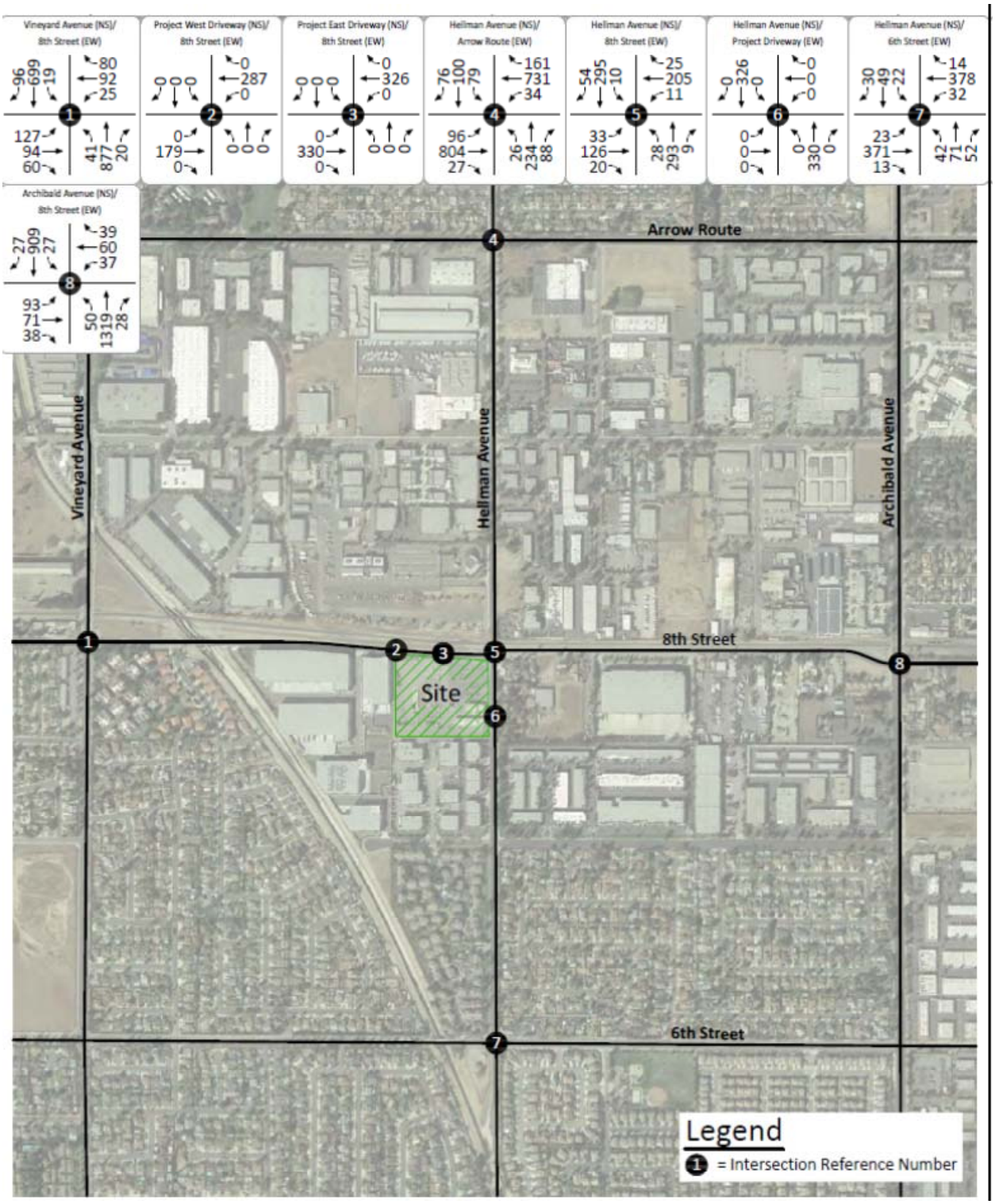


EXHIBIT 3-10
EXISTING EVENING PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

The peak hour traffic counts were converted into Passenger Car Equivalent (PCE) trips in accordance with the San Bernardino County Congestion Management Program recommendations (1.5 PCEs for large 2-axle vehicles, 2.0 PCEs for 3-axle trucks, and 3.0 PCEs for trucks with four or more axles). The peak hour factors used for intersection delay calculations are based the measured peak hour factors obtained from existing traffic counts.

The Hellman Avenue and 8th Street intersection is currently under construction with an estimated completion date of June 2018 for roadway widening and traffic signal installation. The Existing plus Project traffic conditions assume that the intersection will be operational at the currently proposed configuration as provided by the plans for this Capital Improvement Program project (see Appendix G). Historical intersection turning movement counts for the Hellman Avenue and 8th Street intersection in conjunction with the San Bernardino Transportation Analysis Model data were used to determine the Existing intersection turning movement volumes for the Hellman Avenue and 8th Street intersection. The morning and evening peak hour Levels of Service for existing traffic conditions have been calculated and are shown in Table 3-11. The study intersections currently operate within acceptable Levels of Service during the peak hours for existing traffic conditions.

Table 3-11
Existing Intersection Capacity Utilization/Delay and Level of Service

Intersection	Traffic Control	Intersection Approach Lanes												Peak Hour Delay-LOS		Peak Hour V/C-LOS	
		Northbound			Southbound			Eastbound			Westbound						
		L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
Vineyard Avenue (NS) at:																	
8th Street (EW) -# 1	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1	1	11.4	B	13.1	B
Hellman Avenue (NS) at:																	
Arrow Route (EW) - #4	TS													20.3	C	19.2	B
8th Street (EW) - #5	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	22.8	C	40.7	D
6th Street (EW) - #7	AWS													10.4	B	21.9	C
Archibald Avenue (NS) at:																	
8th Street (EW) - #8	TS	1	2	d	1	1.5	0.5	1	0.5	0.5	1	0.5	0.5	8.8	A	12.6	B

The trips generated by the project are determined by multiplying an appropriate trip generation rate by the quantity of land use. Trip generation rates are predicated on the assumption that energy costs, the availability of roadway capacity, the availability of vehicles to drive, and life styles remain similar to what are known today. A major change in these variables may affect trip generation rates.

Trip generation rates were determined for daily trips, morning peak hour inbound and outbound trips, and evening peak hour inbound and outbound trips for the proposed land use. By multiplying the trip generation rates by the land use quantity, the traffic volumes are determined. Table 3-11 shows the project trip generation based upon rates obtained from the Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017 and the City of Fontana, Truck Trip Generation Study, August 2003. In addition, the project trips generated were converted into passenger car equivalents. Table 3-12 summarizes the project trip generation forecast. The project trip generation

has been calculated in total number of vehicle trips as well as passenger car equivalent trips. As shown in Table 3-12, the proposed project is forecast to generate approximately 398 daily trips in passenger car equivalents, 39 passenger car equivalent trips of which will occur during the morning peak hour and 42 passenger car equivalent trips of which will occur during the evening peak hour.[130]

Table 3-12
Project Trip Generation Estimated Based on Project Operational Characteristics

Proposed Project						Vehicle Trips						
						AM Peak Hour			PM Peak Hour			
Land Use	Source	Quantity	Units	PCE Factor	Vehicle Percent	Inbound	Outbound	Total	Inbound	Outbound	Total	Daily
Trip Generation Rates:												
Warehouse						0.13	0.04	0.17	0.05	0.14	0.19	1.74
Truck Trip Generation	ITE 150	--	TSF	--	20.43%	0.03	0.01	0.04	0.01	0.03	0.04	0.36
Car Trip Generation					79.57%	0.10	0.03	0.14	0.04	0.11	0.15	1.39
Vehicle Trips Generated:												
Vehicle Total Trips	--	174.745	TSF	--		23	7	30	9	24	33	304
Truck Vehicle Trips					20.43%	5	1	6	2	5	7	62
Car Vehicle Trips					79.57%	18	6	24	7	19	26	242
PCE Trips Generated:												
2 Axle Trucks	Fontana	--	--	1.5	3.46%	1	0	1	0	1	1	16
3 Axle Trucks				2.0	4.64%	2	1	3	1	2	3	28
4+ Axle Trucks				3.0	12.33%	8	3	11	3	9	12	112
Truck Subtotal	--	--	PCE	--	20.43%	11	4	15	4	12	16	156
Car Subtotal			PCE		79.57%	18	6	24	7	19	26	242
PCE Total Trips	--	**174.745**	**TSF**	--	--	**29**	**10**	**39**	**11**	**31**	**42**	**398**

Source: Kunzman Associates, Inc.

A trip generation comparison has been completed between the previous existing land use (utility) and the proposed land use (warehousing). The previous land use (utility) generates approximately 212 daily trips, 37 trips of which will occur during the morning peak hour and 36 trips of which will occur during the evening peak hour.[131]

Based upon the comparison the previous land use vs. proposed land use, the proposed project is projected to generate approximately 92 more daily vehicle trips, seven less vehicle trips during the morning peak hour and three less vehicle trips during the evening peak hour. When the proposed project trips are converted to passenger car equivalents, the proposed project is projected to generate approximately 186 more daily passenger car equivalent trips, two more passenger car equivalent trips

[130] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

[131] Ibid.

during the morning peak hour and six more passenger car equivalent trips during the evening peak hour.[132]

In order to provide a conservative analysis, the trip generation credits for the previous land use were not subtracted from the study area. The net project trip generation could provide a reduction in study area traffic volumes. Exhibit 3-11 and 3-12 show the forecast outbound and inbound directional distributions of the project generated trips, respectively. The project trip distributions are based on review of existing traffic volume data, surrounding land uses, and the local and regional roadway facilities in the project vicinity. Based on the identified trip generation and distributions, project average daily traffic volumes have been calculated and shown on Exhibit 3-13. Morning and evening peak hour intersection turning movement volumes expected from the project are shown on Exhibit 3-14 and 3-15, respectively.

No analysis is required further than five miles from the project site. The roadway elements that must be analyzed are dependent on both the analysis year (Opening Year) and project generated traffic volumes. The identification of the study area, and the intersections and highway segments requiring analysis, was based on an estimate of the two-way traffic volumes on the roadway segments near the project site. All arterial segments are required to be included in the analysis when the anticipated project volume equals or exceeds 50 two-way trips in the peak hours. The requirement is 100 two-way peak hour trips for freeways.

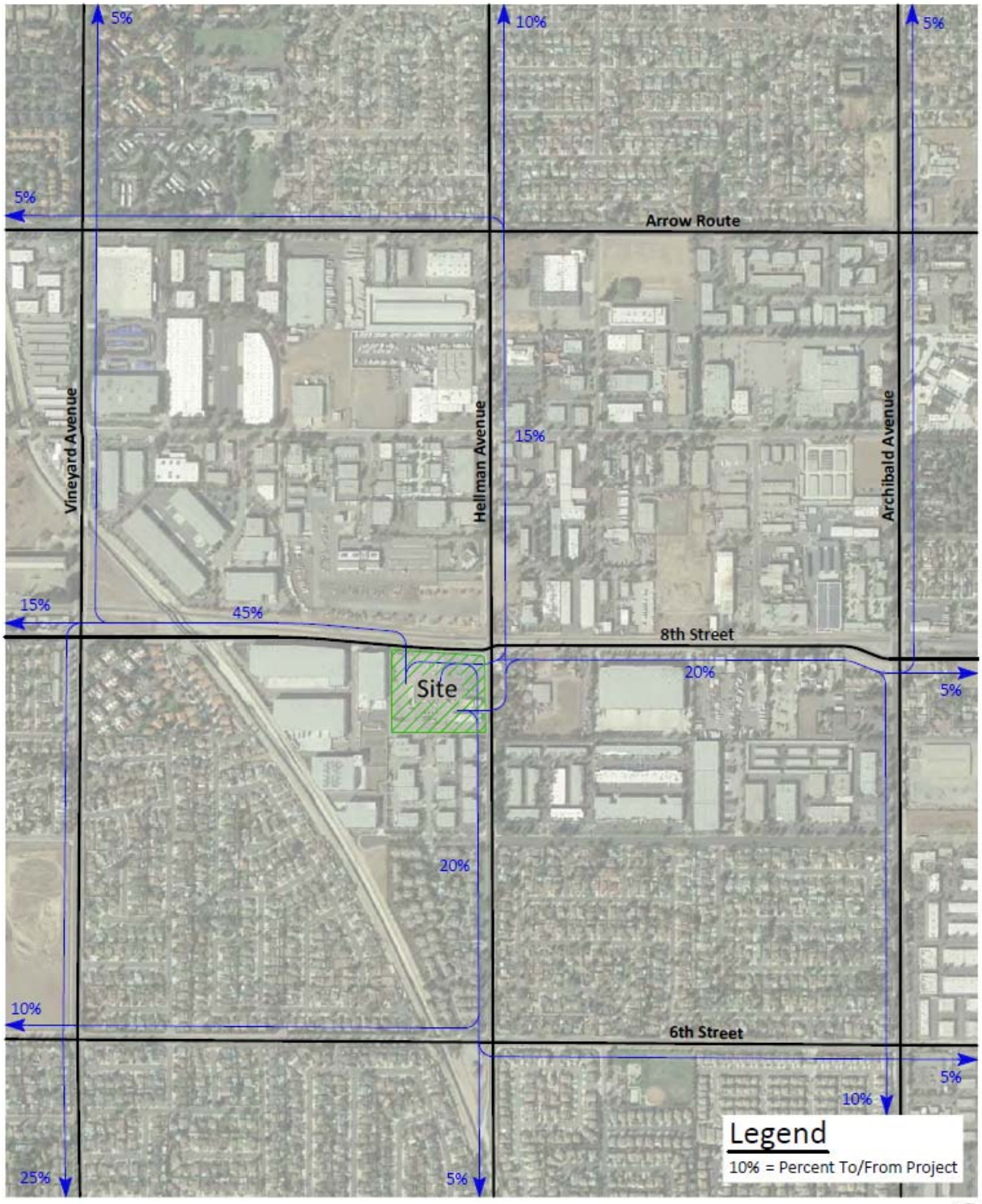
As shown on Exhibit 3-16, the project does not contribute greater than the freeway threshold volume of 100 two-way peak hour trips to the I-10 Freeway. The project does not contribute trips greater than the arterial link threshold volume of 50 two-way trips during the morning and evening peak hours in adjacent jurisdictions. This means that the City of Rancho Cucamonga is not required to notify the adjacent jurisdictions and provide a copy of the focused traffic analysis, once the document is accepted by the City of Rancho Cucamonga. The purpose of this notification is to allow the adjacent jurisdictions to identify opportunities to make improvements to intersections concurrent with adjacent development, at considerably less cost and disruption than would occur if it were done after-the-fact.[133]

To assess background traffic conditions, existing traffic volumes are used with traffic model data to project future Horizon Year (2040) traffic volumes and Opening Year (2020) traffic volumes. For analysis purposes in this report, the Opening Year is 2020.[134] To assess background traffic conditions, existing traffic volumes are combined with ambient growth, and cumulative development trips. The opening year for analysis purposes in this report is 2020. To account for ambient growth on roadways, Opening Year (2020) traffic volumes have been calculated based on a "conservative" 2.0 percent annual growth rate of existing traffic volumes over a two-year period. Potential developments within the study area are included in the analysis if they are not currently built, they are approved, their approval has not expired, and they would contribute trips to the study intersections.

[132] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

[133] Ibid.

[134] Ibid.



KUNZMAN ASSOCIATES, INC.

EXHIBIT 3-11
PROJECT TRIP DISTRIBUTION - CARS

SOURCE: KUNZMAN ASSOCIATES, INC.

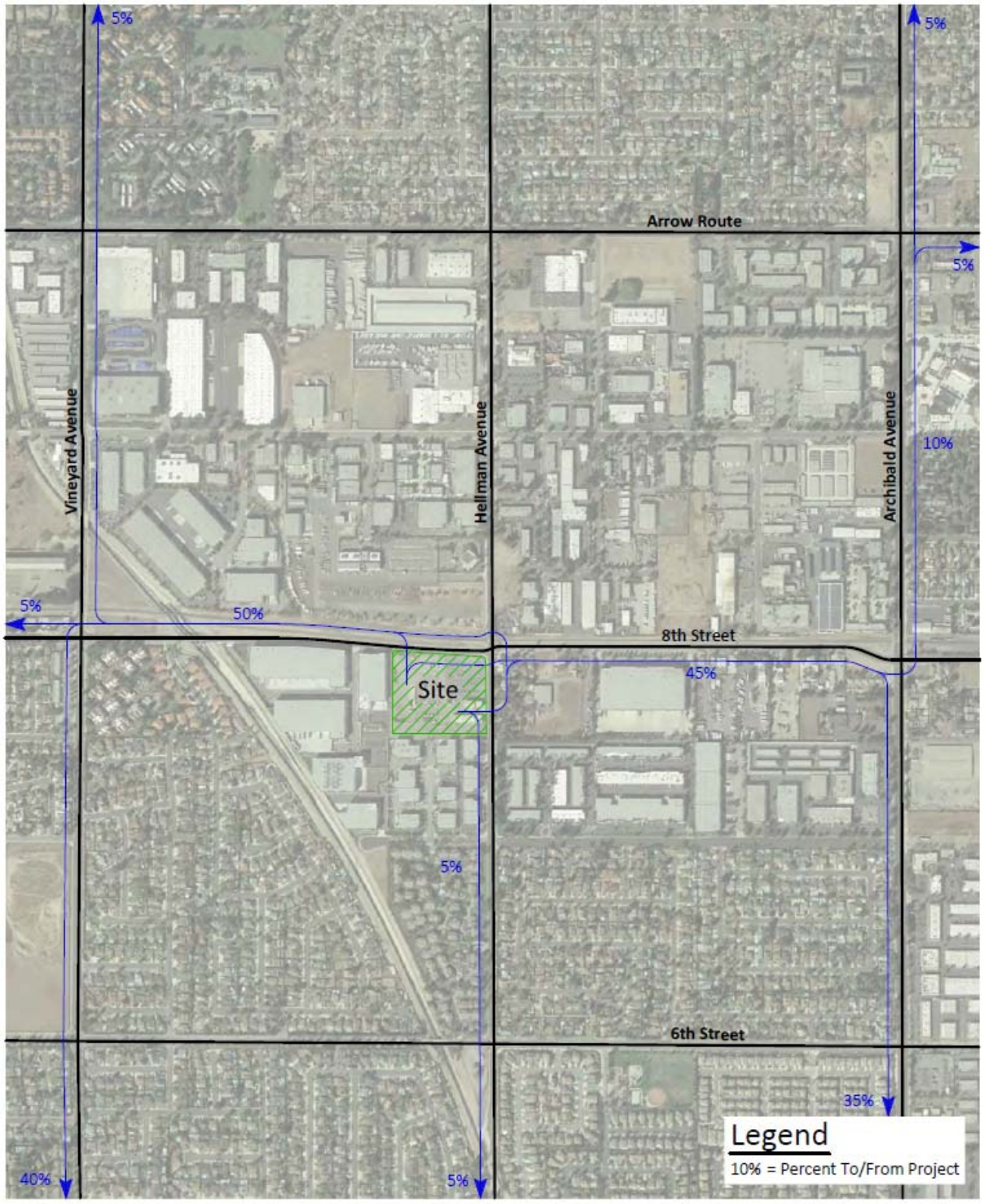


EXHIBIT 3-12
PROJECT TRIP DISTRIBUTION - TRUCKS
SOURCE: KUNZMAN ASSOCIATES, INC.

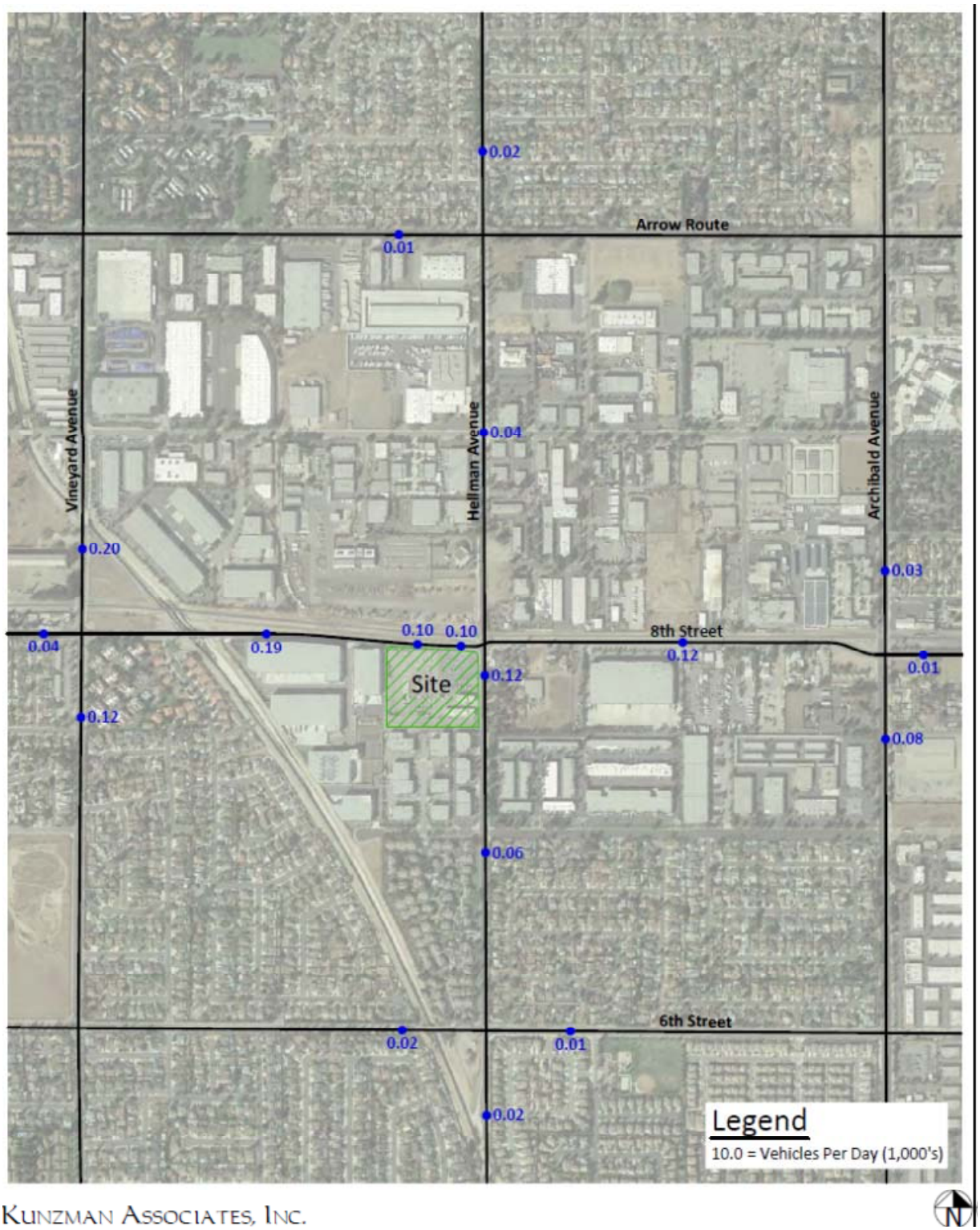


EXHIBIT 3-13
PROJECT AVERAGE DAILY TRAFFIC VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

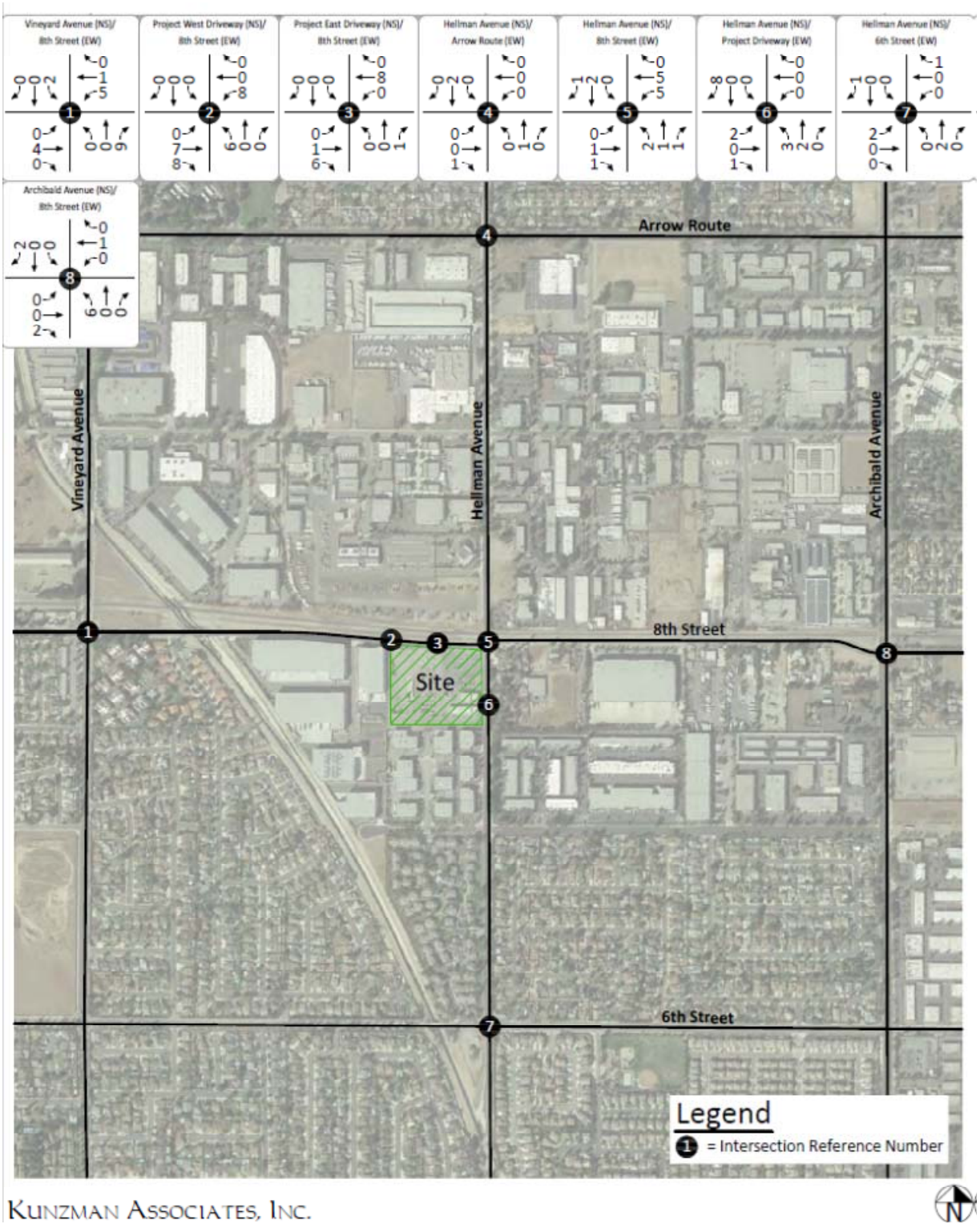


EXHIBIT 3-14
PROJECT AM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES
SOURCE: KUNZMAN ASSOCIATES, INC.

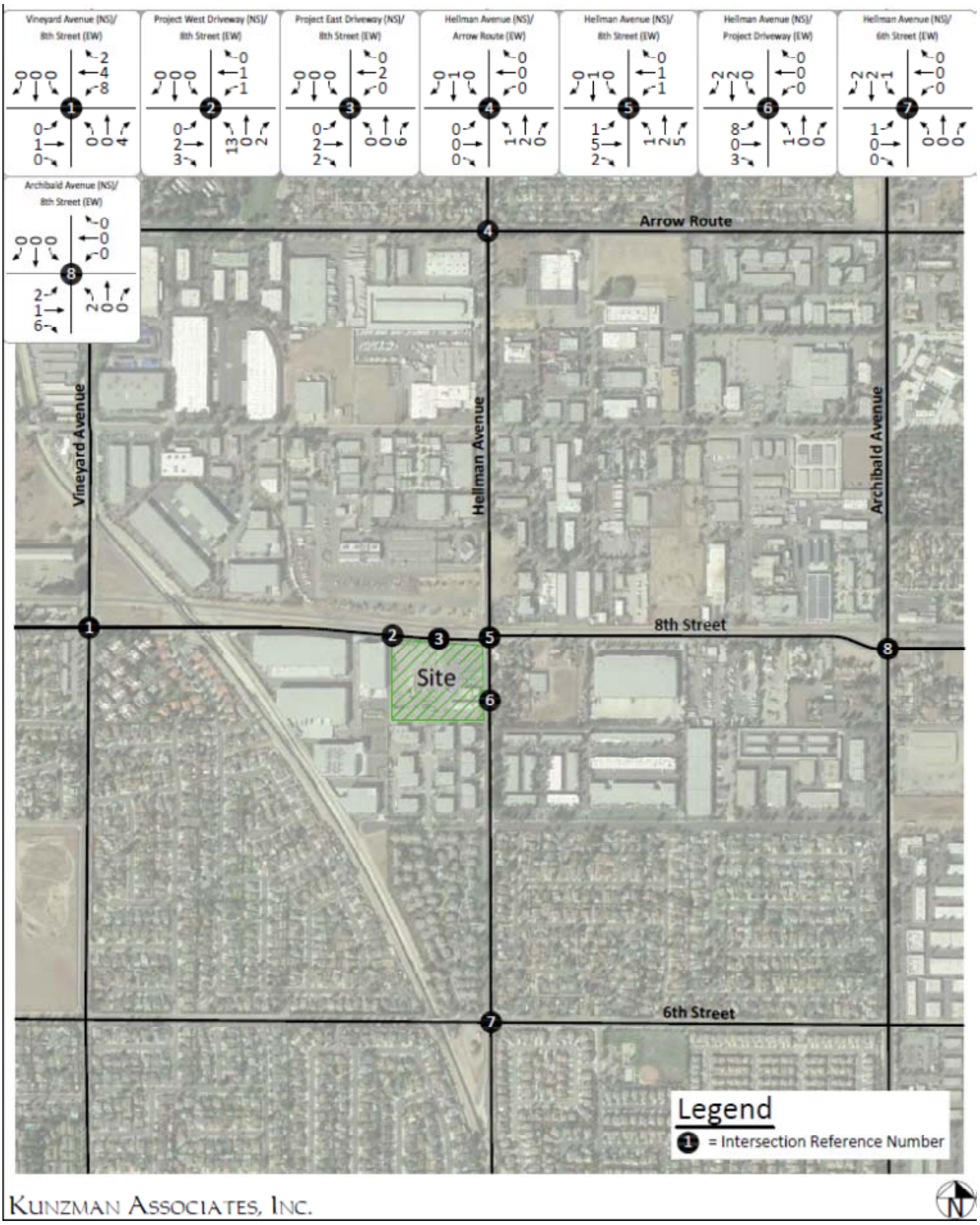


EXHIBIT 3-15
PROJECT PM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES
SOURCE: KUNZMAN ASSOCIATES, INC.

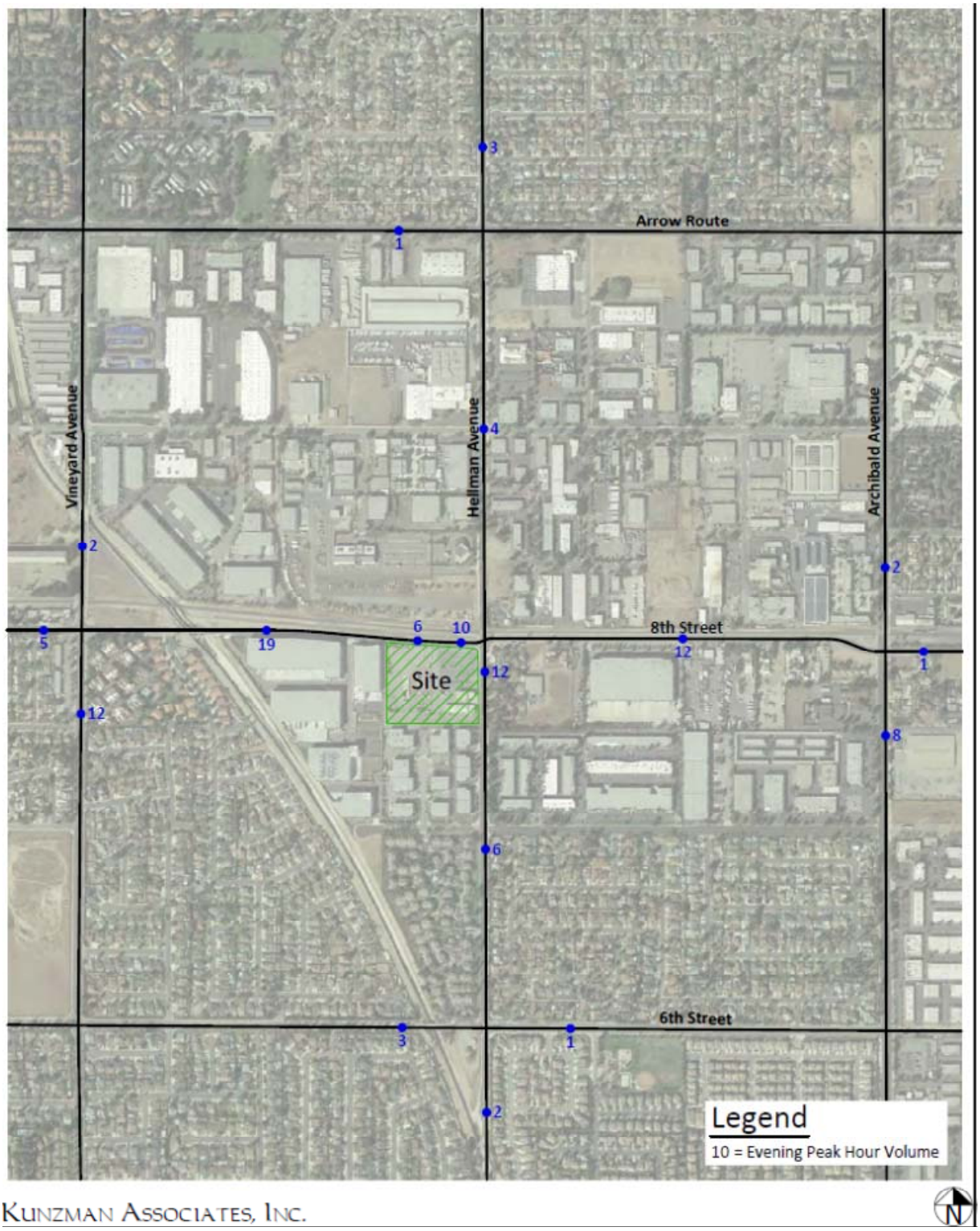


EXHIBIT 3-16
PROJECT TRIP CONTRIBUTION TEST VOLUMES
SOURCE: KUNZMAN ASSOCIATES, INC.

The City of Rancho Cucamonga staff provided a list of cumulative development in the study area (see Exhibit 3-17). In order to provide a "conservative" analysis, the cumulative development has been added to future traffic conditions. Exhibit 3-18 shows the cumulative development average daily traffic volumes. Cumulative development morning and evening peak hour intersection turning movement volumes are shown on Exhibit 3-19 and 3-20, respectively.

Horizon Year (2040) Without Project traffic conditions represent full build-out of the City of Rancho Cucamonga according to the General Plan Land Use Element. The current San Bernardino Transportation Analysis Model was used to derive Horizon Year (2040) traffic volumes. In accordance with post-processing procedures contained in the Congestion Management Program, the future traffic volume forecasts have been determined using the growth increment approach on the Year 2012 and Year 2040 traffic volume forecasts. This difference defines the growth in traffic over the 28-year period. The incremental growth in traffic volumes have been factored to reflect the forecast growth between existing conditions (Year 2018) and Year 2040. For this purpose, linear growth between the Year 2012 base condition and the forecast Year 2040 condition was assumed. Since the increment between Year 2018 and Year 2040 is 24 years of the 28 year time frame, a factor of 0.78 (i.e., 22/28) was used.[135]

To derive intersection turning movement volumes, the traffic growth forecasts were further refined using a spreadsheet program developed by the Federal Highway Administration and consistent with traffic forecasting procedures outlined in the National Cooperative Highway Research Program Report 255. The spreadsheet program uses a linear programming algorithm to calculate future individual turning movements based on the relationship of existing intersection turning movements and forecast model growth by approach. The forecast turning movements developed by the spreadsheet program were reviewed for reasonableness and adjusted as necessary to ensure minimum traffic growth. The end results of the post-processing procedures described are future traffic volumes suitable for analysis. The growth increment calculation and post-processed intersection turning movement volume worksheets are contained in Appendix D of this traffic report. Appendix E of this traffic report contains the traffic model plots.

The traffic volumes for Existing plus Project traffic conditions have been derived by adding the project generated trips to existing traffic volumes. Existing plus project average daily traffic volumes are shown on Exhibit 3-21. Existing plus Project morning and evening peak hour intersection turning movement volumes are shown on Exhibit 3-22 and 3-23, respectively.

To assess Opening Year (2020) Without Project traffic conditions, existing traffic volumes are combined with ambient growth and other development trips. Opening year (2020) without project average daily traffic volumes are shown on Exhibit 3-24. Opening year (2020) without project morning evening peak hour intersection turning movement volumes are shown on Exhibit 3-25 and 3-26, respectively.

[135] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

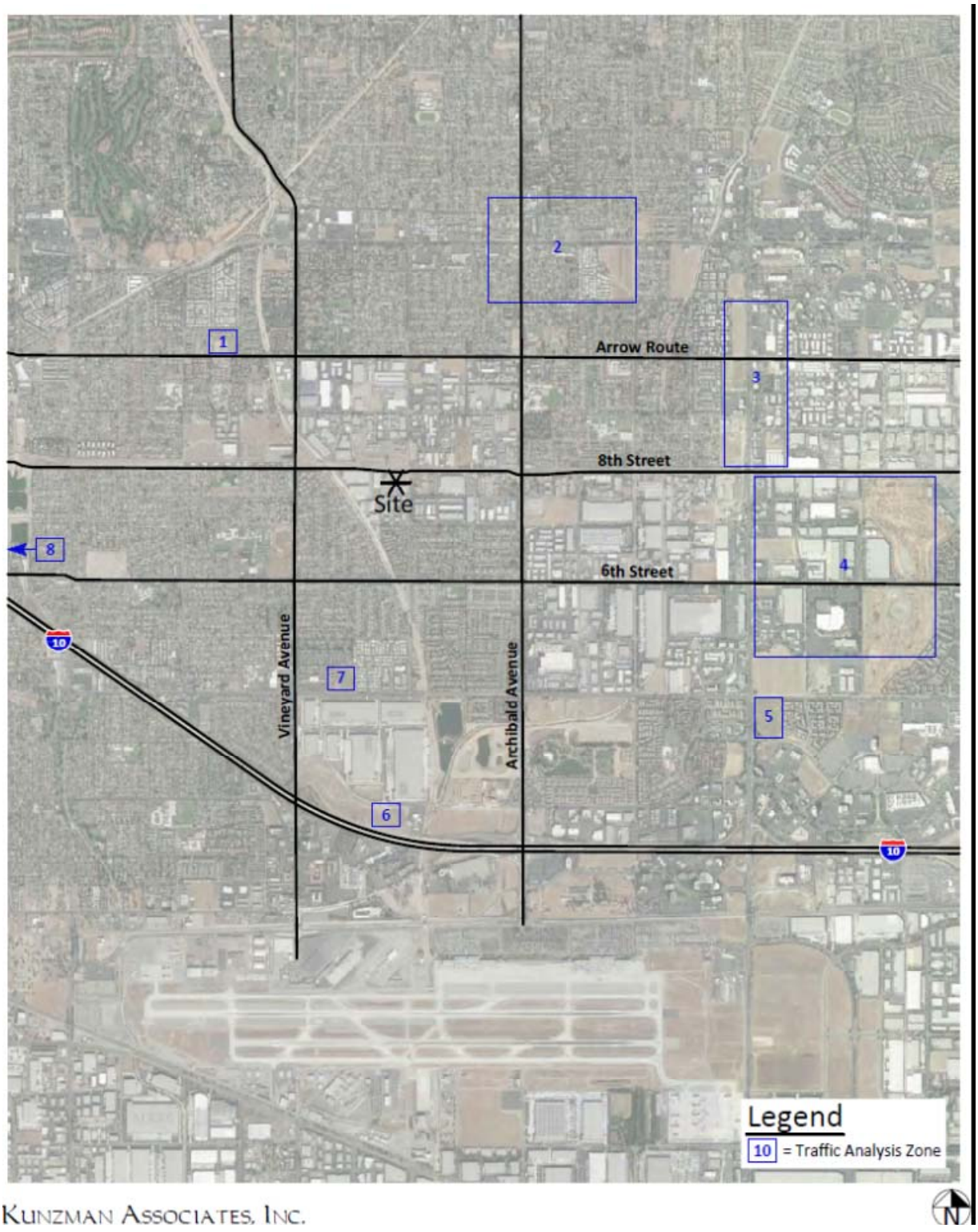
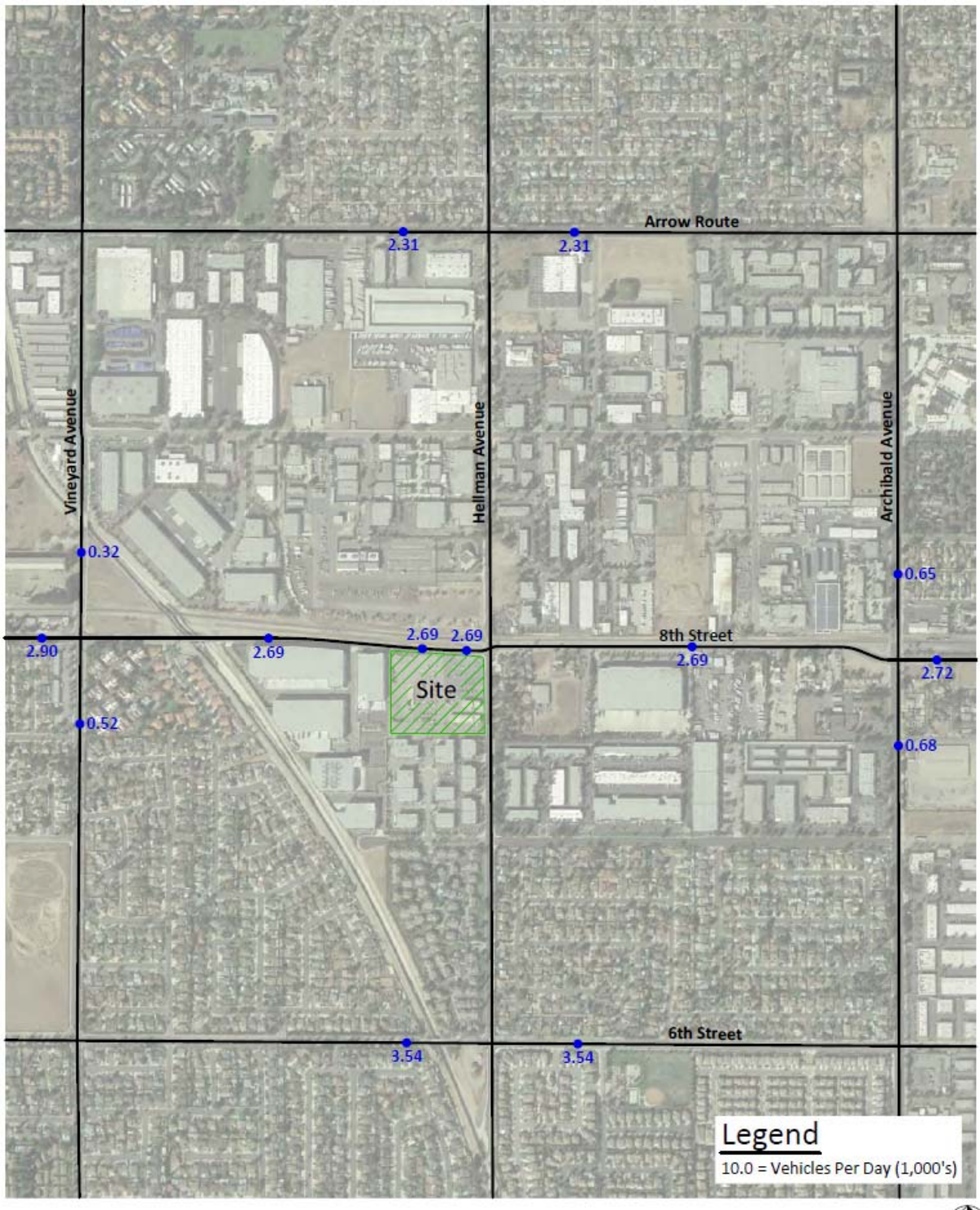


EXHIBIT 3-17
OTHER DEVELOPMENT TRAFFIC ANALYSIS ZONE MAP
SOURCE: KUNZMAN ASSOCIATES, INC.



KUNZMAN ASSOCIATES, INC.

EXHIBIT 3-18
OTHER DEVELOPMENT AVERAGE DAILY TRAFFIC VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

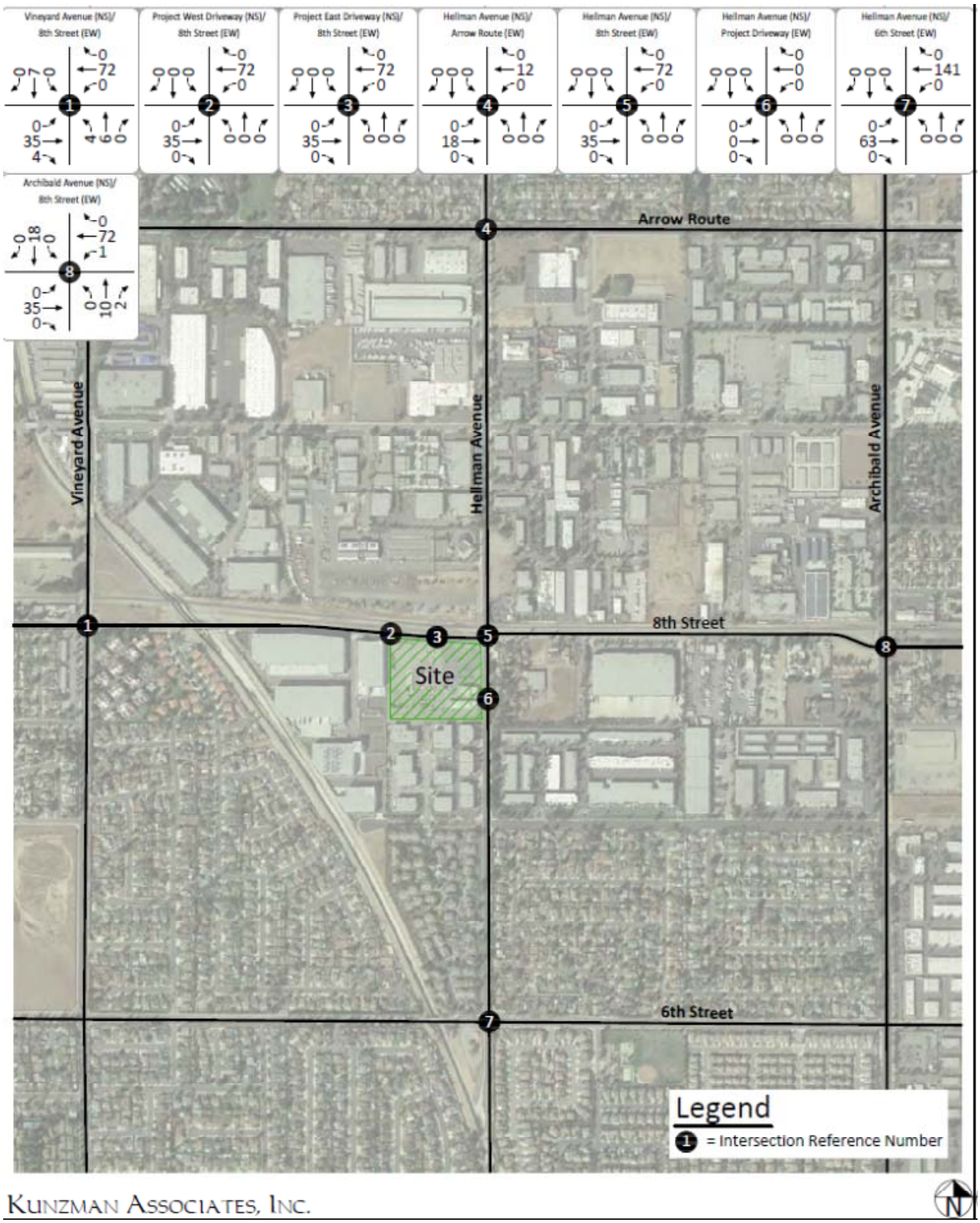


EXHIBIT 3-19
OTHER DEVELOPMENT AM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

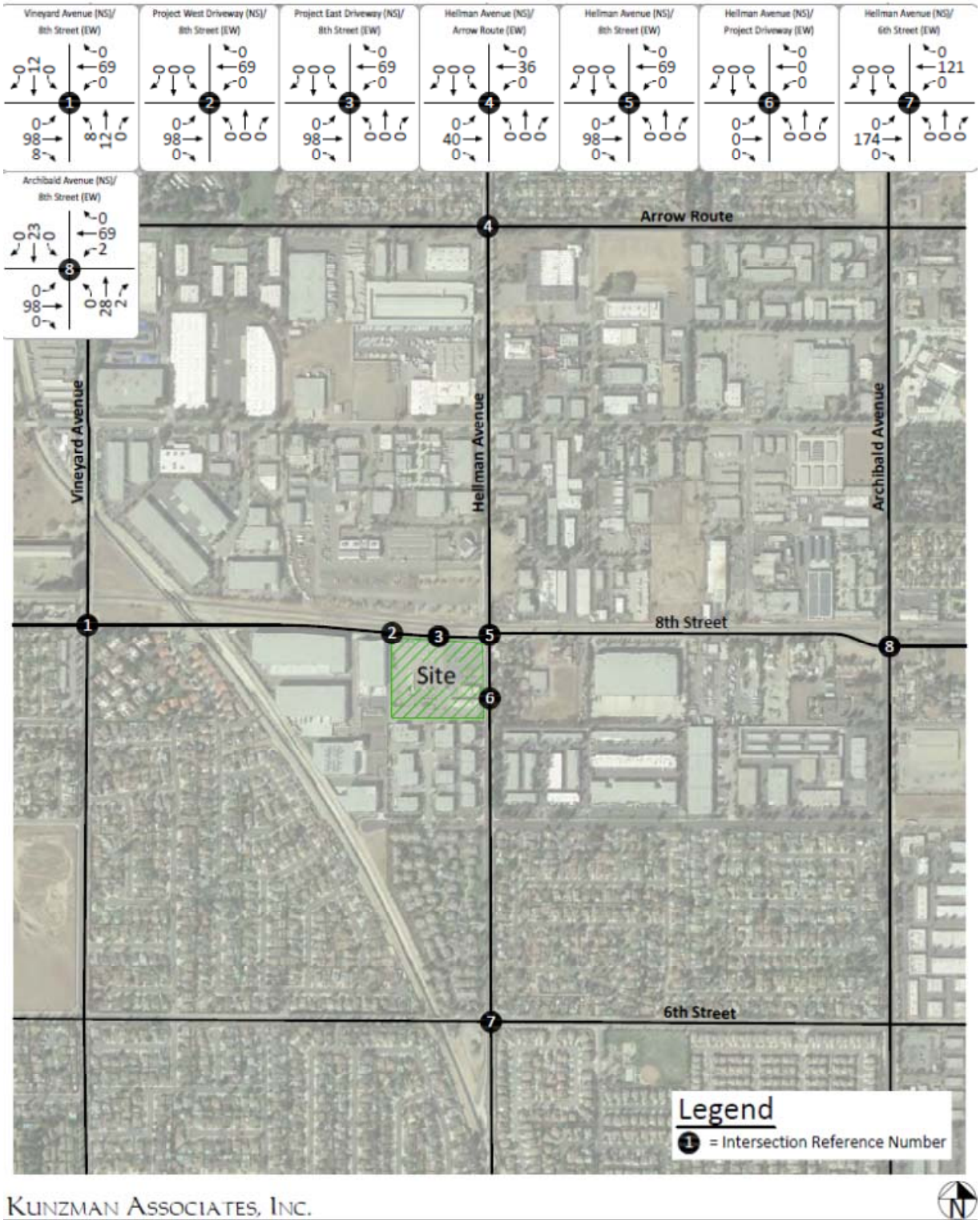


EXHIBIT 3-20
OTHER DEVELOPMENT PM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

To assess Opening year (2020) with project traffic conditions, project generated trips are added to Opening year (2020) without project traffic volumes. Opening Year (2020) With Project average daily traffic volumes are shown on Exhibit 3-27. Opening Year (2020) With Project morning and evening peak hour intersection turning movement volumes are shown on Exhibit 3-28 and 3-29, respectively.

Horizon Year (2040) Without Project average daily traffic volumes are shown on Exhibit 3-30. Horizon Year (2040) Without Project morning and evening peak hour intersection turning movement volumes are shown on Exhibit 3-31 and 3-32, respectively. To assess Horizon Year (2040) With Project traffic conditions, project generated trips are added to Horizon Year (2040) Without Project traffic volumes. Horizon Year (2040) With Project average daily traffic volumes are shown on Exhibit 3-33. Horizon Year (2040) With Project evening peak hour intersection turning movement volumes are shown on Exhibit 3-34 and 3-35, respectively.[136]

The Hellman Avenue and 8th Street intersection is currently under construction with an estimated completion date of June 2018 for roadway widening and traffic signal installation. The Existing plus Project traffic conditions assume that the intersection will be operational at the currently proposed configuration as provided by the plans for this Capital Improvement Program project (see Appendix G). The Existing plus Project delay and Levels of Service for the study intersections are shown in Table 3-14. Table 3-14 shows delay values based on the lane geometries at the study intersections without and with improvements.

[136] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

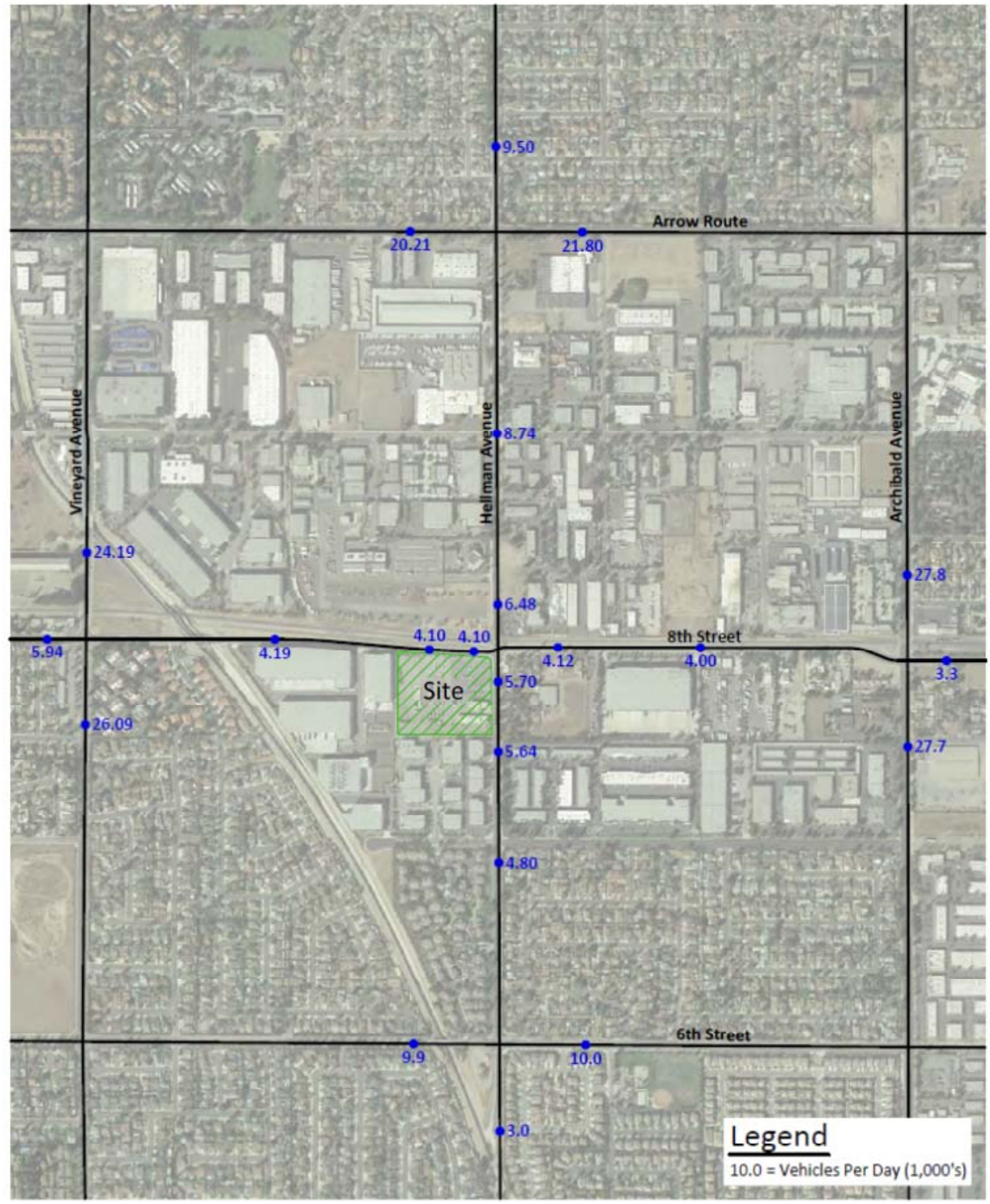


EXHIBIT 3-21
EXISTING PLUS PROJECT AVERAGE DAILY TRAFFIC VOLUMES
SOURCE: KUNZMAN ASSOCIATES, INC.

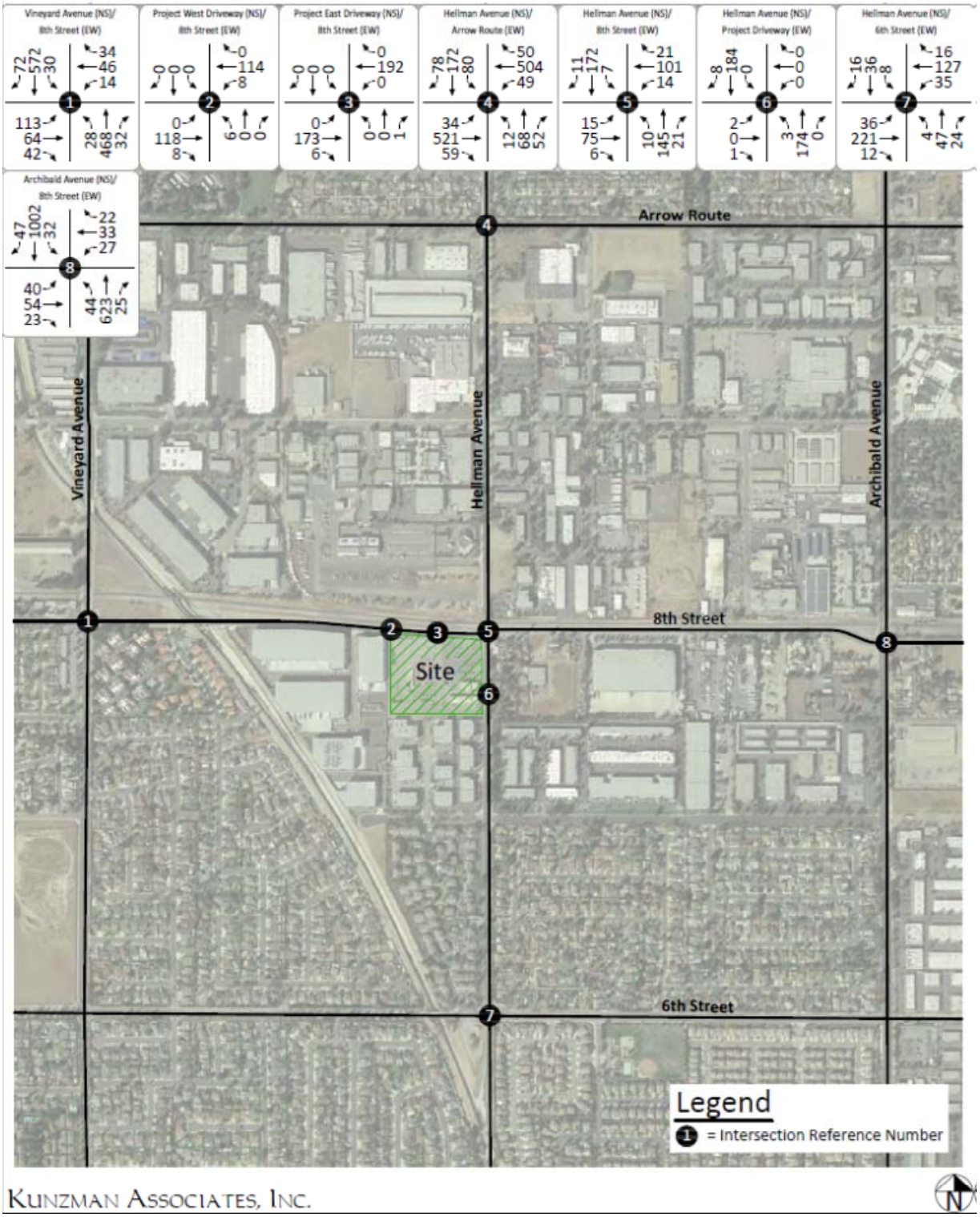


EXHIBIT 3-22
EXISTING PLUS PROJECT AM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

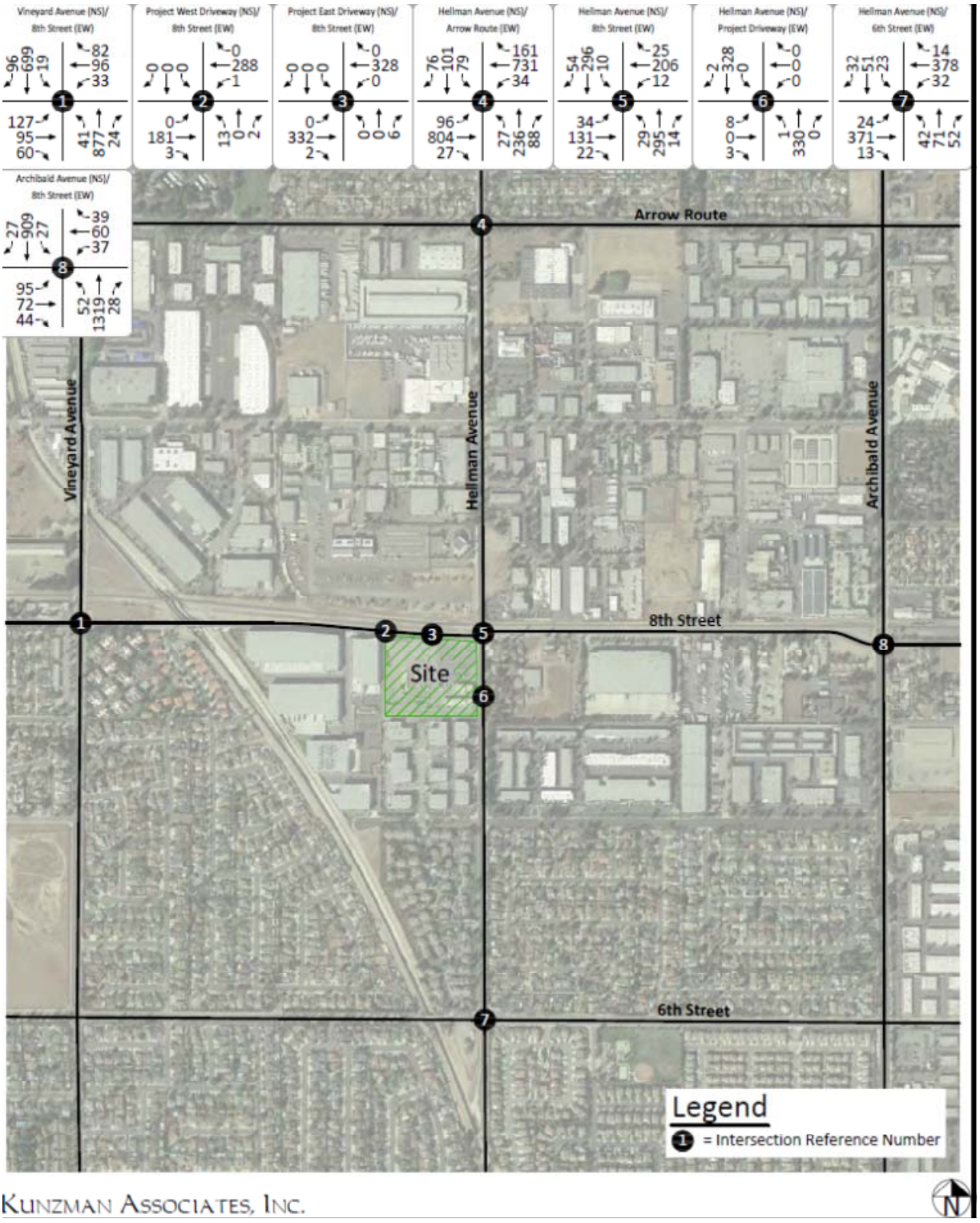


EXHIBIT 3-23
EXISTING PLUS PROJECT PM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

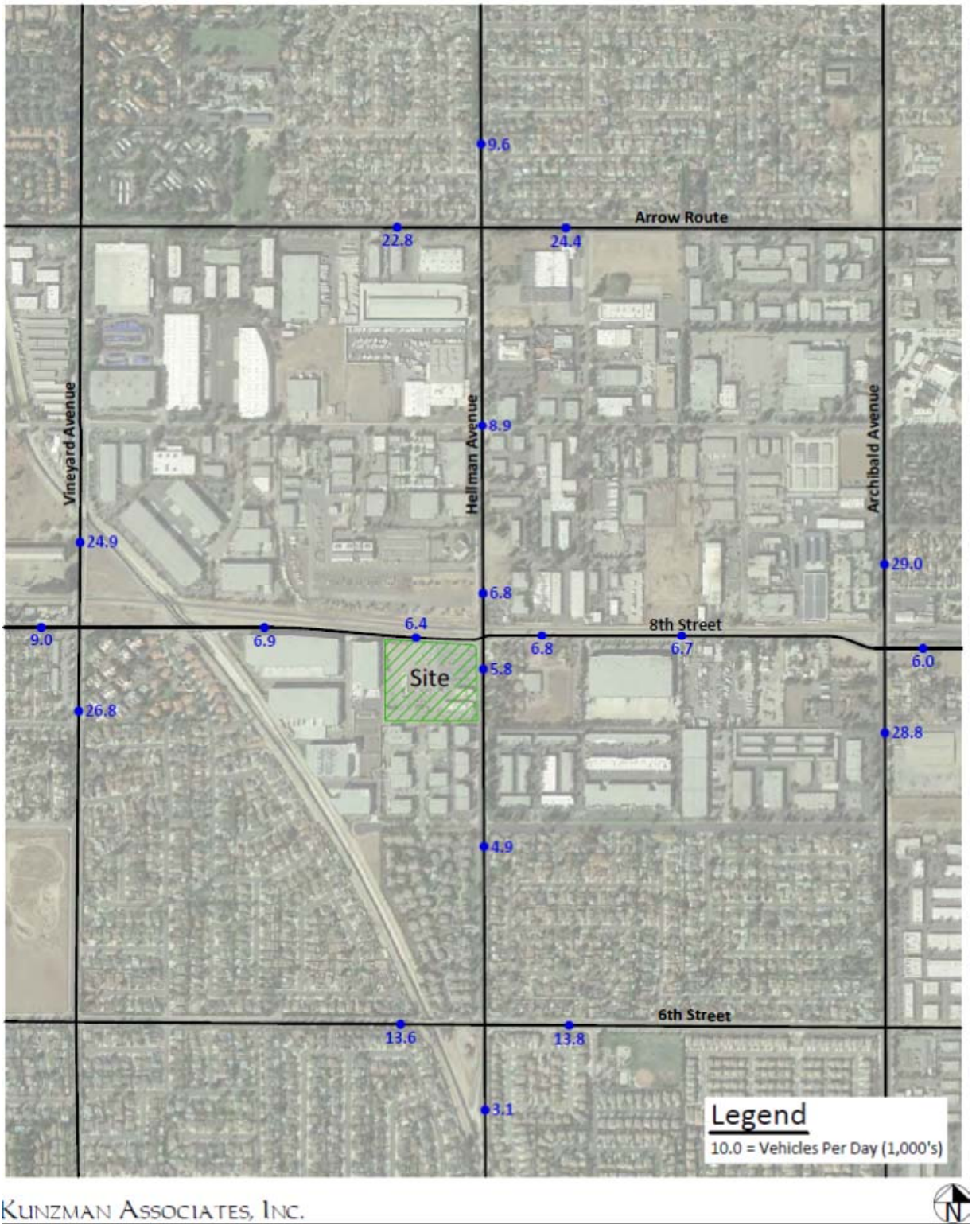


EXHIBIT 3-24
OPENING YEAR (2020) WITHOUT PROJECT AVERAGE DAILY TRAFFIC VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

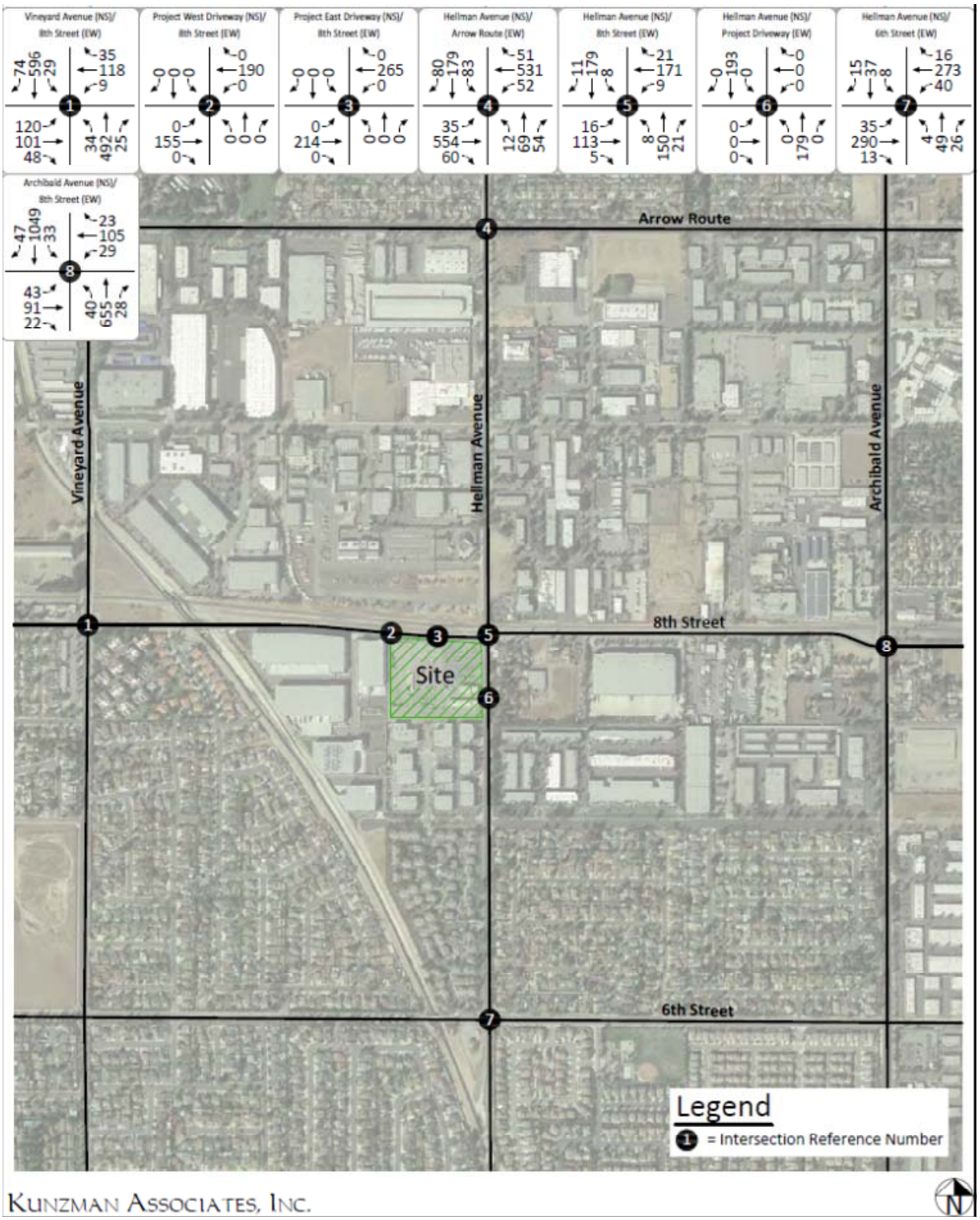


EXHIBIT 3-25
OPENING YEAR (2020) WITHOUT PROJECT AM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

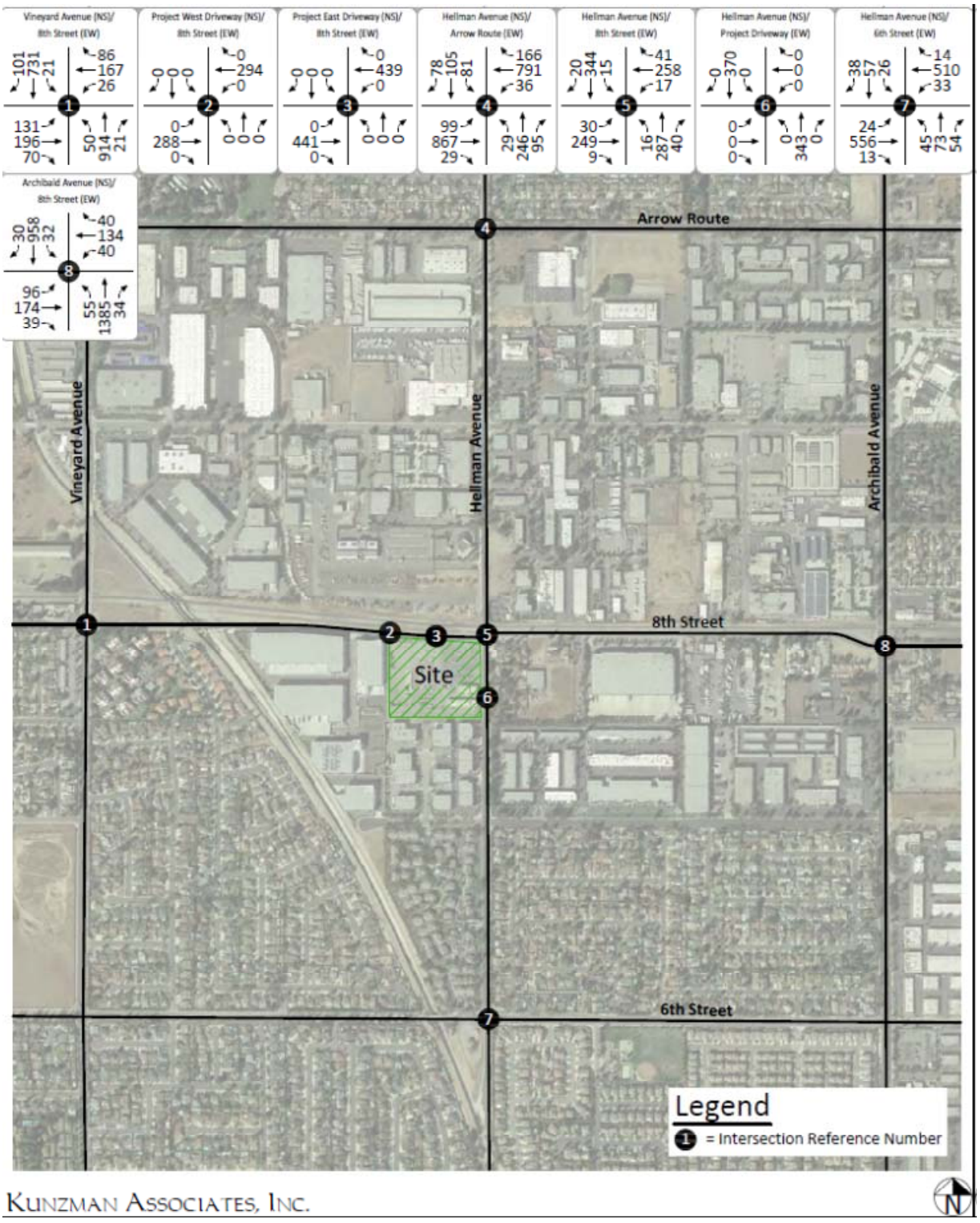


EXHIBIT 3-26
OPENING YEAR (2020) WITHOUT PROJECT PM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

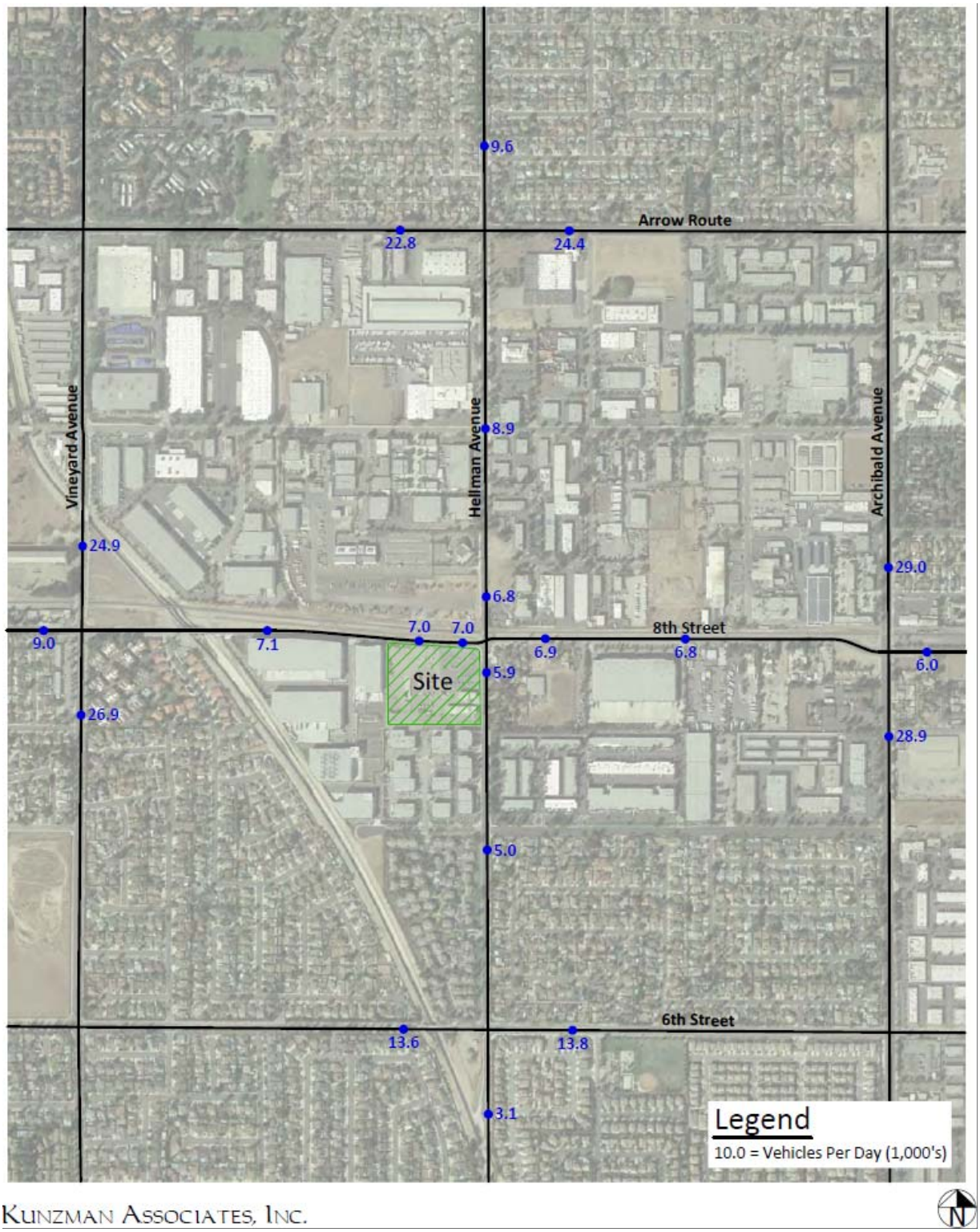


EXHIBIT 3-27
OPENING YEAR (2020) WITH PROJECT AVERAGE DAILY TRAFFIC VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

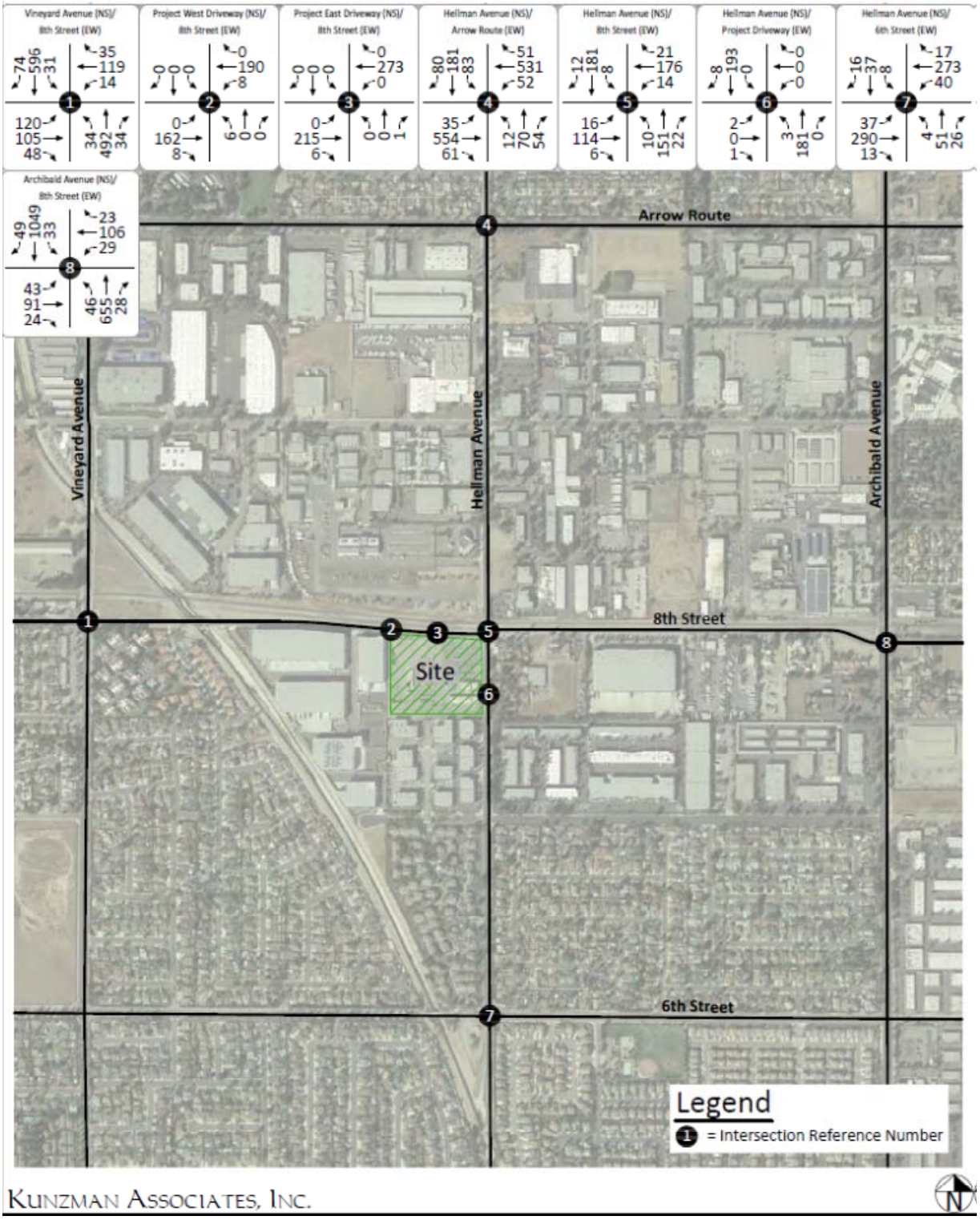
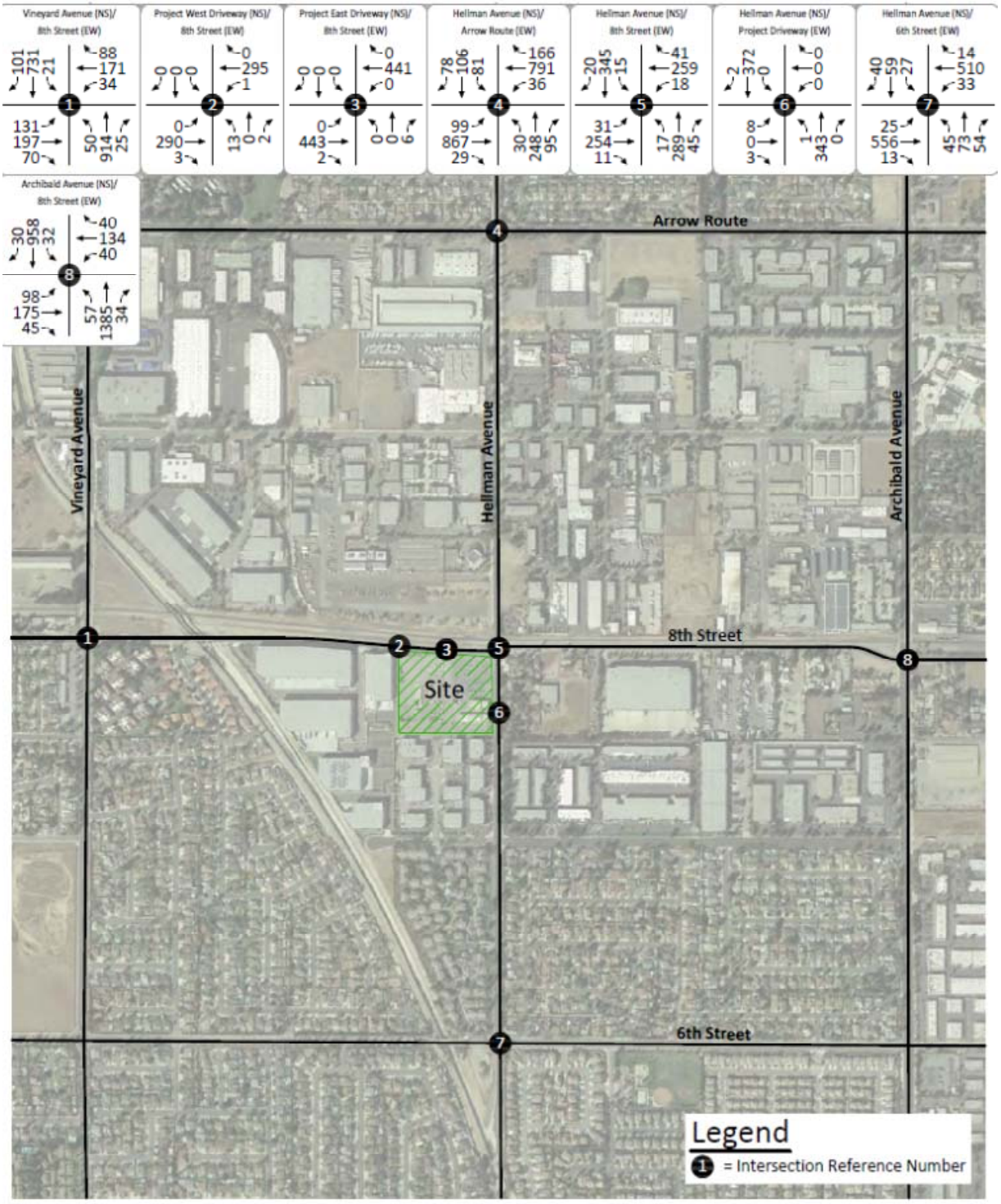


EXHIBIT 3-28
OPENING YEAR (2020) WITH PROJECT AM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.



KUNZMAN ASSOCIATES, INC.

EXHIBIT 3-29
OPENING YEAR (2020) WITH PROJECT PM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

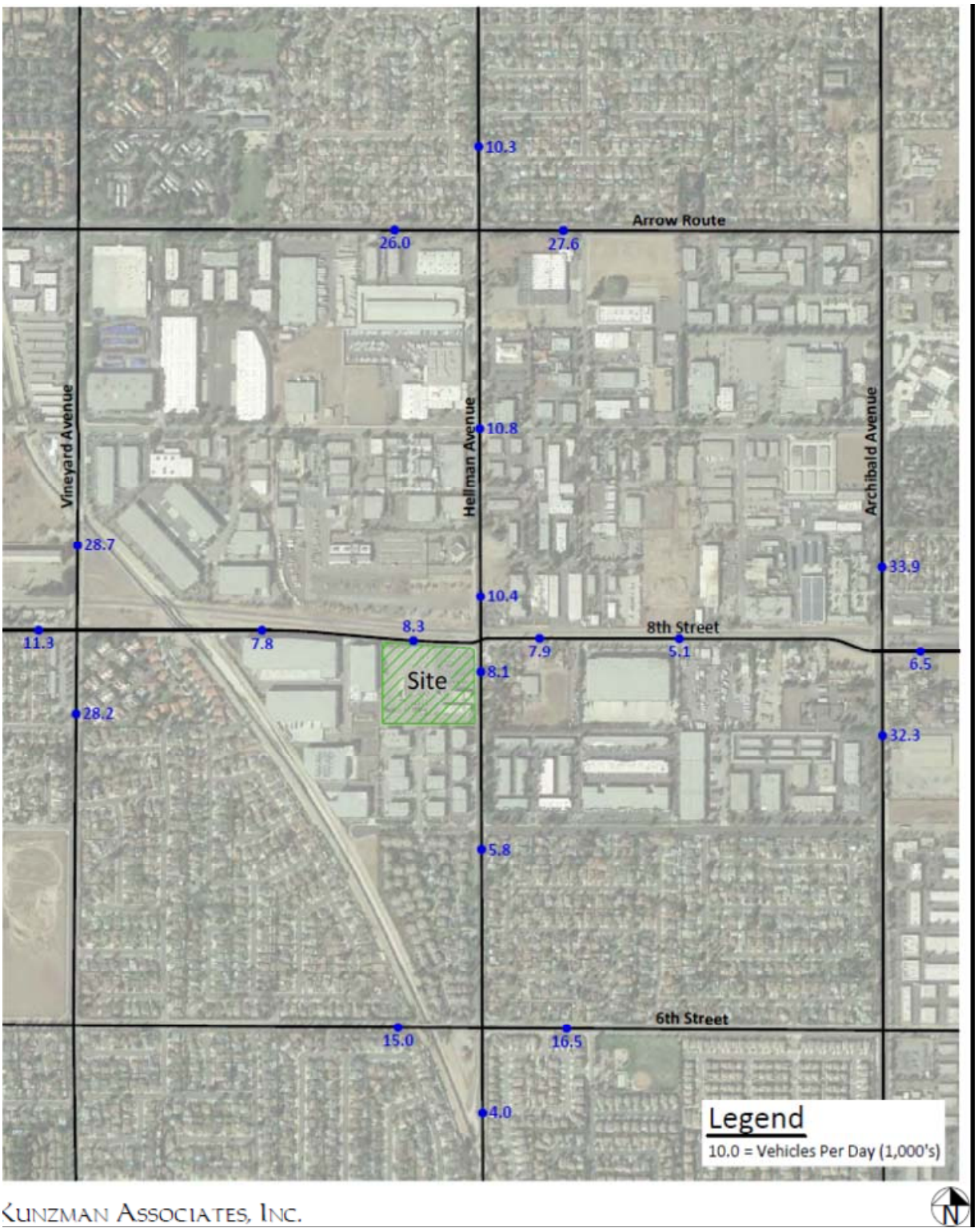
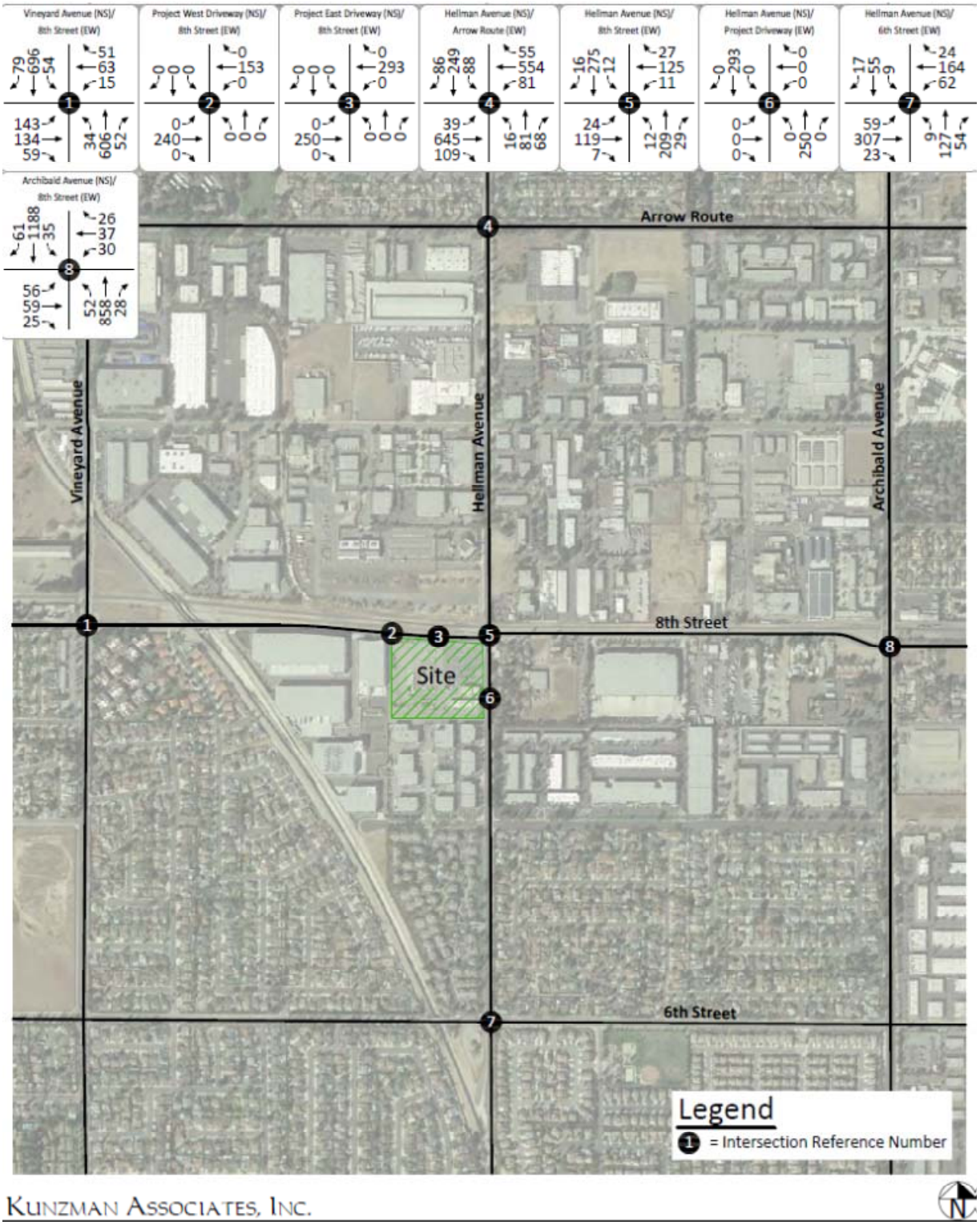


EXHIBIT 3-30
HORIZON YEAR (2040) WITHOUT PROJECT AVERAGE DAILY TRAFFIC VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.



KUNZMAN ASSOCIATES, INC.

EXHIBIT 3-31
HORIZON YEAR (2040) WITHOUT PROJECT AM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

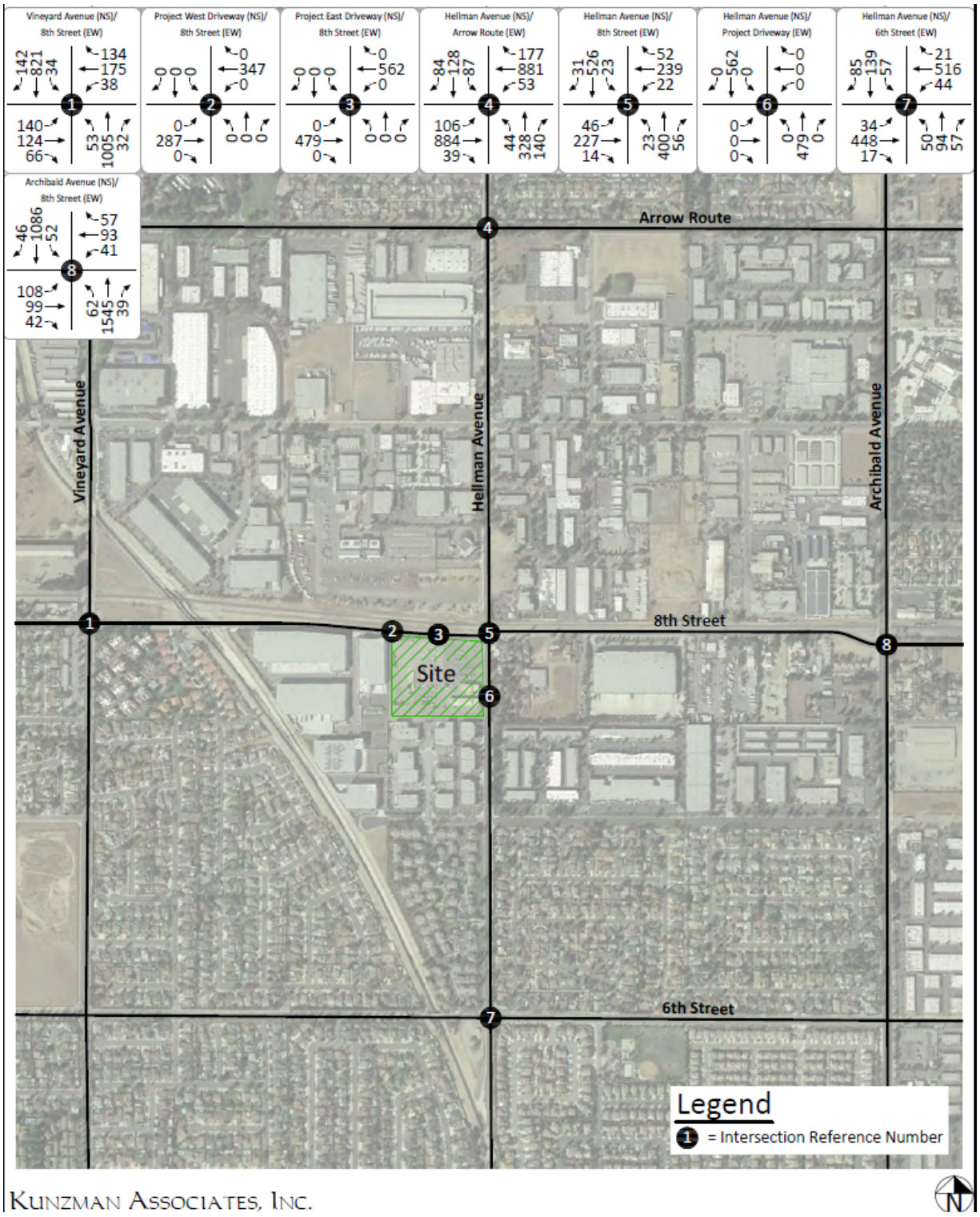
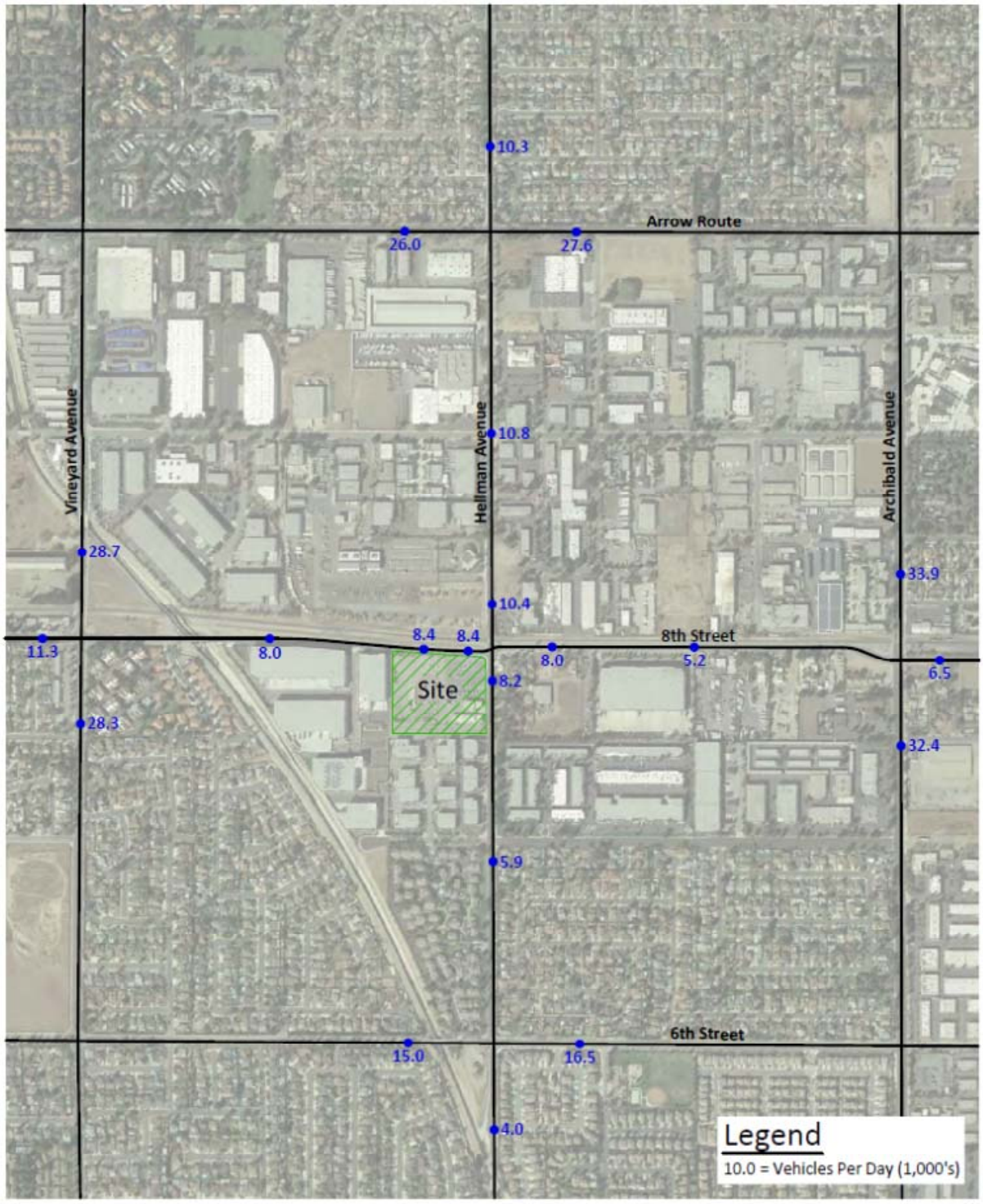


EXHIBIT 3-32
HORIZON YEAR (2040) WITHOUT PROJECT PM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.



KUNZMAN ASSOCIATES, INC.

EXHIBIT 3-33
HORIZON YEAR (2040) WITH PROJECT AVERAGE DAILY TRAFFIC VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

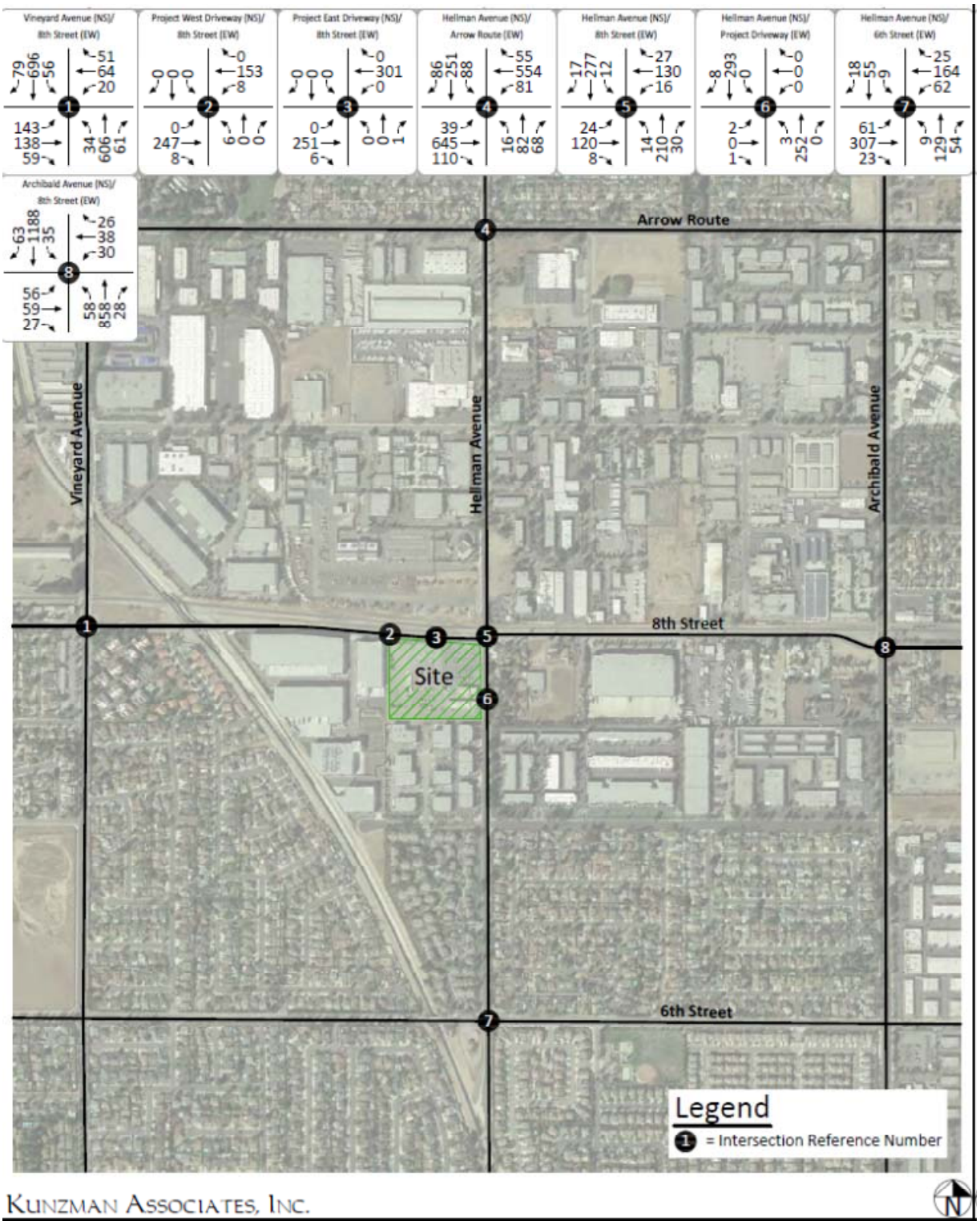


EXHIBIT 3-34
HORIZON YEAR (2040) WITH PROJECT AM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

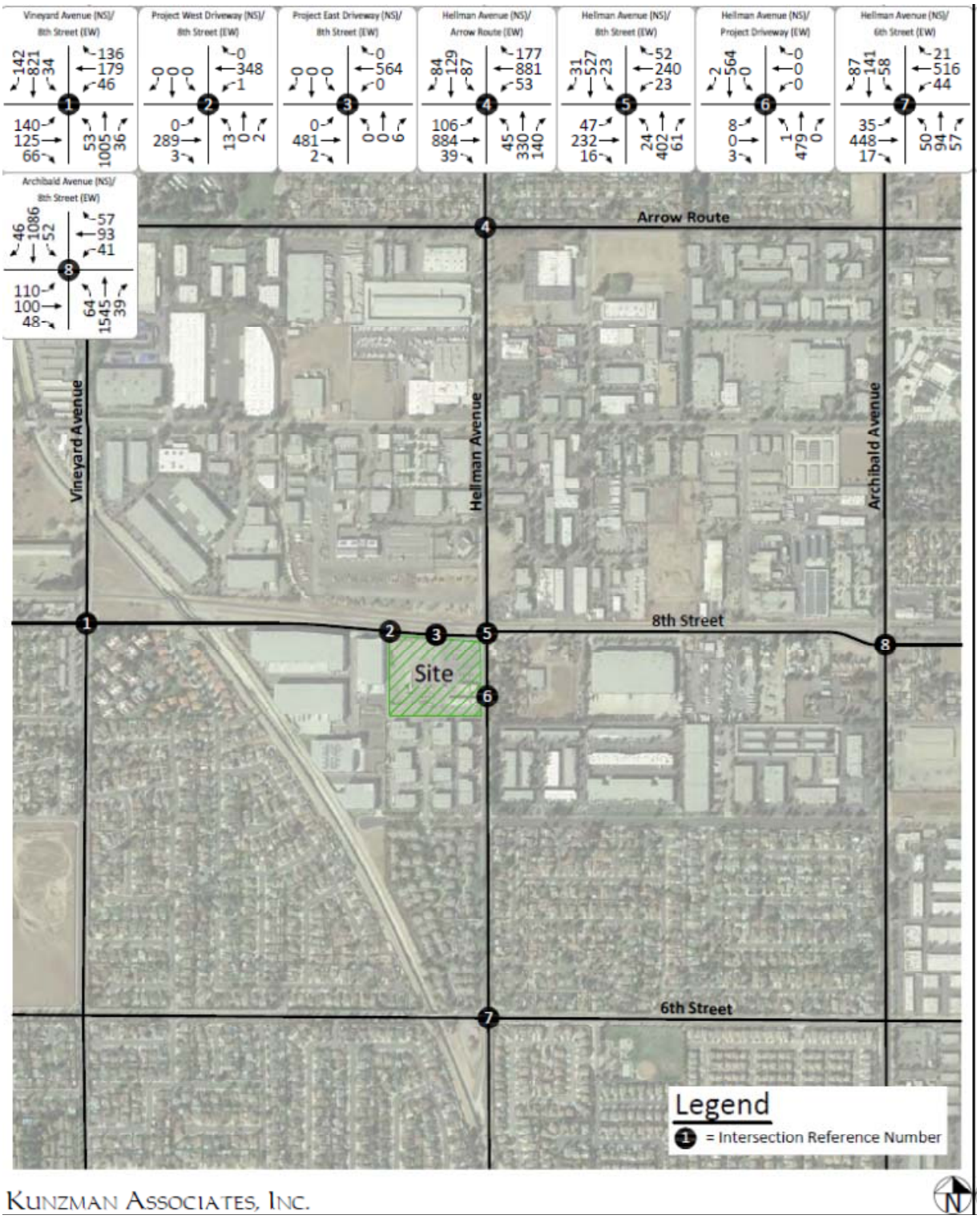


EXHIBIT 3-35
HORIZON YEAR (2040) WITH PROJECT PM PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

SOURCE: KUNZMAN ASSOCIATES, INC.

Table 3-13
Existing Plus Project Levels of Service for the Study Intersections

Intersection	Traffic Control	Intersection Approach Lanes												Peak Hour Delay – Level of Service			
		Northbound			Southbound			Eastbound			Westbound			Existing Without Project		Existing With Project	
		L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
Vineyard Avenue (NS) at: 8th Street (EW) -# 1	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1	1	11.4- B	13.1-B	11.5-B	13.2-B
Project West Access (NS) at: 8th Street (EW) -# 2	CSS	0.5	0	0.5	0	0	0	0	0.5	0.5	0.5	0.5	0	--	--	10.1-B	12.1-B
Project East Access (NS) at: 8th Street (EW) -# 3	CSS	0.5	0	0.5	0	0	0	0	0.5	0.5	0	1	0	--	--	9.2-A	10.3-B
Hellman Avenue (NS) at:																	
Arrow Route (EW) - #4	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	20.3-C	19.2-B	20.3-C	19.2-B
8th Street (EW) - #5	TS	0	1	0	0	1	0	1	0.5	0.5	1	0.5	0.5	22.8-C	40.7-D	23.2-C	41.5-D
Project South Access (EW) - #6	CSS	0.5	0.5	0	0	0.5	0.5	0.5	0	0.5	0	0	0	--	--	10.9-B	14.3-B
6th Street (EW) - #7	AWS	0.5	1.5	d	d	0.5	1	1	0.5	0.5	1	1	1	10.4-B	21.9-C	10.4-B	22.1-C
Archibald Avenue (NS) at: 8th Street (EW) - #8	TS	1	2	d	1	1.5	0.5	1	0.5	0.5	1	0.5	0.5	8.8-A	12.6-B	9.0-A	12.7-B

As shown in Table 3-13, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the morning and evening peak hours for Existing plus Project traffic conditions; therefore, the proposed project is forecast to result in no significant impacts at the study intersections for Existing plus Project traffic conditions.[137] The Opening Year (2020) Without Project delay and Levels of Service for the study intersections are shown in Table 3-14. Table 3-14 shows delay values based on lane geometries at the study intersections without and with improvements. As shown in Table 3-14 for Opening Year (2020) Without Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements:

Hellman Avenue (NS) at:

6th Street (EW) - #7.

[137] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

The Hellman Avenue and 6th Street intersection is programmed for the installation of a traffic signal per the City of Rancho Cucamonga Capital Improvement Program. For Opening Year (2020) and Horizon Year (2040) traffic conditions, the traffic signal is shown as a funded improvement.[138]

Table 3-14
Opening Year (2020) Intersection Delay and Levels of Service

Intersection	Traffic Control	Intersection Approach Lanes												Peak Hour Delay – Level of Service			
		Northbound			Southbound			Eastbound			Westbound			Without Project		With Project	
		L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
Vineyard Avenue (NS) at: 8th Street (EW) -# 1	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1	1	13.0- B	14.8-B	13.1-B	14.9B
Project West Access (NS) at: 8th Street (EW) -# 2	CSS	0.5	0	0.5	0	0	0	0	0.5	0.5	0.5	0.5	0	--	--	11.1-B	13.4-B
Project East Access (NS) at: 8th Street (EW) -# 3	CSS	0.5	0	0.5	0	0	0	0	0.5	0.5	0	1	0	--	--	9.5-A	11.2-B
Hellman Avenue (NS) at:																	
Arrow Route (EW) - #4	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	20.2-C	19.4-B	20.2-C	19.4-B
8th Street (EW) - #5	TS	0	1	0	0	1	0	1	0.5	0.5	1	0.5	0.5	24.1-C	49.0-D	24.3-C	50.1-D
Project South Access (EW) - #6	CSS	0.5	0.5	0	0	0.5	0.5	0.5	0	0.5	0	0	0	--	--	11.1-B	15.1-B
6th Street (EW) - #7	AWS	0.5	1.5	d	0.5	0.5	1	1	0.5	0.5	1	1	1	14.4-B	86.8-F	14.4-B	87.4-F
- With Improvements	TS	0.5	1.5	d	0.5	0.5	1	1	0.5	0.5	1	1	1	19.3-B	18.1-B	19.3-B	18.1-B
Archibald Avenue (NS) at: 8th Street (EW) - #8	TS	1	2	d	1	1.5	0.5	1	0.5	0.5	1	0.5	0.5	11.5-B	14.8-B	11.7-B	14.7-B

The Opening Year (2020) With Project delay and Levels of Service for the study intersections are shown in Table 3-15. Table 3-15 shows delay values based on the lane geometries at the study intersections without and with improvements. As shown in Table 3-15 for Opening Year (2020) With Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements:[139]

[138] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018

[139] Ibid.

Hellman Avenue (NS) at:

6th Street (EW) - #7

The Hellman Avenue and 6th Street intersection is programmed for the installation of a traffic signal per the City of Rancho Cucamonga Capital Improvement Program. For Opening Year (2020) and Horizon Year (2040) traffic conditions, the traffic signal is shown as a funded improvement.[140]

The Horizon Year (2040) Without Project delay and Levels of Service for the study intersections are shown in Table 3-15. Table 3-15 shows delay values based on the lane geometries at the study intersections without and with improvements.

Table 3-15
Horizon Year (2040) Intersection Delay and Levels of Service

Intersection	Traffic Control	Intersection Approach Lanes												Peak Hour Delay – Level of Service			
		Northbound			Southbound			Eastbound			Westbound			Without Project		With Project	
		L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
Vineyard Avenue (NS) at: 8th Street (EW) -# 1	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1	1	13.1- B	15.4-B	13.2-B	15.5-B
Project West Access (NS) at: 8th Street (EW) -# 2	CSS	0.5	0	0.5	0	0	0	0	0.5	0.5	0.5	0.5	0	--	--	11.3-B	13.8-B
Project East Access (NS) at: 8th Street (EW) -# 3	CSS	0.5	0	0.5	0	0	0	0	0.5	0.5	0	1	0	--	--	9.6-A	11.4-B
Hellman Avenue (NS) at:																	
Arrow Route (EW) - #4	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	19.1-B	19.5-B	19.1-B	19.5-B
8th Street (EW) - #5	TS	0	1	0	0	1	0	1	0.5	0.5	1	0.5	0.5	24.6-C	51.6-D	24.9-C	52.4-D
Project South Access (EW) - #6	CSS	0.5	0.5	0	0	0.5	0.5	0.5	0	0.5	0	0	0	--	--	12.6-B	20.8-C
6th Street (EW) - #7	AWS	0.5	1.5	d	0.5	0.5	1	1	0.5	0.5	1	1	1	12.7-B	74.8-F	12.7-B	75.2-F
- With Improvements	TS	0.5	1.5	d	0.5	0.5	1	1	0.5	0.5	1	1	1	--	--	--	--
Archibald Avenue (NS) at: 8th Street (EW) - #8	TS	1	2	d	1	1.5	0.5	1	0.5	0.5	1	0.5	0.5	9.8-B	16.9-B	9.9-A	17.1-B

[140] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

As shown in Table 3-16 for Horizon Year (2040) Without Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements:

Hellman Avenue (NS) at:

6th Street (EW) - #7

The Hellman Avenue and 6th Street intersection is programmed for the installation of a traffic signal per the City of Rancho Cucamonga Capital Improvement Program. For Opening Year (2020) and Horizon Year (2040) traffic conditions, the traffic signal is shown as a funded improvement.[141]

The Horizon Year (2040) With Project delay and Levels of Service for the study intersections are shown in Table 3-16. Table 3-16 shows delay values based on the lane geometries at the study intersections without and with improvements. As shown in Table 3-16 for Horizon Year (2040) Without Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements:

Hellman Avenue (NS) at:

6th Street (EW) - #7

The Hellman Avenue and 6th Street intersection is programmed for the installation of a traffic signal per the City of Rancho Cucamonga Capital Improvement Program. For Opening Year (2020) and Horizon Year (2040) traffic conditions, the traffic signal is shown as a funded improvement.[142] For "With Project" traffic conditions, the project generated less than 50 peak hour trips at the study intersections and project trips did not result in a significant impact at the study intersections. No study intersections were reduced from the pre-project from Level of Service D or better to the "With Project" of Level of Service E or worse for Existing plus Project traffic conditions.[143] As a result, the potential impacts are considered to be less than significant.

B. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways? ● Less than Significant Impact.

The Traffic Impact Analysis that was prepared indicated that the project's traffic would not impact any San Bernardino Congestion Management Plan (CMP) intersection. As a result, the potential impacts are considered to be less than significant.

[141] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

[142] Ibid.

[143] Ibid.

C. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in the location that results in substantial safety risks? ● No Impact.

The project site is not located within an approach or take-off aircraft safety zone for the Ontario Airport (refer to Section 3.12.2.E). As a result, no impacts are anticipated.

D. Substantially increases hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? ● Less than Significant Impact with Mitigation.

Project access is proposed to be provided via two driveways on 8th Street and one driveway on Hellman Avenue. The project east driveway on 8th Street shall be restricted to right turns in/ out only (cars only). Off-site roadway improvements were identified to eliminate any anticipated roadway operational deficiencies for which the project contributes a significant impact throughout the study area. On-site improvements and improvements adjacent to the site will be required in conjunction with the proposed development to ensure adequate circulation within the project itself.[144] The following off-site mitigation is required:

Mitigation Measure No. 8 (Transportation). The proposed project must contribute through the City of Ranch Cucamonga Development Impact Fee (DIF) program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016).

Site-specific circulation and access recommendations are depicted on Exhibit 3-36. These recommendations are reiterated as mitigation measures below:

Mitigation Measure No. 9 (Transportation). The Applicant must construct and/or repair Hellman Avenue from the west project boundary to 8th Street at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

Mitigation Measure No. 10 (Transportation). The Applicant must construct and/or repair 8th Street from Hellman Avenue to the south project boundary at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

Mitigation Measure No. 11 (Transportation). The Applicant must ensure that on-site traffic signing and striping is implemented in conjunction with detailed construction plans for the project. On-site traffic control plans must comply with the California Manual of Uniform Traffic Control Devices (2014).

[144] Kunzman Associates, Inc. *Focused Traffic Analysis*. April 17, 2018.

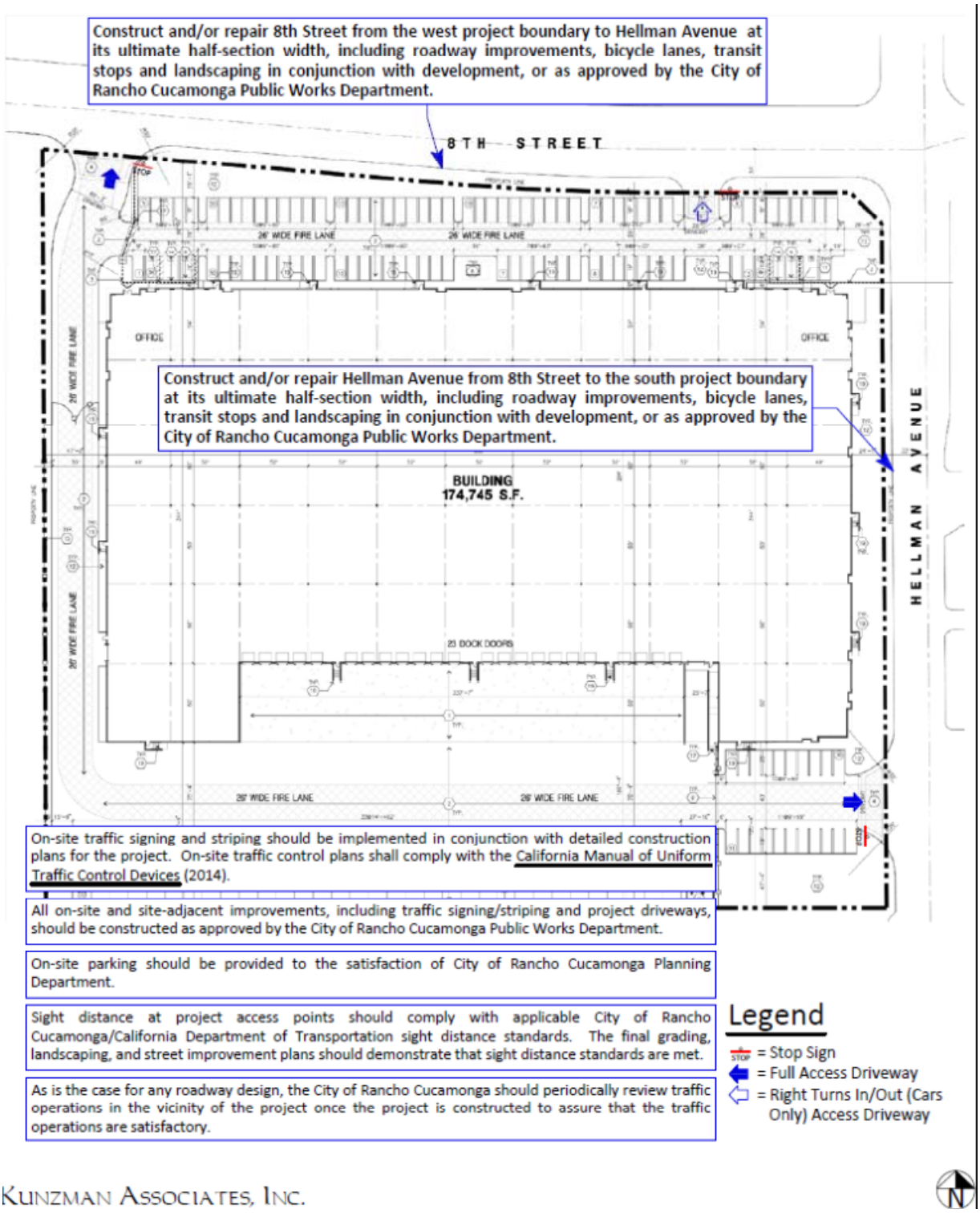


EXHIBIT 3-36
ON-SITE MITIGATION MEASURES
SOURCE: KUNZMAN ASSOCIATES, INC.

Mitigation Measure No. 12 (Transportation). The Applicant must ensure that all on-site and site-adjacent improvements, including traffic signing/striping and project driveways, be constructed as approved by the City of Rancho Cucamonga Public Works Department.

Sight distance at project access points should comply with applicable City of Rancho Cucamonga/California Department of Transportation sight distance standards. The final grading, landscaping, and street improvement plans should demonstrate that sight distance standards are met. As is the case for any roadway design, the City of Rancho Cucamonga should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory. Adherence to the ab0vementioned mitigation will reduce impacts to levels that are less than significant.

E. Result in inadequate emergency access? ● No Impact.

The project would not affect emergency access to any adjacent parcels. At no time will any local streets or parcels be closed to traffic. As a result, the proposed project's implementation will not result in any impacts.

F. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities? ● Less than Significant Impact.

The Applicant will provide new pedestrian facilities (sidewalks), bicycle lanes, and a transit stop as part of the project's approval. As a result, the potential impacts are considered to be less than significant.

3.16.3 CUMULATIVE IMPACTS

The future development contemplated as part of the proposed project's implementation would not result in significant traffic impacts. The project would be required to contribute to the City's Development Impact Fee program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016).

3.16.4 MITIGATION MEASURES

The analysis determined that following mitigation measures are required:

Mitigation Measure No. 8 (Transportation). The proposed project must contribute through the City of Ranch Cucamonga Development Impact Fee (DIF) program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016).

Site-specific circulation and access recommendations are depicted on Exhibit 3-36. These recommendations are reiterated as mitigation measures below:

Mitigation Measure No. 9 (Transportation). The Applicant must construct and/or repair Hellman Avenue from the west project boundary to 8th Street at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

Mitigation Measure No. 10 (Transportation). The Applicant must construct and/or repair 8th Street from Hellman Avenue to the south project boundary at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

Mitigation Measure No. 11 (Transportation). The Applicant must ensure that on-site traffic signing and striping is implemented in conjunction with detailed construction plans for the project. On-site traffic control plans must comply with the California Manual of Uniform Traffic Control Devices (2014).

Mitigation Measure No. 12 (Transportation). The Applicant must ensure that all on-site and site-adjacent improvements, including traffic signing/striping and project driveways, be constructed as approved by the City of Rancho Cucamonga Public Works Department.

3.17 TRIBAL CULTURAL RESOURCES

3.17.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant adverse impact on tribal cultural resources if it results in:

- A substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k); or,

- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

3.17.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)? ● Less than Significant Impact with Mitigation.

As defined in Public Resources Code 21074 and applying the criteria located in Public Resources Code Section 5024.1(c), the project site has not been identified as a "Historic Resource" per the standards of Rancho Cucamonga Municipal Code Section 2.24 (Historic Preservation). A Phase I Cultural Resources Assessment (MIG Hogle-Ireland, 2016) was performed on the project site. In conjunction with the South Central Coastal Information Center at California State University, Fullerton, the California Historical Resources Information was also consulted. The cultural resources records search indicated that there were no historic resources within the project site and none were identified during the pedestrian survey.

The cultural resources records search identified a total of three cultural resource investigations that have been conducted within a one-mile radius of the project site; these include three man-made resources. The three resources have been classified as residential homes; though none of these units are eligible for listing in either the National Register or the California Register due to room additions, alterations, and extensive remodeling. In addition, these historic resources will not be impacted by the proposed project.

The study also included consultation with Native American Heritage Commission and a requested review of the Sacred Lands Files (SLF) to determine if any recorded Native American sacred sites or locations of religious or ceremonial importance are present within one mile of the project site. The NAHC SLF records search results revealed that there are no known “Native American cultural resources” in the SLF database within the project site. As per NAHC suggested procedure, follow-up letters were sent via certified mail on October 13, 2015 to the eight Native American individuals and organizations identified by the NAHC as being affiliated with the vicinity of the project site to request any additional information they may have about Native American cultural resources that may be affected by the proposed project. As of November 9, 2015, the consultant had received one response concerning the proposed project. The Gabrieleno Band of Mission Indians – Kizh Nation requested that at least one Native American Monitor be present during all ground disturbing activities within the project area. No other responses from the Native American community concerning the proposed project were received. The study concludes with the absence of cultural resources in the current project area and surrounding vicinity, no additional cultural work is recommended.

As required by Senate Bill 18 (SB 18), the City submitted Tribal Consultation Requests for General Plan Amendment DRC2015-00683 to the Soboba Band of Luiseno Indians, the San Manuel Band of Mission Indians, the Gabrieleno Band of Mission Indians – Kizh Nation, the Gabrieleno/Tongva Nation, and the Gabrieleno/Tongva San Gabriel Band of Mission Indians. The notices were mailed on August 25, 2015 and provided for a 90-day comment period ending on November 23, 2015. Of the five tribes who were notified, none submitted a response requesting consultation during the notification period.

As required by Assembly Bill 52 (AB 52), the City submitted Tribal Consultation Requests to the Gabrieleno Band of Mission Indians – Kizh Nation, the Morongo Band of Mission Indians, Soboba Band of Luiseno Indians, the San Manuel Band of Mission Indians, the San Gabriel Band of Mission Indians, and the Torres Martinez Desert Cahuilla Indians following a completeness determination for Design Review DRC2015-00682. The notices were mailed on February 14, 2018 and provided for a 30-day comment period ending on March 19, 2018. Responses were received from two tribes: the San Manuel Band of Mission Indians and the Gabrieleno Band of Mission Indians – Kizh Nation. The San Manuel Band of Mission Indians did not request consultation, but did request that specific conditions related to funerary objects, cultural resources, and historical resources discovered during ground disturbing activities be addressed.

The Gabrieleno Band of Mission Indians – Kizh Nation requested consultation, which was held on March 21, 2018, and their comments are included in the mitigation measures below. Should any undocumented archaeological or cultural resources be discovered during ground disturbing activities, adherence to the mitigation measures listed below will ensure that all impacts will be less than significant:

> *Mitigation Measure No. 13 (Tribal Cultural Resources*). The applicant shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians to discuss Tribal Monitoring of the project during all ground disturbing activities, and any trenching below the initial grade level, to ensure that cultural resources that may be encountered during ground disturbances are protected and preserved for study. The monitor(s) must be approved by the Tribal Representatives and will be present on-site during ground disturbing activities. The Native American Monitor(s) will complete monitoring logs on a daily basis. The logs will provide descriptions of the daily activities, including construction activities, locations, soil, and any cultural materials identified. In addition, the monitor(s) will be required to provide insurance certificates, including liability insurance, for any archaeological resource(s) encountered during grading and excavation activities pertinent to the provisions outlined in the California Environmental Quality Act, California Public Resources Code Division 13, and Section 21083.2 (a) through (k). The on-site monitoring shall end when the project site grading and excavation activities are completed, or when the Tribal Representatives and monitor have indicated that the site has a low potential for archeological resources. The applicant shall submit the results of these consultations to the City prior to issuance of grading permits for the project site.

Mitigation Measure No. 14 (Tribal Cultural Resources). In the event that human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5, and that code shall be enforced for the duration of the project. Prior to the start of ground disturbing activities, the land owner shall arrange a designated site location within the footprint of the project for the respectful reburial of the human remains and/or ceremonial objects. Any discoveries of human skeletal material shall be immediately reported to the County Coroner. The monitor will then notify the Qualified Archaeologist and the construction manager who will call the coroner. Work will continue to be diverted while the coroner determines whether the remains are Native American. The discovery is to be kept confidential and secure to prevent any further disturbance. If Native American, the coroner will notify the NAHC as mandated by state law who will then appoint a Most Likely Descendent. In the case where discovered human remains cannot be fully documented and recovered on the same day, the remains will be covered with muslin cloth and a steel plate that can be moved by heavy equipment placed over the excavation opening to protect the remains. If this type of steel plate is not available, a 24 hour guard should be posted outside of working hours. The Tribe(s) will make every effort to recommend diverting the project and keeping the remains in situ and protected. If the project cannot be diverted, it may be determined that burials will be removed. The Tribe(s) will work closely with the Qualified Archaeologist to ensure that the excavation is treated carefully, ethically, and respectfully. If data recovery is approved by the Tribe(s), documentation shall be taken which includes at a minimum detailed descriptive notes and sketches. Additional types of documentation shall be approved by the Tribe(s) for data recovery purposes. Cremations will either be removed in bulk or by means as necessary to ensure completely recovery of all material. If the discovery of human remains includes 4 or more burials, the location is considered a cemetery and a separate treatment plan shall be created. The project applicant shall consult with the Tribe(s) regarding avoidance of all cemetery sites. Once complete, a final report of all activities is to be submitted to the NAHC. The Tribe(s) do NOT authorize any scientific study or the utilization of any invasive diagnostics on human remains.

Mitigation Measure No. 15 (Tribal Cultural Resources). In the event that Native American cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior (SOI) standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. The archaeologist shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for input regarding the preservation, retention and final disposition of any discovered cultural resources. The archaeologist shall prepare a mitigation plan and technical resources management report, which shall document the inventory, evaluation, and proposed mitigation of resources within the project area. Additionally, the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians will be contacted if any such find occurs and be provided information and permitted/invited to perform a site visit when the archaeologist makes his/her assessment, so as to provide Tribal input. All archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist and

Native Monitor. If the resources are Native American in origin, the Tribe(s) shall coordinate with the landowner regarding treatment and curation of these resources. Typically, the Tribe(s) will request reburial or preservation for educational purposes. If a resource is determined by the Qualified Archaeologist to constitute a "historical resource" pursuant to CEQA Guidelines Section 15064.5(a) or has a "unique archaeological resource" pursuant to Public Resources Code Section 21083.2(g), the Qualified Archaeologist shall coordinate with the applicant and the City to develop a formal treatment plan that would serve to reduce impacts to the resources. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Sections 21083.2(b) for unique archaeological resources. Preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. Any historic archaeological material that is not Native American in origin shall be curated at a public, non-profit institution with a research interest in the materials, such as the San Bernardino County Museum, if such an institution agrees to accept the material. If no institution accepts the archaeological material, they shall be donated to a local school or historical society in the area for educational purposes.

Mitigation Measure No. 16 (Tribal Cultural Resources). In the event that significant Native American historical resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, an SOI-qualified archaeologist shall be retained to develop a cultural resources Treatment Plan, as well as a Discovery and Monitoring Plan, the drafts of which shall be provided to the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for review and comment. All in-field investigations, assessments, and/or data recovery enacted pursuant to the finalized Treatment Plan shall be monitored by a Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians Tribal Participant(s). The Lead Agency and/or applicant shall, in good faith, consult with Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians on the disposition and treatment of any artifacts or other cultural materials encountered during the project.

Mitigation Measure No. 17 (Tribal Cultural Resources). Non-Native American artifacts shall be inventoried, assessed, and analyzed for cultural affiliation, personal affiliation (prior ownership), function, and temporal placement. Subsequent to analysis and reporting, these artifacts shall be subjected to curation or returned to the Property Owner/Developer, as deemed appropriate. Once ground altering activities have ceased or the Archeologist determines that monitoring activities are no longer necessary, monitoring activities may be discontinued following notification to the City of Rancho Cucamonga Planning Department.

Adherence to the above-mentioned mitigation will ensure that potential impacts to tribal cultural resources remain at levels that are considered to be less than significant.

B. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe? ● Less than Significant Impact.

As stated previously, the City submitted Tribal Consultation Requests for General Plan Amendment DRC2015-00683 to the Soboba Band of Luiseno Indians, the San Manuel Band of Mission Indians, the Gabrieleno Band of Mission Indians – Kizh Nation, the Gabrieleno/Tongva Nation, and the Gabrieleno/Tongva San Gabriel Band of Mission Indians. The notices were mailed on August 25, 2015 and provided for a 90-day comment period ending on November 23, 2015. Of the five tribes who were notified, none submitted a response requesting consultation during the notification period.

In addition, the City submitted AB-52 Tribal Consultation Requests to the Gabrieleno Band of Mission Indians – Kizh Nation, the Morongo Band of Mission Indians, Soboba Band of Luiseno Indians, the San Manuel Band of Mission Indians, the San Gabriel Band of Mission Indians, and the Torres Martinez Desert Cahuilla Indians following a completeness determination for Design Review DRC2015-00682. The notices were mailed on February 14, 2018 and provided for a 30-day comment period ending on March 19, 2018. Responses were received from two tribes: the San Manuel Band of Mission Indians and the Gabrieleno Band of Mission Indians – Kizh Nation. The San Manuel Band of Mission Indians did not request consultation, but did request that specific conditions related to funerary objects, cultural resources, and historical resources discovered during ground disturbing activities be addressed. The Gabrieleno Band of Mission Indians – Kizh Nation requested consultation, which was held on March 21, 2018. Their comments are re-iterated as mitigation measures in the previous subsection. As a result, less than significant impacts are anticipated to occur.

3.17.3 CUMULATIVE IMPACTS

Typically, the impacts to tribal cultural resources are site-specific. The analysis determined that the potential impacts related to tribal cultural resources are considered to be less than significant. As a result, no significant cumulative impacts will occur as part of the implementation of the proposed project.

3.17.4 MITIGATION MEASURES

The analysis of tribal cultural resources indicated that the following mitigation would be required:

Mitigation Measure No. 13 (Tribal Cultural Resources). The applicant shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians to discuss Tribal Monitoring of the project during all ground disturbing activities, and any trenching below the initial grade level, to ensure that cultural resources that may be encountered during ground disturbances are protected and preserved for study. The monitor(s) must be approved by the Tribal Representatives and will be present on-site during ground disturbing activities. The Native American Monitor(s) will complete monitoring logs on a daily basis. The

logs will provide descriptions of the daily activities, including construction activities, locations, soil, and any cultural materials identified. In addition, the monitor(s) will be required to provide insurance certificates, including liability insurance, for any archaeological resource(s) encountered during grading and excavation activities pertinent to the provisions outlined in the California Environmental Quality Act, California Public Resources Code Division 13, and Section 21083.2 (a) through (k). The on-site monitoring shall end when the project site grading and excavation activities are completed, or when the Tribal Representatives and monitor have indicated that the site has a low potential for archeological resources. The applicant shall submit the results of these consultations to the City prior to issuance of grading permits for the project site.

Mitigation Measure No. 14 (Tribal Cultural Resources). In the event that human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5, and that code shall be enforced for the duration of the project. Prior to the start of ground disturbing activities, the land owner shall arrange a designated site location within the footprint of the project for the respectful reburial of the human remains and/or ceremonial objects. Any discoveries of human skeletal material shall be immediately reported to the County Coroner. The monitor will then notify the Qualified Archaeologist and the construction manager who will call the coroner. Work will continue to be diverted while the coroner determines whether the remains are Native American. The discovery is to be kept confidential and secure to prevent any further disturbance. If Native American, the coroner will notify the NAHC as mandated by state law who will then appoint a Most Likely Descendent. In the case where discovered human remains cannot be fully documented and recovered on the same day, the remains will be covered with muslin cloth and a steel plate that can be moved by heavy equipment placed over the excavation opening to protect the remains. If this type of steel plate is not available, a 24 hour guard should be posted outside of working hours. The Tribe(s) will make every effort to recommend diverting the project and keeping the remains in situ and protected. If the project cannot be diverted, it may be determined that burials will be removed. The Tribe(s) will work closely with the Qualified Archaeologist to ensure that the excavation is treated carefully, ethically, and respectfully. If data recovery is approved by the Tribe(s), documentation shall be taken which includes at a minimum detailed descriptive notes and sketches. Additional types of documentation shall be approved by the Tribe(s) for data recovery purposes. Cremations will either be removed in bulk or by means as necessary to ensure completely recovery of all material. If the discovery of human remains includes 4 or more burials, the location is considered a cemetery and a separate treatment plan shall be created. The project applicant shall consult with the Tribe(s) regarding avoidance of all cemetery sites. Once complete, a final report of all activities is to be submitted to the NAHC. The Tribe(s) do NOT authorize any scientific study or the utilization of any invasive diagnostics on human remains.

Mitigation Measure No. 15 (Tribal Cultural Resources). In the event that Native American cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior (SOI) standards shall be hired to assess the find. Work on the other portions of the project outside

of the buffered area may continue during this assessment period. The archaeologist shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for input regarding the preservation, retention and final disposition of any discovered cultural resources. The archaeologist shall prepare a mitigation plan and technical resources management report, which shall document the inventory, evaluation, and proposed mitigation of resources within the project area. Additionally, the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians will be contacted if any such find occurs and be provided information and permitted/invited to perform a site visit when the archaeologist makes his/her assessment, so as to provide Tribal input. All archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist and Native Monitor. If the resources are Native American in origin, the Tribe(s) shall coordinate with the landowner regarding treatment and curation of these resources. Typically, the Tribe(s) will request reburial or preservation for educational purposes. If a resource is determined by the Qualified Archaeologist to constitute a "historical resource" pursuant to CEQA Guidelines Section 15064.5(a) or has a "unique archaeological resource" pursuant to Public Resources Code Section 21083.2(g), the Qualified Archaeologist shall coordinate with the applicant and the City to develop a formal treatment plan that would serve to reduce impacts to the resources. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Sections 21083.2(b) for unique archaeological resources. Preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. Any historic archaeological material that is not Native American in origin shall be curated at a public, non-profit institution with a research interest in the materials, such as the San Bernardino County Museum, if such an institution agrees to accept the material. If no institution accepts the archaeological material, they shall be donated to a local school or historical society in the area for educational purposes.

Mitigation Measure No. 16 (Tribal Cultural Resources). In the event that significant Native American historical resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, an SOI-qualified archaeologist shall be retained to develop a cultural resources Treatment Plan, as well as a Discovery and Monitoring Plan, the drafts of which shall be provided to the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for review and comment. All in-field investigations, assessments, and/or data recovery enacted pursuant to the finalized Treatment Plan shall be monitored by a Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians Tribal Participant(s). The Lead Agency and/or applicant shall, in good faith, consult with Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians on the disposition and treatment of any artifacts or other cultural materials encountered during the project.

Mitigation Measure No. 17 (Tribal Cultural Resources). Non-Native American artifacts shall be inventoried, assessed, and analyzed for cultural affiliation, personal affiliation (prior ownership), function, and temporal placement. Subsequent to analysis and reporting, these artifacts shall be subjected to curation or returned to the Property Owner/Developer, as deemed appropriate. Once ground altering activities have ceased or the Archeologist determines that monitoring activities are no longer necessary, monitoring activities may be discontinued following notification to the City of Rancho Cucamonga Planning Department.

3.18 UTILITIES

3.18.1 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be deemed to have a significant adverse impact on utilities if it would:

- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board;
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed;
- Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; or,
- Comply with federal, state, and local statutes and regulations related to solid waste.

3.18.2 ANALYSIS OF ENVIRONMENTAL IMPACTS

A. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board? ● Less than Significant Impact.

Wastewater conveyance is handled by the City and Cucamonga Valley Water District, and wastewater is processed by Cucamonga Valley Water District and the Inland Empire Utilities Agency (IEUA). The

Cucamonga Valley Water District oversees the facilities and infrastructure that transport wastewater to treatment plants operated by the IEUA. At IEUA treatment plants, wastewater is subject to tertiary-level water treatment, an advanced process that produces effluent suitable for re-use. The IEUA operates the Wastewater Regional Plant No. 4 located at the intersection of 6th Street and Etiwanda Avenue in Rancho Cucamonga.[145] This Plant has undergone an expansion to increase the design hydraulic domestic sewage (wastewater) treatment capacity to 14 million gallons per day.[146] The plant serves areas of Fontana, Rancho Cucamonga, and San Bernardino County. The plant treats the liquid portion of an average influent wastewater flow of approximately ten million gallons per day.[147]

Table 3-16 indicates the future wastewater generation in gallons per day. According to Table 3-16, the proposed project is expected to generate approximately 1,863 gallons of sewage per day, which is well within the daily average totals for the Wastewater Regional Plant No. 4.

Table 3-16
Wastewater (Effluent) Generation (gals/day)

Use	Unit	Factor	Generation
Warehouse	174,745 sq.ft.	1,863 gallons/unit/day	1,863 gals/day
Total	174,745 sq.ft.		1,863 gals/day

Source: Cucamonga Valley Water District, Engineering & Water Resources Departments
Urban Water Management Plan 2000.

The project will connect to an existing 21-inch sewer line located along Hellman Avenue and to an existing 15-inch sewer line located along 8th Street. The existing sewer lines have sufficient capacity to accommodate the projected flows and adequate sewage collection and treatment are currently available. In addition, the new plumbing fixtures that will be installed will consist of water conserving fixtures as is required by the current City Code requirements, no new or expanded sewage, and/or water treatment facilities will be required to accommodate the proposed project. As a result, the impacts are expected to be less than significant.

B. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? ● Less than Significant Impact.

The demand for water and wastewater treatment services can be accommodated by the existing facilities. As indicated above, the Wastewater Regional Plant No. 4 can process the increase in sewage. Therefore, the potential impacts are considered to be less than significant.

[145] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Public Facilities and Infrastructure Element*. Plan adopted May 19, 2010.

[146] Inland Empire Utilities Agency. *Facilities – Regional Water Recycling Plant No. 4*. https://www.ieua.org/facilities/rp-4/. Website accessed April 30, 2018.

[147] Ibid.

C. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? ● Less than Significant Impact.

A Water Quality Management Plan (WQMP) was prepared for the project by Thienes Engineering, Inc. pursuant to Section 19.20.260 of the City of Rancho Cucamonga Municipal Code. A WQMP is required of new development/redevelopment projects specified in the chapter. The WQMP must outline appropriate non-structural and structural Best Management Practices (BMPs), including stormwater infiltration and treatment devices, which would be implemented and installed to prevent pollutants from being discharged into the City's municipal separate storm sewer system, during and after construction. The WQMP is presented in Appendix D.

The WQMP recommended the inclusion of two Stormtech SC-740 stormwater chambers, grate inlet filters, and curb inlet filters.[148] The Stormtech SC-740 chambers would be installed below ground surface (BGS). These chambers consist of a polypropylene corrugated chamber (resembling a tube-like structure), filter fabric, and a stone bottom. Water accumulates within the isolator row as it simultaneously permeates through the filter fabric. Solid contaminants such as rubbish, debris, leaves, sediment, and other particles are captured from the runoff by the fabric. From there, water would percolate through the stone bottom into the ground. The project would also include grate and curb inlet filters. These filters consist of stainless steel mesh, which traps sediment and allows filtered water to be conveyed through the local storm drains.

Adherence to the construction and post-construction BMPs identified above and in the mandatory WQMP would filter out contaminants of concern (oil, grease, debris, leaves, etc.), minimize the discharge of contaminated runoff into the adjacent streets, local storm drains, and the underlying groundwater table. Once constructed, the project would not create excess runoff that would exceed the capacity of the existing storm water drainage system. The project site in its current state is 100 percent impervious; following construction, ten percent of the site would be covered in pervious surfaces. As a result, the potential impacts are considered to be less than significant.

D. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? ● Less than Significant Impact.

According to the Cucamonga Valley Urban Water Management Plan, the Cucamonga Valley Water District serves a 47 square mile area which includes the City of Rancho Cucamonga, portions of the cities of Upland, Ontario, Fontana, and portions of unincorporated San Bernardino County. Imported water is the District's most significant water supply and can range approximately 35 to 65 percent of the District's water. Sufficient connection capacity exists to meet current and future imported water demands. The District produces groundwater from the two groundwater basins that underlie the District service area: Chino Basin and Cucamonga Basin. In addition to imported water and groundwater, the District has rights to six sources of surface water from the canyons: Cucamonga Canyon, Day/East Canyon, Deer Canyon, Lytle Creek, Smith Canyon Group, and the Golf Course

[148] Thienes Engineering, Inc. *Preliminary Water Quality Management Plan*. Plan dated January 24, 2018.

Tunnel. Currently, water is only utilized from three of the six sources: Cucamonga Canyon, Day/East Canyon, and Deer Canyon.[149]

The Cucamonga Valley Water District's Urban Water Management Plan indicates that the District will have an adequate supply of water to meet projected demand through the year 2035. According to the Urban Water Management Plan, demand for water is projected to reach 63,700 acre-feet per year by the year 2035. The District is anticipated to have a projected supply of 65,700 acre-feet per year by 2035. The report also states that the District will have an adequate supply of water to meet the project demand during a single dry year as well as multiple dry years.[150] As indicated in Table 3-17, the proposed project is projected to consume approximately 1,863 gallons of water on a daily basis.

Table 3-17
Water Consumption (gals/day)

Use	Unit	Factor	Generation
Warehouse	174,745 sq.ft.	1,863 gallons/unit/day	1,863 gals/day
Total	174,745 sq.ft.		1,863 gals/day

Source: Cucamonga Valley Water District, Engineering & Water Resources Departments
Urban Water Management Plan 2000.

The project will connect to an existing 12-inch water line located along Hellman Avenue and an existing 16-inch water line located along 8th Street. The existing water supply facilities and infrastructure will be able accommodate this additional demand. In addition, the warehouse will be equipped with water efficient fixtures and drought tolerant landscaping will be planted throughout the project site. As a result, the impacts are considered to be less than significant.

E. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? ● Less than Significant Impact.

As indicated previously, wastewater conveyance is handled by the City and Cucamonga Valley Water District, and wastewater is processed by Cucamonga Valley Water District and the Inland Empire Utilities Agency (IEUA). The Cucamonga Valley Water District oversees the facilities and infrastructure that transport wastewater to treatment plants operated by the IEUA. At IEUA treatment plants, wastewater is subject to tertiary-level water treatment, an advanced process that produces effluent suitable for re-use. The IEUA operates the Wastewater Regional Plant No. 4 located at the intersection of 6th Street and Etiwanda Avenue in Rancho Cucamonga.[151]

[149] Civiltech Engineering, Inc. *Cucamonga Valley Water District, 2015 Urban Water Management Plan*. June 2016.

[150] Ibid (refer to Tables 10, 43, 46, and 47).

[151] City of Rancho Cucamonga and Hogle-Ireland. *Rancho Cucamonga General Plan Public Facilities and Infrastructure Element*. Plan adopted May 19, 2010.

This Plant has undergone an expansion to increase the design hydraulic domestic sewage (wastewater) treatment capacity to 14 million gallons per day.[152] The plant serves areas of Fontana, Rancho Cucamonga, and San Bernardino County. The plant treats the liquid portion of an average influent wastewater flow of approximately ten million gallons per day.[153] According to Table 3-16, the proposed project is expected to generate approximately 1,863 gallons of sewage per day, which is well within the daily average totals for the Wastewater Regional Plant No. 4. As a result, the impacts are expected to be less than significant.

F. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? ● Less than Significant Impact.

The City contracts its waste collection services with Burrtec Waste Industries, who disposes waste collected within the City to the West Valley Materials Recovery Facility in the City of Fontana.[154] This facility is permitted to receive up to 7,500 tons of solid waste on a daily basis.[155] The proposed project is anticipated to generate approximately 1,048 pounds per day of solid waste (refer to Table 3-18 shown below). This amount is not significant and will be accommodated by the aforementioned transfer station. As a result, the potential impacts are considered to be less than significant.

Table 3-18
Solid Waste Generation (lbs/day)

Use	Unit	Factor	Generation
Warehouse	174,745 sq.ft.	6 lbs/ 1,000 sq. ft./day	1,048 lbs/ day
Total	174,745 sq.ft.		1,048 lbs/ day

Source: Blodgett Baylosis Environmental Planning.

G. Comply with federal, state, and local statutes and regulations related to solid waste? ● No Impact.

The proposed project, like all other development in Rancho Cucamonga, will be required to adhere to City and County ordinances with respect to waste reduction and recycling. As a result, no impacts related to State and local statutes governing solid waste are anticipated.

3.18.3 CUMULATIVE IMPACTS

The analysis herein determined that the proposed project would not result in any significant impacts on local utilities. The ability of the existing sewer lines, water lines, and other utilities to accommodate

[152] Inland Empire Utilities Agency. *Facilities – Regional Water Recycling Plant No. 4*. https://www.ieua.org/facilities/rp-4/. Website accessed April 30, 2018.

[153] Ibid.

[154] Phone call with a representative of Burrtec Waste Industries. The phone call took place April 30, 2018.

[155] CalRecycle. *Facility/Site Summary Details- West Valley Materials Recovery Facility*. http://www.calrecycle.ca.gov/SWFacilities/Directory/36-AA-0341/. Site accessed April 30, 2018.

the projected demand from future related projects will require evaluation on a case-by-case basis. As a result, no cumulative impacts on utilities will occur.

3.18.4 MITIGATION MEASURES

The analysis of utilities impacts indicated that no significant impacts would result from the proposed project's approval and subsequent implementation. As a result, no mitigation is required.

3.19 MANDATORY FINDINGS OF SIGNIFICANCE

The following findings can be made regarding the Mandatory Findings of Significance set forth in Section 15065 of the CEQA Guidelines based on the results of this environmental assessment:

- *Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? ● Less than Significant Impact.*

The proposed project will not have the potential to degrade the quality of the environment since the project's air quality emissions will be below the thresholds of significance outlined by the SCAQMD. No impacts to protected species or habitat would result with the implementation of the proposed project. Furthermore, the best management practices identified in the preliminary WQMP will filter out contaminants of concern present in stormwater runoff. The addition of project trips will not negatively impact any local intersection. Lastly, the project will include energy and water efficient appliances and fixtures.

- *Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)? ● Less than Significant Impact.*

According to the City, there are three related projects located within one mile of the project site. The cumulative air quality emissions will be below the thresholds of significance established by the SCAQMD. In addition, the cumulative GHG emissions from the four projects (including the proposed project) will still be below the thresholds of significance established by the SCAQMD (the CalEEMod worksheets for the cumulative emissions are provided in the Appendix).

- *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? ● Less than Significant Impact with Mitigation.*

Daytime and nighttime light and glare from both the proposed project would not contribute any significant impacts since the project must comply with the City's municipal code. The project's operational air quality impacts would be less than significant. However, the project's construction

would have the potential to result in particulate matter emissions which may affect the adjacent sensitive receptors. Therefore, project contractors would be responsible for maintaining compliance with SCAQMD's mandatory Rule 403 regulations, which significantly reduce the generation of fugitive dust. In addition, future truck drivers must adhere to Title 13 - §2485 of the California Code of Regulations, which limits the idling of diesel powered vehicles to less than five minutes. Adherence to the aforementioned standard condition will minimize odor impacts from diesel trucks. Adherence to Rule 403 Regulations and Title 13 - §2485 of the California Code of Regulations will reduce potential impacts to levels that are less than significant. Adherence to the construction noise mitigation provided in the preceding analysis would prevent the exposure of sensitive receptors to excess noise. Lastly, the addition of the project's traffic would not result in a deterioration of any intersection's level of service or the creation of a CO hot-spot. As a result, the potential impacts are considered to be less than significant with adherence to the required mitigation measures.

SECTION 4 CONCLUSIONS

4.1 FINDINGS

The Initial Study determined that the proposed project is not expected to have significant adverse environmental impacts. The following findings can be made regarding the Mandatory Findings of Significance set forth in Section 15065 of the CEQA Guidelines based on the results of this Initial Study:

- The proposed project *will not* have a significant effect on the environment.
- The proposed project *will not* have the potential to achieve short-term goals to the disadvantage of long-term environmental goals.
- The proposed project *will not* have impacts that are individually limited, but cumulatively considerable, when considering planned or proposed development in the immediate vicinity.
- The proposed project *will not* have environmental effects that will adversely affect humans, either directly or indirectly.
- A Mitigation Reporting and Monitoring Program *will be* required.

4.2 MITIGATION MONITORING & REPORTING PROGRAM

4.2.1. OVERVIEW OF THE PROJECT

The City of Rancho Cucamonga, in its capacity as the Lead Agency, is considering an application to permit the construction of a 174,745 square-foot warehouse on a 8.09-acre site (352,428 square feet) located on the southwest corner of 8th Street and Hellman Avenue. The new building will consist of 160,245 square feet of warehousing, 12,000 square feet of office space, and 2,500 square feet of office mezzanine. A total of 21 dock high doors will be provided along the new building's southern elevation. In addition, 119 parking spaces and 31 trailer parking spaces will be provided in the northern and southern portions of the project site, respectively. Access to the project site will be provided by a driveway located along the west side of Hellman Avenue and two driveways located along the south side of 8th Street. Lastly, a total of 36,312 square feet of landscaping will be provided.[156]

4.2.2. FINDINGS RELATED TO MITIGATION MONITORING

Section 21081(a) of the Public Resources Code states that findings must be adopted by the decision-makers coincidental to the approval of a Mitigated Negative Declaration. These findings shall be incorporated as part of the decision-maker's findings of fact, in response to AB-3180. In accordance with the requirements of Section 21081(a) and 21081.6 of the Public Resources Code, the following additional findings may be made:

[156] HPA Architecture. *Overall Site Plan.* Plan packet dated January 25, 2018.

- A mitigation reporting or monitoring program will be required;

- Site plans and/or building plans, submitted for approval by the responsible monitoring agency, shall include the required standard conditions; and,

- An accountable enforcement agency or monitoring agency shall be identified for the mitigations adopted as part of the decision-maker's final determination.

4.2.3. MITIGATION MEASURES

In the event that previously unidentified paleontological or archeological resources are encountered, the following mitigation will be required:

Mitigation Measure No. 1 (Cultural Resources). In the event that potentially significant archaeological materials are encountered during project related construction activities, all work must be halted in the vicinity of the archaeological discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the archaeological resource.

Mitigation Measure No. 2 (Cultural Resources). If previously unidentified paleontological resources are unearthed during construction, work shall cease within 50 feet of the find and the project Applicant must retain a qualified paleontologist, approved by the City, to assess the significance of the find. If a find is determined to be significant, the Lead Agency and the paleontologist will determine appropriate avoidance measures or other appropriate mitigation. All significant fossil materials recovered will be, as necessary and at the discretion of the qualified paleontologist, subject to scientific analysis, professional museum curation, and documentation according to current professional standards.

Mitigation Measure No. 3 (Cultural Resources). In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with (b) Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains. If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission. In the event that human remains are

uncovered, the City and the applicant/developer shall immediately contact the County of San Bernardino Coroner and the Consulting Tribes. If the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four (24) hours of the determination, as required by California Health and Safety Code § 7050.5 (c). The NAHC-identified Most Likely Descendant (MLD), shall be allowed, under California Public Resources Code § 5097.98 (a), to (1) inspect the site of the discovery and (2) make determinations as to how the human remains and funerary objects shall be treated and disposed of with appropriate dignity. The MLD, City and applicant/developer agree to discuss in good faith what constitutes "appropriate dignity" as that term is used in the applicable statutes. The MLD shall complete its inspection and make recommendations within forty-eight (48) hours of receiving notification from either the applicant/developer or the NAHC, as required by California Public Resources Code § 5097.98.

The preceding analysis concluded that the following mitigation is required:

Mitigation Measure No. 4 (Greenhouse Gas Emissions). Preferential parking spaces for electric or fuel efficient vehicles must be provided.

The proposed project will require the following mitigation measures:

Mitigation Measure No. 5 (Noise). Haul trucks will be prohibited from travelling to the site using Hellman Avenue. All haul trucks must access the site from 8th Street.

Mitigation Measure No. 6 (Noise). The Applicant must ensure that the contractors use construction equipment that includes working mufflers and other sound suppression equipment as a means to reduce machinery noise.

Mitigation Measure No. 7 (Noise). The Applicant must notify residents along Hellman Avenue opposite the project site regarding construction times and local contact information. The notice shall include the name and phone number of the local contact person residents may call to complain about noise. This notice must also be placed along the project site's eastern and northern boundaries. Upon receipt of a complaint, the contractor must respond immediately by reducing noise to meet Code requirements. In addition, copies of all complaints and subsequent communication between the affected residents and contractors must be forwarded to the City's Community Development Director.

The analysis determined that following mitigation measures are required:

Mitigation Measure No. 8 (Transportation). The proposed project must contribute through the City of Ranch Cucamonga Development Impact Fee (DIF) program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016).

Site-specific circulation and access recommendations are depicted on Exhibit 3-36. These recommendations are reiterated as mitigation measures below:

Mitigation Measure No. 9 (Transportation). The Applicant must construct and/or repair Hellman Avenue from the west project boundary to 8th Street at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

Mitigation Measure No. 10 (Transportation). The Applicant must construct and/or repair 8th Street from Hellman Avenue to the south project boundary at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

Mitigation Measure No. 11 (Transportation). The Applicant must ensure that on-site traffic signing and striping is implemented in conjunction with detailed construction plans for the project. On-site traffic control plans must comply with the California Manual of Uniform Traffic Control Devices (2014).

Mitigation Measure No. 12 (Transportation). The Applicant must ensure that all on-site and site-adjacent improvements, including traffic signing/striping and project driveways, be constructed as approved by the City of Rancho Cucamonga Public Works Department.

The analysis of tribal cultural resources indicated that the following mitigation would be required:

Mitigation Measure No. 13 (Tribal Cultural Resources). The applicant shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians to discuss Tribal Monitoring of the project during all ground disturbing activities, and any trenching below the initial grade level, to ensure that cultural resources that may be encountered during ground disturbances are protected and preserved for study. The monitor(s) must be approved by the Tribal Representatives and will be present on-site during ground disturbing activities. The Native American Monitor(s) will complete monitoring logs on a daily basis. The logs will provide descriptions of the daily activities, including construction activities, locations, soil, and any cultural materials identified. In addition, the monitor(s) will be required to provide insurance certificates, including liability insurance, for any archaeological resource(s) encountered during grading and excavation activities pertinent to the provisions outlined in the California Environmental Quality Act, California Public Resources Code Division 13, and Section 21083.2 (a) through (k). The on-site monitoring shall end when the project site grading and excavation activities are completed, or when the Tribal Representatives and monitor have indicated that the site has a low potential for archeological resources. The applicant shall submit the results of these consultations to the City prior to issuance of grading permits for the project site.

Mitigation Measure No. 14 (Tribal Cultural Resources). In the event that human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5, and that code shall be enforced for the duration of the project. Prior to the start of ground disturbing activities, the land owner shall arrange a designated site location within the footprint of the project for the respectful reburial of the human remains and/or ceremonial objects. Any discoveries of human skeletal material shall be immediately reported to the County Coroner. The monitor will then notify the Qualified Archaeologist and the construction manager who will call the coroner. Work will continue to be diverted while the coroner determines whether the remains are Native American. The discovery is to be kept confidential and secure to prevent any further disturbance. If Native American, the coroner will notify the NAHC as mandated by state law who will then appoint a Most Likely Descendent. In the case where discovered human remains cannot be fully documented and recovered on the same day, the remains will be covered with muslin cloth and a steel plate that can be moved by heavy equipment placed over the excavation opening to protect the remains. If this type of steel plate is not available, a 24 hour guard should be posted outside of working hours. The Tribe(s) will make every effort to recommend diverting the project and keeping the remains in situ and protected. If the project cannot be diverted, it may be determined that burials will be removed. The Tribe(s) will work closely with the Qualified Archaeologist to ensure that the excavation is treated carefully, ethically, and respectfully. If data recovery is approved by the Tribe(s), documentation shall be taken which includes at a minimum detailed descriptive notes and sketches. Additional types of documentation shall be approved by the Tribe(s) for data recovery purposes. Cremations will either be removed in bulk or by means as necessary to ensure completely recovery of all material. If the discovery of human remains includes 4 or more burials, the location is considered a cemetery and a separate treatment plan shall be created. The project applicant shall consult with the Tribe(s) regarding avoidance of all cemetery sites. Once complete, a final report of all activities are to be submitted to the NAHC. The Tribe(s) do NOT authorize any scientific study or the utilization of any invasive diagnostics on human remains.

Mitigation Measure No. 15 (Tribal Cultural Resources). In the event that Native American cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior (SOI) standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. The archaeologist shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for input regarding the preservation, retention and final disposition of any discovered cultural resources. The archaeologist shall prepare a mitigation plan and technical resources management report, which shall document the inventory, evaluation, and proposed mitigation of resources within the project area. Additionally, the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians will be contacted if any such find occurs and be provided information and permitted/invited to perform a site visit when the archaeologist makes his/her assessment, so as to provide Tribal input. All archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist and

Native Monitor. If the resources are Native American in origin, the Tribe(s) shall coordinate with the landowner regarding treatment and curation of these resources. Typically, the Tribe(s) will request reburial or preservation for educational purposes. If a resource is determined by the Qualified Archaeologist to constitute a "historical resource" pursuant to CEQA Guidelines Section 15064.5(a) or has a "unique archaeological resource" pursuant to Public Resources Code Section 21083.2(g), the Qualified Archaeologist shall coordinate with the applicant and the City to develop a formal treatment plan that would serve to reduce impacts to the resources. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Sections 21083.2(b) for unique archaeological resources. Preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. Any historic archaeological material that is not Native American in origin shall be curated at a public, non-profit institution with a research interest in the materials, such as the San Bernardino County Museum, if such an institution agrees to accept the material. If no institution accepts the archaeological material, they shall be donated to a local school or historical society in the area for educational purposes.

Mitigation Measure No. 16 (Tribal Cultural Resources). In the event that significant Native American historical resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, an SOI-qualified archaeologist shall be retained to develop a cultural resources Treatment Plan, as well as a Discovery and Monitoring Plan, the drafts of which shall be provided to the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for review and comment. All in-field investigations, assessments, and/or data recovery enacted pursuant to the finalized Treatment Plan shall be monitored by a Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians Tribal Participant(s). In addition, the Lead Agency and/or applicant shall, in good faith, consult with Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians on the disposition and treatment of any artifacts or other cultural materials encountered during the project.

Mitigation Measure No. 17 (Tribal Cultural Resources). Non-Native American artifacts shall be inventoried, assessed, and analyzed for cultural affiliation, personal affiliation (prior ownership), function, and temporal placement. Subsequent to analysis and reporting, these artifacts shall be subjected to curation or returned to the Property Owner/Developer, as deemed appropriate. Once ground altering activities have ceased or the Archeologist determines that monitoring activities are no longer necessary, monitoring activities may be discontinued following notification to the City of Rancho Cucamonga Planning Department.

4.2.4. MITIGATION MONITORING

The monitoring and reporting on the implementation of these measures, including the period for implementation, monitoring agency, and the monitoring action, are identified in Table 4.1 provided below and on the following pages.

TABLE 4.1
MITIGATION-MONITORING PROGRAM

Measure	Enforcement Agency	Monitoring Phase	Verification
Mitigation Measure No. 1 (Cultural Resources). In the event that potentially significant archaeological materials are encountered during project related construction activities, all work must be halted in the vicinity of the archaeological discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the archaeological resource.	Planning Department ● *(Applicant is responsible for implementation)*	*During the project's construction phase.* ● Mitigation ends when ground disturbance is completed or otherwise noted by the appointed Monitor(s).	Date: Name & Title:
Mitigation Measure No. 2 (Cultural Resources). If previously unidentified paleontological resources are unearthed during construction, work shall cease within 50 feet of the find and the project Applicant must retain a qualified paleontologist, approved by the City, to assess the significance of the find. If a find is determined to be significant, the Lead Agency and the paleontologist will determine appropriate avoidance measures or other appropriate mitigation. All significant fossil materials recovered will be, as necessary and at the discretion of the qualified paleontologist, subject to scientific analysis, professional museum curation, and documentation according to current professional standards.	Planning Department ● *(Applicant is responsible for implementation)*	*During the project's construction phase.* ● Mitigation ends when ground disturbance is completed or otherwise noted by the appointed Monitor(s).	Date: Name & Title:

TABLE 4.1
MITIGATION-MONITORING PROGRAM

Measure	Enforcement Agency	Monitoring Phase	Verification
Mitigation Measure No. 3 (Cultural Resources). In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with (b) Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains. If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission. In the event that human remains are uncovered, the City and the applicant/developer shall immediately contact the County of San Bernardino Coroner and the Consulting Tribes. If the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four (24) hours of the determination, as required by California Health and Safety Code § 7050.5 (c). The NAHC-identified Most Likely Descendant (MLD), shall be allowed, under California Public Resources Code § 5097.98 (a), to (1) inspect the site of the discovery and (2) make determinations as to how the human remains and funerary objects shall be treated and disposed of with appropriate dignity. The MLD, City and applicant/developer agree to discuss in good faith what constitutes "appropriate dignity" as that term is used in the applicable statutes. The MLD shall complete its inspection and make recommendations within forty-eight (48) hours of receiving notification from either the applicant/developer or the NAHC, as required by California Public Resources Code § 5097.98.	Planning Department ● *(Applicant is responsible for implementation)*	*During the project's construction phase.* ● Mitigation ends when ground disturbance is completed or otherwise noted by the appointed Monitor(s).	Date: Name & Title:

TABLE 4.1
MITIGATION-MONITORING PROGRAM

Measure	Enforcement Agency	Monitoring Phase	Verification
Mitigation Measure No. 4 (Greenhouse Gas Emissions). Preferential parking spaces for electric or fuel efficient vehicles must be provided.	Planning Department and the Chief Building Official ● *(Applicant is responsible for implementation)*	*Prior to the issuance of a Certificate of Occupancy.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No. 5 (Noise). Haul trucks will be prohibited from travelling to the site using Hellman Avenue. All haul trucks must access the site from 8th Street.	Planning Department and Code Enforcement ● *(Applicant is responsible for implementation)*	*During project's construction.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No.6 (Noise). The Applicant must ensure that the contractors use construction equipment that includes working mufflers and other sound suppression equipment as a means to reduce machinery noise.	Planning Department and Code Enforcement ● *(Applicant is responsible for implementation)*	*During project's construction.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No. 7 (Noise). The Applicant must notify residents along Hellman Avenue opposite the project site regarding construction times and local contact information. The notice shall include the name and phone number of the local contact person residents may call to complain about noise. This notice must also be placed along the project site's eastern and northern boundaries. Upon receipt of a complaint, the contractor must respond immediately by reducing noise to meet Code requirements. In addition, copies of all complaints and subsequent communication between the affected residents and contractors must be forwarded to the City's Community Development Director.	Planning Department and Code Enforcement ● *(Applicant is responsible for implementation)*	*During project's construction.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No. 8 (Transportation & Circulation). The proposed project must contribute through the City of Ranch Cucamonga Development Impact Fee (DIF) program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016).	Public Works Department and the City Engineer ● *(Applicant is responsible for implementation)*	*Prior to the issuance of a Certificate of Occupancy.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No. 9 (Transportation & Circulation). The Applicant must construct and/or repair Hellman Avenue from the west project boundary to 8th Street at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.	Public Works Department and the City Engineer ● *(Applicant is responsible for implementation)*	*Prior to the issuance of a Certificate of Occupancy.* ● Mitigation ends when construction is completed.	Date: Name & Title:

TABLE 4.1
MITIGATION-MONITORING PROGRAM

Measure	Enforcement Agency	Monitoring Phase	Verification
Mitigation Measure No. 10 (Transportation & Circulation). The Applicant must construct and/or repair 8th Street from Hellman Avenue to the south project boundary at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.	Public Works Department and the City Engineer ● *(Applicant is responsible for implementation)*	*Prior to the issuance of a Certificate of Occupancy.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No. 11 (Transportation & Circulation). The Applicant must ensure that on-site traffic signing and striping is implemented in conjunction with detailed construction plans for the project. On-site traffic control plans must comply with the California Manual of Uniform Traffic Control Devices (2014).	Public Works Department and the City Engineer ● *(Applicant is responsible for implementation)*	*Prior to the issuance of a Certificate of Occupancy.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No. 12 (Transportation & Circulation). The Applicant must ensure that all on-site and site-adjacent improvements, including traffic signing/striping and project driveways, be constructed as approved by the City of Rancho Cucamonga Public Works Department.	Public Works Department and the City Engineer ● *(Applicant is responsible for implementation)*	*Prior to the issuance of a Certificate of Occupancy.* ● Mitigation ends when construction is completed.	Date: Name & Title:
Mitigation Measure No. 13 (Tribal Cultural Resources). The applicant shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians to discuss Tribal Monitoring of the project during all ground disturbing activities, and any trenching below the initial grade level, to ensure that cultural resources that may be encountered during ground disturbances are protected and preserved for study. The monitor(s) must be approved by the Tribal Representatives and will be present on-site during ground disturbing activities. The Native American Monitor(s) will complete monitoring logs on a daily basis. The logs will provide descriptions of the daily activities, including construction activities, locations, soil, and any cultural materials identified. In addition, the monitor(s) will be required to provide insurance certificates, including liability insurance, for any archaeological resource(s) encountered during grading and excavation activities pertinent to the provisions outlined in the California Environmental Quality Act, California Public Resources Code Division 13, and Section 21083.2 (a) through (k). The on-site monitoring shall end when the project site grading and excavation activities are completed, or when the Tribal Representatives and monitor have indicated that the site has a low potential for archeological resources. The applicant shall submit the results of these consultations to the City prior to issuance of grading permits for the project site.	Planning Department ● *(Applicant is responsible for implementation)*	*Prior to the start of any construction related activities.* ● Mitigation ends when ground disturbance is completed or otherwise noted by the appointed Native American Monitor(s).	Date: Name & Title:

TABLE 4.1
MITIGATION-MONITORING PROGRAM

Measure	Enforcement Agency	Monitoring Phase	Verification
Mitigation Measure No. 14 (Tribal Cultural Resources). In the event that human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5, and that code shall be enforced for the duration of the project. Prior to the start of ground disturbing activities, the land owner shall arrange a designated site location within the footprint of the project for the respectful reburial of the human remains and/or ceremonial objects. Any discoveries of human skeletal material shall be immediately reported to the County Coroner. The monitor will then notify the Qualified Archaeologist and the construction manager who will call the coroner. Work will continue to be diverted while the coroner determines whether the remains are Native American. The discovery is to be kept confidential and secure to prevent any further disturbance. If Native American, the coroner will notify the NAHC as mandated by state law who will then appoint a Most Likely Descendent. In the case where discovered human remains cannot be fully documented and recovered on the same day, the remains will be covered with muslin cloth and a steel plate that can be moved by heavy equipment placed over the excavation opening to protect the remains. If this type of steel plate is not available, a 24 hour guard should be posted outside of working hours. The Tribe(s) will make every effort to recommend diverting the project and keeping the remains in situ and protected. If the project cannot be diverted, it may be determined that burials will be removed. The Tribe(s) will work closely with the Qualified Archaeologist to ensure that the excavation is treated carefully, ethically, and respectfully. If data recovery is approved by the Tribe(s), documentation shall be taken which includes at a minimum detailed descriptive notes and sketches. Additional types of documentation shall be approved by the Tribe(s) for data recovery purposes. Cremations will either be removed in bulk or by means as necessary to ensure completely recovery of all material. If the discovery of human remains includes 4 or more burials, the location is considered a cemetery and a separate treatment plan shall be created. The project applicant shall consult with the Tribe(s) regarding avoidance of all cemetery sites. Once complete, a final report of all activities are to be submitted to the NAHC. The Tribe(s) do NOT authorize any scientific study or the utilization of any invasive diagnostics on human remains.	Planning Department ● *(Applicant is responsible for implementation)*	*During project's construction.* ● Mitigation ends when ground disturbance is completed or otherwise noted by the appointed Native American Monitor(s).	Date: Name & Title:

TABLE 4.1
MITIGATION-MONITORING PROGRAM

Measure	Enforcement Agency	Monitoring Phase	Verification
Mitigation Measure No. 15 (Tribal Cultural Resources). In the event that Native American cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior (SOI) standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. The archaeologist shall contact the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for input regarding the preservation, retention and final disposition of any discovered cultural resources. The archaeologist shall prepare a mitigation plan and technical resources management report, which shall document the inventory, evaluation, and proposed mitigation of resources within the project area. Additionally, the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians will be contacted if any such find occurs and be provided information and permitted/invited to perform a site visit when the archaeologist makes his/her assessment, so as to provide Tribal input. All archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist and Native Monitor. If the resources are Native American in origin, the Tribe(s) shall coordinate with the landowner regarding treatment and curation of these resources. Typically, the Tribe(s) will request reburial or preservation for educational purposes. If a resource is determined by the Qualified Archaeologist to constitute a "historical resource" pursuant to CEQA Guidelines Section 15064.5(a) or has a "unique archaeological resource" pursuant to Public Resources Code Section 21083.2(g), the Qualified Archaeologist shall coordinate with the applicant and the City to develop a formal treatment plan that would serve to reduce impacts to the resources. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Sections 21083.2(b) for unique archaeological resources. Preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. Any historic archaeological material that is not Native American in origin shall be curated at a public, non-profit institution with a research interest in the materials, such as the San Bernardino County Museum, if such an institution agrees to accept the material. If no institution accepts the archaeological material, they shall be donated to a local school or historical society in the area for educational purposes.	Planning Department ● *(Applicant is responsible for implementation)*	*During project's construction.* ● Mitigation ends when ground disturbance is completed or otherwise noted by the appointed Native American Monitor(s).	Date: Name & Title:

TABLE 4.1
MITIGATION-MONITORING PROGRAM

Measure	Enforcement Agency	Monitoring Phase	Verification
Mitigation Measure No. 16 (Tribal Cultural Resources). In the event that significant Native American historical resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, an SOI-qualified archaeologist shall be retained to develop a cultural resources Treatment Plan, as well as a Discovery and Monitoring Plan, the drafts of which shall be provided to the Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians for review and comment. All in-field investigations, assessments, and/or data recovery enacted pursuant to the finalized Treatment Plan shall be monitored by a Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians Tribal Participant(s). In addition, the Lead Agency and/or applicant shall, in good faith, consult with Gabrieleno Band of Mission Indians – Kizh Nation and the San Manuel Band of Mission Indians on the disposition and treatment of any artifacts or other cultural materials encountered during the project.	Planning Department ● *(Applicant is responsible for implementation)*	*During project's construction.* ● Mitigation ends when ground disturbance is completed or otherwise noted by the appointed Native American Monitor(s).	Date: Name & Title:
Mitigation Measure No. 17 (Tribal Cultural Resources). Non-Native American artifacts shall be inventoried, assessed, and analyzed for cultural affiliation, personal affiliation (prior ownership), function, and temporal placement. Subsequent to analysis and reporting, these artifacts shall be subjected to curation or returned to the Property Owner/Developer, as deemed appropriate. Once ground altering activities have ceased or the Archeologist determines that monitoring activities are no longer necessary, monitoring activities may be discontinued following notification to the City of Rancho Cucamonga Planning Department.	Planning Department ● *(Applicant is responsible for implementation)*	*During project's construction and following the completion of ground altering activities.* ● Mitigation ends when ground disturbance is completed.	

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SECTION 5 REFERENCES

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5.2 REFERENCES

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APPENDICES

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Subsurface Investigation Report

9000 Hellman Avenue
Rancho Cucamonga, California

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Prepared for:
Overton Moore Properties
19300 South Hamilton Avenue, Suite 200
Gardena, California 90248
and
LaSalle Investment Management, Inc.
100 East Pratt Street
Baltimore, Maryland 21202

Prepared by:
Ardent Environmental Group, Inc.
1827 Capital Street, Suite 103
Corona, California 92880

March 16, 2017
Project No. 100855001

March 16, 2017
Project No. 100855001

Mr. Jason Hines
Overton Moore Properties
19300 South Hamilton Avenue, Suite 200
Gardena, California 90248
and
Mr. Henry Feibusch
LaSalle Investment Management, Inc.
100 East Pratt Street
Baltimore, Maryland 21202

Subject: **Subsurface Investigation Report**
9000 Hellman Avenue
Rancho Cucamonga, California

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Dear Messrs. Hines and Feibusch:

This report presents the results of a subsurface investigation completed at the above-referenced property. Work was completed in general accordance with the proposal dated February 15, 2017 between Overton Moore Properties and Ardent Environmental Group, Inc. (Ardent) and the Master Agreement dated November 3, 2015 between LaSalle Investment Management, Inc. and Ardent. The attached report presents our methodology, findings, opinions, and conclusions regarding the environmental conditions at the site. We appreciate the opportunity to be of service to you on this project. If there are any questions, please feel free to call the undersigned at your convenience.

Sincerely,
Ardent Environmental Group, Inc.

Kasia Edlund
Senior Staff Geologist

Paul A. Roberts, P.G.
Principal Geologist

PAR/KE/nw

Distribution: (1) Addressee (electronic copy)

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EXECUTIVE SUMMARY

Frontier Communications (Frontier) currently owns the property and operates a telecommunication maintenance yard, which includes offices, fleet vehicle maintenance, and car washing operations. Historically, the site was used by GTE and Verizon for similar operations. Frontier is considering selling the site, at which time Frontier will lease the property back for approximately 2 years. Following termination of its lease, the site will be redeveloped for commercial purposes. Based on the results of a Phase I Environmental Site Assessment (ESA), Ardent Environmental Group, Inc. (Ardent) presented a list of potential environmental concerns at the site. Soil samples were collected in the vicinity of inactive features and soil gas samples were collected to assess whether a possible vapor intrusion issue was present. Frontier has agreed to sample beneath selected features with possible environmental issues prior to termination of its lease. Based on the results of the subsurface investigations, the following conclusions were drawn.

- **Inactive Leach Field and Clarifier** – Based on laboratory results, there is a low likelihood that elevated concentrations of petroleum hydrocarbons and/or volatile organic compounds (VOCs) are present in soil and soil gas in the vicinity of the inactive leach field and clarifier that would pose a threat to groundwater or present a possible risk to human health through vapor intrusion.
- **Two Inactive Hydraulic Lifts** – Based on laboratory results, there is a low likelihood that elevated concentrations of petroleum hydrocarbons and VOCs are present in soil in the vicinity of the two inactive hydraulic lifts that would pose a threat to groundwater. The low concentrations of petroleum hydrocarbons (up to 10 milligrams per kilogram [mg/kg]) detected near one of the lifts do not need to be remediated.
- **1988 Hydraulic Oil Release** – Based on laboratory results, the majority of the petroleum hydrocarbon-impacted soils associated with the 1988 hydraulic oil release appear to have been adequately remediated. The remaining contaminants associated with boring HA-3C are limited in extent and localized in the vicinity of this boring. The extent of impacted soils remaining is estimated in an area measuring approximately 4 feet, by 5 feet, by 5 feet deep, with a volume of approximately 4 cubic yards. This area is currently located beneath the eastern footing of the Vehicle Maintenance Building. The price to excavate, transport and dispose of these materials would be approximately $5,000 to $7,000.
- **Possible Vapor Intrusion Issue** – Based on laboratory results, there is a low likelihood that elevated concentrations of VOCs are present in soil gas in the vicinity of the Vehicle Maintenance Building and active car wash area that would pose a possible risk to human health through vapor intrusion.

Based on the findings of this investigation, Ardent recommends no additional investigations or remediation at this time. Following demolition of the Vehicle Maintenance Building, the small area of impacted soils associated with boring HA-3C should be excavated and removed from the site.

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1. INTRODUCTION

Ardent Environmental Group, Inc. (Ardent) was retained by Overton Moore Properties and LaSalle Investment Management, Inc. (collectively referred to as the "OMP/LaSalle") to complete a subsurface investigation at the property located at 9000 Hellman Avenue in the city of Rancho Cucamonga, California (site; Figure 1). Work was completed in general accordance with the proposal dated February 15, 2017 between OMP and Ardent and the Master Agreement dated November 3, 2015 between LaSalle and Ardent. Frontier Communications (Frontier) currently owns the property and operates a telecommunication maintenance yard. Historically, the site was used by GTE and Verizon for similar operations. Frontier is considering selling the site to OMP/LaSalle, who will lease the site back to Frontier for approximately 2 years, after which, the site will be redeveloped for commercial purposes.

Ardent has recently completed a draft Phase I Environmental Site Assessment (ESA) as part of the real estate due diligence process (Ardent, 2017). Based on the results, a number of potential environmental concerns were noted. Since the property is planned to be leased back to Frontier for continued use as a telecommunication maintenance yard, it was agreed upon that any potential environmental feature that will continue to be used by Frontier as part of its operation (i.e. active equipment or features) will be removed and sampled by Frontier following completion of its lease. Any environmental concern that is no longer used (i.e. inactive equipment or features), Ardent would sample before OMP/LaSalle closes the real estate transaction.

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1.1. Potential Environmental Concerns Discovered at the Site

Based on the results of the Phase I ESA, the following potential environmental concerns were identified. The locations of the potential environmental concerns are presented on Figure 2.

- Three underground hydraulic lifts; two of which are inactive and one of which is an active dual lift.
- Former 1988 hydraulic oil release
- Inactive clarifier and leach field
- Active car wash and clarifier
- Miscellaneous containers of waste, liquids, or hazardous substances, including above-ground storage tanks (ASTs)

- Possible vapor intrusion issues associated with solvent uses in the Vehicle Maintenance Building, former clarifier and leach field, and existing active car wash and clarifier.
- Asbestos containing building materials (ACMs) and lead-based paint (LBP).

1.2. OMP/LaSalle's Responsibilities

The following presents the potential environmental concerns that OMP/LaSalle will be responsible to sample.

- Inactive hydraulic lifts
- Former 1988 hydraulic oil release in the Vehicle Maintenance Building
- Inactive clarifier and leach field
- Possible vapor intrusion due to solvent uses
- In addition, and after Frontier vacates the property, OMP/LaSalle will need to complete comprehensive asbestos and LBP surveys. For purposes of this report, Ardent has provided an estimated cost to remove ACMs.

1.3. Frontier's Responsibilities

Prior to the expiration of the lease, Frontier will be responsible to remove and sample the following areas of environmental concern.

- One active underground hydraulic lift
- Active car wash
- All active clarifiers
- All miscellaneous containers of waste, liquids, or hazardous substances, including ASTs
- In addition, all permits will be closed

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2. OBJECTIVES

The objectives of the work presented herein were to assess whether elevated concentrations of volatile organic compounds (VOCs) were present in soil gas in selected areas of the site that might pose a possible human health risk through vapor intrusion and to assess whether elevated concentrations of petroleum hydrocarbons and VOCs were present in the vicinity of the inactive hydraulic lifts, and to verify that the majority of the impacted soil associated with the 1988 hydraulic oil release had been mitigated.

3. PHYSICAL SETTING

The following sections include discussions of topographic, geologic, and hydrogeologic conditions in the vicinity of the site, based upon our document review and our visual reconnaissance of the site and adjacent areas.

3.1. Site Topography

Based on the review of the United States Geological Survey (USGS) 7.5 Minute Series, Guasti, California, Topographic Quadrangle Map dated 2012, the site has an elevation of approximately 1,090 feet above mean sea level (msl) and slopes to the south.

3.2. Geology

The project area is situated in the Santa Ana River Valley, in the southwestern portion of the Transverse Ranges Geomorphic Province. The geomorphic province encompasses an area that extends 320 miles from Point Arguello and San Miguel Island on the west to the mountains of Joshua Tree National Monument on the east, where the province merges with the Mojave and Colorado deserts. The geomorphic province varies in width from 40 to 60 miles, most of which is characterized by east-west trending mountain ranges that are underlain by a range of Jurassic to older age metamorphic and igneous rocks. The site vicinity is characterized by recent non-marine alluvial deposits forming a veneer over approximately 17,000 feet of interbedded conglomerate, sandstone, and shale. The site is underlain by a thick alluvial deposit that has been derived from the San Gabriel Mountains located approximately 7 miles north of the site.

3.3. Site Hydrology

The following sections discuss the site hydrology in terms of both surface waters and groundwater.

3.3.1. Surface Waters

No natural water bodies are located on or adjacent to the site.

3.3.2. Groundwater

Based on our experience at properties in the site vicinity, groundwater occurs at depths ranging from approximately 260 and 300 feet bgs and flows in a southwesterly direction.

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4. CLEANUP GUIDELINES

The subsurface investigation included the collection and analyses of soil and soil gas samples. Soil samples were analyzed by SunStar Laboratories of Lake Forest, California. Soil samples were analyzed for total petroleum hydrocarbon carbon chain C_6-C_{32} (TPHcc), VOCs, and/or polychlorinated biphenols (PCBs) in general accordance with EPA Method Nos. 8015 (modified), 8260B, and 8082. Soil gas samples were analyzed by Jones Environmental of Santa Fe Springs, California, using a mobile laboratory. Soil gas samples were analyzed for VOCs in general accordance with EPA Method No. 8260B. Ardent evaluated the laboratory data based on an environmental risk for the protection of groundwater and a human health risk based on dermal contact and possible vapor intrusion from off-gassing of VOC-impacted soil. Ardent completed these evaluations based on an industrial/commercial land use criteria.

To determine the potential environmental risk, concentrations of petroleum hydrocarbons in the soil were assessed based on the Regional Water Quality Control Board, Los Angeles Region (RWQCB), Interim Site Assessment and Cleanup Guidebook dated May 1996 (referred to herein as the "RWQCB guidelines"). The RWQCB guidelines are based on the protection of groundwater and take into account a number of variables including soil lithology and groundwater depth. Based on the depth to groundwater beneath the site, total petroleum hydrocarbons as gasoline in the C_4-C_{12} carbon range (TPHg) would be considered elevated with concentrations exceeding 1,000 milligrams per kilogram (mg/kg). Diesel range hydrocarbons in the carbon range C_{13}-C_{22} (TPHd) would be considered elevated with concentrations exceeding 10,000 mg/kg. Heavy oils in the carbon chain C_{23}-C_{36} (TPHo) would be considered elevated with concentrations exceeding 50,000 mg/kg. Volatile organic compounds were generally compared to the RWQCB guidelines, Department of Toxic Substances Control (DTSC), Human and Ecological Risk Office (HERO), Note 3, soil screening levels for industrial/commercial land use (DTSC-SLi), and Environmental Protection Agency (EPA) Region 9, Regional Screening Levels for industrial/commercial land use (EPA-RSLi). The DTSC-SLi and EPA-RSLi values are human health based criteria.

The DTSC-SLi and EPA-RSLi provides screening levels for soil and ambient air at industrial/commercial properties. These are very conservative guidelines and are based on the protection of human health through dermal contact (soil) and possible vapor intrusion (soil gas). The DTSC-SLi and EPA-RSLi presented on attached Table 2 were calculated by modifying the

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ambient air concentrations using a DTSC-provided attenuation factor of 0.001 and 0.0005 for an existing building and for a future industrial/commercial development, respectively.

5. SUBSURFACE INVESTIGATION

The subsurface investigation was completed on March 2 and March 6, 2017 and consisted of collecting soil and soil vapor samples in the areas of the potential environmental concerns that OMP/LaSalle is responsible to sample. Soil borings were drilled with direct-push drilling equipment. Selected soil samples collected from the borings were screened in the field for stains, odors, and elevated photoionization detector (PID) readings.

Soil vapor monitoring points were installed in selected soil borings at depths of approximately 5 feet bgs using Nylaflow tubing. The sample point was placed in approximately one-foot of #2/12 sand filter pack, followed by approximately one-half foot of dry granular bentonite. The remaining borehole was filled to the surface with hydrated granular bentonite. At least 2 hours following installation, each soil vapor monitoring point was purged of three volumes of air and sampled using a mobile laboratory.

Laboratory results of the 1988 hydraulic oil release investigation are summarized on Table 1, and a summary of the laboratory results of Ardent's investigation are summarized on Tables 2 and 3. A picture of the former clarifier and leach field are presented in Appendix A, boring and well logs are provided in Appendix B, and copies of the laboratory reports are provided in Attachment C. The following presents the results of the subsurface investigations.

5.1. Inactive Leach Field and Clarifier

As noted in the Phase I ESA, an inactive clarifier and leach field were identified northwest of the Vehicle Maintenance Building in a site plan associated with a Brown and Caldwell Report dated 1985 (Figure 3). Based on Ardent's observations during drilling activities, a square concrete cut-out with an apparent clean-out was noted in the location of the reported former clarifier (see color picture in Appendix A). As noted on Figure 3, the information provided on the 1985 site plan and observations noted during our site visit were superimposed onto an existing site map.

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Based on our experience, septic tanks, not clarifiers, are typically connected to leach fields. In addition, clarifiers typically consist of three or more chambers and are rectangular in shape. Based on this information, the "clarifier" noted by Brown and Caldwell may actually be a septic tank. Septic tanks and clarifiers typically measure to depths ranging from 4 to 8 feet.

To further assess this feature, Ardent advanced one soil boring (designated RC15) to a depth of approximately 10 feet bgs. Soil samples were collected at approximately 5 and 10 feet bgs and indicated no staining, odors, or elevated PID readings. Based on this information, the 10 foot soil sample was selected for analysis. Laboratory results indicated no detectable concentrations of petroleum hydrocarbons and VOCs. Boring RC15 was used to install a soil vapor monitoring point at 5 feet bgs.

To further assess the leach field, Ardent advanced two soil borings (RC16 and RC17) to depths of approximately 10 feet bgs (Figure 3). Soil samples were collected at approximately 5 and 10 feet bgs, which indicated no staining, odors, or elevated PID readings. Based on this information, the 10 foot soil samples were selected for analysis. Laboratory results indicated no detectable concentrations of petroleum hydrocarbons and VOCs. Borings RC16 and RC17 were also used to install soil vapor monitoring points at 5 feet bgs. Laboratory results of the three soil gas samples indicated no detectable to low concentrations of VOCs, well below the State and Federal screening levels (Table 3).

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5.2. Two Inactive Hydraulic Lifts

Two inactive hydraulic lifts, which have been removed, were noted in the Vehicle Maintenance Building. As noted on Figure 4, one concrete patch was noted in the western portion of the Vehicle Maintenance Building, possibly associated with a singular lift, and two concrete patches were observed in the eastern portion of the site, possibly associated with a dual lift. One active dual lift was noted in the mid-portion of the Vehicle Maintenance Building (Figure 4). Hydraulic lifts are typically 8 feet in length (i.e. at least 8 feet deep).

Ardent advanced one boring adjacent to each of the two inactive hydraulic lifts to a depth of approximately 15 feet bgs (RC7 and RC9). Soil samples were collected at depths of approximately 5, 10, and 15 feet within each boring and indicated no staining, odors, or elevated PID readings. Based on this information, the 10 foot samples were selected for

analysis. Laboratory results indicated no detectable to low concentrations of petroleum hydrocarbons (in one sample at 10 milligrams per kilogram [mg/kg]), and no detectable concentrations of VOCs (Table 2).

5.3. 1988 Hydraulic Oil Release

As noted above, the Vehicle Maintenance Building contains three underground hydraulic lifts. In 1988, the hydraulic lines associated with the lifts were suspected to be leaking. The pipelines were exposed and leaks were observed. To determine the extent of contamination in soil, numerous soil samples were collected in the northeast portion of the building. The determined area of contaminated soil was then excavated (Figure 4). The excavation activities removed a majority of the impacted soil, but some impacted materials were reportedly left in-place beneath the eastern building foundation (associated with the borings designated HA-3C and HA-4; Figure 4). According to the documentation report, the area shown on Figure 4 was excavated to a depth of approximately 8 feet bgs, although it was unclear if confirmation samples were collected.

The impacted soil that was reportedly left in place beneath the eastern building foundation (associated with HA-3C and HA-4) was identified using total recoverable petroleum hydrocarbons (TRPH) analysis using EPA Method No. 418.1. This analysis does not breakdown the carbon chain of the petroleum hydrocarbons, and therefore, these results cannot be compared to the RWQCB guidelines. However, based on the type of release (i.e. hydraulic oil), it is assumed that these materials are comprised of heavy petroleum hydrocarbons (greater than C_{13}). Based on this information, “elevated concentrations” of TRPH would be concentrations exceeding 10,000 mg/kg. Based on this information, the concentrations of petroleum hydrocarbons discovered in HA-3C at 2 feet bgs would be considered elevated at 23,000 mg/kg. The sample collected at 4 feet bgs in boring HA-4 with concentrations at 7,200 mg/kg, form borings HA-8, HA-9, and HA-10 at depths of approximately 1.5 feet bgs with concentrations up to 27 mg/kg, and from the samples collected by Ardent, as discussed below, would suggest that the area of remaining impacted soil is minimal.

To further verify that the majority of the petroleum hydrocarbon impacted soils that had been reportedly removed and to further assess the extent of the known impacted soils associated

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with boring HA-3C, Ardent advanced six borings in the vicinity of the former excavation area (designated RC1 through RC6; Figure 4). One of the borings (RC1) was advanced within the previous excavation area to verify that the vertical extent of impacted soil had been reached, and three soil borings (designated RC2, RC5, and RC6) were drilled as step-out borings north, west, and south of the previous excavation, respectively, to assess whether the lateral extent of the excavated materials had been reached. Borings RC3 and RC4 were drilled to further assess the vertical extent of the impacted soil known to exist associated with HA-3C.

The 10-foot sample collected from RC-1 indicated no detectable concentrations of petroleum hydrocarbons and VOCs, verifying that the vertical extent had been reached at the reported depth of 8 feet bgs. Soil samples collected at 5 feet bgs from the step-out borings indicated no detectable to low concentrations of petroleum hydrocarbons (at 11 mg/kg of TPHo in one sample), verifying that the lateral extent had been reached. Laboratory results of the samples collected from approximately 5 feet bgs in RC3 and RC4 indicated no detectable concentrations of VOCs and polychlorinated biphenyls (PCBs), and low concentrations of TPHo (up to 39 mg/kg), verifying that the elevated concentrations associated with previous soil boring HA-3 is limited to depths of less than 5 feet bgs. Based on this information, the extent of the impacted soil associated with HA-3C is expected to measure approximately 4 feet, by 5 feet, by 5 feet deep, with a volume of approximately 4 cubic yards. This area is currently located beneath the eastern footing of the Vehicle Maintenance Building. The price to excavate, transport and dispose of these materials would be approximately $5,000 to $7,000.

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5.4. Possible Vapor Intrusion Due to Solvent Uses

As noted in the Phase I ESA, Verizon was listed as a small quantity generator of hazardous waste, including chlorinated solvents. Solvents are typically used for parts cleaning and degreasing purposes. Due to the possible solvent uses in the Vehicle Maintenance Building, active car wash area, inactive clarifier and leach field, a possible vapor intrusion issue may be present. As presented above, no detectable to low concentrations of VOCs were reported in soil gas samples collected I the vicinity of the inactive clarifier and leach field.

Ardent installed three gas points around the Vehicle Maintenance Building (designated RC10, RC13, and RC14) and two next to the active car wash and clarifier (designated RC11 and RC12; Figure 3). Soil borings were drilled to a depth of approximately 5 feet bgs where a soil vapor monitoring point was installed. Laboratory results indicated no detectable to low concentrations of VOCs, well below the State and Federal screening levels (Table 3). It should be noted that no chlorinated solvents were detected.

6. SUSPECT ASBESTOS-CONTAINING BUILDING MATERIALS AND LEAD-BASED PAINT

Based on the age of the buildings, ACMs and LBP are likely present. Due to the destructive nature of the sampling activities, comprehensive demolition asbestos surveys are typically completed after occupants have vacated the buildings and as not to void material warranties (e.g. roofing warranties). Based on this information and after Frontier vacates the site, OMP/LaSalle should complete a comprehensive asbestos and LBP survey to assess quantities of ACMs that will need to be removed and LBP that will need to be stabilized prior to demolition activities. For budgetary purposes and based on our experience, Ardent has estimated the ACM and LBP removal costs at between $35,000 to $45,000

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7. CONCLUSIONS AND RECOMMENDATIONS

Frontier currently owns the property and operates a telecommunication maintenance yard, which includes offices, fleet vehicle maintenance, and car washing operations. Historically, the site was used by GTE and Verizon for similar operations. Frontier is considering selling the site, at which time Frontier will lease the property back for approximately 2 years. Following termination of its lease, the site will be redeveloped for commercial purposes. Based on the results of a Phase I ESA, Ardent presented a list of potential environmental concerns at the site. Soil samples were collected in the vicinity of inactive features and soil gas samples were collected to assess whether a possible vapor intrusion issue was present. Frontier has agreed to sample beneath selected features with possible environmental issues prior to termination of its lease. Based on the results of the subsurface investigations, the following conclusions were drawn.

- **Inactive Leach Field and Clarifier** – Based on laboratory results, there is a low likelihood that elevated concentrations of petroleum hydrocarbons and/or VOCs are present in soil and soil gas in the vicinity of the inactive leach field and clarifier that would pose a threat to groundwater or present a possible risk to human health through vapor intrusion.

- **Two Inactive Hydraulic Lifts** – Based on laboratory results, there is a low likelihood that elevated concentrations of petroleum hydrocarbons and VOCs are present in soil in the vicinity of the two inactive hydraulic lifts that would pose a threat to groundwater. The low concentrations of petroleum hydrocarbons (up to 10 mg/kg) detected near one of the lifts do not need to be remediated.
- **1988 Hydraulic Oil Release** – Based on laboratory results, the majority of the petroleum hydrocarbon-impacted soils associated with the 1988 hydraulic oil release appear to have been adequately remediated. The remaining contaminants associated with boring HA-3C are limited in extent and localized in the vicinity of this boring. The extent of impacted soils remaining is estimated in an area measuring approximately 4 feet, by 5 feet, by 5 feet deep, with a volume of approximately 4 cubic yards. This area is currently located beneath the eastern footing of the Vehicle Maintenance Building. The price to excavate, transport and dispose of these materials would be approximately $5,000 to $7,000.
- **Possible Vapor Intrusion Issue** – Based on laboratory results, there is a low likelihood that elevated concentrations of VOCs are present in soil gas in the vicinity of the Vehicle Maintenance Building and active car wash area that would pose a possible risk to human health through vapor intrusion.

Based on the findings of this investigation, Ardent recommends no additional investigations or remediation at this time. Following demolition of the Vehicle Maintenance Building, the small area of impacted soils associated with boring HA-3C should be excavated and removed from the site.

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8. REFERENCES

Ardent Environmental Group, Inc. (Ardent), 2017, Phase I Environmental Site Assessment, 9000 Hellman Avenue, Rancho Cucamonga, California: Report prepared for Overton Moore Properties, Gardena, California, and LaSalle Investment Management, Inc., Baltimore, Maryland, dated February 14, 2017.

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Department of Toxic Substances Control (DTSC), 2015, Advisory Active Soil Gas Investigations, dated July 2015.

Department of Toxic Substances Control (DTSC), Human and Ecological Risk Office (HERO), 2016, Human Health Risk Assessment (HHRA) Note Number 3, DTSC-Modified Screening Levels (DTSC-SLi), dated June.

EPA Region 9, 2016, Regional Screening Levels (RSLs) Summary Table, dated May.

Regional Water Quality Control Board, Los Angeles Region (RWQCB), 1996, Interim Site Assessment & Cleanup Guidebook, dated May.

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TABLE 1 - LABORATORY RESULTS OF REMAINING SOIL FROM 1988 HYDRAULIC OIL LEAK INVESTIGATION

Location	Rationale	Boring ID	Date Sampled	Depth (feet bgs)	TRPH (mg/kg)
Vehicle Maintenance Building (1988 Hydraulic Oil Release)	Remaining impacted soil within the previous excavation	HA-3C	1988	2	23,000
		HA-4	1988	4	7,200
	Lateral extent of impacted soil	HA-8	1988	1.5	ND<10
		HA-9	1988	1.5	27
		HA-10	1988	1.5	ND<10

Notes:
Boring ID - soil boring sample identification
feet bgs - feet below ground surface
ND - no detectable concentration above the laboratory reporting limit
TRPH - total recoverable petroleum hydrocarbons in general accordance with EPA Method No. 418.1
mg/kg - milligrams per kilogram

TABLE 2 - LABORATORY RESULTS OF SOIL SAMPLES

Rationale	Location	Boring ID	Date Sampled	Depth (feet bgs)	TPHcc (C_6-C_{32}) (mg/kg)			PCBs (mg/kg)	VOCs (mg/kg)
					TPHg (C_6-C_{12})	TPHd (C_{13}-C_{22})	TPHo (C_{23}-C_{32})		
Vehicle Maintenance Building	In the central portion of the reported location of the 1988 excavation	RC1	3/3/2017	5	ND<10	ND<10	**25**	NA	ND<0.005-10
			3/3/2017	10	ND<10	ND<10	ND<10	NA	ND<0.005-10
	Step-out boring north adjacent to the 1988 excavation	RC2	3/3/2017	5	ND<10	ND<10	ND<10	NA	ND<0.005-10
	In the eastern portion of the reported location of the 1988 excavation	RC3	3/6/2017	5	ND<10	ND<10	**39**	ND<0.010	ND<0.005-10
		RC4	3/6/2017	5	ND<10	ND<10	**25**	NA	ND<0.005-10
	Step-out boring west adjacent to the 1988 excavation	RC5	3/6/2017	5	ND<10	ND<10	**11**	NA	ND<0.005-10
	Step-out boring south adjacent to the 1988 excavation	RC6	3/6/2017	5	ND<10	ND<10	ND<10	NA	ND<0.005-10
	In the vicinity of the easterly inactive hydraulic hoist (physically removed)	RC7	3/6/2017	10	ND<10	ND<10	ND<10	NA	ND<0.005-10
	In the vicinity of the westerly inactive hydraulic hoist (physically removed)	RC9	3/3/2017	10	ND<10	**10**	ND<10	NA	ND<0.005-10
Inactive Clarifier and Leach Field	In the vicinity of the inactive clarifier	RC15	3/3/2017	10	ND<10	ND<10	ND<10	NA	ND<0.005-10
	In the vicinity of the easterly leach field	RC16	3/3/2017	10	ND<10	ND<10	ND<10	NA	ND<0.005-10
	In the vicinity of the westerly leach field	RC17	3/3/2017	10	ND<10	ND<10	ND<10	NA	ND<0.005-10
REGULATORY GUIDELINES (mg/kg)									
LARWQCB					1,000	10,000	50,000	NA	NA
DTSC-SLi					NA	NA	NA	NA	Various
EPA RSLi					NA	NA	NA	0.72-27	Various

Notes:

Boring ID - soil boring identification

feet bgs - feet below the ground surface

mg/kg - milligrams per kilogram

NA - not applicable/available

-- not analyzed

ND - no detectable concentration above the laboratory reporting limit

TPHcc - total petroleum hydrocarbons carbon chain C_6-C_{32} analyzed in general accordance with EPA Method No. 8015 (modified)

TPHg - total petroleum hydrocarbons as gasoline carbon chain C_6-C_{12}

TPHd - total petroleum hydrocarbons as diesel fuel carbon chain C_{13}-C_{22}

TPHo - total petroleum hydrocarbons as oil carbon chain C_{23}-C_{32}

PCBs - polychlorinated biphenyls analyzed in general accoradance with EPA Method No. 8082

VOCs - volatile organic compounds analyzed in general accordance with EPA Method No. 8260B

LARWQCB - Regional Water Quality Control Board, Los Angeles Region guidelines presented in the Interim Site Assessment and Cleanup Guidebook, dated May 1996 for samples collected greater than 150 feet above groundwater

DTSC-SLi - Department of Toxic Substances Control Screening Levels, Note 3, for industrial/commercial land use, dated June 2016

EPA RSLi - EPA Region 9, Regional Screening Levels for industrial/commercial land use, dated May 2016

TABLE 3 - LABORATORY RESULTS OF SOIL GAS SAMPLES

Rationale	Location	Boring ID	Date Sampled	Depth (feet bgs)	VOCs (ug/l)			
					Freon 113	Styrene	Freon 11	All Others
Vehicle Maintenance Building	Immediately south of the Vehicle Maintenance Building	RC10	3/7/2017	5	ND<0.10	ND<0.020	ND<0.020	ND<0.020-1.00
	Immediately south of the active car wash and in the vicinity of the associated clarifier	RC11	3/7/2017	5	ND<0.10	**0.036**	ND<0.020	ND<0.020-1.00
	Immediately east of the northern portion of the active car wash	RC12	3/7/2017	5	ND<0.10	**0.03**	ND<0.020	ND<0.020-1.00
	Immediately north of the Vehicle Maintenance Building	RC13	3/7/2017	5	ND<0.10	ND<0.020	ND<0.020	ND<0.020-1.00
	Immediately west of the Vehicle Maintenance Building	RC14	3/7/2017	5	ND<0.10	ND<0.020	ND<0.020	ND<0.020-1.00
Inactive Clarifier and Leach Field	In the vicinity of the inactive clarifier	RC15	3/7/2017	5	**0.048**	ND<0.020	ND<0.020	ND<0.020-1.00
	In the vicinity of the former leach field	RC16	3/7/2017	5	**1.32**	ND<0.020	**0.26**	ND<0.020-1.00
		RC17	3/7/2017	5	**4.73**	ND<0.020	**0.908**	ND<0.020-1.00
Regulatory Guidelines (ug/l)								
Existing Building								
DTSC-SLi					NA	3,900	5,300	Various
EPA RSLi					130,000	4,400	NA	Various
Future Building								
DTSC-SLi					NA	7,800	10,600	Various
EPA RSLi					260,000	8,800	NA	Various

Notes:

Sample ID - soil gas sample identification

feet bgs - feet below ground surface

ND - no detectable concentration above the laboratory reporting limit

NA - not available

ug/l - micrograms per liter

Freon 113 - 1,1,2-trichloro-1,2,2-trifluoroethane

Freon 11 - trichlorofluoromethane

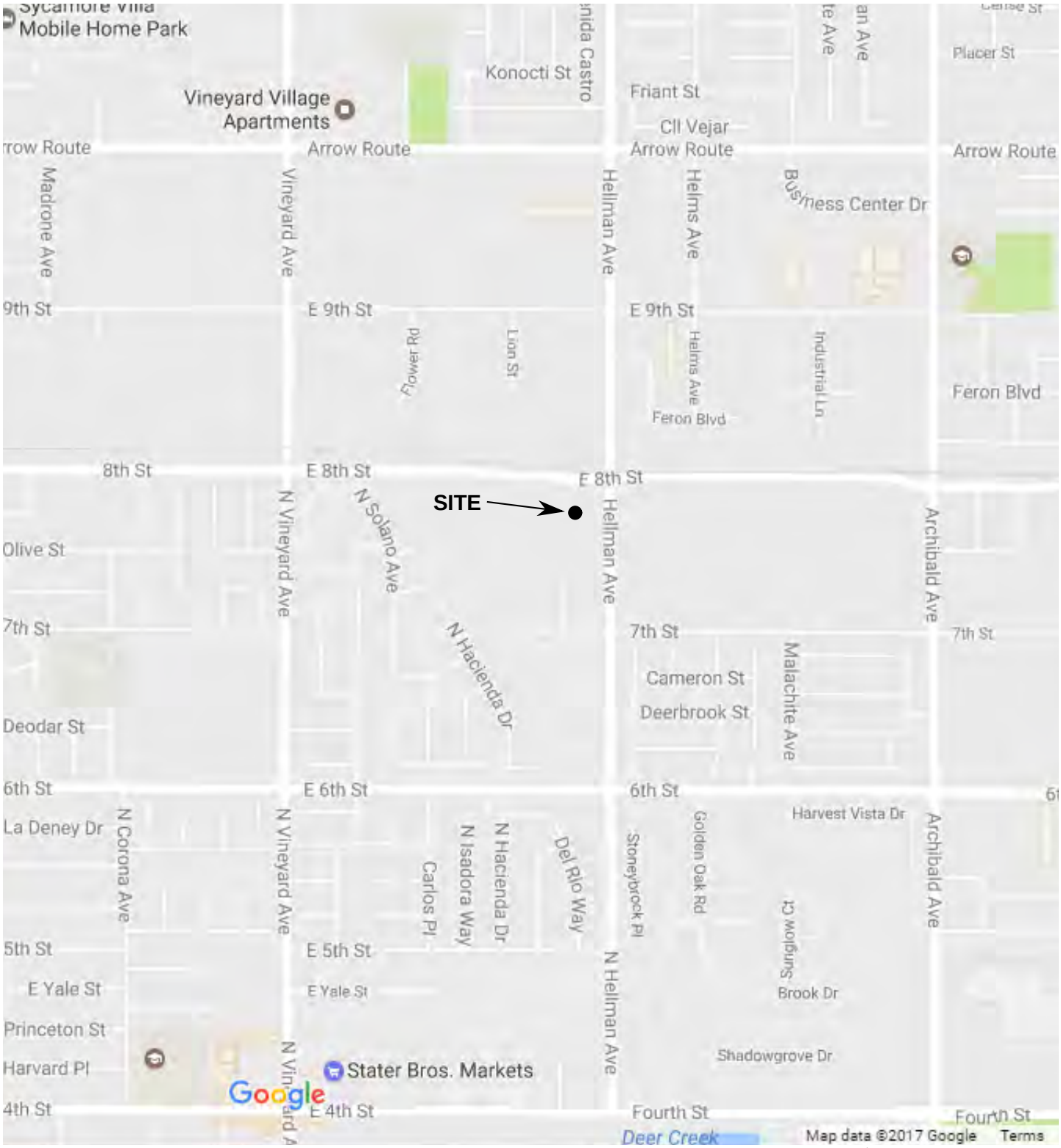
VOCs - volatile organic compounds analyzed in general accordance with EPA Method No. 8260B

DTSC-SLi - Department of Toxic Substances Control Screening Levels, Note 3, for industrial/commercial ambient air, modified using the attenuation factor for an existing commercial building where the sample is collected from the contaminant source (0.001), dated June 2016

EPA RSLi - EPA Region 9, Regional Screening Levels for industrial/commercial ambient air, modified using the attenuation factor for an existing commercial building where the sample is collected from the contaminant source (0.001), dated May 2016

DTSC-SLi - Department of Toxic Substances Control Screening Levels, Note 3, for industrial/commercial ambient air, modified for soil gas using an attenuation factor for a future commercial building (0.0005) at the contaminant source, dated June 2016

EPA-RSLi – EPA Region 9, Regional Screening Levels for industrial/commercial ambient air, modified for soil gas using an attenuation factor for a future commercial building (0.0005) at the contaminant source, dated May 2016

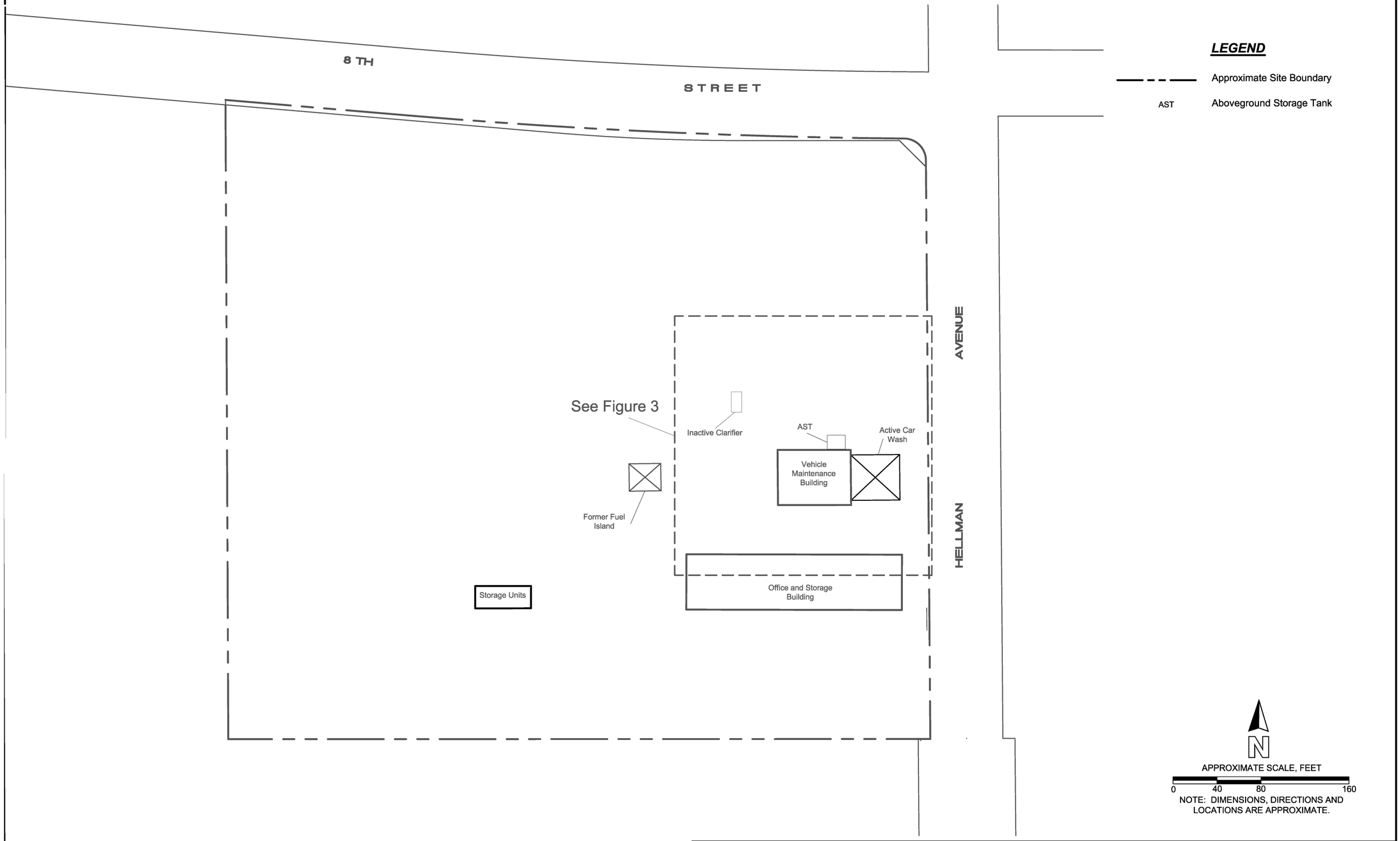


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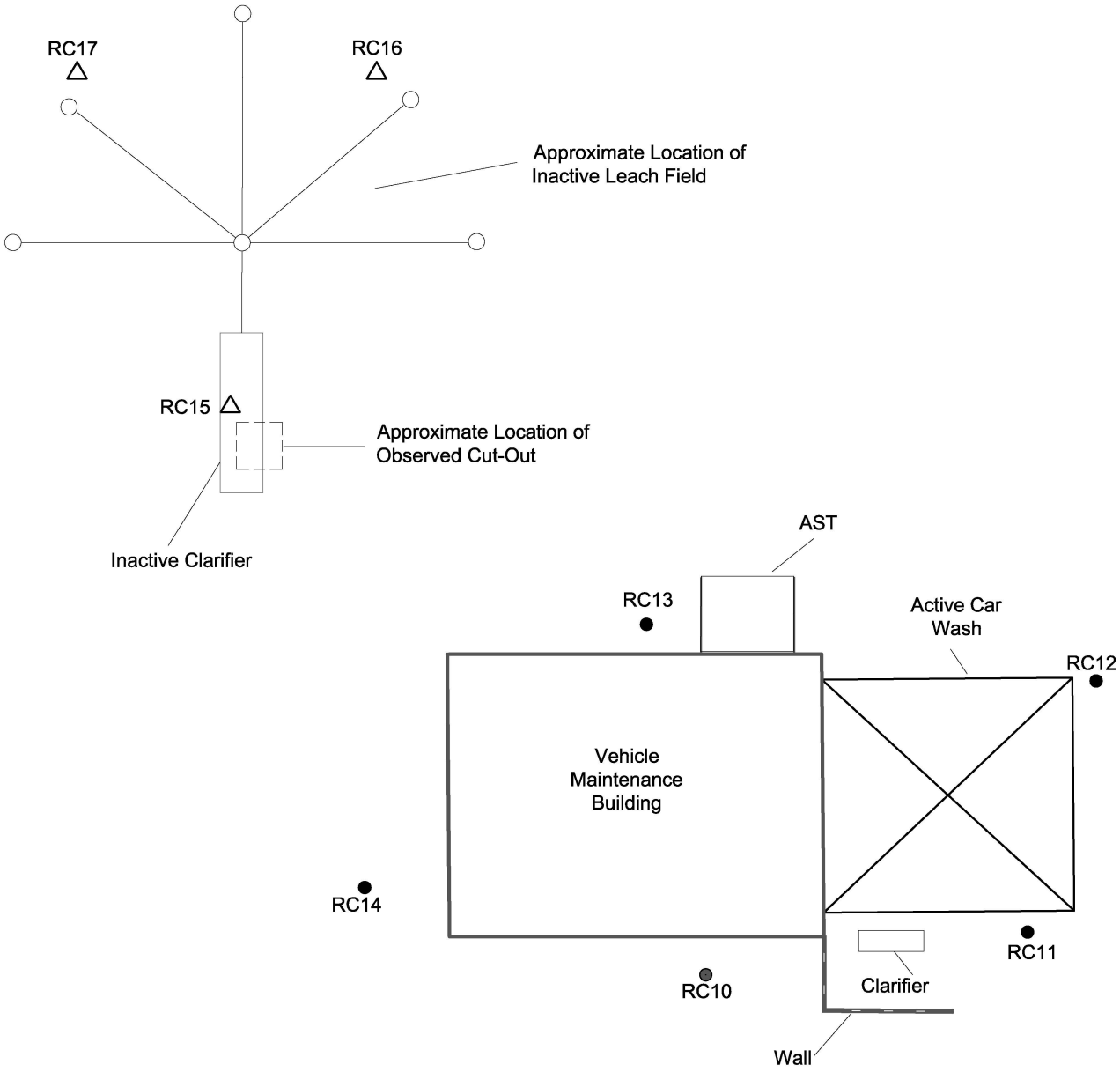
NO SCALE

NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

ARDENT ENVIRONMENTAL GROUP, INC.	PROJECT NO. **100855001**	**SITE LOCATION MAP**	FIGURE **1**
	DATE **03/17**	9000 HELLMAN AVENUE RANCHO CUCAMONGA, CALIFORNIA	



ARDENT ENVIRONMENTAL GROUP, INC.	PROJECT NO. 100855001	SITE PLAN	FIGURE 2
	DATE 03/17	9000 HELLMAN AVENUE RANCHO CUCAMONGA, CALIFORNIA	



LEGEND

- Approximate Site Boundary
- RC15 — Soil and Soil Gas Point Location and Designation
- RC10 — Soil Gas Point Location and Designation
- AST — Aboveground Storage Tank

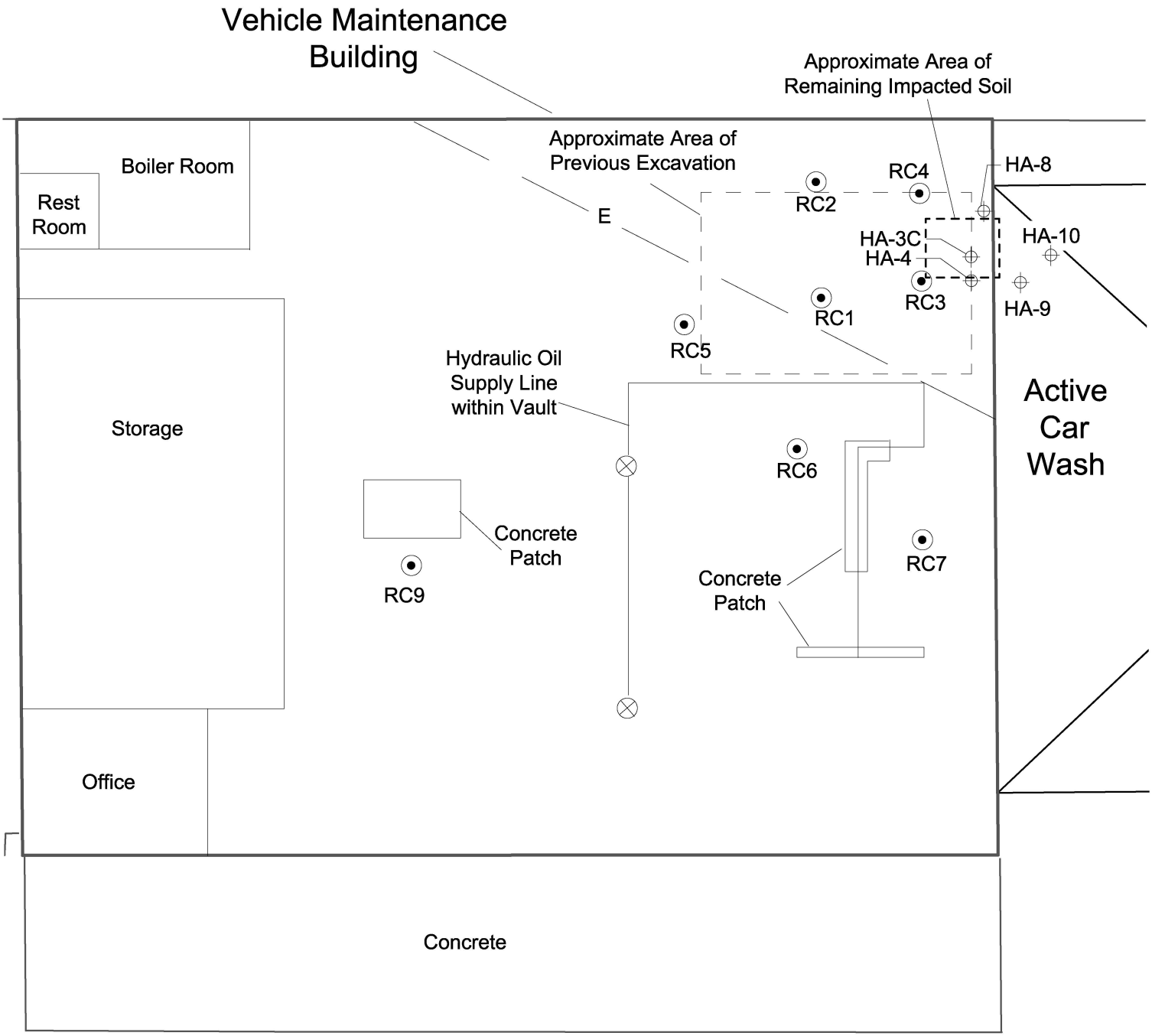
N

APPROXIMATE SCALE, FEET

0 15 30 60

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

ARDENT ENVIRONMENTAL GROUP, INC.	PROJECT NO. 100855001	DETAIL PARTIAL SITE PLAN, INACTIVE CLARIFIER AND LEACH FIELD AND VEHICLE MAINTENANCE BUILDING	FIGURE 3
	DATE 03/17	9000 HELLMAN AVENUE RANCHO CUCAMONGA, CALIFORNIA	



LEGEND

RC1 — Soil Boring Location and Designation

⊗ — Active Underground Hydraulic Lift

—E— — Electrical Conduit

HA-8 — Soil Boring Location from 1988 Hydraulic Oil Leak Investigation

N

APPROXIMATE SCALE, FEET

0 5 10 20

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

ARDENT ENVIRONMENTAL GROUP, INC.	PROJECT NO. 100855001	DETAIL PARTIAL SITE PLAN, VEHICLE MAINTENANCE BUILDING	FIGURE 4
	DATE 03/17	9000 HELLMAN AVENUE RANCHO CUCAMONGA, CALIFORNIA	

DRAFT

APPENDIX A

PICTURE OF THE INACTIVE CLARIFIER AND LEACH FIELD



Photograph No. 1: Inactive clarifier (foreground) and leach field (background).

DRAFT

APPENDIX B

BORING LOGS

DRAFT

APPENDIX C

LABORATORY REPORTS

KUNZMAN ASSOCIATES, INC.

8TH STREET AND HELLMAN AVENUE WAREHOUSING PROJECT

FOCUSED TRAFFIC ANALYSIS

April 17, 2018

Traffic Engineering | Transportation Planning | Parking | Noise/Vibration | Expert Witness
Air Quality | Global Climate Change | Health Risk Assessment

8TH STREET AND HELLMAN AVENUE WAREHOUSING PROJECT

FOCUSED TRAFFIC ANALYSIS

April 17, 2018

Prepared by:

Perrie Ilercil, P.E. ■ Carl Ballard, LEED GA ■ William Kunzman, P.E.



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JN 7405

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EXECUTIVE SUMMARY

The purpose of this report is to provide an assessment of the traffic impacts resulting from the development of the proposed 8th Street and Hellman Avenue Warehousing Project and to identify the traffic mitigation measures necessary to maintain the established Level of Service standard for the elements of the impacted roadway system. The traffic issues related to the proposed land use and development have been evaluated in the context of the California Environmental Quality Act (CEQA).

The City of Rancho Cucamonga is the lead agency responsible for preparation of the focused traffic analysis, in accordance with California Environmental Quality Act authorizing legislation. This report analyzes traffic impacts for the anticipated opening date with occupancy of the development in Opening Year (2020), at which time it will be generating trips at its full potential. This report also analyzes potential project traffic impacts for Horizon Year (2040) traffic conditions.

Although this is a technical report, every effort has been made to write the report clearly and concisely. To assist the reader with those terms unique to transportation engineering, a glossary of terms is provided in Appendix A.

A. Project Description

1. Location and Access

The project site (9000 Hellman Avenue) is located on the southwest corner of the 8th Street and Hellman Avenue intersection in the City of Rancho Cucamonga. The project site is proposed to provide access to 8th Street and Hellman Avenue with regional access to the I-10 Freeway via Vineyard Avenue and Archibald Avenue.

2. Project Development

The 8.09 acre project site is proposed to be developed with 174,745 square feet of warehousing (including mezzanine office).

3. Project Trip Generation

The proposed project is forecast to generate approximately 398 daily trips in passenger car equivalents, 39 passenger car equivalent trips of which will occur during the morning peak hour and 42 passenger car equivalent trips of which will occur during the evening peak hour.

4. Phasing and Timing

The project is proposed to be constructed in one phase. For the purposes of this analysis, the project will be generating trips at its full potential in Opening Year (2020). Existing Plus Project will exemplify the existing traffic conditions with the entire site built-out.

The Hellman Avenue and 8th Street intersection is currently under construction with an estimated completion date of June 2018 for roadway widening and traffic signal installation. The Existing Plus Project traffic conditions assume that the intersection will be operational at the currently proposed configuration as provided by the plans for this Capital Improvement Program project (see Appendix G).

The Hellman Avenue and 6th Street intersection is programmed for the installation of a traffic signal per the City of Rancho Cucamonga Capital Improvement Program. For Opening Year (2020) and Horizon Year (2040) traffic conditions, the traffic signal is shown as a funded improvement.

B. Existing Traffic Conditions

The project site is currently occupied by a 16,000 square foot of utility building and utility parking lot.

For Existing traffic conditions, the study intersections are currently operating within acceptable Levels of Service during the peak hours.

C. Traffic Impacts

For Existing Plus Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service during the peak hours.

For Opening Year (2020) Without Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements.

Hellman Avenue (NS) at:
6th Street (EW) - #7

For Opening Year (2020) With Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements:

Hellman Avenue (NS) at:
6th Street (EW) - #7

For Horizon Year (2040) Without Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements.

Hellman Avenue (NS) at:
6th Street (EW) - #7

For Horizon Year (2040) With Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements:

Hellman Avenue (NS) at:
6th Street (EW) - #7

For "With Project" traffic conditions, the project generated less than 50 peak hour trips at the study intersections and project trips did not result in a significant impact at the study intersections. No study intersections were reduced from the pre-project from Level of Service D or better to the "With Project" of Level of Service E or worse for Existing Plus Project traffic conditions.

The ambient growth and other development trips for Opening Year (2020) Without Project and Horizon Year (2040) Without Project traffic conditions result in an unacceptable Level of Service at the Hellman Avenue and 6th Street intersection. The Hellman Avenue and 6th Street intersection is programmed for the installation of a traffic signal per the City of Rancho Cucamonga Capital Improvement Program. For Opening Year (2020) and Horizon Year (2040) traffic conditions, the traffic signal is shown as a funded improvement.

D. Mitigation Measures

Roadway improvements were identified to eliminate any anticipated roadway operational deficiencies for which the project contributes a significant impact throughout the study area.

On-site improvements and improvements adjacent to the site will be required in conjunction with the proposed development to ensure adequate circulation within the project itself.

As mitigation for any potential traffic impacts, the proposed project shall contribute through the City of Ranch Cucamonga Development Impact Fee (DIF) program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016).

E. On- Site/Access Recommendations

Site-specific circulation and access recommendations are depicted on Figure 38.

Construct and/or repair Hellman Avenue from the west project boundary to 8th Street at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

Construct and/or repair 8th Street from Hellman Avenue to the south project boundary at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops

and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

The project east driveway on 8th Street shall be restricted to right turns in/out only access (cars only).

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project. On-site traffic control plans shall comply with the California Manual of Uniform Traffic Control Devices (2014).

All on-site and site-adjacent improvements, including traffic signing/striping and project driveways, should be constructed as approved by the City of Rancho Cucamonga Public Works Department.

On-site parking should be provided to the satisfaction of City of Rancho Cucamonga Planning Department.

Sight distance at project access points should comply with applicable City of Rancho Cucamonga/California Department of Transportation sight distance standards. The final grading, landscaping, and street improvement plans should demonstrate that sight distance standards are met.

As is the case for any roadway design, the City of Rancho Cucamonga should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

I. INTRODUCTION

This section discusses the project location and proposed development and study area. Figure 1 shows the project location map and Figure 2 illustrates the project site plan.

A. Purpose and Objectives

The purpose of this focused traffic analysis is to provide an assessment of the traffic impacts resulting from the development of the proposed 8th Street and Hellman Avenue Warehousing Project and to identify the traffic mitigation measures necessary to maintain the established Level of Service standard for the elements of the impacted roadway system. The traffic issues related to the proposed land use and development have been evaluated in the context of the California Environmental Quality Act (CEQA).

The City of Rancho Cucamonga is the lead agency responsible for preparation of the focused traffic analysis, in accordance with California Environmental Quality Act authorizing legislation. This report analyzes traffic impacts for the anticipated opening date with occupancy of the development in Opening Year (2020), at which time it will be generating trips at its full potential. This report also analyzes potential project traffic impacts for Horizon Year (2040) traffic conditions.

The following analysis years are considered in this report:

- Existing (2018) Traffic Conditions
- Existing Plus Project Traffic Conditions[1]
- Opening Year (2020) Without and With Project Traffic Conditions
- Horizon Year (2040) Without and With Project Traffic Conditions

B. Project Description

The project site (9000 Hellman Avenue) is located on the southwest corner of the 8th Street and Hellman Avenue intersection in the City of Rancho Cucamonga. The project site is proposed to provide access to 8th Street and Hellman Avenue.

The 8.09 acre project site is proposed to be developed with 174,745 square feet of warehousing (including mezzanine office).

The project is proposed to be constructed in one phase. For the purposes of this analysis, the project will be generating trips at its full potential in Opening Year (2020). Existing Plus Project traffic conditions will exemplify the Existing traffic conditions with the entire site built-out.

The project site is currently designated as General Industrial land use in the City of Rancho Cucamonga General Plan.

[1] The existing plus project conditions has been analyzed to comply with the Sunnyvale West Neighborhood Association v. City of Sunnyvale CEQA court case. This scenario assumes the full development of the proposed project and full absorption of the proposed project trips on the circulation system at the present time.

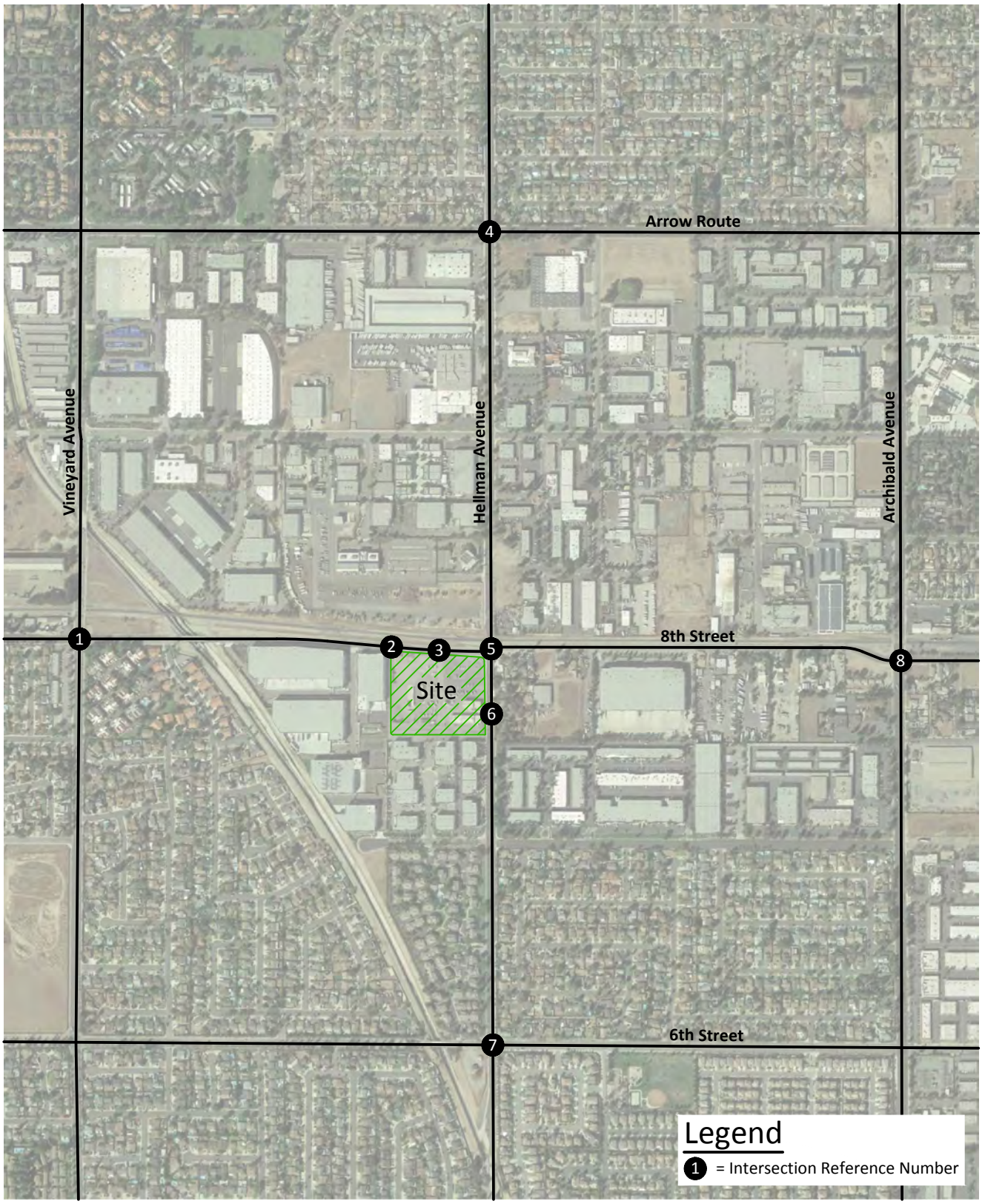
C. Study Area

Local street access is provided by Vineyard Avenue, Hellman Avenue, Archibald Avenue, Arrow Route, 8th Street, and 6th Street. Regional access to the project site is provided by the I-10 Freeway, which is located approximately 1.5 miles to the south.

Based on the City-approved scoping agreement, the study area consists of the following intersections (see Appendix B):

No.	Study Intersection	Jurisdiction
1	Vineyard Avenue (NS) at 8th Street (EW)	Rancho Cucamonga
2	Project West Driveway (NS) at 8th Street (EW)	Rancho Cucamonga
3	Project East Driveway (NS) at 8th Street (EW)	Rancho Cucamonga
4	Hellman Avenue (NS) at Arrow Route (EW)	Rancho Cucamonga
5	Hellman Avenue (NS) at 8th Street (EW)	Rancho Cucamonga
6	Hellman Avenue (NS) at Project South Driveway (EW)	Rancho Cucamonga
7	Hellman Avenue (NS) at 6th Street (EW)	Rancho Cucamonga
8	Archibald Avenue (NS) at 8th Street (EW)	Rancho Cucamonga

Figure 1
Project Location Map

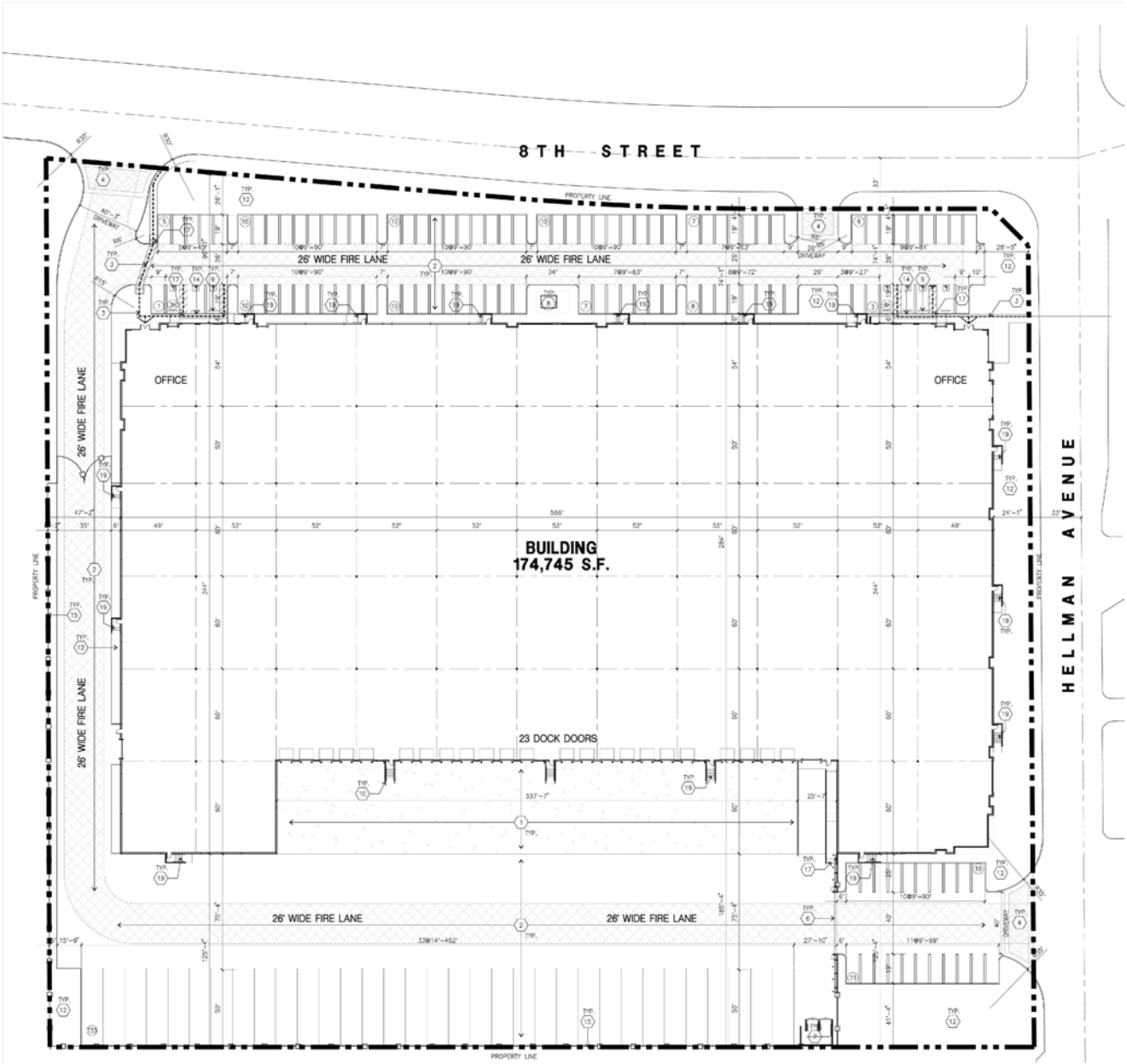


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JN 7405

Figure 2
Site Plan



II. METHODOLOGY

This study has been prepared in accordance with the guidelines contained in the San Bernardino County Congestion Management Program (2016 Update), including input parameters for Highway Capacity Manual calculations, saturation flow rates, and study intersections.

A. Identification of Study Area

Identification of the study area was based on the forecast contribution of peak hour project generated trips on the roadway segments near the project site. Based on the guidelines for preparation of a Traffic Impact Analysis, arterial facilities are required to be included in the analysis when the anticipated project trip contribution equals or exceeds 50 two-way trips during the peak hours; freeway segments are required to be included when the anticipated project trip contribution equals or exceeds 100 two-way peak hour trips. No analysis is typically required further than 5 miles from the project site.

B. Traffic Conditions

1. Existing Traffic

Existing intersection traffic conditions were established through morning and evening peak hour intersection turning movement counts obtained by Kunzman Associates, Inc. in March 2018 (see Appendix C). In addition, truck classification counts were conducted at the study intersections. The existing percent of trucks were used in the conversion of trucks to passenger car equivalents.

2. Traffic Model

The San Bernardino Transportation Analysis Model (SBTAM) has generally been used to evaluate the regional distribution of project trips. A select zone (trip distribution) analysis was performed using the San Bernardino Transportation Analysis Model with the assistance of the San Bernardino Associated Governments staff. The socio-economic data inputs to the San Bernardino Transportation Analysis Model are representative of the planned project development intensity.

The average daily traffic volume forecasts have been determined using the growth increment approach on the San Bernardino Transportation Analysis Model Year 2012 and Year 2040 average daily traffic volume forecasts (see Appendix D). Appendix E contains the traffic model plots.

C. Intersection Analysis Methodology

The technique used to assess the performance of an intersection is known as the intersection delay methodology based on the procedures contained in the Highway Capacity Manual (Transportation Research Board). The methodology compares the traffic volumes using the intersection to the capacity of the intersection to calculate the delay associated with associated with the traffic control at the intersection. The intersection

delay is then correlated to a performance measure known as Level of Service based on the following thresholds:

Level of Service	Intersection Control Delay (Seconds/Vehicle)	
	Signalized Intersection	Unsignalized Intersection
A	≤ 10.0	≤ 10.0
B	> 10.0 to ≤ 20.0	> 10.0 to ≤ 15.0
C	> 20.0 to ≤ 35.0	> 15.0 to ≤ 25.0
D	> 35.0 to ≤ 55.0	> 25.0 to ≤ 35.0
E	> 55.0 to ≤ 80.0	> 35.0 to ≤ 50.0
F	> 80.0	> 50.0

Source: Highway Capacity Manual (Transportation Research Board).

Level of Service is used to qualitatively describe the performance of a roadway facility, ranging from Level of Service A (free-flow conditions) to Level of Service F (extreme congestion and system failure).

Input parameters such as saturation flow rates and default values for Highway Capacity Manual calculations were used in accordance with the guidelines contained in the San Bernardino County Congestion Management Program (2016 Update).

D. Performance Standards

The City of Rancho Cucamonga General Plan Circulation Element has established Level of Service D as the minimum acceptable Level of Service for the City's transportation system. Roadway facilities operating at Level of Service E or F are considered deficient.

E. Thresholds of Significance

Based on the City-established performance standards, a project traffic impact is considered significant if the proposed project causes or worsens Level of Service E or F.

To reduce a potential impact to a less than significant level, feasible mitigation measures should be identified that will maintain the acceptable Level of Service. If a project is forecast to worsen a facility already operating at Level of Service E or F under pre-project conditions, proposed mitigation measures should maintain operation of the impacted facility at pre-project conditions. Mitigation measures can be in many forms, including addition of lanes, traffic control modification, or demand management measures. If no feasible mitigation measures can be identified for a significantly impacted facility, the impact will remain significant and unavoidable.

III. EXISTING CONDITIONS

Traffic conditions as they exist today are discussed below for study roadways and intersections.

A. Existing Roadway System

Figure 3 identifies the Existing roadway conditions based on a field survey of the study area; the Existing number of through lanes for roadways and the intersection geometry and controls are identified.

Local street access is provided by Vineyard Avenue, Hellman Avenue, Archibald Avenue, Arrow Route, 8th Street, and 6th Street. Regional access to the project site is provided by the I-10 Freeway, which is located approximately 1.5 miles to the south.

B. Existing Volumes

Figure 4 depicts the Existing average daily traffic volumes. The Existing average daily traffic volumes have been factored from peak hour intersection turning movement volumes using the following formula for each intersection leg:

PM Peak Hour (Approach Volume + Exit Volume) x 11.5 = Leg Volume.

Figure 5 and Figure 6 and show the existing morning and evening peak hour intersection turning movement volumes, respectively. Existing peak hour intersection turning movement volumes are based upon morning and evening peak period intersection turning movement counts conducted in April 2018 during typical weekday conditions. The morning peak period was counted between 7:00 AM and 9:00 AM; the evening peak period was counted between 4:00 PM and 6:00 PM. The actual peak hour within the peak period is the four consecutive 15-minute periods with the highest total volume when all movements are added together. Thus, the weekday evening peak hour at one intersection may be 4:45 PM to 5:45 PM if those four consecutive 15-minute periods have the highest combined volume. Intersection turning movement count worksheets are provided in Appendix C.

The peak hour traffic counts were converted into Passenger Car Equivalent (PCE) trips in accordance with the San Bernardino County Congestion Management Program recommendations (1.5 PCEs for large 2-axle vehicles, 2.0 PCEs for 3-axle trucks, and 3.0 PCEs for trucks with 4 or more axles). The peak hour factors used for intersection delay calculations are based the measured peak hour factors obtained from existing traffic counts.

C. 8th Street and Hellman Avenue Intersection Traffic Volume Adjustments

The Hellman Avenue and 8th Street intersection is currently under construction with an estimated completion date of June 2018 for roadway widening and traffic signal installation. The Existing Plus Project traffic conditions assume that the intersection will be operational at the currently proposed configuration as provided by the plans for this Capital Improvement Program project (see Appendix G).

Historical intersection turning movement counts for the Hellman Avenue and 8th Street intersection in conjunction with the San Bernardino Transportation Analysis Model data were used to determine the Existing intersection turning movement volumes for the Hellman Avenue and 8th Street intersection.

D. Existing Intersection Delay and Level of Service

The morning and evening peak hour Levels of Service for Existing traffic conditions have been calculated and are shown in Table 1. The study intersections currently operate within acceptable Levels of Service during the peak hours for Existing traffic conditions (see Table 1). Existing Level of Service worksheets are provided in Appendix F.

E. City of Rancho Cucamonga General Plan Circulation Element

Figure 7 shows the City of Rancho Cucamonga General Plan Circulation Plan. This figure shows the nature and extent of arterial highways that are needed to adequately serve the ultimate development depicted by the Land Use Element of the General Plan. The City of Rancho Cucamonga General Plan roadway cross-sections are illustrated on Figure 8.

F. Truck Routes

The City of Rancho Cucamonga designated truck route map is illustrated on Figure 9.

G. Transit Service

There are currently no transit routes along Hellman Avenue and 8th Street in the project vicinity. The nearest transit service is Omnitrans Route 80 along Vineyard Avenue. The existing bus routes provided within the study area are shown on Figure 10.

H. Bicycle & Pedestrian Facilities

The City of Rancho Cucamonga bicycle plan is illustrated on Figure 11 and the existing pedestrian facilities adjacent to the project site are shown on Figure 12.

Table 1

Existing Intersection Delay and Levels of Service

Intersection	Traffic Control[2]	Intersection Approach Lanes[1]												Peak Hour			
		Northbound			Southbound			Eastbound			Westbound			Morning		Evening	
		L	T	R	L	T	R	L	T	R	L	T	R	Delay[3]	LOS[4]	Delay[3]	LOS[4]
Vineyard Avenue (NS) at:																	
8th Street (EW) -# 1	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1	1	11.4	B	13.1	B
Hellman Avenue (NS) at:																	
Arrow Route (EW) -#4	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	20.3	C	19.2	B
8th Street (EW) -# 5	TS[5]	0	<1>	0	0	<1>	0	1	0.5	0.5	1	0.5	0.5	22.8	C	40.7	D
6th Street (EW) -#7	AWS	0.5	1.5	d	0.5	0.5	1	1	0.5	0.5	1	1	1	10.4	B	21.9	C
Archibald Avenue (NS) at:																	
8th Street (EW) -# 8	TS	1	2	d	1	1.5	0.5	1	0.5	0.5	1	0.5	0.5	8.8	A	12.6	B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane, there must be sufficient width for right turning vehicles to travel outside the through lanes. L = Left; T = Through; R = Right; d = De Facto Right Turn Lane; <1> = Shared Left/Through/Right Lane.

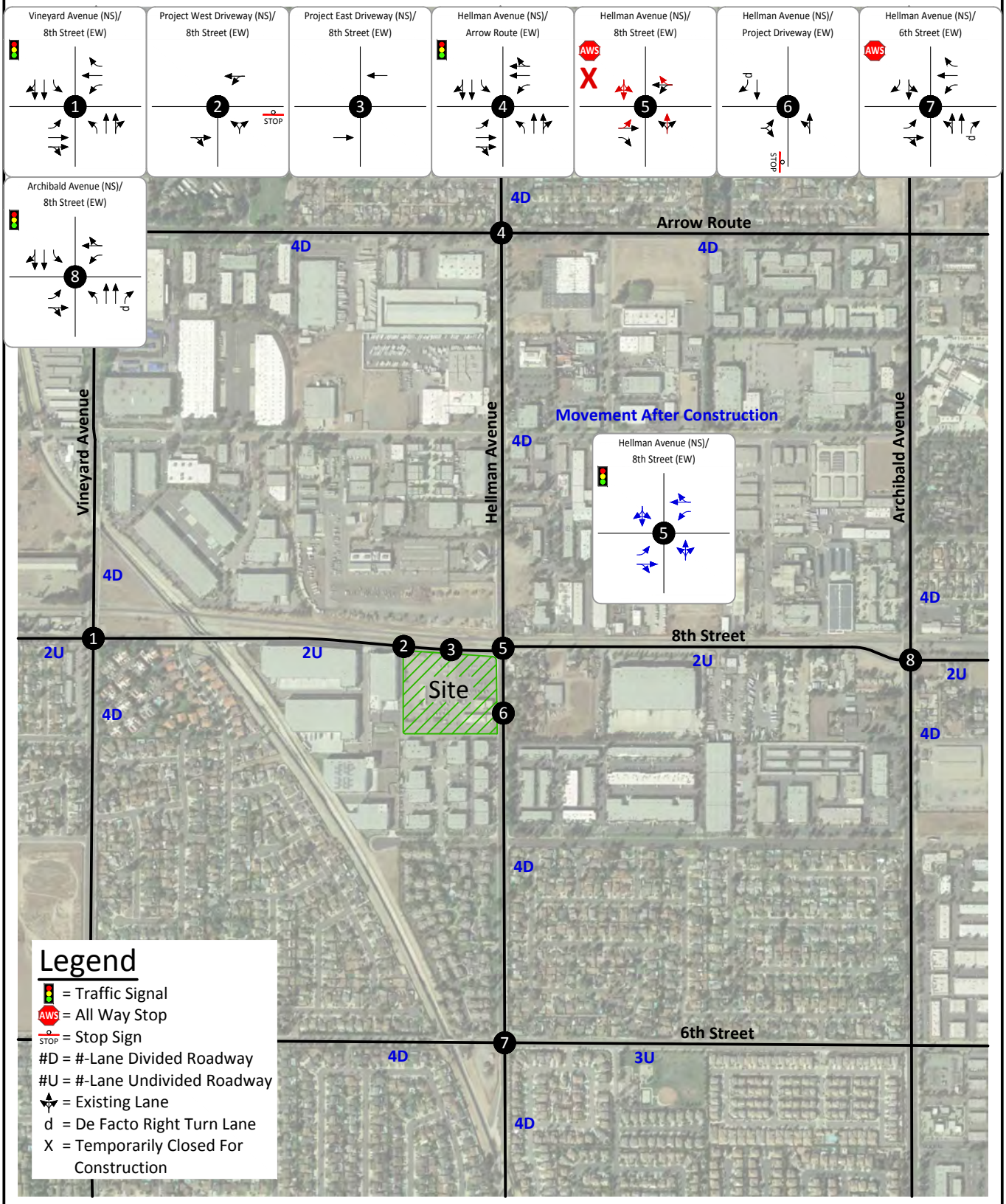
[2] AWS = All Way Stop; TS = Traffic Signal; CSS = Cross Street Stop

[3] Delay and Level of Service have been calculated using the following analysis software: Vistro, Version 5.00-02. Per the Highway Capacity Manual, overall average intersection delay and Level of Service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and Level of Service for the worst individual movement (or movements sharing a single lane) are shown.

[4] LOS = Level of Service

[5] Traffic signal installation and lane configuration at Hellman Avenue and 8th Street under construction to be opened by June 2018.

Figure 3
Existing Lane Geometry and Intersection Traffic Controls

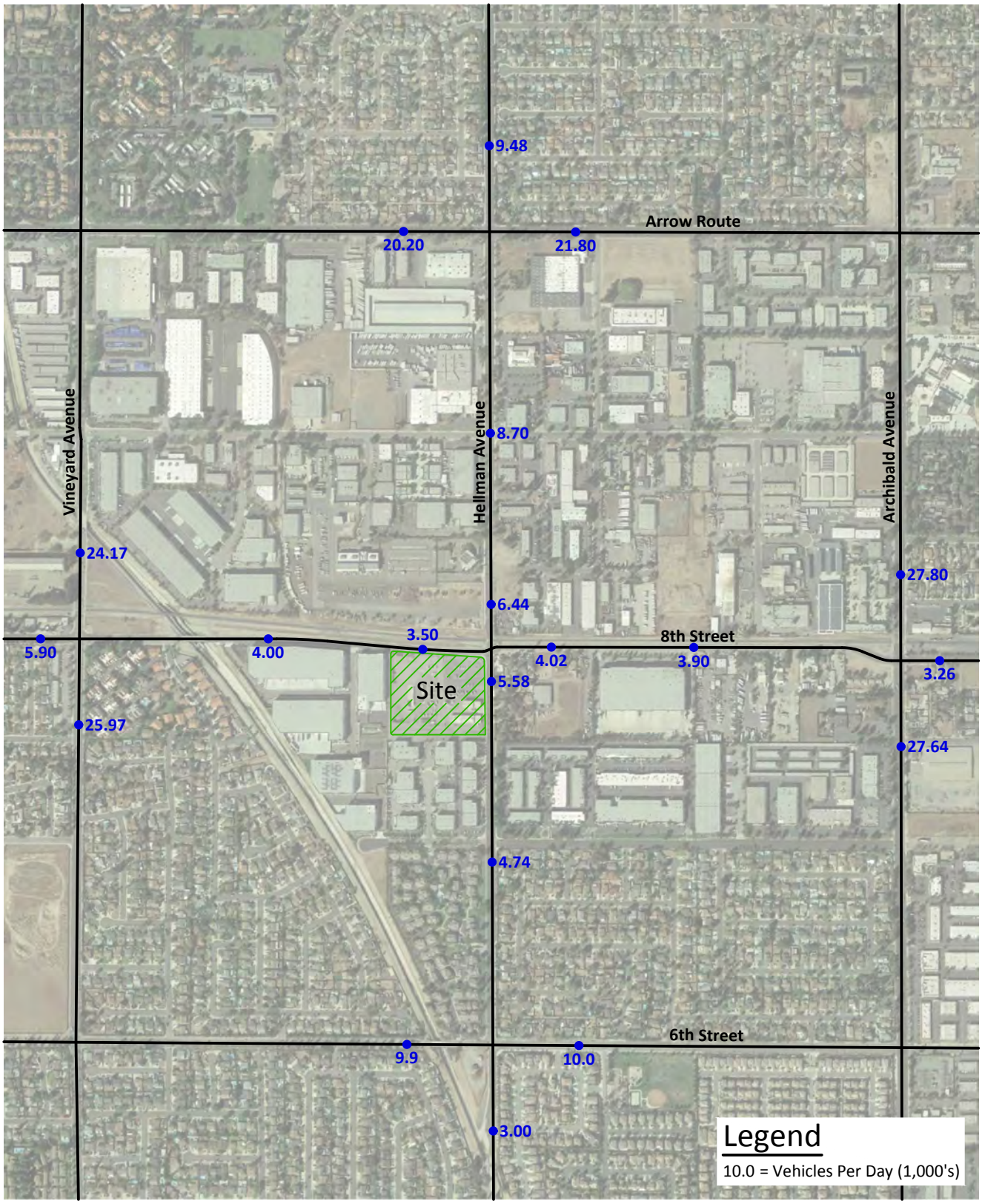


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Figure 4
Existing Average Daily Traffic Volumes

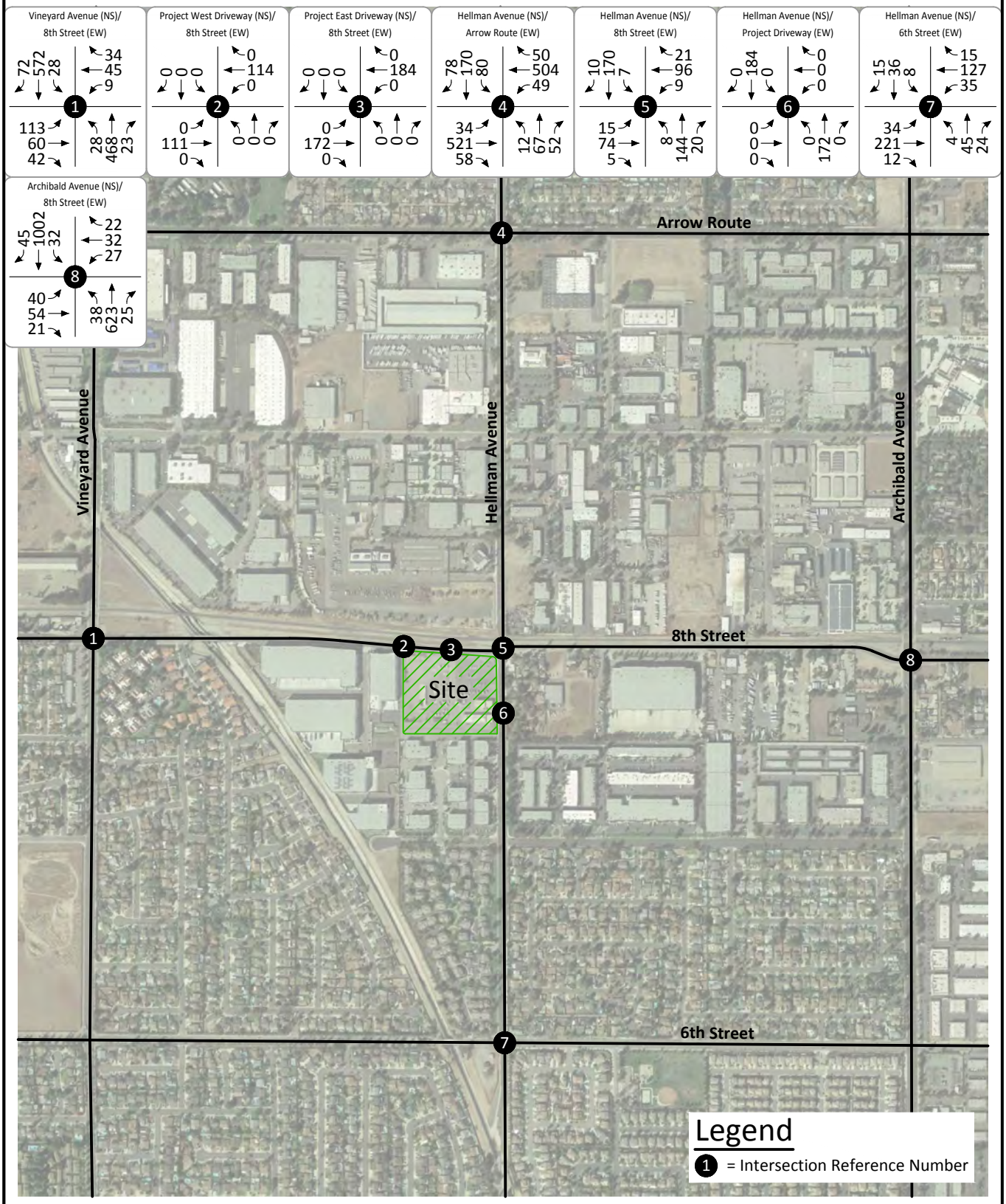


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Figure 5
Existing Morning Peak Hour Intersection Turning Movement Volumes

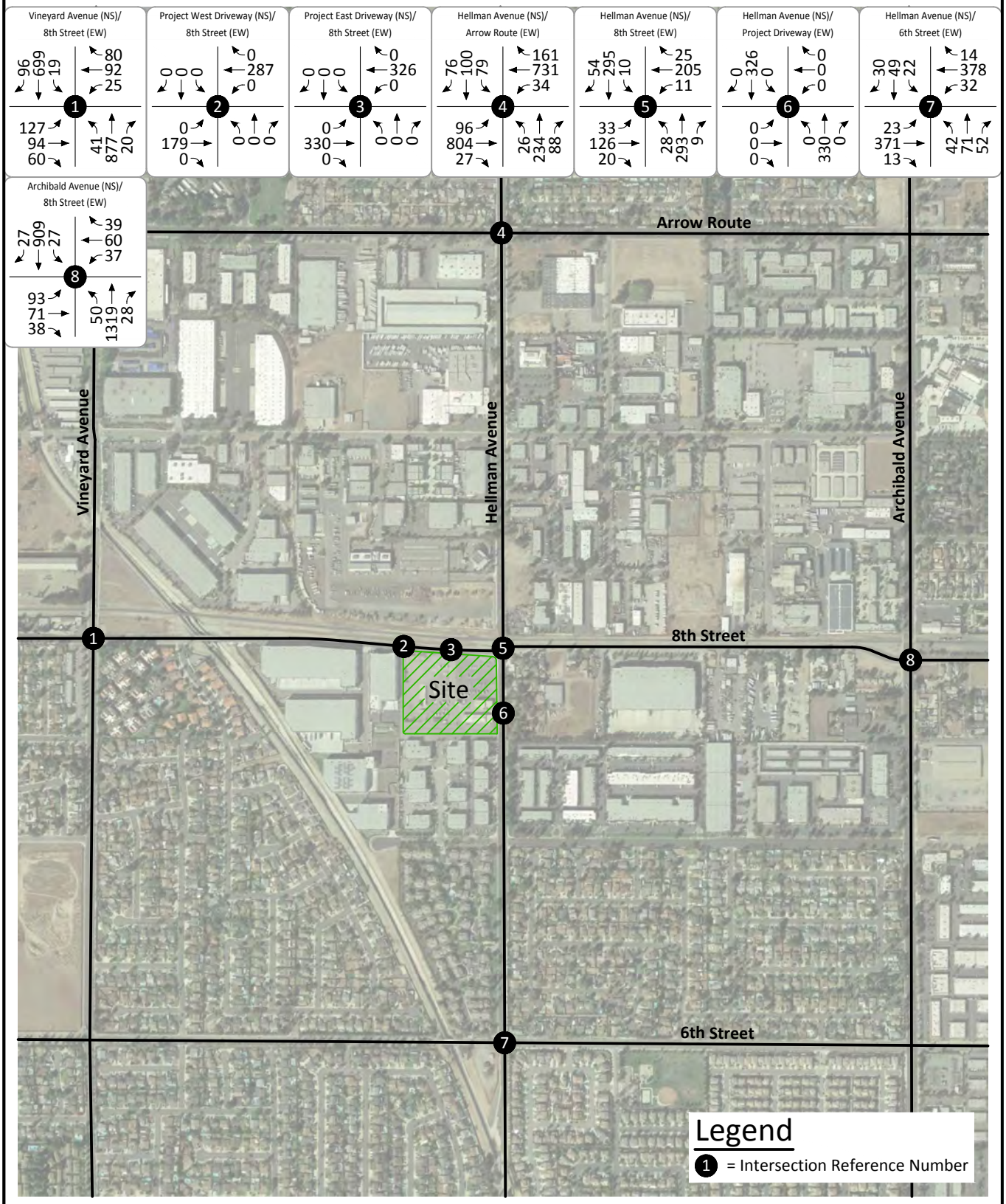


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Figure 6
Existing Evening Peak Hour Intersection Turning Movement Volumes

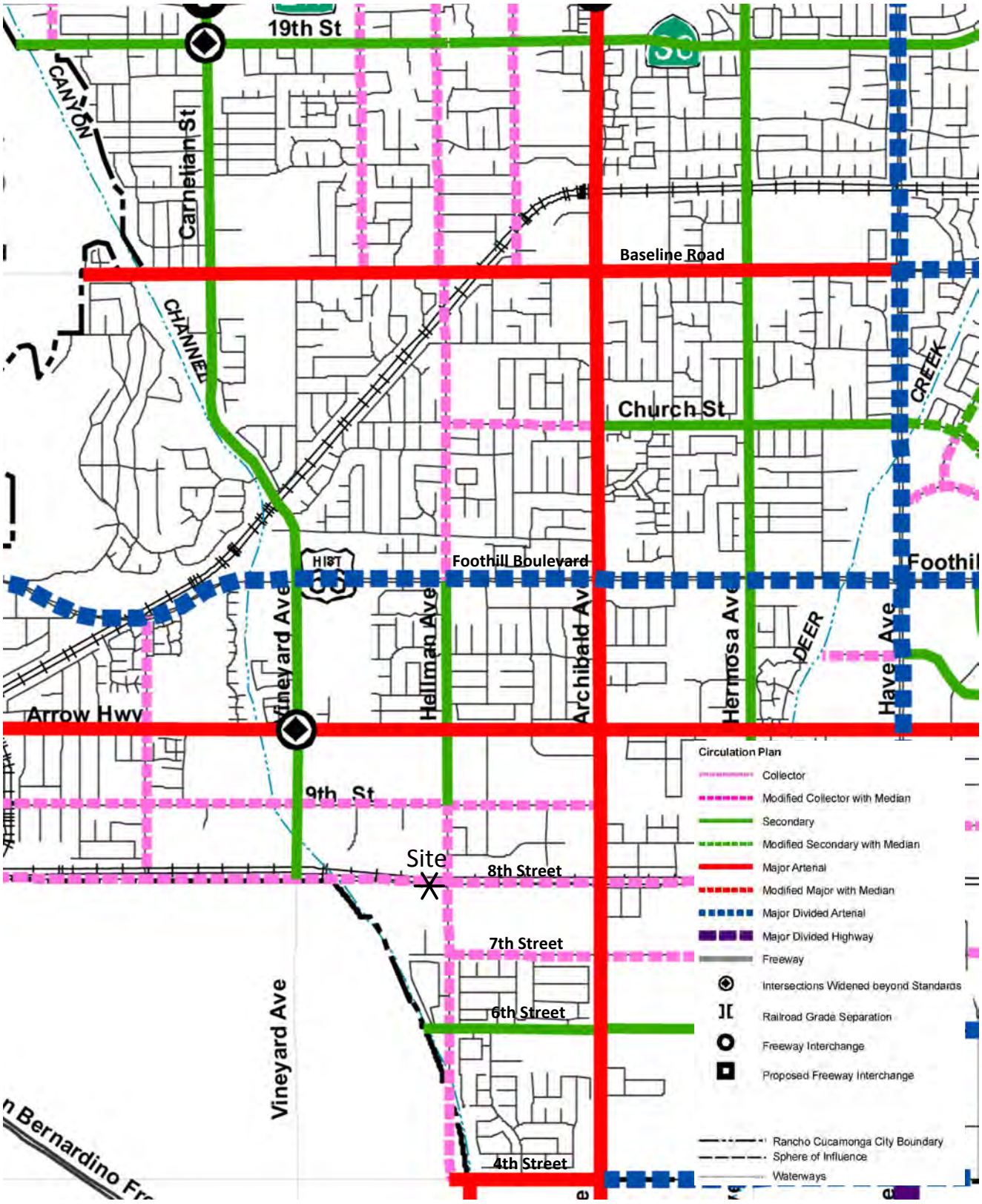


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Figure 7
City of Rancho Cucamonga General Plan Circulation Element



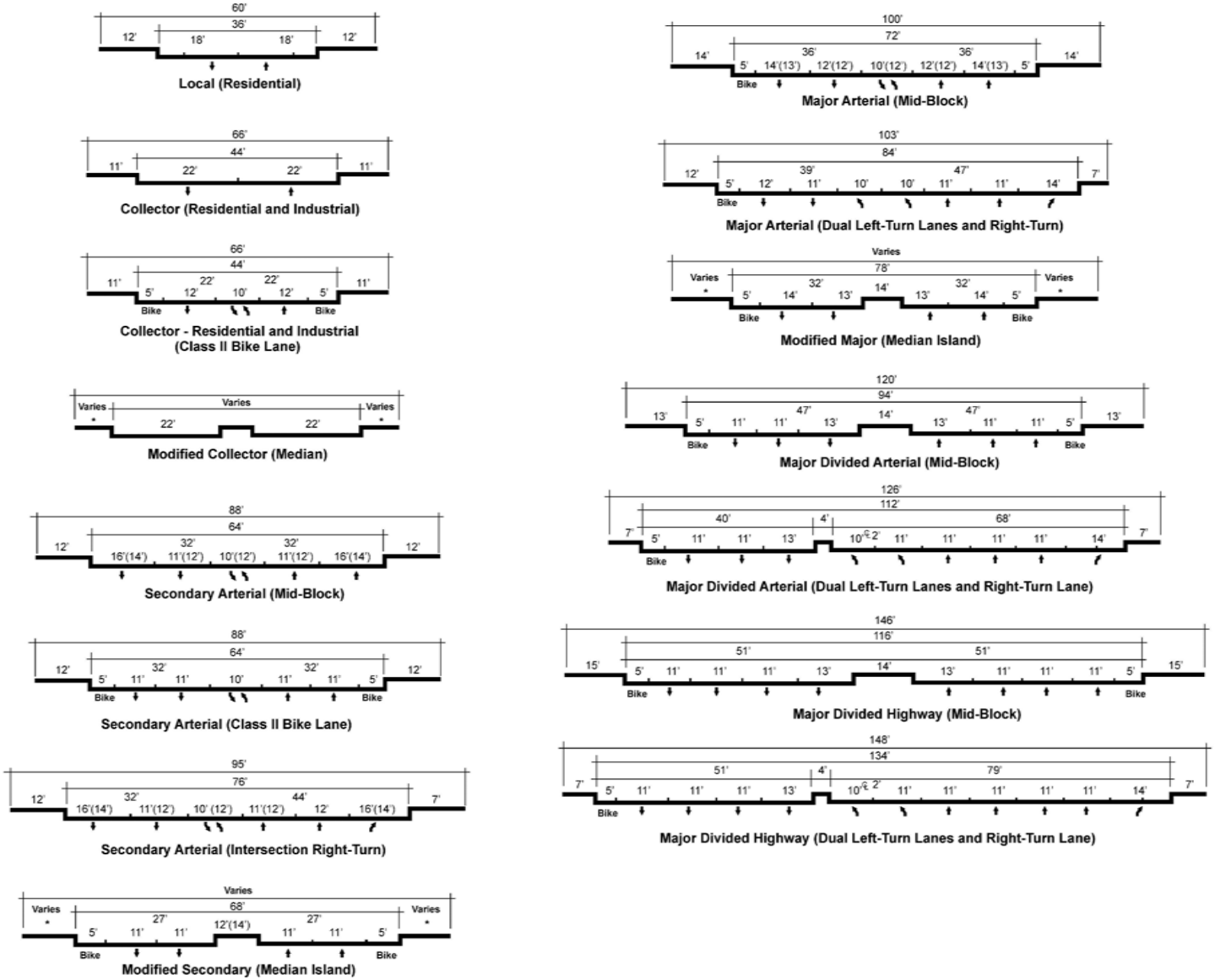
KUNZMAN ASSOCIATES, INC.

Source: City of Rancho Cucamonga

OVER 40 YEARS OF EXCELLENT SERVICE

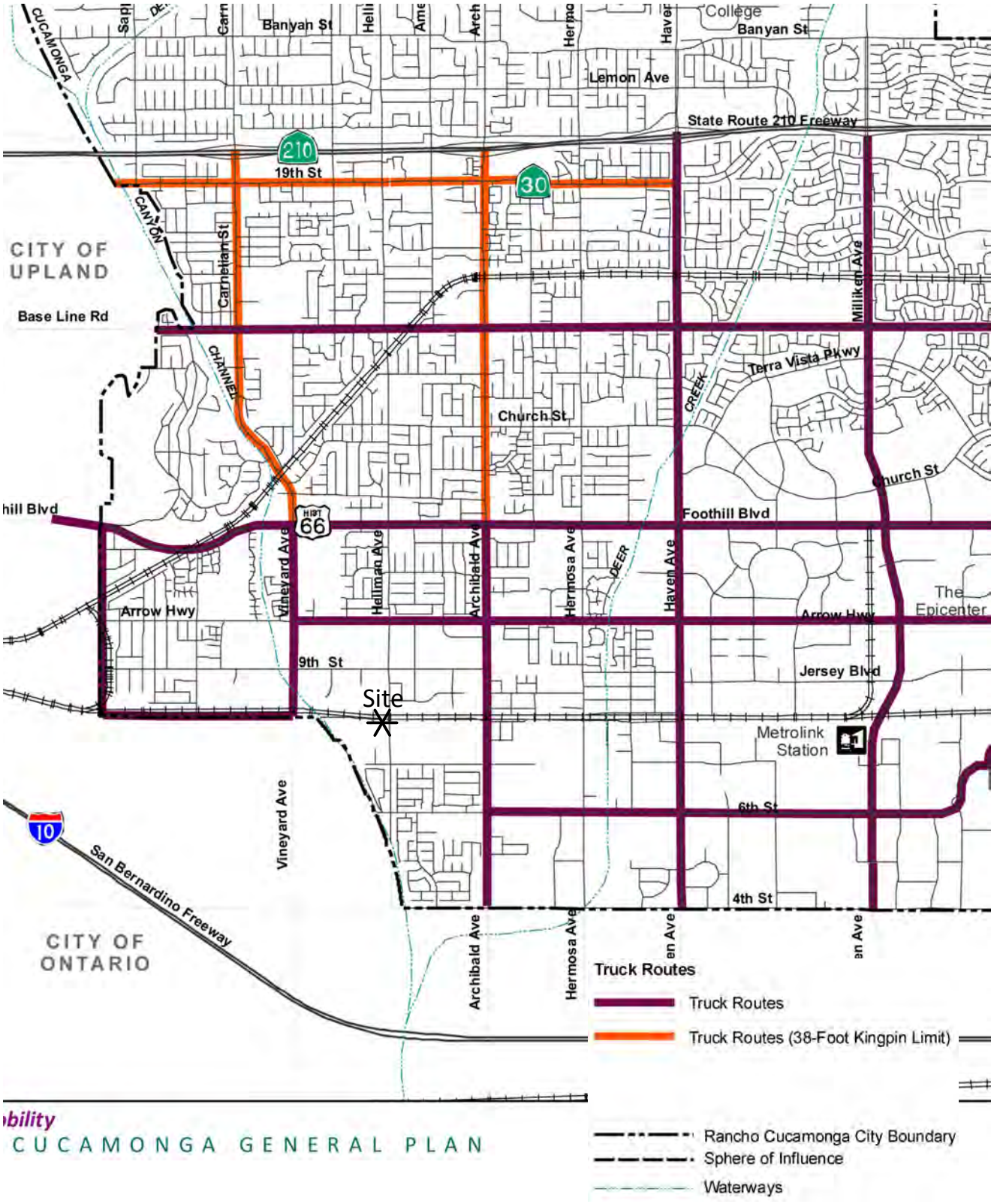
JN 7405

Figure 8
City of Rancho Cucamonga General Plan Roadway Cross-Sections



Source: City of Rancho Cucamonga

Figure 9
City of Rancho Cucamonga General Plan Truck Routes



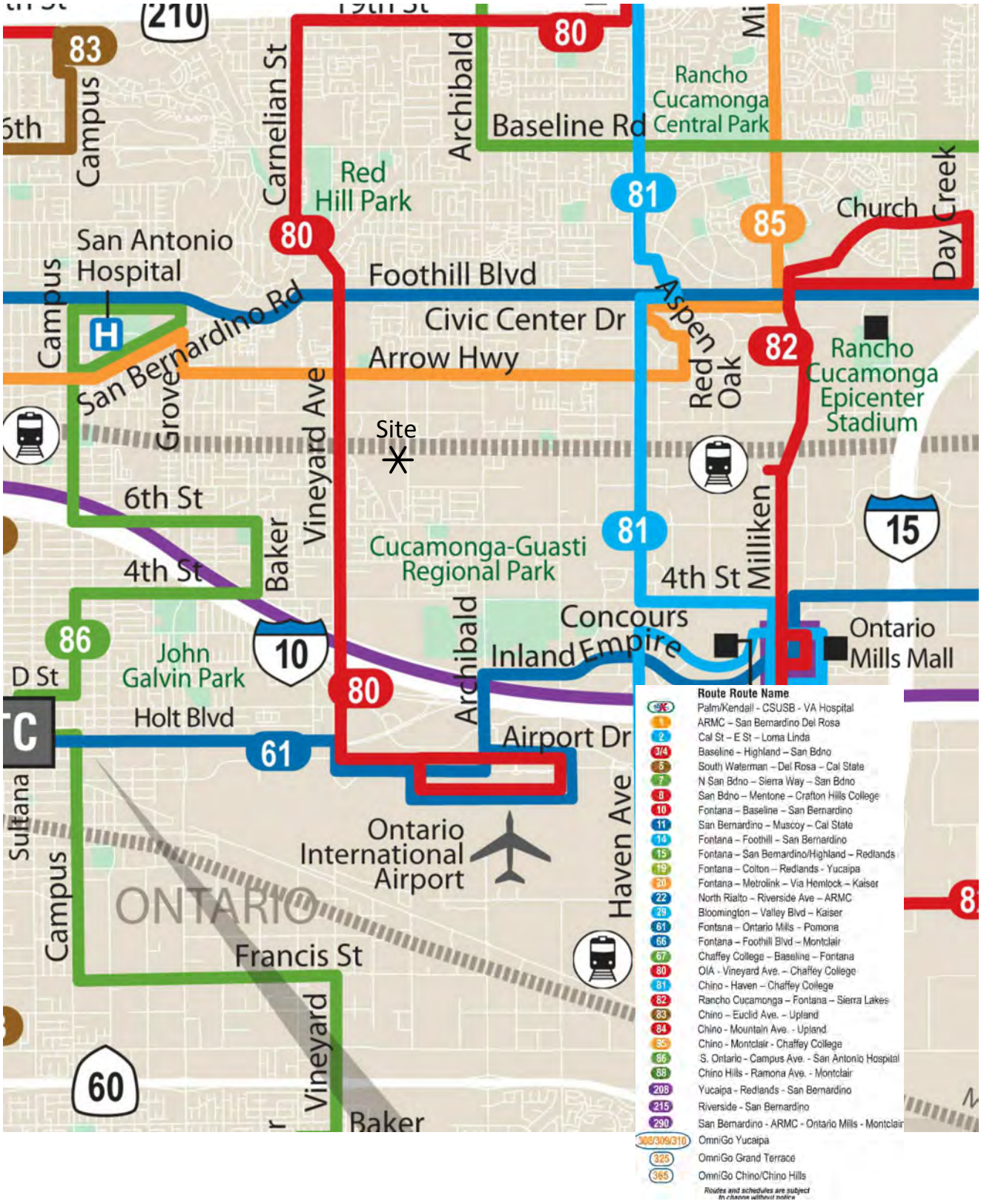
KUNZMAN ASSOCIATES, INC.

Source: City of Rancho Cucamonga

OVER 40 YEARS OF EXCELLENT SERVICE

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Figure 10
Existing Transit Routes



Source: Omnitrans

Figure 11
Existing Pedestrian Facilities

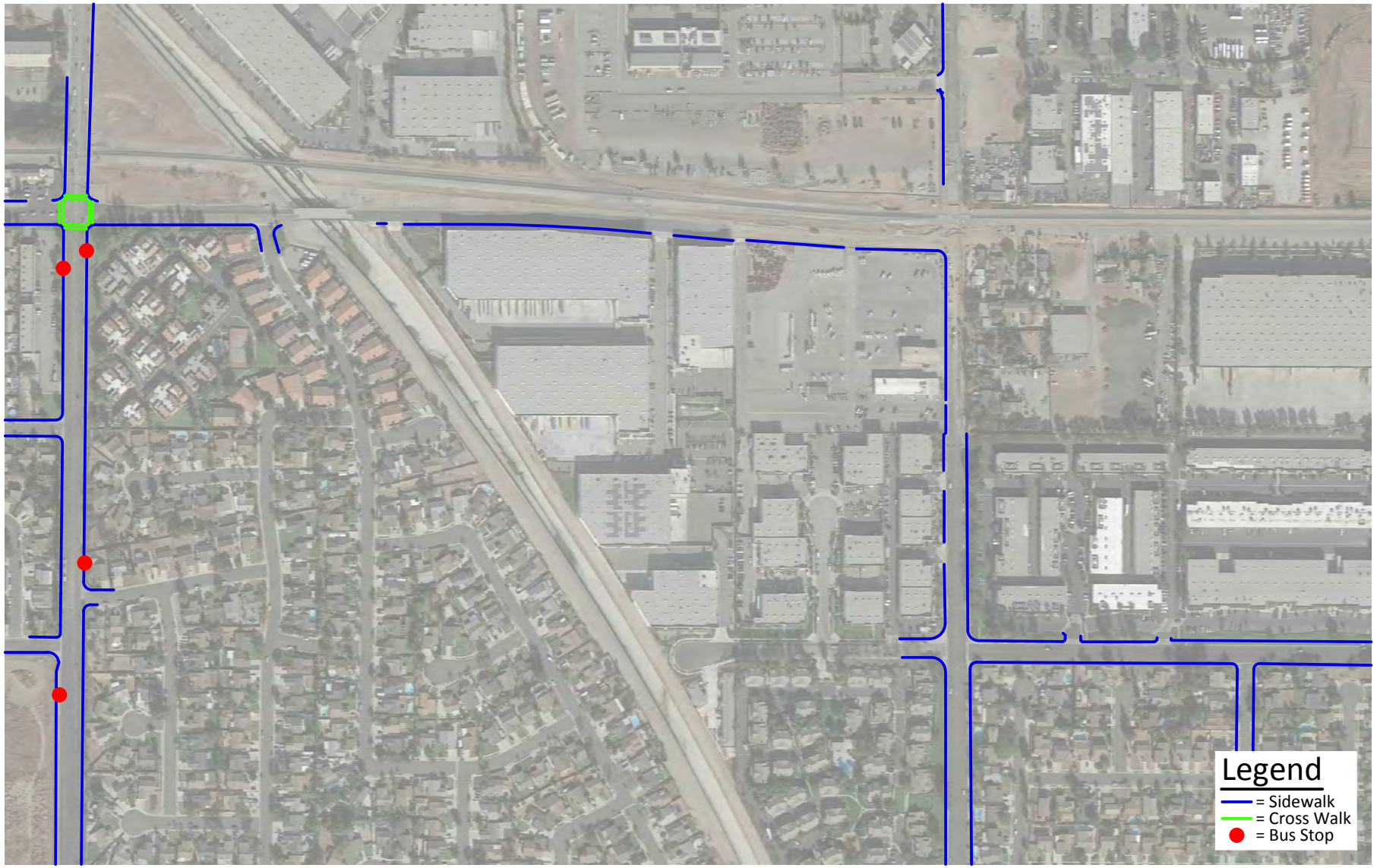


Figure 12
City of Rancho Cucamonga General Plan Bicycle Plan



KUNZMAN ASSOCIATES, INC.

Source: City of Rancho Cucamonga

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IV. PROPOSED PROJECT

The 8.09 acre project site is proposed to be developed with 174,745 square feet of warehousing (including mezzanine office). The project site is proposed to provide access to 8th Street and Hellman Avenue. The project opening year is planned for Year 2020.

A. Trip Generation

The trips generated by the project are determined by multiplying an appropriate trip generation rate by the quantity of land use. Trip generation rates are predicated on the assumption that energy costs, the availability of roadway capacity, the availability of vehicles to drive, and life styles remain similar to what are known today. A major change in these variables may affect trip generation rates.

Trip generation rates were determined for daily trips, morning peak hour inbound and outbound trips, and evening peak hour inbound and outbound trips for the proposed land use. By multiplying the trip generation rates by the land use quantity, the traffic volumes are determined. Table 2 shows the project trip generation based upon rates obtained from the Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017 and the City of Fontana, Truck Trip Generation Study, August 2003. In addition, the project trips generated were converted into passenger car equivalents.

Table 2 summarizes the project trip generation forecast. The project trip generation has been calculated in total number of vehicle trips as well as passenger car equivalent trips. As shown in Table 2, the proposed project is forecast to generate approximately 398 daily trips in passenger car equivalents, 39 passenger car equivalent trips of which will occur during the morning peak hour and 42 passenger car equivalent trips of which will occur during the evening peak hour.

B. Trip Generation Comparison

A trip generation comparison has been completed between the previous existing land use (utility) and the proposed land use (warehousing). The trips generated by the existing land use have been calculated and are shown in Table 3. As shown in Table 3, the previous land use (utility) generates approximately 212 daily trips, 37 trips of which will occur during the morning peak hour and 36 trips of which will occur during the evening peak hour.

Based upon the comparison the previous land use vs. proposed land use, the proposed project is projected to generate approximately 92 more daily vehicle trips, 7 less vehicle trips during the morning peak hour and 3 less vehicle trips during the evening peak hour. When the proposed project trips are converted to passenger car equivalents, the proposed project is projected to generate approximately 186 more daily passenger car equivalent trips, 2 more passenger car equivalent trips during the morning peak hour and 6 more passenger car equivalent trips during the evening peak hour.

In order to provide a conservative analysis, the trip generation credits for the previous land use were not subtracted from the study area. The net project trip generation could provide a reduction in study area traffic volumes.

C. Trip Distribution

Figure 13 and Figure 14 show the forecast outbound and inbound directional distributions of the project generated trips, respectively. The project trip distributions are based on review of existing traffic volume data, surrounding land uses, and the local and regional roadway facilities in the project vicinity.

D. Trip Assignment

Based on the identified trip generation and distributions, project average daily traffic volumes have been calculated and shown on Figure 15. Morning and evening peak hour intersection turning movement volumes expected from the project are shown on Figure 16 and Figure 17, respectively.

E. Trip Contribution Test

No analysis is required further than 5 miles from the project site. The roadway elements that must be analyzed are dependent on both the analysis year (Opening Year) and project generated traffic volumes. The identification of the study area, and the intersections and highway segments requiring analysis, was based on an estimate of the two-way traffic volumes on the roadway segments near the project site. All arterial segments are required to be included in the analysis when the anticipated project volume equals or exceeds 50 two-way trips in the peak hours. The requirement is 100 two-way peak hour trips for freeways.

As shown on Figure 18, the project does not contribute greater than the freeway threshold volume of 100 two-way peak hour trips to the I-10 Freeway. The project does not contribute trips greater than the arterial link threshold volume of 50 two-way trips during the morning and evening peak hours in adjacent jurisdictions. This means that the City of Rancho Cucamonga is not required to notify the adjacent jurisdictions and provide a copy of the focused traffic analysis, once the document is accepted by the City of Rancho Cucamonga. The purpose of this notification is to allow the adjacent jurisdictions to identify opportunities to make improvements to intersections concurrent with adjacent development, at considerably less cost and disruption than would occur if it were done after-the-fact.

Table 2

Project Trip Generation

Land Use	Source[1]	Quantity[2]	Units[3]	PCE Factor[4]	Vehicle Percent[5]	Peak Hour						Daily
						Morning			Evening			
						Inbound	Outbound	Total	Inbound	Outbound	Total	
Trip Generation Rates												
Warehouse	ITE 150		TSF			0.13	0.04	0.17	0.05	0.14	0.19	1.74
Truck Trip Generation					20.43%	0.03	0.01	0.04	0.01	0.03	0.04	0.36
Car Trip Generation					79.57%	0.10	0.03	0.14	0.04	0.11	0.15	1.39
Vehicle Trips Generated												
Vehicle Total Trips		174.745	TSF	-	-	23	7	30	9	24	33	304
Truck Vehicle Trips					20.43%	5	1	6	2	5	7	62
Car Vehicle Trips					79.57%	18	6	24	7	19	26	242
PCE Trips Generated												
Warehouse Trucks 2 Axle	Fontana			1.5	3.46%	1	0	1	0	1	1	16
Warehouse Trucks 3 Axle	Fontana			2.0	4.64%	2	1	3	1	2	3	28
Warehouse Trucks 4+ Axle	Fontana			3.0	12.33%	8	3	11	3	9	12	112
Warehouse Truck Subtotal			PCE		20.4%	11	4	15	4	12	16	156
Warehouse Car Subtotal			PCE		79.6%	18	6	24	7	19	26	242
PCE Total Trips		174.745	TSF			29	10	39	11	31	42	398

[1] Source: Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017, Land Use Code 150.

[2] Source: Drawing DAB-A1.1 Overall Site Plan for Project: 8th Street and Hellman Avenue Project (January 25, 2018).

[3] TSF = Thousand Square Feet; PCE = Passenger Car Equivalents.

[4] Passenger Car Equivalent factors are per City of San Bernardino recommended values.

[5] Source: City of Fontana, Truck Trip Generation Study, August 2003 (Heavy Warehouse).

Table 3

Trip Generation Comparison

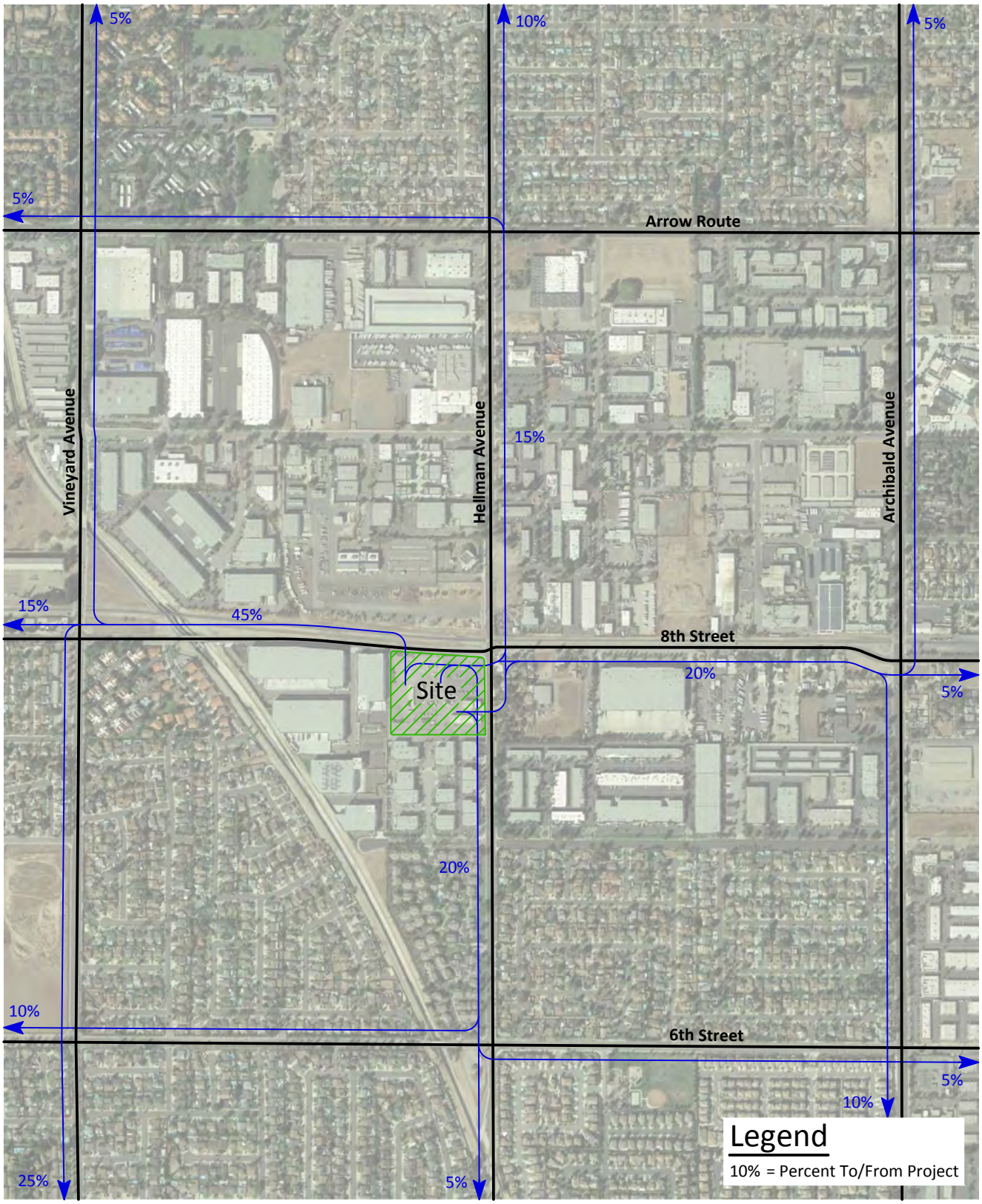
Descriptor	Existing vs. Proposed Land Use	Source[1]	Quantity[2]	Units[3]	Peak Hour						Daily
					Morning			Evening			
					Inbound	Outbound	Total	Inbound	Outbound	Total	
Trip Generation Rates	Utility	ITE 170		TSF	1.85	0.46	2.31	0.45	1.82	2.27	13.24
	Warehouse	ITE 150		TSF	0.13	0.04	0.17	0.05	0.14	0.19	1.74
Vehicle Trips Generated	Utility		-16.000	TSF	-30	-7	-37	-7	-29	-36	-212
	Warehouse		174.745	TSF	23	7	30	9	24	33	304
	Difference				-7	0	-7	+2	-5	-3	+92
PCE Trips Generated	Utility		-16.000	TSF	-30	-7	-37	-7	-29	-36	-212
	Warehouse		174.745	TSF	29	10	39	11	31	42	398
	Difference				-1	+3	+2	+4	+2	+6	+186

[1] Source: Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017, Land Use Codes 150 and 170.

[2] Source: Drawing DAB-A1.1 Overall Site Plan for Project: 8th Street and Hellman Avenue Project (January 25, 2018).

[3] TSF = Thousand Square Feet; PCE = Passenger Car Equivalents.

Figure 13
Project Trip Distribution - Cars

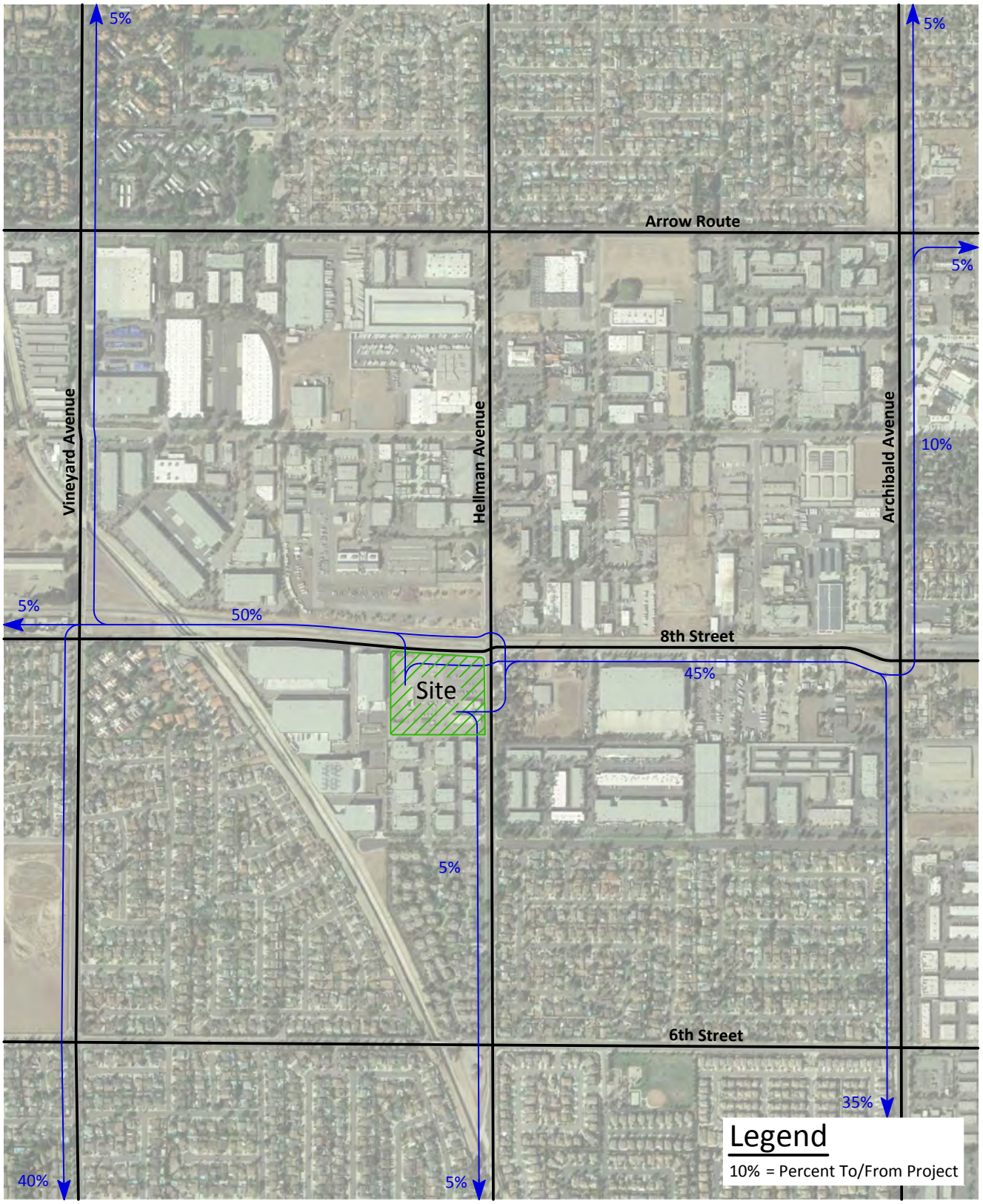


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Figure 14
Project Trip Distribution - Trucks

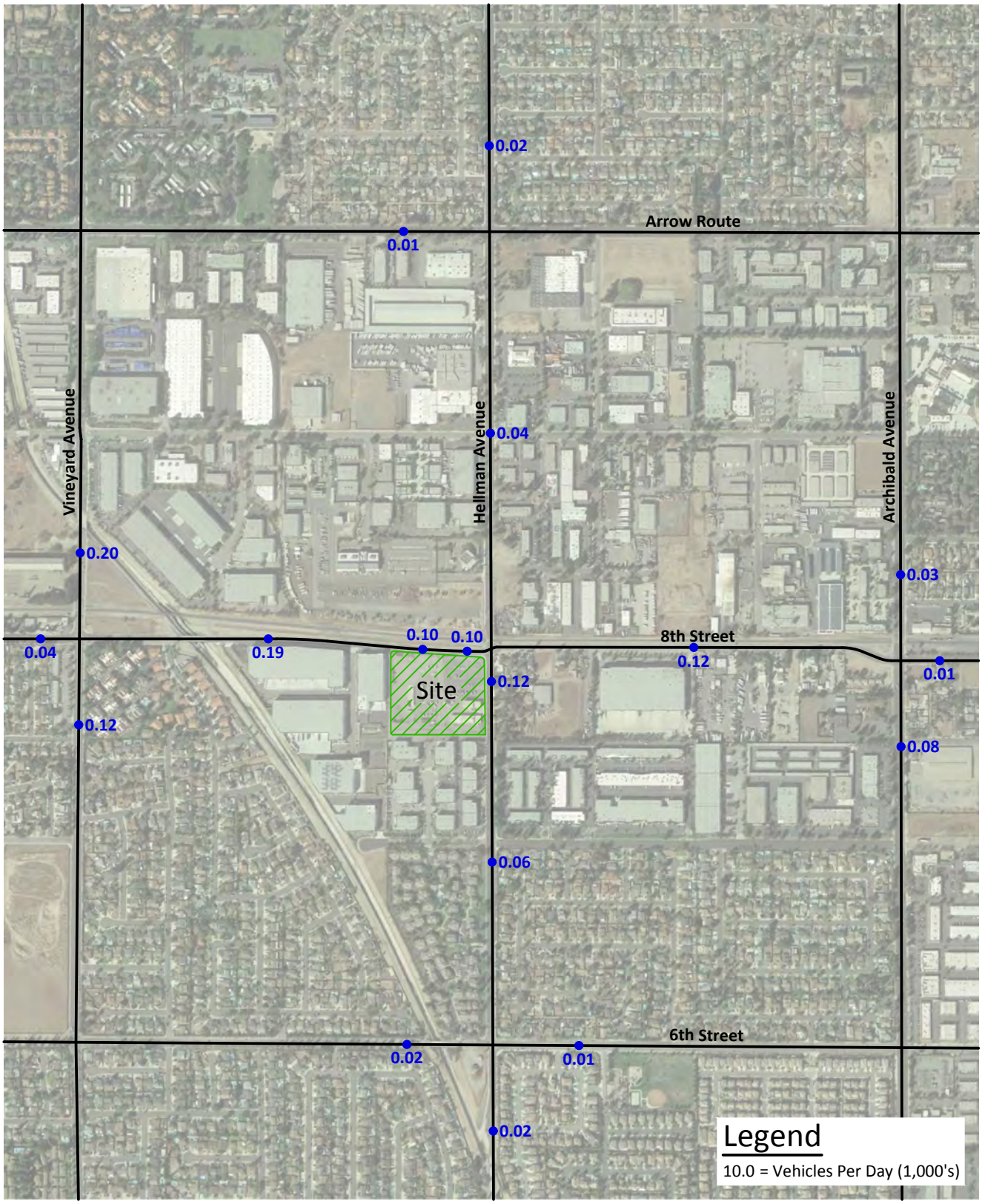


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Figure 15
Project Average Daily Traffic Volumes

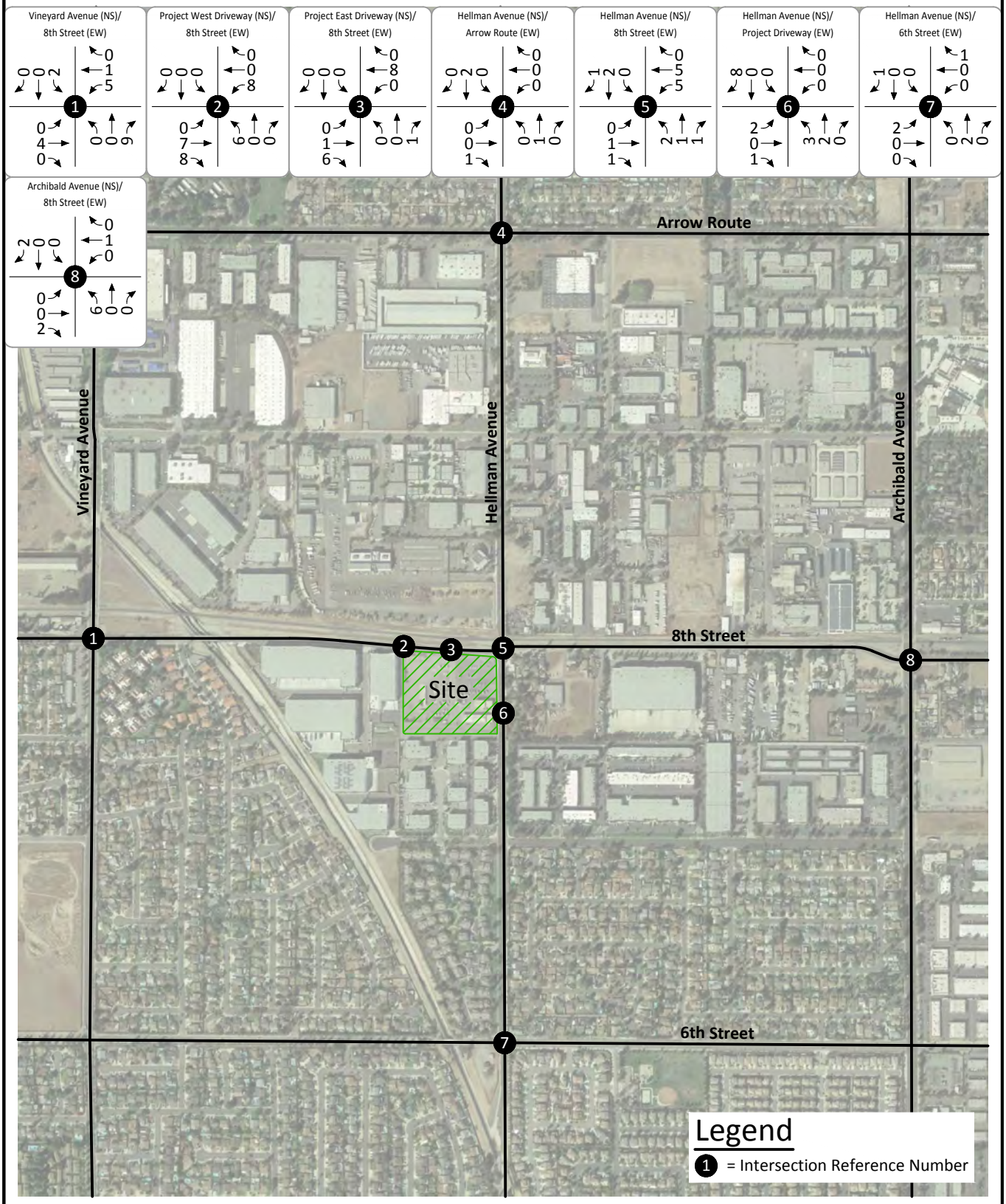


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Figure 16
Project Morning Peak Hour Intersection Turning Movement Volumes

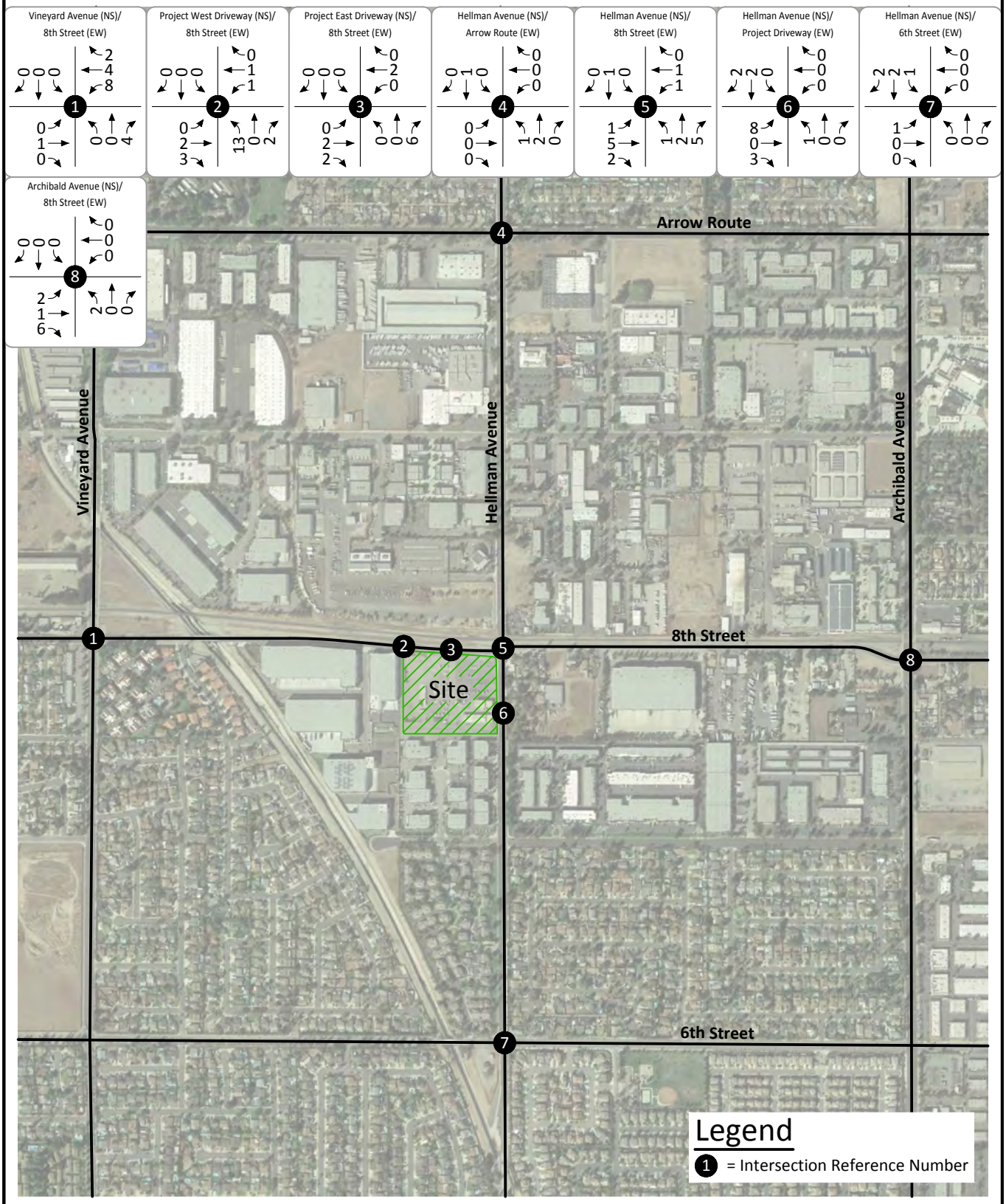


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Figure 17
Project Evening Peak Hour Intersection Turning Movement Volumes

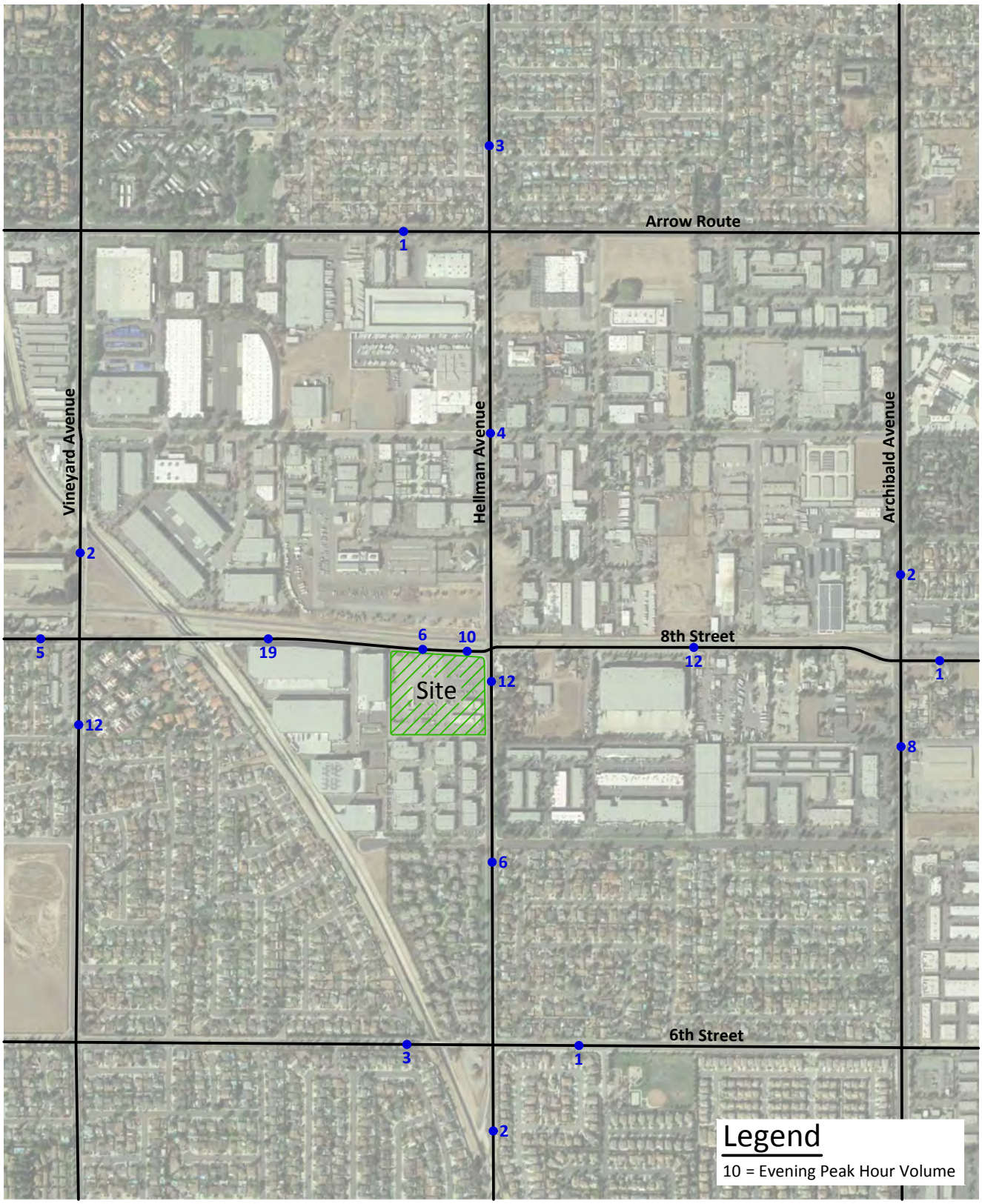


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Figure 18
Project Trip Contribution Test Volumes



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V. FUTURE CONDITIONS

To assess background traffic conditions, existing traffic volumes are used with traffic model data to project future Horizon Year (2040) traffic volumes and Opening Year (2020) traffic volumes. For analysis purposes in this report, the Opening Year is 2020.

A. Method of Projection

1. Background Growth

To assess background traffic conditions, existing traffic volumes are combined with ambient growth, and cumulative development trips. The opening year for analysis purposes in this report is 2020.

2. Ambient Growth (Near Future)

To account for ambient growth on roadways, Opening Year (2020) traffic volumes have been calculated based on a “conservative” 2.0 percent annual growth rate of Existing traffic volumes over a two (2) year period.

3. Cumulative Development

Potential developments within the study area are included in the analysis if they are not currently built, they are approved, their approval has not expired, and they would contribute trips to the study intersections.

The City of Rancho Cucamonga staff provided a list of cumulative development in the study area (see Figure 19). In order to provide a "conservative" analysis, the cumulative development have been added to future traffic conditions. Table 4 shows the cumulative development daily and peak hour trip generation. Figure 20 shows the cumulative development average daily traffic volumes. Cumulative development morning and evening peak hour intersection turning movement volumes are shown on Figures 21 and 22, respectively.

4. Build-out Development

Horizon Year (2040) Without Project traffic conditions represent full buildout of the City of Rancho Cucamonga according to the General Plan Land Use Element. The current San Bernardino Transportation Analysis Model was used to derive Horizon Year (2040) traffic volumes. In accordance with post-processing procedures contained in the Congestion Management Program, the future traffic volume forecasts have been determined using the growth increment approach on the Year 2012 and Year 2040 traffic volume forecasts. This difference defines the growth in traffic over the 28 year period. The incremental growth in traffic volumes have been factored to reflect the forecast growth between existing conditions (Year 2018) and Year 2040. For this purpose, linear growth between the Year 2012 base condition and the forecast Year 2040 condition was assumed. Since the increment between Year

2018 and Year 2040 is 24 years of the 28 year time frame, a factor of 0.78 (i.e., 22/28) was used.

To derive intersection turning movement volumes, the traffic growth forecasts were further refined using a spreadsheet program developed by the Federal Highway Administration and consistent with traffic forecasting procedures outlined in the National Cooperative Highway Research Program Report 255. The spreadsheet program uses a linear programming algorithm to calculate future individual turning movements based on the relationship of existing intersection turning movements and forecast model growth by approach. The forecast turning movements developed by the spreadsheet program were reviewed for reasonableness and adjusted as necessary to ensure minimum traffic growth. The end results of the post-processing procedures described are future traffic volumes suitable for analysis.

The growth increment calculation and post-processed intersection turning movement volume worksheets are contained in Appendix D. Appendix E contains the traffic model plots.

B. Future Volumes

1. Existing Plus Project

The traffic volumes for Existing Plus Project traffic conditions have been derived by adding the project generated trips to existing traffic volumes. Existing Plus Project average daily traffic volumes are shown on Figure 23. Existing Plus Project morning and evening peak hour intersection turning movement volumes are shown on Figures 24 and 25, respectively.

2. Opening Year (2020) Without Project

To assess Opening Year (2020) Without Project traffic conditions, existing traffic volumes are combined with ambient growth and other development trips.

Opening Year (2020) Without Project average daily traffic volumes are shown on Figure 26. Opening Year (2020) Without Project morning evening peak hour intersection turning movement volumes are shown on Figures 27 and 28, respectively.

3. Opening Year (2020) With Project

To assess Opening Year (2020) With Project traffic conditions, project generated trips are added to Opening Year (2020) Without Project traffic volumes.

Opening Year (2020) With Project average daily traffic volumes are shown on Figure 29. Opening Year (2020) With Project morning and evening peak hour intersection turning movement volumes are shown on Figures 30 and 31, respectively.

4. Horizon Year (2040) Without Project

Horizon Year (2040) Without Project average daily traffic volumes are shown on Figure 32. Horizon Year (2040) Without Project morning and evening peak hour intersection turning movement volumes are shown on Figures 33 and 34, respectively.

5. Horizon Year (2040) With Project

To assess Horizon Year (2040) With Project traffic conditions, project generated trips are added to Horizon Year (2040) Without Project traffic volumes.

Horizon Year (2040) With Project average daily traffic volumes are shown on Figure 35. Horizon Year (2040) With Project evening peak hour intersection turning movement volumes are shown on Figures 36 and 37, respectively.

C. Future Levels of Service

Detailed delay and Level of Service calculation worksheets for each of the following analysis scenarios are provided in Appendix F.

1. Existing Plus Project

The Hellman Avenue and 8th Street intersection is currently under construction with an estimated completion date of June 2018 for roadway widening and traffic signal installation. The Existing Plus Project traffic conditions assume that the intersection will be operational at the currently proposed configuration as provided by the plans for this Capital Improvement Program project (see Appendix G).

The Existing Plus Project delay and Levels of Service for the study intersections are shown in Table 5. Table 5 shows delay values based on the lane geometries at the study intersections without and with improvements.

As shown in Table 5, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the morning and evening peak hours for Existing Plus Project traffic conditions; therefore, the proposed project is forecast to result in no significant impacts at the study intersections for Existing Plus Project traffic conditions.

2. Opening Year (2020) Without Project

The Opening Year (2020) Without Project delay and Levels of Service for the study intersections are shown in Table 6. Table 6 shows delay values based on lane geometries at the study intersections without and with improvements.

As shown in Table 6 for Opening Year (2020) Without Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours, except for the following study intersection that is

projected to operate at Level of Service F during the evening peak hour without improvements:

Hellman Avenue (NS) at:
6th Street (EW) - #7

The Hellman Avenue and 6th Street intersection is programmed for the installation of a traffic signal per the City of Rancho Cucamonga Capital Improvement Program. For Opening Year (2020) and Horizon Year (2040) traffic conditions, the traffic signal is shown as a funded improvement.

3. Opening Year (2020) With Project

The Opening Year (2020) With Project delay and Levels of Service for the study intersections are shown in Table 6. Table 6 shows delay values based on the lane geometries at the study intersections without and with improvements.

As shown in Table 6 for Opening Year (2020) With Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements:

Hellman Avenue (NS) at:
6th Street (EW) - #7

The Hellman Avenue and 6th Street intersection is programmed for the installation of a traffic signal per the City of Rancho Cucamonga Capital Improvement Program. For Opening Year (2020) and Horizon Year (2040) traffic conditions, the traffic signal is shown as a funded improvement.

4. Horizon Year (2040) Without Project

The Horizon Year (2040) Without Project delay and Levels of Service for the study intersections are shown in Table 7. Table 7 shows delay values based on the lane geometries at the study intersections without and with improvements.

As shown in Table 7 for Horizon Year (2040) Without Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements:

Hellman Avenue (NS) at:
6th Street (EW) - #7

The Hellman Avenue and 6th Street intersection is programmed for the installation of a traffic signal per the City of Rancho Cucamonga Capital Improvement Program. For

Opening Year (2020) and Horizon Year (2040) traffic conditions, the traffic signal is shown as a funded improvement.

5. Horizon Year (2040) Without Project

The Horizon Year (2040) With Project delay and Levels of Service for the study intersections are shown in Table 7. Table 7 shows delay values based on the lane geometries at the study intersections without and with improvements.

As shown in Table 7 for Horizon Year (2040) Without Project traffic conditions, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours, except for the following study intersection that is projected to operate at Level of Service F during the evening peak hour without improvements:

Hellman Avenue (NS) at:
6th Street (EW) - #7

The Hellman Avenue and 6th Street intersection is programmed for the installation of a traffic signal per the City of Rancho Cucamonga Capital Improvement Program. For Opening Year (2020) and Horizon Year (2040) traffic conditions, the traffic signal is shown as a funded improvement.

Table 4

Cumulative Development Trip Generation

Traffic Analysis Zone	Project	Land Use[1]	Quantity	Units[2]	ITE Code	Morning Peak Hour			Evening Peak Hour			Daily
						Inbound	Outbound	Total	Inbound	Outbound	Total	
1	Crestwood Homes	Single Family Detached Residential	31	DU	210	6	17	23	19	12	31	293
2	3 Retail Buildings	Commercial	17.980	TSF	820	10	7	17	33	36	69	679
	The Vintner	Single Family Detached Residential	182	DU	210	35	100	135	113	67	180	1,718
		Commercial	7.615	TSF	820	4	3	7	14	15	29	287
	Pass-by					0	0	0	-16	-17	-33	0
	Subtotal					49	110	159	144	101	245	2,684
3	Haven Market Place	Restaurant	59.000	TSF	930	82	40	122	458	376	834	18,595
		Grocery Store	20.500	TSF	850	47	31	78	97	92	189	2,189
		Art Gallery	5.619	TSF	495	7	3	10	6	7	13	162
	PALU17-003 5.2 AC Mixed Use	Multi-Family Attached Residential	63	DU	220	7	22	29	22	13	35	461
		Commercial	36.250	TSF	820	21	13	34	66	72	138	1,368
	Pass-by					0	0	0	-259	-223	-482	0
	Subtotal					164	109	273	390	337	727	22,775
4	Residence Inn	Hotel	126	RM	310	35	24	59	39	37	76	1,053
	Empire Lakes	Single Family Detached Residential	*1016*	DU	210	193	*559*	752	630	*376*	1,006	9,591
		Multi-Family Attached Residential	*2034*	DU	220	224	*712*	936	712	*427*	1,139	14,889
		Park[3]	*75.0*	AC	411	1	1	2	5	3	8	59
		Commercial	*145.000*	TSF	820	84	52	136	265	287	552	5,474
	Pass-by					0	0	0	-90	-98	-188	0
	Subtotal					537	1,348	1,885	1,561	1,032	2,593	31,066
5	PDEV17-016	Commercial	94.280	TSF	820	55	34	89	173	186	359	3,559
	Pass-by					0	0	0	-59	-63	-122	0
	Subtotal					55	34	89	114	123	237	3,559
6	PDEV17-036	Commercial	36.818	TSF	820	21	14	35	67	73	140	1,390
	Pass-by					0	0	0	-23	-25	-48	0
	Subtotal					21	14	35	44	48	92	1,390
7	PDEV17-026	Single Family Detached Residential	55	DU	210	10	31	41	34	20	54	519
8	PDEV17-028	Multi-Family Attached Residential	37	DU	220	4	13	17	13	8	21	271
Total						837	1,672	2,509	2,294	1,652	3,946	62,003

[1] Source: Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017, Land Use Codes 210, 220, 820, 930, and 930 (unless otherwise noted).

[2] DU = Dwelling Units; TSF = Thousand Square Feet; RM = Rooms, AC = Acres.

[3] Source: San Diego Association of Governments, Traffic Generators, 2003, used when peak hour total or distribution is missing from ITE Trip Generation Manual.

Table 5

Existing Plus Project Intersection Delay and Levels of Service

Intersection	Traffic Control[2]	Intersection Approach Lanes[1]												Peak Hour							
														Existing Without Project				Existing Plus Project			
		Northbound			Southbound			Eastbound			Westbound			Morning		Evening		Morning		Evening	
		L	T	R	L	T	R	L	T	R	L	T	R	Delay[3]	LOS[4]	Delay[3]	LOS[4]	Delay[3]	LOS[4]	Delay[3]	LOS[4]
Vineyard Avenue (NS) at:																					
8th Street (EW) -# 1	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1	1	11.4	B	13.1	B	11.5	B	13.2	B
Project West Access (NS) at:																					
8th Street (EW) -# 2	**CSS**	**0.5**	0	**0.5**	0	0	0	0	0.5	0.5	0.5	0.5	0	-	-	-	-	10.1	B	12.1	B
Project East Access (NS) at:																					
8th Street (EW) -# 3	**CSS**	**0.5**	0	**0.5**	0	0	0	0	0.5	0.5	0	1	0	-	-	-	-	9.2	A	10.3	B
Hellman Avenue (NS) at:																					
Arrow Route (EW) -#4	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	20.3	C	19.2	B	20.3	C	19.2	B
8th Street (EW) -# 5	TS	0	<1>	0	0	<1>	0	1	0.5	0.5	1	0.5	0.5	22.8	C	40.7	D	23.2	C	41.5	D
Project South Access (EW) -#6	**CSS**	0.5	0.5	0	0	0.5	0.5	**0.5**	0	**0.5**	0	0	0	-	-	-	-	10.9	B	14.3	B
6th Street (EW) -#7	AWS	0.5	1.5	d	0.5	0.5	1	1	0.5	0.5	1	1	1	10.4	B	21.9	C	10.4	B	22.1	C
Archibald Avenue (NS) at:																					
8th Street (EW) -# 8	TS	1	2	d	1	1.5	0.5	1	0.5	0.5	1	0.5	0.5	8.8	A	12.6	B	9.0	A	12.7	B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane, there must be sufficient width for right turning vehicles to travel outside the through lanes. L = Left; T = Through; R = Right; d = De Facto Right Turn Lane; <1> = Shared Left/Through/Right Lane; **BOLD** = Improvement.

[2] AWS = All Way Stop; TS = Traffic Signal; CSS = Cross Street Stop

[3] Delay and Level of Service have been calculated using the following analysis software: Vistro, Version 5.00-02. Per the Highway Capacity Manual, overall average intersection delay and Level of Service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and Level of Service for the worst individual movement (or movements sharing a single lane) are shown.

[4] LOS = Level of Service

Table 6

Opening Year (2020) Intersection Delay and Levels of Service

Intersection	Traffic Control[2]	Intersection Approach Lanes[1]												Opening Year (2020) Peak Hour							
														Without Project				With Project			
		Northbound			Southbound			Eastbound			Westbound			Morning		Evening		Morning		Evening	
		L	T	R	L	T	R	L	T	R	L	T	R	Delay[3]	LOS[4]	Delay[3]	LOS[4]	Delay[3]	LOS[4]	Delay[3]	LOS[4]
Vineyard Avenue (NS) at:																					
8th Street (EW) -# 1	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1	1	13	B	14.8	B	13.1	B	14.9	B
Project West Access (NS) at:																					
8th Street (EW) -# 2	**CSS**	**0.5**	0	**0.5**	0	0	0	0	0.5	0.5	0.5	0.5	0	-	-	-	-	11.1	B	13.4	B
Project East Access (NS) at:																					
8th Street (EW) -# 3	**CSS**	**0.5**	0	**0.5**	0	0	0	0	0.5	0.5	0	1	0	-	-	-	-	9.5	A	11.2	B
Hellman Avenue (NS) at:																					
Arrow Route (EW) -#4	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	20.2	C	19.4	B	20.2	C	19.4	B
8th Street (EW) -# 5	TS	0	<1>	0	0	<1>	0	1	0.5	0.5	1	0.5	0.5	24.1	C	49	D	24.3	C	50.1	D
Project South Access (EW) -#6	**CSS**	0.5	0.5	0	0	0.5	0.5	**0.5**	0	**0.5**	0	0	0	-	-	-	-	11.1	B	15.1	C
6th Street (EW) -#7	AWS	0.5	1.5	d	0.5	0.5	1	1	0.5	0.5	1	1	1	14.4	B	86.8	F	14.4	B	87.4	F
-With Improvements	**TS**	0.5	1.5	d	0.5	0.5	1	1	0.5	0.5	1	1	1	19.3	B	18.1	B	19.3	B	18.1	B
Archibald Avenue (NS) at:																					
8th Street (EW) -# 8	TS	1	2	d	1	1.5	0.5	1	0.5	0.5	1	0.5	0.5	11.5	B	14.8	B	11.7	B	14.7	B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane, there must be sufficient width for right turning vehicles to travel outside the through lanes. L = Left; T = Through; R = Right; d = De Facto Right Turn Lane; <1> = Shared Left/Through/Right Lane; **BOLD** = Improvement.

[2] AWS = All Way Stop; TS = Traffic Signal; CSS = Cross Street Stop

[3] Delay and Level of Service have been calculated using the following analysis software: Vistro, Version 5.00-02. Per the Highway Capacity Manual, overall average intersection delay and Level of Service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and Level of Service for the worst individual movement (or movements sharing a single lane) are shown.

[4] LOS = Level of Service

[5] Existing Two-Way Left Turn Lane.

Table 7

Horizon Year (2040) Intersection Delay and Levels of Service

Intersection	Traffic Control[2]	Intersection Approach Lanes[1]												Horizon Year (2040) Peak Hour							
														Without Project				With Project			
		Northbound			Southbound			Eastbound			Westbound			Morning		Evening		Morning		Evening	
		L	T	R	L	T	R	L	T	R	L	T	R	Delay[3]	LOS[4]	Delay[3]	LOS[4]	Delay[3]	LOS[4]	Delay[3]	LOS[4]
Vineyard Avenue (NS) at:																					
8th Street (EW) -# 1	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1	1	13.1	B	15.4	B	13.2	B	15.5	B
Project West Access (NS) at:																					
8th Street (EW) -# 2	**CSS**	**0.5**	0	**0.5**	0	0	0	0	0.5	0.5	0.5	0.5	0	-	-	-	-	11.3	B	13.8	B
Project East Access (NS) at:																					
8th Street (EW) -# 3	**CSS**	**0.5**	0	**0.5**	0	0	0	0	0.5	0.5	0	1	0	-	-	-	-	9.6	A	11.4	B
Hellman Avenue (NS) at:																					
Arrow Route (EW) -#4	TS	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	19.1	B	19.5	B	19.1	B	19.5	B
8th Street (EW) -# 5	TS	0	<1>	0	0	<1>	0	1	0.5	0.5	1	0.5	0.5	24.6	C	51.6	D	24.9	C	52.4	D
Project South Access (EW) -#6	**CSS**	0.5	0.5	0	0	0.5	0.5	**0.5**	0	**0.5**	0	0	0	-	-	-	-	12.6	B	20.8	C
6th Street (EW) -#7	AWS	0.5	1.5	d	0.5	0.5	1	1	0.5	0.5	1	1	1	12.7	B	74.8	F	12.7	B	75.2	F
-With Improvements	**TS**	0.5	1.5	d	0.5	0.5	1	1	0.5	0.5	1	1	1	-		-		-		-	
Archibald Avenue (NS) at:																					
8th Street (EW) -# 8	TS	1	2	d	1	1.5	0.5	1	0.5	0.5	1	0.5	0.5	9.8	A	16.9	B	9.9	A	17.1	B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane, there must be sufficient width for right turning vehicles to travel outside the through lanes. L = Left; T = Through; R = Right; d = De Facto Right Turn Lane; <1> = Shared Left/Through/Right Lane; **BOLD** = Improvement.

[2] AWS = All Way Stop; TS = Traffic Signal; CSS = Cross Street Stop

[3] Delay and Level of Service have been calculated using the following analysis software: Vistro, Version 5.00-02. Per the Highway Capacity Manual, overall average intersection delay and Level of Service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and Level of Service for the worst individual movement (or movements sharing a single lane) are shown.

[4] LOS = Level of Service

[5] Existing Two-Way Left Turn Lane.

Figure 19
Other Development Traffic Analysis Zone Map

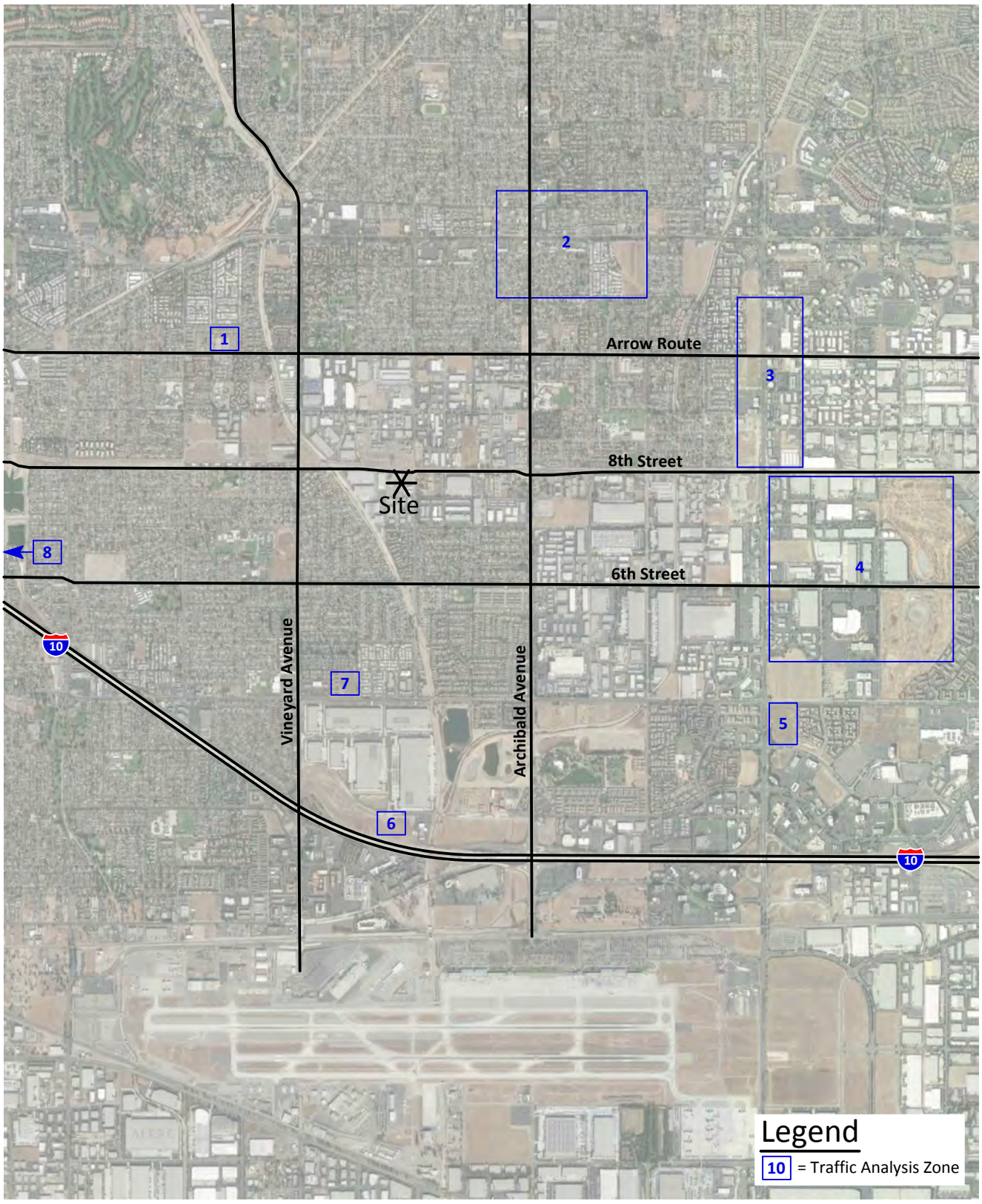
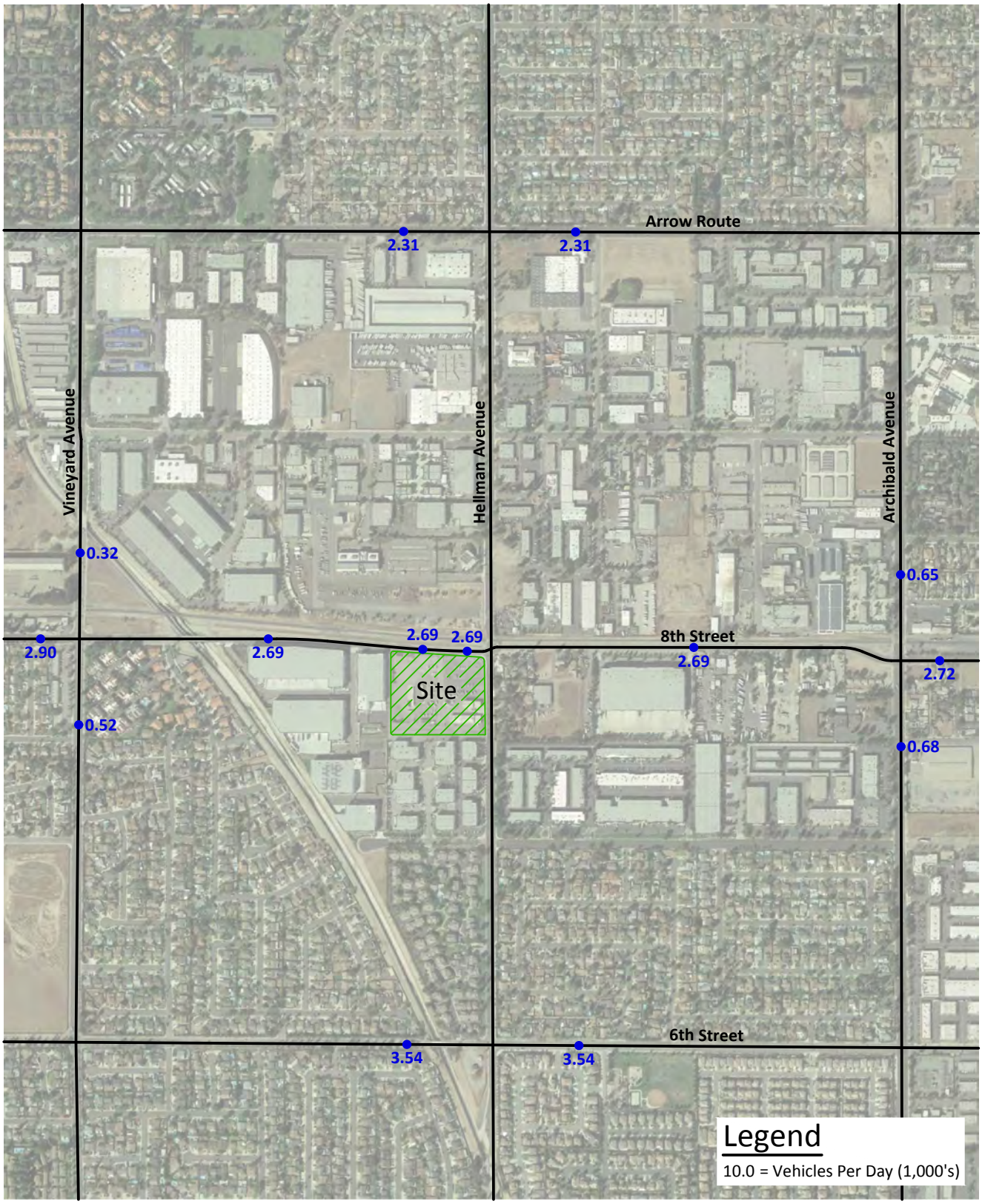
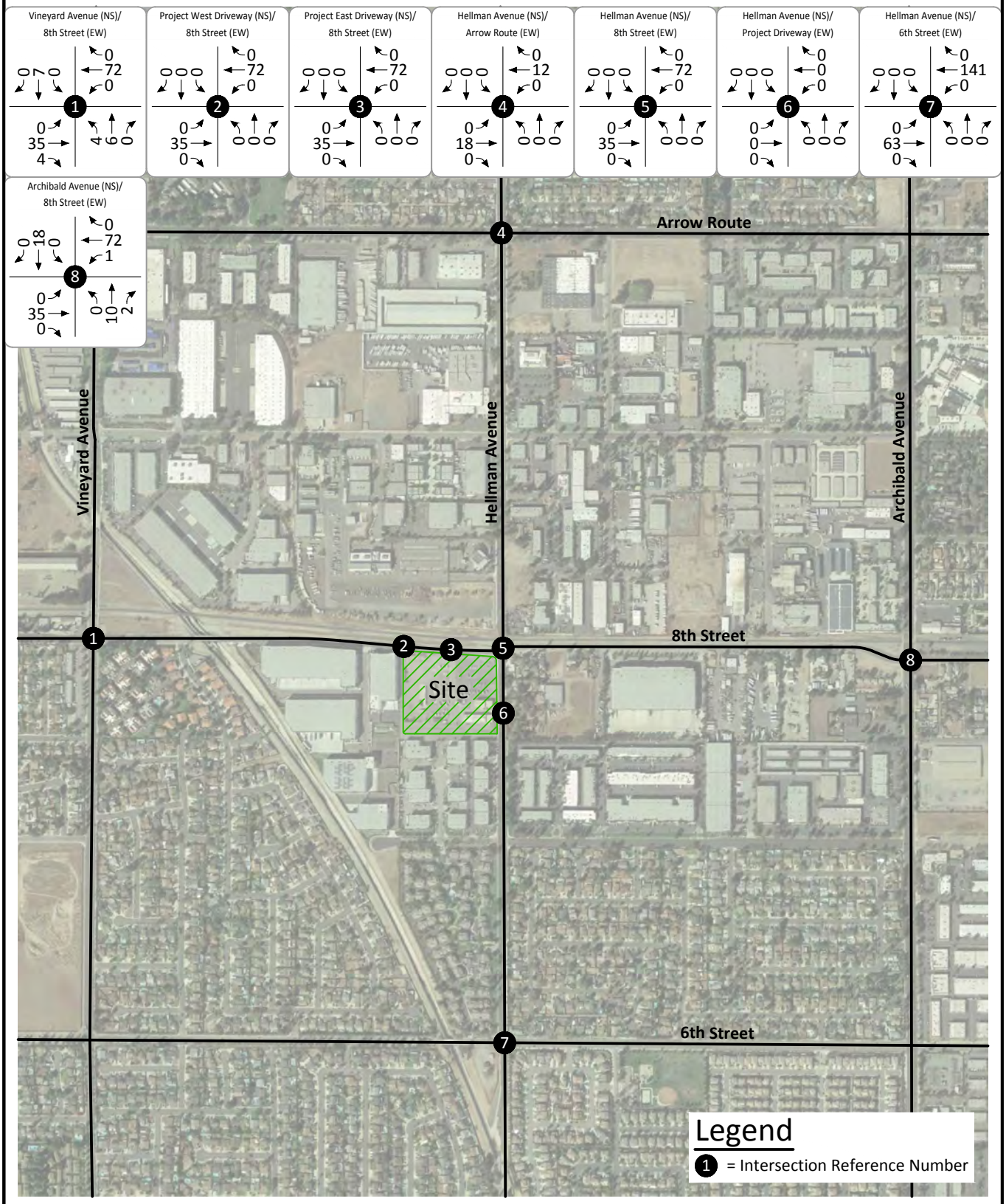


Figure 20
Other Development Average Daily Traffic Volumes



KUNZMAN ASSOCIATES, INC.
OVER 40 YEARS OF EXCELLENT SERVICE
JN 7405

Figure 21
Other Development
Morning Peak Hour Intersection Turning Movement Volumes

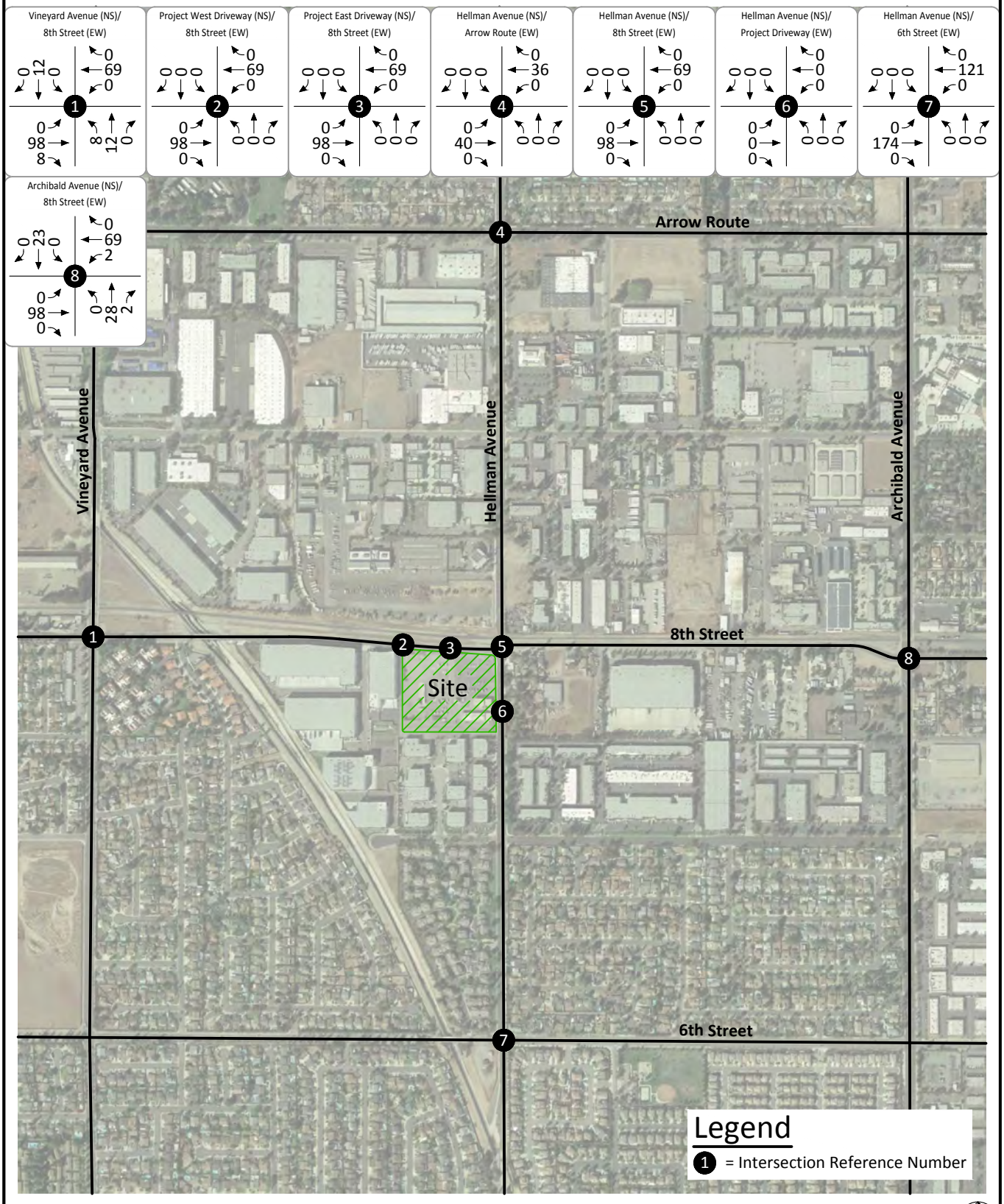


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OVER 40 YEARS OF EXCELLENT SERVICE

JN 7405

Figure 22
Other Development
Evening Peak Hour Intersection Turning Movement Volumes



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OVER 40 YEARS OF EXCELLENT SERVICE

JN 7405

Figure 23
Existing Plus Project Average Daily Traffic Volumes

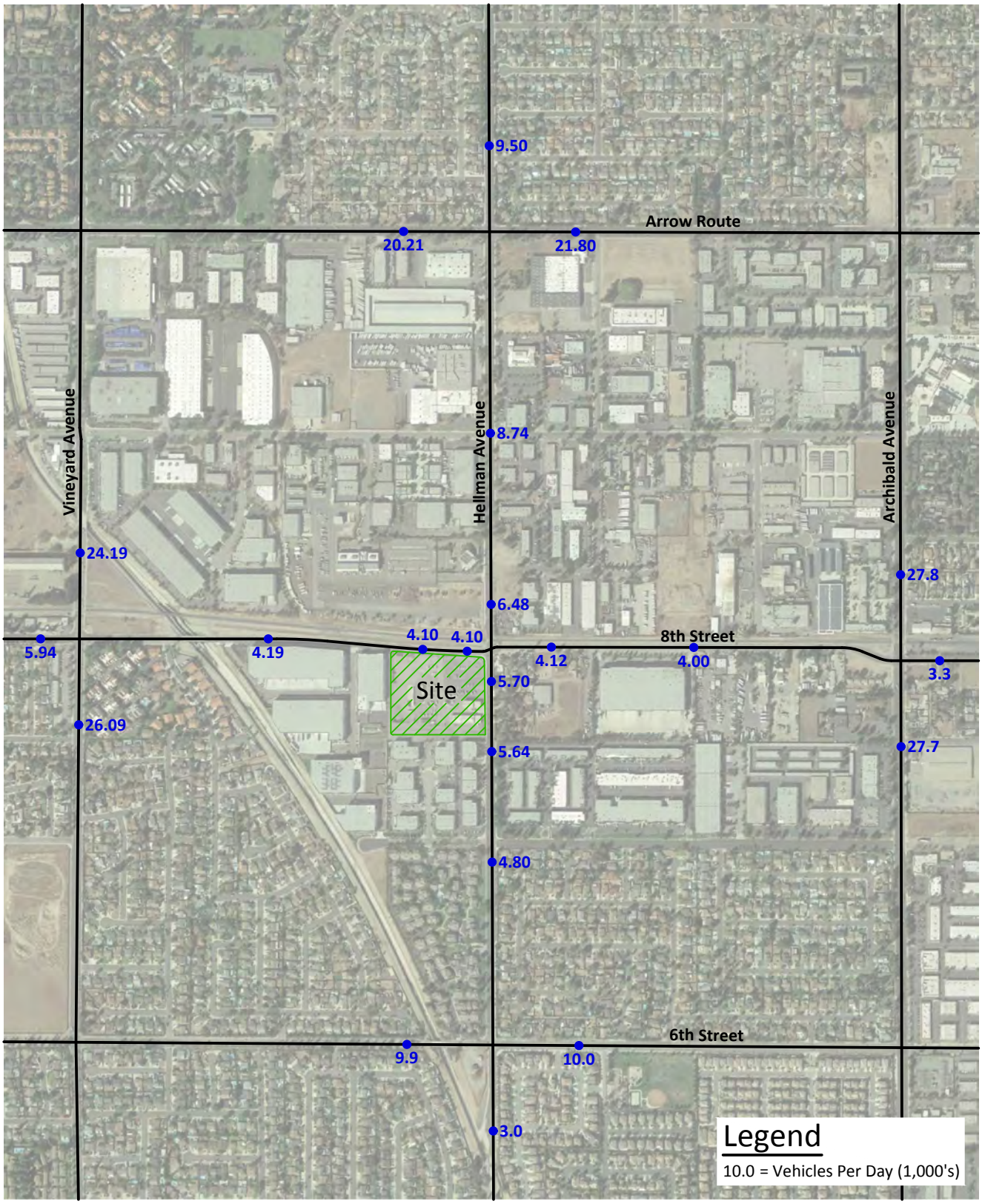
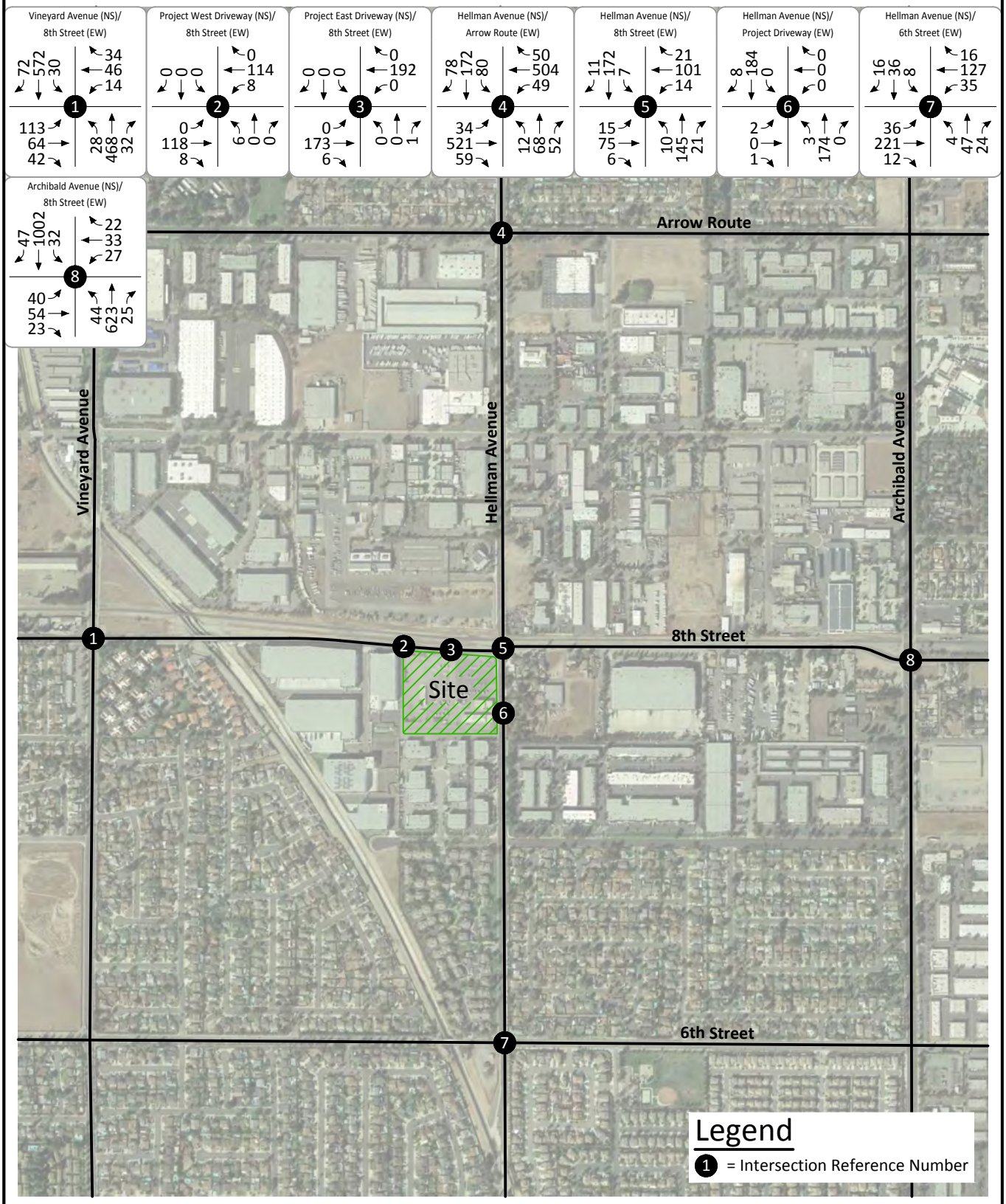


Figure 24
Existing Plus Project
Morning Peak Hour Intersection Turning Movement Volumes

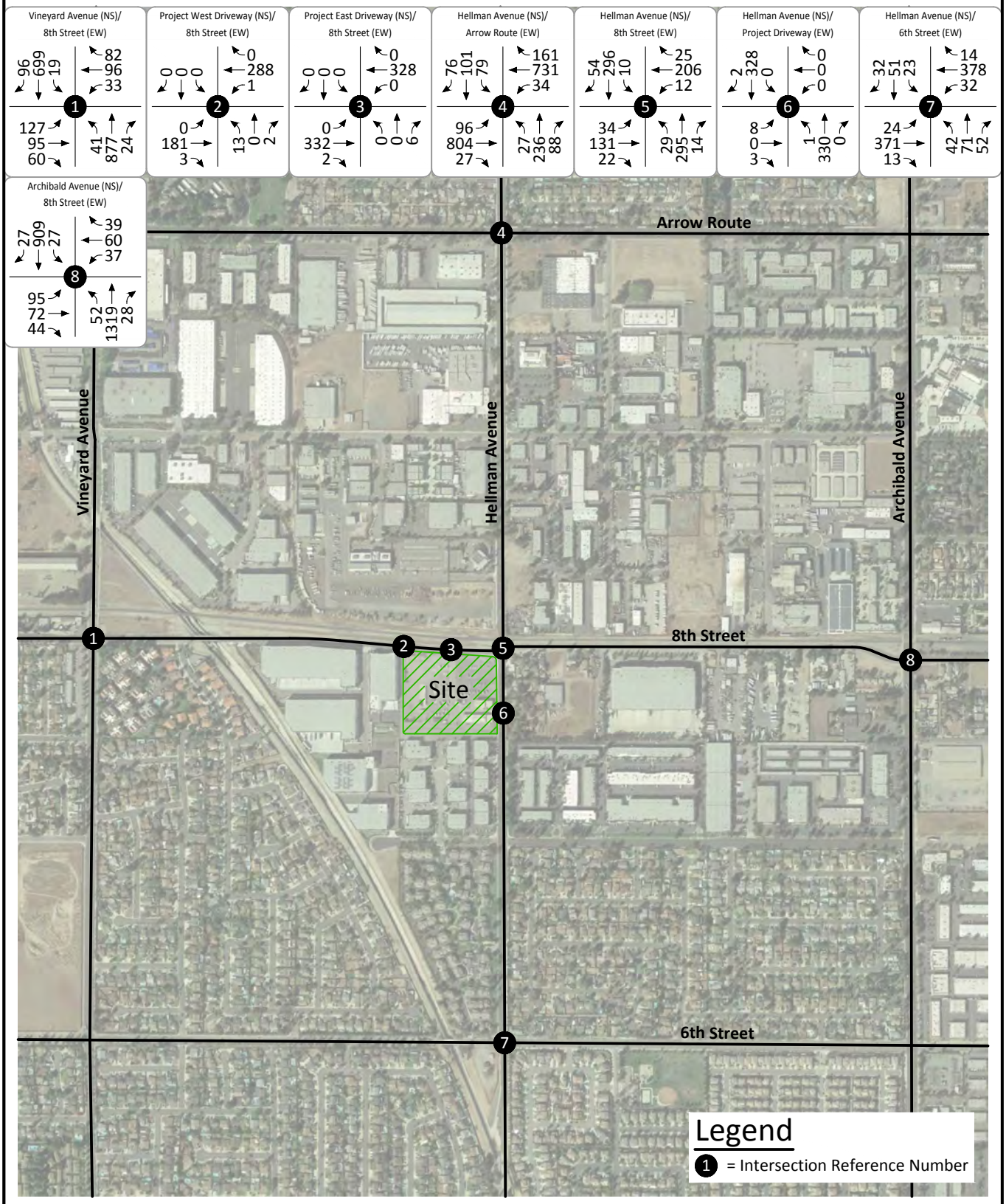


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 7405

Figure 25
Existing Plus Project
Evening Peak Hour Intersection Turning Movement Volumes

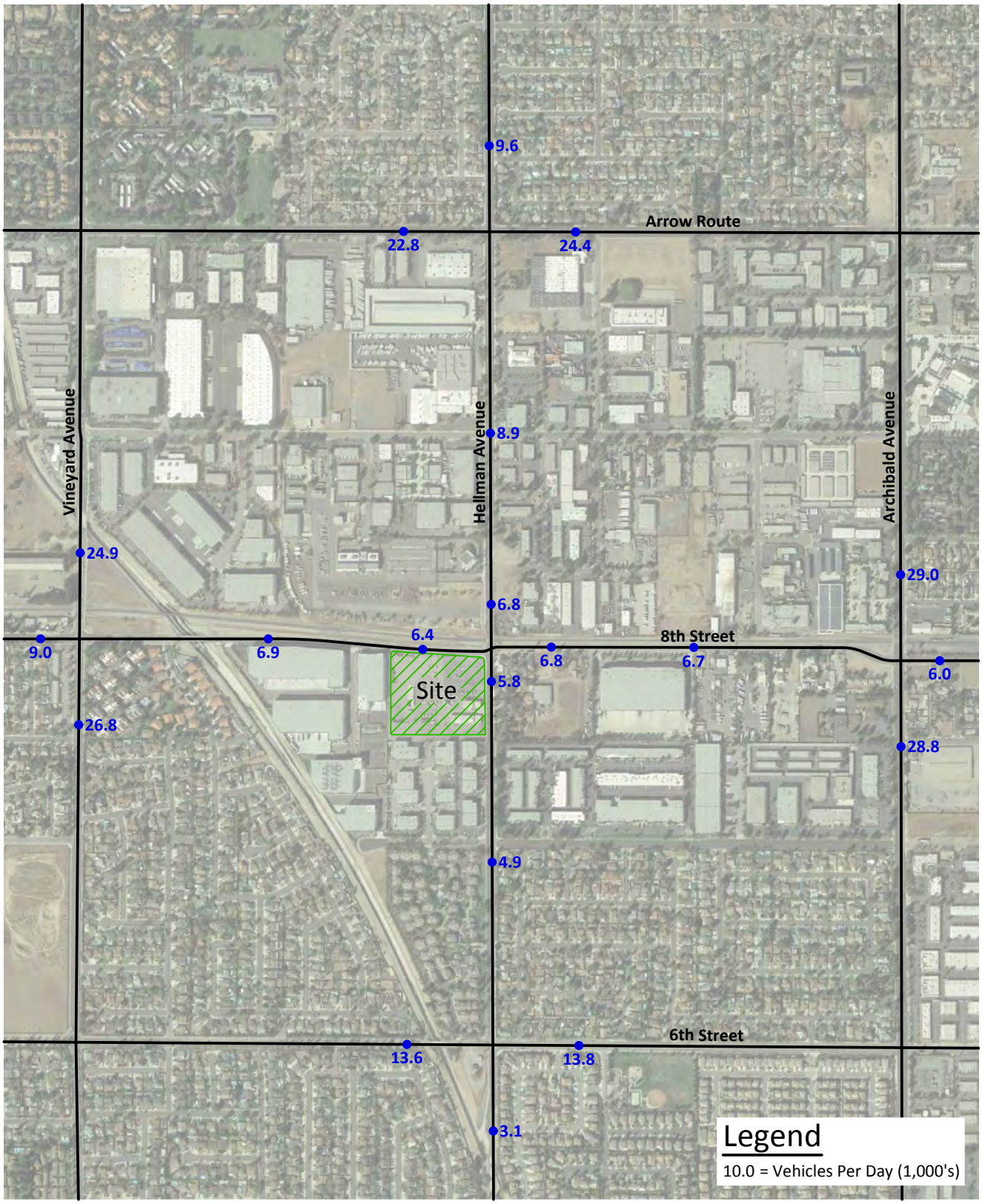


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 7405

Figure 26
Opening Year (2020) Without Project Average Daily Traffic Volumes

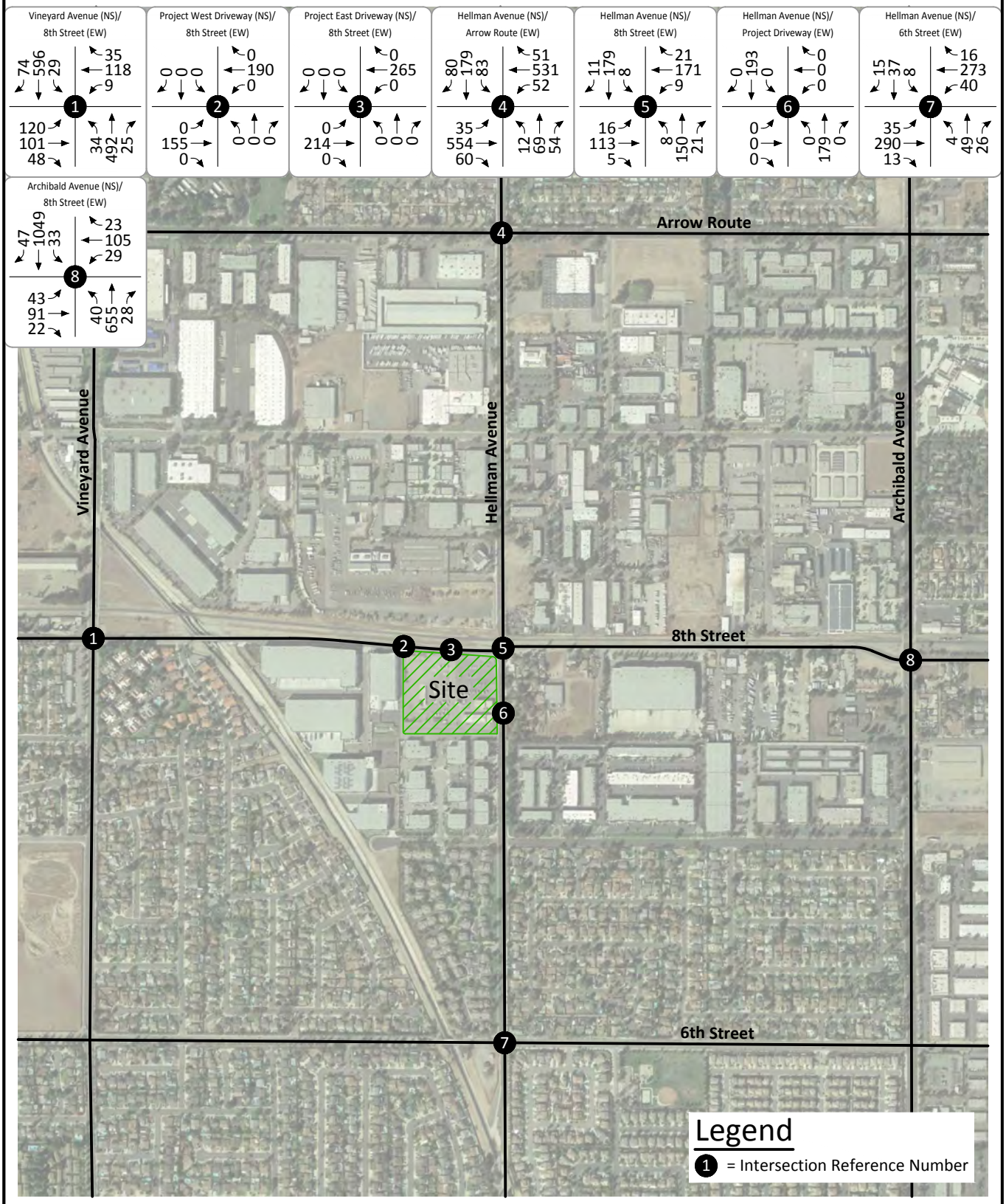


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 7405

Figure 27
Opening Year (2020) Without Project
Morning Peak Hour Intersection Turning Movement Volumes

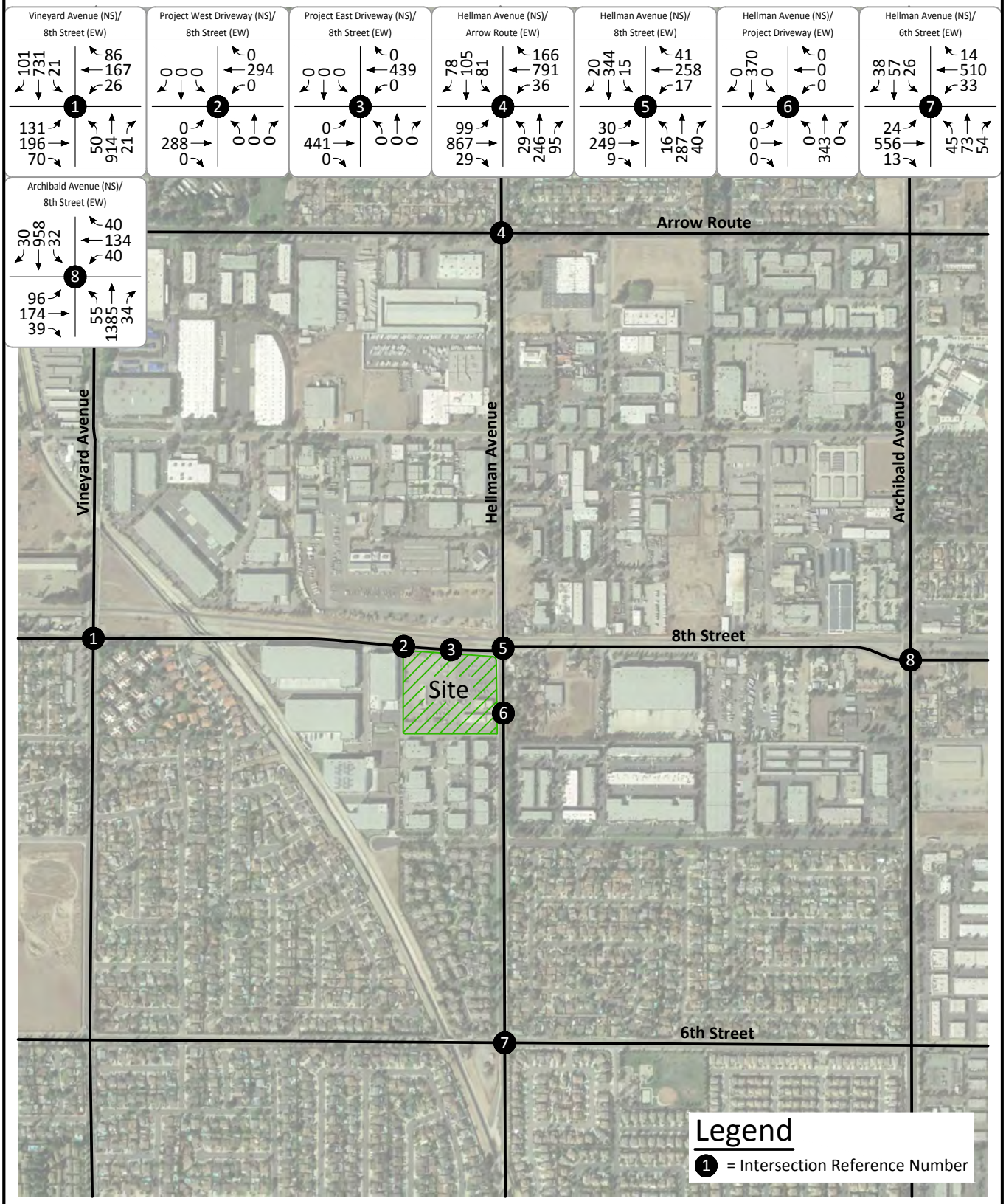


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OVER 40 YEARS OF EXCELLENT SERVICE

JN 7405

Figure 28
Opening Year (2020) Without Project
Evening Peak Hour Intersection Turning Movement Volumes

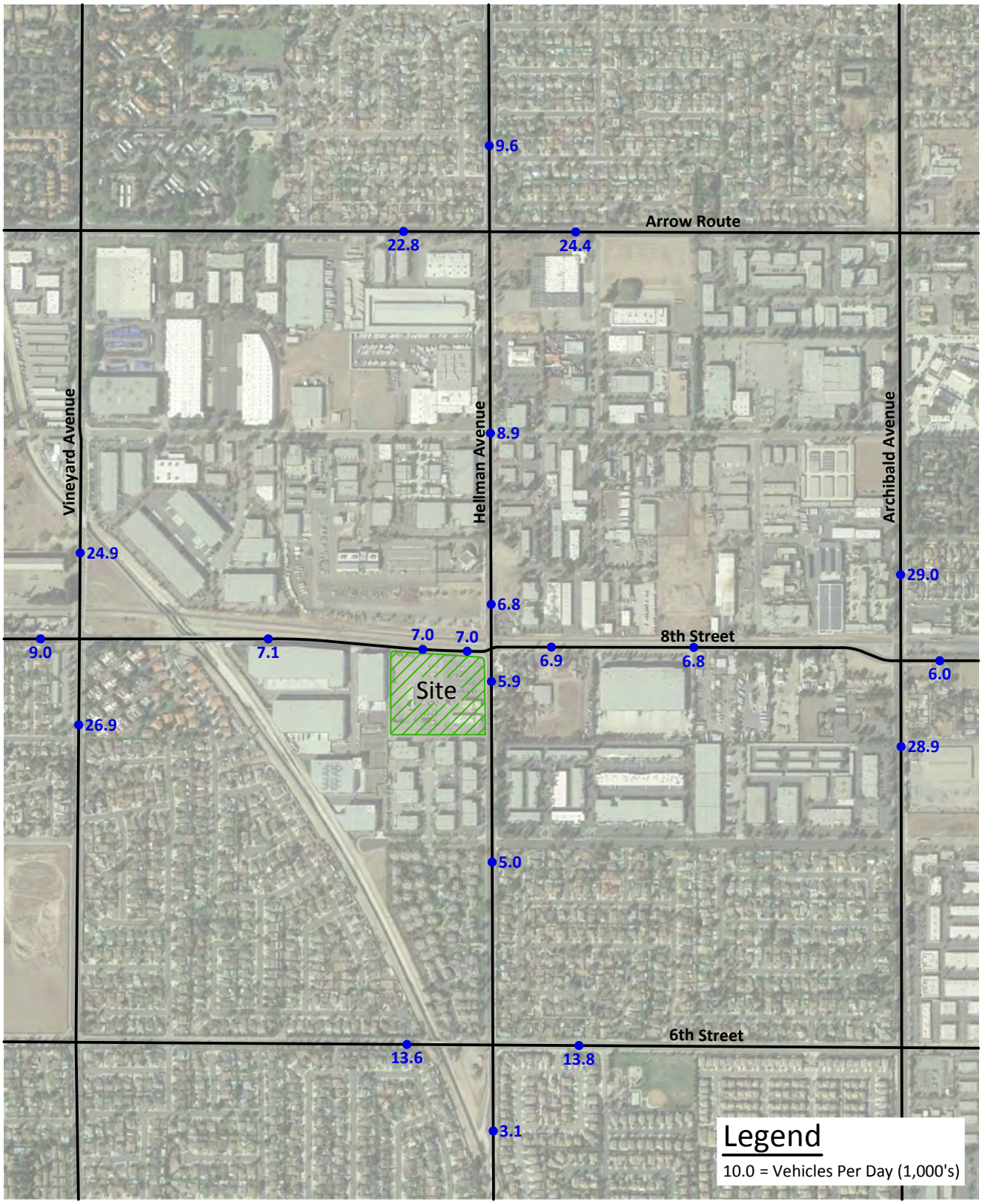


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OVER 40 YEARS OF EXCELLENT SERVICE

JN 7405

Figure 29
Opening Year (2020) With Project Average Daily Traffic Volumes

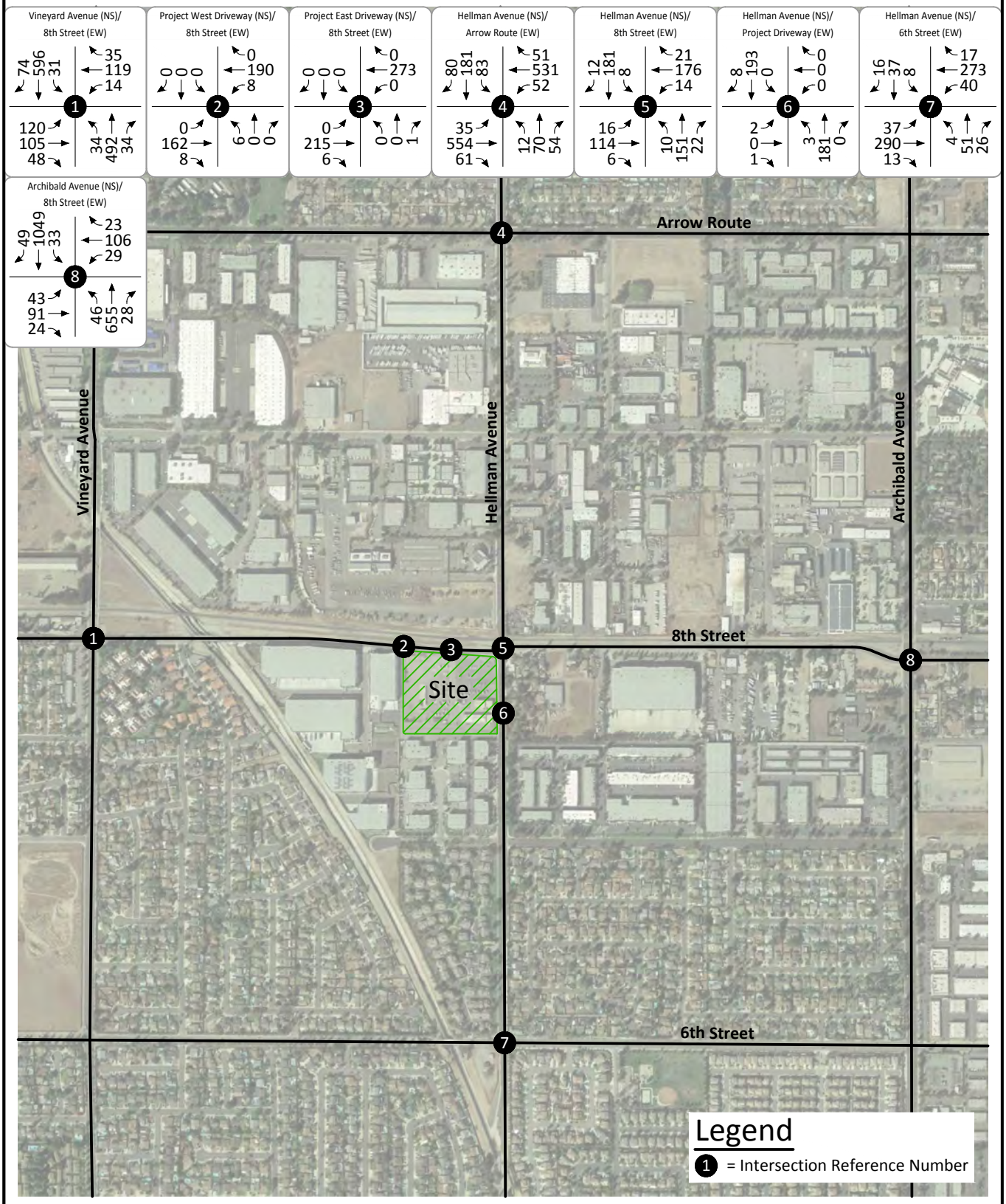


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OVER 40 YEARS OF EXCELLENT SERVICE

JN 7405

Figure 30
Opening Year (2020) With Project
Morning Peak Hour Intersection Turning Movement Volumes

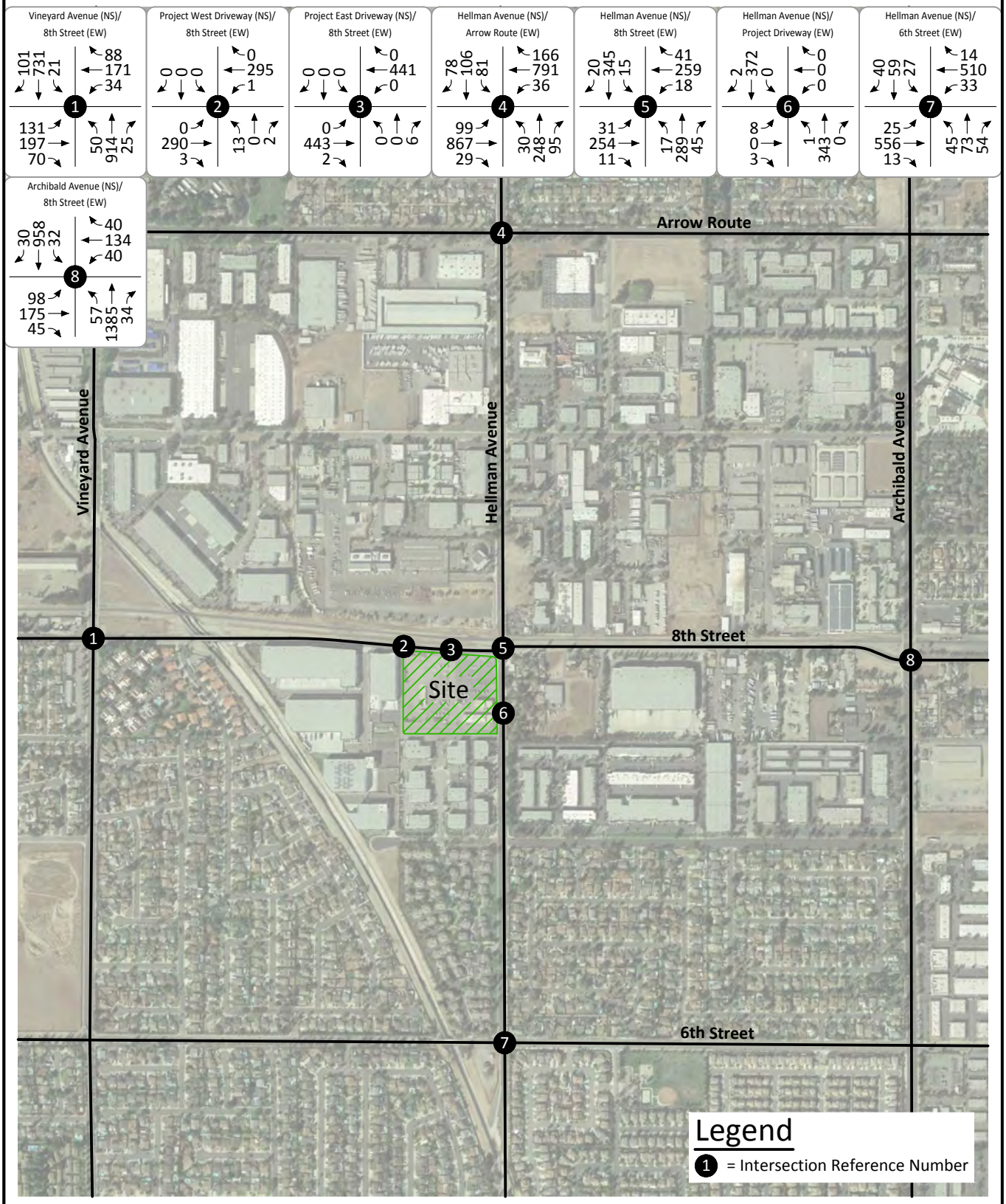


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OVER 40 YEARS OF EXCELLENT SERVICE

JN 7405

Figure 31
Opening Year (2020) With Project
Evening Peak Hour Intersection Turning Movement Volumes



KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 7405

Figure 32
Horizon Year (2040) Without Project Average Daily Traffic Volumes

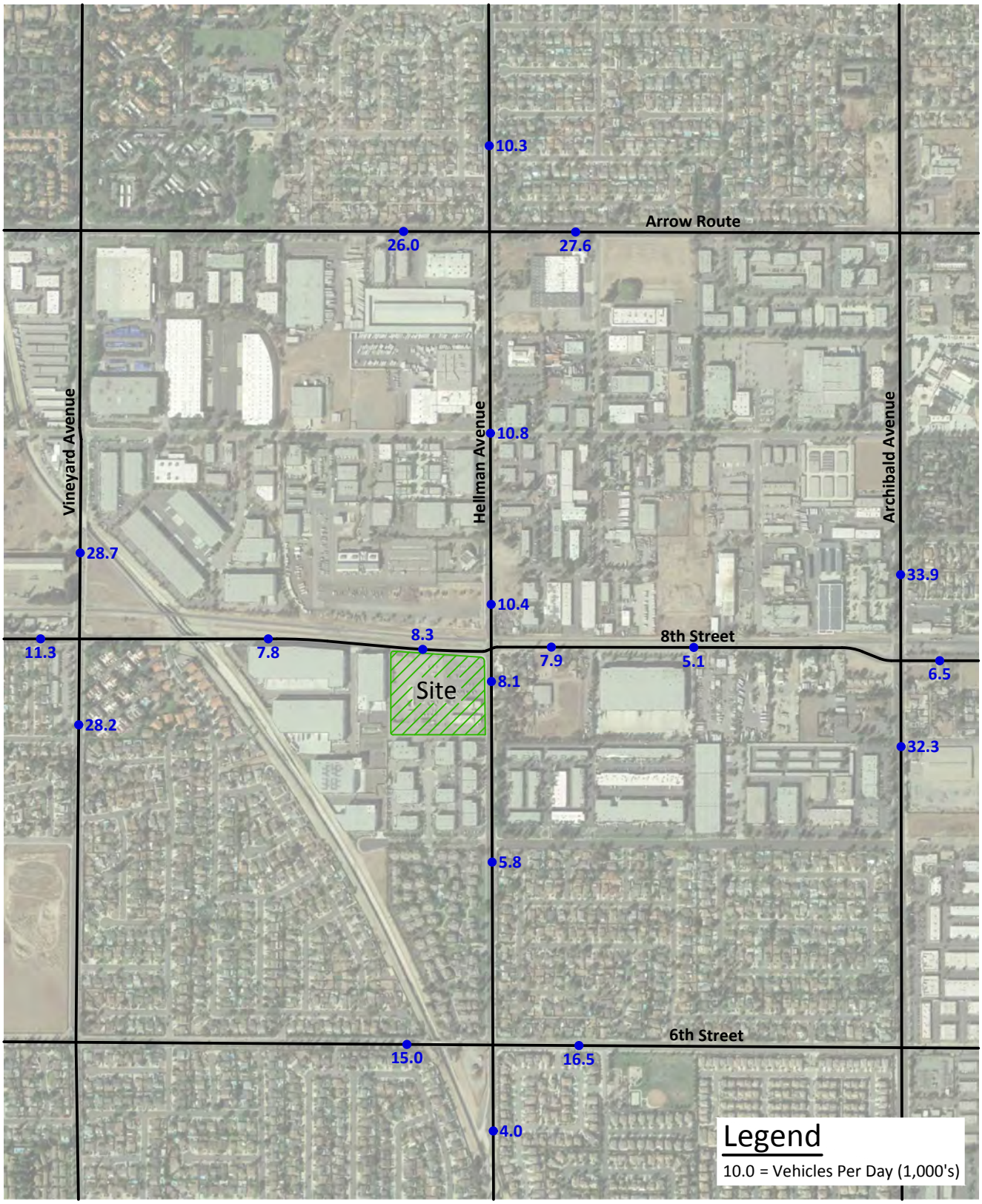
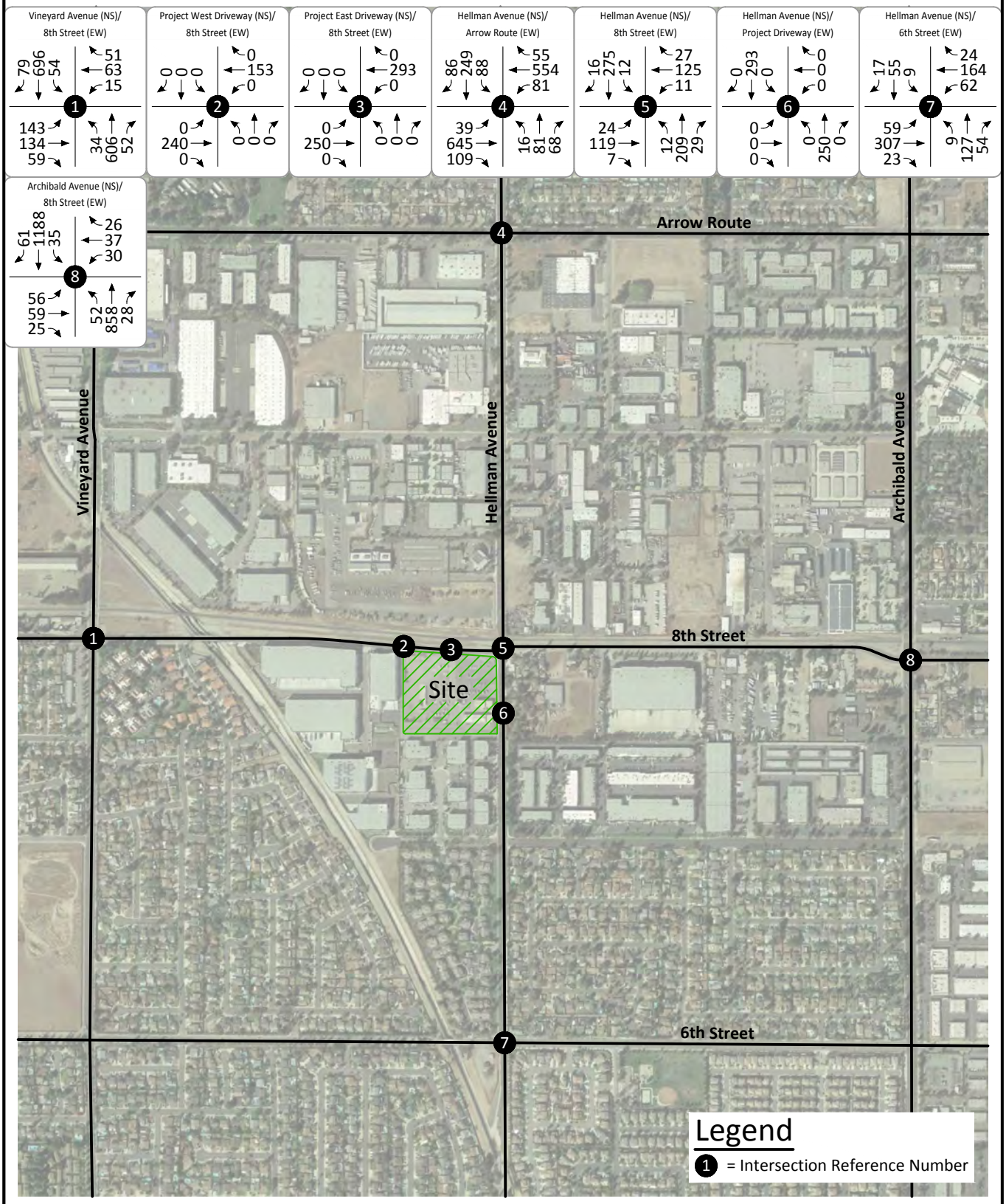


Figure 33
Horizon Year (2040) Without Project
Morning Peak Hour Intersection Turning Movement Volumes

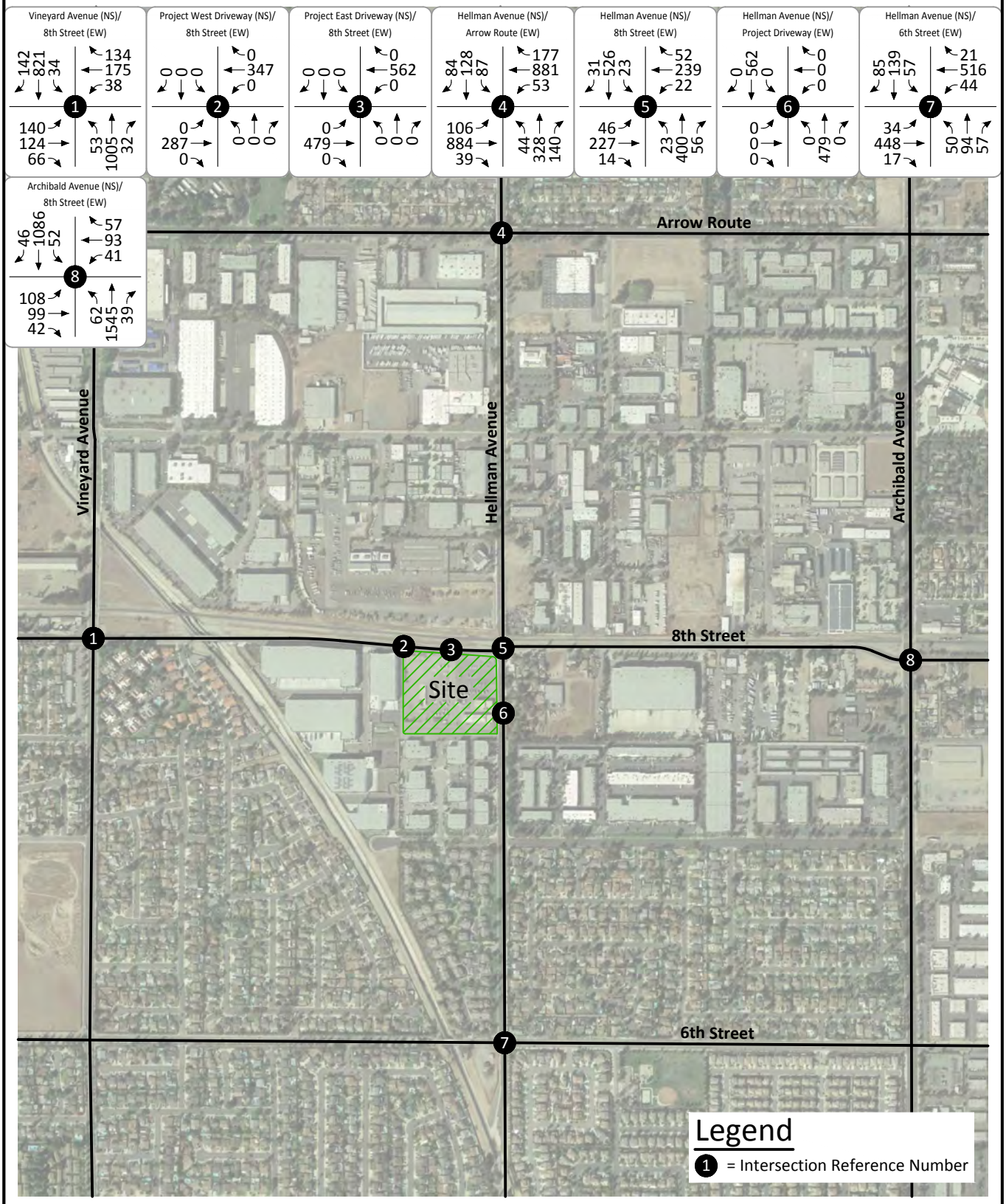


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 7405

Figure 34
Horizon Year (2040) Without Project
Evening Peak Hour Intersection Turning Movement Volumes

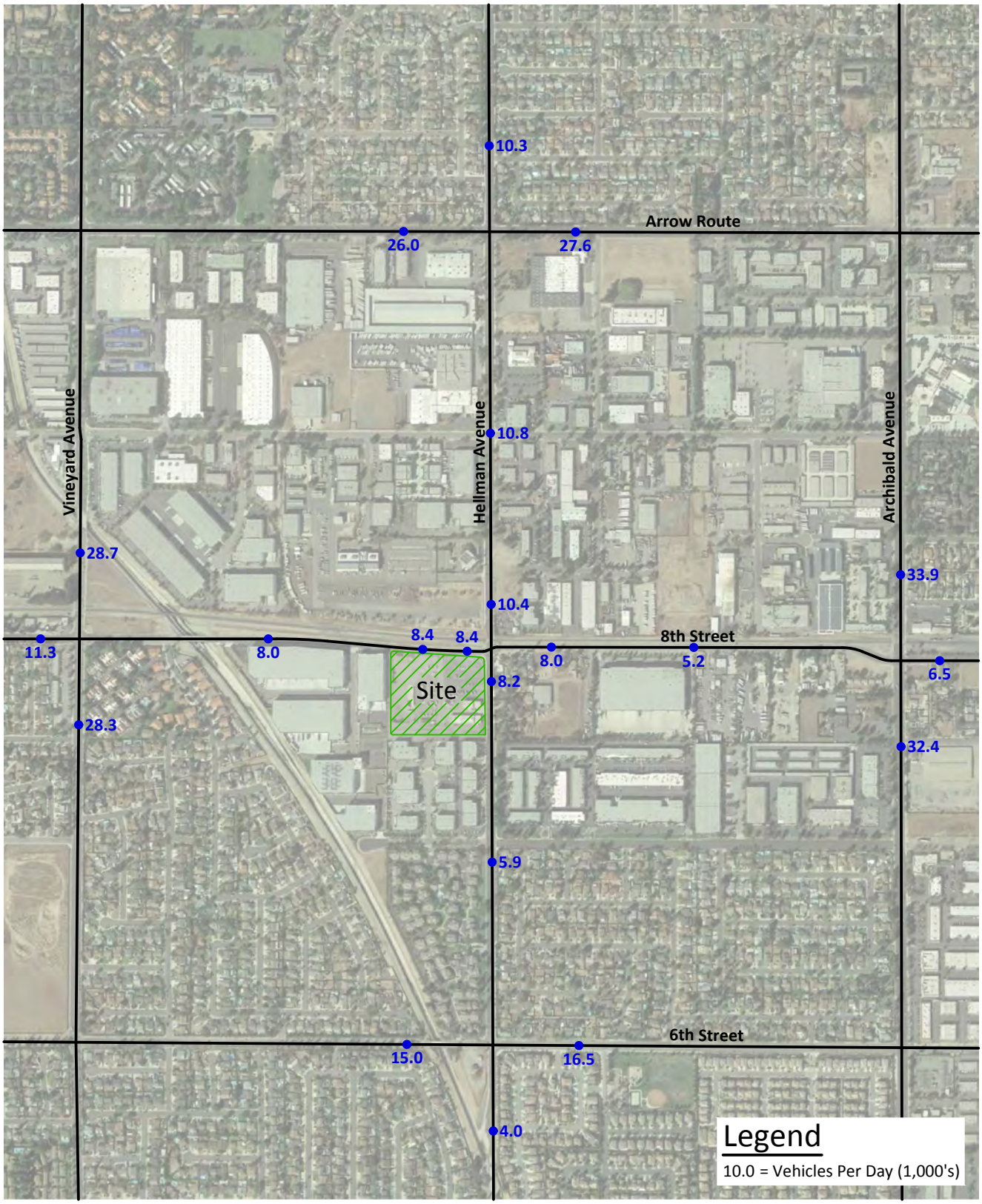


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 7405

Figure 35
Horizon Year (2040) With Project Average Daily Traffic Volumes

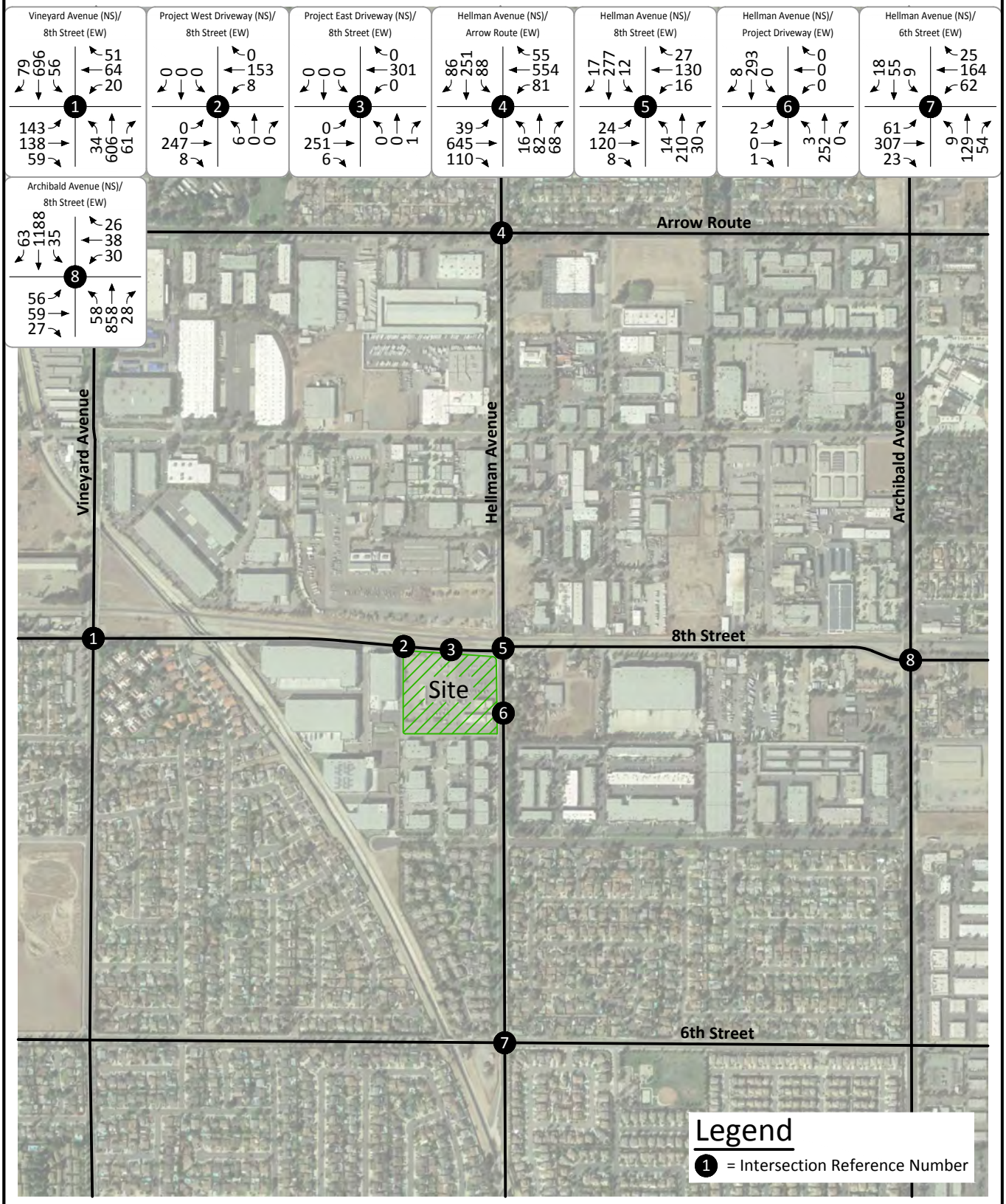


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 7405

Figure 36
Horizon Year (2040) With Project
Morning Peak Hour Intersection Turning Movement Volumes

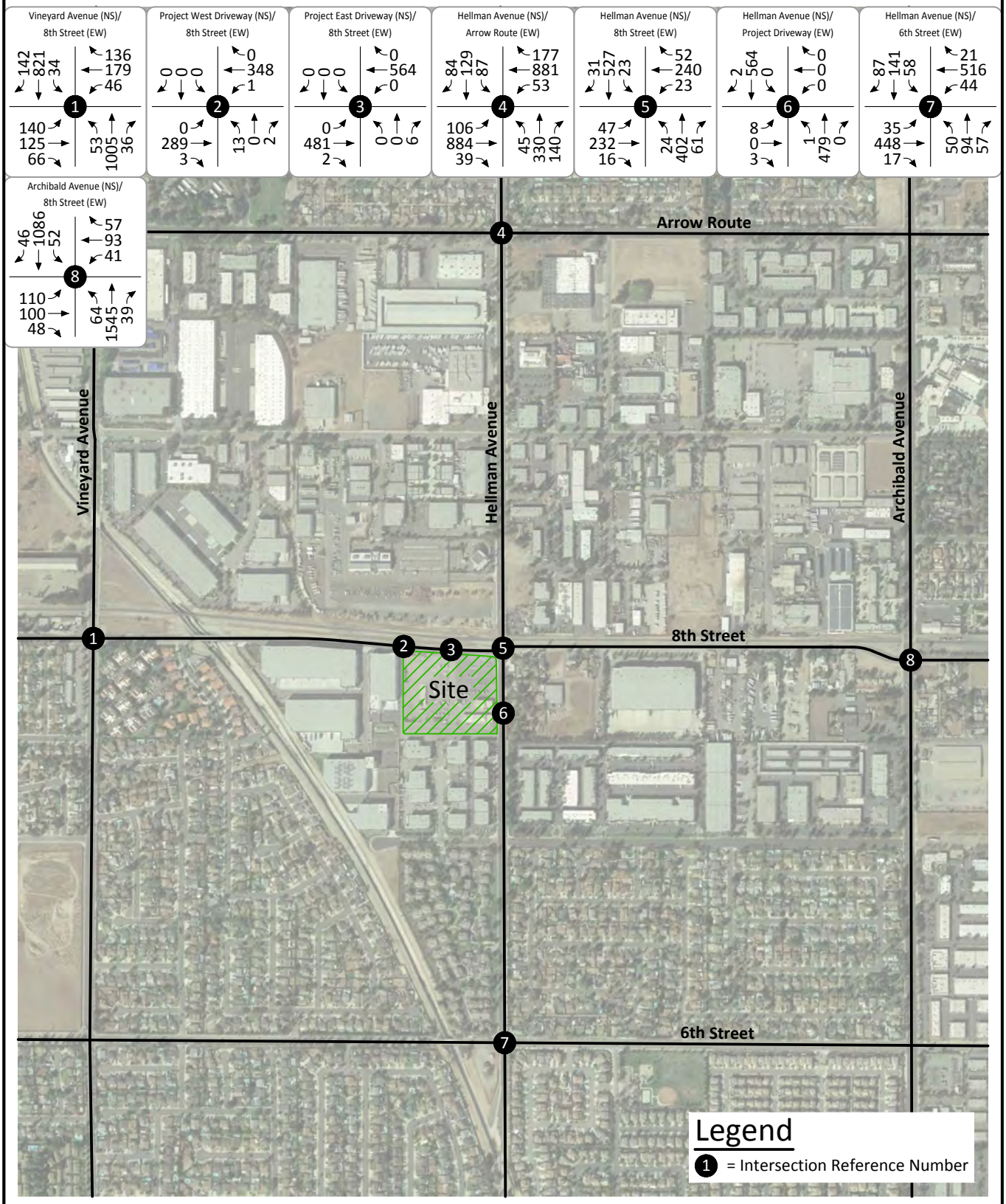


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Figure 37
Horizon Year (2040) With Project
Evening Peak Hour Intersection Turning Movement Volumes



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JN 7405

VI. MITIGATION MEASURES

The proposed project shall contribute through the adopted traffic impact fee program of the City of City of Ranch Cucamonga and the County of San Bernardino.

A. Summary of Traffic Improvements

Roadway improvements were identified to eliminate any anticipated roadway operational deficiencies for which the project contributes a significant impact throughout the study area.

On-site improvements and improvements adjacent to the site will be required in conjunction with the proposed development to ensure adequate circulation within the project itself.

As mitigation for any potential traffic impacts, the proposed project shall contribute through the City of Ranch Cucamonga Development Impact Fee (DIF) program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016) in addition to any fair share contributions shown within the traffic study which is not covered within this fee program.

B. Project Contribution and Percentages

The contribution of project trips have also been calculated for the study intersections. The project percentage has been based on the proportion of project peak hour intersection turning movement volumes contributed to the study intersection relative to the total new peak hour Horizon Year (2040) intersection turning movement volume. Table 8 shows both the morning and evening peak hour contributions for informational purposes only.

As mitigation for the potential traffic impacts, the proposed project shall contribute through the City of Rancho Cucamonga Development Impact Fee (DIF) program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016).

Table 8

Project Intersection Trip Contribution

Intersection	Peak Hour	Traffic Volumes					Project % at Intersection[1,2]
		Existing	Horizon Year (2040) With Project	Project	Total New	Project % Total New	
Vineyard Avenue (NS) at:	Morning	1,494	2,007	21	513	4.1%	4.1%
8th Street (EW) -# 1	Evening	2,230	2,783	19	553	3.4%	
Project West Access (NS) at:	Morning	225	422	28	197	14.2%	14.2%
8th Street (EW) -# 2	Evening	466	656	22	190	11.6%	
Project East Access (NS) at:	Morning	356	559	16	203	7.9%	7.9%
8th Street (EW) -# 3	Evening	656	1,053	12	397	3.0%	
Hellman Avenue (NS) at:	Morning	1,675	2,075	4	400	1.0%	1.0%
Arrow Route (EW) -#4	Evening	2,456	2,956	4	500	0.8%	
Hellman Avenue (NS) at:	Morning	579	885	19	306	6.2%	6.2%
8th Street (EW) -# 5	Evening	1,109	1,678	19	569	3.3%	
Hellman Avenue (NS) at:	Morning	356	543	16	187	8.6%	8.6%
Project South Access (EW) -#6	Evening	656	1,057	16	401	4.0%	
Hellman Avenue (NS) at:	Morning	576	916	6	340	1.8%	1.8%
6th Street (EW) -#7	Evening	1,097	1,568	6	471	1.3%	
Archibald Avenue (NS) at:	Morning	1,961	2,466	11	505	2.2%	2.2%
8th Street (EW) -# 8	Evening	2,698	3,281	11	583	1.9%	

[1] The project cost share is the highest amount for either the morning or evening peak hour.

[2] Project new trip volume percentage shown for informational purposes only.

[3] Project related improvement to mitigate direct impacts and improve level of service. Improvements to 8th Street and Hellman Avenue at project access intersections adjacent to the project will be funded and/or constructed by the applicant.

VII. CONCLUSIONS

The recommendations in this section address on-site improvements, off-site improvements and the phasing of all necessary study area transportation improvements. The improvements were determined through the operations analysis of Section IV and other traffic considerations of Section V. Table 9 summarizes the operational analysis for the studied scenarios.

A. Site Access

The project site is proposed to provide access to 8th Street and Hellman Avenue with regional access to the I-10 Freeway via Vineyard Avenue and Archibald Avenue.

Project access is proposed to be provided via two driveways on 8th Street and one driveway on Hellman Avenue. The project east driveway on 8th Street shall be restricted to right turns in/ out only (cars only).

B. Off-Site Mitigation Measures

Roadway improvements were identified to eliminate any anticipated roadway operational deficiencies for which the project contributes a significant impact throughout the study area.

On-site improvements and improvements adjacent to the site will be required in conjunction with the proposed development to ensure adequate circulation within the project itself.

As mitigation for any potential traffic impacts, the proposed project shall contribute through the City of Ranch Cucamonga Development Impact Fee (DIF) program as well as the San Bernardino County Transportation Authority Development Mitigation Nexus Study (2016).

C. On-Site/Access Recommendations

Site-specific circulation and access recommendations are depicted on Figure 38.

Construct and/or repair Hellman Avenue from the west project boundary to 8th Street at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

Construct and/or repair 8th Street from Hellman Avenue to the south project boundary at its ultimate half-section width, including roadway improvements, bicycle lanes, transit stops and landscaping in conjunction with development, or as approved by the City of Rancho Cucamonga Public Works Department.

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project. On-site traffic control plans shall comply with the California Manual of Uniform Traffic Control Devices (2014).

All on-site and site-adjacent improvements, including traffic signing/striping and project driveways, should be constructed as approved by the City of Rancho Cucamonga Public Works Department.

On-site parking should be provided to the satisfaction of City of Rancho Cucamonga Planning Department.

Sight distance at project access points should comply with applicable City of Rancho Cucamonga/California Department of Transportation sight distance standards. The final grading, landscaping, and street improvement plans should demonstrate that sight distance standards are met.

As is the case for any roadway design, the City of Rancho Cucamonga should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

Table 9

Summary of Intersection Delay and Levels of Service for Scenarios

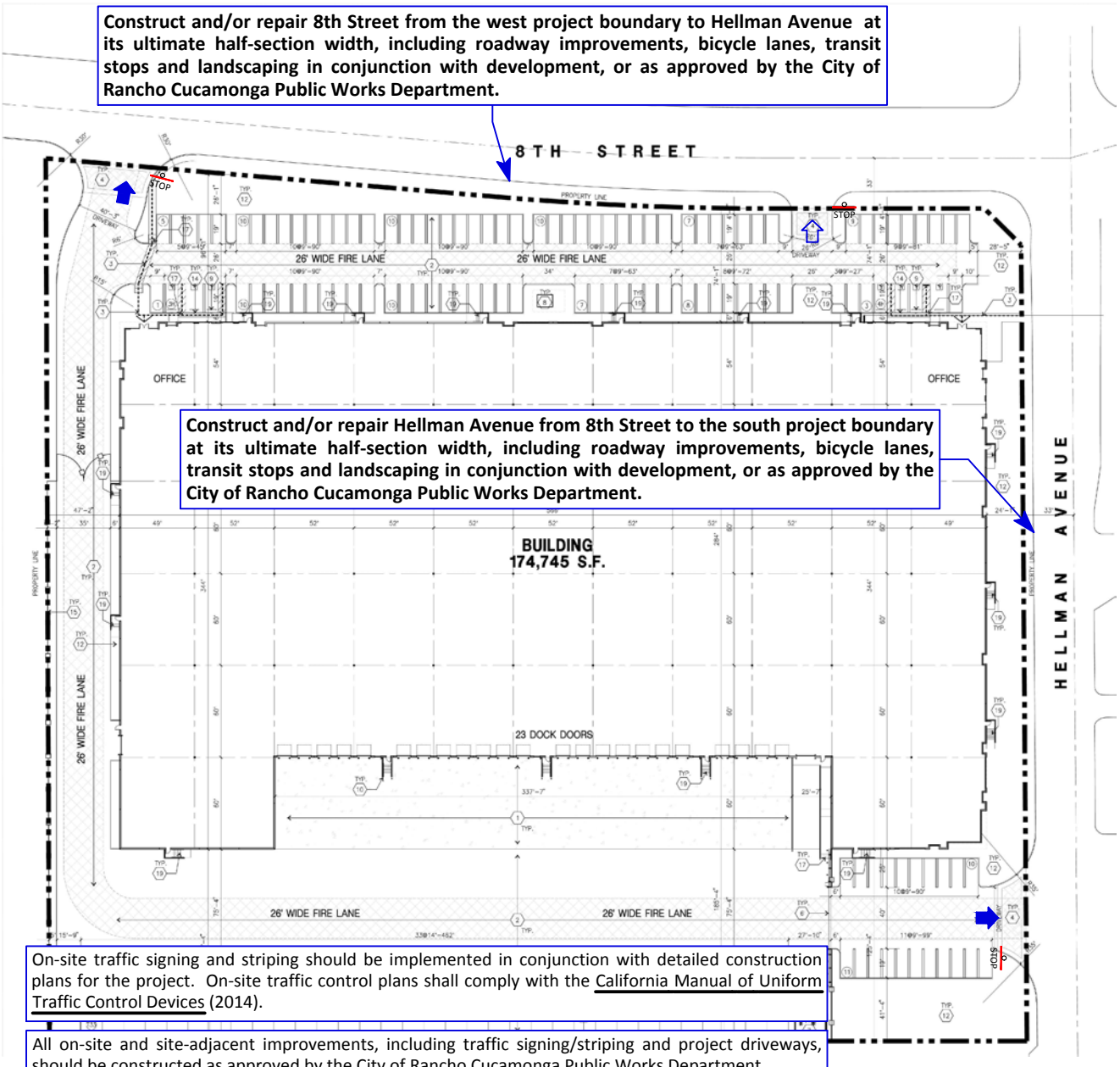
Intersection	Peak Hour Delay and Levels of Service											
	Existing				Opening Year (2020)				Horizon Year (2040)			
	Without Project[1]		With Project[1]		Without Project[2]		With Project[2]		Without Project[3]		With Project[3]	
	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening
Vineyard Avenue (NS) at:												
8th Street (EW) -# 1	11.4 B	13.1 B	11.5 B	13.2 B	13.0 B	14.8 B	13.1 B	14.9 B	13.1 B	15.4 B	13.2 B	15.5 B
Project West Access (NS) at:												
8th Street (EW) -# 2	- -	- -	10.1 B	12.1 B	- -	- -	11.1 B	13.4 B	- -	- -	11.3 B	13.8 B
Project East Access (NS) at:												
8th Street (EW) -# 3	- -	- -	9.2 A	10.3 B	- -	- -	9.5 A	11.2 B	- -	- -	9.6 A	11.4 B
Hellman Avenue (NS) at:												
Arrow Route (EW) -#4	20.3 C	19.2 B	20.3 C	19.2 B	20.2 C	19.4 B	20.2 C	19.4 B	19.1 B	19.5 B	19.1 B	19.5 B
8th Street (EW) -# 5	22.8 C	40.7 D	23.2 C	41.5 D	24.1 C	49.0 D	24.3 C	50.1 D	24.6 C	51.6 D	24.9 C	52.4 D
Project South Access (EW) -#6	- -	- -	10.9 B	14.3 B	- -	- -	11.1 B	15.1 C	- -	- -	12.6 B	20.8 C
6th Street (EW) -#7	10.4 B	21.9 C	10.4 B	22.1 C	14.4 B	86.8 F	14.4 B	87.4 F	12.7 B	74.8 F	12.7 B	75.2 F
-With Improvements	-	-	-	-	19.3 B	18.1 B	19.3 B	18.1 B	-	-	-	-
Archibald Avenue (NS) at:												
8th Street (EW) -# 8	8.8 A	12.6 B	9.0 A	12.7 B	11.5 B	14.8 B	11.7 B	14.7 B	9.8 A	16.9 B	9.9 A	17.1 B

[1] See Table 5.

[2] See Table 6.

[3] See Table 7.

Figure 38
Circulation Recommendations



On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project. On-site traffic control plans shall comply with the California Manual of Uniform Traffic Control Devices (2014).

All on-site and site-adjacent improvements, including traffic signing/striping and project driveways, should be constructed as approved by the City of Rancho Cucamonga Public Works Department.

On-site parking should be provided to the satisfaction of City of Rancho Cucamonga Planning Department.

Sight distance at project access points should comply with applicable City of Rancho Cucamonga/California Department of Transportation sight distance standards. The final grading, landscaping, and street improvement plans should demonstrate that sight distance standards are met.

As is the case for any roadway design, the City of Rancho Cucamonga should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

Legend

STOP = Stop Sign

= Full Access Driveway

= Right Turns In/Out (Cars Only) Access Driveway

APPENDICES

Appendix A – Glossary of Transportation Terms

Appendix B – Traffic Scoping Agreement

Appendix C – Intersection Turning Movement Count Worksheets

Appendix D – Future Growth Increment Calculation Worksheets

Appendix E – Traffic Model Plots

Appendix F – Intersection Delay and Level of Service Worksheets

Appendix G – Hellman Avenue and 8th Street Widening and At Grade Improvement Project

APPENDIX A

Glossary of Transportation Terms

GLOSSARY OF TRANSPORTATION TERMS

COMMON ABBREVIATIONS

AC:	Acres
ADT:	Average Daily Traffic
Caltrans:	California Department of Transportation
DU:	Dwelling Unit
ICU:	Intersection Capacity Utilization
LOS:	Level of Service
TSF:	Thousand Square Feet
V/C:	Volume/Capacity
VMT:	Vehicle Miles Traveled

TERMS

AVERAGE DAILY TRAFFIC: The total volume during a year divided by the number of days in a year. Usually only weekdays are included.

BANDWIDTH: The number of seconds of green time available for through traffic in a signal progression.

BOTTLENECK: A constriction along a travelway that limits the amount of traffic that can proceed downstream from its location.

CAPACITY: The maximum number of vehicles that can be reasonably expected to pass over a given section of a lane or a roadway in a given time period.

CHANNELIZATION: The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movements of both vehicles and pedestrians.

CLEARANCE INTERVAL: Nearly same as yellow time. If there is an all red interval after the end of a yellow, then that is also added into the clearance interval.

CORDON: An imaginary line around an area across which vehicles, persons, or other items are counted (in and out).

CYCLE LENGTH: The time period in seconds required for one complete signal cycle.

CUL-DE-SAC STREET: A local street open at one end only, and with special provisions for turning around.

DAILY CAPACITY: The daily volume of traffic that will result in a volume during the peak hour equal to the capacity of the roadway.

DELAY: The time consumed while traffic is impeded in its movement by some element over which it has no control, usually expressed in seconds per vehicle.

DEMAND RESPONSIVE SIGNAL: Same as traffic-actuated signal.

DENSITY: The number of vehicles occupying in a unit length of the through traffic lanes of a roadway at any given instant. Usually expressed in vehicles per mile.

DETECTOR: A device that responds to a physical stimulus and transmits a resulting impulse to the signal controller.

DESIGN SPEED: A speed selected for purposes of design. Features of a highway, such as curvature, superelevation, and sight distance (upon which the safe operation of vehicles is dependent) are correlated to design speed.

DIRECTIONAL SPLIT: The percent of traffic in the peak direction at any point in time.

DIVERSION: The rerouting of peak hour traffic to avoid congestion.

FORCED FLOW: Opposite of free flow.

FREE FLOW: Volumes are well below capacity. Vehicles can maneuver freely and travel is unimpeded by other traffic.

GAP: Time or distance between successive vehicles in a traffic stream, rear bumper to front bumper.

HEADWAY: Time or distance spacing between successive vehicles in a traffic stream, front bumper to front bumper.

INTERCONNECTED SIGNAL SYSTEM: A number of intersections that are connected to achieve signal progression.

LEVEL OF SERVICE: A qualitative measure of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

LOOP DETECTOR: A vehicle detector consisting of a loop of wire embedded in the roadway, energized by alternating current and producing an output circuit closure when passed over by a vehicle.

MINIMUM ACCEPTABLE GAP: Smallest time headway between successive vehicles in a traffic stream into which another vehicle is willing and able to cross or merge.

MULTI-MODAL: More than one mode; such as automobile, bus transit, rail rapid transit, and bicycle transportation modes.

OFFSET: The time interval in seconds between the beginning of green at one intersection and the beginning of green at an adjacent intersection.

PLATOON: A closely grouped component of traffic that is composed of several vehicles moving, or standing ready to move, with clear spaces ahead and behind.

PASSENGER CAR EQUIVALENTS (PCE): One car is one Passenger Car Equivalent. A truck is equal to 2 or 3 Passenger Car Equivalents in that a truck requires longer to start, goes slower, and accelerates slower. Loaded trucks have a higher Passenger Car Equivalent than empty trucks.

PEAK HOUR: The 60 consecutive minutes with the highest number of vehicles.

PRETIMED SIGNAL: A type of traffic signal that directs traffic to stop and go on a predetermined time schedule without regard to traffic conditions. Also, fixed time signal.

PROGRESSION: A term used to describe the progressive movement of traffic through several signalized intersections.

SCREEN-LINE: An imaginary line or physical feature across which all trips are counted, normally to verify the validity of mathematical traffic models.

SIGNAL CYCLE: The time period in seconds required for one complete sequence of signal indications.

SIGNAL PHASE: The part of the signal cycle allocated to one or more traffic movements.

STARTING DELAY: The delay experienced in initiating the movement of queued traffic from a stop to an average running speed through a signalized intersection.

TRAFFIC-ACTUATED SIGNAL: A type of traffic signal that directs traffic to stop and go in accordance with the demands of traffic, as registered by the actuation of detectors.

TRIP: The movement of a person or vehicle from one location (origin) to another (destination). For example, from home to store to home is two trips, not one.

TRIP-END: One end of a trip at either the origin or destination (i.e., each trip has two trip-ends). A trip-end occurs when a person, object, or message is transferred to or from a vehicle.

TRIP GENERATION RATE: The quantity of trips produced and/or attracted by a specific land use stated in terms of units such as per dwelling, per acre, and per 1,000 square feet of floor space.

TRUCK: A vehicle having dual tires on one or more axles, or having more than two axles.

UNBALANCED FLOW: Heavier traffic flow in one direction than the other. On a daily basis, most facilities have balanced flow. During the peak hours, flow is seldom balanced in an urban area.

VEHICLE MILES OF TRAVEL: A measure of the amount of usage of a section of highway, obtained by multiplying the average daily traffic by length of facility in miles.

APPENDIX B

Traffic Scoping Agreement

SCOPING AGREEMENT FOR CITY OF RANCHO CUCAMONGA TRAFFIC IMPACT ANALYSIS

This Memorandum of Understanding acknowledges the City of Rancho Cucamonga Traffic Impact Analysis requirements for the following project.

Project Name: 8th Street & Hellman Avenue Project

Project Address/Location: 9000 Hellman Avenue, Rancho Cucamonga, CA 91730

Governmental Jurisdiction: City of Rancho Cucamonga

Project Description and Land Use: 174,745 Square Foot Warehouse

	Consultant	Developer
Name:	Carl Ballard, LEED GA, Principal	Mr. Michael Johnson, Development Manager
Firm:	KUNZMAN ASSOCIATES, INC.	OVERTON MOORE PROPERTIES
Address:	1111 Town and Country Road, Suite 34	19300 Hamilton Avenue, Suite 200
	Orange, CA 92868	Gardena, CA 90248
Telephone:	714-973-8383 x 202	310-354-2477
Fax:	714-973-8821	310-608-7997
E-mail:	carl@traffic-engineer.com	mjohnson@omprop.com

Trip Generation Source: Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017

	Morning		Evening		
	In	Out	In	Out	Daily
Total	31	9	10	32	398

Project Full Occupancy Year: 2020

Internal Trip Capture Allowance	NO	(- Trip Discount)
Pass-By Trip Allowance	NO	(- Trip Discount)

Based on the application the project does not meet the 50 or more peak hour trip threshold criteria outlined in the San Bernardino County CMP, 2016 Update (prepared by San Bernardino Associated Governments, Appendix B), no intersections meet the threshold. As such, a Traffic Impact Report is not required for the proposed Project.

Approved by:

Consultant's Representative	3/29/18 Date	City of Rancho Cucamonga Representative	4/3/18 Date

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Table 1

Project Trip Generation[1]

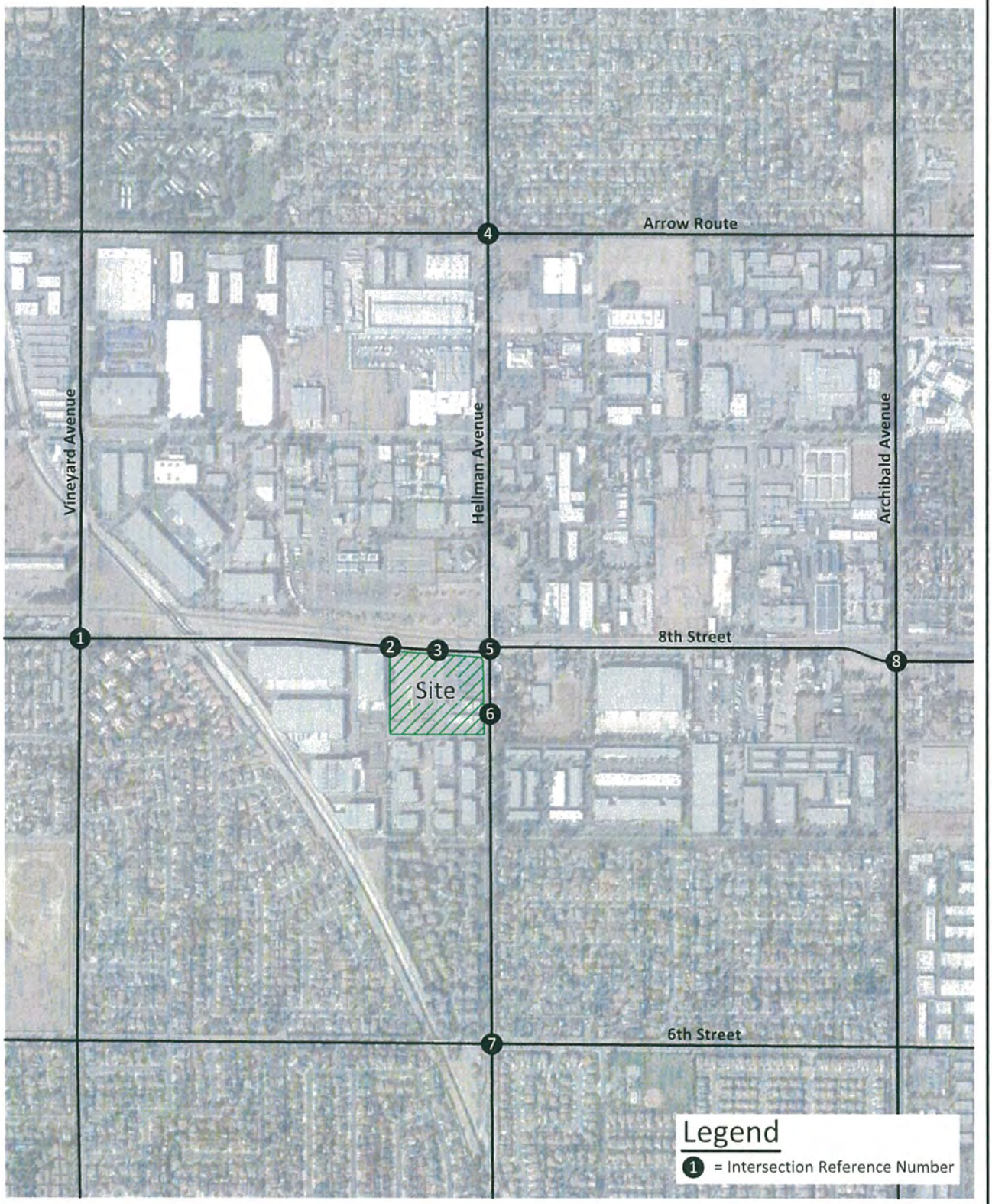
Descriptor	Quantity	Units[2]	Type of Vehicle: Passenger Car	2 Axle Truck	3 Axle Truck	4+ Axle Truck	Total Trucks	Total
Land Use: Warehousing	174.745	TSF	79.57%	3.46%	4.64%	12.33%	20.43%	100%
Trip Generation Rates in trips per TSF								
Daily			1.385	0.060	0.081	0.215	0.355	1.74
Morning Peak Hour			0.135	0.006	0.008	0.021	0.035	0.17
Evening Peak Hour			0.151	0.007	0.009	0.023	0.039	0.19
Trip Generation in Vehicles								
Daily			242	11	14	37	62	304
Morning Peak Hour								
Inbound			18	1	1	3	5	23
Outbound			6	-	-	1	1	7
Total			24	1	1	4	6	30
Evening Peak Hour								
Inbound			7	-	-	1	1	8
Outbound			19	1	1	3	5	24
Total			26	1	1	4	6	32
Passenger Car Equivalent's (PCE'S) Factor[3]			1.00	1.50	2.00	3.00		
Trip Generation in PCE's								
Daily			242	17	28	111	156	398
Morning Peak Hour								
Inbound			18	2	2	9	13	31
Outbound			6	-	-	3	3	9
Total			24	2	2	12	16	40
Evening Peak Hour								
Inbound			7	-	-	3	3	10
Outbound			19	2	2	9	13	32
Total			26	2	2	12	16	42

[1] Source: Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017, Land Use Code 150 and City of Fontana, Truck Trip Generation Study, August 2003.

[2] TSF = Thousand Square Feet

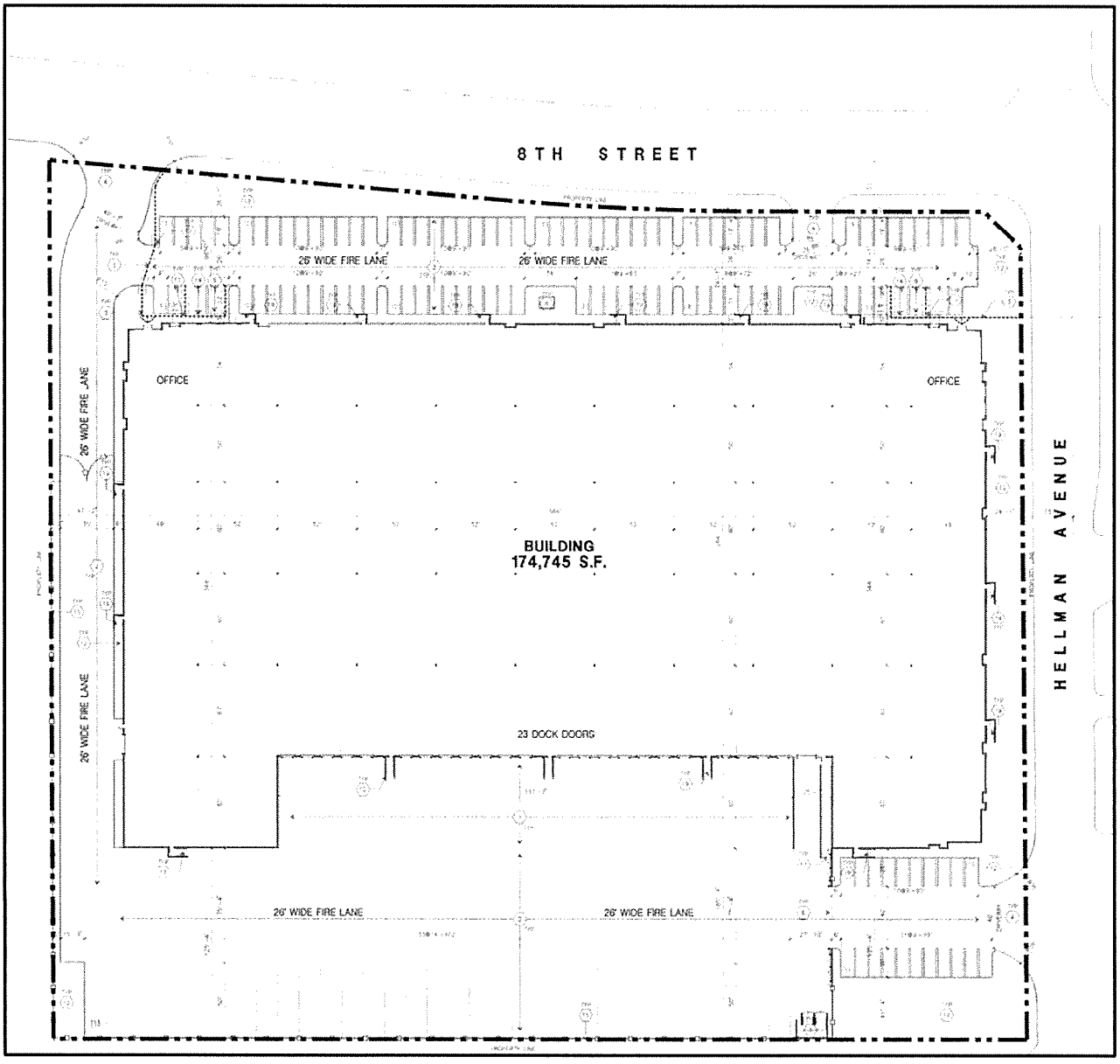
[3] Passenger Car Equivalent factors are recommended by the San Bernardino Associated Governments

Figure 1
Project Location Map



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Figure 2
Site Plan

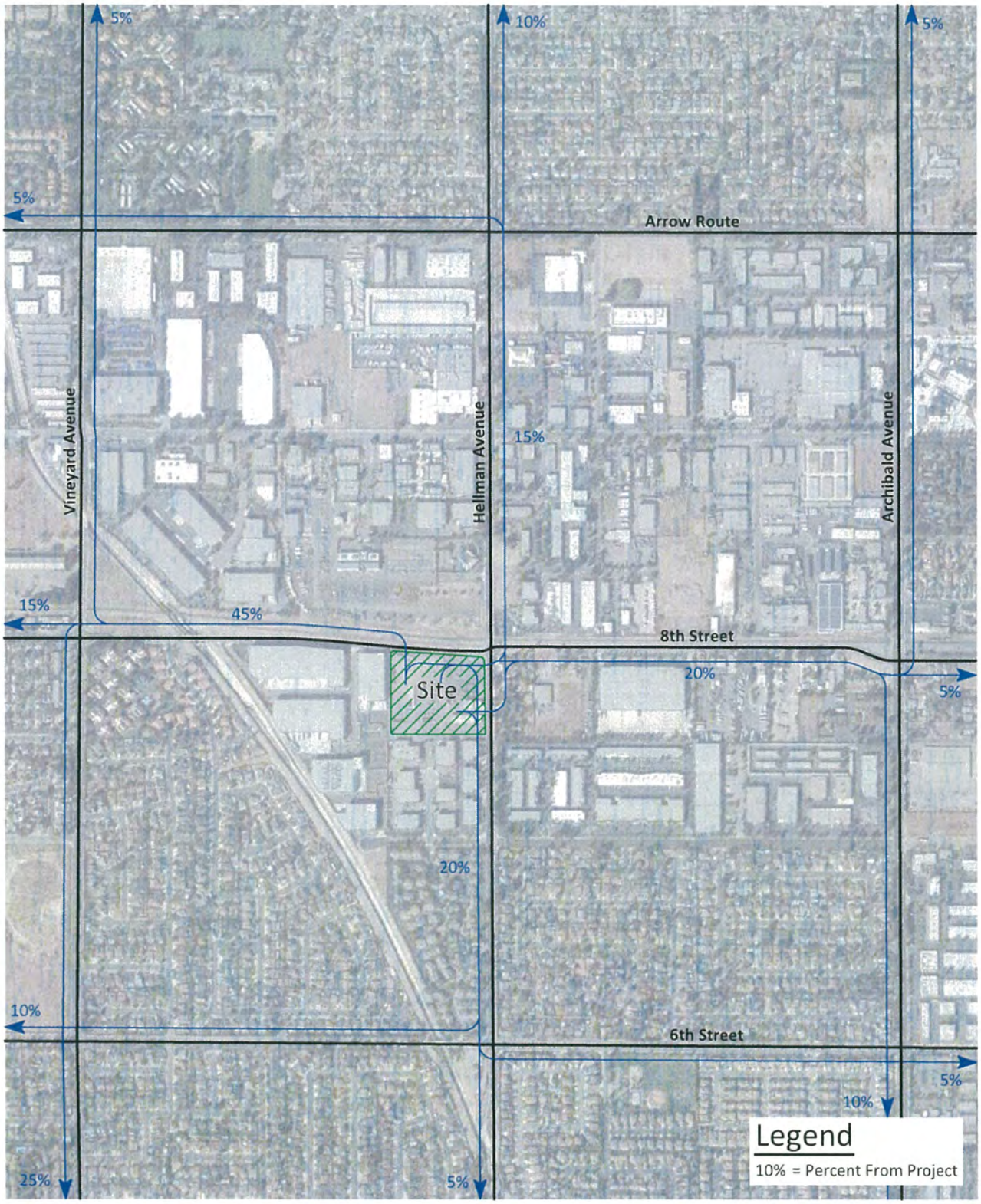


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OVER 40 YEARS OF EXCELLENT SERVICE

JN 7405

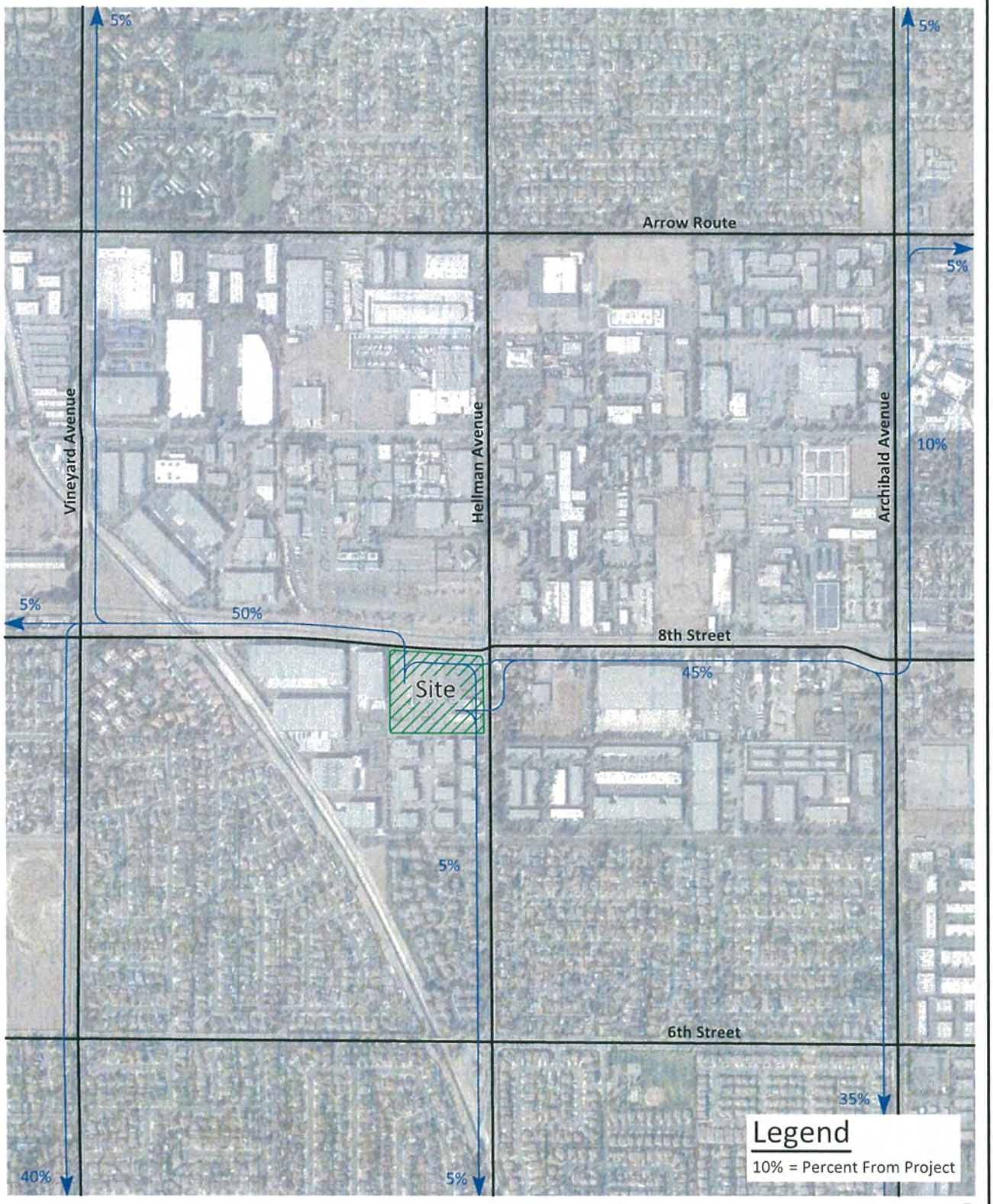
Figure 3
Project Trip Distribution - Cars



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Figure 4
Project Trip Distribution - Trucks



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APPENDIX C

Intersection Turning Movement Count Worksheets

Counts Unlimited
PO Box 1178
Corona, CA 92878
951-268-6268

City of Rancho Cucamonga
N/S: Vineyard Avenue
E/W: 8th Street
Weather: Clear

File Name : 01_RNCVI8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

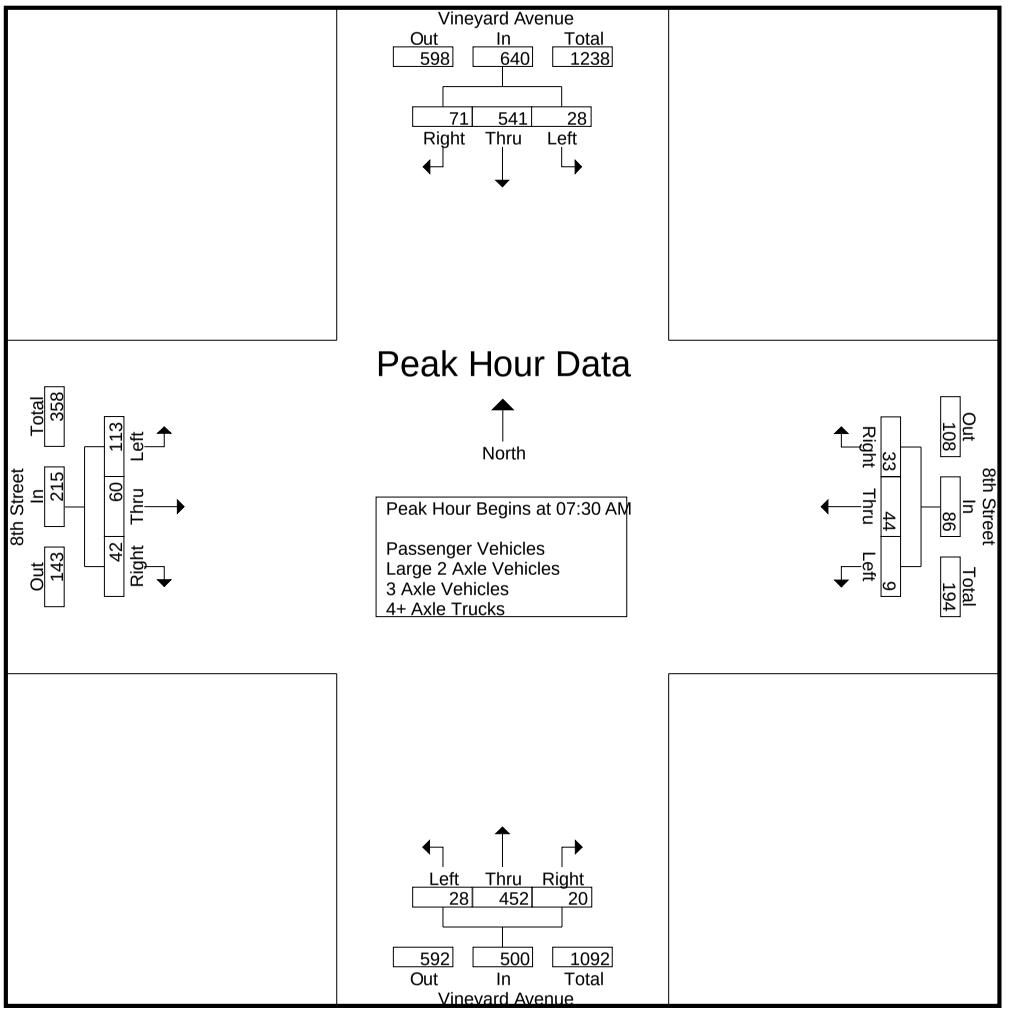
	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	4	107	6	117	1	4	9	14	8	91	3	102	17	5	6	28	261
07:15 AM	3	136	13	152	0	6	5	11	2	89	1	92	13	11	4	28	283
07:30 AM	8	149	12	169	1	12	6	19	5	102	2	109	25	15	9	49	346
07:45 AM	8	128	21	157	3	5	6	14	7	147	6	160	25	22	12	59	390
Total	23	520	52	595	5	27	26	58	22	429	12	463	80	53	31	164	1280
08:00 AM	3	135	22	160	2	15	16	33	7	103	8	118	26	4	13	43	354
08:15 AM	9	129	16	154	3	12	5	20	9	100	4	113	37	19	8	64	351
08:30 AM	9	130	26	165	4	10	6	20	5	113	2	120	17	16	7	40	345
08:45 AM	0	136	15	151	0	6	12	18	3	98	3	104	22	13	8	43	316
Total	21	530	79	630	9	43	39	91	24	414	17	455	102	52	36	190	1366
Grand Total	44	1050	131	1225	14	70	65	149	46	843	29	918	182	105	67	354	2646
Apprch %	3.6	85.7	10.7		9.4	47	43.6		5	91.8	3.2		51.4	29.7	18.9		
Total %	1.7	39.7	5	46.3	0.5	2.6	2.5	5.6	1.7	31.9	1.1	34.7	6.9	4	2.5	13.4	
Passenger Vehicles	43	1011	127	1181	13	64	64	141	45	805	26	876	179	104	66	349	2547
% Passenger Vehicles	97.7	96.3	96.9	96.4	92.9	91.4	98.5	94.6	97.8	95.5	89.7	95.4	98.4	99	98.5	98.6	96.3
Large 2 Axle Vehicles	1	24	4	29	0	6	1	7	1	24	2	27	2	1	0	3	66
% Large 2 Axle Vehicles	2.3	2.3	3.1	2.4	0	8.6	1.5	4.7	2.2	2.8	6.9	2.9	1.1	1	0	0.8	2.5
3 Axle Vehicles	0	2	0	2	0	0	0	0	0	2	0	2	0	0	1	1	5
% 3 Axle Vehicles	0	0.2	0	0.2	0	0	0	0	0	0.2	0	0.2	0	0	1.5	0.3	0.2
4+ Axle Trucks	0	13	0	13	1	0	0	1	0	12	1	13	1	0	0	1	28
% 4+ Axle Trucks	0	1.2	0	1.1	7.1	0	0	0.7	0	1.4	3.4	1.4	0.5	0	0	0.3	1.1

	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	8	**149**	12	**169**	1	12	6	19	5	102	2	109	25	15	9	49	346
07:45 AM	8	128	21	157	**3**	5	6	14	7	**147**	6	**160**	25	**22**	12	59	**390**
08:00 AM	3	135	**22**	160	2	**15**	**16**	**33**	7	103	**8**	118	26	4	**13**	43	354
08:15 AM	**9**	129	16	154	3	12	5	20	**9**	100	4	113	**37**	19	8	**64**	351
Total Volume	28	541	71	640	9	44	33	86	28	452	20	500	113	60	42	215	1441
% App. Total	4.4	84.5	11.1		10.5	51.2	38.4		5.6	90.4	4		52.6	27.9	19.5		
PHF	.778	.908	.807	.947	.750	.733	.516	.652	.778	.769	.625	.781	.764	.682	.808	.840	.924

Counts Unlimited
PO Box 1178
Corona, CA 92878
951-268-6268

City of Rancho Cucamonga
N/S: Vineyard Avenue
E/W: 8th Street
Weather: Clear

File Name : 01_RNCVI8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				08:00 AM				07:45 AM				07:30 AM			
+0 mins.	8	**149**	12	**169**	2	**15**	**16**	**33**	7	**147**	6	**160**	25	15	9	49
+15 mins.	8	128	21	157	3	12	5	20	7	103	**8**	118	25	**22**	12	59
+30 mins.	3	135	**22**	160	**4**	10	6	20	**9**	100	4	113	26	4	**13**	43
+45 mins.	**9**	129	16	154	0	6	12	18	5	113	2	120	**37**	19	8	**64**
Total Volume	28	541	71	640	9	43	39	91	28	463	20	511	113	60	42	215
% App. Total	4.4	84.5	11.1		9.9	47.3	42.9		5.5	90.6	3.9		52.6	27.9	19.5	
PHF	.778	.908	.807	.947	.563	.717	.609	.689	.778	.787	.625	.798	.764	.682	.808	.840

Counts Unlimited
PO Box 1178
Corona, CA 92878
951-268-6268

City of Rancho Cucamonga
N/S: Vineyard Avenue
E/W: 8th Street
Weather: Clear

File Name : 01_RNCVI8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles

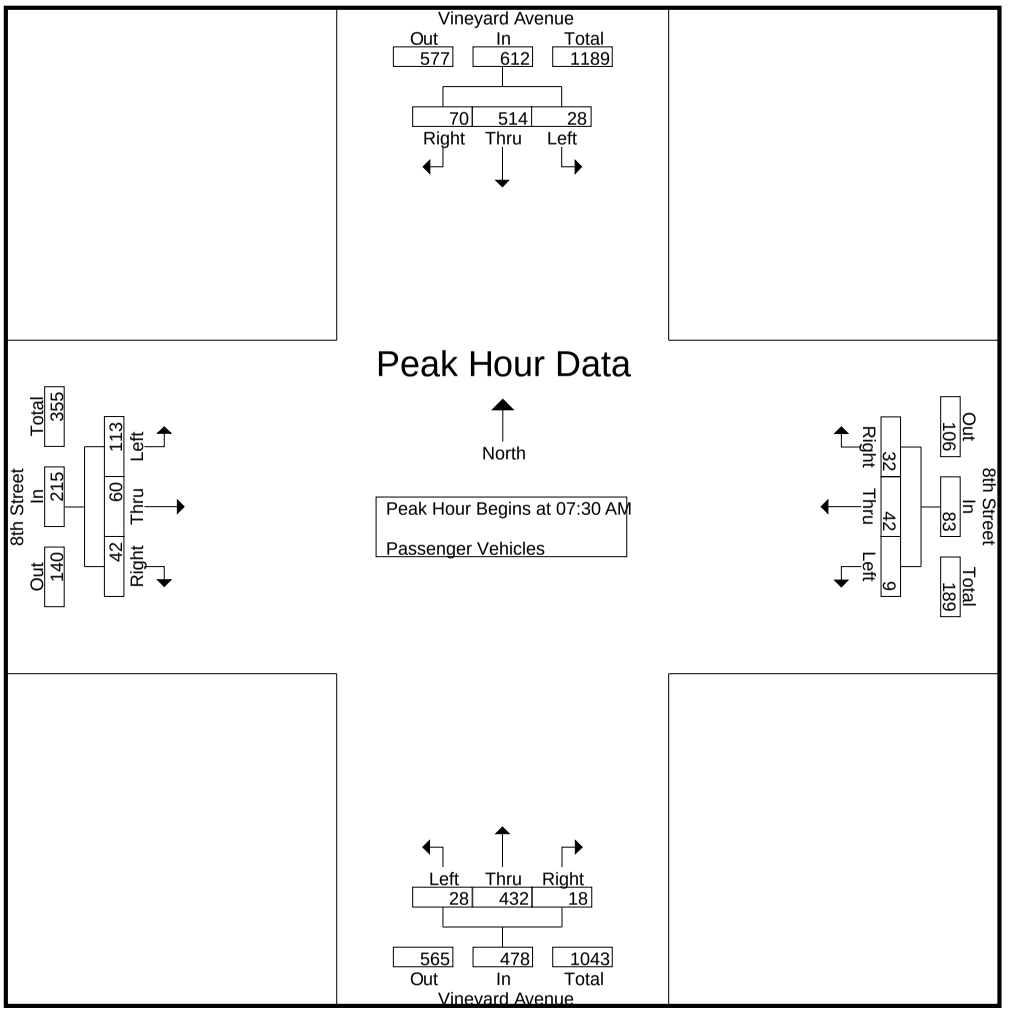
	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	4	104	6	114	0	4	9	13	7	88	3	98	17	5	5	27	252
07:15 AM	3	133	12	148	0	5	5	10	2	84	1	87	11	11	4	26	271
07:30 AM	8	139	12	159	1	12	6	19	5	96	2	103	25	15	9	49	330
07:45 AM	8	121	21	150	3	5	6	14	7	142	6	155	25	22	12	59	378
Total	23	497	51	571	4	26	26	56	21	410	12	443	78	53	30	161	1231
08:00 AM	3	131	21	155	2	15	15	32	7	99	6	112	26	4	13	43	342
08:15 AM	9	123	16	148	3	10	5	18	9	95	4	108	37	19	8	64	338
08:30 AM	8	126	25	159	4	8	6	18	5	106	1	112	17	15	7	39	328
08:45 AM	0	134	14	148	0	5	12	17	3	95	3	101	21	13	8	42	308
Total	20	514	76	610	9	38	38	85	24	395	14	433	101	51	36	188	1316
Grand Total	43	1011	127	1181	13	64	64	141	45	805	26	876	179	104	66	349	2547
Apprch %	3.6	85.6	10.8		9.2	45.4	45.4		5.1	91.9	3		51.3	29.8	18.9		
Total %	1.7	39.7	5	46.4	0.5	2.5	2.5	5.5	1.8	31.6	1	34.4	7	4.1	2.6	13.7	

	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	8	**139**	12	**159**	1	12	6	19	5	96	2	103	25	15	9	49	330
07:45 AM	8	121	**21**	150	**3**	5	6	14	7	**142**	**6**	**155**	25	**22**	12	59	**378**
08:00 AM	3	131	21	155	2	**15**	**15**	**32**	7	99	6	112	26	4	**13**	43	342
08:15 AM	**9**	123	16	148	3	10	5	18	**9**	95	4	108	**37**	19	8	**64**	338
Total Volume	28	514	70	612	9	42	32	83	28	432	18	478	113	60	42	215	1388
% App. Total	4.6	84	11.4		10.8	50.6	38.6		5.9	90.4	3.8		52.6	27.9	19.5		
PHF	.778	.924	.833	.962	.750	.700	.533	.648	.778	.761	.750	.771	.764	.682	.808	.840	.918

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City of Rancho Cucamonga
N/S: Vineyard Avenue
E/W: 8th Street
Weather: Clear

File Name : 01_RNCVI8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	8	**139**	12	**159**	1	12	6	19	5	96	2	103	25	15	9	49
+15 mins.	8	121	**21**	150	**3**	5	6	14	7	**142**	**6**	**155**	25	**22**	12	59
+30 mins.	3	131	21	155	2	**15**	**15**	**32**	7	99	6	112	26	4	**13**	43
+45 mins.	**9**	123	16	148	3	10	5	18	**9**	95	4	108	**37**	19	8	**64**
Total Volume	28	514	70	612	9	42	32	83	28	432	18	478	113	60	42	215
% App. Total	4.6	84	11.4		10.8	50.6	38.6		5.9	90.4	3.8		52.6	27.9	19.5	
PHF	.778	.924	.833	.962	.750	.700	.533	.648	.778	.761	.750	.771	.764	.682	.808	.840

Counts Unlimited
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City of Rancho Cucamonga
N/S: Vineyard Avenue
E/W: 8th Street
Weather: Clear

File Name : 01_RNCVI8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Large 2 Axle Vehicles

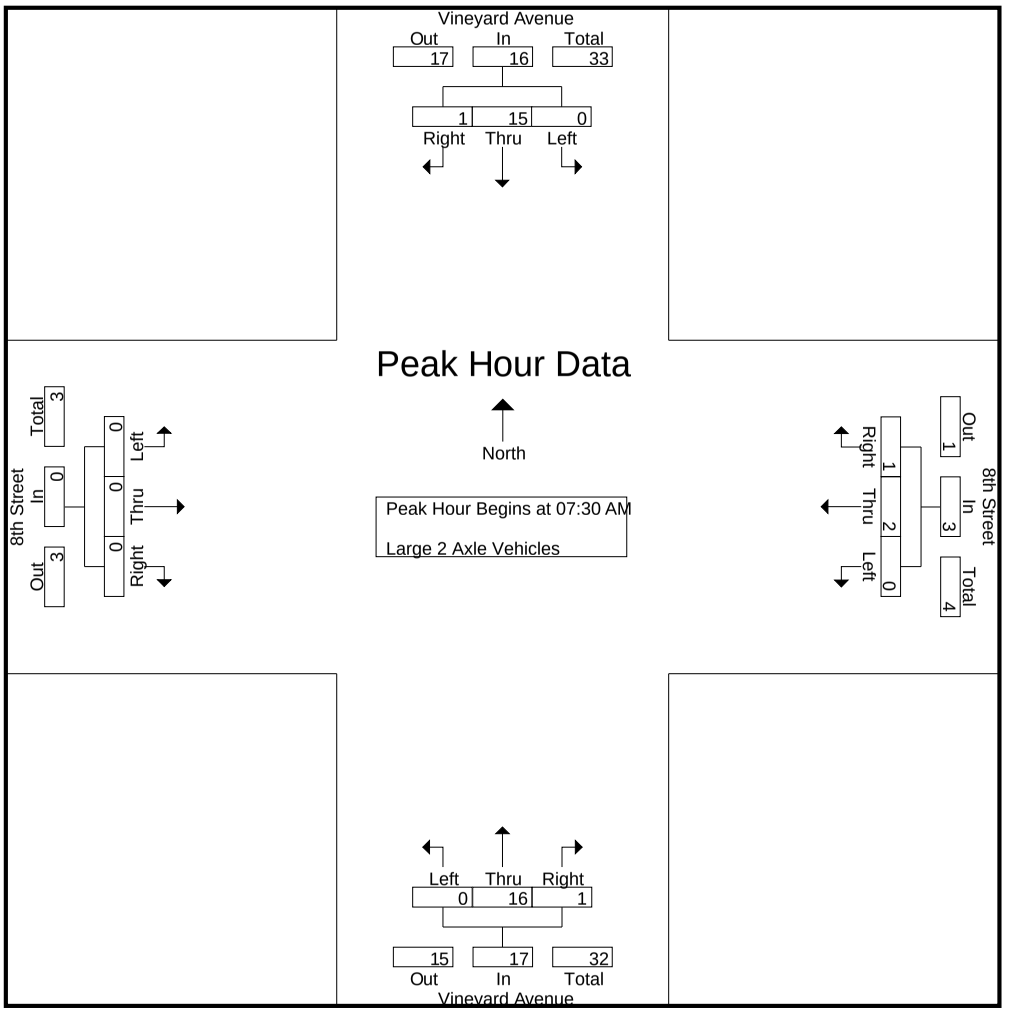
	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	2	0	2	0	0	0	0	1	2	0	3	0	0	0	0	5
07:15 AM	0	3	1	4	0	1	0	1	0	2	0	2	2	0	0	2	9
07:30 AM	0	4	0	4	0	0	0	0	0	4	0	4	0	0	0	0	8
07:45 AM	0	3	0	3	0	0	0	0	0	4	0	4	0	0	0	0	7
Total	0	12	1	13	0	1	0	1	1	12	0	13	2	0	0	2	29
08:00 AM	0	4	1	5	0	0	1	1	0	4	1	5	0	0	0	0	11
08:15 AM	0	4	0	4	0	2	0	2	0	4	0	4	0	0	0	0	10
08:30 AM	1	3	1	5	0	2	0	2	0	3	1	4	0	1	0	1	12
08:45 AM	0	1	1	2	0	1	0	1	0	1	0	1	0	0	0	0	4
Total	1	12	3	16	0	5	1	6	0	12	2	14	0	1	0	1	37
Grand Total	1	24	4	29	0	6	1	7	1	24	2	27	2	1	0	3	66
Apprch %	3.4	82.8	13.8		0	85.7	14.3		3.7	88.9	7.4		66.7	33.3	0		
Total %	1.5	36.4	6.1	43.9	0	9.1	1.5	10.6	1.5	36.4	3	40.9	3	1.5	0	4.5	

	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	**4**	0	4	0	0	0	0	0	**4**	0	4	0	0	0	0	8
07:45 AM	0	3	0	3	0	0	0	0	0	4	0	4	0	0	0	0	7
08:00 AM	0	4	**1**	**5**	0	0	**1**	1	0	4	**1**	**5**	0	0	0	0	**11**
08:15 AM	0	4	0	4	0	**2**	0	**2**	0	4	0	4	0	0	0	0	10
Total Volume	0	15	1	16	0	2	1	3	0	16	1	17	0	0	0	0	36
% App. Total	0	93.8	6.2		0	66.7	33.3		0	94.1	5.9		0	0	0		
PHF	.000	.938	.250	.800	.000	.250	.250	.375	.000	1.00	.250	.850	.000	.000	.000	.000	.818

Counts Unlimited
PO Box 1178
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951-268-6268

City of Rancho Cucamonga
N/S: Vineyard Avenue
E/W: 8th Street
Weather: Clear

File Name : 01_RNCVI8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	**4**	0	4	0	0	0	0	0	**4**	0	4	0	0	0	0
+15 mins.	0	3	0	3	0	0	0	0	0	4	0	4	0	0	0	0
+30 mins.	0	4	**1**	**5**	0	0	**1**	1	0	4	**1**	**5**	0	0	0	0
+45 mins.	0	4	0	4	0	**2**	0	**2**	0	4	0	4	0	0	0	0
Total Volume	0	15	1	16	0	2	1	3	0	16	1	17	0	0	0	0
% App. Total	0	93.8	6.2		0	66.7	33.3		0	94.1	5.9		0	0	0	
PHF	.000	.938	.250	.800	.000	.250	.250	.375	.000	1.000	.250	.850	.000	.000	.000	.000

Counts Unlimited
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City of Rancho Cucamonga
N/S: Vineyard Avenue
E/W: 8th Street
Weather: Clear

File Name : 01_RNCVI8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 3 Axle Vehicles

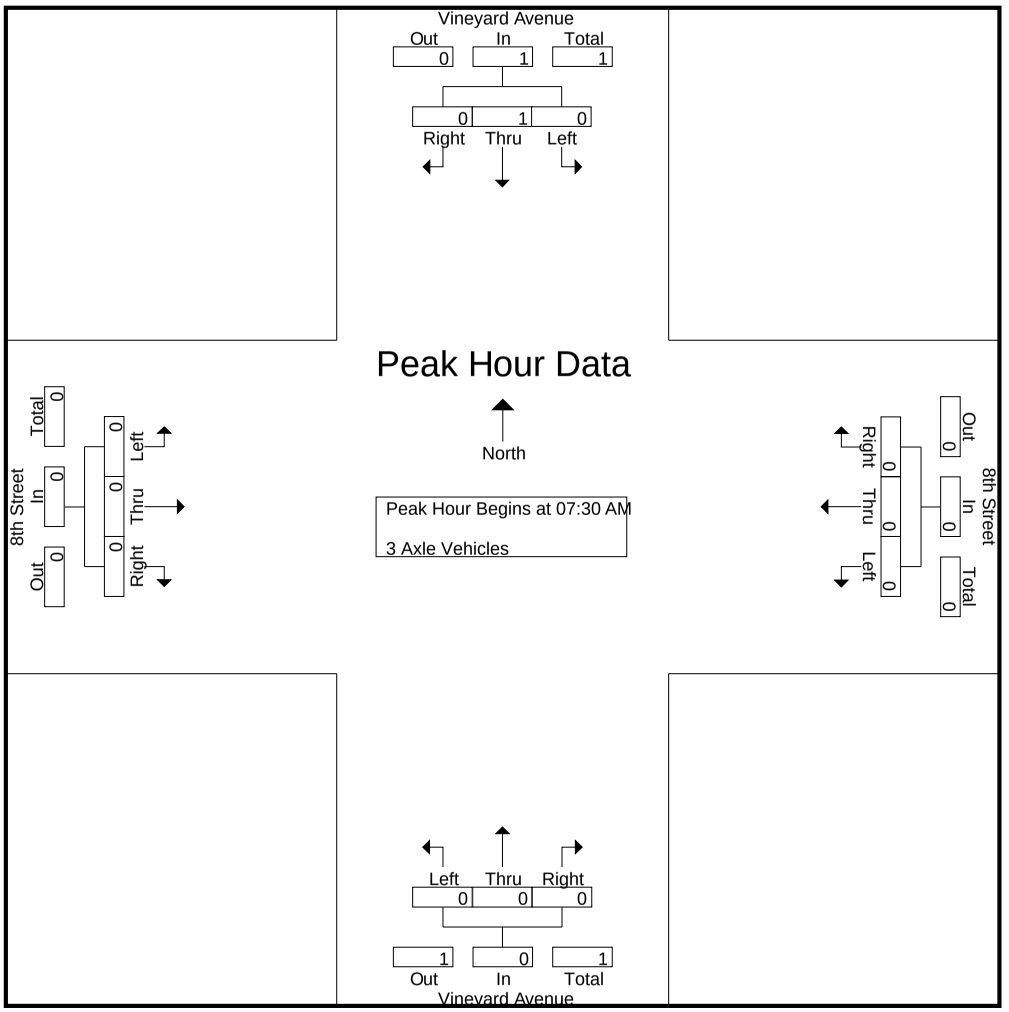
	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	2
07:15 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
07:30 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	1	0	0	0	0	0	2	0	2	0	0	1	1	4
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Grand Total	0	2	0	2	0	0	0	0	0	2	0	2	0	0	1	1	5
Apprch %	0	100	0		0	0	0		0	100	0		0	0	100		
Total %	0	40	0	40	0	0	0	0	0	40	0	40	0	0	20	20	

	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	**1**
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% App. Total	0	100	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

Counts Unlimited
PO Box 1178
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City of Rancho Cucamonga
N/S: Vineyard Avenue
E/W: 8th Street
Weather: Clear

File Name : 01_RNCVI8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	100	0		0	0	0		0	0	0		0	0	0	
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Vineyard Avenue
E/W: 8th Street
Weather: Clear

File Name : 01_RNCVI8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 4+ Axle Trucks

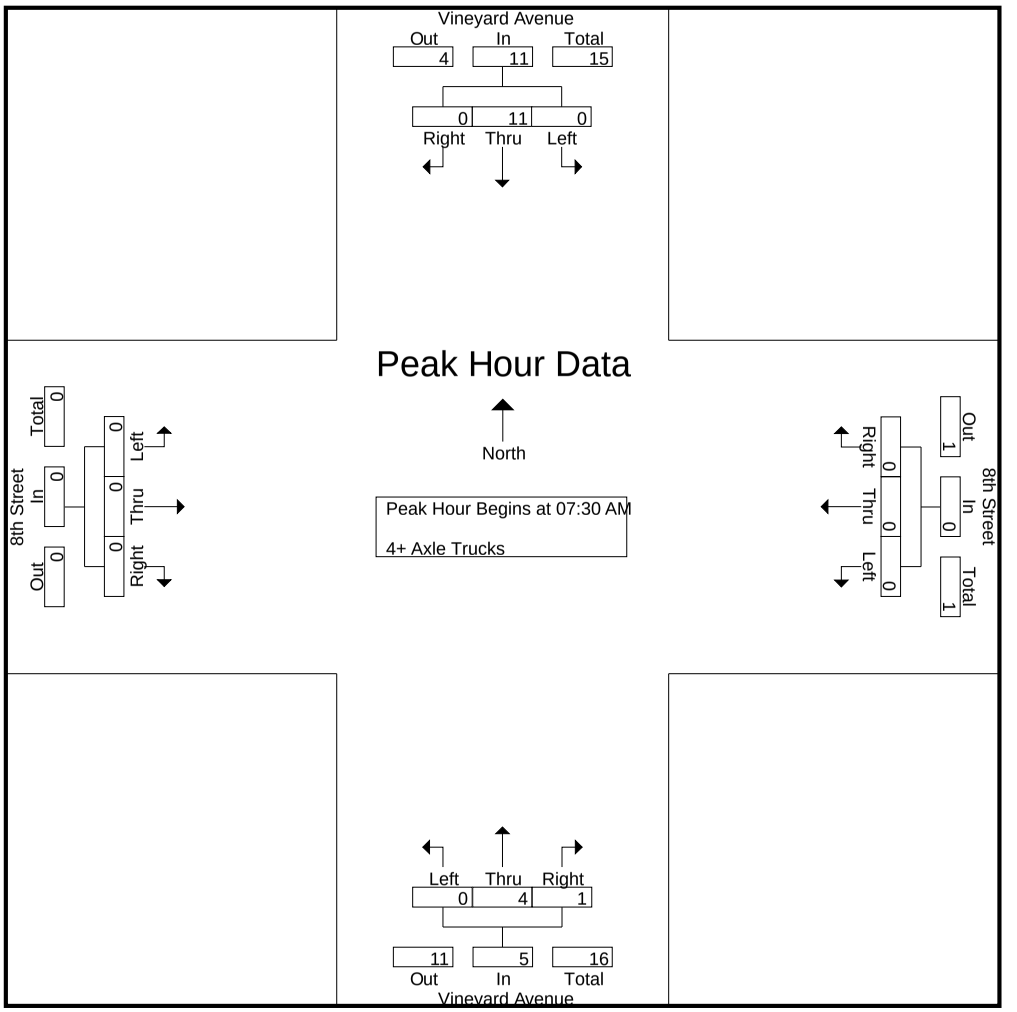
	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	2
07:15 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
07:30 AM	0	5	0	5	0	0	0	0	0	2	0	2	0	0	0	0	7
07:45 AM	0	4	0	4	0	0	0	0	0	1	0	1	0	0	0	0	5
Total	0	10	0	10	1	0	0	1	0	5	0	5	0	0	0	0	16
08:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
08:15 AM	0	2	0	2	0	0	0	0	0	1	0	1	0	0	0	0	3
08:30 AM	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	4
08:45 AM	0	1	0	1	0	0	0	0	0	2	0	2	1	0	0	1	4
Total	0	3	0	3	0	0	0	0	0	7	1	8	1	0	0	1	12
Grand Total	0	13	0	13	1	0	0	1	0	12	1	13	1	0	0	1	28
Apprch %	0	100	0		100	0	0		0	92.3	7.7		100	0	0		
Total %	0	46.4	0	46.4	3.6	0	0	3.6	0	42.9	3.6	46.4	3.6	0	0	3.6	

	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	**5**	0	**5**	0	0	0	0	0	**2**	0	**2**	0	0	0	0	**7**
07:45 AM	0	4	0	4	0	0	0	0	0	1	0	1	0	0	0	0	5
08:00 AM	0	0	0	0	0	0	0	0	0	0	**1**	1	0	0	0	0	1
08:15 AM	0	2	0	2	0	0	0	0	0	1	0	1	0	0	0	0	3
Total Volume	0	11	0	11	0	0	0	0	0	4	1	5	0	0	0	0	16
% App. Total	0	100	0		0	0	0		0	80	20		0	0	0		
PHF	.000	.550	.000	.550	.000	.000	.000	.000	.000	.500	.250	.625	.000	.000	.000	.000	.571

Counts Unlimited
PO Box 1178
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City of Rancho Cucamonga
N/S: Vineyard Avenue
E/W: 8th Street
Weather: Clear

File Name : 01_RNCVI8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	**5**	0	**5**	0	0	0	0	0	**2**	0	**2**	0	0	0	0
+15 mins.	0	4	0	4	0	0	0	0	0	1	0	1	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	**1**	1	0	0	0	0
+45 mins.	0	2	0	2	0	0	0	0	0	1	0	1	0	0	0	0
Total Volume	0	11	0	11	0	0	0	0	0	4	1	5	0	0	0	0
% App. Total	0	100	0		0	0	0		0	80	20		0	0	0	
PHF	.000	.550	.000	.550	.000	.000	.000	.000	.000	.500	.250	.625	.000	.000	.000	.000

Counts Unlimited
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City of Rancho Cucamonga
N/S: Vineyard Avenue
E/W: 8th Street
Weather: Clear

File Name : 01_RNCVI8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

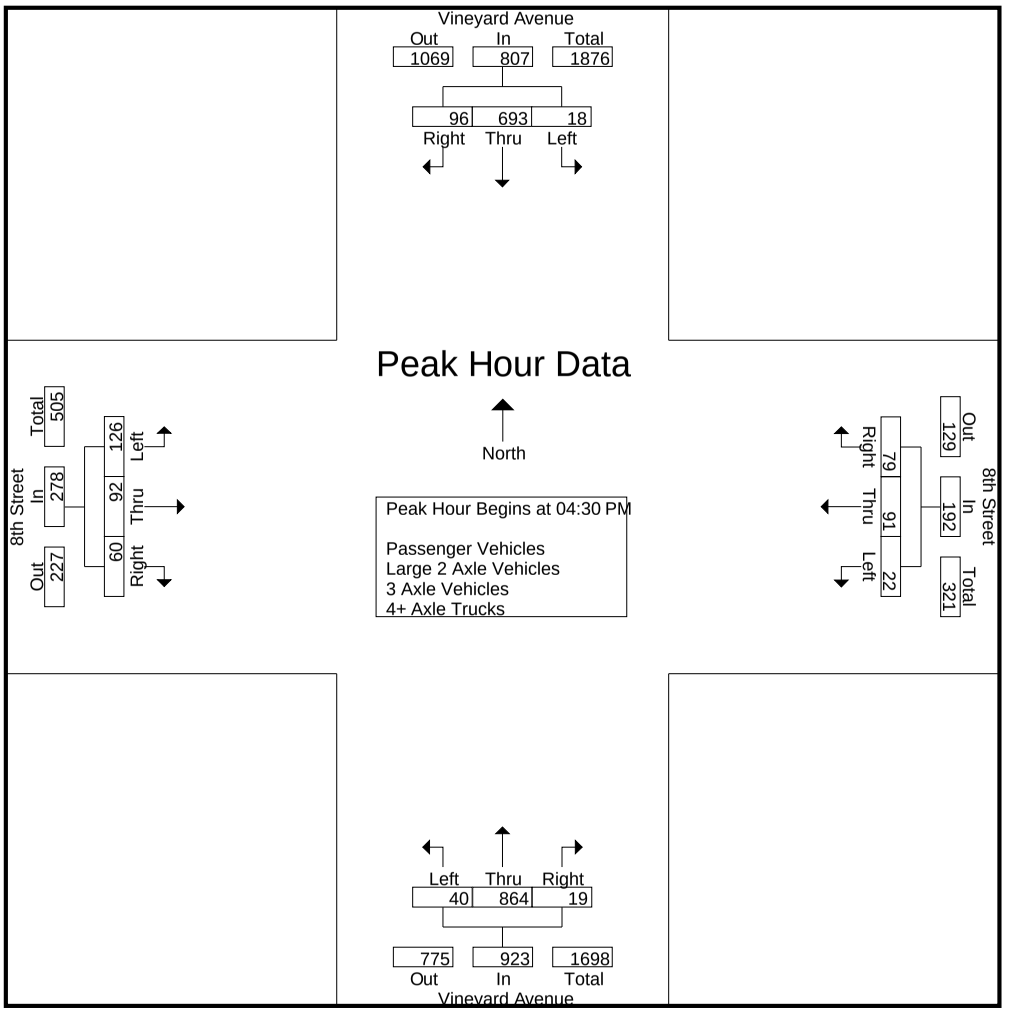
	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	8	155	23	186	2	17	21	40	16	184	2	202	29	17	11	57	485
04:15 PM	4	184	17	205	4	18	15	37	6	198	4	208	37	24	17	78	528
04:30 PM	2	177	21	200	6	25	12	43	9	204	7	220	21	23	15	59	522
04:45 PM	3	159	27	189	3	11	27	41	7	216	8	231	37	21	13	71	532
Total	17	675	88	780	15	71	75	161	38	802	21	861	124	85	56	265	2067
05:00 PM	5	194	25	224	5	35	22	62	12	228	3	243	31	26	14	71	600
05:15 PM	8	163	23	194	8	20	18	46	12	216	1	229	37	22	18	77	546
05:30 PM	4	154	17	175	8	29	12	49	7	185	4	196	30	25	14	69	489
05:45 PM	7	153	23	183	3	21	15	39	8	217	5	230	32	23	18	73	525
Total	24	664	88	776	24	105	67	196	39	846	13	898	130	96	64	290	2160
Grand Total	41	1339	176	1556	39	176	142	357	77	1648	34	1759	254	181	120	555	4227
Apprch %	2.6	86.1	11.3		10.9	49.3	39.8		4.4	93.7	1.9		45.8	32.6	21.6		
Total %	1	31.7	4.2	36.8	0.9	4.2	3.4	8.4	1.8	39	0.8	41.6	6	4.3	2.8	13.1	
Passenger Vehicles	39	1319	174	1532	36	172	137	345	74	1617	32	1723	251	177	120	548	4148
% Passenger Vehicles	95.1	98.5	98.9	98.5	92.3	97.7	96.5	96.6	96.1	98.1	94.1	98	98.8	97.8	100	98.7	98.1
Large 2 Axle Vehicles	2	20	2	24	2	4	5	11	2	24	0	26	2	4	0	6	67
% Large 2 Axle Vehicles	4.9	1.5	1.1	1.5	5.1	2.3	3.5	3.1	2.6	1.5	0	1.5	0.8	2.2	0	1.1	1.6
3 Axle Vehicles	0	0	0	0	0	0	0	0	0	2	1	3	0	0	0	0	3
% 3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0.1	2.9	0.2	0	0	0	0	0.1
4+ Axle Trucks	0	0	0	0	1	0	0	1	1	5	1	7	1	0	0	1	9
% 4+ Axle Trucks	0	0	0	0	2.6	0	0	0.3	1.3	0.3	2.9	0.4	0.4	0	0	0.2	0.2

	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	2	177	21	200	6	25	12	43	9	204	7	220	21	23	15	59	522
04:45 PM	3	159	**27**	189	3	11	**27**	41	7	216	**8**	231	**37**	21	13	71	532
05:00 PM	5	**194**	25	**224**	5	**35**	22	**62**	**12**	**228**	3	**243**	31	**26**	14	71	**600**
05:15 PM	**8**	163	23	194	**8**	20	18	46	12	216	1	229	37	22	**18**	**77**	546
Total Volume	18	693	96	807	22	91	79	192	40	864	19	923	126	92	60	278	2200
% App. Total	2.2	85.9	11.9		11.5	47.4	41.1		4.3	93.6	2.1		45.3	33.1	21.6		
PHF	.563	.893	.889	.901	.688	.650	.731	.774	.833	.947	.594	.950	.851	.885	.833	.903	.917

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City of Rancho Cucamonga
N/S: Vineyard Avenue
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Weather: Clear

File Name : 01_RNCVI8PM
Site Code : 07518233
Start Date : 3/29/2018
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Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM				04:45 PM				04:30 PM				05:00 PM			
+0 mins.	4	184	17	205	3	11	**27**	41	9	204	7	220	31	**26**	14	71
+15 mins.	2	177	21	200	5	**35**	22	**62**	7	216	**8**	231	**37**	22	**18**	**77**
+30 mins.	3	159	**27**	189	**8**	20	18	46	**12**	**228**	3	**243**	30	25	14	69
+45 mins.	**5**	**194**	25	**224**	8	29	12	49	12	216	1	229	32	23	18	73
Total Volume	14	714	90	818	24	95	79	198	40	864	19	923	130	96	64	290
% App. Total	1.7	87.3	11		12.1	48	39.9		4.3	93.6	2.1		44.8	33.1	22.1	
PHF	.700	.920	.833	.913	.750	.679	.731	.798	.833	.947	.594	.950	.878	.923	.889	.942

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Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles

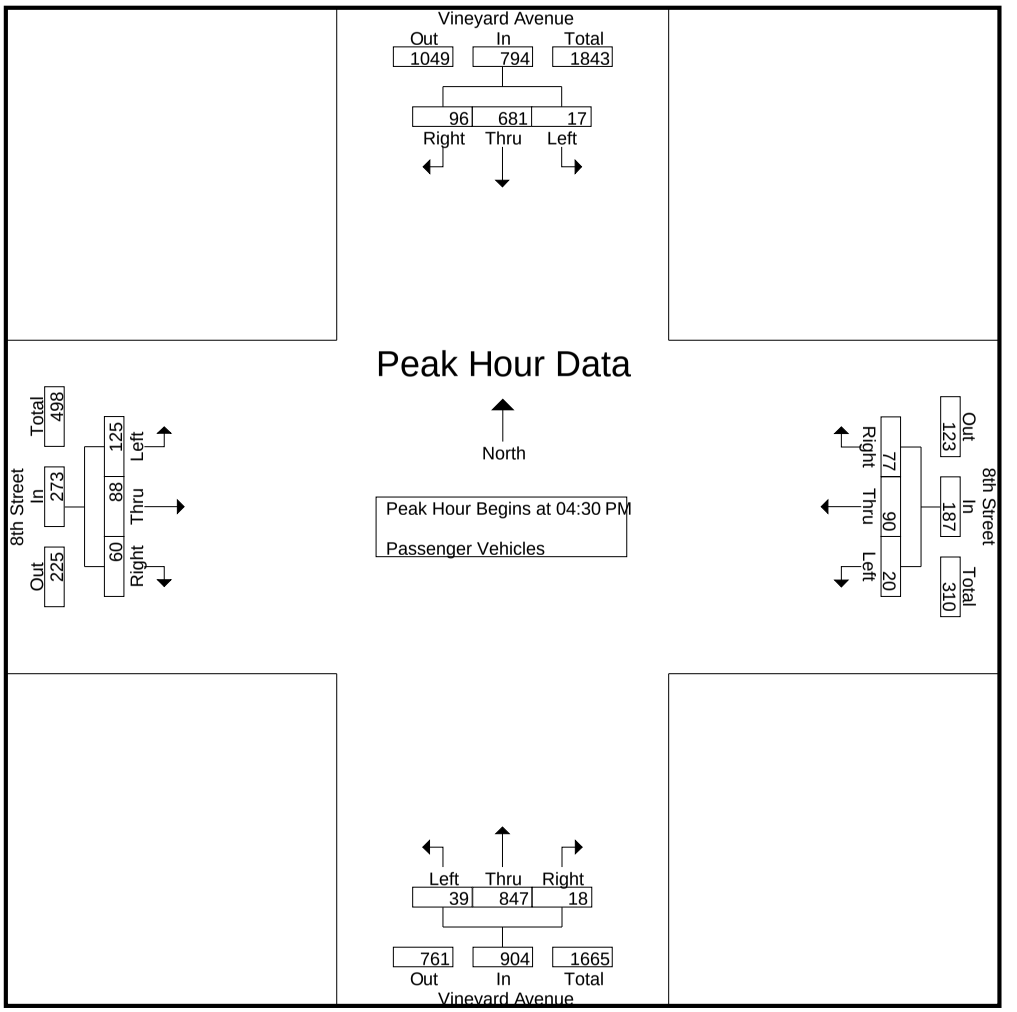
	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	7	154	22	183	2	17	19	38	15	177	2	194	29	17	11	57	472
04:15 PM	4	180	17	201	3	18	14	35	6	195	3	204	36	24	17	77	517
04:30 PM	1	170	21	192	6	25	12	43	8	198	7	213	21	23	15	59	507
04:45 PM	3	157	27	187	3	11	26	40	7	213	7	227	37	19	13	69	523
Total	15	661	87	763	14	71	71	156	36	783	19	838	123	83	56	262	2019
05:00 PM	5	193	25	223	3	35	22	60	12	221	3	236	31	25	14	70	589
05:15 PM	8	161	23	192	8	19	17	44	12	215	1	228	36	21	18	75	539
05:30 PM	4	151	17	172	8	27	12	47	7	183	4	194	29	25	14	68	481
05:45 PM	7	153	22	182	3	20	15	38	7	215	5	227	32	23	18	73	520
Total	24	658	87	769	22	101	66	189	38	834	13	885	128	94	64	286	2129
Grand Total	39	1319	174	1532	36	172	137	345	74	1617	32	1723	251	177	120	548	4148
Apprch %	2.5	86.1	11.4		10.4	49.9	39.7		4.3	93.8	1.9		45.8	32.3	21.9		
Total %	0.9	31.8	4.2	36.9	0.9	4.1	3.3	8.3	1.8	39	0.8	41.5	6.1	4.3	2.9	13.2	

	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	1	170	21	192	6	25	12	43	8	198	**7**	213	21	23	15	59	507
04:45 PM	3	157	**27**	187	3	11	**26**	40	7	213	7	227	**37**	19	13	69	523
05:00 PM	5	**193**	25	**223**	3	**35**	22	**60**	**12**	**221**	3	**236**	31	**25**	14	70	**589**
05:15 PM	**8**	161	23	192	**8**	19	17	44	12	215	1	228	36	21	**18**	**75**	539
Total Volume	17	681	96	794	20	90	77	187	39	847	18	904	125	88	60	273	2158
% App. Total	2.1	85.8	12.1		10.7	48.1	41.2		4.3	93.7	2		45.8	32.2	22		
PHF	.531	.882	.889	.890	.625	.643	.740	.779	.813	.958	.643	.958	.845	.880	.833	.910	.916

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Site Code : 07518233
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Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	1	170	21	192	6	25	12	43	8	198	**7**	213	21	23	15	59
+15 mins.	3	157	**27**	187	3	11	**26**	40	7	213	7	227	**37**	19	13	69
+30 mins.	5	**193**	25	**223**	3	**35**	22	**60**	**12**	**221**	3	**236**	31	**25**	14	70
+45 mins.	**8**	161	23	192	**8**	19	17	44	12	215	1	228	36	21	**18**	**75**
Total Volume	17	681	96	794	20	90	77	187	39	847	18	904	125	88	60	273
% App. Total	2.1	85.8	12.1		10.7	48.1	41.2		4.3	93.7	2		45.8	32.2	22	
PHF	.531	.882	.889	.890	.625	.643	.740	.779	.813	.958	.643	.958	.845	.880	.833	.910

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Start Date : 3/29/2018
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Groups Printed- Large 2 Axle Vehicles

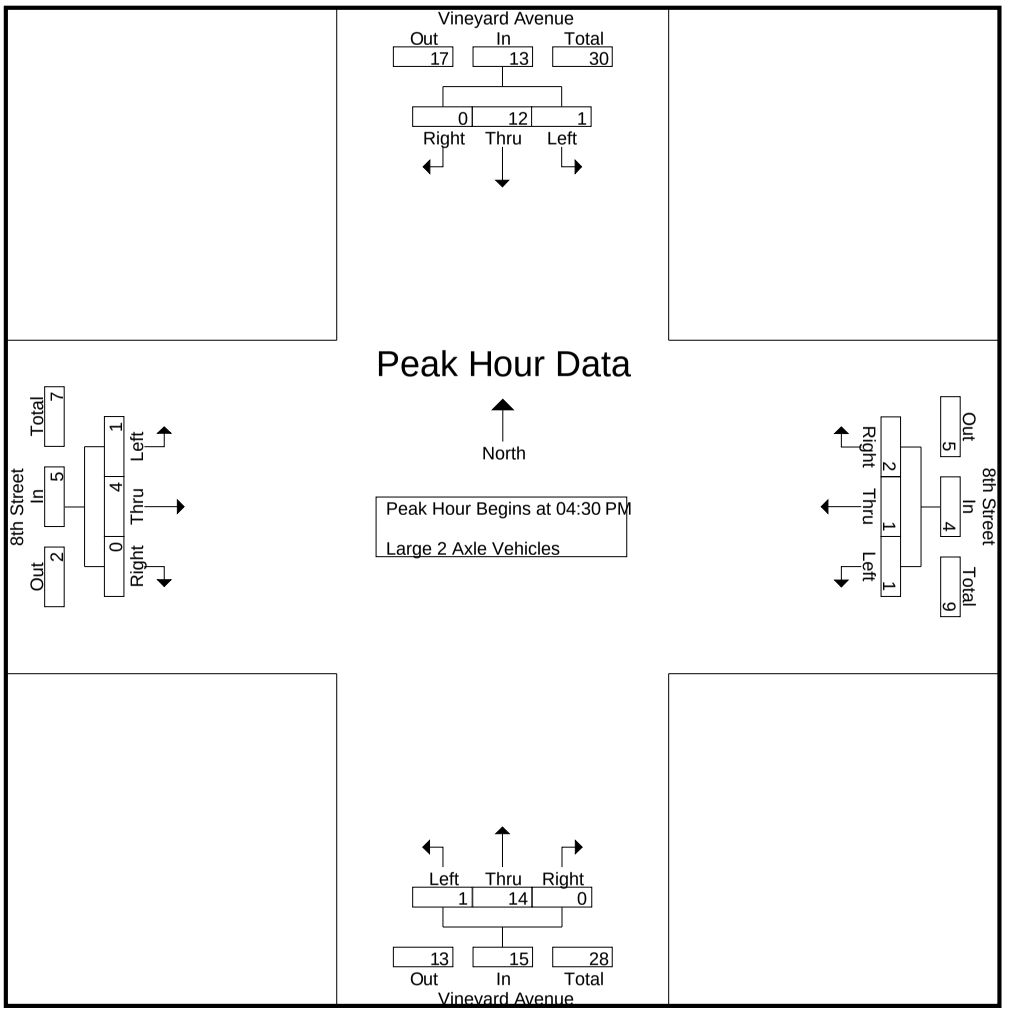
	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	1	1	1	3	0	0	2	2	1	5	0	6	0	0	0	0	11
04:15 PM	0	4	0	4	1	0	1	2	0	2	0	2	0	0	0	0	8
04:30 PM	1	7	0	8	0	0	0	0	1	6	0	7	0	0	0	0	15
04:45 PM	0	2	0	2	0	0	1	1	0	2	0	2	0	2	0	2	7
Total	2	14	1	17	1	0	4	5	2	15	0	17	0	2	0	2	41
05:00 PM	0	1	0	1	1	0	0	1	0	6	0	6	0	1	0	1	9
05:15 PM	0	2	0	2	0	1	1	2	0	0	0	0	1	1	0	2	6
05:30 PM	0	3	0	3	0	2	0	2	0	1	0	1	1	0	0	1	7
05:45 PM	0	0	1	1	0	1	0	1	0	2	0	2	0	0	0	0	4
Total	0	6	1	7	1	4	1	6	0	9	0	9	2	2	0	4	26
Grand Total	2	20	2	24	2	4	5	11	2	24	0	26	2	4	0	6	67
Apprch %	8.3	83.3	8.3		18.2	36.4	45.5		7.7	92.3	0		33.3	66.7	0		
Total %	3	29.9	3	35.8	3	6	7.5	16.4	3	35.8	0	38.8	3	6	0	9	

	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**1**	**7**	0	**8**	0	0	0	0	**1**	**6**	0	**7**	0	0	0	0	**15**
04:45 PM	0	2	0	2	0	0	**1**	1	0	2	0	2	0	**2**	0	**2**	7
05:00 PM	0	1	0	1	**1**	0	0	1	0	6	0	6	0	1	0	1	9
05:15 PM	0	2	0	2	0	**1**	1	**2**	0	0	0	0	**1**	1	0	2	6
Total Volume	1	12	0	13	1	1	2	4	1	14	0	15	1	4	0	5	37
% App. Total	7.7	92.3	0		25	25	50		6.7	93.3	0		20	80	0		
PHF	.250	.429	.000	.406	.250	.250	.500	.500	.250	.583	.000	.536	.250	.500	.000	.625	.617

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Site Code : 07518233
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Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	**1**	**7**	0	**8**	0	0	0	0	**1**	**6**	0	**7**	0	0	0	0
+15 mins.	0	2	0	2	0	0	**1**	1	0	2	0	2	0	**2**	0	**2**
+30 mins.	0	1	0	1	**1**	0	0	1	0	6	0	6	0	1	0	1
+45 mins.	0	2	0	2	0	**1**	1	**2**	0	0	0	0	**1**	1	0	2
Total Volume	1	12	0	13	1	1	2	4	1	14	0	15	1	4	0	5
% App. Total	7.7	92.3	0		25	25	50		6.7	93.3	0		20	80	0	
PHF	.250	.429	.000	.406	.250	.250	.500	.500	.250	.583	.000	.536	.250	.500	.000	.625

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File Name : 01_RNCVI8PM
Site Code : 07518233
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Groups Printed- 3 Axle Vehicles

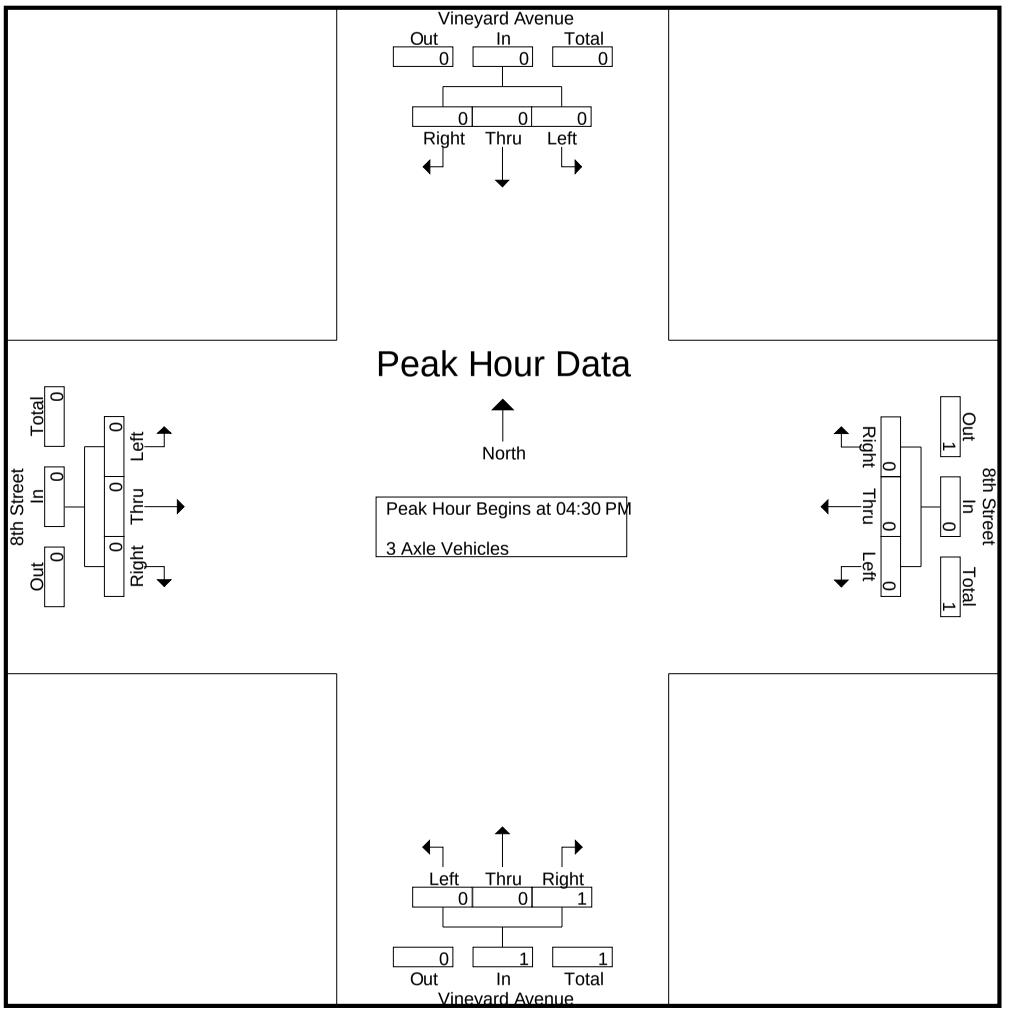
	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Grand Total	0	0	0	0	0	0	0	0	0	2	1	3	0	0	0	0	3
Apprch %	0	0	0		0	0	0		0	66.7	33.3		0	0	0		
Total %	0	0	0	0	0	0	0	0	0	66.7	33.3	100	0	0	0	0	

	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	**1**	**1**	0	0	0	0	**1**
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
% App. Total	0	0	0		0	0	0		0	0	100		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.000	.000	.250

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Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	**1**	**1**	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	100		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.000	.000

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Groups Printed- 4+ Axle Trucks

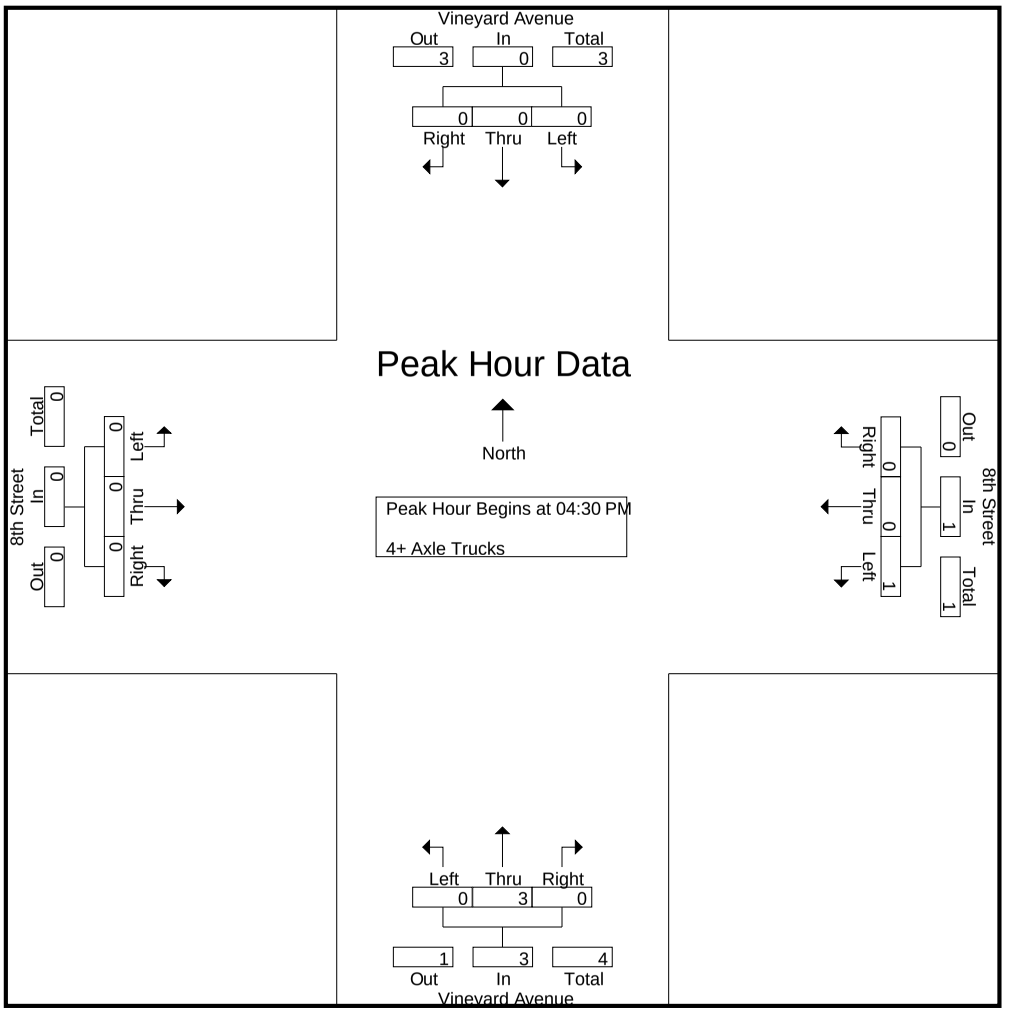
	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	1	1	2	1	0	0	1	3
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	3	1	4	1	0	0	1	5
05:00 PM	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	2
05:15 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
Total	0	0	0	0	1	0	0	1	1	2	0	3	0	0	0	0	4
Grand Total	0	0	0	0	1	0	0	1	1	5	1	7	1	0	0	1	9
Apprch %	0	0	0		100	0	0		14.3	71.4	14.3		100	0	0		
Total %	0	0	0	0	11.1	0	0	11.1	11.1	55.6	11.1	77.8	11.1	0	0	11.1	

	Vineyard Avenue Southbound				8th Street Westbound				Vineyard Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0	1
05:00 PM	0	0	0	0	**1**	0	0	**1**	0	1	0	1	0	0	0	0	**2**
05:15 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Total Volume	0	0	0	0	1	0	0	1	0	3	0	3	0	0	0	0	4
% App. Total	0	0	0		100	0	0		0	100	0		0	0	0		
PHF	.000	.000	.000	.000	.250	.000	.000	.250	.000	.750	.000	.750	.000	.000	.000	.000	.500

Counts Unlimited
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951-268-6268

City of Rancho Cucamonga
N/S: Vineyard Avenue
E/W: 8th Street
Weather: Clear

File Name : 01_RNCVI8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0
+30 mins.	0	0	0	0	**1**	0	0	**1**	0	1	0	1	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Total Volume	0	0	0	0	1	0	0	1	0	3	0	3	0	0	0	0
% App. Total	0	0	0		100	0	0		0	100	0		0	0	0	
PHF	.000	.000	.000	.000	.250	.000	.000	.250	.000	.750	.000	.750	.000	.000	.000	.000

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Corona, CA 92878
951-268-6268

City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARAM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

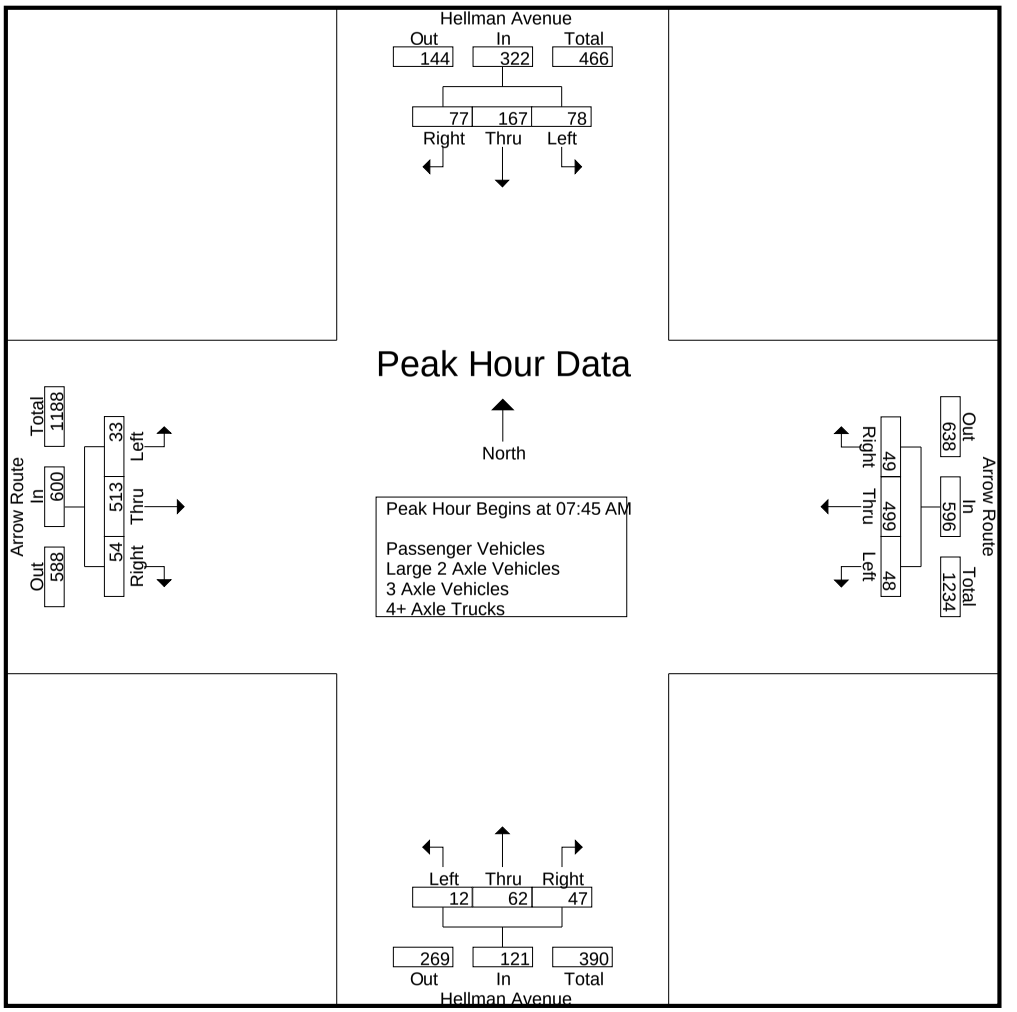
	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	16	25	11	52	6	85	4	95	1	4	7	12	6	86	2	94	253
07:15 AM	16	44	18	78	7	90	4	101	3	16	5	24	8	81	11	100	303
07:30 AM	17	22	12	51	11	121	9	141	1	16	7	24	4	127	12	143	359
07:45 AM	22	59	14	95	10	102	15	127	1	11	9	21	6	157	16	179	422
Total	71	150	55	276	34	398	32	464	6	47	28	81	24	451	41	516	1337
08:00 AM	19	48	14	81	11	136	9	156	1	19	12	32	10	106	19	135	404
08:15 AM	14	38	23	75	16	125	12	153	4	12	13	29	9	125	12	146	403
08:30 AM	23	22	26	71	11	136	13	160	6	20	13	39	8	125	7	140	410
08:45 AM	20	21	13	54	14	131	13	158	9	25	13	47	7	113	9	129	388
Total	76	129	76	281	52	528	47	627	20	76	51	147	34	469	47	550	1605
Grand Total	147	279	131	557	86	926	79	1091	26	123	79	228	58	920	88	1066	2942
Apprch %	26.4	50.1	23.5		7.9	84.9	7.2		11.4	53.9	34.6		5.4	86.3	8.3		
Total %	5	9.5	4.5	18.9	2.9	31.5	2.7	37.1	0.9	4.2	2.7	7.7	2	31.3	3	36.2	
Passenger Vehicles	143	275	130	548	83	905	75	1063	26	100	67	193	57	893	83	1033	2837
% Passenger Vehicles	97.3	98.6	99.2	98.4	96.5	97.7	94.9	97.4	100	81.3	84.8	84.6	98.3	97.1	94.3	96.9	96.4
Large 2 Axle Vehicles	3	3	1	7	1	19	4	24	0	20	9	29	1	24	4	29	89
% Large 2 Axle Vehicles	2	1.1	0.8	1.3	1.2	2.1	5.1	2.2	0	16.3	11.4	12.7	1.7	2.6	4.5	2.7	3
3 Axle Vehicles	1	0	0	1	1	1	0	2	0	3	1	4	0	3	0	3	10
% 3 Axle Vehicles	0.7	0	0	0.2	1.2	0.1	0	0.2	0	2.4	1.3	1.8	0	0.3	0	0.3	0.3
4+ Axle Trucks	0	1	0	1	1	1	0	2	0	0	2	2	0	0	1	1	6
% 4+ Axle Trucks	0	0.4	0	0.2	1.2	0.1	0	0.2	0	0	2.5	0.9	0	0	1.1	0.1	0.2

	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	22	**59**	14	**95**	10	102	**15**	127	1	11	9	21	6	**157**	16	**179**	**422**
08:00 AM	19	48	14	81	11	**136**	9	156	1	19	12	32	**10**	106	**19**	135	404
08:15 AM	14	38	23	75	**16**	125	12	153	4	12	**13**	29	9	125	12	146	403
08:30 AM	**23**	22	**26**	71	11	136	13	**160**	**6**	**20**	13	**39**	8	125	7	140	410
Total Volume	78	167	77	322	48	499	49	596	12	62	47	121	33	513	54	600	1639
% App. Total	24.2	51.9	23.9		8.1	83.7	8.2		9.9	51.2	38.8		5.5	85.5	9		
PHF	.848	.708	.740	.847	.750	.917	.817	.931	.500	.775	.904	.776	.825	.817	.711	.838	.971

Counts Unlimited
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARAM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				08:00 AM				08:00 AM				07:30 AM			
+0 mins.	22	**59**	14	**95**	11	**136**	9	156	1	19	12	32	4	127	12	143
+15 mins.	19	48	14	81	**16**	125	12	153	4	12	**13**	29	6	**157**	16	**179**
+30 mins.	14	38	23	75	11	136	**13**	**160**	6	20	13	39	**10**	106	**19**	135
+45 mins.	**23**	22	**26**	71	14	131	13	158	**9**	**25**	13	**47**	9	125	12	146
Total Volume	78	167	77	322	52	528	47	627	20	76	51	147	29	515	59	603
% App. Total	24.2	51.9	23.9		8.3	84.2	7.5		13.6	51.7	34.7		4.8	85.4	9.8	
PHF	.848	.708	.740	.847	.813	.971	.904	.980	.556	.760	.981	.782	.725	.820	.776	.842

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARAM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles

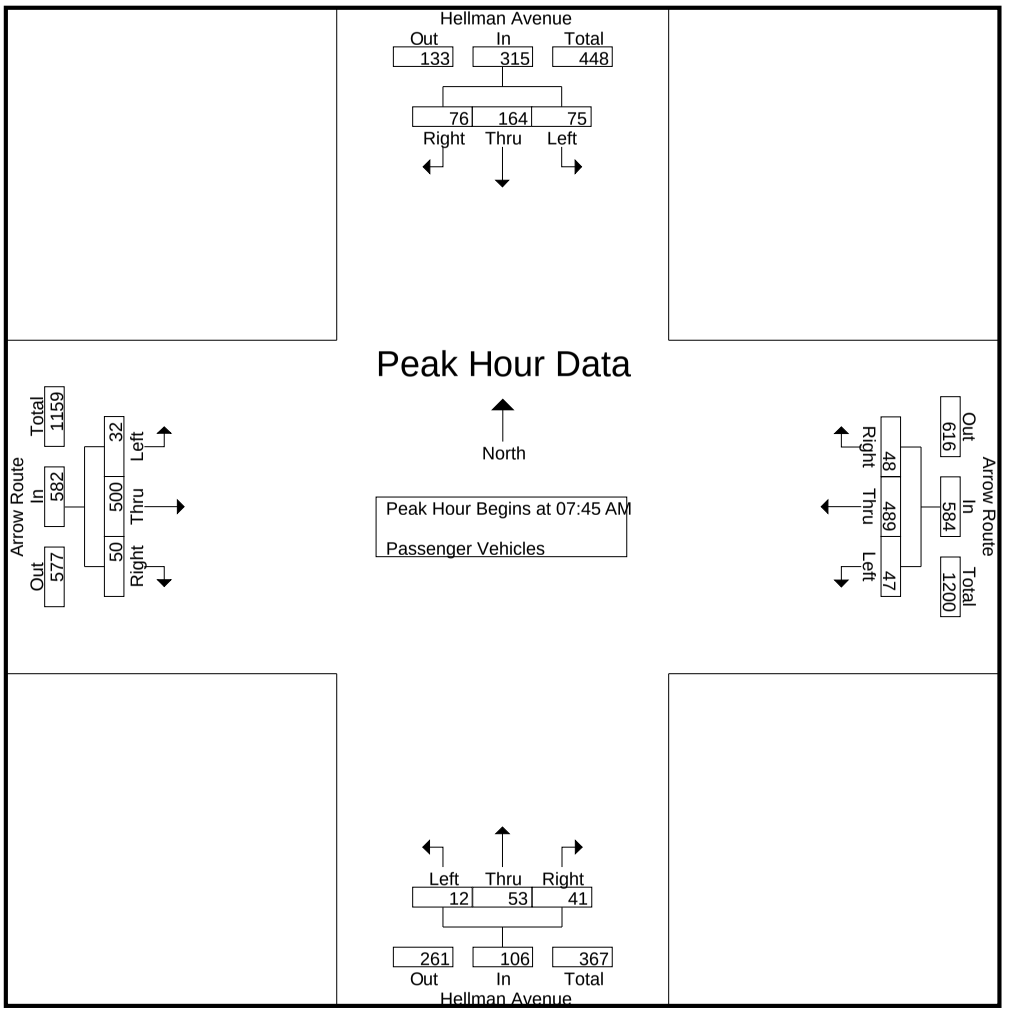
	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	16	25	11	52	6	80	4	90	1	3	4	8	6	83	2	91	241
07:15 AM	16	44	18	78	7	89	2	98	3	10	4	17	8	74	10	92	285
07:30 AM	17	22	12	51	9	118	8	135	1	11	7	19	4	126	12	142	347
07:45 AM	20	58	14	92	10	101	15	126	1	8	7	16	6	155	16	177	411
Total	69	149	55	273	32	388	29	449	6	32	22	60	24	438	40	502	1284
08:00 AM	19	47	14	80	11	131	9	151	1	16	12	29	10	101	19	130	390
08:15 AM	14	37	22	73	16	122	11	149	4	9	12	25	8	123	10	141	388
08:30 AM	22	22	26	70	10	135	13	158	6	20	10	36	8	121	5	134	398
08:45 AM	19	20	13	52	14	129	13	156	9	23	11	43	7	110	9	126	377
Total	74	126	75	275	51	517	46	614	20	68	45	133	33	455	43	531	1553
Grand Total	143	275	130	548	83	905	75	1063	26	100	67	193	57	893	83	1033	2837
Apprch %	26.1	50.2	23.7		7.8	85.1	7.1		13.5	51.8	34.7		5.5	86.4	8		
Total %	5	9.7	4.6	19.3	2.9	31.9	2.6	37.5	0.9	3.5	2.4	6.8	2	31.5	2.9	36.4	

	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	20	**58**	14	**92**	10	101	**15**	126	1	8	7	16	6	**155**	16	**177**	**411**
08:00 AM	19	47	14	80	11	131	9	151	1	16	**12**	29	**10**	101	**19**	130	390
08:15 AM	14	37	22	73	**16**	122	11	149	4	9	12	25	8	123	10	141	388
08:30 AM	**22**	22	**26**	70	10	**135**	13	**158**	**6**	**20**	10	**36**	8	121	5	134	398
Total Volume	75	164	76	315	47	489	48	584	12	53	41	106	32	500	50	582	1587
% App. Total	23.8	52.1	24.1		8	83.7	8.2		11.3	50	38.7		5.5	85.9	8.6		
PHF	.852	.707	.731	.856	.734	.906	.800	.924	.500	.663	.854	.736	.800	.806	.658	.822	.965

Counts Unlimited
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARAM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:45 AM				07:45 AM				07:45 AM			
+0 mins.	20	**58**	14	**92**	10	101	**15**	126	1	8	7	16	6	**155**	16	**177**
+15 mins.	19	47	14	80	11	131	9	151	1	16	**12**	29	**10**	101	**19**	130
+30 mins.	14	37	22	73	**16**	122	11	149	4	9	12	25	8	123	10	141
+45 mins.	**22**	22	**26**	70	10	**135**	13	**158**	**6**	**20**	10	**36**	8	121	5	134
Total Volume	75	164	76	315	47	489	48	584	12	53	41	106	32	500	50	582
% App. Total	23.8	52.1	24.1		8	83.7	8.2		11.3	50	38.7		5.5	85.9	8.6	
PHF	.852	.707	.731	.856	.734	.906	.800	.924	.500	.663	.854	.736	.800	.806	.658	.822

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARAM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Large 2 Axle Vehicles

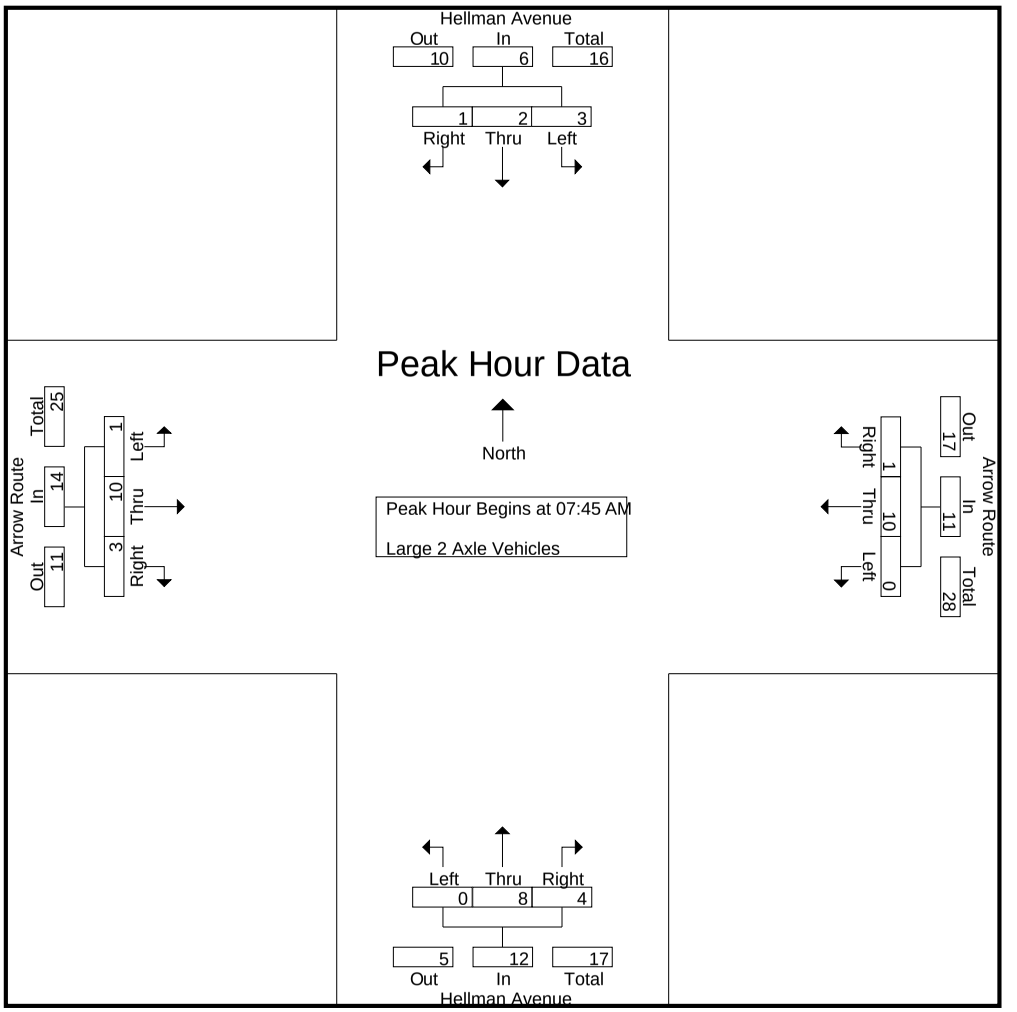
	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	5	0	5	0	1	3	4	0	3	0	3	12
07:15 AM	0	0	0	0	0	1	2	3	0	6	1	7	0	7	1	8	18
07:30 AM	0	0	0	0	1	2	1	4	0	4	0	4	0	1	0	1	9
07:45 AM	2	0	0	2	0	1	0	1	0	2	2	4	0	2	0	2	9
Total	2	0	0	2	1	9	3	13	0	13	6	19	0	13	1	14	48
08:00 AM	0	1	0	1	0	5	0	5	0	3	0	3	0	4	0	4	13
08:15 AM	0	1	1	2	0	3	1	4	0	3	0	3	1	2	2	5	14
08:30 AM	1	0	0	1	0	1	0	1	0	0	2	2	0	2	1	3	7
08:45 AM	0	1	0	1	0	1	0	1	0	1	1	2	0	3	0	3	7
Total	1	3	1	5	0	10	1	11	0	7	3	10	1	11	3	15	41
Grand Total	3	3	1	7	1	19	4	24	0	20	9	29	1	24	4	29	89
Apprch %	42.9	42.9	14.3		4.2	79.2	16.7		0	69	31		3.4	82.8	13.8		
Total %	3.4	3.4	1.1	7.9	1.1	21.3	4.5	27	0	22.5	10.1	32.6	1.1	27	4.5	32.6	

	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	**2**	0	0	**2**	0	1	0	1	0	2	**2**	**4**	0	2	0	2	9
08:00 AM	0	**1**	0	1	0	**5**	0	**5**	0	**3**	0	3	0	**4**	0	4	13
08:15 AM	0	1	**1**	2	0	3	**1**	4	0	3	0	3	**1**	2	**2**	**5**	**14**
08:30 AM	1	0	0	1	0	1	0	1	0	0	2	2	0	2	1	3	7
Total Volume	3	2	1	6	0	10	1	11	0	8	4	12	1	10	3	14	43
% App. Total	50	33.3	16.7		0	90.9	9.1		0	66.7	33.3		7.1	71.4	21.4		
PHF	.375	.500	.250	.750	.000	.500	.250	.550	.000	.667	.500	.750	.250	.625	.375	.700	.768

Counts Unlimited
PO Box 1178
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARAM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:45 AM				07:45 AM				07:45 AM			
+0 mins.	**2**	0	0	**2**	0	1	0	1	0	2	**2**	**4**	0	2	0	2
+15 mins.	0	**1**	0	1	0	**5**	0	**5**	0	**3**	0	3	0	**4**	0	4
+30 mins.	0	1	**1**	2	0	3	**1**	4	0	3	0	3	**1**	2	**2**	**5**
+45 mins.	1	0	0	1	0	1	0	1	0	0	2	2	0	2	1	3
Total Volume	3	2	1	6	0	10	1	11	0	8	4	12	1	10	3	14
% App. Total	50	33.3	16.7		0	90.9	9.1		0	66.7	33.3		7.1	71.4	21.4	
PHF	.375	.500	.250	.750	.000	.500	.250	.550	.000	.667	.500	.750	.250	.625	.375	.700

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARAM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 3 Axle Vehicles

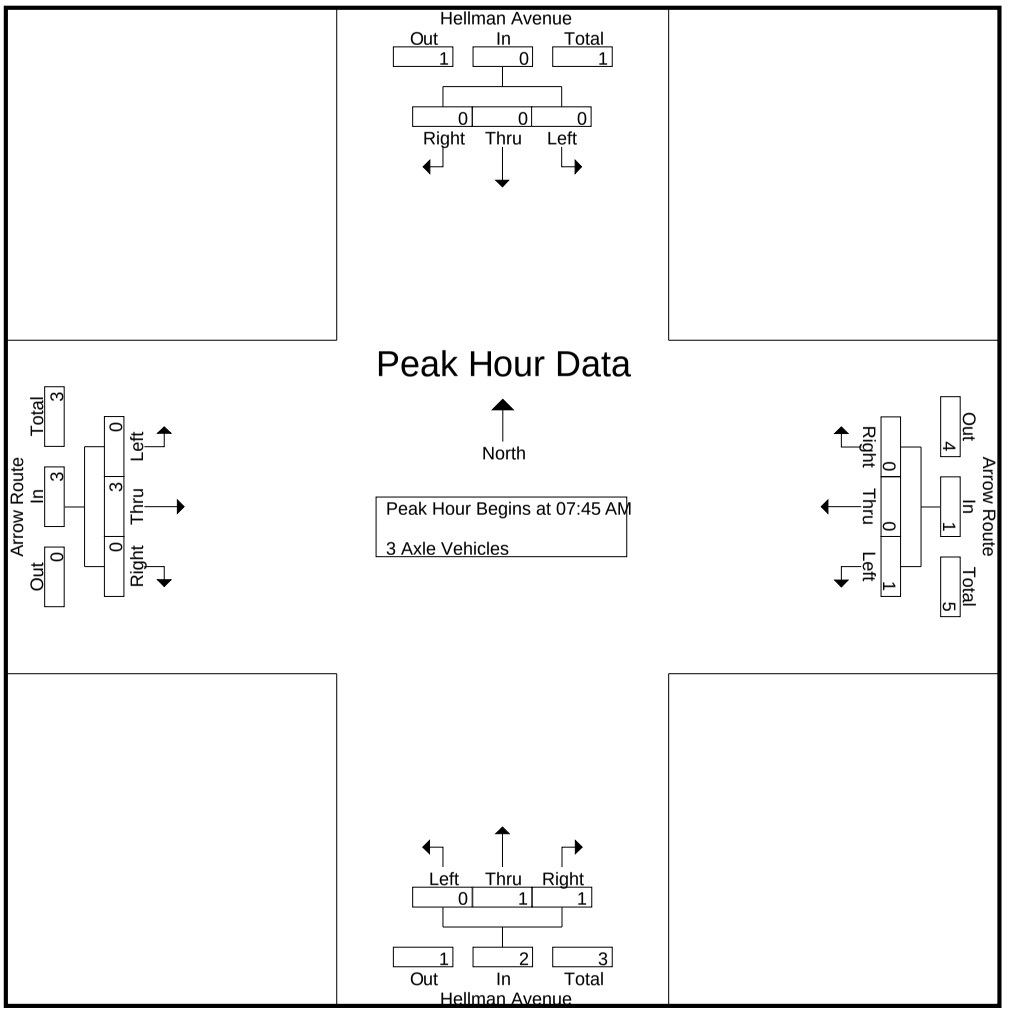
	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	1	0	0	1	0	0	1	1	0	2	0	2	4
08:45 AM	1	0	0	1	0	1	0	1	0	1	0	1	0	0	0	0	3
Total	1	0	0	1	1	1	0	2	0	1	1	2	0	3	0	3	8
Grand Total	1	0	0	1	1	1	0	2	0	3	1	4	0	3	0	3	10
Apprch %	100	0	0		50	50	0		0	75	25		0	100	0		
Total %	10	0	0	10	10	10	0	20	0	30	10	40	0	30	0	30	

	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	**1**	0	0	**1**	0	0	**1**	1	0	**2**	0	**2**	**4**
Total Volume	0	0	0	0	1	0	0	1	0	1	1	2	0	3	0	3	6
% App. Total	0	0	0		100	0	0		0	50	50		0	100	0		
PHF	.000	.000	.000	.000	.250	.000	.000	.250	.000	.250	.250	.500	.000	.375	.000	.375	.375

Counts Unlimited
PO Box 1178
Corona, CA 92878
951-268-6268

City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARAM
Site Code : 07518233
Start Date : 3/29/2018
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Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:45 AM				07:45 AM				07:45 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	**1**	0	0	**1**	0	0	**1**	1	0	**2**	0	**2**
Total Volume	0	0	0	0	1	0	0	1	0	1	1	2	0	3	0	3
% App. Total	0	0	0		100	0	0		0	50	50		0	100	0	
PHF	.000	.000	.000	.000	.250	.000	.000	.250	.000	.250	.250	.500	.000	.375	.000	.375

Counts Unlimited
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARAM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 4+ Axle Trucks

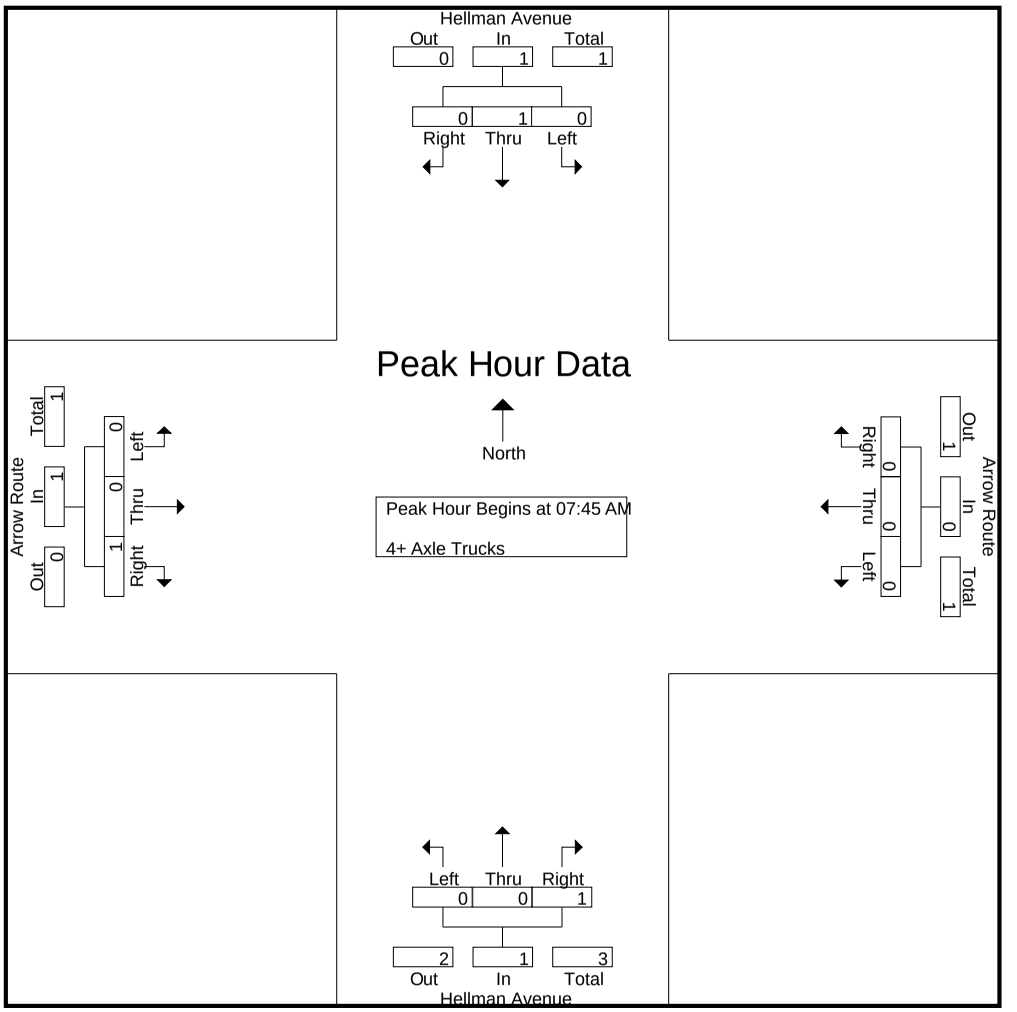
	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	2
07:45 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	1	0	1	1	1	0	2	0	0	0	0	0	0	0	0	3
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	2	2	0	0	1	1	3
Grand Total	0	1	0	1	1	1	0	2	0	0	2	2	0	0	1	1	6
Apprch %	0	100	0		50	50	0		0	0	100		0	0	100		
Total %	0	16.7	0	16.7	16.7	16.7	0	33.3	0	0	33.3	33.3	0	0	16.7	16.7	

	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	**1**
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	**1**	**1**	0	0	0	0	1
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**	1
Total Volume	0	1	0	1	0	0	0	0	0	0	1	1	0	0	1	1	3
% App. Total	0	100	0		0	0	0		0	0	100		0	0	100		
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.250	.250	.750

Counts Unlimited
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARAM
Site Code : 07518233
Start Date : 3/29/2018
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Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:45 AM				07:45 AM				07:45 AM			
+0 mins.	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	**1**	**1**	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**
Total Volume	0	1	0	1	0	0	0	0	0	0	1	1	0	0	1	1
% App. Total	0	100	0		0	0	0		0	0	100		0	0	100	
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.250	.250

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARPM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

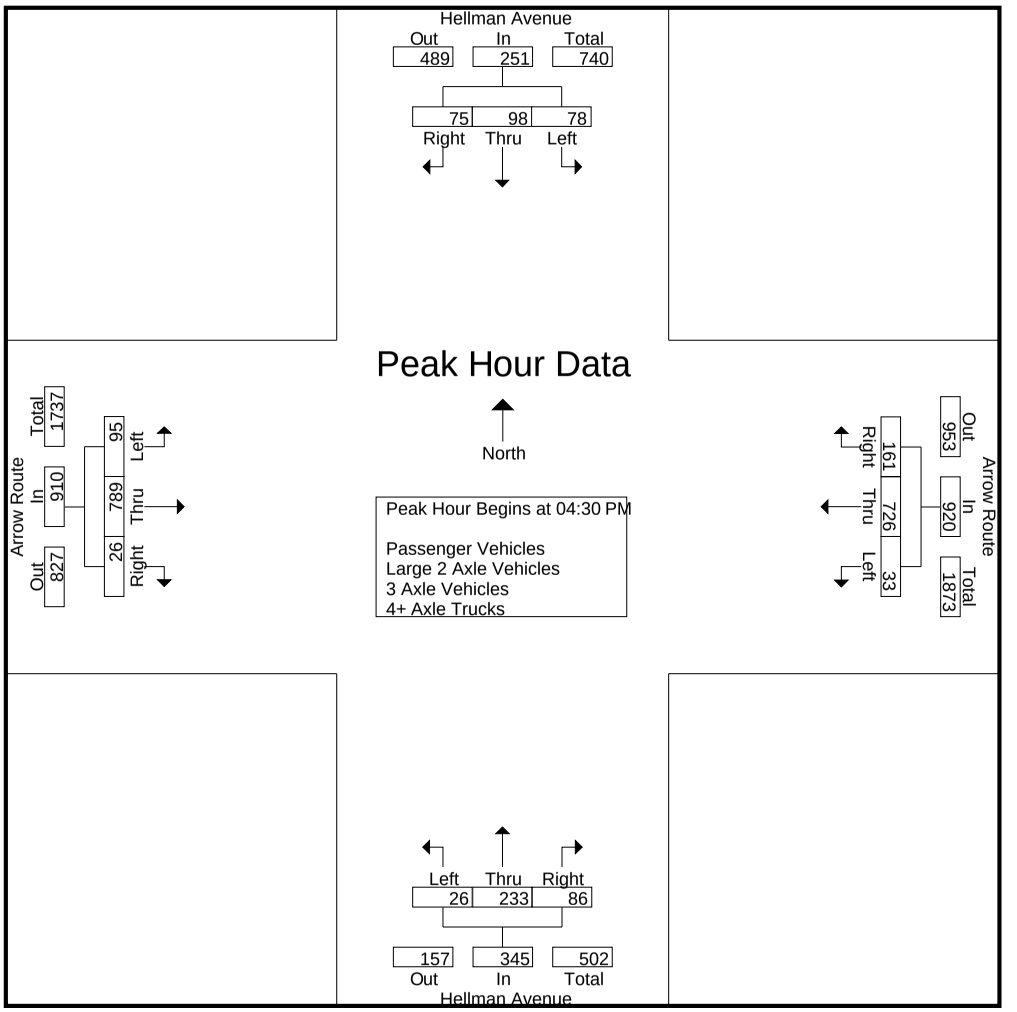
	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	18	22	18	58	18	147	43	208	4	44	21	69	17	142	8	167	502
04:15 PM	15	24	15	54	8	143	23	174	7	35	22	64	21	192	2	215	507
04:30 PM	17	28	18	63	8	168	38	214	5	61	27	93	15	176	12	203	573
04:45 PM	18	25	17	60	14	162	33	209	3	61	22	86	27	181	4	212	567
Total	68	99	68	235	48	620	137	805	19	201	92	312	80	691	26	797	2149
05:00 PM	22	23	22	67	2	197	51	250	12	49	17	78	28	208	4	240	635
05:15 PM	21	22	18	61	9	199	39	247	6	62	20	88	25	224	6	255	651
05:30 PM	20	28	15	63	0	144	35	179	4	40	16	60	33	214	6	253	555
05:45 PM	19	25	15	59	4	167	36	207	11	41	14	66	30	181	4	215	547
Total	82	98	70	250	15	707	161	883	33	192	67	292	116	827	20	963	2388
Grand Total	150	197	138	485	63	1327	298	1688	52	393	159	604	196	1518	46	1760	4537
Apprch %	30.9	40.6	28.5		3.7	78.6	17.7		8.6	65.1	26.3		11.1	86.2	2.6		
Total %	3.3	4.3	3	10.7	1.4	29.2	6.6	37.2	1.1	8.7	3.5	13.3	4.3	33.5	1	38.8	
Passenger Vehicles	147	189	137	473	59	1313	297	1669	52	390	155	597	191	1472	43	1706	4445
% Passenger Vehicles	98	95.9	99.3	97.5	93.7	98.9	99.7	98.9	100	99.2	97.5	98.8	97.4	97	93.5	96.9	98
Large 2 Axle Vehicles	3	8	1	12	4	13	1	18	0	3	2	5	5	28	3	36	71
% Large 2 Axle Vehicles	2	4.1	0.7	2.5	6.3	1	0.3	1.1	0	0.8	1.3	0.8	2.6	1.8	6.5	2	1.6
3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	1	1	0	16	0	16	17
% 3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	0.6	0.2	0	1.1	0	0.9	0.4
4+ Axle Trucks	0	0	0	0	0	1	0	1	0	0	1	1	0	2	0	2	4
% 4+ Axle Trucks	0	0	0	0	0	0.1	0	0.1	0	0	0.6	0.2	0	0.1	0	0.1	0.1

	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	17	**28**	18	63	8	168	38	214	5	61	**27**	**93**	15	176	**12**	203	573
04:45 PM	18	25	17	60	**14**	162	33	209	3	61	22	86	27	181	4	212	567
05:00 PM	**22**	23	**22**	**67**	2	197	**51**	**250**	**12**	49	17	78	**28**	208	4	240	635
05:15 PM	21	22	18	61	9	**199**	39	247	6	**62**	20	88	25	**224**	6	**255**	**651**
Total Volume	78	98	75	251	33	726	161	920	26	233	86	345	95	789	26	910	2426
% App. Total	31.1	39	29.9		3.6	78.9	17.5		7.5	67.5	24.9		10.4	86.7	2.9		
PHF	.886	.875	.852	.937	.589	.912	.789	.920	.542	.940	.796	.927	.848	.881	.542	.892	.932

Counts Unlimited
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARPM
Site Code : 07518233
Start Date : 3/29/2018
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Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				05:00 PM			
+0 mins.	17	**28**	18	63	8	168	38	214	5	61	**27**	**93**	28	208	4	240
+15 mins.	18	25	17	60	**14**	162	33	209	3	61	22	86	25	**224**	**6**	**255**
+30 mins.	**22**	23	**22**	**67**	2	197	**51**	**250**	**12**	49	17	78	**33**	214	6	253
+45 mins.	21	22	18	61	9	**199**	39	247	6	**62**	20	88	30	181	4	215
Total Volume	78	98	75	251	33	726	161	920	26	233	86	345	116	827	20	963
% App. Total	31.1	39	29.9		3.6	78.9	17.5		7.5	67.5	24.9		12	85.9	2.1	
PHF	.886	.875	.852	.937	.589	.912	.789	.920	.542	.940	.796	.927	.879	.923	.833	.944

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City of Rancho Cucamonga
N/S: Hellman Avenue
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File Name : 02_RNCHEARPM
Site Code : 07518233
Start Date : 3/29/2018
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Groups Printed- Passenger Vehicles

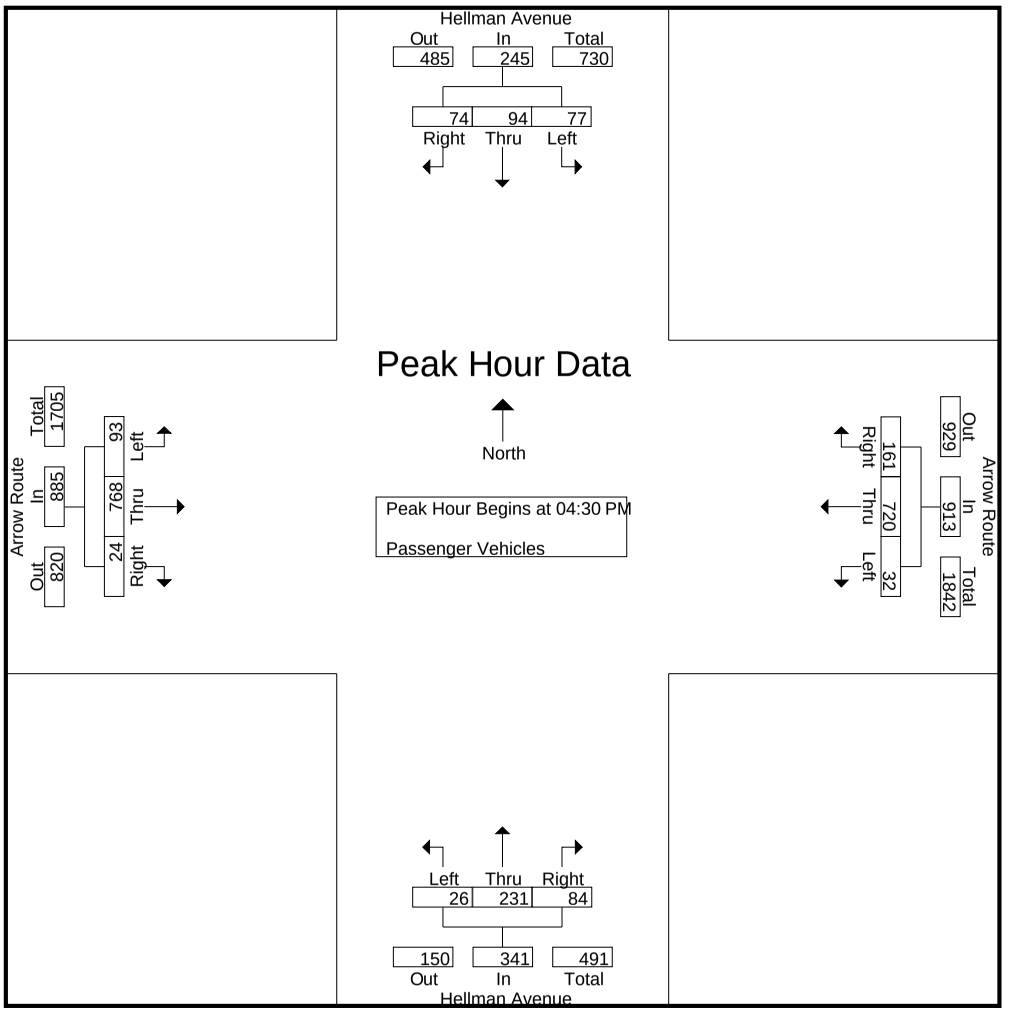
	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	17	21	18	56	16	145	43	204	4	44	20	68	16	140	7	163	491
04:15 PM	14	22	15	51	8	140	22	170	7	35	21	63	21	180	2	203	487
04:30 PM	16	27	17	60	8	165	38	211	5	60	27	92	15	173	10	198	561
04:45 PM	18	23	17	58	14	161	33	208	3	61	22	86	27	174	4	205	557
Total	65	93	67	225	46	611	136	793	19	200	90	309	79	667	23	769	2096
05:00 PM	22	22	22	66	2	195	51	248	12	48	16	76	28	201	4	233	623
05:15 PM	21	22	18	61	8	199	39	246	6	62	19	87	23	220	6	249	643
05:30 PM	20	27	15	62	0	144	35	179	4	39	16	59	33	206	6	245	545
05:45 PM	19	25	15	59	3	164	36	203	11	41	14	66	28	178	4	210	538
Total	82	96	70	248	13	702	161	876	33	190	65	288	112	805	20	937	2349
Grand Total	147	189	137	473	59	1313	297	1669	52	390	155	597	191	1472	43	1706	4445
Apprch %	31.1	40	29		3.5	78.7	17.8		8.7	65.3	26		11.2	86.3	2.5		
Total %	3.3	4.3	3.1	10.6	1.3	29.5	6.7	37.5	1.2	8.8	3.5	13.4	4.3	33.1	1	38.4	

	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	16	**27**	17	60	8	165	38	211	5	60	**27**	**92**	15	173	**10**	198	561
04:45 PM	18	23	17	58	**14**	161	33	208	3	61	22	86	27	174	4	205	557
05:00 PM	**22**	22	**22**	**66**	2	195	**51**	**248**	**12**	48	16	76	**28**	201	4	233	623
05:15 PM	21	22	18	61	8	**199**	39	246	6	**62**	19	87	23	**220**	6	**249**	**643**
Total Volume	77	94	74	245	32	720	161	913	26	231	84	341	93	768	24	885	2384
% App. Total	31.4	38.4	30.2		3.5	78.9	17.6		7.6	67.7	24.6		10.5	86.8	2.7		
PHF	.875	.870	.841	.928	.571	.905	.789	.920	.542	.931	.778	.927	.830	.873	.600	.889	.927

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City of Rancho Cucamonga
N/S: Hellman Avenue
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Weather: Clear

File Name : 02_RNCHEARPM
Site Code : 07518233
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Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	16	**27**	17	60	8	165	38	211	5	60	**27**	**92**	15	173	**10**	198
+15 mins.	18	23	17	58	**14**	161	33	208	3	61	22	86	27	174	4	205
+30 mins.	**22**	22	**22**	**66**	2	195	**51**	**248**	**12**	48	16	76	**28**	201	4	233
+45 mins.	21	22	18	61	8	**199**	39	246	6	**62**	19	87	23	**220**	6	**249**
Total Volume	77	94	74	245	32	720	161	913	26	231	84	341	93	768	24	885
% App. Total	31.4	38.4	30.2		3.5	78.9	17.6		7.6	67.7	24.6		10.5	86.8	2.7	
PHF	.875	.870	.841	.928	.571	.905	.789	.920	.542	.931	.778	.927	.830	.873	.600	.889

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City of Rancho Cucamonga
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File Name : 02_RNCHEARPM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Large 2 Axle Vehicles

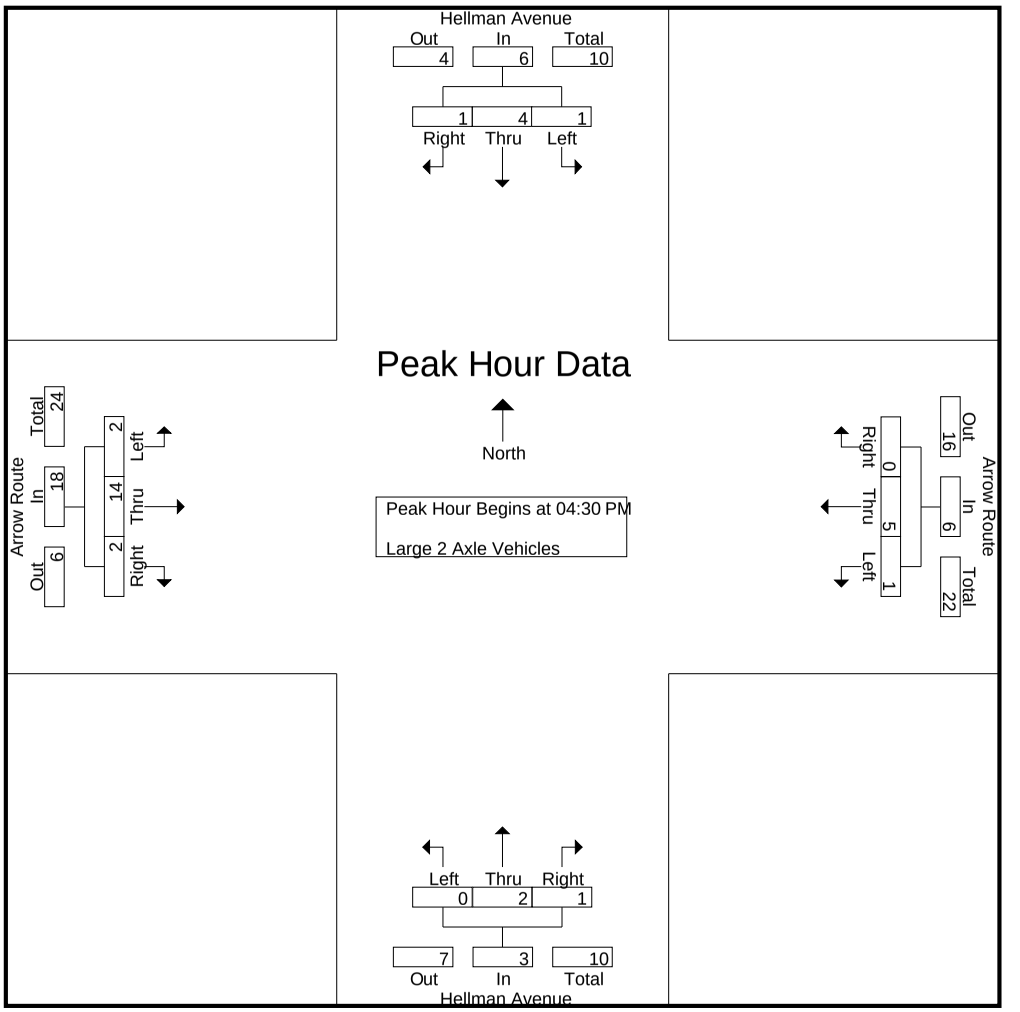
	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	1	1	0	2	2	2	0	4	0	0	1	1	1	1	1	3	10
04:15 PM	1	2	0	3	0	3	1	4	0	0	0	0	0	7	0	7	14
04:30 PM	1	1	1	3	0	2	0	2	0	1	0	1	0	3	2	5	11
04:45 PM	0	2	0	2	0	1	0	1	0	0	0	0	0	3	0	3	6
Total	3	6	1	10	2	8	1	11	0	1	1	2	1	14	3	18	41
05:00 PM	0	1	0	1	0	2	0	2	0	1	0	1	0	5	0	5	9
05:15 PM	0	0	0	0	1	0	0	1	0	0	1	1	2	3	0	5	7
05:30 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	3	0	3	5
05:45 PM	0	0	0	0	1	3	0	4	0	0	0	0	2	3	0	5	9
Total	0	2	0	2	2	5	0	7	0	2	1	3	4	14	0	18	30
Grand Total	3	8	1	12	4	13	1	18	0	3	2	5	5	28	3	36	71
Apprch %	25	66.7	8.3		22.2	72.2	5.6		0	60	40		13.9	77.8	8.3		
Total %	4.2	11.3	1.4	16.9	5.6	18.3	1.4	25.4	0	4.2	2.8	7	7	39.4	4.2	50.7	

	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**1**	1	**1**	**3**	0	**2**	0	**2**	0	**1**	0	**1**	0	3	**2**	**5**	**11**
04:45 PM	0	**2**	0	2	0	1	0	1	0	0	0	0	0	3	0	3	6
05:00 PM	0	1	0	1	0	2	0	2	0	1	0	1	0	**5**	0	5	9
05:15 PM	0	0	0	0	**1**	0	0	1	0	0	**1**	1	**2**	3	0	5	7
Total Volume	1	4	1	6	1	5	0	6	0	2	1	3	2	14	2	18	33
% App. Total	16.7	66.7	16.7		16.7	83.3	0		0	66.7	33.3		11.1	77.8	11.1		
PHF	.250	.500	.250	.500	.250	.625	.000	.750	.000	.500	.250	.750	.250	.700	.250	.900	.750

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City of Rancho Cucamonga
N/S: Hellman Avenue
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File Name : 02_RNCHEARPM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	**1**	1	**1**	**3**	0	**2**	0	**2**	0	**1**	0	**1**	0	3	**2**	**5**
+15 mins.	0	**2**	0	2	0	1	0	1	0	0	0	0	0	3	0	3
+30 mins.	0	1	0	1	0	2	0	2	0	1	0	1	0	**5**	0	5
+45 mins.	0	0	0	0	**1**	0	0	1	0	0	**1**	1	**2**	3	0	5
Total Volume	1	4	1	6	1	5	0	6	0	2	1	3	2	14	2	18
% App. Total	16.7	66.7	16.7		16.7	83.3	0		0	66.7	33.3		11.1	77.8	11.1	
PHF	.250	.500	.250	.500	.250	.625	.000	.750	.000	.500	.250	.750	.250	.700	.250	.900

Counts Unlimited
PO Box 1178
Corona, CA 92878
951-268-6268

City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARPM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 3 Axle Vehicles

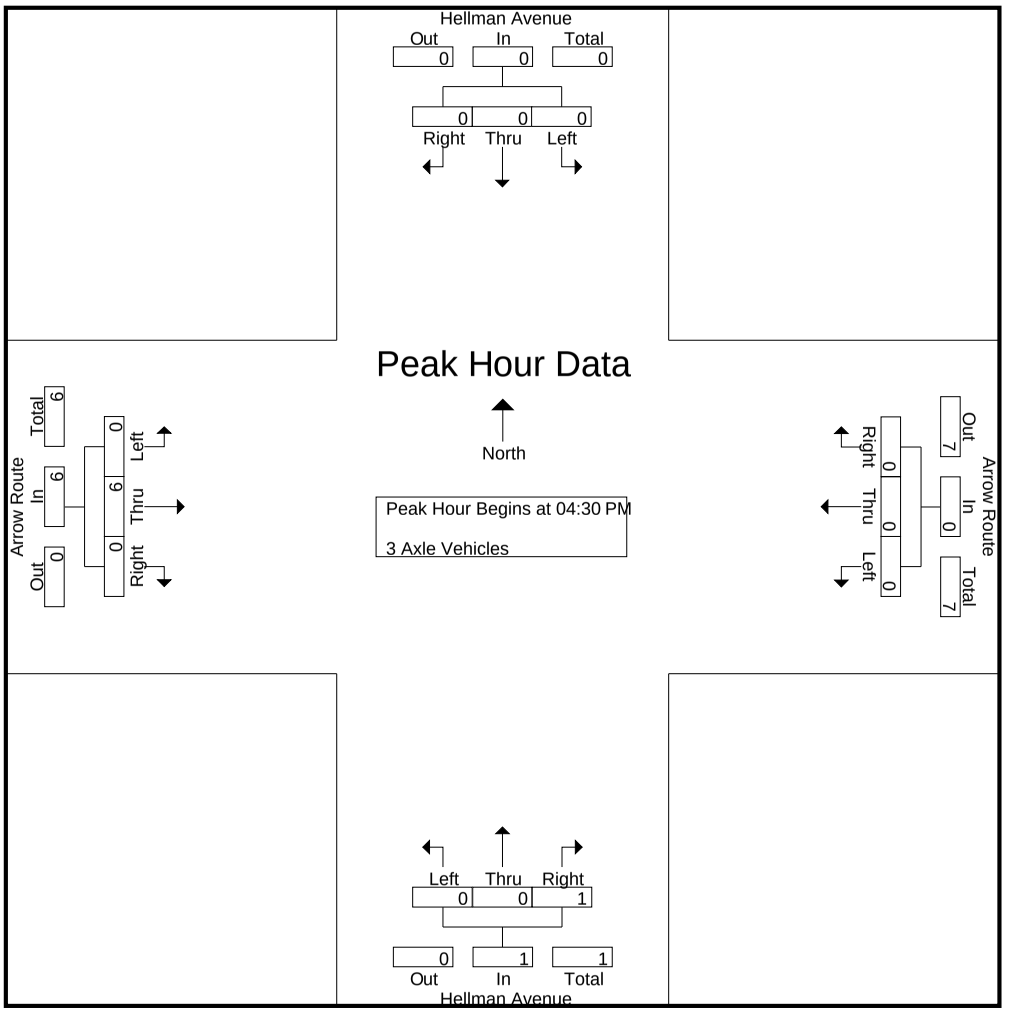
	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	4
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	4
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	9	9
05:00 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	2
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	5
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	1	1	0	7	0	7	8
Grand Total	0	0	0	0	0	0	0	0	0	0	1	1	0	16	0	16	17
Apprch %	0	0	0		0	0	0		0	0	100		0	100	0		
Total %	0	0	0	0	0	0	0	0	0	0	5.9	5.9	0	94.1	0	94.1	

	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**	0	**4**	**4**
05:00 PM	0	0	0	0	0	0	0	0	0	0	**1**	**1**	0	1	0	1	2
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total Volume	0	0	0	0	0	0	0	0	0	0	1	1	0	6	0	6	7
% App. Total	0	0	0		0	0	0		0	0	100		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.375	.000	.375	.438

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARPM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**	0	**4**
+30 mins.	0	0	0	0	0	0	0	0	0	0	**1**	**1**	0	1	0	1
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total Volume	0	0	0	0	0	0	0	0	0	0	1	1	0	6	0	6
% App. Total	0	0	0		0	0	0		0	0	100		0	100	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.375	.000	.375

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARPM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 4+ Axle Trucks

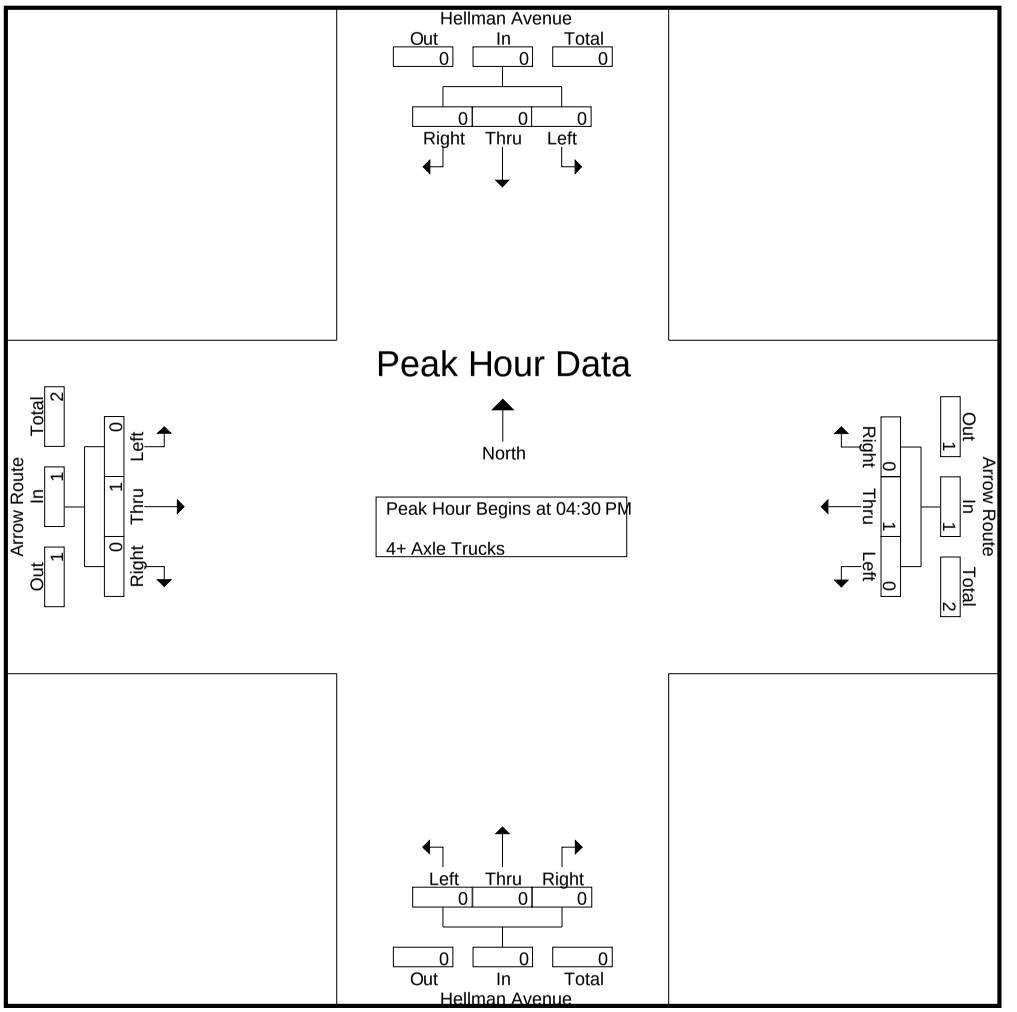
	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	2
04:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	1	0	0	1	1	0	1	0	1	3
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Grand Total	0	0	0	0	0	1	0	1	0	0	1	1	0	2	0	2	4
Apprch %	0	0	0		0	100	0		0	0	100		0	100	0		
Total %	0	0	0	0	0	25	0	25	0	0	25	25	0	50	0	50	

	Hellman Avenue Southbound				Arrow Route Westbound				Hellman Avenue Northbound				Arrow Route Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	**1**
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.000	.250	.500

Counts Unlimited
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: Arrow Route
Weather: Clear

File Name : 02_RNCHEARPM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0	
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.000	.250

Counts Unlimited
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

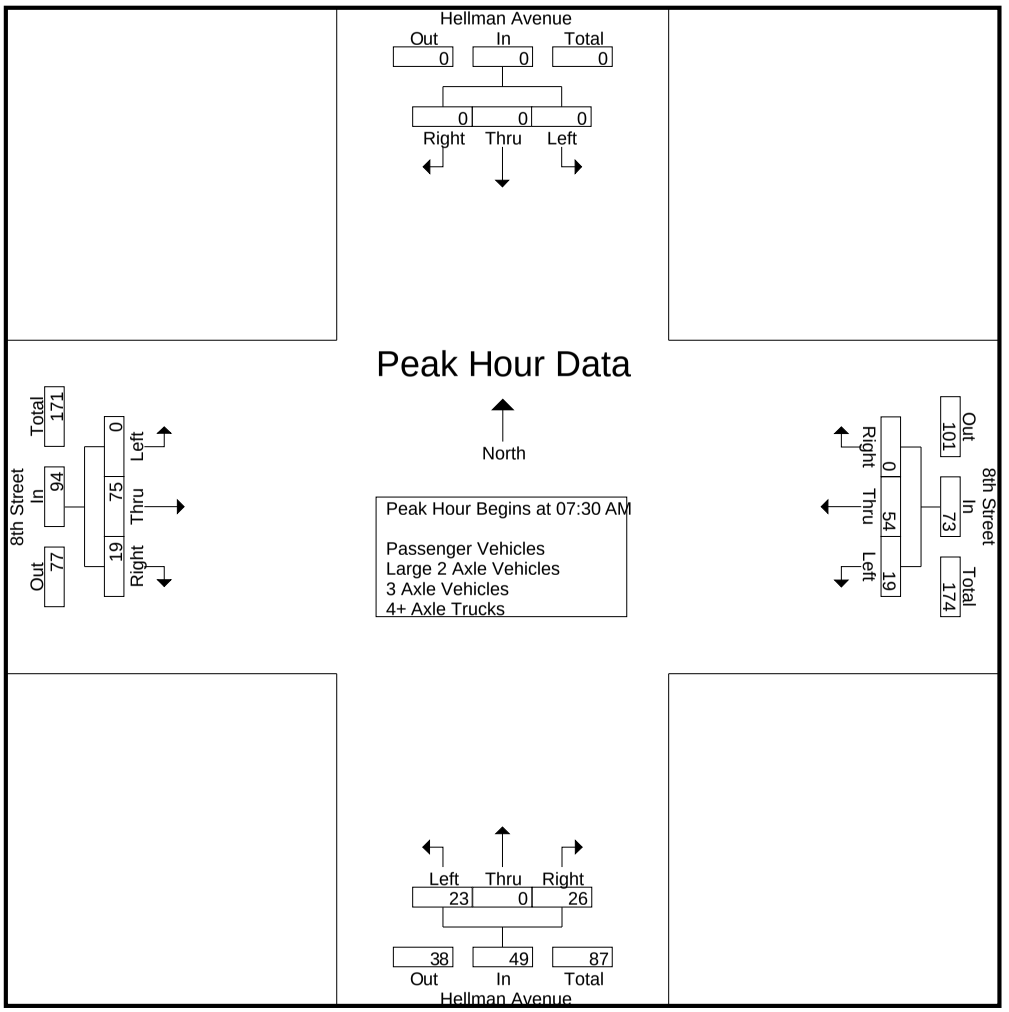
	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	3	4	0	7	1	0	2	3	0	7	2	9	19
07:15 AM	0	0	0	0	9	6	0	15	3	0	7	10	0	13	3	16	41
07:30 AM	0	0	0	0	8	14	0	22	1	0	6	7	0	17	4	21	50
07:45 AM	0	0	0	0	4	9	0	13	3	0	13	16	0	27	4	31	60
Total	0	0	0	0	24	33	0	57	8	0	28	36	0	64	13	77	170
08:00 AM	0	0	0	0	5	11	0	16	12	0	4	16	0	12	3	15	47
08:15 AM	0	0	0	0	2	20	0	22	7	0	3	10	0	19	8	27	59
08:30 AM	0	0	0	0	3	13	0	16	3	0	4	7	0	18	9	27	50
08:45 AM	0	0	0	0	2	9	0	11	6	0	10	16	0	16	2	18	45
Total	0	0	0	0	12	53	0	65	28	0	21	49	0	65	22	87	201
Grand Total	0	0	0	0	36	86	0	122	36	0	49	85	0	129	35	164	371
Apprch %	0	0	0		29.5	70.5	0		42.4	0	57.6		0	78.7	21.3		
Total %	0	0	0	0	9.7	23.2	0	32.9	9.7	0	13.2	22.9	0	34.8	9.4	44.2	
Passenger Vehicles	0	0	0	0	35	79	0	114	35	0	48	83	0	124	34	158	355
% Passenger Vehicles	0	0	0	0	97.2	91.9	0	93.4	97.2	0	98	97.6	0	96.1	97.1	96.3	95.7
Large 2 Axle Vehicles	0	0	0	0	0	5	0	5	1	0	0	1	0	3	1	4	10
% Large 2 Axle Vehicles	0	0	0	0	0	5.8	0	4.1	2.8	0	0	1.2	0	2.3	2.9	2.4	2.7
3 Axle Vehicles	0	0	0	0	1	0	0	1	0	0	1	1	0	1	0	1	3
% 3 Axle Vehicles	0	0	0	0	2.8	0	0	0.8	0	0	2	1.2	0	0.8	0	0.6	0.8
4+ Axle Trucks	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
% 4+ Axle Trucks	0	0	0	0	0	2.3	0	1.6	0	0	0	0	0	0.8	0	0.6	0.8

	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	**8**	14	0	**22**	1	0	6	7	0	17	4	21	50
07:45 AM	0	0	0	0	4	9	0	13	3	0	**13**	**16**	0	**27**	4	**31**	**60**
08:00 AM	0	0	0	0	5	11	0	16	**12**	0	4	16	0	12	3	15	47
08:15 AM	0	0	0	0	2	**20**	0	22	7	0	3	10	0	19	**8**	27	59
Total Volume	0	0	0	0	19	54	0	73	23	0	26	49	0	75	19	94	216
% App. Total	0	0	0		26	74	0		46.9	0	53.1		0	79.8	20.2		
PHF	.000	.000	.000	.000	.594	.675	.000	.830	.479	.000	.500	.766	.000	.694	.594	.758	.900

Counts Unlimited
PO Box 1178
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:30 AM				07:15 AM				07:45 AM			
+0 mins.	0	0	0	0	**8**	14	0	**22**	3	0	7	10	0	**27**	4	**31**
+15 mins.	0	0	0	0	4	9	0	13	1	0	6	7	0	12	3	15
+30 mins.	0	0	0	0	5	11	0	16	3	0	**13**	**16**	0	19	8	27
+45 mins.	0	0	0	0	2	**20**	0	22	**12**	0	4	16	0	18	**9**	27
Total Volume	0	0	0	0	19	54	0	73	19	0	30	49	0	76	24	100
% App. Total	0	0	0		26	74	0		38.8	0	61.2		0	76	24	
PHF	.000	.000	.000	.000	.594	.675	.000	.830	.396	.000	.577	.766	.000	.704	.667	.806

Counts Unlimited
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles

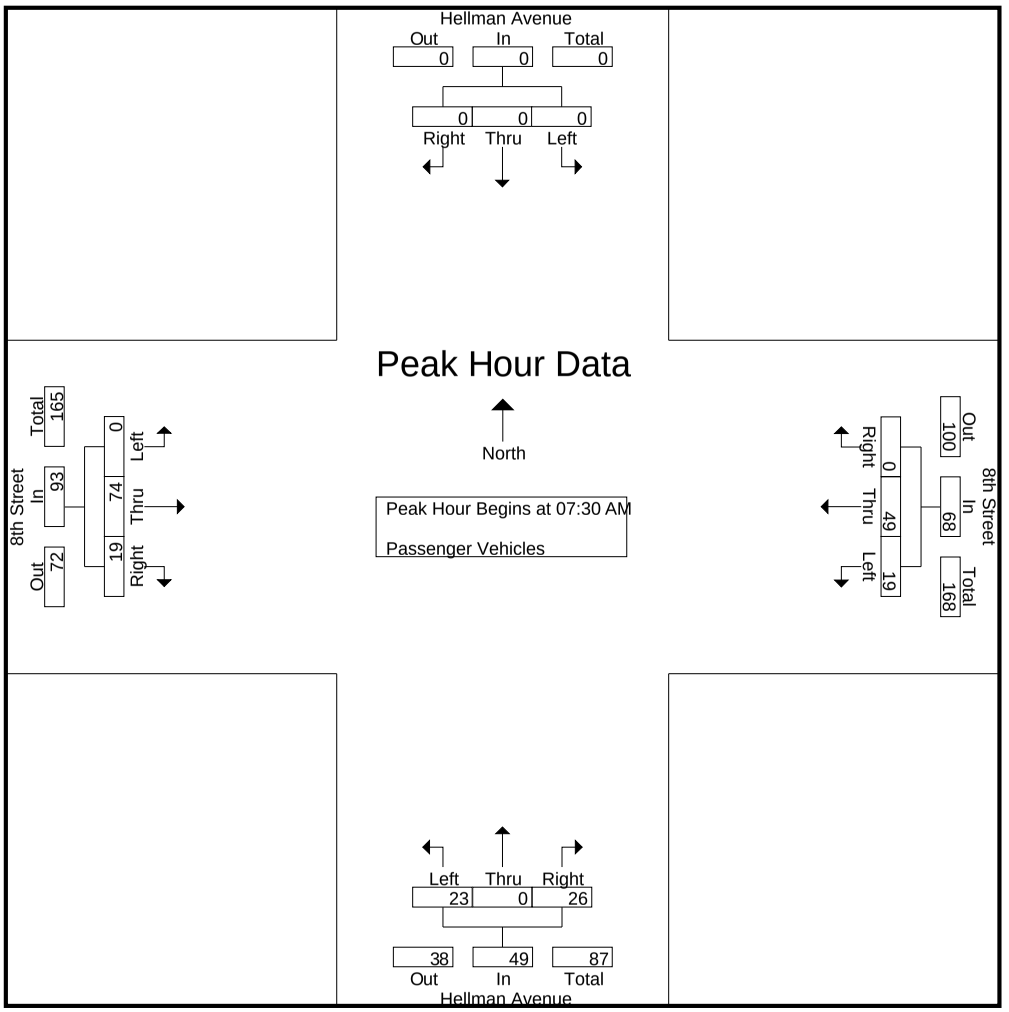
	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	2	4	0	6	1	0	2	3	0	7	2	9	18
07:15 AM	0	0	0	0	9	5	0	14	3	0	6	9	0	13	3	16	39
07:30 AM	0	0	0	0	8	13	0	21	1	0	6	7	0	17	4	21	49
07:45 AM	0	0	0	0	4	8	0	12	3	0	13	16	0	27	4	31	59
Total	0	0	0	0	23	30	0	53	8	0	27	35	0	64	13	77	165
08:00 AM	0	0	0	0	5	10	0	15	12	0	4	16	0	11	3	14	45
08:15 AM	0	0	0	0	2	18	0	20	7	0	3	10	0	19	8	27	57
08:30 AM	0	0	0	0	3	12	0	15	3	0	4	7	0	15	9	24	46
08:45 AM	0	0	0	0	2	9	0	11	5	0	10	15	0	15	1	16	42
Total	0	0	0	0	12	49	0	61	27	0	21	48	0	60	21	81	190
Grand Total	0	0	0	0	35	79	0	114	35	0	48	83	0	124	34	158	355
Apprch %	0	0	0		30.7	69.3	0		42.2	0	57.8		0	78.5	21.5		
Total %	0	0	0	0	9.9	22.3	0	32.1	9.9	0	13.5	23.4	0	34.9	9.6	44.5	

	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	**8**	13	0	**21**	1	0	6	7	0	17	4	21	49
07:45 AM	0	0	0	0	4	8	0	12	3	0	**13**	**16**	0	**27**	4	**31**	**59**
08:00 AM	0	0	0	0	5	10	0	15	**12**	0	4	16	0	11	3	14	45
08:15 AM	0	0	0	0	2	**18**	0	20	7	0	3	10	0	19	**8**	27	57
Total Volume	0	0	0	0	19	49	0	68	23	0	26	49	0	74	19	93	210
% App. Total	0	0	0		27.9	72.1	0		46.9	0	53.1		0	79.6	20.4		
PHF	.000	.000	.000	.000	.594	.681	.000	.810	.479	.000	.500	.766	.000	.685	.594	.750	.890

Counts Unlimited
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	0	0	0	**8**	13	0	**21**	1	0	6	7	0	17	4	21
+15 mins.	0	0	0	0	4	8	0	12	3	0	**13**	**16**	0	**27**	4	**31**
+30 mins.	0	0	0	0	5	10	0	15	**12**	0	4	16	0	11	3	14
+45 mins.	0	0	0	0	2	**18**	0	20	7	0	3	10	0	19	**8**	27
Total Volume	0	0	0	0	19	49	0	68	23	0	26	49	0	74	19	93
% App. Total	0	0	0		27.9	72.1	0		46.9	0	53.1		0	79.6	20.4	
PHF	.000	.000	.000	.000	.594	.681	.000	.810	.479	.000	.500	.766	.000	.685	.594	.750

Counts Unlimited
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Large 2 Axle Vehicles

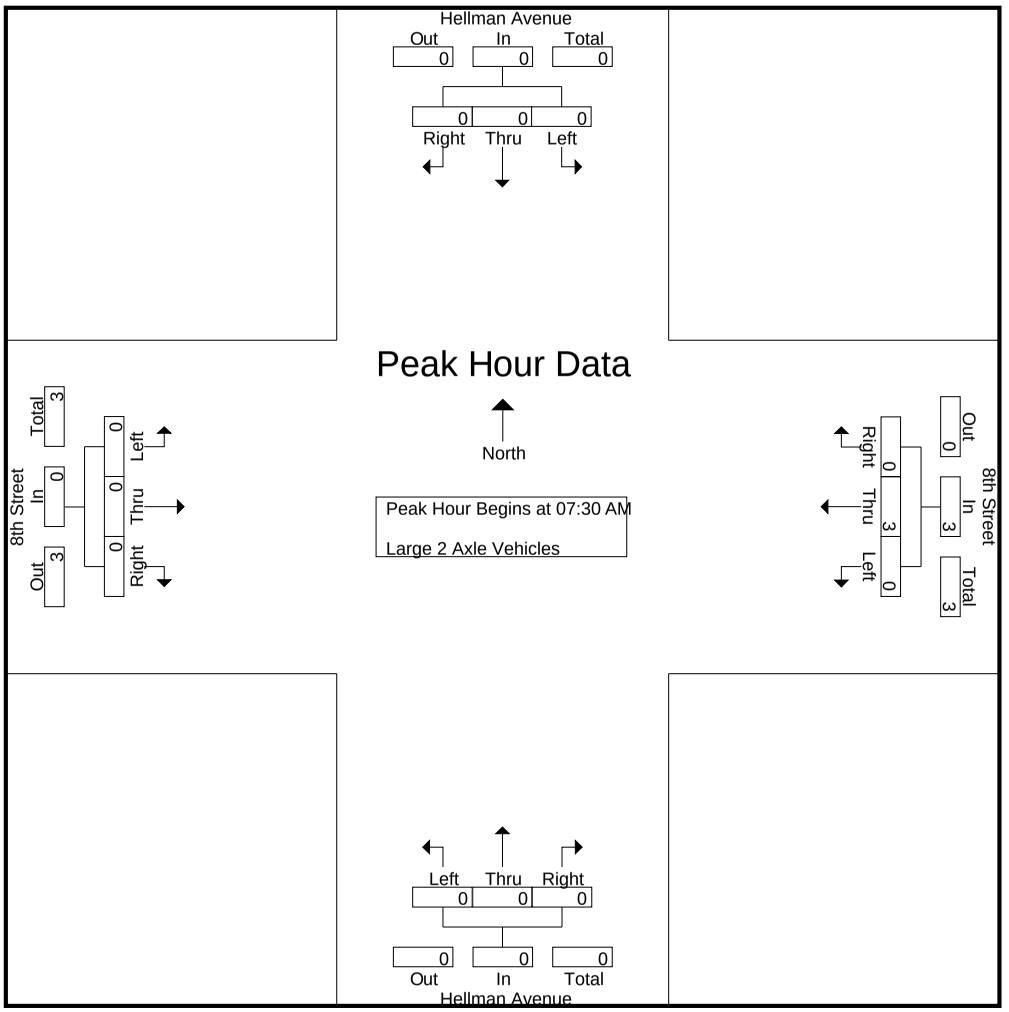
	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
08:30 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	2	3
08:45 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	2	3
Total	0	0	0	0	0	4	0	4	1	0	0	1	0	3	1	4	9
Grand Total	0	0	0	0	0	5	0	5	1	0	0	1	0	3	1	4	10
Apprch %	0	0	0		0	100	0		100	0	0		0	75	25		
Total %	0	0	0	0	0	50	0	50	10	0	0	10	0	30	10	40	

	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	**2**	0	**2**	0	0	0	0	0	0	0	0	**2**
Total Volume	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3
% App. Total	0	0	0		0	100	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.375	.000	.375	.000	.000	.000	.000	.000	.000	.000	.000	.375

Counts Unlimited
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951-268-6268

City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	**2**	0	**2**	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	100	0		0	0	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.375	.000	.375	.000	.000	.000	.000	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 3 Axle Vehicles

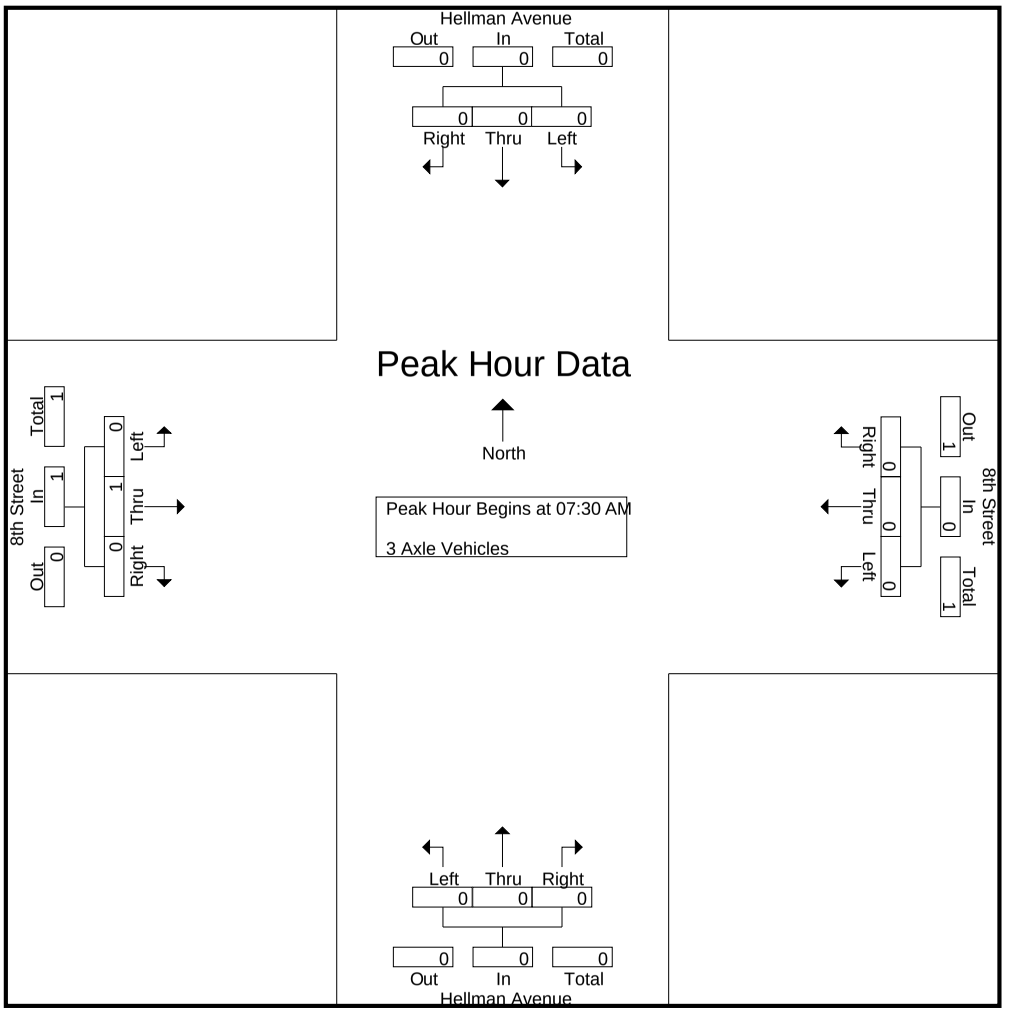
	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	0	1	0	0	1	1	0	0	0	0	2
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Grand Total	0	0	0	0	1	0	0	1	0	0	1	1	0	1	0	1	3
Apprch %	0	0	0		100	0	0		0	0	100		0	100	0		
Total %	0	0	0	0	33.3	0	0	33.3	0	0	33.3	33.3	0	33.3	0	33.3	

	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	**1**
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
% App. Total	0	0	0		0	0	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.250

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8AM
Site Code : 07518233
Start Date : 3/29/2018
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Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
% App. Total	0	0	0		0	0	0		0	0	0		0	100	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 4+ Axle Trucks

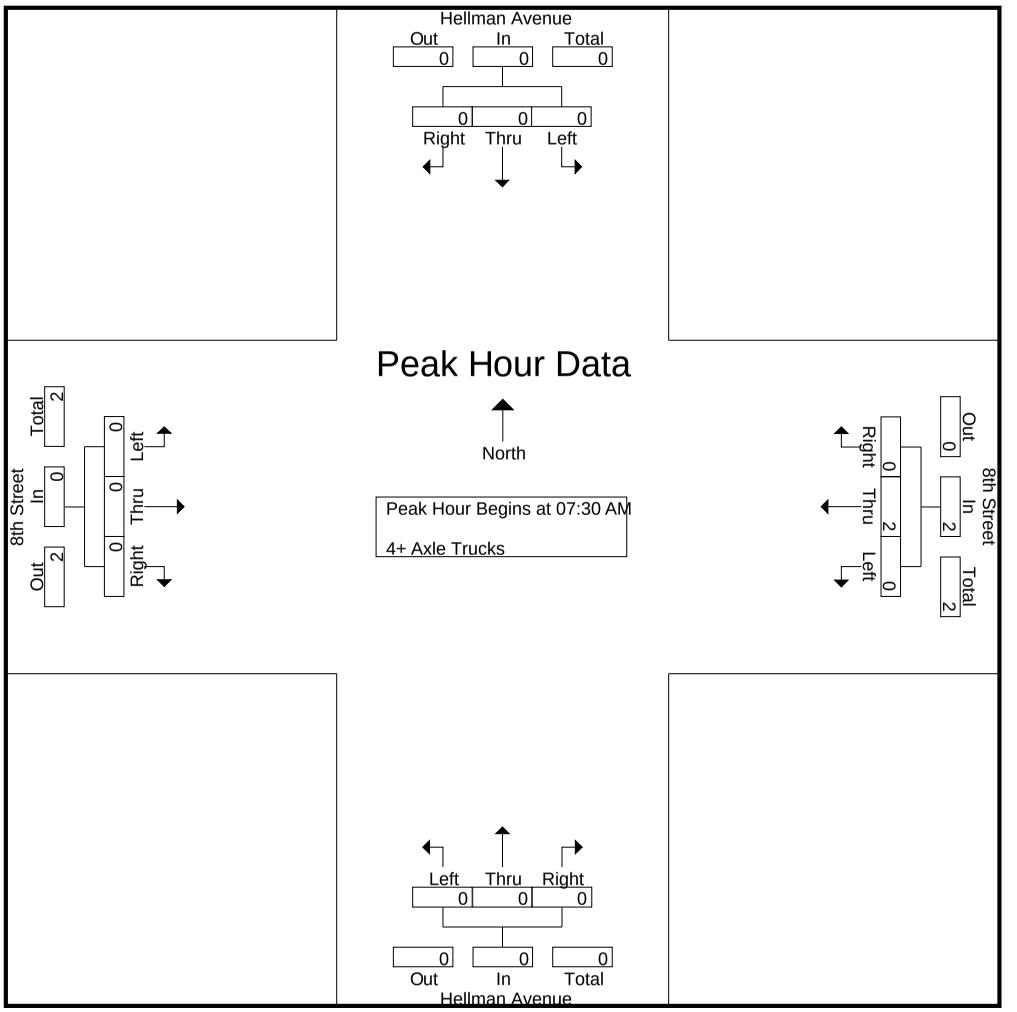
	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Grand Total	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
Apprch %	0	0	0		0	100	0		0	0	0		0	100	0		
Total %	0	0	0	0	0	66.7	0	66.7	0	0	0	0	0	33.3	0	33.3	

	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	**1**
07:45 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
% App. Total	0	0	0		0	100	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000	.500

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File Name : 03_RNCHE8AM
Site Code : 07518233
Start Date : 3/29/2018
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Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	100	0		0	0	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

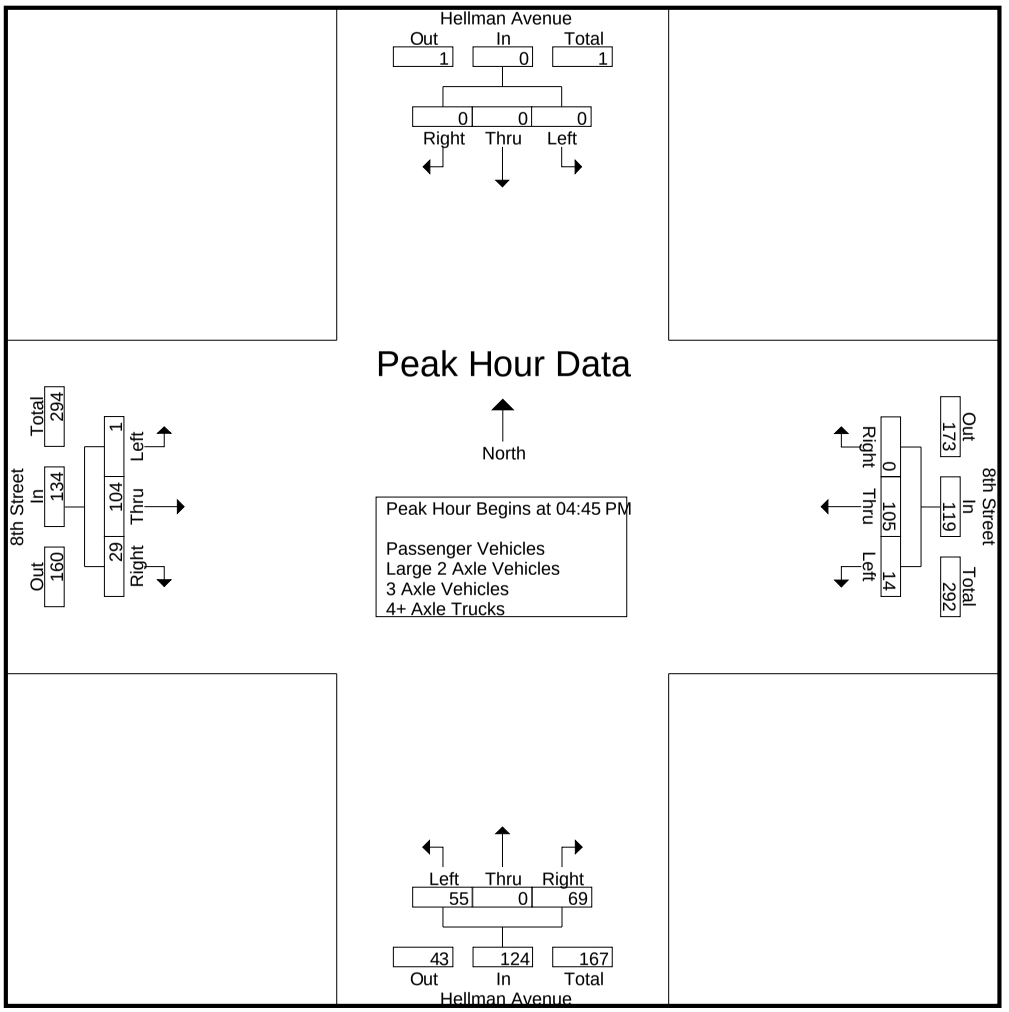
	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	19	0	19	15	0	17	32	1	17	5	23	74
04:15 PM	0	0	0	0	3	21	0	24	7	0	9	16	0	19	6	25	65
04:30 PM	0	0	0	0	5	29	0	34	13	0	13	26	0	23	5	28	88
04:45 PM	0	0	0	0	1	23	0	24	14	0	22	36	0	23	4	27	87
Total	0	0	0	0	9	92	0	101	49	0	61	110	1	82	20	103	314
05:00 PM	0	0	0	0	3	30	0	33	18	0	16	34	0	34	14	48	115
05:15 PM	0	0	0	0	5	22	0	27	11	0	14	25	0	22	6	28	80
05:30 PM	0	0	0	0	5	30	0	35	12	0	17	29	1	25	5	31	95
05:45 PM	0	0	0	0	3	21	0	24	9	0	16	25	1	24	3	28	77
Total	0	0	0	0	16	103	0	119	50	0	63	113	2	105	28	135	367
Grand Total	0	0	0	0	25	195	0	220	99	0	124	223	3	187	48	238	681
Apprch %	0	0	0		11.4	88.6	0		44.4	0	55.6		1.3	78.6	20.2		
Total %	0	0	0	0	3.7	28.6	0	32.3	14.5	0	18.2	32.7	0.4	27.5	7	34.9	
Passenger Vehicles	0	0	0	0	24	190	0	214	93	0	120	213	3	183	45	231	658
% Passenger Vehicles	0	0	0	0	96	97.4	0	97.3	93.9	0	96.8	95.5	100	97.9	93.8	97.1	96.6
Large 2 Axle Vehicles	0	0	0	0	1	4	0	5	6	0	2	8	0	2	2	4	17
% Large 2 Axle Vehicles	0	0	0	0	4	2.1	0	2.3	6.1	0	1.6	3.6	0	1.1	4.2	1.7	2.5
3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2
% 3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	1.6	0.9	0	0	0	0	0.3
4+ Axle Trucks	0	0	0	0	0	1	0	1	0	0	0	0	0	2	1	3	4
% 4+ Axle Trucks	0	0	0	0	0	0.5	0	0.5	0	0	0	0	0	1.1	2.1	1.3	0.6

	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	1	23	0	24	14	0	**22**	**36**	0	23	4	27	87
05:00 PM	0	0	0	0	3	**30**	0	33	**18**	0	16	34	0	**34**	**14**	**48**	**115**
05:15 PM	0	0	0	0	**5**	22	0	27	11	0	14	25	0	22	6	28	80
05:30 PM	0	0	0	0	5	30	0	**35**	12	0	17	29	**1**	25	5	31	95
Total Volume	0	0	0	0	14	105	0	119	55	0	69	124	1	104	29	134	377
% App. Total	0	0	0		11.8	88.2	0		44.4	0	55.6		0.7	77.6	21.6		
PHF	.000	.000	.000	.000	.700	.875	.000	.850	.764	.000	.784	.861	.250	.765	.518	.698	.820

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File Name : 03_RNCHE8PM
Site Code : 07518233
Start Date : 3/29/2018
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Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:45 PM				04:45 PM				05:00 PM			
+0 mins.	0	0	0	0	1	23	0	24	14	0	**22**	**36**	0	**34**	**14**	**48**
+15 mins.	0	0	0	0	3	**30**	0	33	**18**	0	16	34	0	22	6	28
+30 mins.	0	0	0	0	**5**	22	0	27	11	0	14	25	**1**	25	5	31
+45 mins.	0	0	0	0	5	30	0	**35**	12	0	17	29	1	24	3	28
Total Volume	0	0	0	0	14	105	0	119	55	0	69	124	2	105	28	135
% App. Total	0	0	0		11.8	88.2	0		44.4	0	55.6		1.5	77.8	20.7	
PHF	.000	.000	.000	.000	.700	.875	.000	.850	.764	.000	.784	.861	.500	.772	.500	.703

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City of Rancho Cucamonga
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E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles

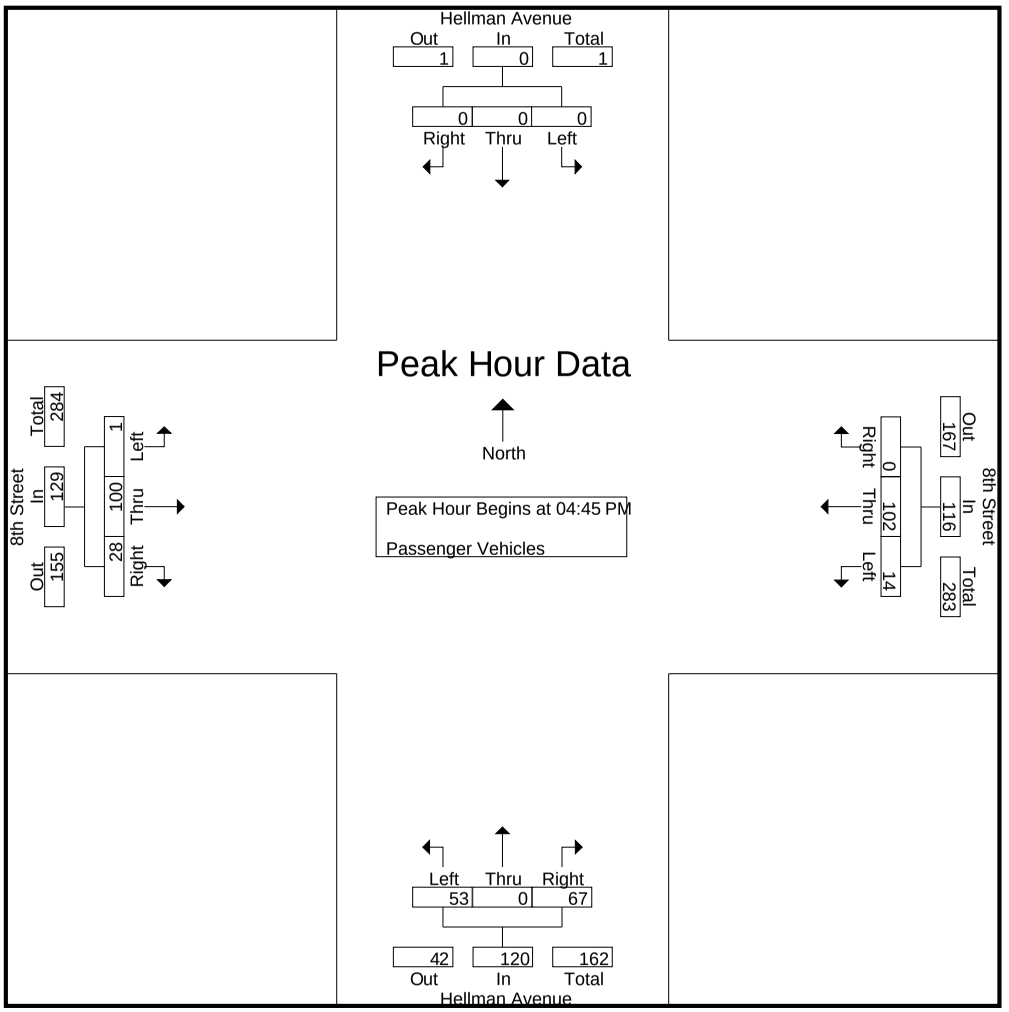
	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	19	0	19	13	0	17	30	1	17	3	21	70
04:15 PM	0	0	0	0	3	21	0	24	5	0	9	14	0	19	6	25	63
04:30 PM	0	0	0	0	4	28	0	32	13	0	13	26	0	23	5	28	86
04:45 PM	0	0	0	0	1	23	0	24	13	0	20	33	0	21	4	25	82
Total	0	0	0	0	8	91	0	99	44	0	59	103	1	80	18	99	301
05:00 PM	0	0	0	0	3	30	0	33	18	0	16	34	0	33	14	47	114
05:15 PM	0	0	0	0	5	20	0	25	11	0	14	25	0	21	5	26	76
05:30 PM	0	0	0	0	5	29	0	34	11	0	17	28	1	25	5	31	93
05:45 PM	0	0	0	0	3	20	0	23	9	0	14	23	1	24	3	28	74
Total	0	0	0	0	16	99	0	115	49	0	61	110	2	103	27	132	357
Grand Total	0	0	0	0	24	190	0	214	93	0	120	213	3	183	45	231	658
Apprch %	0	0	0		11.2	88.8	0		43.7	0	56.3		1.3	79.2	19.5		
Total %	0	0	0	0	3.6	28.9	0	32.5	14.1	0	18.2	32.4	0.5	27.8	6.8	35.1	

	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	1	23	0	24	13	0	**20**	33	0	21	4	25	82
05:00 PM	0	0	0	0	3	**30**	0	33	**18**	0	16	**34**	0	**33**	**14**	**47**	**114**
05:15 PM	0	0	0	0	**5**	20	0	25	11	0	14	25	0	21	5	26	76
05:30 PM	0	0	0	0	5	29	0	**34**	11	0	17	28	**1**	25	5	31	93
Total Volume	0	0	0	0	14	102	0	116	53	0	67	120	1	100	28	129	365
% App. Total	0	0	0		12.1	87.9	0		44.2	0	55.8		0.8	77.5	21.7		
PHF	.000	.000	.000	.000	.700	.850	.000	.853	.736	.000	.838	.882	.250	.758	.500	.686	.800

Counts Unlimited
PO Box 1178
Corona, CA 92878
951-268-6268

City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				04:45 PM			
+0 mins.	0	0	0	0	1	23	0	24	13	0	**20**	33	0	21	4	25
+15 mins.	0	0	0	0	3	**30**	0	33	**18**	0	16	**34**	0	**33**	**14**	**47**
+30 mins.	0	0	0	0	**5**	20	0	25	11	0	14	25	0	21	5	26
+45 mins.	0	0	0	0	5	29	0	**34**	11	0	17	28	**1**	25	5	31
Total Volume	0	0	0	0	14	102	0	116	53	0	67	120	1	100	28	129
% App. Total	0	0	0		12.1	87.9	0		44.2	0	55.8		0.8	77.5	21.7	
PHF	.000	.000	.000	.000	.700	.850	.000	.853	.736	.000	.838	.882	.250	.758	.500	.686

Counts Unlimited
PO Box 1178
Corona, CA 92878
951-268-6268

City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Large 2 Axle Vehicles

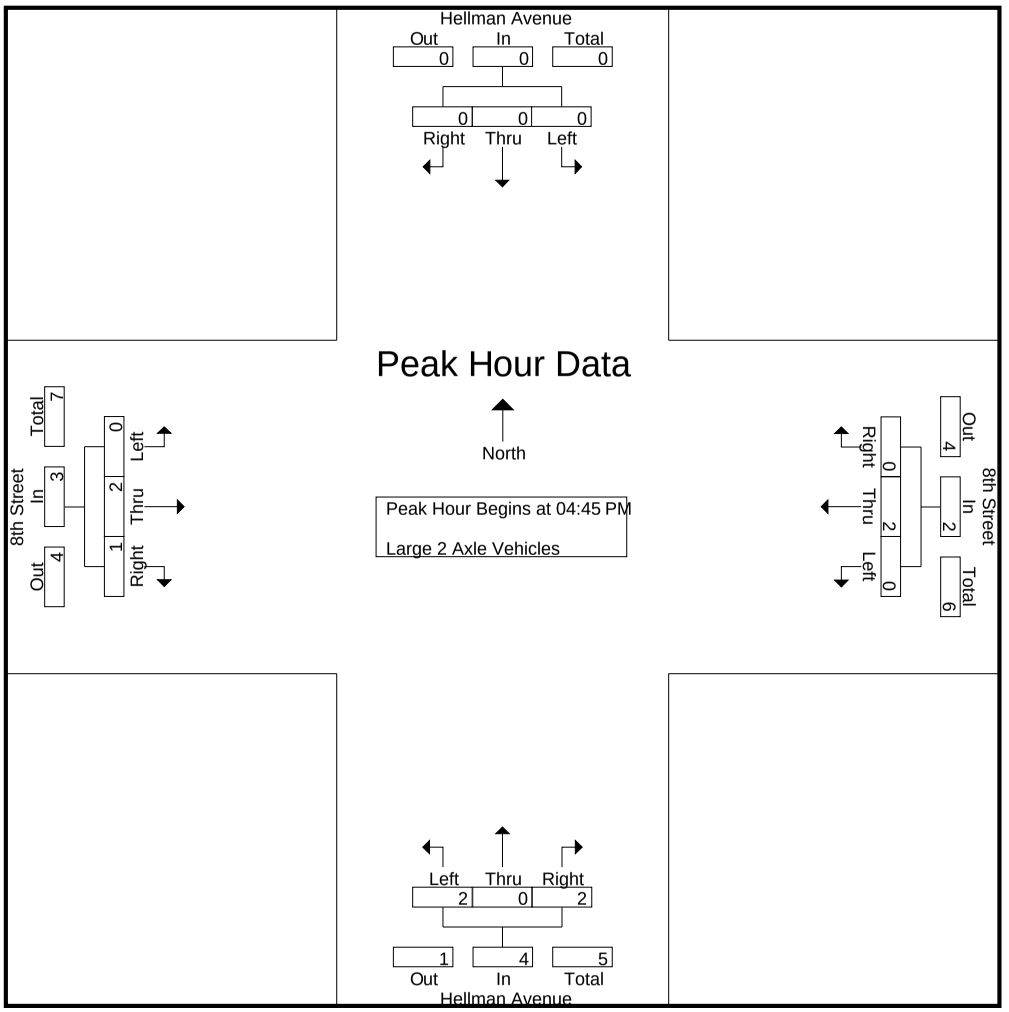
	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	1	1	3
04:15 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	2
04:30 PM	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	1	0	2	3	0	2	0	2	5
Total	0	0	0	0	1	1	0	2	5	0	2	7	0	2	1	3	12
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	2
05:30 PM	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	2
05:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	3	0	3	1	0	0	1	0	0	1	1	5
Grand Total	0	0	0	0	1	4	0	5	6	0	2	8	0	2	2	4	17
Apprch %	0	0	0		20	80	0		75	0	25		0	50	50		
Total %	0	0	0	0	5.9	23.5	0	29.4	35.3	0	11.8	47.1	0	11.8	11.8	23.5	

	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	**1**	0	**2**	**3**	0	**2**	0	**2**	**5**
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	**1**	1	2
05:30 PM	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	2
Total Volume	0	0	0	0	0	2	0	2	2	0	2	4	0	2	1	3	9
% App. Total	0	0	0		0	100	0		50	0	50		0	66.7	33.3		
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.500	.000	.250	.333	.000	.250	.250	.375	.450

Counts Unlimited
PO Box 1178
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				04:45 PM			
+0 mins.	0	0	0	0	0	0	0	0	**1**	0	**2**	**3**	0	**2**	0	**2**
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	**1**	1
+45 mins.	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0
Total Volume	0	0	0	0	0	2	0	2	2	0	2	4	0	2	1	3
% App. Total	0	0	0		0	100	0		50	0	50		0	66.7	33.3	
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.500	.000	.250	.333	.000	.250	.250	.375

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951-268-6268

City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 3 Axle Vehicles

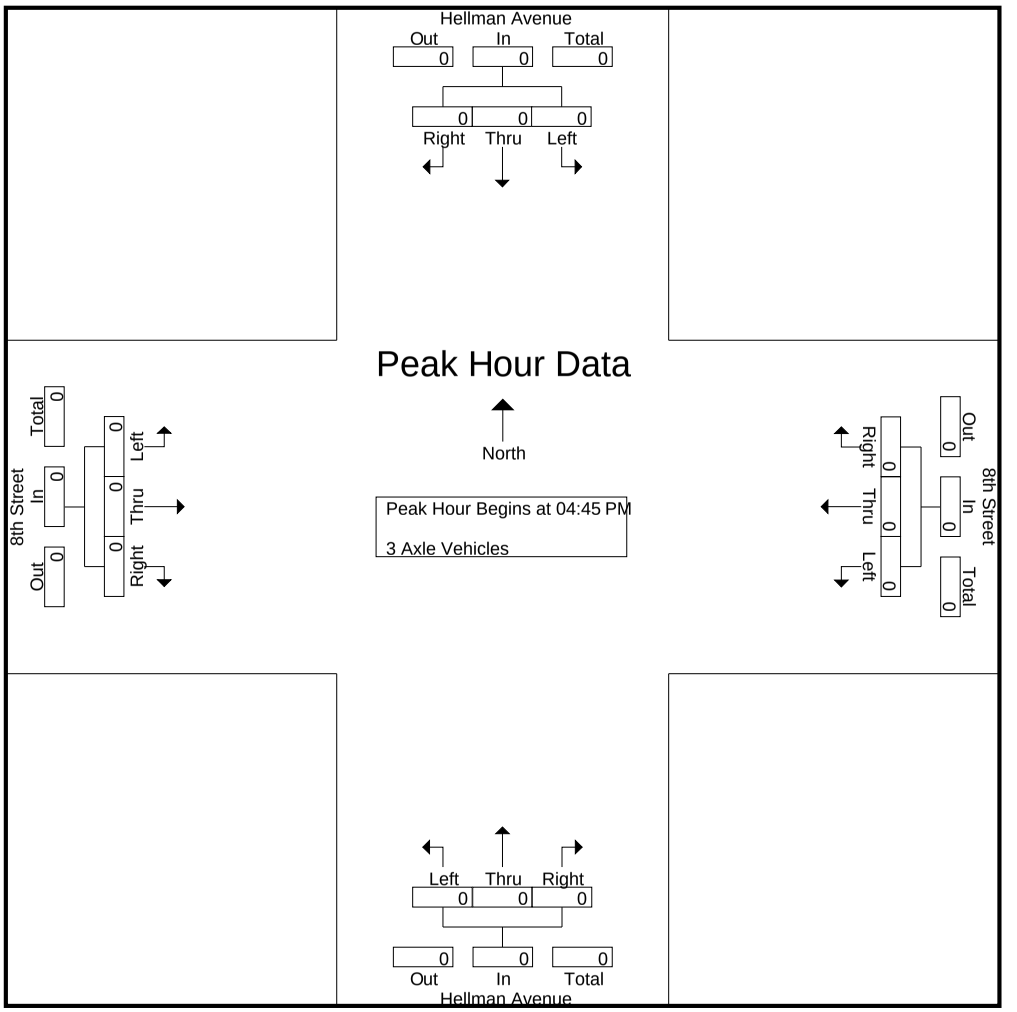
	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2
Total	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2
Grand Total	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2
Apprch %	0	0	0		0	0	0		0	0	100		0	0	0		
Total %	0	0	0	0	0	0	0	0	0	0	100	100	0	0	0	0	

	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				04:45 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 4+ Axle Trucks

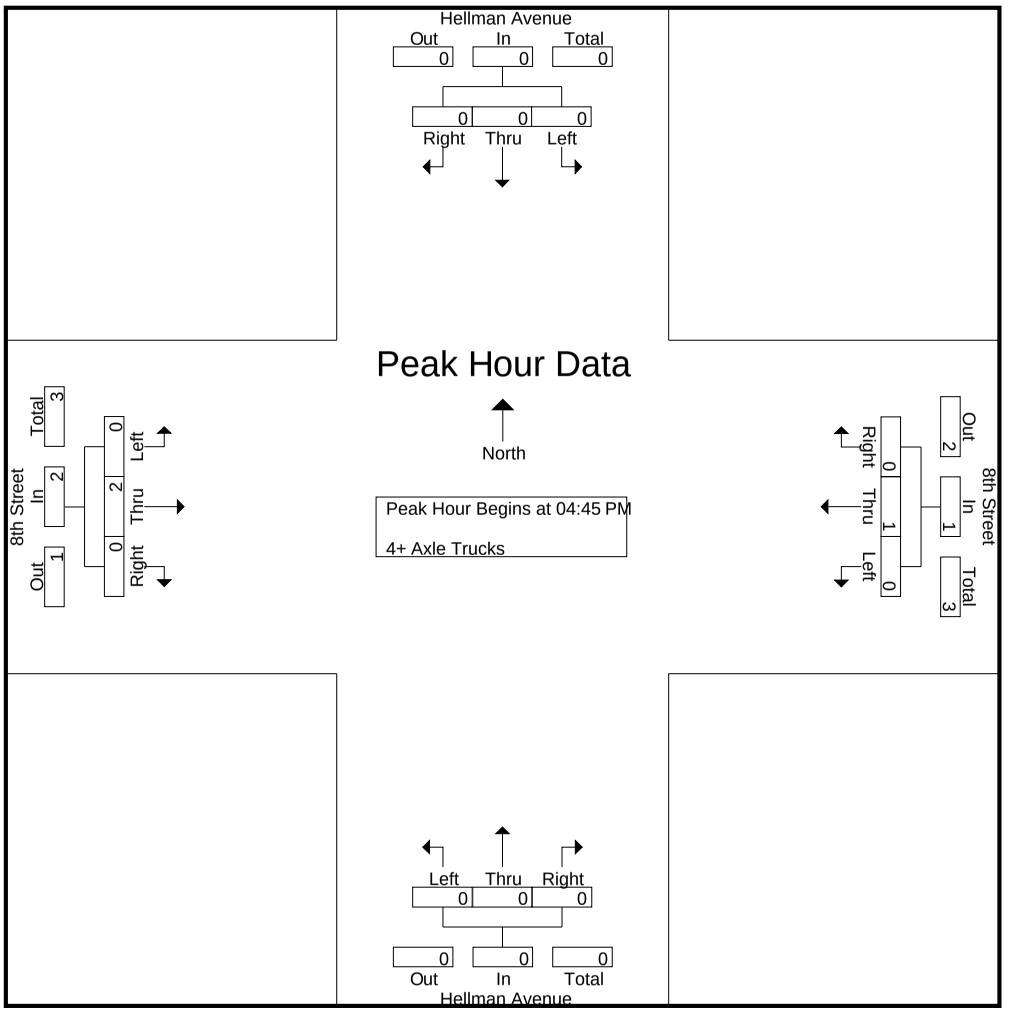
	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
05:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	2	3
Grand Total	0	0	0	0	0	1	0	1	0	0	0	0	0	2	1	3	4
Apprch %	0	0	0		0	100	0		0	0	0		0	66.7	33.3		
Total %	0	0	0	0	0	25	0	25	0	0	0	0	0	50	25	75	

	Hellman Avenue Southbound				8th Street Westbound				Hellman Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	1
05:15 PM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	1	0	1	**2**
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	2	3
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.500	.000	.500	.375

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 8th Street
Weather: Clear

File Name : 03_RNCHE8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				04:45 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**
+30 mins.	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	2
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0	
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.500	.000	.500

Counts Unlimited
PO Box 1178
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

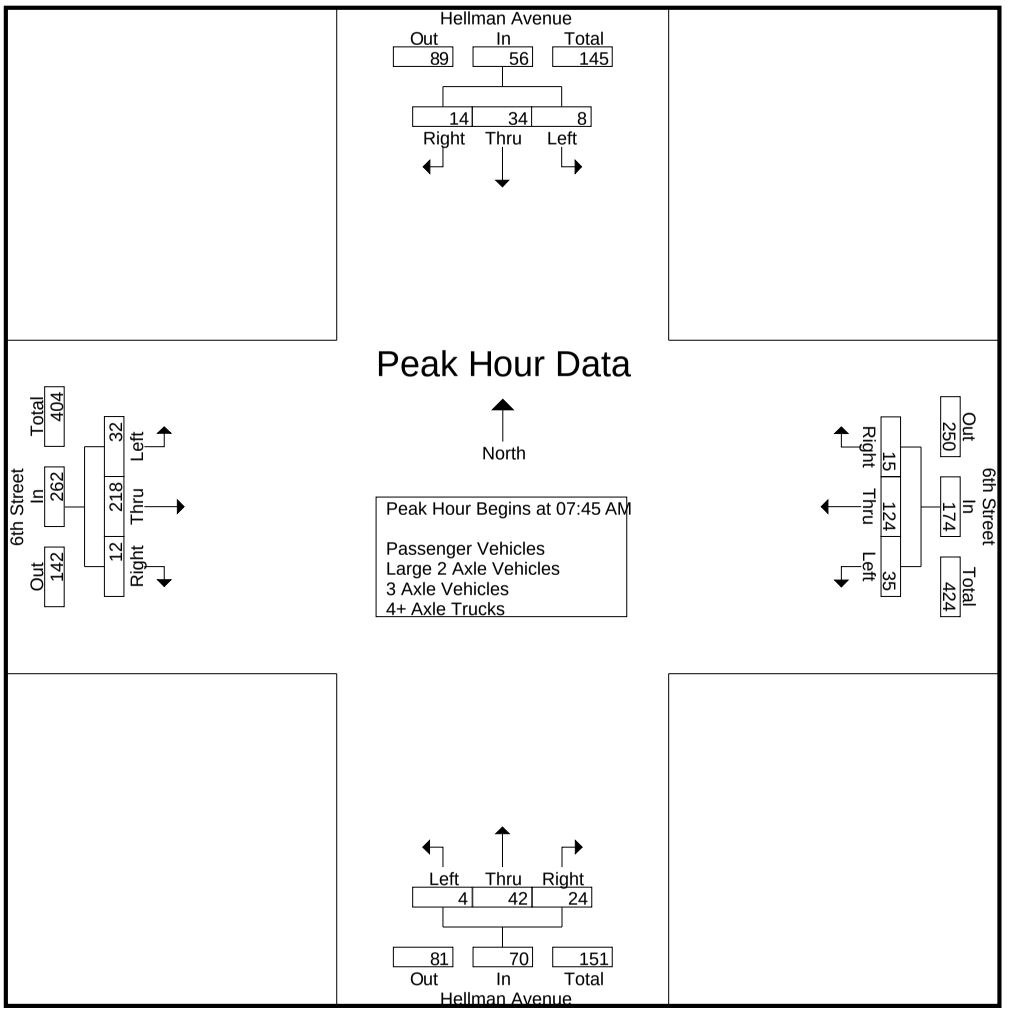
	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	6	1	8	8	17	2	27	2	7	7	16	3	34	2	39	90
07:15 AM	3	6	5	14	14	15	2	31	3	11	5	19	2	42	3	47	111
07:30 AM	3	10	1	14	15	22	3	40	2	11	5	18	7	61	1	69	141
07:45 AM	5	8	2	15	6	30	4	40	0	14	10	24	12	70	5	87	166
Total	12	30	9	51	43	84	11	138	7	43	27	77	24	207	11	242	508
08:00 AM	2	8	3	13	10	26	7	43	0	16	1	17	7	51	3	61	134
08:15 AM	1	11	4	16	11	27	4	42	2	6	5	13	3	44	2	49	120
08:30 AM	0	7	5	12	8	41	0	49	2	6	8	16	10	53	2	65	142
08:45 AM	3	6	1	10	9	34	4	47	1	13	12	26	3	54	3	60	143
Total	6	32	13	51	38	128	15	181	5	41	26	72	23	202	10	235	539
Grand Total	18	62	22	102	81	212	26	319	12	84	53	149	47	409	21	477	1047
Apprch %	17.6	60.8	21.6		25.4	66.5	8.2		8.1	56.4	35.6		9.9	85.7	4.4		
Total %	1.7	5.9	2.1	9.7	7.7	20.2	2.5	30.5	1.1	8	5.1	14.2	4.5	39.1	2	45.6	
Passenger Vehicles	18	56	21	95	80	207	25	312	11	72	51	134	41	400	20	461	1002
% Passenger Vehicles	100	90.3	95.5	93.1	98.8	97.6	96.2	97.8	91.7	85.7	96.2	89.9	87.2	97.8	95.2	96.6	95.7
Large 2 Axle Vehicles	0	5	1	6	1	4	1	6	1	12	2	15	5	9	1	15	42
% Large 2 Axle Vehicles	0	8.1	4.5	5.9	1.2	1.9	3.8	1.9	8.3	14.3	3.8	10.1	10.6	2.2	4.8	3.1	4
3 Axle Vehicles	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	2
% 3 Axle Vehicles	0	1.6	0	1	0	0	0	0	0	0	0	0	2.1	0	0	0.2	0.2
4+ Axle Trucks	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
% 4+ Axle Trucks	0	0	0	0	0	0.5	0	0.3	0	0	0	0	0	0	0	0	0.1

	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	**5**	8	2	15	6	30	4	40	0	14	**10**	**24**	**12**	**70**	**5**	**87**	**166**
08:00 AM	2	8	3	13	10	26	**7**	43	0	**16**	1	17	7	51	3	61	134
08:15 AM	1	**11**	4	**16**	**11**	27	4	42	**2**	6	5	13	3	44	2	49	120
08:30 AM	0	7	**5**	12	8	**41**	0	**49**	2	6	8	16	10	53	2	65	142
Total Volume	8	34	14	56	35	124	15	174	4	42	24	70	32	218	12	262	562
% App. Total	14.3	60.7	25		20.1	71.3	8.6		5.7	60	34.3		12.2	83.2	4.6		
PHF	.400	.773	.700	.875	.795	.756	.536	.888	.500	.656	.600	.729	.667	.779	.600	.753	.846

Counts Unlimited
PO Box 1178
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				08:00 AM				07:15 AM				07:30 AM			
+0 mins.	3	10	1	14	10	26	**7**	43	**3**	11	5	19	7	61	1	69
+15 mins.	**5**	8	2	15	**11**	27	4	42	2	11	5	18	**12**	**70**	**5**	**87**
+30 mins.	2	8	3	13	8	**41**	0	**49**	0	14	**10**	**24**	7	51	3	61
+45 mins.	1	**11**	**4**	**16**	9	34	4	47	0	**16**	1	17	3	44	2	49
Total Volume	11	37	10	58	38	128	15	181	5	52	21	78	29	226	11	266
% App. Total	19	63.8	17.2		21	70.7	8.3		6.4	66.7	26.9		10.9	85	4.1	
PHF	.550	.841	.625	.906	.864	.780	.536	.923	.417	.813	.525	.813	.604	.807	.550	.764

Counts Unlimited
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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles

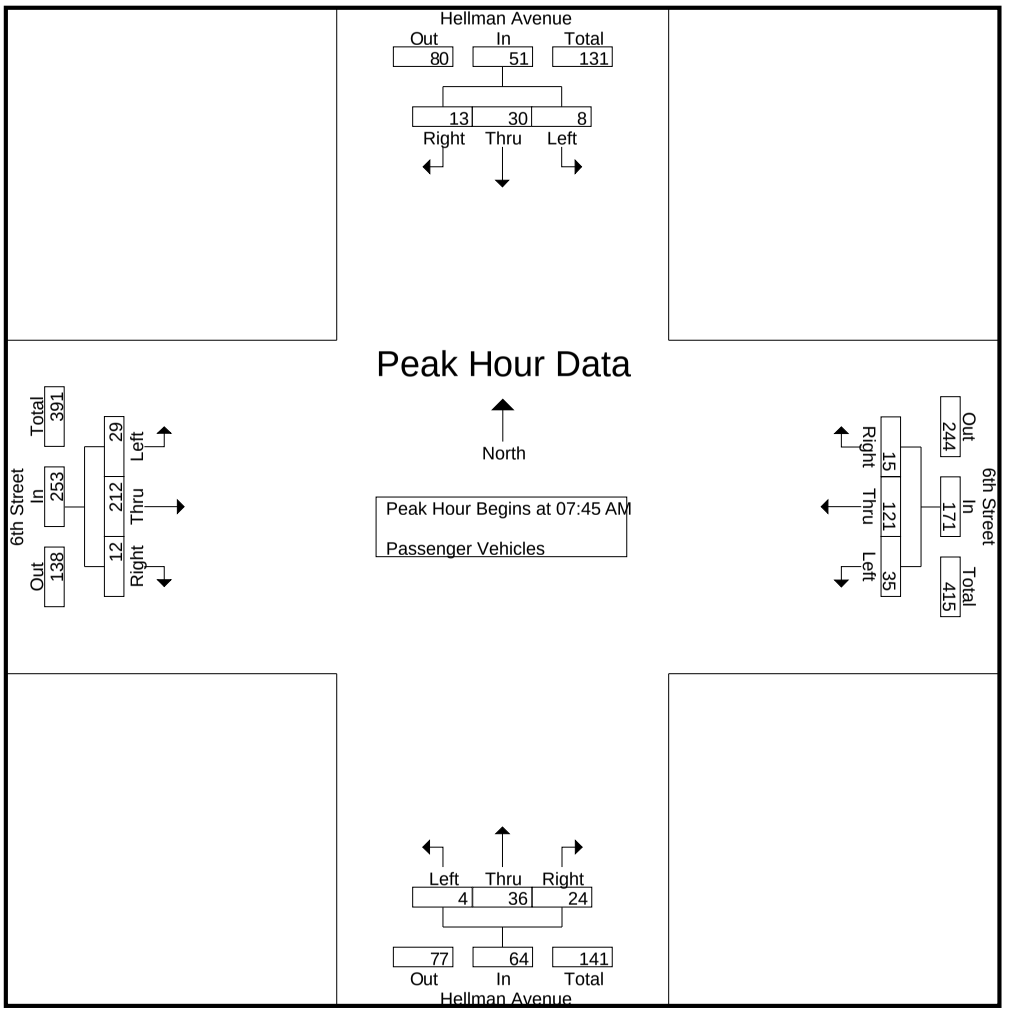
	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	5	1	7	8	17	1	26	2	6	7	15	3	33	2	38	86
07:15 AM	3	5	5	13	13	14	2	29	2	10	5	17	2	41	2	45	104
07:30 AM	3	10	1	14	15	21	3	39	2	10	4	16	4	61	1	66	135
07:45 AM	5	8	2	15	6	30	4	40	0	11	10	21	11	69	5	85	161
Total	12	28	9	49	42	82	10	134	6	37	26	69	20	204	10	234	486
08:00 AM	2	7	3	12	10	25	7	42	0	13	1	14	6	50	3	59	127
08:15 AM	1	10	4	15	11	27	4	42	2	6	5	13	3	43	2	48	118
08:30 AM	0	5	4	9	8	39	0	47	2	6	8	16	9	50	2	61	133
08:45 AM	3	6	1	10	9	34	4	47	1	10	11	22	3	53	3	59	138
Total	6	28	12	46	38	125	15	178	5	35	25	65	21	196	10	227	516
Grand Total	18	56	21	95	80	207	25	312	11	72	51	134	41	400	20	461	1002
Apprch %	18.9	58.9	22.1		25.6	66.3	8		8.2	53.7	38.1		8.9	86.8	4.3		
Total %	1.8	5.6	2.1	9.5	8	20.7	2.5	31.1	1.1	7.2	5.1	13.4	4.1	39.9	2	46	

	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	**5**	8	2	**15**	6	30	4	40	0	11	**10**	**21**	**11**	**69**	**5**	**85**	**161**
08:00 AM	2	7	3	12	10	25	**7**	42	0	**13**	1	14	6	50	3	59	127
08:15 AM	1	**10**	**4**	15	**11**	27	4	42	**2**	6	5	13	3	43	2	48	118
08:30 AM	0	5	4	9	8	**39**	0	**47**	2	6	8	16	9	50	2	61	133
Total Volume	8	30	13	51	35	121	15	171	4	36	24	64	29	212	12	253	539
% App. Total	15.7	58.8	25.5		20.5	70.8	8.8		6.2	56.2	37.5		11.5	83.8	4.7		
PHF	.400	.750	.813	.850	.795	.776	.536	.910	.500	.692	.600	.762	.659	.768	.600	.744	.837

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City of Rancho Cucamonga
N/S: Hellman Avenue
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Weather: Clear

File Name : 04_RNCHE6AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:45 AM				07:45 AM				07:45 AM			
+0 mins.	**5**	8	2	**15**	6	30	4	40	0	11	**10**	**21**	**11**	**69**	**5**	**85**
+15 mins.	2	7	3	12	10	25	**7**	42	0	**13**	1	14	6	50	3	59
+30 mins.	1	**10**	**4**	15	**11**	27	4	42	**2**	6	5	13	3	43	2	48
+45 mins.	0	5	4	9	8	**39**	0	**47**	2	6	8	16	9	50	2	61
Total Volume	8	30	13	51	35	121	15	171	4	36	24	64	29	212	12	253
% App. Total	15.7	58.8	25.5		20.5	70.8	8.8		6.2	56.2	37.5		11.5	83.8	4.7	
PHF	.400	.750	.813	.850	.795	.776	.536	.910	.500	.692	.600	.762	.659	.768	.600	.744

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Large 2 Axle Vehicles

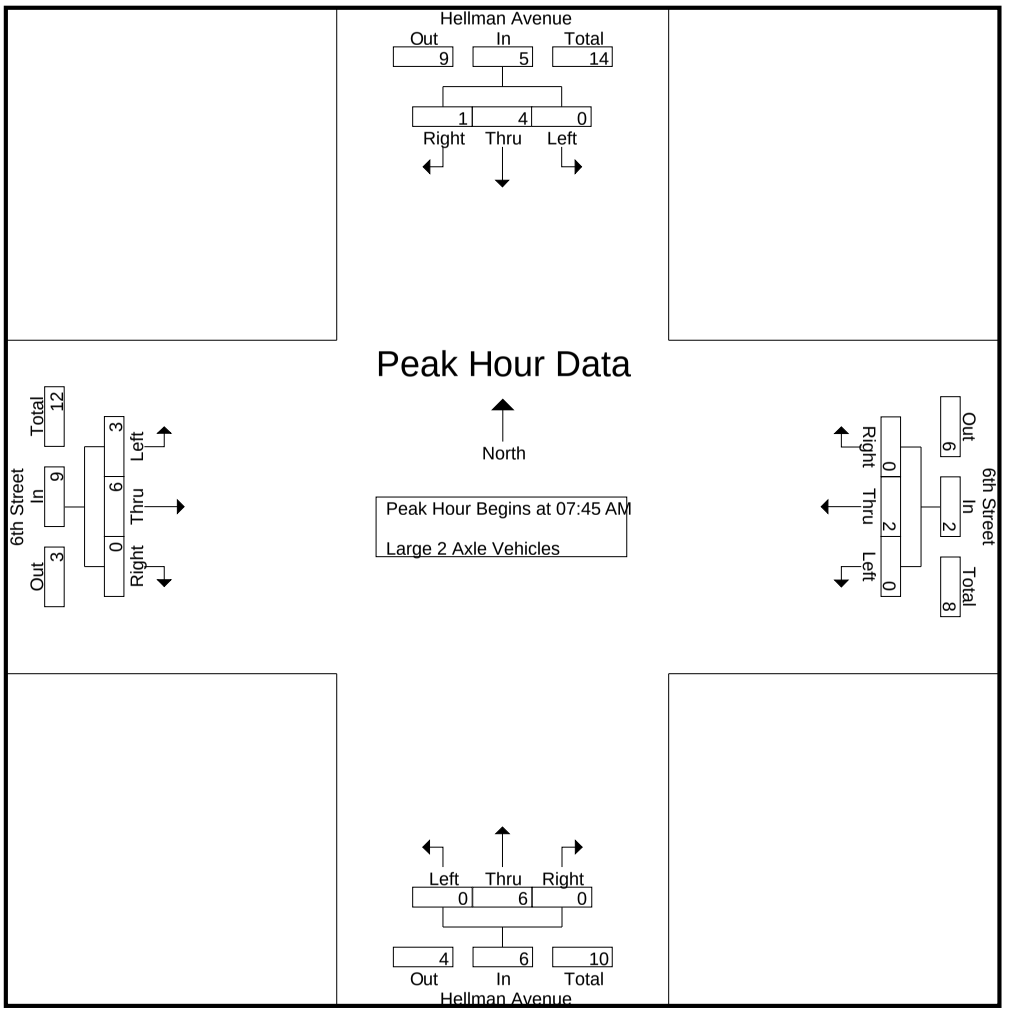
	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	1	1	0	1	0	1	0	1	0	1	3
07:15 AM	0	1	0	1	1	1	0	2	1	1	0	2	0	1	1	2	7
07:30 AM	0	0	0	0	0	1	0	1	0	1	1	2	2	0	0	2	5
07:45 AM	0	0	0	0	0	0	0	0	0	3	0	3	1	1	0	2	5
Total	0	1	0	1	1	2	1	4	1	6	1	8	3	3	1	7	20
08:00 AM	0	1	0	1	0	1	0	1	0	3	0	3	1	1	0	2	7
08:15 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	2
08:30 AM	0	2	1	3	0	1	0	1	0	0	0	0	1	3	0	4	8
08:45 AM	0	0	0	0	0	0	0	0	0	3	1	4	0	1	0	1	5
Total	0	4	1	5	0	2	0	2	0	6	1	7	2	6	0	8	22
Grand Total	0	5	1	6	1	4	1	6	1	12	2	15	5	9	1	15	42
Apprch %	0	83.3	16.7		16.7	66.7	16.7		6.7	80	13.3		33.3	60	6.7		
Total %	0	11.9	2.4	14.3	2.4	9.5	2.4	14.3	2.4	28.6	4.8	35.7	11.9	21.4	2.4	35.7	

	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	0	0	0	0	0	0	0	0	**3**	0	**3**	**1**	1	0	2	5
08:00 AM	0	1	0	1	0	**1**	0	**1**	0	3	0	3	1	1	0	2	7
08:15 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	2
08:30 AM	0	**2**	**1**	**3**	0	1	0	1	0	0	0	0	1	**3**	0	**4**	**8**
Total Volume	0	4	1	5	0	2	0	2	0	6	0	6	3	6	0	9	22
% App. Total	0	80	20		0	100	0		0	100	0		33.3	66.7	0		
PHF	.000	.500	.250	.417	.000	.500	.000	.500	.000	.500	.000	.500	.750	.500	.000	.563	.688

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E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:45 AM				07:45 AM				07:45 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	**3**	0	**3**	**1**	1	0	2
+15 mins.	0	1	0	1	0	**1**	0	**1**	0	3	0	3	1	1	0	2
+30 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1
+45 mins.	0	**2**	**1**	**3**	0	1	0	1	0	0	0	0	1	**3**	0	**4**
Total Volume	0	4	1	5	0	2	0	2	0	6	0	6	3	6	0	9
% App. Total	0	80	20		0	100	0		0	100	0		33.3	66.7	0	
PHF	.000	.500	.250	.417	.000	.500	.000	.500	.000	.500	.000	.500	.750	.500	.000	.563

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 3 Axle Vehicles

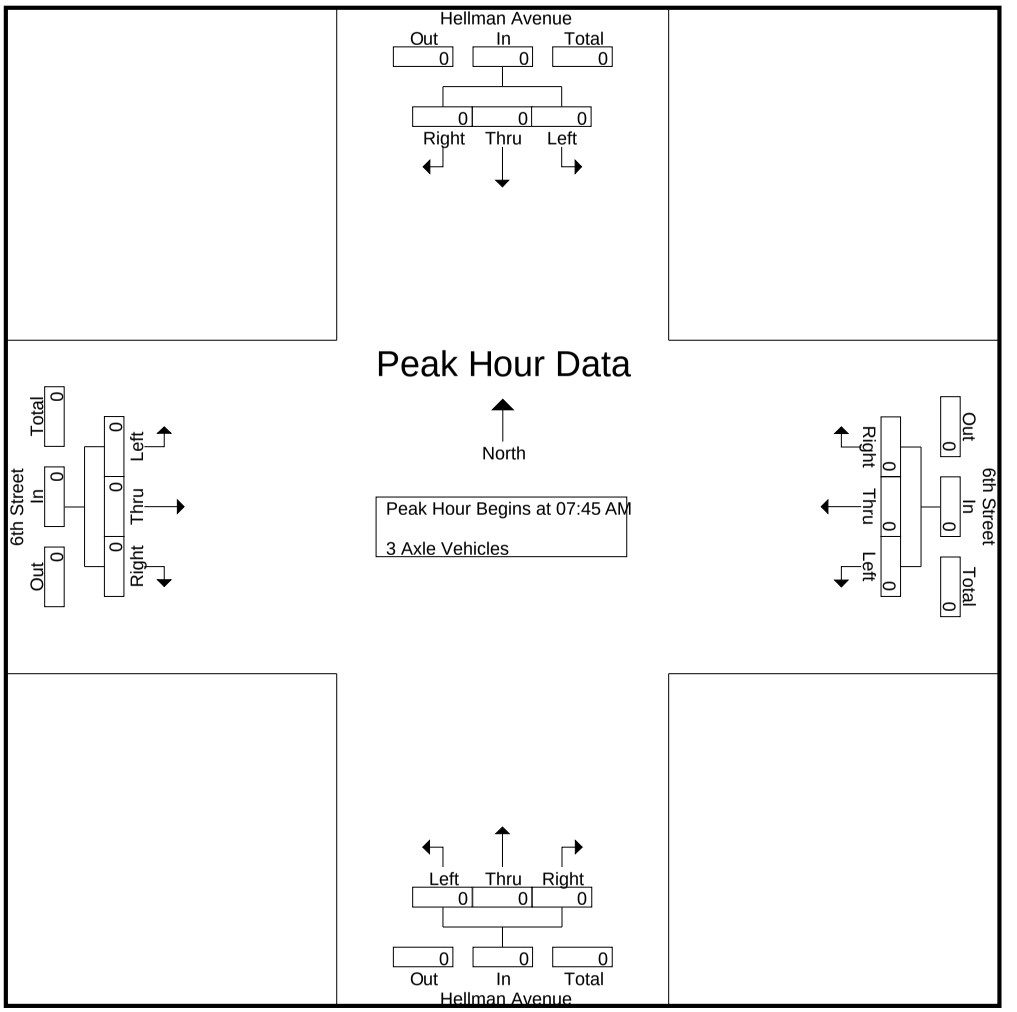
	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	2
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	2
Apprch %	0	100	0		0	0	0		0	0	0		100	0	0		
Total %	0	50	0	50	0	0	0	0	0	0	0	0	50	0	0	50	

	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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Site Code : 07518233
Start Date : 3/29/2018
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Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:45 AM				07:45 AM				07:45 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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Weather: Clear

File Name : 04_RNCHE6AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 4+ Axle Trucks

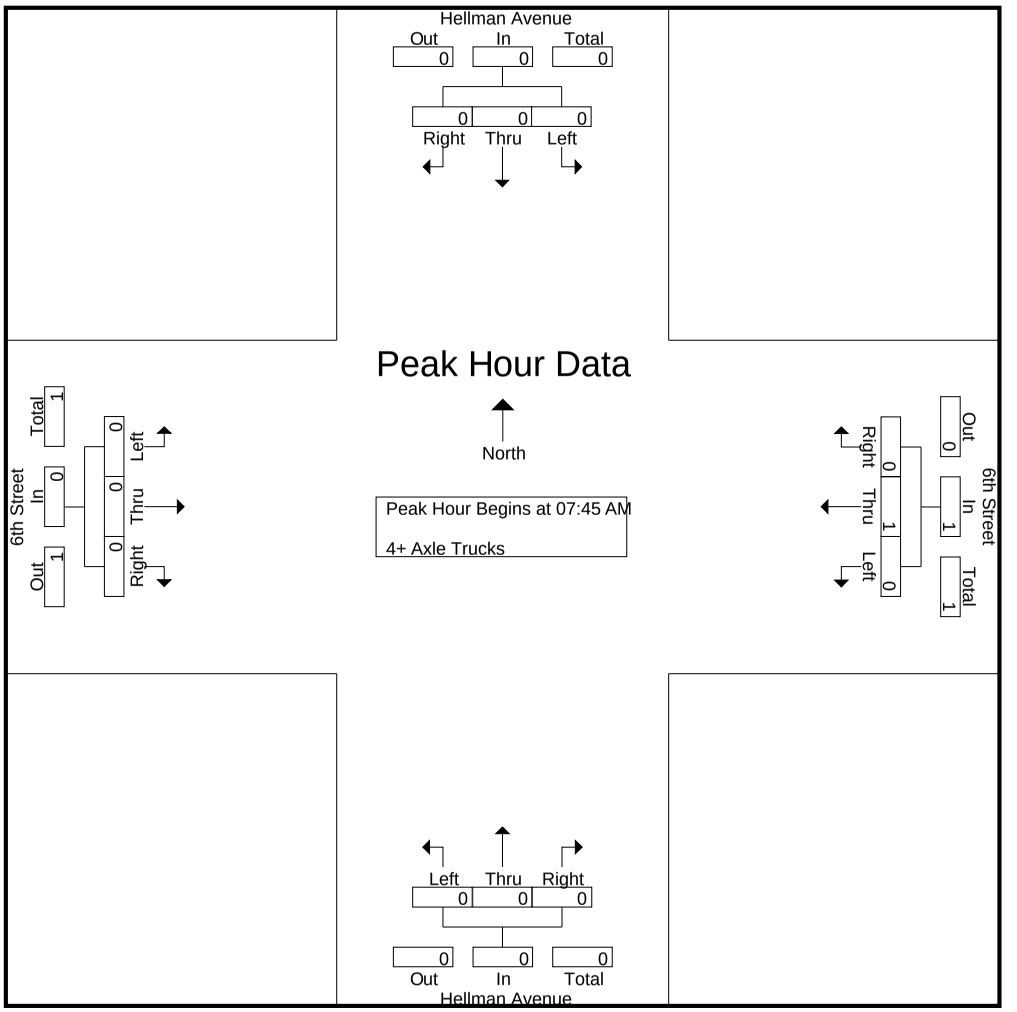
	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Grand Total	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Apprch %	0	0	0		0	100	0		0	0	0		0	0	0		
Total %	0	0	0	0	0	100	0	100	0	0	0	0	0	0	0	0	

	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	**1**
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
% App. Total	0	0	0		0	100	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.250

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Site Code : 07518233
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Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:45 AM				07:45 AM				07:45 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	100	0		0	0	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000

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E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

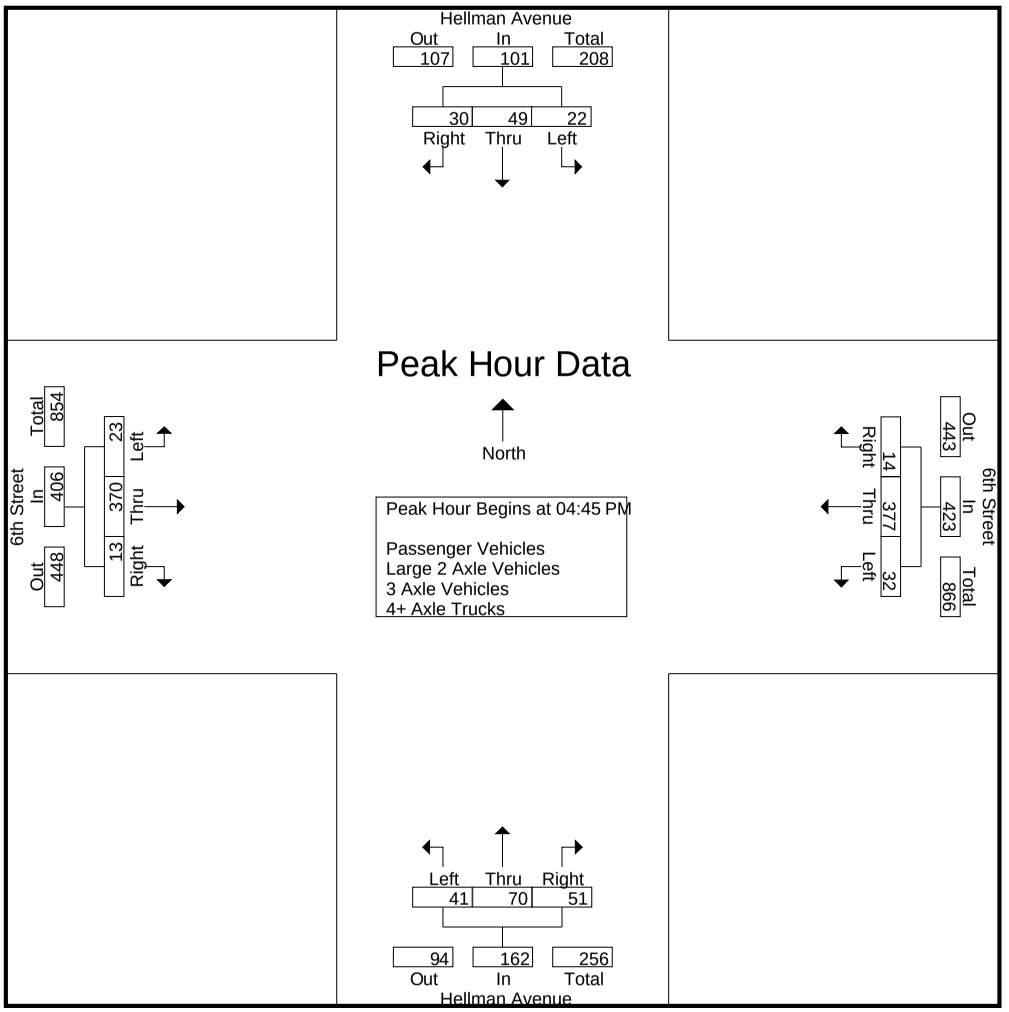
	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	3	12	6	21	10	89	5	104	4	14	9	27	6	55	2	63	215
04:15 PM	1	12	8	21	4	77	3	84	4	16	23	43	9	88	7	104	252
04:30 PM	5	11	6	22	13	81	2	96	5	17	12	34	6	103	2	111	263
04:45 PM	8	14	9	31	5	83	3	91	10	19	15	44	2	92	3	97	263
Total	17	49	29	95	32	330	13	375	23	66	59	148	23	338	14	375	993
05:00 PM	8	16	6	30	12	98	6	116	18	14	8	40	6	93	4	103	289
05:15 PM	6	11	7	24	8	107	2	117	3	18	13	34	6	81	2	89	264
05:30 PM	0	8	8	16	7	89	3	99	10	19	15	44	9	104	4	117	276
05:45 PM	2	7	4	13	5	79	3	87	8	16	13	37	3	110	3	116	253
Total	16	42	25	83	32	373	14	419	39	67	49	155	24	388	13	425	1082
Grand Total	33	91	54	178	64	703	27	794	62	133	108	303	47	726	27	800	2075
Apprch %	18.5	51.1	30.3		8.1	88.5	3.4		20.5	43.9	35.6		5.9	90.8	3.4		
Total %	1.6	4.4	2.6	8.6	3.1	33.9	1.3	38.3	3	6.4	5.2	14.6	2.3	35	1.3	38.6	
Passenger Vehicles	32	89	53	174	64	696	26	786	61	129	107	297	47	720	26	793	2050
% Passenger Vehicles	97	97.8	98.1	97.8	100	99	96.3	99	98.4	97	99.1	98	100	99.2	96.3	99.1	98.8
Large 2 Axle Vehicles	0	2	1	3	0	7	0	7	1	4	1	6	0	6	1	7	23
% Large 2 Axle Vehicles	0	2.2	1.9	1.7	0	1	0	0.9	1.6	3	0.9	2	0	0.8	3.7	0.9	1.1
3 Axle Vehicles	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	2
% 3 Axle Vehicles	3	0	0	0.6	0	0	3.7	0.1	0	0	0	0	0	0	0	0	0.1
4+ Axle Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% 4+ Axle Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**8**	14	**9**	**31**	5	83	3	91	10	**19**	**15**	**44**	2	92	3	97	263
05:00 PM	8	**16**	6	30	**12**	98	**6**	116	**18**	14	8	40	6	93	**4**	103	**289**
05:15 PM	6	11	7	24	8	**107**	2	**117**	3	18	13	34	6	81	2	89	264
05:30 PM	0	8	8	16	7	89	3	99	10	19	15	44	**9**	**104**	4	**117**	276
Total Volume	22	49	30	101	32	377	14	423	41	70	51	162	23	370	13	406	1092
% App. Total	21.8	48.5	29.7		7.6	89.1	3.3		25.3	43.2	31.5		5.7	91.1	3.2		
PHF	.688	.766	.833	.815	.667	.881	.583	.904	.569	.921	.850	.920	.639	.889	.813	.868	.945

Counts Unlimited
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951-268-6268

City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:45 PM				04:45 PM				05:00 PM			
+0 mins.	5	11	6	22	5	83	3	91	10	**19**	**15**	**44**	6	93	**4**	103
+15 mins.	**8**	14	**9**	**31**	**12**	98	**6**	116	**18**	14	8	40	6	81	2	89
+30 mins.	8	**16**	6	30	8	**107**	2	**117**	3	18	13	34	**9**	104	4	**117**
+45 mins.	6	11	7	24	7	89	3	99	10	19	15	44	3	**110**	3	116
Total Volume	27	52	28	107	32	377	14	423	41	70	51	162	24	388	13	425
% App. Total	25.2	48.6	26.2		7.6	89.1	3.3		25.3	43.2	31.5		5.6	91.3	3.1	
PHF	.844	.813	.778	.863	.667	.881	.583	.904	.569	.921	.850	.920	.667	.882	.813	.908

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951-268-6268

City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles

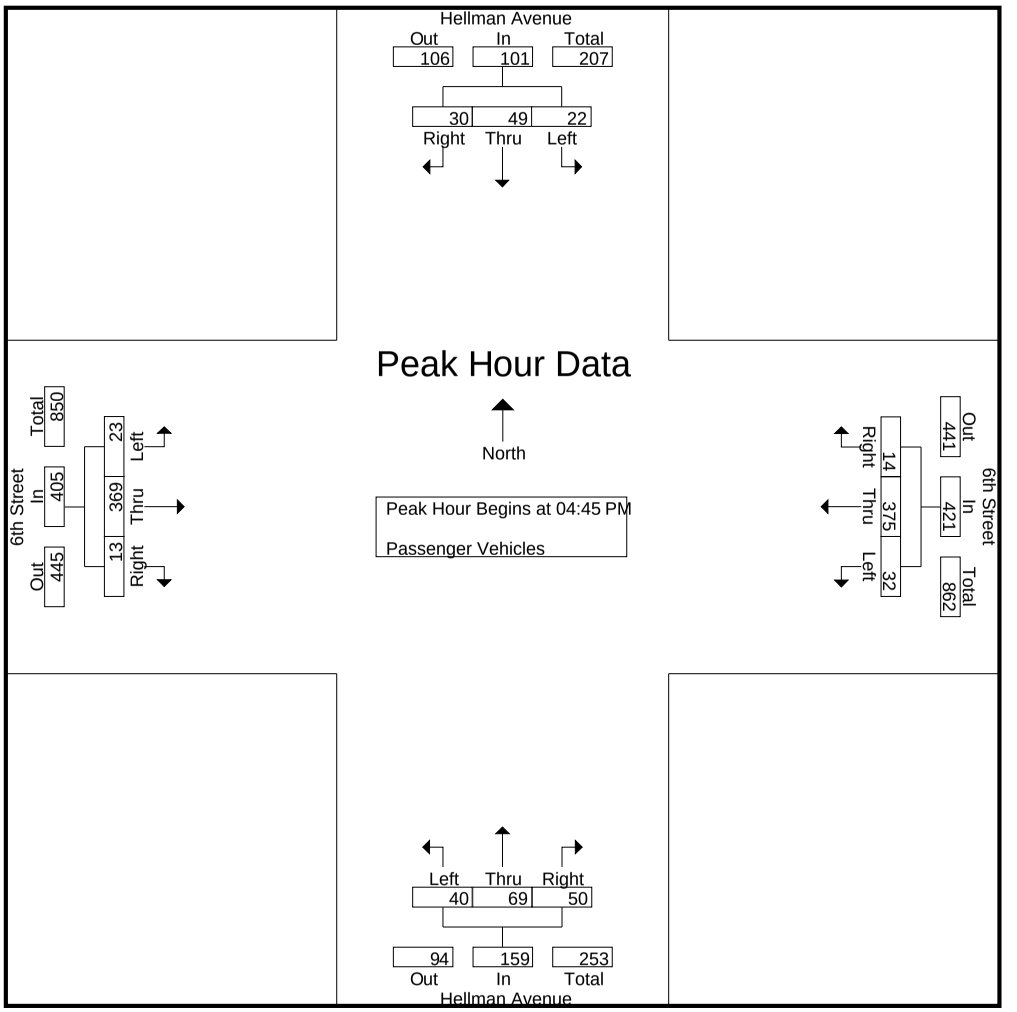
	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	3	11	6	20	10	89	5	104	4	14	9	27	6	54	2	62	213
04:15 PM	1	12	7	20	4	73	3	80	4	14	23	41	9	86	7	102	243
04:30 PM	4	10	6	20	13	80	2	95	5	16	12	33	6	102	1	109	257
04:45 PM	8	14	9	31	5	83	3	91	10	19	14	43	2	91	3	96	261
Total	16	47	28	91	32	325	13	370	23	63	58	144	23	333	13	369	974
05:00 PM	8	16	6	30	12	98	6	116	17	13	8	38	6	93	4	103	287
05:15 PM	6	11	7	24	8	107	2	117	3	18	13	34	6	81	2	89	264
05:30 PM	0	8	8	16	7	87	3	97	10	19	15	44	9	104	4	117	274
05:45 PM	2	7	4	13	5	79	2	86	8	16	13	37	3	109	3	115	251
Total	16	42	25	83	32	371	13	416	38	66	49	153	24	387	13	424	1076
Grand Total	32	89	53	174	64	696	26	786	61	129	107	297	47	720	26	793	2050
Apprch %	18.4	51.1	30.5		8.1	88.5	3.3		20.5	43.4	36		5.9	90.8	3.3		
Total %	1.6	4.3	2.6	8.5	3.1	34	1.3	38.3	3	6.3	5.2	14.5	2.3	35.1	1.3	38.7	

	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**8**	14	**9**	**31**	5	83	3	91	10	**19**	14	43	2	91	3	96	261
05:00 PM	8	**16**	6	30	**12**	98	**6**	116	**17**	13	8	38	6	93	**4**	103	**287**
05:15 PM	6	11	7	24	8	**107**	2	**117**	3	18	13	34	6	81	2	89	264
05:30 PM	0	8	8	16	7	87	3	97	10	19	**15**	**44**	**9**	**104**	4	**117**	274
Total Volume	22	49	30	101	32	375	14	421	40	69	50	159	23	369	13	405	1086
% App. Total	21.8	48.5	29.7		7.6	89.1	3.3		25.2	43.4	31.4		5.7	91.1	3.2		
PHF	.688	.766	.833	.815	.667	.876	.583	.900	.588	.908	.833	.903	.639	.887	.813	.865	.946

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				04:45 PM			
+0 mins.	**8**	14	**9**	**31**	5	83	3	91	10	**19**	14	43	2	91	3	96
+15 mins.	8	**16**	6	30	**12**	98	**6**	116	**17**	13	8	38	6	93	**4**	103
+30 mins.	6	11	7	24	8	**107**	2	**117**	3	18	13	34	6	81	2	89
+45 mins.	0	8	8	16	7	87	3	97	10	19	**15**	**44**	**9**	**104**	4	**117**
Total Volume	22	49	30	101	32	375	14	421	40	69	50	159	23	369	13	405
% App. Total	21.8	48.5	29.7		7.6	89.1	3.3		25.2	43.4	31.4		5.7	91.1	3.2	
PHF	.688	.766	.833	.815	.667	.876	.583	.900	.588	.908	.833	.903	.639	.887	.813	.865

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Large 2 Axle Vehicles

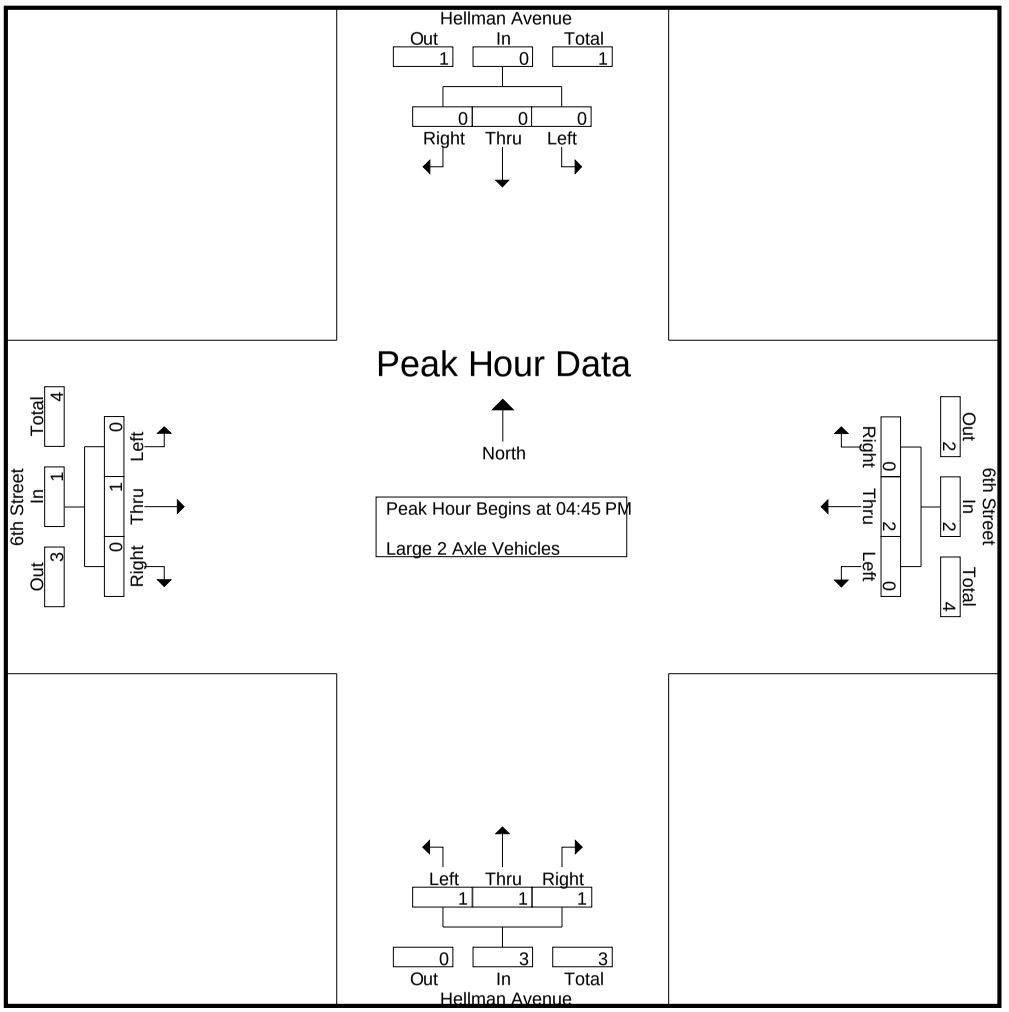
	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	2
04:15 PM	0	0	1	1	0	4	0	4	0	2	0	2	0	2	0	2	9
04:30 PM	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1	2	5
04:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	2
Total	0	2	1	3	0	5	0	5	0	3	1	4	0	5	1	6	18
05:00 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	2
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total	0	0	0	0	0	2	0	2	1	1	0	2	0	1	0	1	5
Grand Total	0	2	1	3	0	7	0	7	1	4	1	6	0	6	1	7	23
Apprch %	0	66.7	33.3		0	100	0		16.7	66.7	16.7		0	85.7	14.3		
Total %	0	8.7	4.3	13	0	30.4	0	30.4	4.3	17.4	4.3	26.1	0	26.1	4.3	30.4	

	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	0	0	**1**	1	0	**1**	0	**1**	**2**
05:00 PM	0	0	0	0	0	0	0	0	**1**	**1**	0	**2**	0	0	0	0	2
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	**2**	0	**2**	0	0	0	0	0	0	0	0	2
Total Volume	0	0	0	0	0	2	0	2	1	1	1	3	0	1	0	1	6
% App. Total	0	0	0		0	100	0		33.3	33.3	33.3		0	100	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.250	.250	.250	.375	.000	.250	.000	.250	.750

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City of Rancho Cucamonga
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E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				04:45 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	**1**	1	0	**1**	0	**1**
+15 mins.	0	0	0	0	0	0	0	0	**1**	**1**	0	**2**	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	**2**	0	**2**	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	2	0	2	1	1	1	3	0	1	0	1
% App. Total	0	0	0		0	100	0		33.3	33.3	33.3		0	100	0	
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.250	.250	.250	.375	.000	.250	.000	.250

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 3 Axle Vehicles

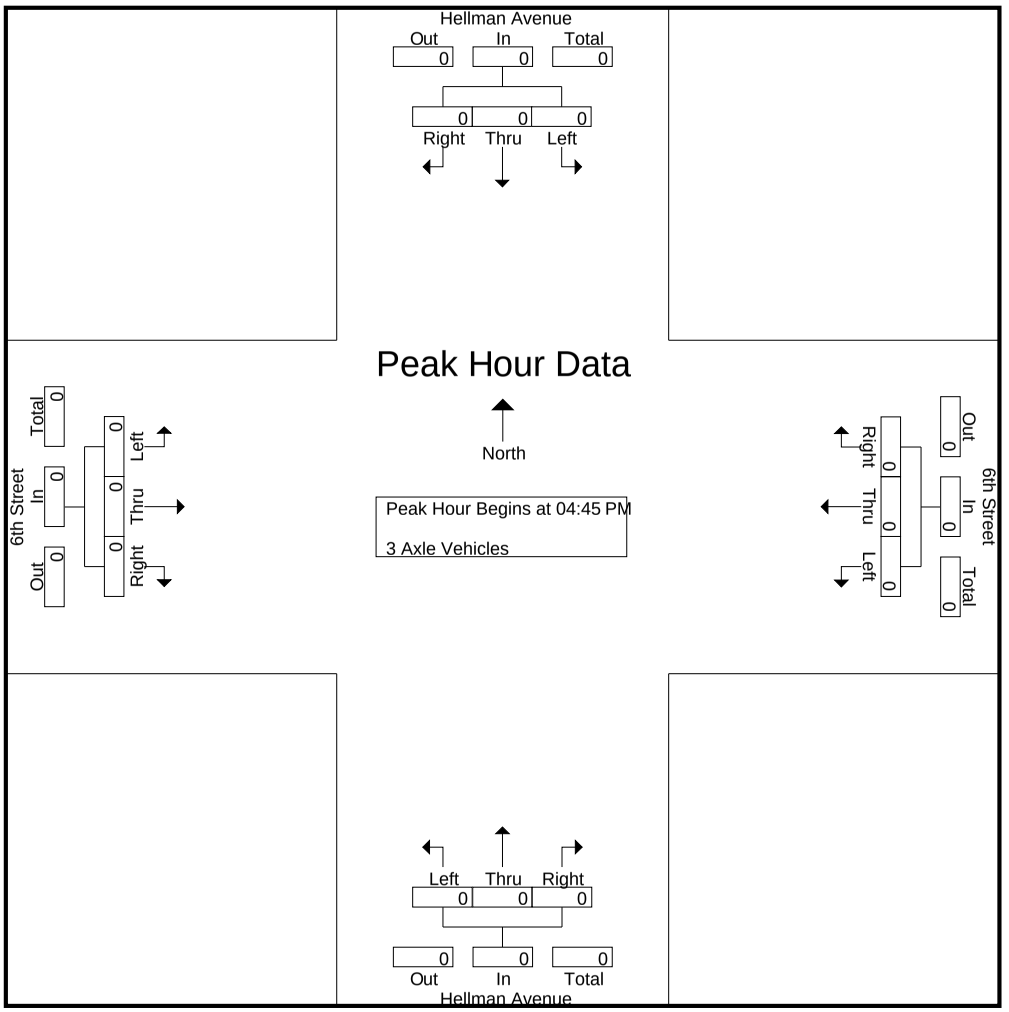
	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
Grand Total	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	2
Apprch %	100	0	0		0	0	100		0	0	0		0	0	0		
Total %	50	0	0	50	0	0	50	50	0	0	0	0	0	0	0	0	

	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				04:45 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 4+ Axle Trucks

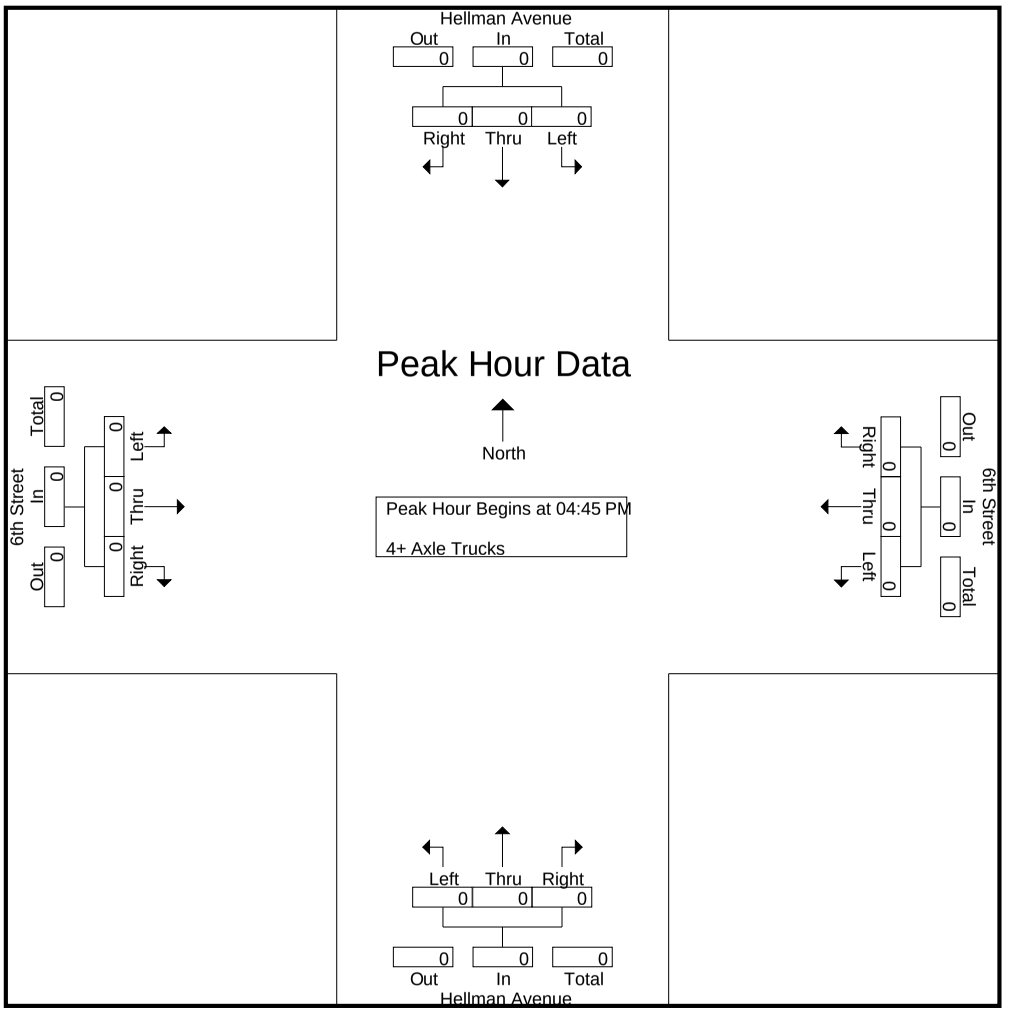
	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0		
Total %																	

	Hellman Avenue Southbound				6th Street Westbound				Hellman Avenue Northbound				6th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Hellman Avenue
E/W: 6th Street
Weather: Clear

File Name : 04_RNCHE6PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				04:45 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Archibald Avenue
E/W: 8th Street
Weather: Clear

File Name : 05_RNCAR8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

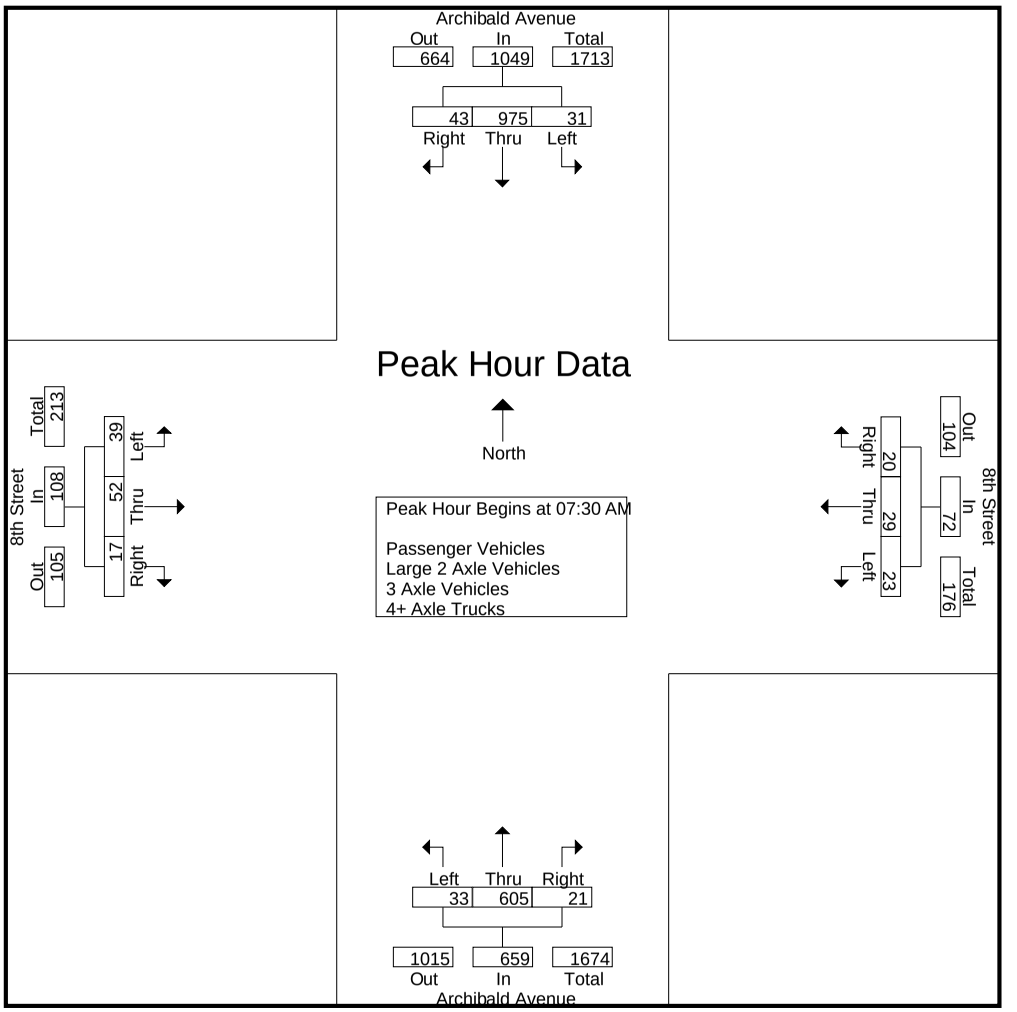
	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	5	243	6	254	5	1	0	6	6	90	3	99	4	6	1	11	370
07:15 AM	4	230	9	243	4	7	1	12	4	112	3	119	10	8	3	21	395
07:30 AM	7	278	13	298	3	7	6	16	11	146	7	164	13	12	1	26	504
07:45 AM	10	262	8	280	11	10	3	24	9	162	3	174	14	22	4	40	518
Total	26	1013	36	1075	23	25	10	58	30	510	16	556	41	48	9	98	1787
08:00 AM	7	221	11	239	7	7	6	20	5	159	2	166	5	10	5	20	445
08:15 AM	7	214	11	232	2	5	5	12	8	138	9	155	7	8	7	22	421
08:30 AM	5	224	7	236	5	5	2	12	7	170	2	179	11	7	6	24	451
08:45 AM	4	208	9	221	10	5	1	16	7	179	7	193	14	11	7	32	462
Total	23	867	38	928	24	22	14	60	27	646	20	693	37	36	25	98	1779
Grand Total	49	1880	74	2003	47	47	24	118	57	1156	36	1249	78	84	34	196	3566
Apprch %	2.4	93.9	3.7		39.8	39.8	20.3		4.6	92.6	2.9		39.8	42.9	17.3		
Total %	1.4	52.7	2.1	56.2	1.3	1.3	0.7	3.3	1.6	32.4	1	35	2.2	2.4	1	5.5	
Passenger Vehicles	44	1807	71	1922	39	43	20	102	51	1113	30	1194	73	80	27	180	3398
% Passenger Vehicles	89.8	96.1	95.9	96	83	91.5	83.3	86.4	89.5	96.3	83.3	95.6	93.6	95.2	79.4	91.8	95.3
Large 2 Axle Vehicles	4	51	2	57	2	3	3	8	4	34	3	41	3	4	2	9	115
% Large 2 Axle Vehicles	8.2	2.7	2.7	2.8	4.3	6.4	12.5	6.8	7	2.9	8.3	3.3	3.8	4.8	5.9	4.6	3.2
3 Axle Vehicles	0	11	1	12	3	0	1	4	1	6	2	9	2	0	4	6	31
% 3 Axle Vehicles	0	0.6	1.4	0.6	6.4	0	4.2	3.4	1.8	0.5	5.6	0.7	2.6	0	11.8	3.1	0.9
4+ Axle Trucks	1	11	0	12	3	1	0	4	1	3	1	5	0	0	1	1	22
% 4+ Axle Trucks	2	0.6	0	0.6	6.4	2.1	0	3.4	1.8	0.3	2.8	0.4	0	0	2.9	0.5	0.6

	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	7	**278**	**13**	**298**	3	7	**6**	16	**11**	146	7	164	13	12	1	26	504
07:45 AM	**10**	262	8	280	**11**	**10**	3	**24**	9	**162**	3	**174**	**14**	**22**	4	**40**	**518**
08:00 AM	7	221	11	239	7	7	6	20	5	159	2	166	5	10	5	20	445
08:15 AM	7	214	11	232	2	5	5	12	8	138	**9**	155	7	8	**7**	22	421
Total Volume	31	975	43	1049	23	29	20	72	33	605	21	659	39	52	17	108	1888
% App. Total	3	92.9	4.1		31.9	40.3	27.8		5	91.8	3.2		36.1	48.1	15.7		
PHF	.775	.877	.827	.880	.523	.725	.833	.750	.750	.934	.583	.947	.696	.591	.607	.675	.911

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City of Rancho Cucamonga
N/S: Archibald Avenue
E/W: 8th Street
Weather: Clear

File Name : 05_RNCAR8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:15 AM				08:00 AM				07:30 AM			
+0 mins.	5	243	6	254	4	7	1	12	5	159	2	166	13	12	1	26
+15 mins.	4	230	9	243	3	7	**6**	16	**8**	138	**9**	155	**14**	**22**	4	**40**
+30 mins.	7	**278**	**13**	**298**	**11**	**10**	3	**24**	7	170	2	179	5	10	5	20
+45 mins.	**10**	262	8	280	7	7	6	20	7	**179**	7	**193**	7	8	**7**	22
Total Volume	26	1013	36	1075	25	31	16	72	27	646	20	693	39	52	17	108
% App. Total	2.4	94.2	3.3		34.7	43.1	22.2		3.9	93.2	2.9		36.1	48.1	15.7	
PHF	.650	.911	.692	.902	.568	.775	.667	.750	.844	.902	.556	.898	.696	.591	.607	.675

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File Name : 05_RNCAR8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles

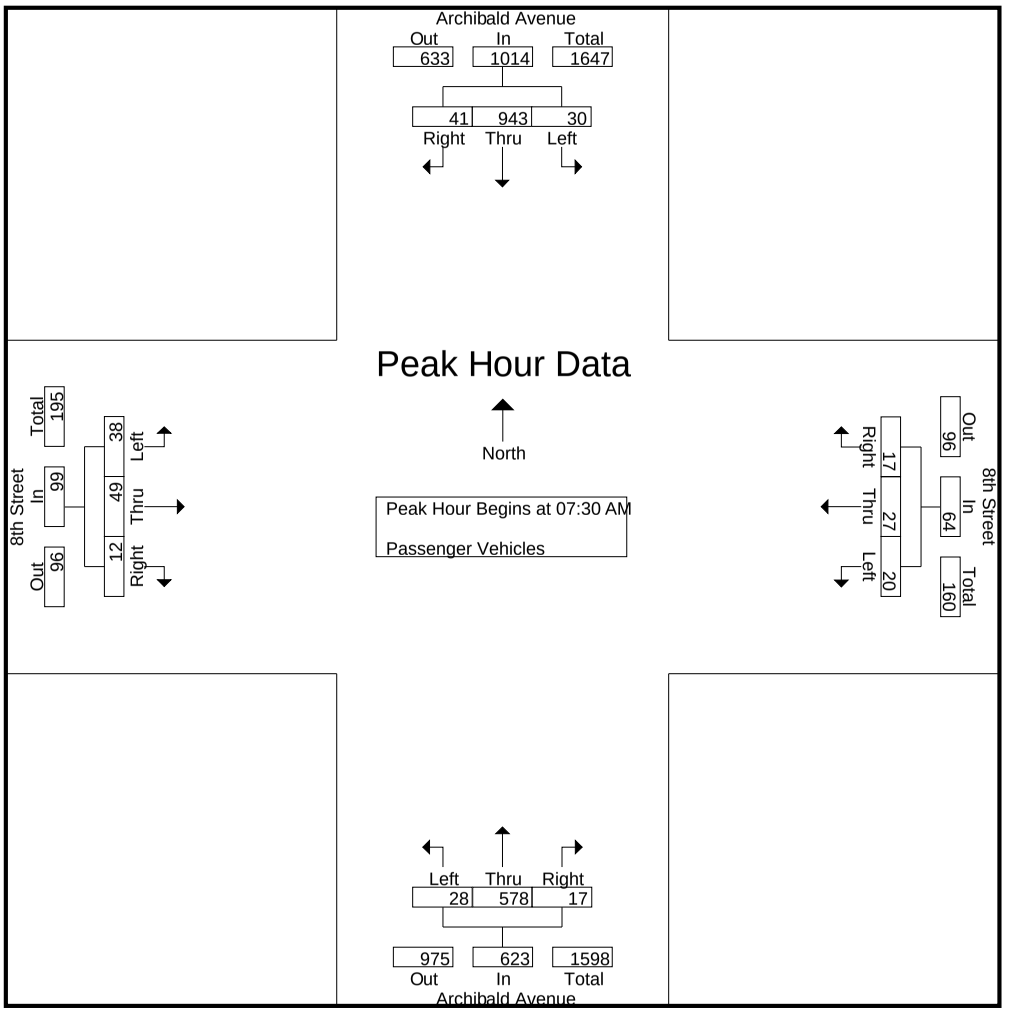
	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	4	236	6	246	3	1	0	4	6	86	2	94	3	6	1	10	354
07:15 AM	2	219	9	230	3	7	1	11	4	109	3	116	10	8	3	21	378
07:30 AM	7	272	13	292	3	7	5	15	8	138	6	152	12	12	1	25	484
07:45 AM	9	254	8	271	9	8	3	20	8	159	3	170	14	21	4	39	500
Total	22	981	36	1039	18	23	9	50	26	492	14	532	39	47	9	95	1716
08:00 AM	7	212	11	230	6	7	5	18	4	151	2	157	5	9	2	16	421
08:15 AM	7	205	9	221	2	5	4	11	8	130	6	144	7	7	5	19	395
08:30 AM	5	214	6	225	3	4	1	8	6	166	2	174	10	7	4	21	428
08:45 AM	3	195	9	207	10	4	1	15	7	174	6	187	12	10	7	29	438
Total	22	826	35	883	21	20	11	52	25	621	16	662	34	33	18	85	1682
Grand Total	44	1807	71	1922	39	43	20	102	51	1113	30	1194	73	80	27	180	3398
Apprch %	2.3	94	3.7		38.2	42.2	19.6		4.3	93.2	2.5		40.6	44.4	15		
Total %	1.3	53.2	2.1	56.6	1.1	1.3	0.6	3	1.5	32.8	0.9	35.1	2.1	2.4	0.8	5.3	

	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	7	**272**	**13**	**292**	3	7	**5**	15	**8**	138	**6**	152	12	12	1	25	484
07:45 AM	**9**	254	8	271	**9**	**8**	3	**20**	8	**159**	3	**170**	**14**	**21**	4	**39**	**500**
08:00 AM	7	212	11	230	6	7	5	18	4	151	2	157	5	9	2	16	421
08:15 AM	7	205	9	221	2	5	4	11	8	130	6	144	7	7	**5**	19	395
Total Volume	30	943	41	1014	20	27	17	64	28	578	17	623	38	49	12	99	1800
% App. Total	3	93	4		31.2	42.2	26.6		4.5	92.8	2.7		38.4	49.5	12.1		
PHF	.833	.867	.788	.868	.556	.844	.850	.800	.875	.909	.708	.916	.679	.583	.600	.635	.900

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File Name : 05_RNCAR8AM
Site Code : 07518233
Start Date : 3/29/2018
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Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	7	**272**	**13**	**292**	3	7	**5**	15	**8**	138	**6**	152	12	12	1	25
+15 mins.	**9**	254	8	271	**9**	**8**	3	**20**	8	**159**	3	**170**	**14**	**21**	4	**39**
+30 mins.	7	212	11	230	6	7	5	18	4	151	2	157	5	9	2	16
+45 mins.	7	205	9	221	2	5	4	11	8	130	6	144	7	7	**5**	19
Total Volume	30	943	41	1014	20	27	17	64	28	578	17	623	38	49	12	99
% App. Total	3	93	4		31.2	42.2	26.6		4.5	92.8	2.7		38.4	49.5	12.1	
PHF	.833	.867	.788	.868	.556	.844	.850	.800	.875	.909	.708	.916	.679	.583	.600	.635

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File Name : 05_RNCAR8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Large 2 Axle Vehicles

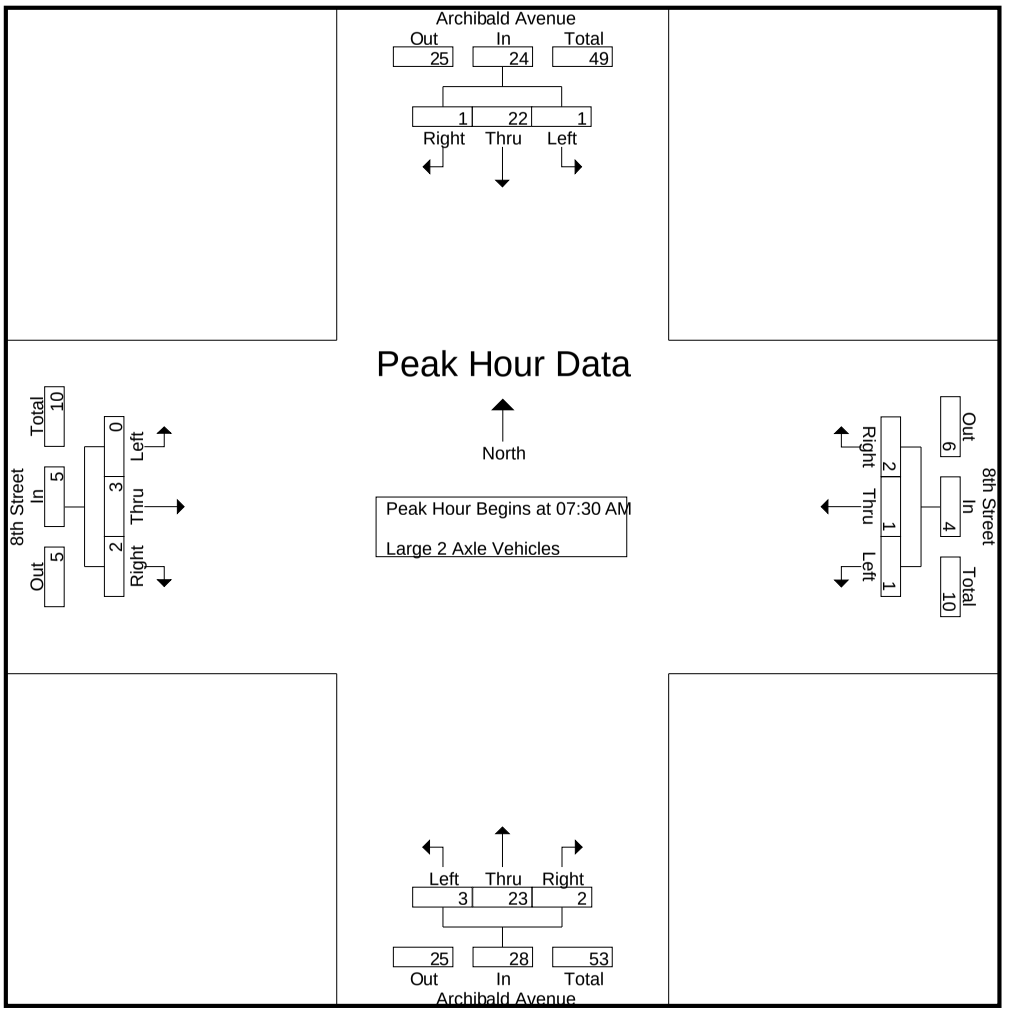
	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	5	0	6	1	0	0	1	0	4	0	4	1	0	0	1	12
07:15 AM	2	9	0	11	0	0	0	0	0	2	0	2	0	0	0	0	13
07:30 AM	0	5	0	5	0	0	1	1	2	7	1	10	0	0	0	0	16
07:45 AM	1	5	0	6	1	1	0	2	1	3	0	4	0	1	0	1	13
Total	4	24	0	28	2	1	1	4	3	16	1	20	1	1	0	2	54
08:00 AM	0	7	0	7	0	0	1	1	0	7	0	7	0	1	1	2	17
08:15 AM	0	5	1	6	0	0	0	0	0	6	1	7	0	1	1	2	15
08:30 AM	0	8	1	9	0	1	1	2	1	1	0	2	1	0	0	1	14
08:45 AM	0	7	0	7	0	1	0	1	0	4	1	5	1	1	0	2	15
Total	0	27	2	29	0	2	2	4	1	18	2	21	2	3	2	7	61
Grand Total	4	51	2	57	2	3	3	8	4	34	3	41	3	4	2	9	115
Apprch %	7	89.5	3.5		25	37.5	37.5		9.8	82.9	7.3		33.3	44.4	22.2		
Total %	3.5	44.3	1.7	49.6	1.7	2.6	2.6	7	3.5	29.6	2.6	35.7	2.6	3.5	1.7	7.8	

	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	5	0	5	0	0	**1**	1	**2**	**7**	**1**	**10**	0	0	0	0	16
07:45 AM	**1**	5	0	6	**1**	**1**	0	**2**	1	3	0	4	0	**1**	0	1	13
08:00 AM	0	**7**	0	**7**	0	0	1	1	0	7	0	7	0	1	**1**	**2**	**17**
08:15 AM	0	5	**1**	6	0	0	0	0	0	6	1	7	0	1	1	2	15
Total Volume	1	22	1	24	1	1	2	4	3	23	2	28	0	3	2	5	61
% App. Total	4.2	91.7	4.2		25	25	50		10.7	82.1	7.1		0	60	40		
PHF	.250	.786	.250	.857	.250	.250	.500	.500	.375	.821	.500	.700	.000	.750	.500	.625	.897

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City of Rancho Cucamonga
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Weather: Clear

File Name : 05_RNCAR8AM
Site Code : 07518233
Start Date : 3/29/2018
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Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	5	0	5	0	0	**1**	1	**2**	**7**	**1**	**10**	0	0	0	0
+15 mins.	**1**	5	0	6	**1**	**1**	0	**2**	1	3	0	4	0	**1**	0	1
+30 mins.	0	**7**	0	**7**	0	0	1	1	0	7	0	7	0	1	**1**	**2**
+45 mins.	0	5	**1**	6	0	0	0	0	0	6	1	7	0	1	1	2
Total Volume	1	22	1	24	1	1	2	4	3	23	2	28	0	3	2	5
% App. Total	4.2	91.7	4.2		25	25	50		10.7	82.1	7.1		0	60	40	
PHF	.250	.786	.250	.857	.250	.250	.500	.500	.375	.821	.500	.700	.000	.750	.500	.625

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File Name : 05_RNCAR8AM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 3 Axle Vehicles

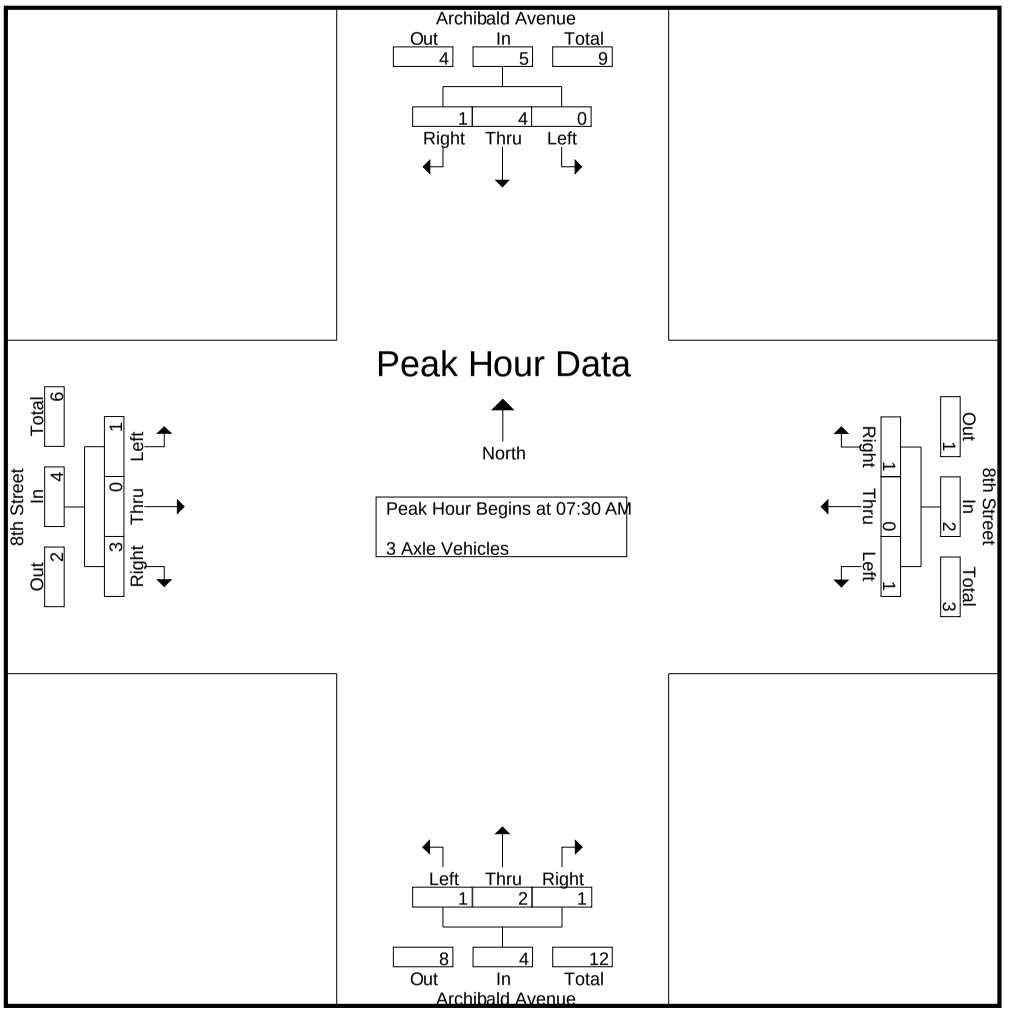
	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	1	0	1	1	0	0	1	0	0	1	1	0	0	0	0	3
07:15 AM	0	1	0	1	1	0	0	1	0	1	0	1	0	0	0	0	3
07:30 AM	0	1	0	1	0	0	0	0	0	1	0	1	1	0	0	1	3
07:45 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
Total	0	3	0	3	3	0	0	3	0	2	1	3	1	0	0	1	10
08:00 AM	0	1	0	1	0	0	0	0	1	0	0	1	0	0	2	2	4
08:15 AM	0	2	1	3	0	0	1	1	0	1	1	2	0	0	1	1	7
08:30 AM	0	2	0	2	0	0	0	0	0	2	0	2	0	0	1	1	5
08:45 AM	0	3	0	3	0	0	0	0	0	1	0	1	1	0	0	1	5
Total	0	8	1	9	0	0	1	1	1	4	1	6	1	0	4	5	21
Grand Total	0	11	1	12	3	0	1	4	1	6	2	9	2	0	4	6	31
Apprch %	0	91.7	8.3		75	0	25		11.1	66.7	22.2		33.3	0	66.7		
Total %	0	35.5	3.2	38.7	9.7	0	3.2	12.9	3.2	19.4	6.5	29	6.5	0	12.9	19.4	

	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	1	0	1	0	0	0	0	0	**1**	0	1	**1**	0	0	1	3
07:45 AM	0	0	0	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0	1
08:00 AM	0	1	0	1	0	0	0	0	**1**	0	0	1	0	0	**2**	**2**	4
08:15 AM	0	**2**	**1**	**3**	0	0	**1**	1	0	1	**1**	**2**	0	0	1	1	**7**
Total Volume	0	4	1	5	1	0	1	2	1	2	1	4	1	0	3	4	15
% App. Total	0	80	20		50	0	50		25	50	25		25	0	75		
PHF	.000	.500	.250	.417	.250	.000	.250	.500	.250	.500	.250	.500	.250	.000	.375	.500	.536

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Start Date : 3/29/2018
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Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	1	0	1	0	0	0	0	0	**1**	0	1	**1**	0	0	1
+15 mins.	0	0	0	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0
+30 mins.	0	1	0	1	0	0	0	0	**1**	0	0	1	0	0	**2**	**2**
+45 mins.	0	**2**	**1**	**3**	0	0	**1**	1	0	1	**1**	**2**	0	0	1	1
Total Volume	0	4	1	5	1	0	1	2	1	2	1	4	1	0	3	4
% App. Total	0	80	20		50	0	50		25	50	25		25	0	75	
PHF	.000	.500	.250	.417	.250	.000	.250	.500	.250	.500	.250	.500	.250	.000	.375	.500

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File Name : 05_RNCAR8AM
Site Code : 07518233
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Page No : 1

Groups Printed- 4+ Axle Trucks

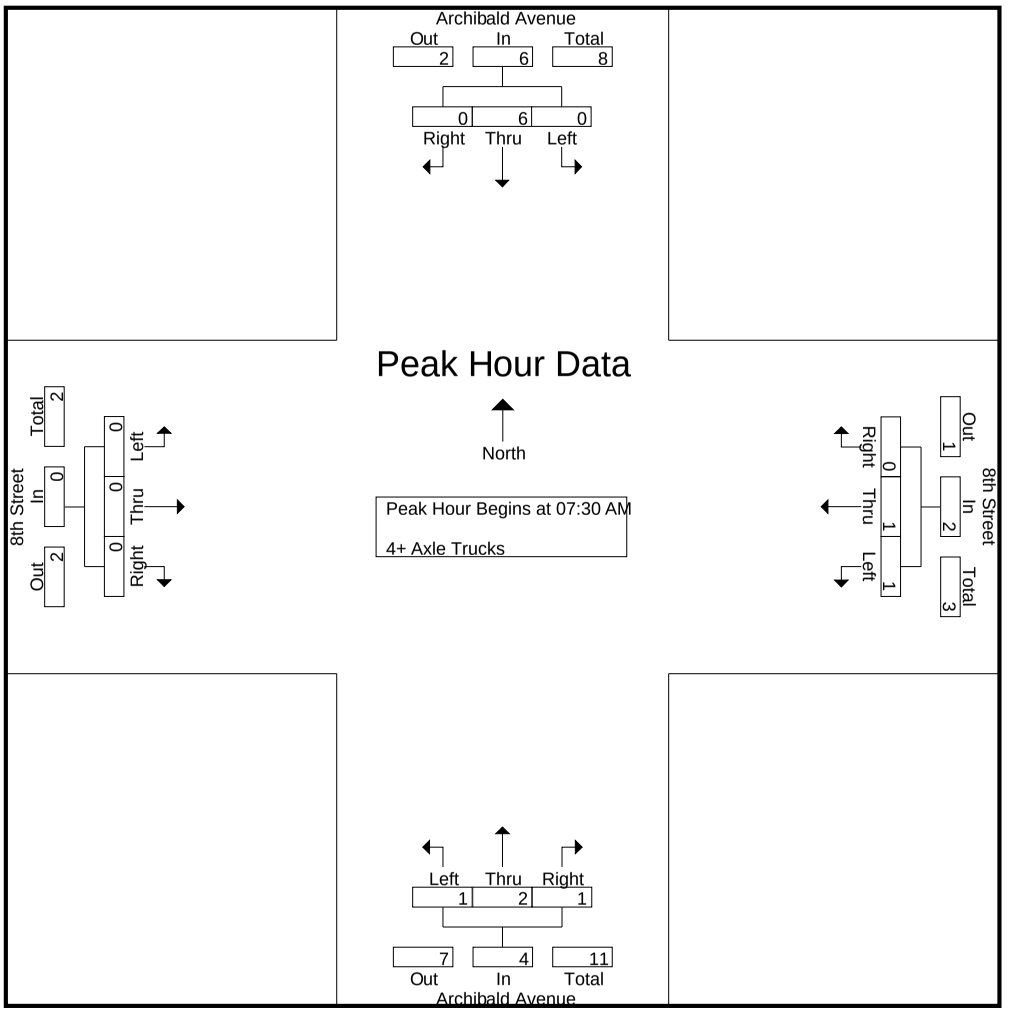
	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
07:45 AM	0	3	0	3	0	1	0	1	0	0	0	0	0	0	0	0	4
Total	0	5	0	5	0	1	0	1	1	0	0	1	0	0	0	0	7
08:00 AM	0	1	0	1	1	0	0	1	0	1	0	1	0	0	0	0	3
08:15 AM	0	2	0	2	0	0	0	0	0	1	1	2	0	0	0	0	4
08:30 AM	0	0	0	0	2	0	0	2	0	1	0	1	0	0	1	1	4
08:45 AM	1	3	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
Total	1	6	0	7	3	0	0	3	0	3	1	4	0	0	1	1	15
Grand Total	1	11	0	12	3	1	0	4	1	3	1	5	0	0	1	1	22
Apprch %	8.3	91.7	0		75	25	0		20	60	20		0	0	100		
Total %	4.5	50	0	54.5	13.6	4.5	0	18.2	4.5	13.6	4.5	22.7	0	0	4.5	4.5	

	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	0	0	0	**1**	0	0	1	0	0	0	0	1
07:45 AM	0	**3**	0	**3**	0	**1**	0	**1**	0	0	0	0	0	0	0	0	**4**
08:00 AM	0	1	0	1	**1**	0	0	1	0	**1**	0	1	0	0	0	0	3
08:15 AM	0	2	0	2	0	0	0	0	0	1	**1**	**2**	0	0	0	0	4
Total Volume	0	6	0	6	1	1	0	2	1	2	1	4	0	0	0	0	12
% App. Total	0	100	0		50	50	0		25	50	25		0	0	0		
PHF	.000	.500	.000	.500	.250	.250	.000	.500	.250	.500	.250	.500	.000	.000	.000	.000	.750

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City of Rancho Cucamonga
N/S: Archibald Avenue
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Weather: Clear

File Name : 05_RNCAR8AM
Site Code : 07518233
Start Date : 3/29/2018
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Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	0	0	0	0	0	0	0	**1**	0	0	1	0	0	0	0
+15 mins.	0	**3**	0	**3**	0	**1**	0	**1**	0	0	0	0	0	0	0	0
+30 mins.	0	1	0	1	**1**	0	0	1	0	**1**	0	1	0	0	0	0
+45 mins.	0	2	0	2	0	0	0	0	0	1	**1**	**2**	0	0	0	0
Total Volume	0	6	0	6	1	1	0	2	1	2	1	4	0	0	0	0
% App. Total	0	100	0		50	50	0		25	50	25		0	0	0	
PHF	.000	.500	.000	.500	.250	.250	.000	.500	.250	.500	.250	.500	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Archibald Avenue
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Weather: Clear

File Name : 05_RNCAR8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

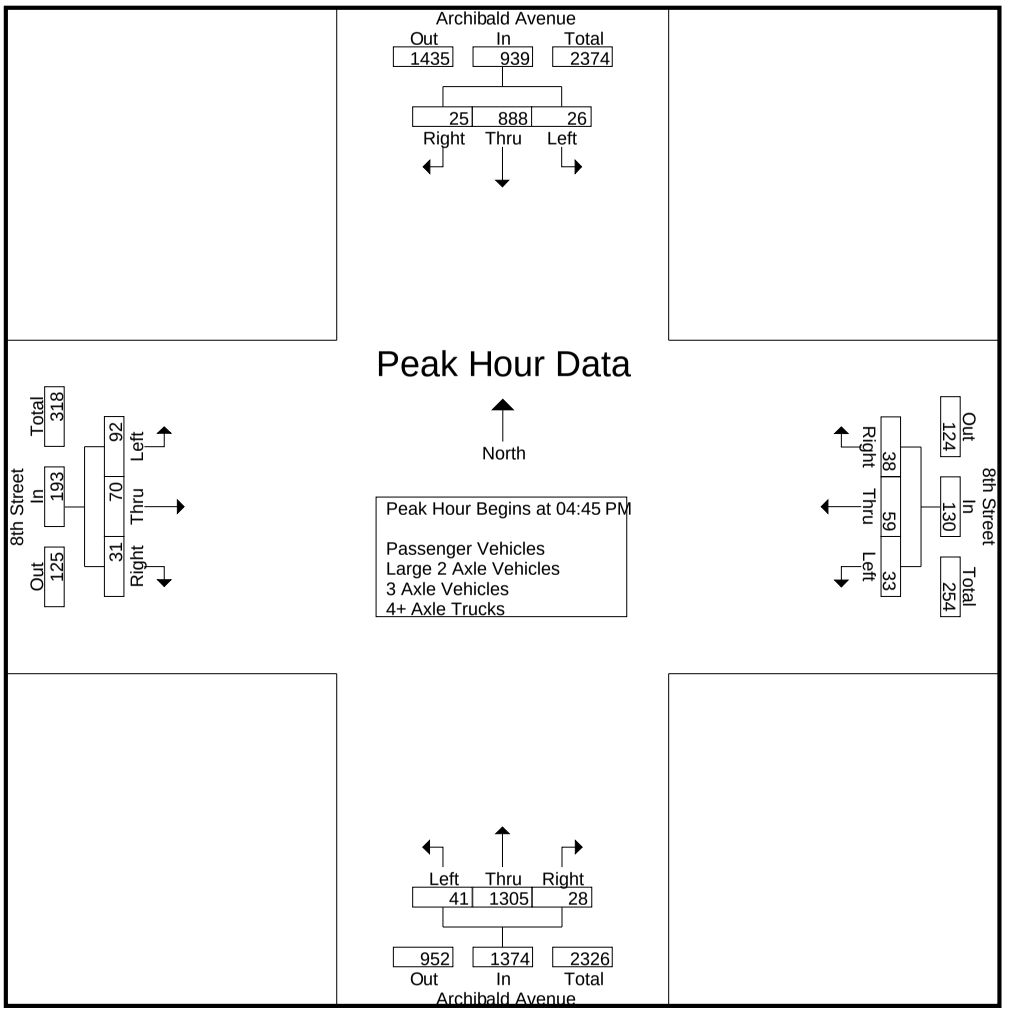
	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	5	202	7	214	12	9	13	34	3	271	11	285	24	10	5	39	572
04:15 PM	6	221	12	239	16	9	7	32	5	256	9	270	14	14	4	32	573
04:30 PM	3	209	12	224	10	17	11	38	5	257	10	272	26	17	10	53	587
04:45 PM	4	211	6	221	10	8	9	27	7	308	7	322	27	16	6	49	619
Total	18	843	37	898	48	43	40	131	20	1092	37	1149	91	57	25	173	2351
05:00 PM	11	216	6	233	8	16	11	35	14	343	8	365	22	23	9	54	687
05:15 PM	5	231	8	244	6	12	9	27	8	334	6	348	16	15	9	40	659
05:30 PM	6	230	5	241	9	23	9	41	12	320	7	339	27	16	7	50	671
05:45 PM	4	189	8	201	7	14	3	24	6	311	9	326	19	13	6	38	589
Total	26	866	27	919	30	65	32	127	40	1308	30	1378	84	67	31	182	2606
Grand Total	44	1709	64	1817	78	108	72	258	60	2400	67	2527	175	124	56	355	4957
Apprch %	2.4	94.1	3.5		30.2	41.9	27.9		2.4	95	2.7		49.3	34.9	15.8		
Total %	0.9	34.5	1.3	36.7	1.6	2.2	1.5	5.2	1.2	48.4	1.4	51	3.5	2.5	1.1	7.2	
Passenger Vehicles	43	1676	60	1779	72	101	67	240	51	2363	65	2479	171	121	48	340	4838
% Passenger Vehicles	97.7	98.1	93.8	97.9	92.3	93.5	93.1	93	85	98.5	97	98.1	97.7	97.6	85.7	95.8	97.6
Large 2 Axle Vehicles	1	21	3	25	3	7	3	13	4	30	1	35	3	2	4	9	82
% Large 2 Axle Vehicles	2.3	1.2	4.7	1.4	3.8	6.5	4.2	5	6.7	1.2	1.5	1.4	1.7	1.6	7.1	2.5	1.7
3 Axle Vehicles	0	2	1	3	1	0	0	1	1	1	0	2	1	1	0	2	8
% 3 Axle Vehicles	0	0.1	1.6	0.2	1.3	0	0	0.4	1.7	0	0	0.1	0.6	0.8	0	0.6	0.2
4+ Axle Trucks	0	10	0	10	2	0	2	4	4	6	1	11	0	0	4	4	29
% 4+ Axle Trucks	0	0.6	0	0.6	2.6	0	2.8	1.6	6.7	0.2	1.5	0.4	0	0	7.1	1.1	0.6

	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	4	211	6	221	**10**	8	9	27	7	308	7	322	**27**	16	6	49	619
05:00 PM	**11**	216	6	233	8	16	**11**	35	**14**	**343**	**8**	**365**	22	**23**	**9**	**54**	**687**
05:15 PM	5	**231**	**8**	**244**	6	12	9	27	8	334	6	348	16	15	9	40	659
05:30 PM	6	230	5	241	9	**23**	9	**41**	12	320	7	339	27	16	7	50	671
Total Volume	26	888	25	939	33	59	38	130	41	1305	28	1374	92	70	31	193	2636
% App. Total	2.8	94.6	2.7		25.4	45.4	29.2		3	95	2		47.7	36.3	16.1		
PHF	.591	.961	.781	.962	.825	.641	.864	.793	.732	.951	.875	.941	.852	.761	.861	.894	.959

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File Name : 05_RNCAR8PM
Site Code : 07518233
Start Date : 3/29/2018
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Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:15 PM				05:00 PM				04:30 PM			
+0 mins.	4	211	6	221	**16**	9	7	32	**14**	**343**	8	**365**	26	17	**10**	53
+15 mins.	**11**	216	6	233	10	**17**	**11**	**38**	8	334	6	348	**27**	16	6	49
+30 mins.	5	**231**	**8**	**244**	10	8	9	27	12	320	7	339	22	**23**	9	**54**
+45 mins.	6	230	5	241	8	16	11	35	6	311	**9**	326	16	15	9	40
Total Volume	26	888	25	939	44	50	38	132	40	1308	30	1378	91	71	34	196
% App. Total	2.8	94.6	2.7		33.3	37.9	28.8		2.9	94.9	2.2		46.4	36.2	17.3	
PHF	.591	.961	.781	.962	.688	.735	.864	.868	.714	.953	.833	.944	.843	.772	.850	.907

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City of Rancho Cucamonga
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Weather: Clear

File Name : 05_RNCAR8PM
Site Code : 07518233
Start Date : 3/29/2018
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Groups Printed- Passenger Vehicles

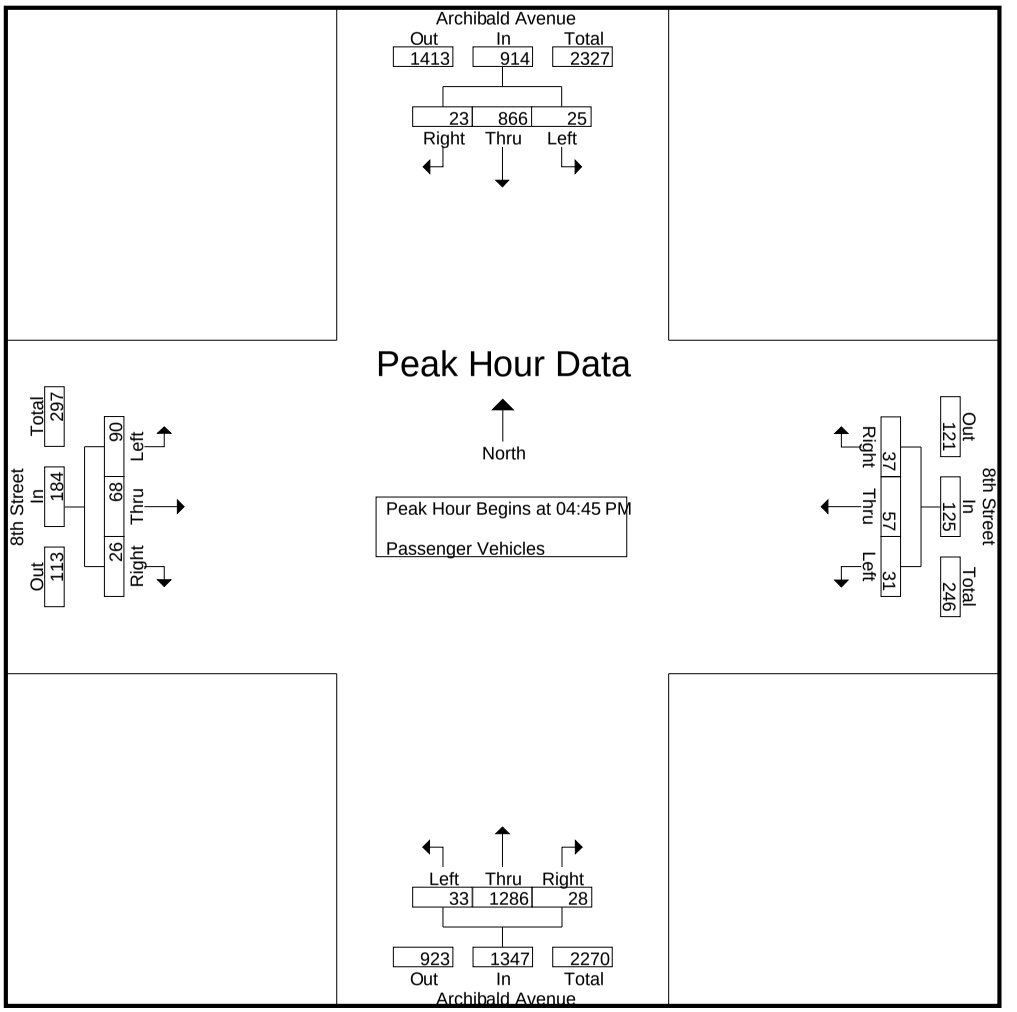
	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	5	197	7	209	12	8	13	33	3	268	11	282	24	10	4	38	562
04:15 PM	6	218	11	235	13	8	5	26	5	253	8	266	14	14	2	30	557
04:30 PM	3	206	11	220	9	16	9	34	5	252	10	267	25	17	10	52	573
04:45 PM	3	203	6	212	10	8	9	27	7	306	7	320	25	15	6	46	605
Total	17	824	35	876	44	40	36	120	20	1079	36	1135	88	56	22	166	2297
05:00 PM	11	210	6	227	6	14	11	31	11	339	8	358	22	23	8	53	669
05:15 PM	5	228	6	239	6	12	9	27	5	328	6	339	16	15	6	37	642
05:30 PM	6	225	5	236	9	23	8	40	10	313	7	330	27	15	6	48	654
05:45 PM	4	189	8	201	7	12	3	22	5	304	8	317	18	12	6	36	576
Total	26	852	25	903	28	61	31	120	31	1284	29	1344	83	65	26	174	2541
Grand Total	43	1676	60	1779	72	101	67	240	51	2363	65	2479	171	121	48	340	4838
Apprch %	2.4	94.2	3.4		30	42.1	27.9		2.1	95.3	2.6		50.3	35.6	14.1		
Total %	0.9	34.6	1.2	36.8	1.5	2.1	1.4	5	1.1	48.8	1.3	51.2	3.5	2.5	1	7	

	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	3	203	**6**	212	**10**	8	9	27	7	306	7	320	25	15	6	46	605
05:00 PM	**11**	210	6	227	6	14	**11**	31	**11**	**339**	**8**	**358**	22	**23**	**8**	**53**	**669**
05:15 PM	5	**228**	6	**239**	6	12	9	27	5	328	6	339	16	15	6	37	642
05:30 PM	6	225	5	236	9	**23**	8	**40**	10	313	7	330	**27**	15	6	48	654
Total Volume	25	866	23	914	31	57	37	125	33	1286	28	1347	90	68	26	184	2570
% App. Total	2.7	94.7	2.5		24.8	45.6	29.6		2.4	95.5	2.1		48.9	37	14.1		
PHF	.568	.950	.958	.956	.775	.620	.841	.781	.750	.948	.875	.941	.833	.739	.813	.868	.960

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City of Rancho Cucamonga
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Weather: Clear

File Name : 05_RNCAR8PM
Site Code : 07518233
Start Date : 3/29/2018
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Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				04:45 PM			
+0 mins.	3	203	**6**	212	**10**	8	9	27	7	306	7	320	25	15	6	46
+15 mins.	**11**	210	6	227	6	14	**11**	31	**11**	**339**	**8**	**358**	22	**23**	**8**	**53**
+30 mins.	5	**228**	6	**239**	6	12	9	27	5	328	6	339	16	15	6	37
+45 mins.	6	225	5	236	9	**23**	8	**40**	10	313	7	330	**27**	15	6	48
Total Volume	25	866	23	914	31	57	37	125	33	1286	28	1347	90	68	26	184
% App. Total	2.7	94.7	2.5		24.8	45.6	29.6		2.4	95.5	2.1		48.9	37	14.1	
PHF	.568	.950	.958	.956	.775	.620	.841	.781	.750	.948	.875	.941	.833	.739	.813	.868

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File Name : 05_RNCAR8PM
Site Code : 07518233
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Groups Printed- Large 2 Axle Vehicles

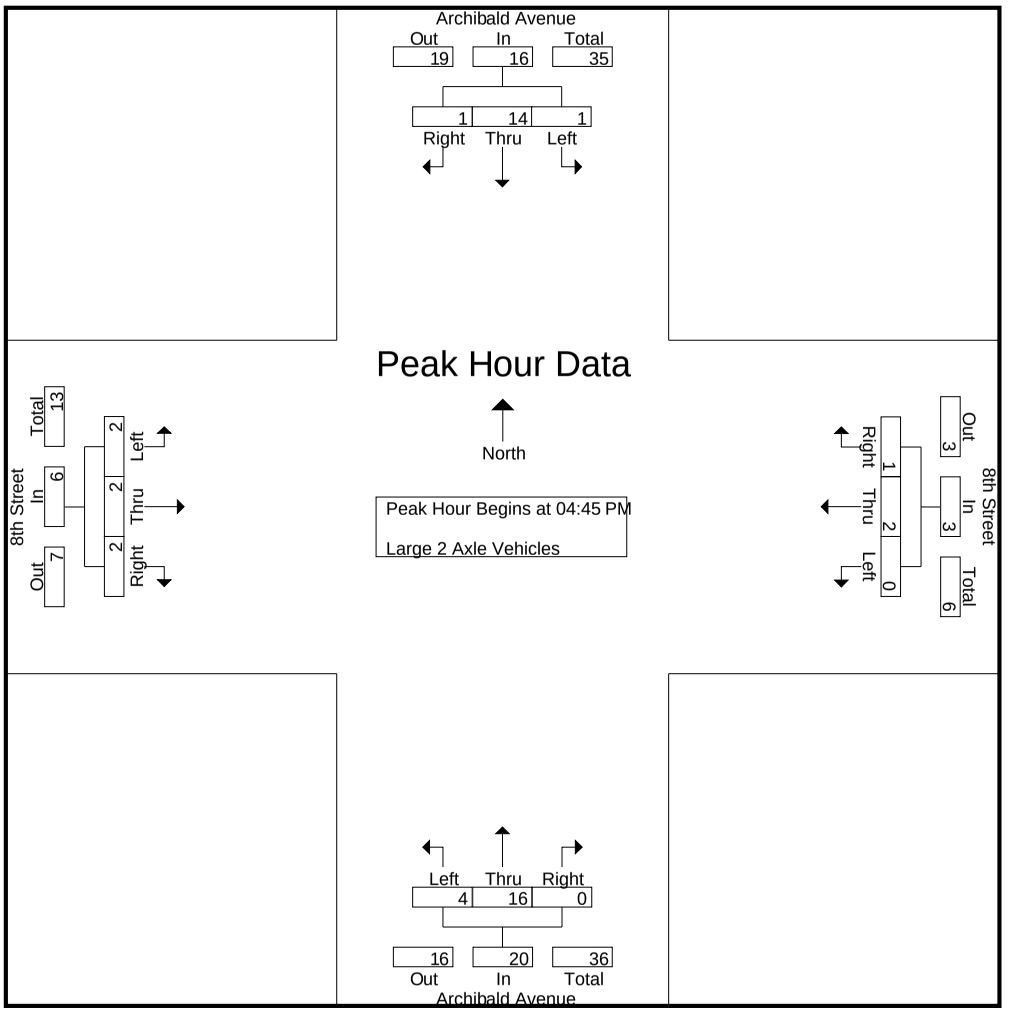
	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	3	0	3	0	1	0	1	0	3	0	3	0	0	0	0	7
04:15 PM	0	2	1	3	3	1	0	4	0	2	0	2	0	0	2	2	11
04:30 PM	0	2	1	3	0	1	2	3	0	3	0	3	1	0	0	1	10
04:45 PM	1	4	0	5	0	0	0	0	0	1	0	1	2	1	0	3	9
Total	1	11	2	14	3	3	2	8	0	9	0	9	3	1	2	6	37
05:00 PM	0	3	0	3	0	2	0	2	1	4	0	5	0	0	0	0	10
05:15 PM	0	3	1	4	0	0	0	0	2	5	0	7	0	0	1	1	12
05:30 PM	0	4	0	4	0	0	1	1	1	6	0	7	0	1	1	2	14
05:45 PM	0	0	0	0	0	2	0	2	0	6	1	7	0	0	0	0	9
Total	0	10	1	11	0	4	1	5	4	21	1	26	0	1	2	3	45
Grand Total	1	21	3	25	3	7	3	13	4	30	1	35	3	2	4	9	82
Apprch %	4	84	12		23.1	53.8	23.1		11.4	85.7	2.9		33.3	22.2	44.4		
Total %	1.2	25.6	3.7	30.5	3.7	8.5	3.7	15.9	4.9	36.6	1.2	42.7	3.7	2.4	4.9	11	

	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**1**	**4**	0	**5**	0	0	0	0	0	1	0	1	**2**	**1**	0	**3**	9
05:00 PM	0	3	0	3	0	**2**	0	**2**	1	4	0	5	0	0	0	0	10
05:15 PM	0	3	**1**	4	0	0	0	0	**2**	5	0	**7**	0	0	**1**	1	12
05:30 PM	0	4	0	4	0	0	**1**	1	1	**6**	0	7	0	1	1	2	**14**
Total Volume	1	14	1	16	0	2	1	3	4	16	0	20	2	2	2	6	45
% App. Total	6.2	87.5	6.2		0	66.7	33.3		20	80	0		33.3	33.3	33.3		
PHF	.250	.875	.250	.800	.000	.250	.250	.375	.500	.667	.000	.714	.250	.500	.500	.500	.804

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File Name : 05_RNCAR8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				04:45 PM			
+0 mins.	**1**	**4**	0	**5**	0	0	0	0	0	1	0	1	**2**	**1**	0	**3**
+15 mins.	0	3	0	3	0	**2**	0	**2**	1	4	0	5	0	0	0	0
+30 mins.	0	3	**1**	4	0	0	0	0	**2**	5	0	**7**	0	0	**1**	1
+45 mins.	0	4	0	4	0	0	**1**	1	1	**6**	0	7	0	1	1	2
Total Volume	1	14	1	16	0	2	1	3	4	16	0	20	2	2	2	6
% App. Total	6.2	87.5	6.2		0	66.7	33.3		20	80	0		33.3	33.3	33.3	
PHF	.250	.875	.250	.800	.000	.250	.250	.375	.500	.667	.000	.714	.250	.500	.500	.500

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Weather: Clear

File Name : 05_RNCAR8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 3 Axle Vehicles

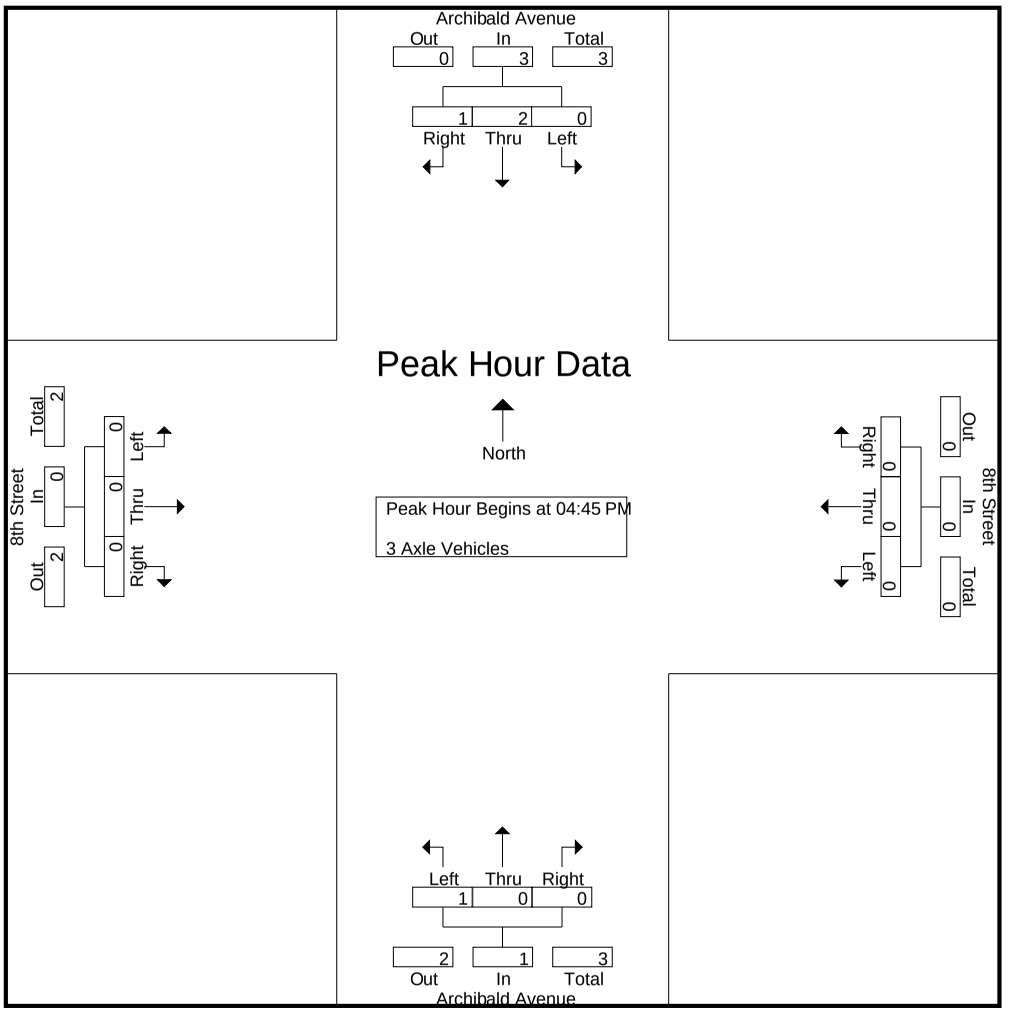
	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	2
04:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	1	0	1	1	0	0	1	0	1	0	1	0	0	0	0	3
05:00 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	2
Total	0	1	1	2	0	0	0	0	1	0	0	1	1	1	0	2	5
Grand Total	0	2	1	3	1	0	0	1	1	1	0	2	1	1	0	2	8
Apprch %	0	66.7	33.3		100	0	0		50	50	0		50	50	0		
Total %	0	25	12.5	37.5	12.5	0	0	12.5	12.5	12.5	0	25	12.5	12.5	0	25	

	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	**1**
05:00 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	**1**	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0	1
Total Volume	0	2	1	3	0	0	0	0	1	0	0	1	0	0	0	0	4
% App. Total	0	66.7	33.3		0	0	0		100	0	0		0	0	0		
PHF	.000	.500	.250	.750	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000	1.00

Counts Unlimited
PO Box 1178
Corona, CA 92878
951-268-6268

City of Rancho Cucamonga
N/S: Archibald Avenue
E/W: 8th Street
Weather: Clear

File Name : 05_RNCAR8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				04:45 PM			
+0 mins.	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	**1**	1	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0
Total Volume	0	2	1	3	0	0	0	0	1	0	0	1	0	0	0	0
% App. Total	0	66.7	33.3		0	0	0		100	0	0		0	0	0	
PHF	.000	.500	.250	.750	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Archibald Avenue
E/W: 8th Street
Weather: Clear

File Name : 05_RNCAR8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 1

Groups Printed- 4+ Axle Trucks

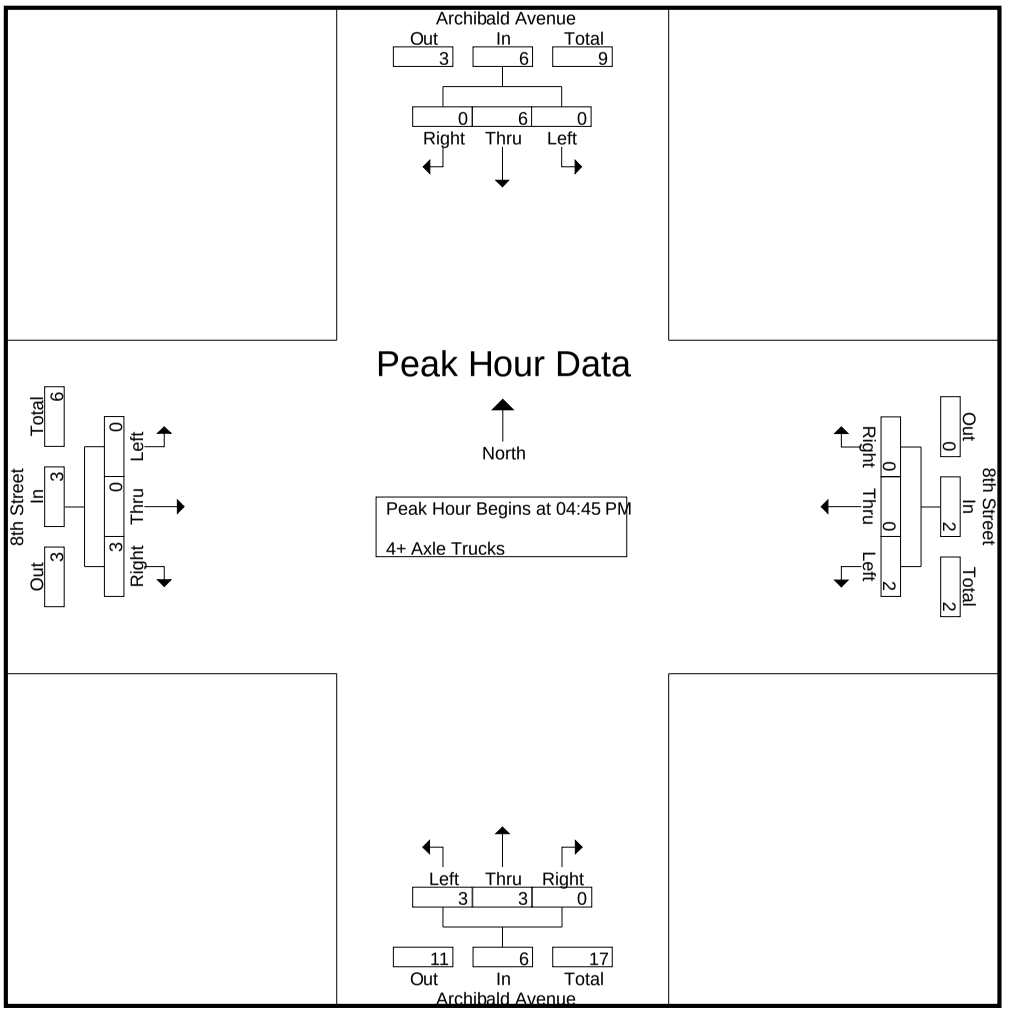
	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	1	1	3
04:15 PM	0	1	0	1	0	0	2	2	0	1	1	2	0	0	0	0	5
04:30 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
04:45 PM	0	3	0	3	0	0	0	0	0	1	0	1	0	0	0	0	4
Total	0	7	0	7	0	0	2	2	0	3	1	4	0	0	1	1	14
05:00 PM	0	2	0	2	2	0	0	2	2	0	0	2	0	0	1	1	7
05:15 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	0	2	2	4
05:30 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	2
Total	0	3	0	3	2	0	0	2	4	3	0	7	0	0	3	3	15
Grand Total	0	10	0	10	2	0	2	4	4	6	1	11	0	0	4	4	29
Apprch %	0	100	0		50	0	50		36.4	54.5	9.1		0	0	100		
Total %	0	34.5	0	34.5	6.9	0	6.9	13.8	13.8	20.7	3.4	37.9	0	0	13.8	13.8	

	Archibald Avenue Southbound				8th Street Westbound				Archibald Avenue Northbound				8th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	**3**	0	**3**	0	0	0	0	0	**1**	0	1	0	0	0	0	4
05:00 PM	0	2	0	2	**2**	0	0	**2**	**2**	0	0	**2**	0	0	1	1	**7**
05:15 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	0	**2**	**2**	4
05:30 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
Total Volume	0	6	0	6	2	0	0	2	3	3	0	6	0	0	3	3	17
% App. Total	0	100	0		100	0	0		50	50	0		0	0	100		
PHF	.000	.500	.000	.500	.250	.000	.000	.250	.375	.750	.000	.750	.000	.000	.375	.375	.607

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City of Rancho Cucamonga
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File Name : 05_RNCAR8PM
Site Code : 07518233
Start Date : 3/29/2018
Page No : 2



Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				04:45 PM			
+0 mins.	0	**3**	0	**3**	0	0	0	0	0	**1**	0	1	0	0	0	0
+15 mins.	0	2	0	2	**2**	0	0	**2**	**2**	0	0	**2**	0	0	1	1
+30 mins.	0	0	0	0	0	0	0	0	1	1	0	2	0	0	**2**	**2**
+45 mins.	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0
Total Volume	0	6	0	6	2	0	0	2	3	3	0	6	0	0	3	3
% App. Total	0	100	0		100	0	0		50	50	0		0	0	100	
PHF	.000	.500	.000	.500	.250	.000	.000	.250	.375	.750	.000	.750	.000	.000	.375	.375

APPENDIX D

Future Growth Increment Calculation Worksheets

AVERAGE DAILY TRAFFIC

8th Street and Hellman Avenue 7405 INTERSECTION	LEG	MODEL **2012** ADT	EXISTING **2018** ADT	MODEL **2040** ADT	FUTURE **2040** ADT[1]	OPENING **2020** ADT
Vineyard Avenue (NS) at:	North	22,548	**24,170**	28,381	28,400	24,600
8th Street (EW) -#1	South	22,573	**25,970**	27,700	27,700	26,300
	East	1,859	**4,000**	5,077	5,100	4,200
	West	5,186	**5,900**	8,394	8,400	6,100
Project West Access (NS) at:	North	-	**0**	-	-	-
8th Street (EW) -#2	South	-	**0**	-	-	-
	East	1,856	**4,000**	5,077	5,600	4,200
	West	1,856	**4,000**	5,077	5,600	4,200
Project East Access (NS) at:	North	-	**0**	-	-	-
8th Street (EW) -#3	South	-	**0**	-	-	-
	East	1,856	**4,000**	5,077	5,100	4,200
	West	1,856	**4,000**	5,077	5,100	4,200
Hellman Avenue (NS) at:	North	1,101	**9,480**	2,134	10,300	9,600
Arrow Route (EW) -#4	South	2,939	**8,700**	5,606	10,800	8,900
	East	13,527	**21,800**	17,983	25,300	22,100
	West	13,598	**20,200**	18,018	23,700	20,500
Hellman Avenue (NS) at:	North	4,893	**6,440**	9,484	10,400	6,800
8th Street (EW) -#5	South	4,807	**5,580**	7,327	8,100	5,800
	East	1,559	**4,000**	3,036	5,200	4,100
	West	1,856	**3,500**	5,077	5,600	3,700
Hellman Avenue (NS) at:	North	4,807	**5,580**	7,327	8,100	5,800
Project South Access (EW) -#6	South	4,807	**5,580**	7,327	8,100	5,800
	East	-	**0**	-	-	-
	West	-	**0**	-	-	-
Hellman Avenue (NS) at:	North	3,552	**4,740**	5,251	5,800	4,900
6th Street (EW) -#7	South	1,718	**3,000**	3,676	4,000	3,100
	East	6,035	**10,000**	9,825	13,000	10,300
	West	7,006	**9,900**	10,419	11,500	10,100
Archibald Avenue (NS) at:	North	22,871	**27,800**	30,217	33,200	28,300
8th Street (EW) -#8	South	22,332	**27,640**	28,747	31,600	28,100
	East	1,236	**3,260**	1,914	3,800	3,300
	West	1,559	**3,900**	3,036	5,100	4,000
		-		-	-	-
		-		-	-	-
		-		-	-	-
		-		-	-	-
		-		-	-	-
		-		-	-	-
		-		-	-	-
		-		-	-	-

7405

Adjusted for minimum 10% growth over existing average daily traffic volumes for year 2040.

Vineyard Avenue (NS) / 8th Street (EW) - #1

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES

NCHRP 255

YEAR 2020 TRAFFIC CONDITIONS									
MORNING PEAK HOUR INPUT DATA					EVENING PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2020 TOTAL	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2020 TOTAL
NORTH	LEFT	**28**	SOUTH LEG		NORTH	LEFT	**41**	SOUTH LEG	
BOUND	THRU	**468**	IN ...	**540**	BOUND	THRU	**877**	IN ...	**950**
	RIGHT	**23**	OUT ...	**630**		RIGHT	**20**	OUT ...	**790**
SOUTH	LEFT	**28**	NORTH LEG		SOUTH	LEFT	**19**	NORTH LEG	
BOUND	THRU	**572**	IN ...	**680**	BOUND	THRU	**699**	IN ...	**830**
	RIGHT	**72**	OUT ...	**640**		RIGHT	**96**	OUT ...	**1,100**
EAST	LEFT	**113**	WEST LEG		EAST	LEFT	**127**	WEST LEG	
BOUND	THRU	**60**	IN ...	**230**	BOUND	THRU	**94**	IN ...	**280**
	RIGHT	**42**	OUT ...	**150**		RIGHT	**60**	OUT ...	**240**
WEST	LEFT	**9**	EAST LEG		WEST	LEFT	**25**	EAST LEG	
BOUND	THRU	**45**	IN ...	**90**	BOUND	THRU	**92**	IN ...	**210**
	RIGHT	**34**	OUT ...	**120**		RIGHT	**80**	OUT ...	**140**

YEAR 2020 TRAFFIC CONDITIONS										
MORNING PEAK HOUR RESULTS					EVENING PEAK HOUR RESULTS					
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2020 FORECAST	PEAK - DAILY RELATIONSHIP	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2020 FORECAST	PEAK - DAILY RELATIONSHIP	
NORTH	LEFT	**28**	**30**	NORTH LEG	NORTH	LEFT	**41**	**42**	NORTH LEG	
BOUND	THRU	**468**	**486**	RATIO **55.8%**	BOUND	THRU	**877**	**902**	RATIO	**82.0%**
	RIGHT	**23**	**25**	ADT 2,390		RIGHT	**20**	**21**	ADT	2,390
SOUTH	LEFT	**28**	**29**	SOUTH LEG	SOUTH	LEFT	**19**	**21**	SOUTH LEG	
BOUND	THRU	**572**	**589**	RATIO **46.0%**	BOUND	THRU	**699**	**719**	RATIO	**68.9%**
	RIGHT	**72**	**74**	ADT 2,570		RIGHT	**96**	**101**	ADT	2,570
EAST	LEFT	**113**	**120**	EAST LEG	EAST	LEFT	**127**	**131**	EAST LEG	
BOUND	THRU	**60**	**66**	RATIO **10.1%**	BOUND	THRU	**94**	**98**	RATIO	**16.9%**
	RIGHT	**42**	**44**	ADT 2,070		RIGHT	**60**	**62**	ADT	2,070
WEST	LEFT	**9**	**9**	WEST LEG	WEST	LEFT	**25**	**26**	WEST LEG	
BOUND	THRU	**45**	**46**	RATIO **17.6%**	BOUND	THRU	**92**	**98**	RATIO	**24.6%**
	RIGHT	**34**	**35**	ADT 2,160		RIGHT	**80**	**86**	ADT	2,160

Vineyard Avenue (NS) / 8th Street (EW) - #1

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES

NCHRP 255

YEAR 2040 TRAFFIC CONDITIONS									
MORNING PEAK HOUR INPUT DATA					EVENING PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2040 TOTAL	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2040 TOTAL
NORTH	LEFT	**28**	SOUTH LEG		NORTH	LEFT	**41**	SOUTH LEG	
BOUND	THRU	**468**	IN ...	**700**	BOUND	THRU	**877**	IN ...	**1,100**
	RIGHT	**23**	OUT ...	**770**		RIGHT	**20**	OUT ...	**910**
SOUTH	LEFT	**28**	NORTH LEG		SOUTH	LEFT	**19**	NORTH LEG	
BOUND	THRU	**572**	IN ...	**830**	BOUND	THRU	**699**	IN ...	**1,010**
	RIGHT	**72**	OUT ...	**800**		RIGHT	**96**	OUT ...	**1,260**
EAST	LEFT	**113**	WEST LEG		EAST	LEFT	**127**	WEST LEG	
BOUND	THRU	**60**	IN ...	**340**	BOUND	THRU	**94**	IN ...	**300**
	RIGHT	**42**	OUT ...	**170**		RIGHT	**60**	OUT ...	**370**
WEST	LEFT	**9**	EAST LEG		WEST	LEFT	**25**	EAST LEG	
BOUND	THRU	**45**	IN ...	**130**	BOUND	THRU	**92**	IN ...	**350**
	RIGHT	**34**	OUT ...	**240**		RIGHT	**80**	OUT ...	**190**

YEAR 2040 TRAFFIC CONDITIONS										
MORNING PEAK HOUR RESULTS					EVENING PEAK HOUR RESULTS					
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2040 FORECAST	PEAK - DAILY RELATIONSHIP	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2040 FORECAST	PEAK - DAILY RELATIONSHIP	
NORTH	LEFT	**28**	**34**	NORTH LEG	NORTH	LEFT	**41**	**53**	NORTH LEG	
BOUND	THRU	**468**	**606**	RATIO **55.0%**	BOUND	THRU	**877**	**1,005**	RATIO	**76.9%**
	RIGHT	**23**	**52**	ADT 2,960		RIGHT	**20**	**32**	ADT	2,960
SOUTH	LEFT	**28**	**54**	SOUTH LEG	SOUTH	LEFT	**19**	**34**	SOUTH LEG	
BOUND	THRU	**572**	**696**	RATIO **48.6%**	BOUND	THRU	**699**	**821**	RATIO	**66.9%**
	RIGHT	**72**	**79**	ADT 3,010		RIGHT	**96**	**142**	ADT	3,010
EAST	LEFT	**113**	**143**	EAST LEG	EAST	LEFT	**127**	**140**	EAST LEG	
BOUND	THRU	**60**	**134**	RATIO **5.8%**	BOUND	THRU	**94**	**124**	RATIO	**8.4%**
	RIGHT	**42**	**59**	ADT 6,370		RIGHT	**60**	**66**	ADT	6,370
WEST	LEFT	**9**	**15**	WEST LEG	WEST	LEFT	**25**	**38**	WEST LEG	
BOUND	THRU	**45**	**63**	RATIO **11.9%**	BOUND	THRU	**92**	**175**	RATIO	**16.2%**
	RIGHT	**34**	**51**	ADT 4,310		RIGHT	**80**	**134**	ADT	4,310

Hellman (NS) / Arrow Route (EW) - #4

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES

NCHRP 255

YEAR 2020 TRAFFIC CONDITIONS									
MORNING PEAK HOUR INPUT DATA					EVENING PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2020 TOTAL	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2020 TOTAL
NORTH	LEFT	**12**	SOUTH LEG		NORTH	LEFT	**26**	SOUTH LEG	
BOUND	THRU	**67**	IN ...	**130**	BOUND	THRU	**234**	IN ...	**370**
	RIGHT	**52**	OUT ...	**290**		RIGHT	**88**	OUT ...	**170**
SOUTH	LEFT	**80**	NORTH LEG		SOUTH	LEFT	**79**	NORTH LEG	
BOUND	THRU	**170**	IN ...	**340**	BOUND	THRU	**100**	IN ...	**260**
	RIGHT	**78**	OUT ...	**150**		RIGHT	**76**	OUT ...	**500**
EAST	LEFT	**34**	WEST LEG		EAST	LEFT	**96**	WEST LEG	
BOUND	THRU	**521**	IN ...	**620**	BOUND	THRU	**804**	IN ...	**940**
	RIGHT	**58**	OUT ...	**590**		RIGHT	**27**	OUT ...	**860**
WEST	LEFT	**49**	EAST LEG		WEST	LEFT	**34**	EAST LEG	
BOUND	THRU	**504**	IN ...	**610**	BOUND	THRU	**731**	IN ...	**950**
	RIGHT	**50**	OUT ...	**660**		RIGHT	**161**	OUT ...	**990**

YEAR 2020 TRAFFIC CONDITIONS										
MORNING PEAK HOUR RESULTS					EVENING PEAK HOUR RESULTS					
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2020 FORECAST	PEAK - DAILY RELATIONSHIP	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2020 FORECAST	PEAK - DAILY RELATIONSHIP	
NORTH	LEFT	**12**	**12**	NORTH LEG	NORTH	LEFT	**26**	**29**	NORTH LEG	
BOUND	THRU	**67**	**69**	RATIO **20.8%**	BOUND	THRU	**234**	**246**	RATIO	**32.4%**
	RIGHT	**52**	**54**	ADT 2,390		RIGHT	**88**	**95**	ADT	2,390
SOUTH	LEFT	**80**	**83**	SOUTH LEG	SOUTH	LEFT	**79**	**81**	SOUTH LEG	
BOUND	THRU	**170**	**179**	RATIO **16.6%**	BOUND	THRU	**100**	**105**	RATIO	**21.0%**
	RIGHT	**78**	**80**	ADT 2,570		RIGHT	**76**	**78**	ADT	2,570
EAST	LEFT	**34**	**35**	EAST LEG	EAST	LEFT	**96**	**99**	EAST LEG	
BOUND	THRU	**521**	**536**	RATIO **62.6%**	BOUND	THRU	**804**	**827**	RATIO	**94.7%**
	RIGHT	**58**	**60**	ADT 2,070		RIGHT	**27**	**29**	ADT	2,070
WEST	LEFT	**49**	**52**	WEST LEG	WEST	LEFT	**34**	**36**	WEST LEG	
BOUND	THRU	**504**	**519**	RATIO **57.5%**	BOUND	THRU	**731**	**755**	RATIO	**84.1%**
	RIGHT	**50**	**51**	ADT 2,160		RIGHT	**161**	**166**	ADT	2,160

Hellman (NS) / Arrow Route (EW) - #4

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES

NCHRP 255

YEAR 2040 TRAFFIC CONDITIONS									
MORNING PEAK HOUR INPUT DATA					EVENING PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2040 TOTAL	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2040 TOTAL
NORTH	LEFT	**12**	SOUTH LEG		NORTH	LEFT	**26**	SOUTH LEG	
BOUND	THRU	**67**	IN ...	**160**	BOUND	THRU	**234**	IN ...	**520**
	RIGHT	**52**	OUT ...	**440**		RIGHT	**88**	OUT ...	**220**
SOUTH	LEFT	**80**	NORTH LEG		SOUTH	LEFT	**79**	NORTH LEG	
BOUND	THRU	**170**	IN ...	**390**	BOUND	THRU	**100**	IN ...	**280**
	RIGHT	**78**	OUT ...	**170**		RIGHT	**76**	OUT ...	**580**
EAST	LEFT	**34**	WEST LEG		EAST	LEFT	**96**	WEST LEG	
BOUND	THRU	**521**	IN ...	**770**	BOUND	THRU	**804**	IN ...	**1,000**
	RIGHT	**58**	OUT ...	**640**		RIGHT	**27**	OUT ...	**1,000**
WEST	LEFT	**49**	EAST LEG		WEST	LEFT	**34**	EAST LEG	
BOUND	THRU	**504**	IN ...	**660**	BOUND	THRU	**731**	IN ...	**1,110**
	RIGHT	**50**	OUT ...	**790**		RIGHT	**161**	OUT ...	**1,070**

YEAR 2040 TRAFFIC CONDITIONS										
MORNING PEAK HOUR RESULTS						EVENING PEAK HOUR RESULTS				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2040 FORECAST	PEAK - DAILY RELATIONSHIP		APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2040 FORECAST	PEAK - DAILY RELATIONSHIP	
NORTH	LEFT	**12**	**16**	NORTH LEG		NORTH	LEFT	**26**	**44**	NORTH LEG	
BOUND	THRU	**67**	**81**	RATIO	**20.2%**	BOUND	THRU	**234**	**328**	RATIO	**30.7%**
	RIGHT	**52**	**68**	ADT	2,960		RIGHT	**88**	**140**	ADT	2,960
SOUTH	LEFT	**80**	**88**	SOUTH LEG		SOUTH	LEFT	**79**	**87**	SOUTH LEG	
BOUND	THRU	**170**	**249**	RATIO	**20.1%**	BOUND	THRU	**100**	**128**	RATIO	**24.3%**
	RIGHT	**78**	**86**	ADT	3,010		RIGHT	**76**	**84**	ADT	3,010
EAST	LEFT	**34**	**39**	EAST LEG		EAST	LEFT	**96**	**106**	EAST LEG	
BOUND	THRU	**521**	**645**	RATIO	**23.4%**	BOUND	THRU	**804**	**884**	RATIO	**34.9%**
	RIGHT	**58**	**109**	ADT	6,370		RIGHT	**27**	**39**	ADT	6,370
WEST	LEFT	**49**	**81**	WEST LEG		WEST	LEFT	**34**	**53**	WEST LEG	
BOUND	THRU	**504**	**554**	RATIO	**33.6%**	BOUND	THRU	**731**	**881**	RATIO	**47.3%**
	RIGHT	**50**	**55**	ADT	4,310		RIGHT	**161**	**177**	ADT	4,310

Hellman (NS) / Arrow Route (EW) - #4

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES

NCHRP 255

YEAR 2020 TRAFFIC CONDITIONS									
MORNING PEAK HOUR INPUT DATA					EVENING PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2020 TOTAL	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2020 TOTAL
NORTH	LEFT	**12**	SOUTH LEG		NORTH	LEFT	**26**	SOUTH LEG	
BOUND	THRU	**67**	IN ...	**130**	BOUND	THRU	**234**	IN ...	**370**
	RIGHT	**52**	OUT ...	**290**		RIGHT	**88**	OUT ...	**170**
SOUTH	LEFT	**80**	NORTH LEG		SOUTH	LEFT	**79**	NORTH LEG	
BOUND	THRU	**170**	IN ...	**340**	BOUND	THRU	**100**	IN ...	**260**
	RIGHT	**78**	OUT ...	**150**		RIGHT	**76**	OUT ...	**500**
EAST	LEFT	**34**	WEST LEG		EAST	LEFT	**96**	WEST LEG	
BOUND	THRU	**521**	IN ...	**620**	BOUND	THRU	**804**	IN ...	**940**
	RIGHT	**58**	OUT ...	**590**		RIGHT	**27**	OUT ...	**860**
WEST	LEFT	**49**	EAST LEG		WEST	LEFT	**34**	EAST LEG	
BOUND	THRU	**504**	IN ...	**610**	BOUND	THRU	**731**	IN ...	**950**
	RIGHT	**50**	OUT ...	**660**		RIGHT	**161**	OUT ...	**990**

YEAR 2020 TRAFFIC CONDITIONS										
MORNING PEAK HOUR RESULTS					EVENING PEAK HOUR RESULTS					
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2020 FORECAST	PEAK - DAILY RELATIONSHIP	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2020 FORECAST	PEAK - DAILY RELATIONSHIP	
NORTH	LEFT	**12**	**12**	NORTH LEG	NORTH	LEFT	**26**	**29**	NORTH LEG	
BOUND	THRU	**67**	**69**	RATIO **20.8%**	BOUND	THRU	**234**	**246**	RATIO	**32.4%**
	RIGHT	**52**	**54**	ADT 2,390		RIGHT	**88**	**95**	ADT	2,390
SOUTH	LEFT	**80**	**83**	SOUTH LEG	SOUTH	LEFT	**79**	**81**	SOUTH LEG	
BOUND	THRU	**170**	**179**	RATIO **16.6%**	BOUND	THRU	**100**	**105**	RATIO	**21.0%**
	RIGHT	**78**	**80**	ADT 2,570		RIGHT	**76**	**78**	ADT	2,570
EAST	LEFT	**34**	**35**	EAST LEG	EAST	LEFT	**96**	**99**	EAST LEG	
BOUND	THRU	**521**	**536**	RATIO **62.6%**	BOUND	THRU	**804**	**827**	RATIO	**94.7%**
	RIGHT	**58**	**60**	ADT 2,070		RIGHT	**27**	**29**	ADT	2,070
WEST	LEFT	**49**	**52**	WEST LEG	WEST	LEFT	**34**	**36**	WEST LEG	
BOUND	THRU	**504**	**519**	RATIO **57.5%**	BOUND	THRU	**731**	**755**	RATIO	**84.1%**
	RIGHT	**50**	**51**	ADT 2,160		RIGHT	**161**	**166**	ADT	2,160

Hellman (NS) / Arrow Route (EW) - #4

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES

NCHRP 255

YEAR 2040 TRAFFIC CONDITIONS									
MORNING PEAK HOUR INPUT DATA					EVENING PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2040 TOTAL	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2040 TOTAL
NORTH	LEFT	**12**	SOUTH LEG		NORTH	LEFT	**26**	SOUTH LEG	
BOUND	THRU	**67**	IN ...	**160**	BOUND	THRU	**234**	IN ...	**520**
	RIGHT	**52**	OUT ...	**440**		RIGHT	**88**	OUT ...	**220**
SOUTH	LEFT	**80**	NORTH LEG		SOUTH	LEFT	**79**	NORTH LEG	
BOUND	THRU	**170**	IN ...	**390**	BOUND	THRU	**100**	IN ...	**280**
	RIGHT	**78**	OUT ...	**170**		RIGHT	**76**	OUT ...	**580**
EAST	LEFT	**34**	WEST LEG		EAST	LEFT	**96**	WEST LEG	
BOUND	THRU	**521**	IN ...	**770**	BOUND	THRU	**804**	IN ...	**1,000**
	RIGHT	**58**	OUT ...	**640**		RIGHT	**27**	OUT ...	**1,000**
WEST	LEFT	**49**	EAST LEG		WEST	LEFT	**34**	EAST LEG	
BOUND	THRU	**504**	IN ...	**660**	BOUND	THRU	**731**	IN ...	**1,110**
	RIGHT	**50**	OUT ...	**790**		RIGHT	**161**	OUT ...	**1,070**

YEAR 2040 TRAFFIC CONDITIONS										
MORNING PEAK HOUR RESULTS					EVENING PEAK HOUR RESULTS					
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2040 FORECAST	PEAK - DAILY RELATIONSHIP	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2040 FORECAST	PEAK - DAILY RELATIONSHIP	
NORTH	LEFT	**12**	**16**	NORTH LEG	NORTH	LEFT	**26**	**44**	NORTH LEG	
BOUND	THRU	**67**	**81**	RATIO **20.2%**	BOUND	THRU	**234**	**328**	RATIO	**30.7%**
	RIGHT	**52**	**68**	ADT 2,960		RIGHT	**88**	**140**	ADT	2,960
SOUTH	LEFT	**80**	**88**	SOUTH LEG	SOUTH	LEFT	**79**	**87**	SOUTH LEG	
BOUND	THRU	**170**	**249**	RATIO **20.1%**	BOUND	THRU	**100**	**128**	RATIO	**24.3%**
	RIGHT	**78**	**86**	ADT 3,010		RIGHT	**76**	**84**	ADT	3,010
EAST	LEFT	**34**	**39**	EAST LEG	EAST	LEFT	**96**	**106**	EAST LEG	
BOUND	THRU	**521**	**645**	RATIO **23.4%**	BOUND	THRU	**804**	**884**	RATIO	**34.9%**
	RIGHT	**58**	**109**	ADT 6,370		RIGHT	**27**	**39**	ADT	6,370
WEST	LEFT	**49**	**81**	WEST LEG	WEST	LEFT	**34**	**53**	WEST LEG	
BOUND	THRU	**504**	**554**	RATIO **33.6%**	BOUND	THRU	**731**	**881**	RATIO	**47.3%**
	RIGHT	**50**	**55**	ADT 4,310		RIGHT	**161**	**177**	ADT	4,310

Archibald Avenue (NS) / 8th Street (EW) - #8

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES

NCHRP 255

YEAR 2020 TRAFFIC CONDITIONS									
MORNING PEAK HOUR INPUT DATA					EVENING PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2020 TOTAL	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2020 TOTAL
NORTH	LEFT	**38**	SOUTH LEG		NORTH	LEFT	**50**	SOUTH LEG	
BOUND	THRU	**623**	IN ...	**710**	BOUND	THRU	**1,319**	IN ...	**1,430**
	RIGHT	**25**	OUT ...	**1,070**		RIGHT	**28**	OUT ...	**1,000**
SOUTH	LEFT	**32**	NORTH LEG		SOUTH	LEFT	**27**	NORTH LEG	
BOUND	THRU	**1,002**	IN ...	**1,100**	BOUND	THRU	**909**	IN ...	**990**
	RIGHT	**45**	OUT ...	**710**		RIGHT	**27**	OUT ...	**1,470**
EAST	LEFT	**40**	WEST LEG		EAST	LEFT	**93**	WEST LEG	
BOUND	THRU	**54**	IN ...	**120**	BOUND	THRU	**71**	IN ...	**200**
	RIGHT	**21**	OUT ...	**120**		RIGHT	**38**	OUT ...	**150**
WEST	LEFT	**27**	EAST LEG		WEST	LEFT	**37**	EAST LEG	
BOUND	THRU	**32**	IN ...	**80**	BOUND	THRU	**60**	IN ...	**140**
	RIGHT	**22**	OUT ...	**110**		RIGHT	**39**	OUT ...	**140**

YEAR 2020 TRAFFIC CONDITIONS										
MORNING PEAK HOUR RESULTS					EVENING PEAK HOUR RESULTS					
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2020 FORECAST	PEAK - DAILY RELATIONSHIP	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2020 FORECAST	PEAK - DAILY RELATIONSHIP	
NORTH	LEFT	**38**	**40**	NORTH LEG	NORTH	LEFT	**50**	**55**	NORTH LEG	
BOUND	THRU	**623**	**645**	RATIO **76.2%**	BOUND	THRU	**1,319**	**1,357**	RATIO	**104.2%**
	RIGHT	**25**	**26**	ADT 2,390		RIGHT	**28**	**32**	ADT	2,390
SOUTH	LEFT	**32**	**33**	SOUTH LEG	SOUTH	LEFT	**27**	**32**	SOUTH LEG	
BOUND	THRU	**1,002**	**1,031**	RATIO **69.7%**	BOUND	THRU	**909**	**935**	RATIO	**95.6%**
	RIGHT	**45**	**47**	ADT 2,570		RIGHT	**27**	**30**	ADT	2,570
EAST	LEFT	**40**	**43**	EAST LEG	EAST	LEFT	**93**	**96**	EAST LEG	
BOUND	THRU	**54**	**56**	RATIO **9.6%**	BOUND	THRU	**71**	**76**	RATIO	**13.7%**
	RIGHT	**21**	**22**	ADT 2,070		RIGHT	**38**	**39**	ADT	2,070
WEST	LEFT	**27**	**28**	WEST LEG	WEST	LEFT	**37**	**38**	WEST LEG	
BOUND	THRU	**32**	**33**	RATIO **11.2%**	BOUND	THRU	**60**	**65**	RATIO	**16.7%**
	RIGHT	**22**	**23**	ADT 2,160		RIGHT	**39**	**40**	ADT	2,160

Archibald Avenue (NS) / 8th Street (EW) - #8

FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES

NCHRP 255

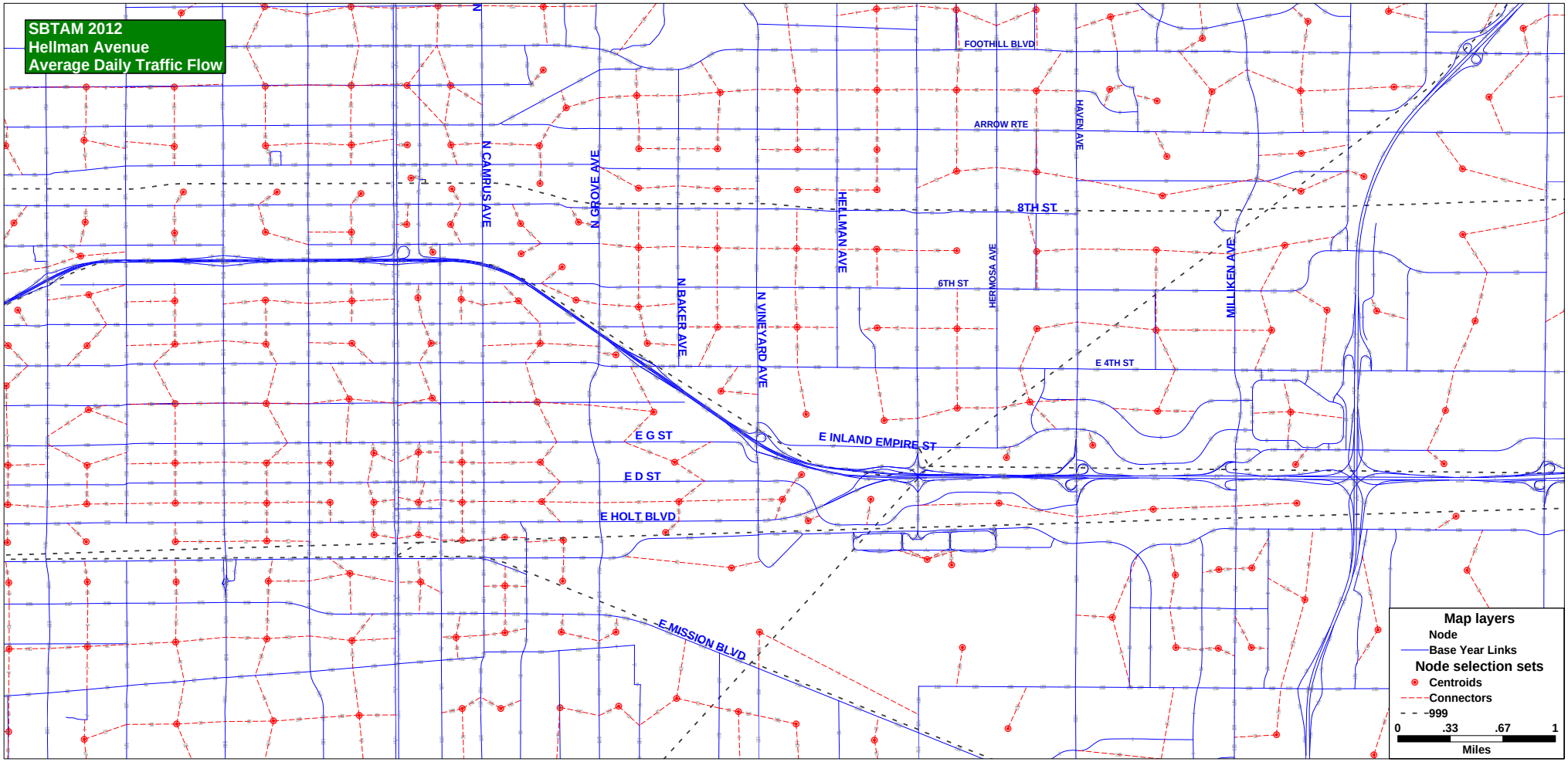
YEAR 2040 TRAFFIC CONDITIONS									
MORNING PEAK HOUR INPUT DATA					EVENING PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2040 TOTAL	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2040 TOTAL
NORTH	LEFT	**38**	SOUTH LEG		NORTH	LEFT	**50**	SOUTH LEG	
BOUND	THRU	**623**	IN ...	**930**	BOUND	THRU	**1,319**	IN ...	**1,630**
	RIGHT	**25**	OUT ...	**1,240**		RIGHT	**28**	OUT ...	**1,160**
SOUTH	LEFT	**32**	NORTH LEG		SOUTH	LEFT	**27**	NORTH LEG	
BOUND	THRU	**1,002**	IN ...	**1,290**	BOUND	THRU	**909**	IN ...	**1,200**
	RIGHT	**45**	OUT ...	**940**		RIGHT	**27**	OUT ...	**1,710**
EAST	LEFT	**40**	WEST LEG		EAST	LEFT	**93**	WEST LEG	
BOUND	THRU	**54**	IN ...	**140**	BOUND	THRU	**71**	IN ...	**240**
	RIGHT	**21**	OUT ...	**150**		RIGHT	**38**	OUT ...	**200**
WEST	LEFT	**27**	EAST LEG		WEST	LEFT	**37**	EAST LEG	
BOUND	THRU	**32**	IN ...	**90**	BOUND	THRU	**60**	IN ...	**190**
	RIGHT	**22**	OUT ...	**120**		RIGHT	**39**	OUT ...	**190**

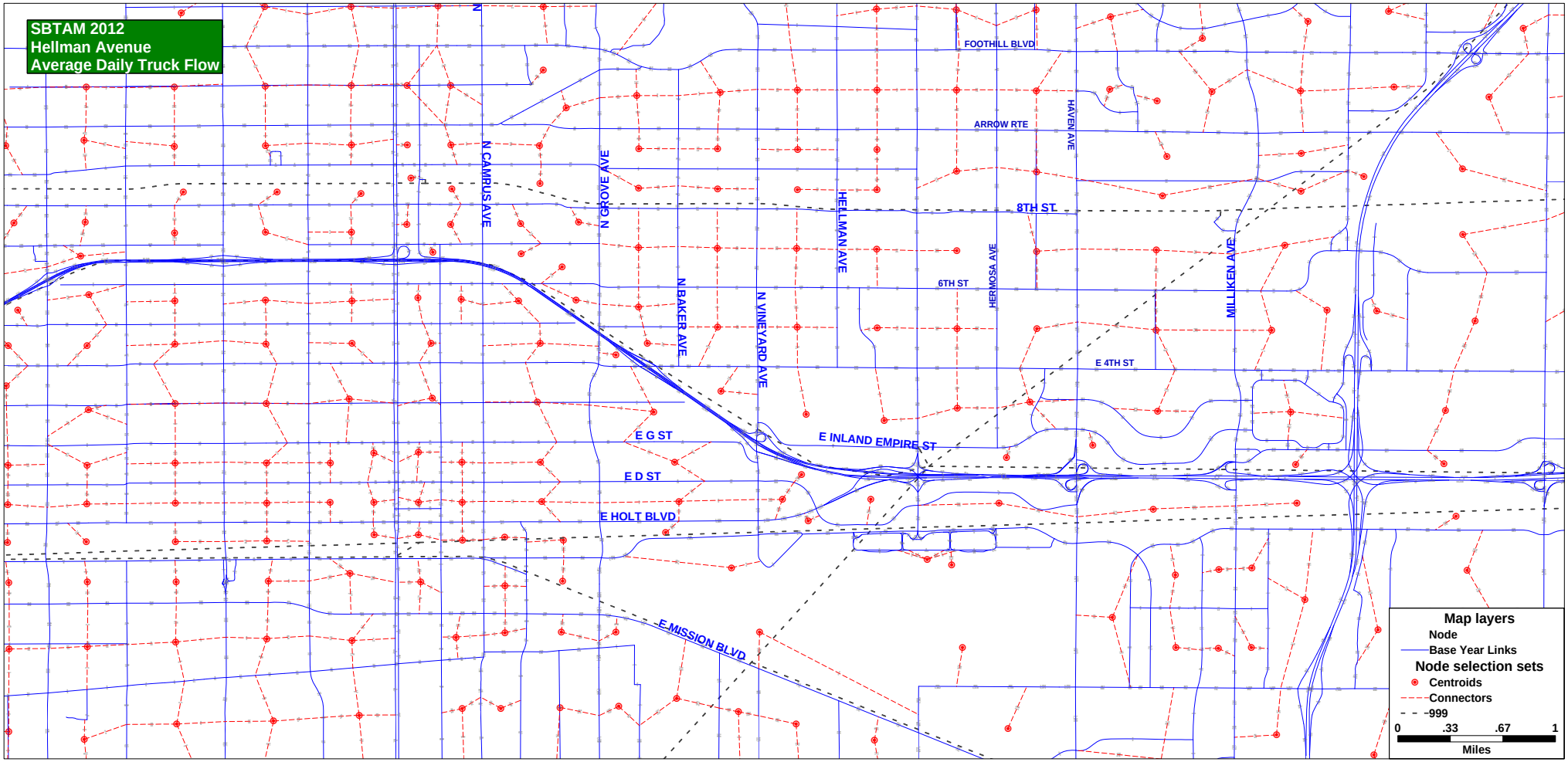
YEAR 2040 TRAFFIC CONDITIONS										
MORNING PEAK HOUR RESULTS					EVENING PEAK HOUR RESULTS					
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2040 FORECAST	PEAK - DAILY RELATIONSHIP	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2040 FORECAST	PEAK - DAILY RELATIONSHIP	
NORTH	LEFT	**38**	**52**	NORTH LEG	NORTH	LEFT	**50**	**62**	NORTH LEG	
BOUND	THRU	**623**	**858**	RATIO **75.1%**	BOUND	THRU	**1,319**	**1,545**	RATIO	**97.8%**
	RIGHT	**25**	**28**	ADT 2,960		RIGHT	**28**	**39**	ADT	2,960
SOUTH	LEFT	**32**	**35**	SOUTH LEG	SOUTH	LEFT	**27**	**52**	SOUTH LEG	
BOUND	THRU	**1,002**	**1,188**	RATIO **72.5%**	BOUND	THRU	**909**	**1,086**	RATIO	**93.5%**
	RIGHT	**45**	**61**	ADT 3,010		RIGHT	**27**	**46**	ADT	3,010
EAST	LEFT	**40**	**56**	EAST LEG	EAST	LEFT	**93**	**108**	EAST LEG	
BOUND	THRU	**54**	**59**	RATIO **3.4%**	BOUND	THRU	**71**	**99**	RATIO	**6.0%**
	RIGHT	**21**	**25**	ADT 6,370		RIGHT	**38**	**42**	ADT	6,370
WEST	LEFT	**27**	**30**	WEST LEG	WEST	LEFT	**37**	**41**	WEST LEG	
BOUND	THRU	**32**	**37**	RATIO **6.7%**	BOUND	THRU	**60**	**93**	RATIO	**10.4%**
	RIGHT	**22**	**26**	ADT 4,310		RIGHT	**39**	**57**	ADT	4,310

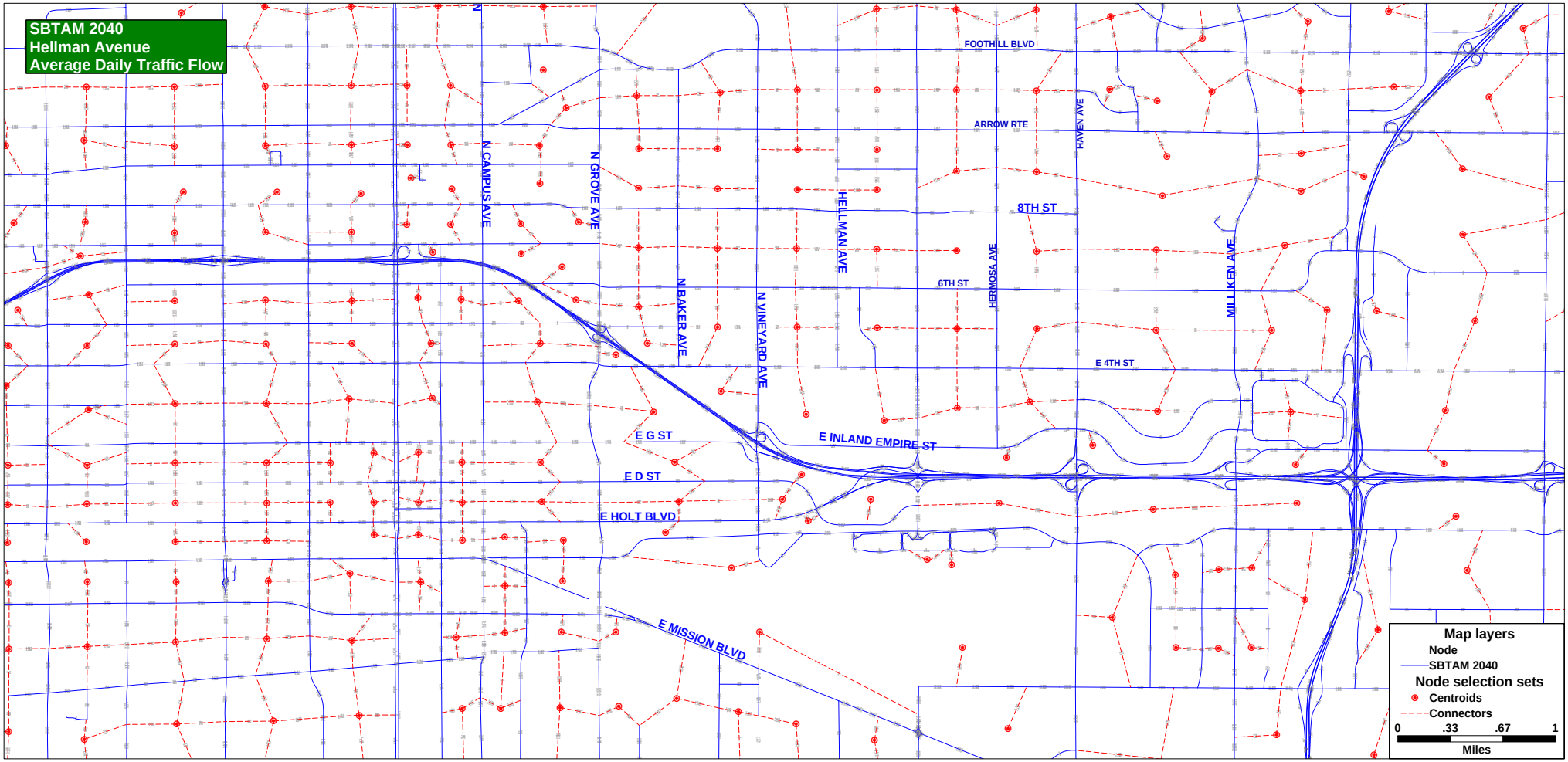
APPENDIX E

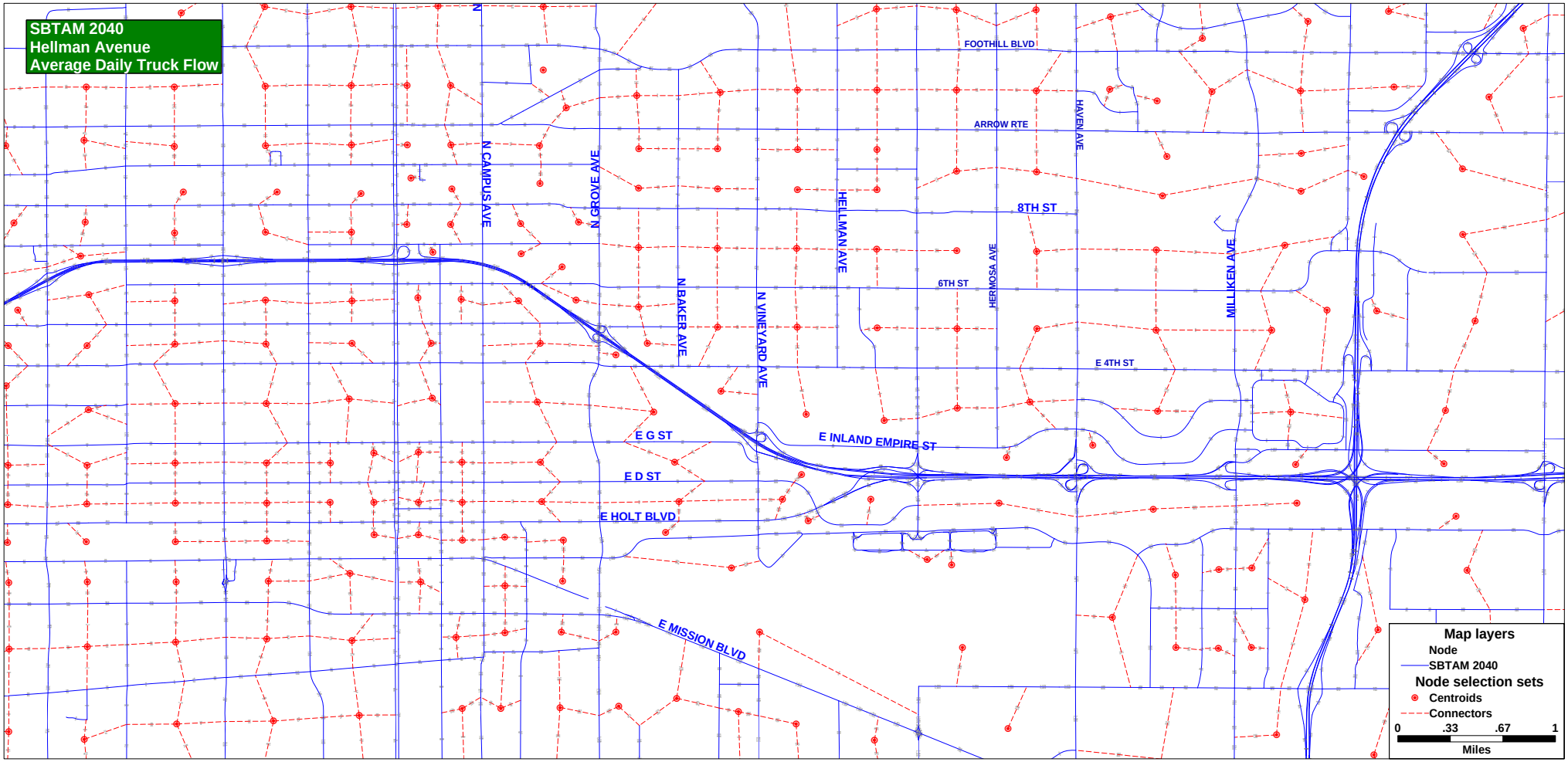
Traffic Model Plots

Daily

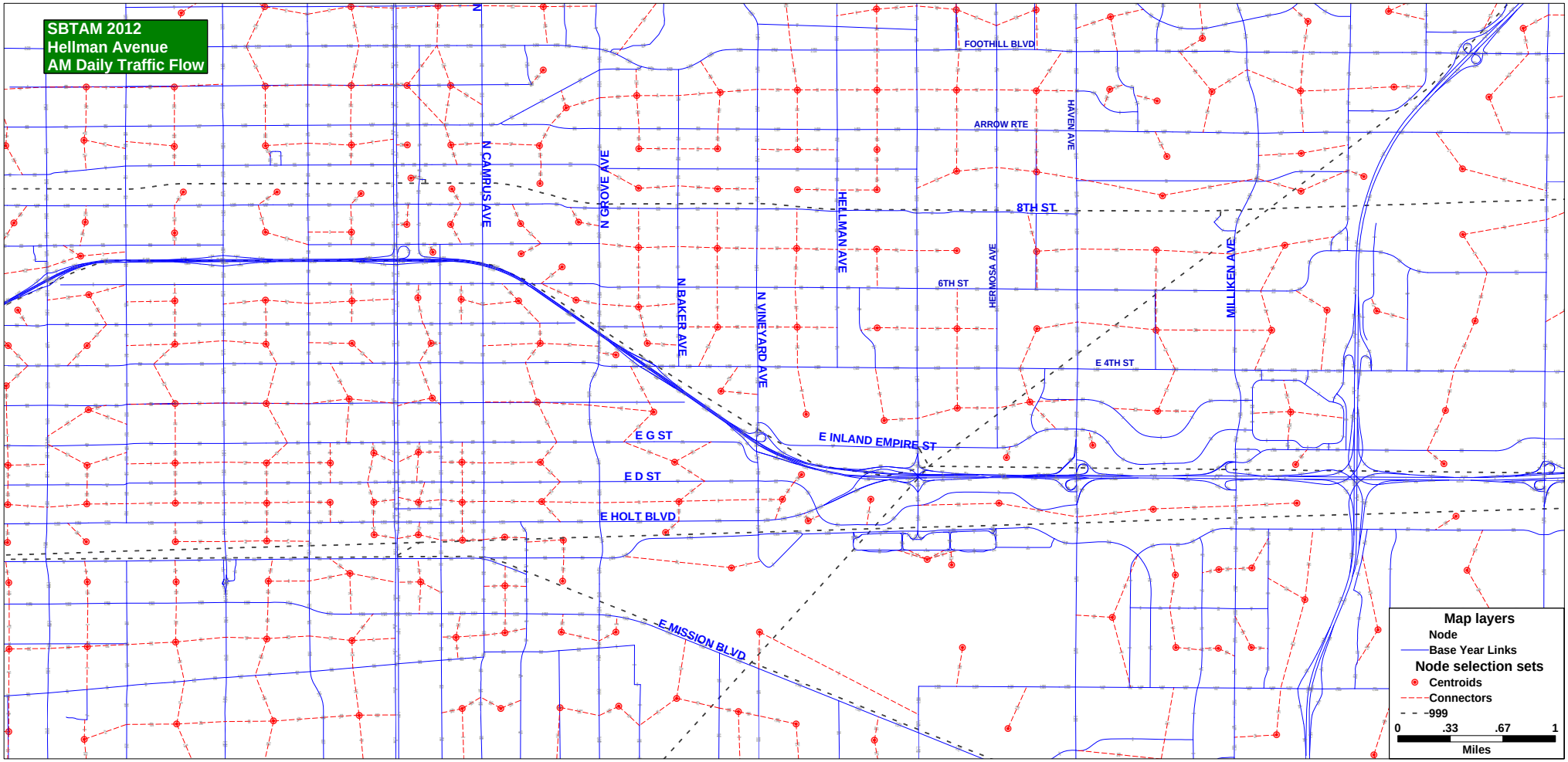

SBTAM 2012
Hellman Avenue
Average Daily Traffic Flow
FOOTHILL BLVD
ARROW RTE
HAVEN AVE
8TH ST
6TH ST
E 4TH ST
N CAMPUS AVE
N GROVE AVE
N BAKER AVE
N VINEYARD AVE
HELLMAN AVE
HERMOSA AVE
MILLIKEN AVE
E G ST
E D ST
E HOLT BLVD
E INLAND EMPIRE ST
E MISSION BLVD
Map layers
Node
Base Year Links
Node selection sets
Centroids
Connectors
999
0 .33 .67 1
Miles

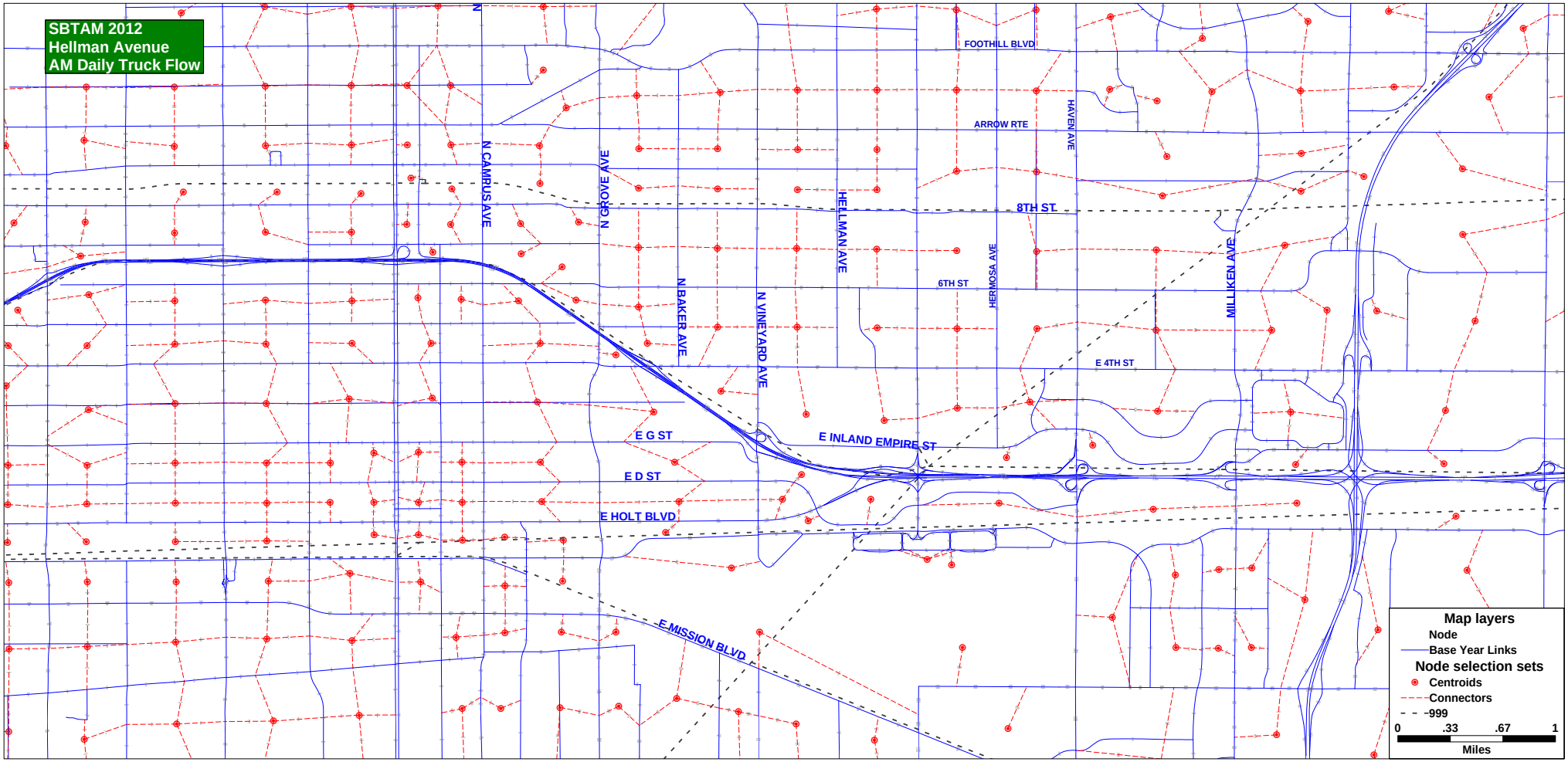

SBTAM 2012
Hellman Avenue
Average Daily Truck Flow
FOOTHILL BLVD
ARROW RTE
HAVEN AVE
8TH ST
6TH ST
E 4TH ST
N CAMPUS AVE
N GROVE AVE
N BAKER AVE
N VINEYARD AVE
HELLMAN AVE
HERMOSA AVE
MILLIKEN AVE
E G ST
E D ST
E HOLT BLVD
E INLAND EMPIRE ST
E MISSION BLVD
Map layers
Node
Base Year Links
Node selection sets
Centroids
Connectors
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Miles

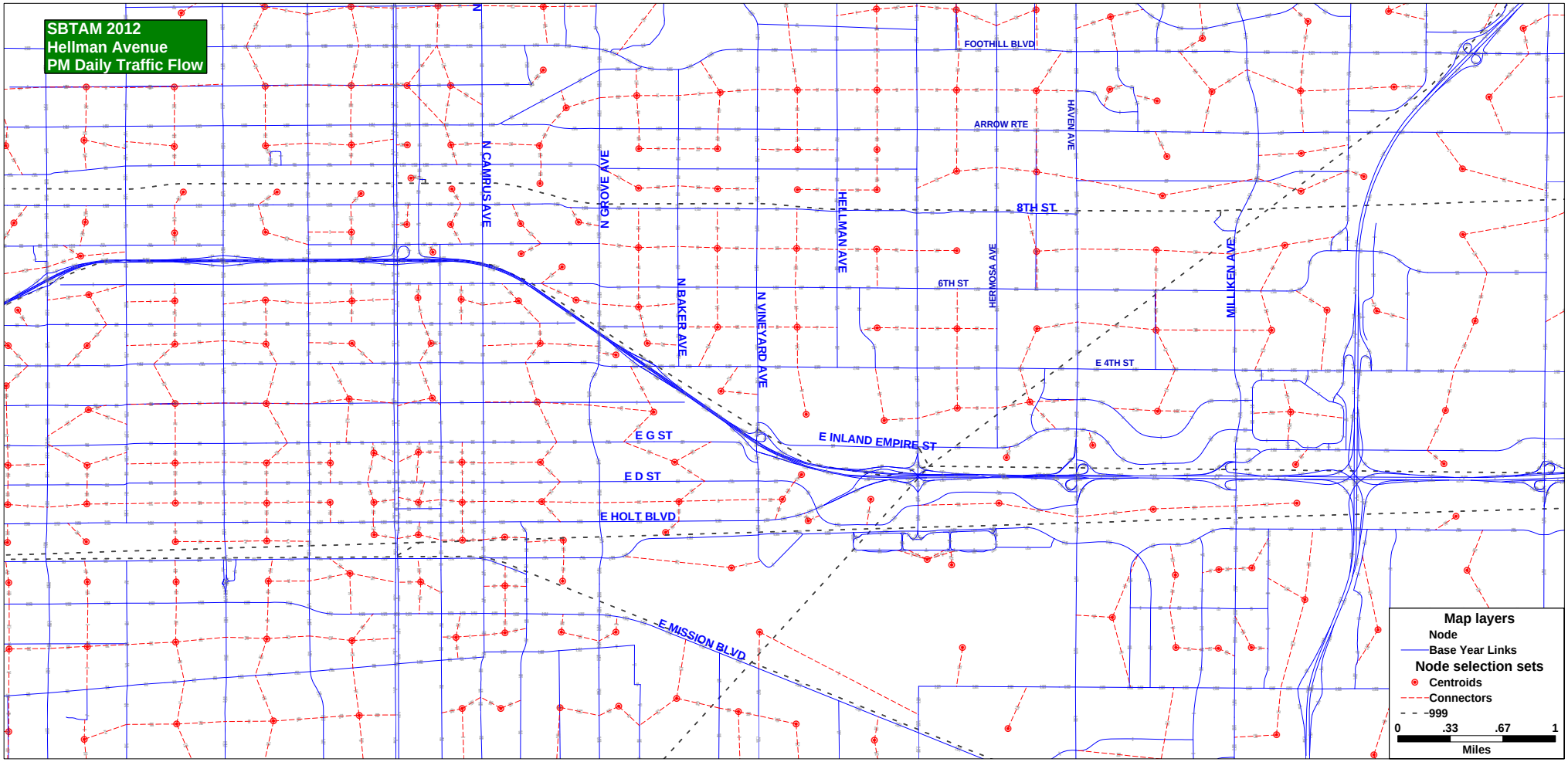

SBTAM 2040
Hellman Avenue
Average Daily Traffic Flow
FOOTHILL BLVD
ARROW RTE
HAVEN AVE
N CAMPUS AVE
N GROVE AVE
HELLMAN AVE
8TH ST
6TH ST
HERMOSA AVE
MILLIKEN AVE
N BAKER AVE
N VINEYARD AVE
E 4TH ST
E G ST
E INLAND EMPIRE ST
E D ST
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E MISSION BLVD
Map layers
Node
SBTAM 2040
Node selection sets
Centroids
Connectors
0 .33 .67 1
Miles

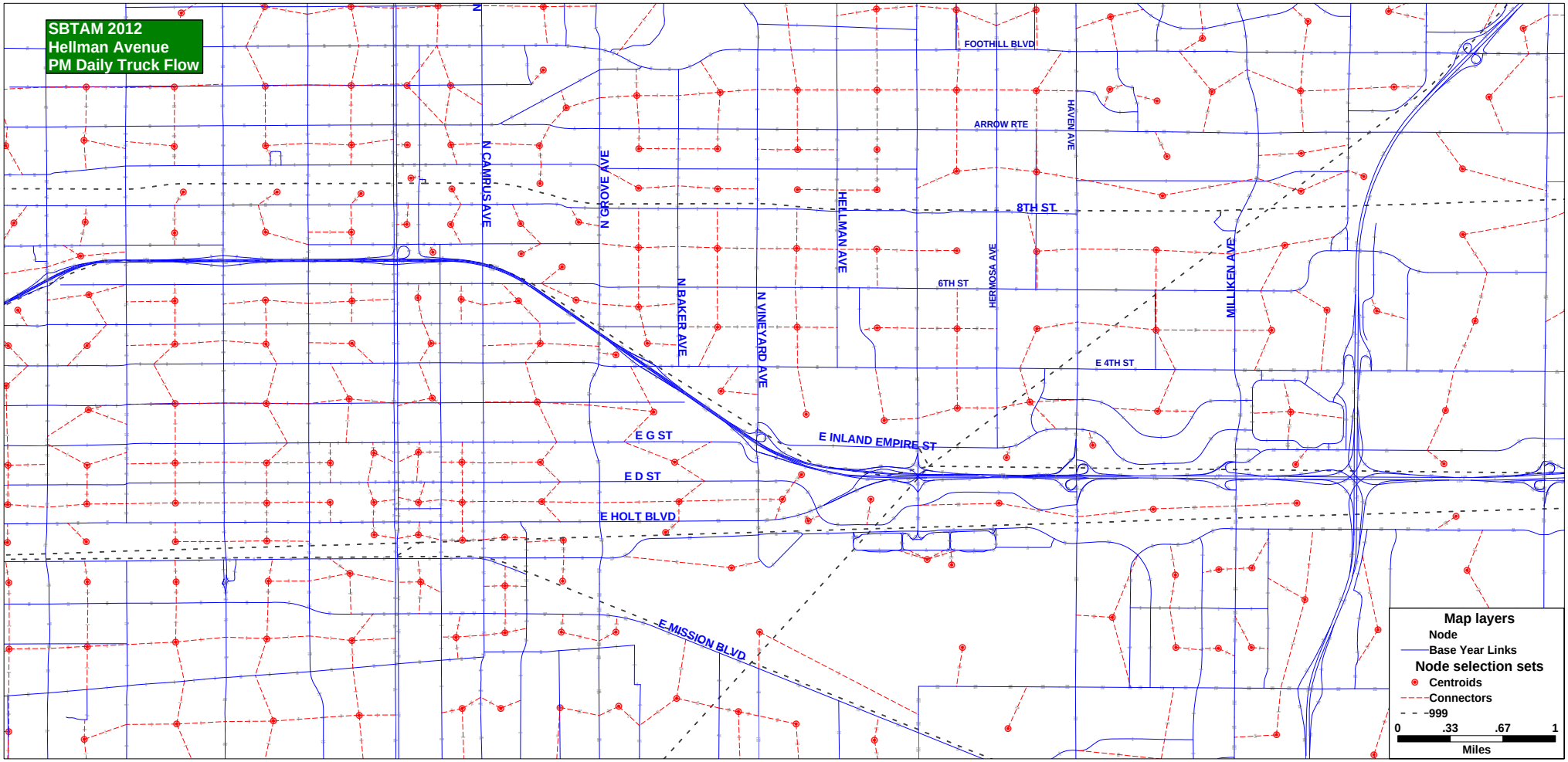

SBTAM 2040
Hellman Avenue
Average Daily Truck Flow
FOOTHILL BLVD
ARROW RTE
HAVEN AVE
8TH ST
6TH ST
E 4TH ST
N CAMPUS AVE
N GROVE AVE
N BAKER AVE
N VINEYARD AVE
HELLMAN AVE
HERMOSA AVE
MILLIKEN AVE
E G ST
E D ST
E HOLT BLVD
E INLAND EMPIRE ST
E MISSION BLVD
Map layers
Node
SBTAM 2040
Node selection sets
Centroids
Connectors
0 .33 .67 1
Miles

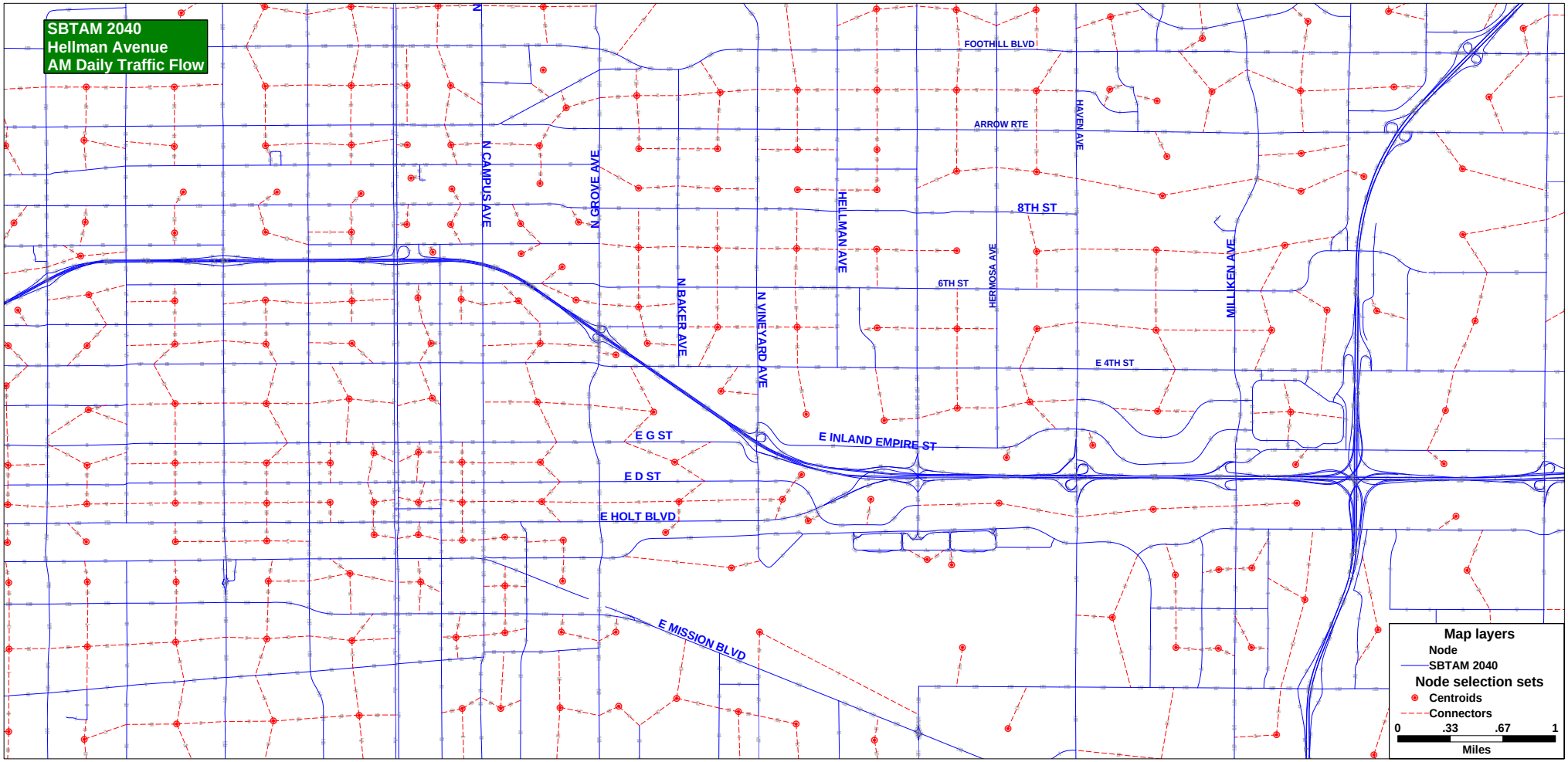
Peak Hour

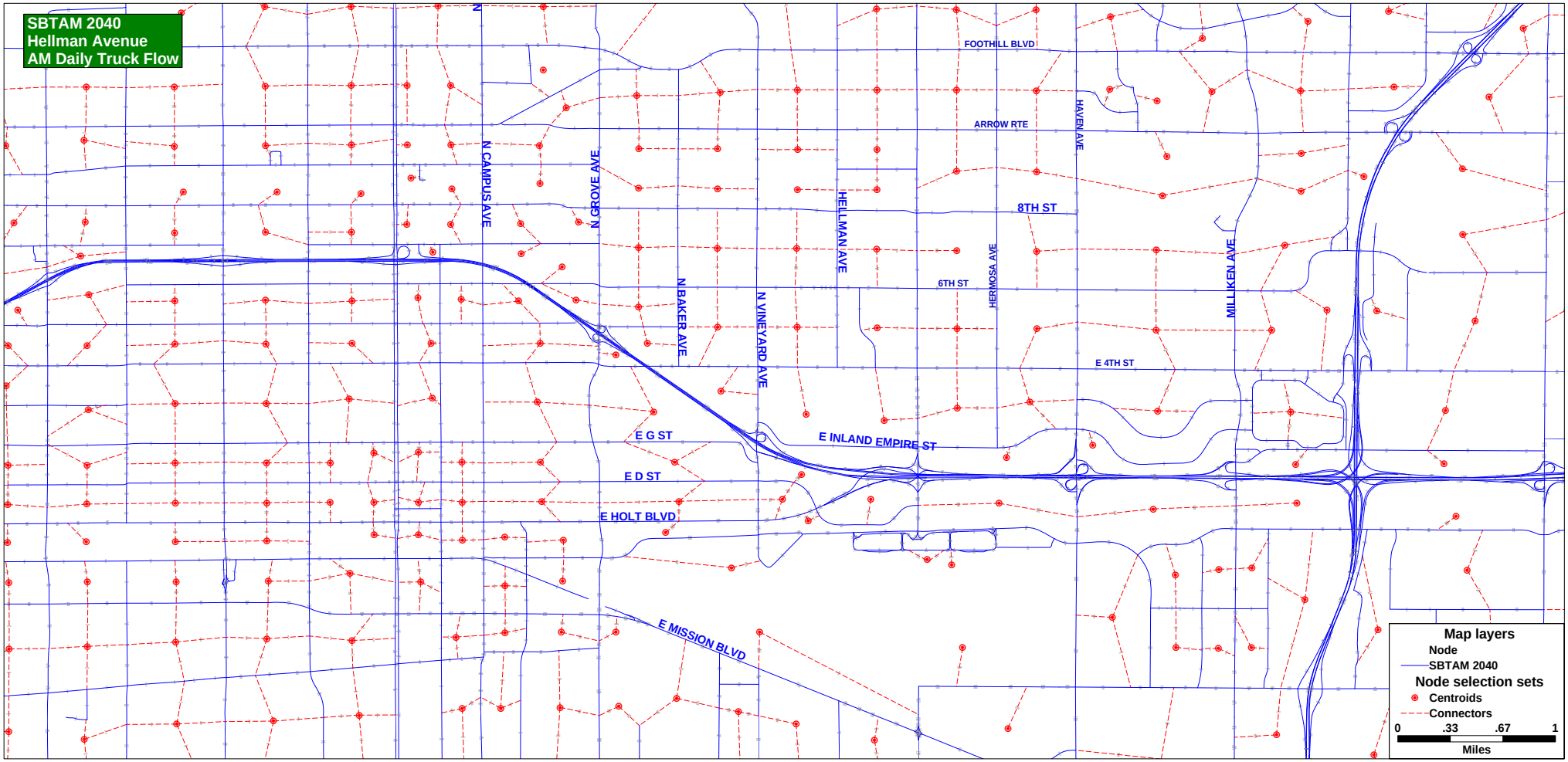

SBTAM 2012
Hellman Avenue
AM Daily Traffic Flow
FOOTHILL BLVD
ARROW RTE
HAVEN AVE
N CAMPUS AVE
N GROVE AVE
HELLMAN AVE
8TH ST
HERMOSA AVE
MILLIKEN AVE
6TH ST
N BAKER AVE
N VINEYARD AVE
E 4TH ST
E G ST
E INLAND EMPIRE ST
E D ST
E HOLT BLVD
E MISSION BLVD
Map layers
Node
Base Year Links
Node selection sets
Centroids
Connectors
999
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Miles

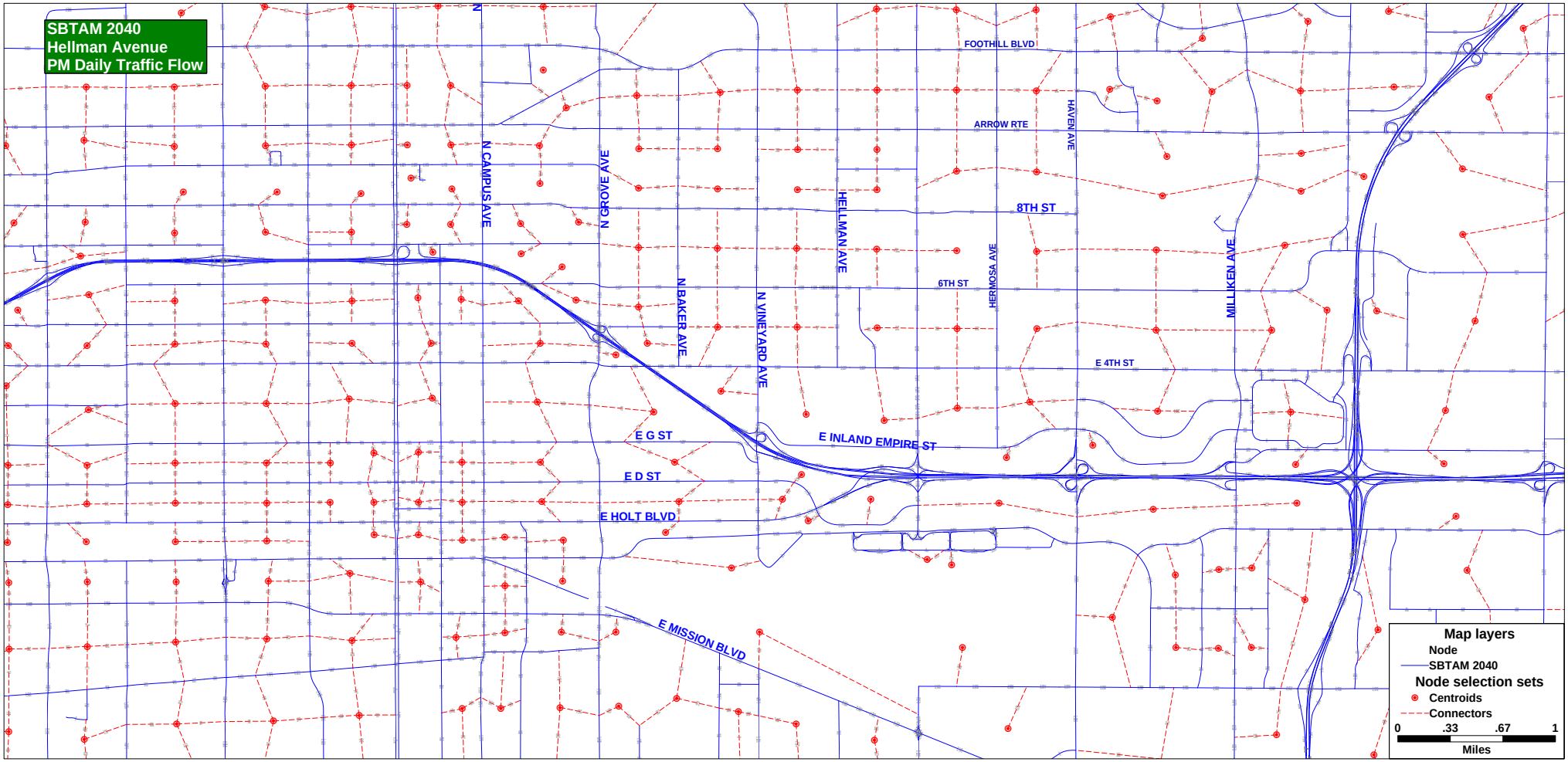

SBTAM 2012
Hellman Avenue
AM Daily Truck Flow
N CAMPUS AVE
N GROVE AVE
N BAKER AVE
N VINEYARD AVE
HELLMAN AVE
HERMOSA AVE
HAVEN AVE
MILLIKEN AVE
FOOTHILL BLVD
ARROW RTE
8TH ST
6TH ST
E 4TH ST
E G ST
E D ST
E HOLT BLVD
E INLAND EMPIRE ST
E MISSION BLVD
Map layers
Node
Base Year Links
Node selection sets
Centroids
Connectors
999
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Miles

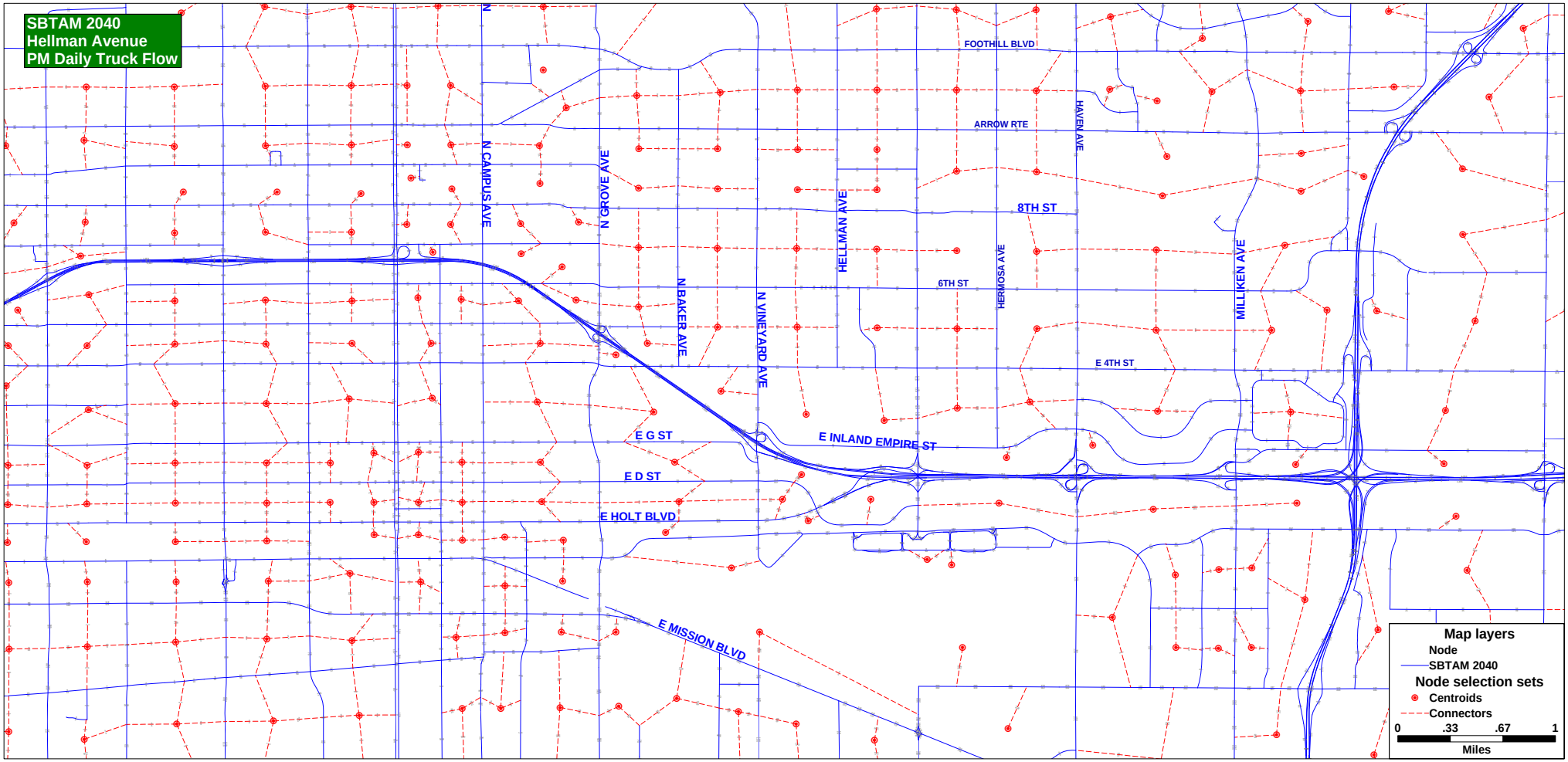

SBTAM 2012
Hellman Avenue
PM Daily Traffic Flow
FOOTHILL BLVD
ARROW RTE
HAVEN AVE
N CAMPUS AVE
N GROVE AVE
HELLMAN AVE
8TH ST
HERMOSA AVE
MILLIKEN AVE
6TH ST
N BAKER AVE
N VINEYARD AVE
E 4TH ST
E G ST
E INLAND EMPIRE ST
E D ST
E HOLT BLVD
E MISSION BLVD
Map layers
Node
Base Year Links
Node selection sets
Centroids
Connectors
999
0
.33
.67
1
Miles


SBTAM 2012
Hellman Avenue
PM Daily Truck Flow
N CAMPUS AVE
N GROVE AVE
N BAKER AVE
N VINEYARD AVE
HELLMAN AVE
HERMOSA AVE
HAVEN AVE
MILLIKEN AVE
FOOTHILL BLVD
ARROW RTE
8TH ST
6TH ST
E 4TH ST
E G ST
E D ST
E HOLT BLVD
E INLAND EMPIRE ST
E MISSION BLVD
Map layers
Node
Base Year Links
Node selection sets
Centroids
Connectors
999
0
.33
.67
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Miles


SBTAM 2040
Hellman Avenue
AM Daily Traffic Flow
FOOTHILL BLVD
ARROW RTE
HAVEN AVE
8TH ST
6TH ST
E 4TH ST
N CAMPUS AVE
N GROVE AVE
N BAKER AVE
N VINEYARD AVE
HELLMAN AVE
HERMOSA AVE
MILLIKEN AVE
E G ST
E D ST
E HOLT BLVD
E INLAND EMPIRE ST
E MISSION BLVD
Map layers
Node
SBTAM 2040
Node selection sets
Centroids
Connectors
0 .33 .67 1
Miles


SBTAM 2040
Hellman Avenue
AM Daily Truck Flow
FOOTHILL BLVD
ARROW RTE
HAVEN AVE
8TH ST
6TH ST
E 4TH ST
N CAMPUS AVE
N GROVE AVE
N BAKER AVE
N VINEYARD AVE
HELLMAN AVE
HERMOSA AVE
MILLIKEN AVE
E G ST
E D ST
E HOLT BLVD
E INLAND EMPIRE ST
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Map layers
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SBTAM 2040
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Map layers
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Node selection sets
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Connectors
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APPENDIX F

Explanation and Calculation of Intersection Delay

EXPLANATION AND CALCULATION OF INTERSECTION LEVEL OF SERVICE USING DELAY METHODOLOGY

The Levels of Service at the unsignalized and signalized intersections are calculated using the delay methodology in the Highway Capacity Manual. This methodology views an intersection as consisting of several lane groups. A lane group is a set of lanes serving a movement. If there are two northbound left turn lanes, then the lane group serving the northbound left turn movement has two lanes. Similarly, there may be three lanes in the lane group serving the northbound through movement, one lane in the lane group serving the northbound right turn movement, and so forth. It is also possible for one lane to serve two lane groups. A shared lane might result in there being 1.5 lanes in the northbound left turn lane group and 2.5 lanes in the northbound through lane group.

For each lane group, there is a capacity. That capacity is calculated by multiplying the number of lanes in the lane group times a theoretical maximum lane capacity per lane time's 12 adjustment factors.

Each of the 12 adjustment factors has a value of approximately 1.00. A value less than 1.00 is generally assigned when a less than desirable condition occurs.

The 12 adjustment factors are as follows:

1. Peak hour factor (to account for peaking within the peak hour)
2. Lane utilization factor (to account for not all lanes loading equally)
3. Lane width
4. Percent of heavy trucks
5. Approach grade
6. Parking
7. Bus stops at intersections
8. Area type (CBD or other)
9. Right turns
10. Left turns
11. Pedestrian activity
12. Signal progression

The maximum theoretical lane capacity and the 12 adjustment factors for it are all unknowns for which approximate estimates have been recommended in the Highway Capacity Manual. For the most part, the recommended values are not based on statistical analysis but rather on educated estimates. However, it is possible to use the delay methodology and get reasonable results as will be discussed below.

Once the lane group volume is known and the lane group capacity is known, a volume to capacity ratio can be calculated for the lane group.

With a volume to capacity ratio calculated, average delay per vehicle in a lane group can be estimated. The average delay per vehicle in a lane group is calculated using a complex formula provided by the Highway Capacity Manual, which can be simplified and described as follows:

Delay per vehicle in a lane group is a function of the following:

1. Cycle length
2. Amount of red time faced by a lane group
3. Amount of yellow time for that lane group
4. The volume to capacity ratio of the lane group

The average delay per vehicle for each lane group is calculated, and eventually an overall average delay for all vehicles entering the intersection is calculated. This average delay per vehicle is then used to judge Level of Service. The Level of Services are defined in the table that follows this discussion.

Experience has shown that when a maximum lane capacity of 1,900 vehicles per hour is used (as recommended in the Highway Capacity Manual), little or no yellow time penalty is used, and none of the 12 penalty factors are applied, calculated delay is realistic. The delay calculation for instance assumes that yellow time is totally unused. Yet experience shows that most of the yellow time is used.

An idiosyncrasy of the delay methodology is that it is possible to add traffic to an intersection and reduce the average total delay per vehicle. If the average total delay is 30 seconds per vehicle for all vehicles traveling through an intersection, and traffic is added to a movement that has an average total delay of 15 seconds per vehicle, then the overall average total delay is reduced.

The delay calculation for a lane group is based on a concept that the delay is a function of the amount of unused capacity available. As the volume approaches capacity and there is no more unused capacity available, then the delay rapidly increases. Delay is not proportional to volume, but rather increases rapidly as the unused capacity approaches zero.

Because delay is not linearly related to volumes, the delay does not reflect how close an intersection is to overloading. If an intersection is operating at Level of Service C and has an average total delay of 18 seconds per vehicle, you know very little as to what percent the traffic can increase before Level of Service E is reached.

LEVEL OF SERVICE DESCRIPTION[1]

Level of Service	Description	Average Total Delay per Vehicle (Seconds)	
		Signalized	Unsignalized
A	Level of Service A occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	0 to 10.00	0 to 10.00
B	Level of Service B generally occurs with good progression and/or short cycle lengths. More vehicles stop than for Level of Service A, causing higher levels of average total delay.	10.01 to 20.00	10.01 to 15.00
C	Level of Service C generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	20.01 to 35.00	15.01 to 25.00
D	Level of Service D generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	35.01 to 55.00	25.01 to 35.00
E	Level of Service E is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume to capacity ratios. Individual cycle failures are frequent occurrences.	55.01 to 80.00	35.01 to 50.00
F	Level of Service F is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume to capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	80.01 and up	50.01 and up

[1] Source: Highway Capacity Manual Special Report 209, Transportation Research Board, National Research Council, Washington, D.C., 2010.

Existing

8th Street & Hellman Avenue Project

Vistro File: J:\...\AME.vistro
Report File: \...\AME.pdf

Scenario 1 Existing Without Project
4/13/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Vineyard Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Left	0.337	11.4	B
4	Hellman Avenue (NS) at Arrow Route (EW)	Signalized	HCM 6th Edition	EB Left	0.305	20.3	C
5	Hellman Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	WB Left	0.344	22.8	C
7	Hellman Avenue (NS) at 6th Street (EW)	All-way stop	HCM 6th Edition	EB Thru	0.412	10.4	B
8	Archibald Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	WB Left	0.420	8.8	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Vineyard Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	11.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.337

Intersection Setup

Name				Vineyard Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	98.00	100.00	100.00	57.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name				Vineyard Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	28	468	23	28	572	72	113	60	42	9	45	34
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	468	23	28	572	72	113	60	42	9	45	34
Peak Hour Factor	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	127	6	8	155	19	31	16	11	2	12	9
Total Analysis Volume [veh/h]	30	507	25	30	619	78	122	65	45	10	49	37
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	12	28	0	16	32	0	0	16	0	0	16	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	35	35	3	35	35	10	10	10	10	10	10
g / C, Green / Cycle	0.05	0.58	0.58	0.05	0.58	0.58	0.17	0.17	0.17	0.17	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.02	0.15	0.15	0.02	0.20	0.20	0.09	0.03	0.03	0.01	0.03	0.02
s, saturation flow rate [veh/h]	1714	1800	1770	1714	1800	1730	1378	1800	1567	1304	1800	1530
c, Capacity [veh/h]	79	1044	1027	79	1044	1004	278	313	272	262	313	266
d1, Uniform Delay [s]	27.79	6.21	6.22	27.79	6.59	6.59	25.80	21.16	21.21	24.02	21.06	21.00
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.96	0.59	0.61	2.96	0.88	0.92	1.09	0.28	0.35	0.06	0.23	0.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.38	0.26	0.26	0.38	0.34	0.34	0.44	0.18	0.20	0.04	0.16	0.14
d, Delay for Lane Group [s/veh]	30.74	6.81	6.82	30.74	7.47	7.52	26.89	21.43	21.56	24.08	21.30	21.24
Lane Group LOS	C	A	A	C	A	A	C	C	C	C	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	No	No
50th-Percentile Queue Length [veh]	0.46	1.47	1.46	0.44	1.78	1.73	1.58	0.62	0.59	0.12	0.53	0.40
50th-Percentile Queue Length [ft]	11.56	36.79	36.38	11.04	44.54	43.20	39.49	15.51	14.73	2.95	13.34	10.10
95th-Percentile Queue Length [veh]	0.83	2.65	2.62	0.80	3.21	3.11	2.84	1.12	1.06	0.21	0.96	0.73
95th-Percentile Queue Length [ft]	20.82	66.21	65.48	19.88	80.17	77.76	71.09	27.91	26.51	5.31	24.01	18.18

Movement, Approach, & Intersection Results

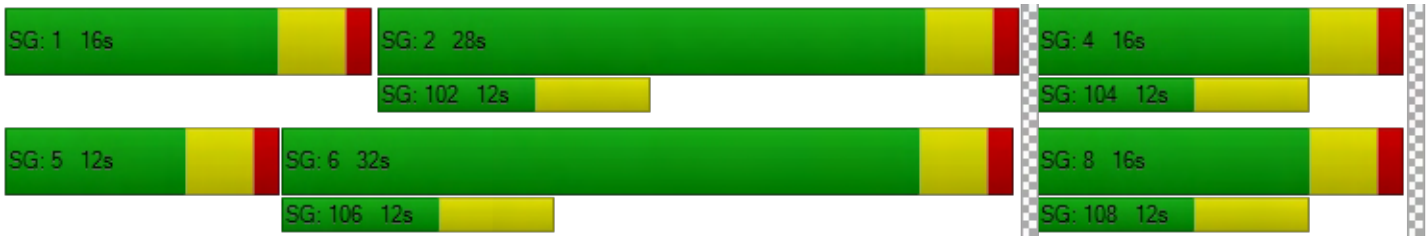
d_M, Delay for Movement [s/veh]	30.74	6.82	6.82	30.74	7.49	7.52	26.89	21.45	21.56	24.08	21.30	21.24
Movement LOS	C	A	A	C	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	8.09			8.45			24.33			21.56		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	11.39											
Intersection LOS	B											
Intersection V/C	0.337											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.645	2.858	2.251	2.340
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	800	933	400	400
d_b, Bicycle Delay [s]	10.80	8.53	19.20	19.20
l_b,int, Bicycle LOS Score for Intersection	2.023	2.159	1.751	1.718
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Hellman Avenue (NS) at Arrow Route (EW)

Control Type:	Signalized	Delay (sec / veh):	20.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.305

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	50.00	100.00	100.00	50.00	100.00	100.00	102.00	100.00	100.00	63.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Base Volume Input [veh/h]	12	67	52	80	170	78	34	521	58	49	504	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	67	52	80	170	78	34	521	58	49	504	50
Peak Hour Factor	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	17	13	21	44	20	9	134	15	13	130	13
Total Analysis Volume [veh/h]	12	69	54	82	175	80	35	537	60	50	519	51
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	13	33	0	11	31	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	31	31	31	31	31	3	13	13	4	14	14
g / C, Green / Cycle	0.52	0.52	0.52	0.52	0.52	0.52	0.05	0.22	0.22	0.07	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.01	0.03	0.04	0.06	0.07	0.08	0.02	0.17	0.17	0.03	0.16	0.16
s, saturation flow rate [veh/h]	1142	1800	1554	1288	1800	1615	1714	1800	1737	1714	1800	1744
c, Capacity [veh/h]	620	929	802	711	929	833	92	389	376	117	415	402
d1, Uniform Delay [s]	9.61	7.30	7.33	9.39	7.61	7.63	27.49	22.21	22.23	26.90	21.20	21.22
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.06	0.14	0.18	0.33	0.32	0.38	2.55	3.39	3.57	2.46	2.11	2.20
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.02	0.07	0.08	0.12	0.14	0.15	0.38	0.78	0.78	0.43	0.70	0.70
d, Delay for Lane Group [s/veh]	9.67	7.44	7.52	9.72	7.92	8.01	30.04	25.60	25.81	29.36	23.31	23.42
Lane Group LOS	A	A	A	A	A	A	C	C	C	C	C	C
Critical Lane Group	No	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	0.08	0.33	0.32	0.54	0.72	0.69	0.50	3.84	3.74	0.70	3.44	3.36
50th-Percentile Queue Length [ft]	2.00	8.20	8.05	13.52	17.98	17.17	12.57	95.99	93.56	17.45	85.97	83.95
95th-Percentile Queue Length [veh]	0.14	0.59	0.58	0.97	1.29	1.24	0.91	6.91	6.74	1.26	6.19	6.04
95th-Percentile Queue Length [ft]	3.61	14.75	14.49	24.34	32.37	30.90	22.63	172.77	168.40	31.41	154.74	151.10

Movement, Approach, & Intersection Results

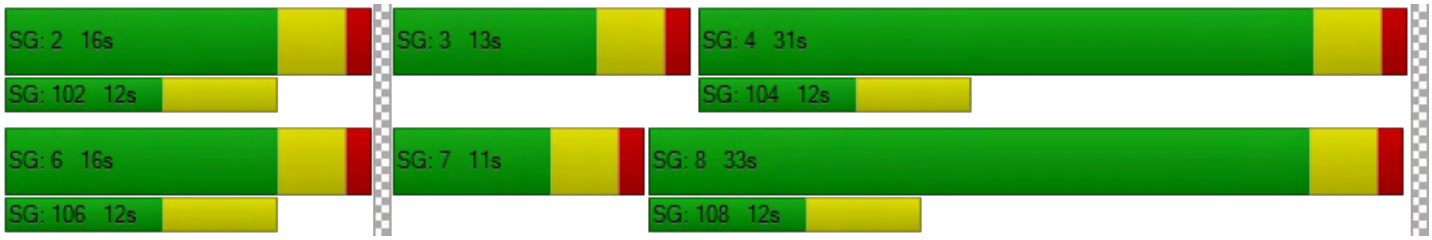
d_M, Delay for Movement [s/veh]	9.67	7.45	7.52	9.72	7.95	8.01	30.04	25.69	25.81	29.36	23.36	23.42
Movement LOS	A	A	A	A	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	7.67			8.39			25.94			23.85		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	20.33											
Intersection LOS	C											
Intersection V/C	0.305											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.400	2.421	2.658	2.772
Crosswalk LOS	B	B	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	967	900
d_b, Bicycle Delay [s]	19.20	19.20	8.01	9.08
l_b,int, Bicycle LOS Score for Intersection	1.671	1.838	2.081	2.071
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Hellman Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	22.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.344

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	45.00	100.00	100.00	150.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	8	144	20	7	170	10	15	74	5	9	96	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	144	20	7	170	10	15	74	5	9	96	21
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	40	6	2	47	3	4	21	1	3	27	6
Total Analysis Volume [veh/h]	9	160	22	8	189	11	17	82	6	10	107	23
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	16	16	0	12	12	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	18	18	2	7	1	6
g / C, Green / Cycle	0.30	0.30	0.03	0.12	0.02	0.10
(v / s)_i Volume / Saturation Flow Rate	0.11	0.12	0.01	0.05	0.01	0.07
s, saturation flow rate [veh/h]	1760	1780	1714	1779	1714	1746
c, Capacity [veh/h]	527	532	54	206	35	183
d1, Uniform Delay [s]	16.61	16.77	28.57	24.78	29.11	26.09
k, delay calibration	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.93	2.15	3.32	1.39	4.47	4.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.36	0.39	0.32	0.43	0.29	0.71
d, Delay for Lane Group [s/veh]	18.54	18.92	31.90	26.17	33.58	31.07
Lane Group LOS	B	B	C	C	C	C
Critical Lane Group	Yes	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	2.03	2.23	0.27	1.12	0.17	1.86
50th-Percentile Queue Length [ft]	50.63	55.84	6.66	27.96	4.30	46.38
95th-Percentile Queue Length [veh]	3.65	4.02	0.48	2.01	0.31	3.34
95th-Percentile Queue Length [ft]	91.14	100.51	12.00	50.32	7.74	83.48

Movement, Approach, & Intersection Results

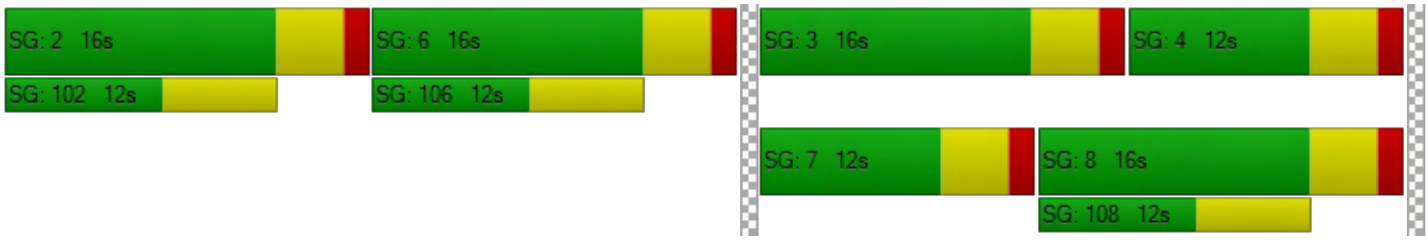
d_M, Delay for Movement [s/veh]	18.54	18.54	18.54	18.92	18.92	18.92	31.90	26.17	26.17	33.58	31.07	31.07
Movement LOS	B	B	B	B	B	B	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	18.54			18.92			27.10			31.25		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	22.82											
Intersection LOS	C											
Intersection V/C	0.344											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	0.00	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	1.982	0.000	2.031	2.041
Crosswalk LOS	A	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	400	267
d_b, Bicycle Delay [s]	19.20	19.20	19.20	22.53
l_b,int, Bicycle LOS Score for Intersection	1.875	1.903	1.733	1.791
Bicycle LOS	A	A	A	A

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	All-way stop	Delay (sec / veh):	10.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.412

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	4	45	24	8	36	15	34	221	12	35	127	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	45	24	8	36	15	34	221	12	35	127	15
Peak Hour Factor	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	13	7	2	11	4	10	65	4	10	38	4
Total Analysis Volume [veh/h]	5	53	28	9	43	18	40	261	14	41	150	18
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	583	591	668	578	661	608	669	586	637	727
Degree of Utilization, x	0.05	0.05	0.04	0.09	0.03	0.07	0.41	0.07	0.24	0.02

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.16	0.15	0.13	0.30	0.08	0.21	2.02	0.23	0.91	0.08
95th-Percentile Queue Length [ft]	3.92	3.86	3.28	7.38	2.10	5.27	50.39	5.63	22.77	1.90
Approach Delay [s/veh]	8.89			9.22		11.45		9.74		
Approach LOS	A			A		B		A		
Intersection Delay [s/veh]	10.37									
Intersection LOS	B									

Intersection Level Of Service Report
Intersection 8: Archibald Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	8.8
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.420

Intersection Setup

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	32.00	100.00	100.00	90.00	100.00	100.00	120.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	38	623	25	32	1002	45	40	54	21	27	32	22
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	38	623	25	32	1002	45	40	54	21	27	32	22
Peak Hour Factor	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	171	7	9	275	12	11	15	6	7	9	6
Total Analysis Volume [veh/h]	42	684	27	35	1100	49	44	59	23	30	35	24
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	16	0	11	16	0	0	33	0	0	33	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	L	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	45	38	38	45	37	37	7	7	7	7
g / C, Green / Cycle	0.75	0.63	0.63	0.75	0.62	0.62	0.12	0.12	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.06	0.20	0.02	0.04	0.32	0.32	0.03	0.05	0.02	0.04
s, saturation flow rate [veh/h]	647	3427	1530	877	1800	1773	1365	1715	1337	1679
c, Capacity [veh/h]	575	2163	966	765	1123	1106	188	201	170	197
d1, Uniform Delay [s]	2.94	5.10	4.16	2.17	6.26	6.26	28.01	24.57	28.45	24.24
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.25	0.38	0.05	0.02	1.69	1.72	0.63	1.33	0.49	0.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.07	0.32	0.03	0.05	0.52	0.52	0.23	0.41	0.18	0.30
d, Delay for Lane Group [s/veh]	3.19	5.49	4.21	2.20	7.95	7.98	28.64	25.90	28.94	25.09
Lane Group LOS	A	A	A	A	A	A	C	C	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.07	1.23	0.09	0.03	2.85	2.82	0.59	1.03	0.41	0.73
50th-Percentile Queue Length [ft]	1.66	30.70	2.15	0.69	71.24	70.45	14.76	25.82	10.14	18.17
95th-Percentile Queue Length [veh]	0.12	2.21	0.15	0.05	5.13	5.07	1.06	1.86	0.73	1.31
95th-Percentile Queue Length [ft]	2.99	55.26	3.87	1.25	128.24	126.81	26.56	46.47	18.25	32.71

Movement, Approach, & Intersection Results

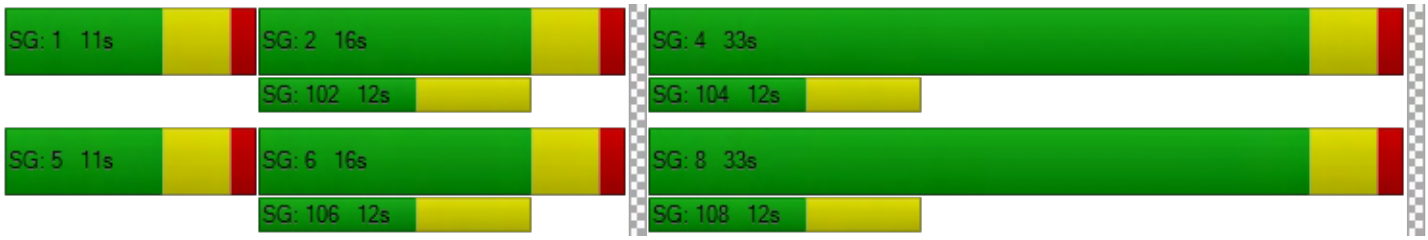
d_M, Delay for Movement [s/veh]	3.19	5.49	4.21	2.20	7.96	7.98	28.64	25.90	25.90	28.94	25.09	25.09
Movement LOS	A	A	A	A	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	5.31			7.79			26.85			26.39		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	8.81											
Intersection LOS	A											
Intersection V/C	0.420											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	3.094	2.906	2.080	2.053
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	967	967
d_b, Bicycle Delay [s]	19.20	19.20	8.01	8.01
l_b,int, Bicycle LOS Score for Intersection	2.181	2.536	1.768	1.706
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



8th Street & Hellman Avenue Project

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Report File: \...\PME.pdf

Scenario 1 Existing Without Project
4/13/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Vineyard Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Left	0.434	13.1	B
4	Hellman Avenue (NS) at Arrow Route (EW)	Signalized	HCM 6th Edition	WB Left	0.485	19.2	B
5	Hellman Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Thru	0.715	40.7	D
7	Hellman Avenue (NS) at 6th Street (EW)	All-way stop	HCM 6th Edition	EB Thru	0.753	21.9	C
8	Archibald Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	EB Left	0.531	12.6	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Vineyard Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	13.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.434

Intersection Setup

Name				Vineyard Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	98.00	100.00	100.00	57.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name				Vineyard Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	41	877	20	19	699	96	127	94	60	25	92	80
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	41	877	20	19	699	96	127	94	60	25	92	80
Peak Hour Factor	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	239	5	5	191	26	35	26	16	7	25	22
Total Analysis Volume [veh/h]	45	957	22	21	763	105	139	103	65	27	100	87
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	32	0	12	33	0	0	16	0	0	16	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	34	34	2	32	32	12	12	12	12	12	12
g / C, Green / Cycle	0.06	0.56	0.56	0.04	0.54	0.54	0.20	0.20	0.20	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.03	0.27	0.27	0.01	0.25	0.25	0.11	0.05	0.05	0.02	0.06	0.06
s, saturation flow rate [veh/h]	1714	1800	1786	1714	1800	1725	1315	1800	1577	1237	1800	1530
c, Capacity [veh/h]	109	1014	1006	63	965	925	282	361	316	277	361	307
d1, Uniform Delay [s]	27.07	7.89	7.89	28.26	8.59	8.59	25.85	20.20	20.26	23.43	20.35	20.38
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.46	1.66	1.67	3.06	1.57	1.64	1.33	0.34	0.42	0.15	0.41	0.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.41	0.48	0.48	0.33	0.46	0.46	0.49	0.24	0.26	0.10	0.28	0.28
d, Delay for Lane Group [s/veh]	29.53	9.55	9.57	31.32	10.16	10.23	27.19	20.54	20.69	23.58	20.77	20.88
Lane Group LOS	C	A	A	C	B	B	C	C	C	C	C	C
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No
50th-Percentile Queue Length [veh]	0.66	3.43	3.41	0.32	2.87	2.77	1.83	0.93	0.87	0.32	1.08	0.94
50th-Percentile Queue Length [ft]	16.61	85.81	85.23	8.00	71.68	69.15	45.64	23.22	21.79	7.89	26.92	23.62
95th-Percentile Queue Length [veh]	1.20	6.18	6.14	0.58	5.16	4.98	3.29	1.67	1.57	0.57	1.94	1.70
95th-Percentile Queue Length [ft]	29.89	154.46	153.41	14.40	129.03	124.48	82.15	41.80	39.23	14.20	48.46	42.52

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	29.53	9.56	9.57	31.32	10.19	10.23	27.19	20.56	20.69	23.58	20.77	20.88
Movement LOS	C	A	A	C	B	B	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	10.44			10.70			23.59			21.17		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	13.13											
Intersection LOS	B											
Intersection V/C	0.434											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.774	3.081	2.312	2.383
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	933	967	400	400
d_b, Bicycle Delay [s]	8.53	8.01	19.20	19.20
l_b,int, Bicycle LOS Score for Intersection	2.404	2.293	1.813	1.913
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Hellman Avenue (NS) at Arrow Route (EW)

Control Type:	Signalized	Delay (sec / veh):	19.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.485

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	50.00	100.00	100.00	50.00	100.00	100.00	102.00	100.00	100.00	63.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Base Volume Input [veh/h]	26	234	88	79	100	76	96	804	27	34	731	161
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	234	88	79	100	76	96	804	27	34	731	161
Peak Hour Factor	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	63	24	21	27	20	26	216	7	9	196	43
Total Analysis Volume [veh/h]	28	251	94	85	107	82	103	863	29	36	785	173
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	11	32	0	12	33	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	23	23	23	23	23	6	22	22	3	20	20
g / C, Green / Cycle	0.38	0.38	0.38	0.38	0.38	0.38	0.10	0.37	0.37	0.05	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.02	0.10	0.10	0.08	0.05	0.06	0.06	0.25	0.25	0.02	0.27	0.27
s, saturation flow rate [veh/h]	1213	1800	1638	1052	1800	1553	1714	1800	1779	1714	1800	1689
c, Capacity [veh/h]	489	679	618	406	679	586	167	663	656	94	586	550
d1, Uniform Delay [s]	14.89	12.95	13.00	17.36	12.34	12.40	26.06	15.98	15.98	27.44	18.85	18.85
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.12	0.12
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.22	0.94	1.08	1.17	0.45	0.56	3.64	1.22	1.23	2.53	3.78	4.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.26	0.27	0.21	0.14	0.16	0.62	0.68	0.68	0.38	0.84	0.84
d, Delay for Lane Group [s/veh]	15.11	13.88	14.08	18.53	12.79	12.96	29.70	17.20	17.21	29.97	22.63	22.87
Lane Group LOS	B	B	B	B	B	B	C	B	B	C	C	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.26	1.52	1.45	0.92	0.79	0.75	1.43	4.40	4.35	0.52	5.86	5.53
50th-Percentile Queue Length [ft]	6.51	37.97	36.36	23.12	19.75	18.75	35.76	109.89	108.70	12.89	146.51	138.37
95th-Percentile Queue Length [veh]	0.47	2.73	2.62	1.66	1.42	1.35	2.57	7.83	7.77	0.93	9.83	9.39
95th-Percentile Queue Length [ft]	11.71	68.34	65.45	41.61	35.55	33.75	64.37	195.84	194.19	23.21	245.76	234.83

Movement, Approach, & Intersection Results

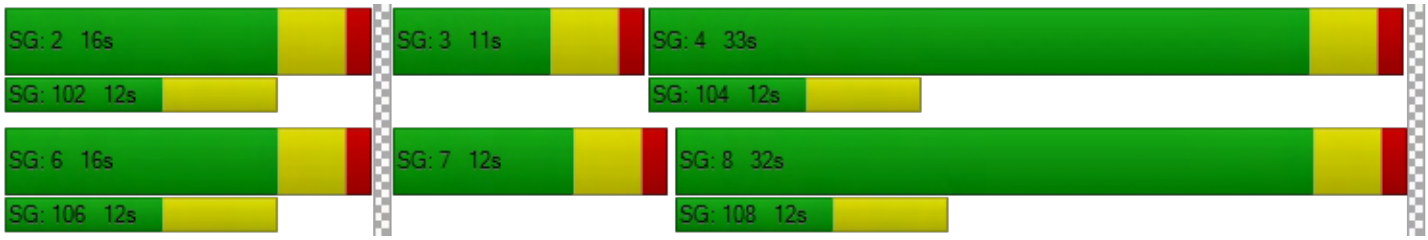
d_M, Delay for Movement [s/veh]	15.11	13.94	14.08	18.53	12.80	12.96	29.70	17.20	17.21	29.97	22.72	22.87
Movement LOS	B	B	B	B	B	B	C	B	B	C	C	C
d_A, Approach Delay [s/veh]	14.06			14.63			18.50			23.01		
Approach LOS	B			B			B			C		
d_I, Intersection Delay [s/veh]	19.17											
Intersection LOS	B											
Intersection V/C	0.485											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.437	2.512	2.870	2.994
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	933	967
d_b, Bicycle Delay [s]	19.20	19.20	8.53	8.01
l_b,int, Bicycle LOS Score for Intersection	1.867	1.786	2.380	2.380
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Hellman Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	40.7
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.715

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	45.00	100.00	100.00	150.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	28	293	9	10	295	54	33	126	20	11	205	25
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	293	9	10	295	54	33	126	20	11	205	25
Peak Hour Factor	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	89	3	3	90	16	10	38	6	3	63	8
Total Analysis Volume [veh/h]	34	357	11	12	360	66	40	154	24	13	250	31
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	75
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	22	0	0	26	0	11	16	0	11	16	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C
C, Cycle Length [s]	75	75	75	75	75	75
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	21	4	16	2	14
g / C, Green / Cycle	0.28	0.28	0.05	0.21	0.02	0.18
(v / s)_i Volume / Saturation Flow Rate	0.23	0.25	0.02	0.10	0.01	0.16
s, saturation flow rate [veh/h]	1784	1751	1714	1758	1714	1766
c, Capacity [veh/h]	492	483	94	372	41	320
d1, Uniform Delay [s]	25.47	26.31	34.42	26.00	36.11	30.00
k, delay calibration	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.98	23.34	3.05	0.95	4.32	7.72
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.82	0.91	0.43	0.48	0.32	0.88
d, Delay for Lane Group [s/veh]	39.45	49.65	37.47	26.96	40.43	37.72
Lane Group LOS	D	D	D	C	D	D
Critical Lane Group	Yes	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	7.90	9.88	0.74	2.65	0.27	5.20
50th-Percentile Queue Length [ft]	197.60	246.93	18.55	66.16	6.74	129.97
95th-Percentile Queue Length [veh]	12.51	15.03	1.34	4.76	0.49	8.94
95th-Percentile Queue Length [ft]	312.86	375.79	33.40	119.08	12.13	223.46

Movement, Approach, & Intersection Results

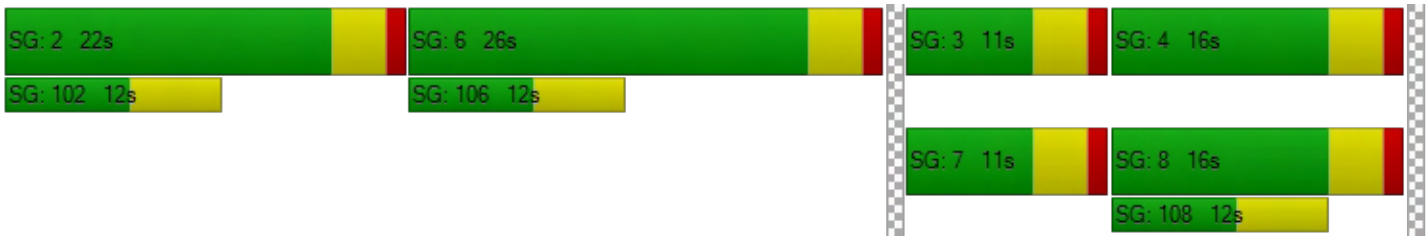
d_M, Delay for Movement [s/veh]	39.45	39.45	39.45	49.65	49.65	49.65	37.47	26.96	26.96	40.43	37.72	37.72
Movement LOS	D	D	D	D	D	D	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	39.45			49.65			28.89			37.84		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	40.70											
Intersection LOS	D											
Intersection V/C	0.715											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	27.31	0.00	27.31	27.31
l_p,int, Pedestrian LOS Score for Intersection	2.289	0.000	2.207	2.160
Crosswalk LOS	B	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	480	587	320	320
d_b, Bicycle Delay [s]	21.66	18.73	26.46	26.46
l_b,int, Bicycle LOS Score for Intersection	2.223	2.282	1.919	2.045
Bicycle LOS	B	B	A	B

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	All-way stop	Delay (sec / veh):	21.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.753

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	42	71	52	22	49	30	23	371	13	32	378	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	42	71	52	22	49	30	23	371	13	32	378	14
Peak Hour Factor	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	19	14	6	13	8	6	98	3	8	100	4
Total Analysis Volume [veh/h]	44	75	55	23	52	32	24	393	14	34	400	15
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	445	466	513	447	500	502	541	501	537	600
Degree of Utilization, x	0.13	0.13	0.11	0.17	0.06	0.05	0.75	0.07	0.74	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.46	0.44	0.36	0.60	0.20	0.15	6.56	0.22	6.37	0.08
95th-Percentile Queue Length [ft]	11.48	10.89	8.96	14.95	5.11	3.76	163.91	5.45	159.23	1.92
Approach Delay [s/veh]	11.41			11.79		25.93		24.59		
Approach LOS	B			B		D		C		
Intersection Delay [s/veh]	21.93									
Intersection LOS	C									

Intersection Level Of Service Report
Intersection 8: Archibald Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	12.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.531

Intersection Setup

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	32.00	100.00	100.00	90.00	100.00	100.00	120.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	50	1319	28	27	909	27	93	71	38	37	60	39
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	1319	28	27	909	27	93	71	38	37	60	39
Peak Hour Factor	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	344	7	7	237	7	24	19	10	10	16	10
Total Analysis Volume [veh/h]	52	1375	29	28	948	28	97	74	40	39	63	41
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	65
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	30	0	24	29	0	0	25	0	0	25	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	L	C
C, Cycle Length [s]	65	65	65	65	65	65	65	65	65	65
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	45	38	38	45	36	36	12	12	12	12
g / C, Green / Cycle	0.69	0.58	0.58	0.69	0.56	0.56	0.19	0.19	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.09	0.40	0.02	0.05	0.27	0.27	0.07	0.07	0.03	0.06
s, saturation flow rate [veh/h]	607	3427	1530	542	1800	1782	1311	1695	1299	1683
c, Capacity [veh/h]	512	1994	890	425	1006	996	245	323	237	321
d1, Uniform Delay [s]	4.22	9.50	5.80	5.90	8.70	8.70	28.28	22.84	27.31	22.71
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.40	1.98	0.07	0.06	1.69	1.71	1.03	0.66	0.32	0.58
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.10	0.69	0.03	0.07	0.49	0.49	0.40	0.35	0.16	0.32
d, Delay for Lane Group [s/veh]	4.62	11.48	5.87	5.97	10.39	10.41	29.31	23.50	27.63	23.29
Lane Group LOS	A	B	A	A	B	B	C	C	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.17	5.15	0.14	0.07	3.45	3.42	1.39	1.41	0.53	1.27
50th-Percentile Queue Length [ft]	4.26	128.76	3.38	1.70	86.32	85.57	34.81	35.18	13.31	31.87
95th-Percentile Queue Length [veh]	0.31	8.87	0.24	0.12	6.22	6.16	2.51	2.53	0.96	2.29
95th-Percentile Queue Length [ft]	7.66	221.81	6.09	3.06	155.38	154.03	62.66	63.32	23.96	57.36

Movement, Approach, & Intersection Results

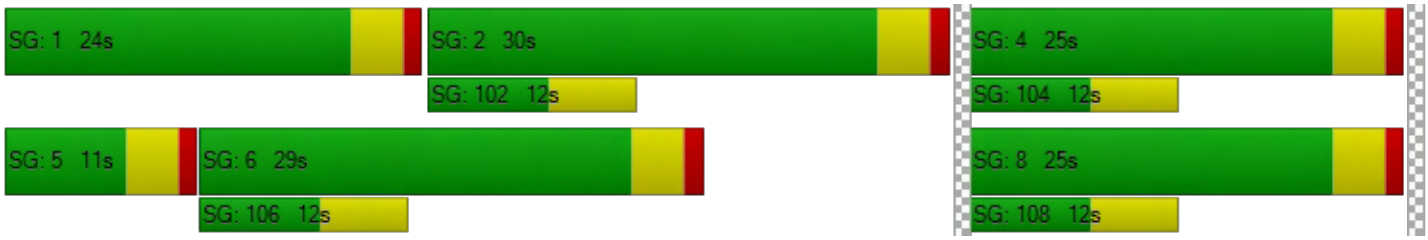
d_M, Delay for Movement [s/veh]	4.62	11.48	5.87	5.97	10.40	10.41	29.31	23.50	23.50	27.63	23.29	23.29
Movement LOS	A	B	A	A	B	B	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	11.12			10.27			26.17			24.48		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	12.63											
Intersection LOS	B											
Intersection V/C	0.531											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	22.43	22.43	22.43	22.43
l_p,int, Pedestrian LOS Score for Intersection	3.217	3.156	2.138	2.080
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	800	769	646	646
d_b, Bicycle Delay [s]	11.70	12.31	14.89	14.89
l_b,int, Bicycle LOS Score for Intersection	2.761	2.388	1.908	1.796
Bicycle LOS	C	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Existing Plus Project

8th Street & Hellman Avenue Project

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Report File: \...\AMEp.pdf

Scenario 2 Existing Plus Project
4/13/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Vineyard Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	NB Left	0.338	11.5	B
2	Project West Driveway (NS) at 8th Street (EW)	Two-way stop	HCM 6th Edition	NB Left	0.010	10.1	B
3	Project East Driveway (NS) at 8th Street (EW)	Two-way stop	HCM 6th Edition	NB Right	0.001	9.2	A
4	Hellman Avenue (NS) at Arrow Route (EW)	Signalized	HCM 6th Edition	EB Left	0.306	20.3	C
5	Hellman Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	WB Left	0.352	23.2	C
6	Hellman Avenue (NS) at Project Driveway (EW)	Two-way stop	HCM 6th Edition	EB Left	0.003	10.9	B
7	Hellman Avenue (NS) at 6th Street (EW)	All-way stop	HCM 6th Edition	EB Thru	0.413	10.4	B
8	Archibald Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	WB Left	0.424	9.0	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Vineyard Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	11.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.338

Intersection Setup

Name				Vineyard Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	98.00	100.00	100.00	57.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name				Vineyard Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	28	468	23	28	572	72	113	60	42	9	45	34
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	9	2	0	0	0	4	0	5	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	468	32	30	572	72	113	64	42	14	46	34
Peak Hour Factor	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	127	9	8	155	19	31	17	11	4	12	9
Total Analysis Volume [veh/h]	30	507	35	32	619	78	122	69	45	15	50	37
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	12	28	0	16	32	0	0	16	0	0	16	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	35	35	3	35	35	11	11	11	11	11	11
g / C, Green / Cycle	0.05	0.58	0.58	0.05	0.58	0.58	0.18	0.18	0.18	0.18	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.02	0.15	0.15	0.02	0.20	0.20	0.09	0.03	0.04	0.01	0.03	0.02
s, saturation flow rate [veh/h]	1714	1800	1760	1714	1800	1730	1376	1800	1574	1299	1800	1530
c, Capacity [veh/h]	79	1039	1015	83	1043	1003	278	314	275	261	314	267
d1, Uniform Delay [s]	27.79	6.33	6.33	27.68	6.61	6.62	25.79	21.14	21.20	24.13	21.04	20.96
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.96	0.62	0.64	2.89	0.89	0.93	1.09	0.28	0.36	0.09	0.23	0.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.38	0.26	0.26	0.38	0.34	0.34	0.44	0.19	0.20	0.06	0.16	0.14
d, Delay for Lane Group [s/veh]	30.74	6.95	6.97	30.57	7.50	7.54	26.87	21.43	21.56	24.22	21.27	21.19
Lane Group LOS	C	A	A	C	A	A	C	C	C	C	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	No	No
50th-Percentile Queue Length [veh]	0.46	1.53	1.50	0.47	1.79	1.73	1.58	0.64	0.61	0.18	0.54	0.40
50th-Percentile Queue Length [ft]	11.56	38.18	37.59	11.69	44.69	43.34	39.48	16.06	15.27	4.44	13.60	10.08
95th-Percentile Queue Length [veh]	0.83	2.75	2.71	0.84	3.22	3.12	2.84	1.16	1.10	0.32	0.98	0.73
95th-Percentile Queue Length [ft]	20.82	68.72	67.66	21.05	80.44	78.02	71.06	28.91	27.48	8.00	24.48	18.15

Movement, Approach, & Intersection Results

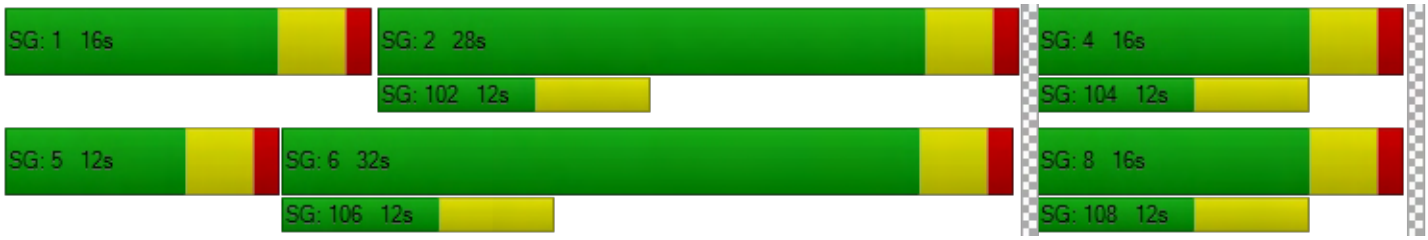
d_M, Delay for Movement [s/veh]	30.74	6.96	6.97	30.57	7.52	7.54	26.87	21.45	21.56	24.22	21.27	21.19
Movement LOS	C	A	A	C	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	8.21			8.53			24.27			21.68		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	11.50											
Intersection LOS	B											
Intersection V/C	0.338											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.655	2.859	2.253	2.347
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	800	933	400	400
d_b, Bicycle Delay [s]	10.80	8.53	19.20	19.20
l_b,int, Bicycle LOS Score for Intersection	2.032	2.161	1.754	1.728
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Project West Driveway (NS) at 8th Street (EW)

Control Type:	Two-way stop	Delay (sec / veh):	10.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.010

Intersection Setup

Name	Project West Driveway		8th Street		8th Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project West Driveway		8th Street		8th Street	
Base Volume Input [veh/h]	0	0	111	0	0	114
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	6	0	7	8	8	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	0	118	8	8	114
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	0	32	2	2	31
Total Analysis Volume [veh/h]	7	0	128	9	9	124
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	10.09	8.95	0.00	0.00	7.48	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.03	0.03	0.00	0.00	0.30	0.30
95th-Percentile Queue Length [ft]	0.74	0.74	0.00	0.00	7.51	7.51
d_A, Approach Delay [s/veh]	10.09		0.00		0.51	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.50					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 3: Project East Driveway (NS) at 8th Street (EW)

Control Type:	Two-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Project East Driveway		8th Street		8th Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project East Driveway		8th Street		8th Street	
Base Volume Input [veh/h]	0	0	172	0	0	184
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	1	1	6	0	8
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1	173	6	0	192
Peak Hour Factor	0.9500	0.9200	0.9200	0.9200	0.9500	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	47	2	0	52
Total Analysis Volume [veh/h]	0	1	188	7	0	209
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	9.21	0.00	0.00	0.00	0.00
Movement LOS		A	A	A		A
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.09	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.21		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.02					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 4: Hellman Avenue (NS) at Arrow Route (EW)

Control Type:	Signalized	Delay (sec / veh):	20.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.306

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	50.00	100.00	100.00	50.00	100.00	100.00	102.00	100.00	100.00	63.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Base Volume Input [veh/h]	12	67	52	80	170	78	34	521	58	49	504	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	1	0	0	2	0	0	0	1	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	68	52	80	172	78	34	521	59	49	504	50
Peak Hour Factor	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	18	13	21	44	20	9	134	15	13	130	13
Total Analysis Volume [veh/h]	12	70	54	82	177	80	35	537	61	50	519	51
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	13	33	0	11	31	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	31	31	31	31	31	3	13	13	4	14	14
g / C, Green / Cycle	0.52	0.52	0.52	0.52	0.52	0.52	0.05	0.22	0.22	0.07	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.01	0.04	0.04	0.06	0.07	0.08	0.02	0.17	0.17	0.03	0.16	0.16
s, saturation flow rate [veh/h]	1140	1800	1556	1287	1800	1617	1714	1800	1736	1714	1800	1744
c, Capacity [veh/h]	618	928	802	710	928	833	92	390	376	117	416	403
d1, Uniform Delay [s]	9.63	7.32	7.35	9.41	7.62	7.65	27.49	22.20	22.22	26.90	21.18	21.20
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.06	0.14	0.18	0.33	0.32	0.38	2.55	3.39	3.57	2.46	2.09	2.19
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.02	0.07	0.08	0.12	0.14	0.15	0.38	0.78	0.78	0.43	0.69	0.70
d, Delay for Lane Group [s/veh]	9.69	7.46	7.53	9.74	7.94	8.03	30.04	25.59	25.80	29.36	23.28	23.39
Lane Group LOS	A	A	A	A	A	A	C	C	C	C	C	C
Critical Lane Group	No	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	0.08	0.33	0.33	0.54	0.73	0.69	0.50	3.85	3.75	0.70	3.44	3.35
50th-Percentile Queue Length [ft]	2.01	8.28	8.13	13.55	18.16	17.34	12.57	96.14	93.67	17.45	85.89	83.87
95th-Percentile Queue Length [veh]	0.14	0.60	0.59	0.98	1.31	1.25	0.91	6.92	6.74	1.26	6.18	6.04
95th-Percentile Queue Length [ft]	3.61	14.90	14.63	24.39	32.68	31.21	22.63	173.06	168.61	31.41	154.60	150.96

Movement, Approach, & Intersection Results

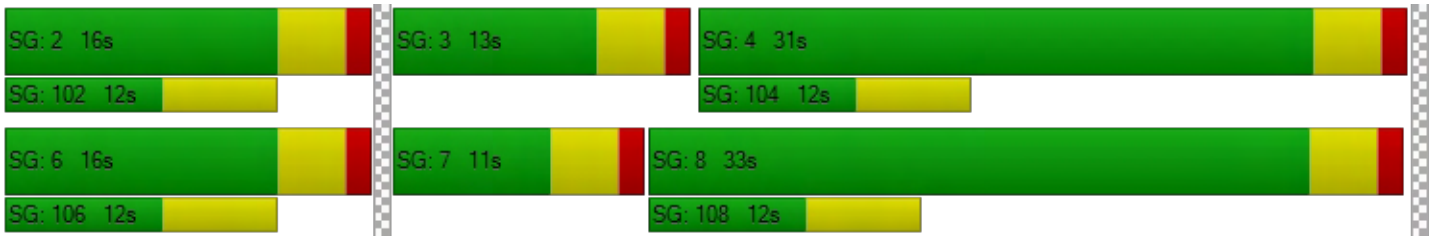
d_M, Delay for Movement [s/veh]	9.69	7.47	7.53	9.74	7.96	8.03	30.04	25.68	25.80	29.36	23.33	23.39
Movement LOS	A	A	A	A	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	7.69			8.41			25.93			23.82		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	20.30											
Intersection LOS	C											
Intersection V/C	0.306											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.401	2.422	2.658	2.772
Crosswalk LOS	B	B	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	967	900
d_b, Bicycle Delay [s]	19.20	19.20	8.01	9.08
l_b,int, Bicycle LOS Score for Intersection	1.672	1.839	2.082	2.071
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Hellman Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	23.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.352

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	45.00	100.00	100.00	150.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	8	144	20	7	170	10	15	74	5	9	96	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	1	1	0	2	1	0	1	1	5	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	145	21	7	172	11	15	75	6	14	101	21
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	40	6	2	48	3	4	21	2	4	28	6
Total Analysis Volume [veh/h]	11	161	23	8	191	12	17	83	7	16	112	23
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	16	16	0	12	12	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	18	18	2	6	2	6
g / C, Green / Cycle	0.30	0.30	0.03	0.11	0.03	0.11
(v / s)_i Volume / Saturation Flow Rate	0.11	0.12	0.01	0.05	0.01	0.08
s, saturation flow rate [veh/h]	1758	1779	1714	1776	1714	1747
c, Capacity [veh/h]	525	531	54	191	51	186
d1, Uniform Delay [s]	16.69	16.83	28.57	25.28	28.64	26.09
k, delay calibration	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.01	2.22	3.32	1.79	3.43	5.33
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.37	0.40	0.32	0.47	0.31	0.73
d, Delay for Lane Group [s/veh]	18.70	19.05	31.90	27.07	32.07	31.43
Lane Group LOS	B	B	C	C	C	C
Critical Lane Group	Yes	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	2.08	2.28	0.27	1.17	0.25	1.94
50th-Percentile Queue Length [ft]	51.99	56.91	6.66	29.30	6.33	48.51
95th-Percentile Queue Length [veh]	3.74	4.10	0.48	2.11	0.46	3.49
95th-Percentile Queue Length [ft]	93.57	102.44	12.00	52.73	11.40	87.32

Movement, Approach, & Intersection Results

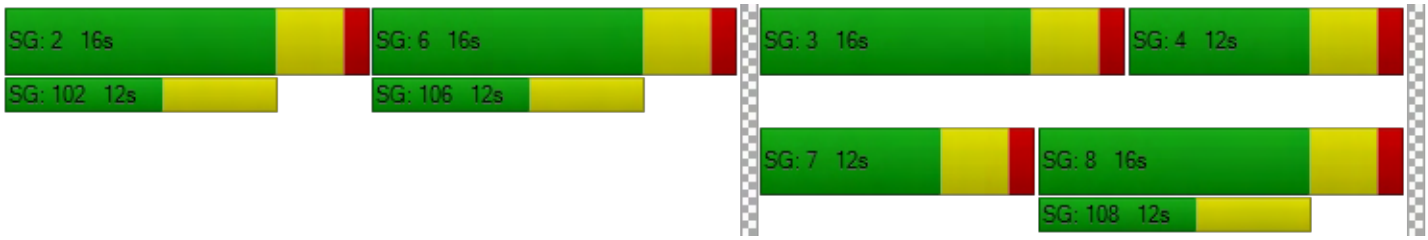
d_M, Delay for Movement [s/veh]	18.70	18.70	18.70	19.05	19.05	19.05	31.90	27.07	27.07	32.07	31.43	31.43
Movement LOS	B	B	B	B	B	B	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	18.70			19.05			27.84			31.50		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	23.19											
Intersection LOS	C											
Intersection V/C	0.352											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	0.00	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	1.991	0.000	2.036	2.047
Crosswalk LOS	A	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	400	267
d_b, Bicycle Delay [s]	19.20	19.20	19.20	22.53
l_b,int, Bicycle LOS Score for Intersection	1.881	1.908	1.736	1.809
Bicycle LOS	A	A	A	A

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Hellman Avenue (NS) at Project Driveway (EW)

Control Type:	Two-way stop	Delay (sec / veh):	10.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.003

Intersection Setup

Name	Hellman Avenue		Hellman Avenue		Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	45.00		45.00		15.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Hellman Avenue		Hellman Avenue		Project Driveway	
Base Volume Input [veh/h]	0	172	184	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	2	0	8	2	1
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	174	184	8	2	1
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	47	50	2	1	0
Total Analysis Volume [veh/h]	3	189	200	9	2	1
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.63	0.00	0.00	0.00	10.94	9.30
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh]	0.49	0.49	0.00	0.00	0.01	0.01
95th-Percentile Queue Length [ft]	12.14	12.14	0.00	0.00	0.34	0.34
d_A, Approach Delay [s/veh]	0.12		0.00		10.39	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.13					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	All-way stop	Delay (sec / veh):	10.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.413

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	4	45	24	8	36	15	34	221	12	35	127	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	0	1	2	0	0	0	0	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	47	24	8	36	16	36	221	12	35	127	16
Peak Hour Factor	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	14	7	2	11	5	11	65	4	10	38	5
Total Analysis Volume [veh/h]	5	56	28	9	43	19	43	261	14	41	150	19
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	582	590	666	577	659	607	666	584	634	724
Degree of Utilization, x	0.05	0.05	0.04	0.09	0.03	0.07	0.41	0.07	0.24	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.17	0.16	0.13	0.30	0.09	0.23	2.02	0.23	0.91	0.08
95th-Percentile Queue Length [ft]	4.14	4.08	3.29	7.40	2.22	5.70	50.60	5.65	22.87	2.02
Approach Delay [s/veh]	8.92			9.23		11.47		9.76		
Approach LOS	A			A		B		A		
Intersection Delay [s/veh]	10.39									
Intersection LOS	B									

Intersection Level Of Service Report
Intersection 8: Archibald Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	9.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.424

Intersection Setup

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	32.00	100.00	100.00	90.00	100.00	100.00	120.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	38	623	25	32	1002	45	40	54	21	27	32	22
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	6	0	0	0	0	2	0	0	2	0	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	44	623	25	32	1002	47	40	54	23	27	33	22
Peak Hour Factor	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	171	7	9	275	13	11	15	6	7	9	6
Total Analysis Volume [veh/h]	48	684	27	35	1100	52	44	59	25	30	36	24
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	16	0	11	16	0	0	33	0	0	33	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	L	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	45	38	38	45	37	37	7	7	7	7
g / C, Green / Cycle	0.75	0.63	0.63	0.75	0.62	0.62	0.12	0.12	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.07	0.20	0.02	0.04	0.32	0.32	0.03	0.05	0.02	0.04
s, saturation flow rate [veh/h]	655	3427	1530	877	1800	1772	1364	1710	1335	1681
c, Capacity [veh/h]	578	2159	964	764	1111	1093	188	202	170	199
d1, Uniform Delay [s]	3.03	5.14	4.18	2.19	6.49	6.49	27.97	24.54	28.46	24.19
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.28	0.39	0.05	0.02	1.76	1.79	0.63	1.36	0.49	0.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.08	0.32	0.03	0.05	0.52	0.52	0.23	0.42	0.18	0.30
d, Delay for Lane Group [s/veh]	3.31	5.52	4.24	2.22	8.25	8.28	28.60	25.89	28.95	25.04
Lane Group LOS	A	A	A	A	A	A	C	C	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.08	1.24	0.09	0.03	2.97	2.94	0.59	1.06	0.41	0.74
50th-Percentile Queue Length [ft]	1.93	30.91	2.16	0.71	74.25	73.38	14.74	26.45	10.14	18.45
95th-Percentile Queue Length [veh]	0.14	2.23	0.16	0.05	5.35	5.28	1.06	1.90	0.73	1.33
95th-Percentile Queue Length [ft]	3.48	55.64	3.89	1.28	133.66	132.09	26.53	47.61	18.25	33.21

Movement, Approach, & Intersection Results

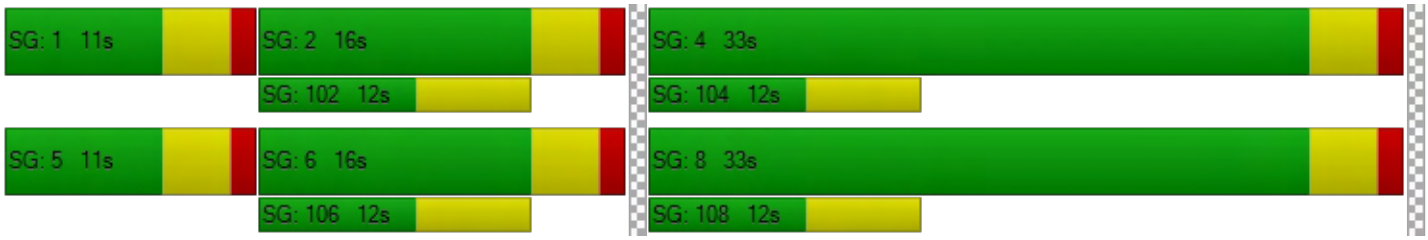
d_M, Delay for Movement [s/veh]	3.31	5.52	4.24	2.22	8.26	8.28	28.60	25.89	25.89	28.95	25.04	25.04
Movement LOS	A	A	A	A	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	5.34			8.09			26.82			26.34		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	8.99											
Intersection LOS	A											
Intersection V/C	0.424											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	3.095	2.907	2.091	2.053
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	967	967
d_b, Bicycle Delay [s]	19.20	19.20	8.01	8.01
l_b,int, Bicycle LOS Score for Intersection	2.186	2.539	1.771	1.708
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



8th Street & Hellman Avenue Project

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Report File: \...\PMEp.pdf

Scenario 2 Existing Plus Project
4/13/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Vineyard Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Left	0.436	13.2	B
2	Project West Driveway (NS) at 8th Street (EW)	Two-way stop	HCM 6th Edition	NB Left	0.027	12.1	B
3	Project East Driveway (NS) at 8th Street (EW)	Two-way stop	HCM 6th Edition	NB Right	0.010	10.3	B
4	Hellman Avenue (NS) at Arrow Route (EW)	Signalized	HCM 6th Edition	WB Left	0.486	19.2	B
5	Hellman Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Thru	0.724	41.5	D
6	Hellman Avenue (NS) at Project Driveway (EW)	Two-way stop	HCM 6th Edition	EB Left	0.023	14.3	B
7	Hellman Avenue (NS) at 6th Street (EW)	All-way stop	HCM 6th Edition	EB Thru	0.755	22.1	C
8	Archibald Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	EB Left	0.532	12.7	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Vineyard Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	13.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.436

Intersection Setup

Name				Vineyard Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	98.00	100.00	100.00	57.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name				Vineyard Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	41	877	20	19	699	96	127	94	60	25	92	80
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	4	0	0	0	0	1	0	8	4	2
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	41	877	24	19	699	96	127	95	60	33	96	82
Peak Hour Factor	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	239	7	5	191	26	35	26	16	9	26	22
Total Analysis Volume [veh/h]	45	957	26	21	763	105	139	104	65	36	105	89
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	32	0	12	33	0	0	16	0	0	16	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	34	34	2	32	32	12	12	12	12	12	12
g / C, Green / Cycle	0.06	0.56	0.56	0.04	0.54	0.54	0.20	0.20	0.20	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.03	0.27	0.27	0.01	0.25	0.25	0.11	0.05	0.05	0.03	0.06	0.06
s, saturation flow rate [veh/h]	1714	1800	1783	1714	1800	1725	1309	1800	1578	1236	1800	1530
c, Capacity [veh/h]	109	1014	1004	63	965	925	278	361	317	276	361	307
d1, Uniform Delay [s]	27.07	7.91	7.91	28.26	8.59	8.59	26.02	20.21	20.27	23.62	20.41	20.41
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.46	1.67	1.69	3.06	1.57	1.64	1.39	0.34	0.43	0.21	0.44	0.52
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.41	0.49	0.49	0.33	0.46	0.46	0.50	0.24	0.26	0.13	0.29	0.29
d, Delay for Lane Group [s/veh]	29.53	9.58	9.60	31.32	10.16	10.23	27.41	20.55	20.69	23.83	20.85	20.93
Lane Group LOS	C	A	A	C	B	B	C	C	C	C	C	C
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No
50th-Percentile Queue Length [veh]	0.66	3.46	3.43	0.32	2.87	2.77	1.84	0.93	0.88	0.42	1.13	0.97
50th-Percentile Queue Length [ft]	16.61	86.41	85.72	8.00	71.68	69.15	45.90	23.37	21.93	10.61	28.37	24.21
95th-Percentile Queue Length [veh]	1.20	6.22	6.17	0.58	5.16	4.98	3.30	1.68	1.58	0.76	2.04	1.74
95th-Percentile Queue Length [ft]	29.89	155.54	154.29	14.40	129.03	124.48	82.62	42.06	39.48	19.10	51.07	43.58

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	29.53	9.59	9.60	31.32	10.19	10.23	27.41	20.57	20.69	23.83	20.85	20.93
Movement LOS	C	A	A	C	B	B	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	10.46			10.70			23.68			21.35		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	13.23											
Intersection LOS	B											
Intersection V/C	0.436											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.789	3.082	2.314	2.389
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	933	967	400	400
d_b, Bicycle Delay [s]	8.53	8.01	19.20	19.20
l_b,int, Bicycle LOS Score for Intersection	2.408	2.293	1.814	1.939
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Project West Driveway (NS) at 8th Street (EW)

Control Type:	Two-way stop	Delay (sec / veh):	12.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.027

Intersection Setup

Name	Project West Driveway		8th Street		8th Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project West Driveway		8th Street		8th Street	
Base Volume Input [veh/h]	0	0	179	0	0	287
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	13	2	2	3	1	1
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	2	181	3	1	288
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	49	1	0	78
Total Analysis Volume [veh/h]	14	2	197	3	1	313
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	12.07	9.44	0.00	0.00	7.60	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.09	0.09	0.00	0.00	0.87	0.87
95th-Percentile Queue Length [ft]	2.24	2.24	0.00	0.00	21.86	21.86
d_A, Approach Delay [s/veh]	11.74		0.00		0.02	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.37					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 3: Project East Driveway (NS) at 8th Street (EW)

Control Type:	Two-way stop	Delay (sec / veh):	10.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.010

Intersection Setup

Name	Project East Driveway		8th Street		8th Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project East Driveway		8th Street		8th Street	
Base Volume Input [veh/h]	0	0	330	0	0	326
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	6	2	2	0	2
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	6	332	2	0	328
Peak Hour Factor	0.9500	0.9200	0.9200	0.9200	0.9500	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	2	90	1	0	89
Total Analysis Volume [veh/h]	0	7	361	2	0	357
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	10.29	0.00	0.00	0.00	0.00
Movement LOS		B	A	A		A
95th-Percentile Queue Length [veh]	0.00	0.03	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.77	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	10.29		0.00		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.10					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 4: Hellman Avenue (NS) at Arrow Route (EW)

Control Type:	Signalized	Delay (sec / veh):	19.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.486

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	50.00	100.00	100.00	50.00	100.00	100.00	102.00	100.00	100.00	63.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Base Volume Input [veh/h]	26	234	88	79	100	76	96	804	27	34	731	161
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	2	0	0	1	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	236	88	79	101	76	96	804	27	34	731	161
Peak Hour Factor	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	63	24	21	27	20	26	216	7	9	196	43
Total Analysis Volume [veh/h]	29	253	94	85	108	82	103	863	29	36	785	173
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	11	32	0	12	33	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	23	23	23	23	23	6	22	22	3	20	20
g / C, Green / Cycle	0.38	0.38	0.38	0.38	0.38	0.38	0.10	0.37	0.37	0.05	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.02	0.10	0.10	0.08	0.05	0.06	0.06	0.25	0.25	0.02	0.27	0.27
s, saturation flow rate [veh/h]	1212	1800	1639	1050	1800	1554	1714	1800	1779	1714	1800	1689
c, Capacity [veh/h]	489	679	618	405	679	586	167	663	656	94	586	550
d1, Uniform Delay [s]	14.91	12.96	13.01	17.38	12.35	12.40	26.06	15.98	15.98	27.44	18.85	18.85
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.12	0.12
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.23	0.94	1.09	1.18	0.45	0.57	3.64	1.22	1.23	2.53	3.78	4.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.26	0.27	0.21	0.15	0.16	0.62	0.68	0.68	0.38	0.84	0.84
d, Delay for Lane Group [s/veh]	15.14	13.90	14.09	18.56	12.79	12.97	29.70	17.20	17.21	29.97	22.63	22.87
Lane Group LOS	B	B	B	B	B	B	C	B	B	C	C	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.27	1.53	1.46	0.93	0.79	0.75	1.43	4.40	4.35	0.52	5.86	5.53
50th-Percentile Queue Length [ft]	6.75	38.22	36.60	23.15	19.86	18.86	35.76	109.89	108.70	12.89	146.51	138.37
95th-Percentile Queue Length [veh]	0.49	2.75	2.64	1.67	1.43	1.36	2.57	7.83	7.77	0.93	9.83	9.39
95th-Percentile Queue Length [ft]	12.15	68.79	65.88	41.66	35.75	33.94	64.37	195.84	194.19	23.21	245.76	234.83

Movement, Approach, & Intersection Results

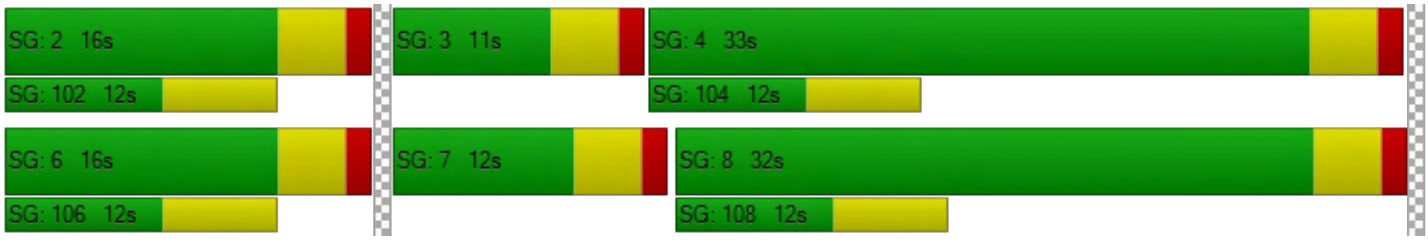
d_M, Delay for Movement [s/veh]	15.14	13.96	14.09	18.56	12.81	12.97	29.70	17.20	17.21	29.97	22.72	22.87
Movement LOS	B	B	B	B	B	B	C	B	B	C	C	C
d_A, Approach Delay [s/veh]	14.08			14.63			18.50			23.01		
Approach LOS	B			B			B			C		
d_I, Intersection Delay [s/veh]	19.16											
Intersection LOS	B											
Intersection V/C	0.486											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.438	2.512	2.872	2.994
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	933	967
d_b, Bicycle Delay [s]	19.20	19.20	8.53	8.01
l_b,int, Bicycle LOS Score for Intersection	1.870	1.786	2.380	2.380
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Hellman Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	41.5
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.724

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	45.00	100.00	100.00	150.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	28	293	9	10	295	54	33	126	20	11	205	25
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	2	5	0	1	0	1	5	2	1	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	295	14	10	296	54	34	131	22	12	206	25
Peak Hour Factor	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	90	4	3	90	16	10	40	7	4	63	8
Total Analysis Volume [veh/h]	35	360	17	12	361	66	41	160	27	15	251	31
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	75
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	22	0	0	26	0	11	16	0	11	16	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C
C, Cycle Length [s]	75	75	75	75	75	75
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	21	4	16	2	14
g / C, Green / Cycle	0.27	0.27	0.05	0.21	0.03	0.18
(v / s)_i Volume / Saturation Flow Rate	0.23	0.25	0.02	0.11	0.01	0.16
s, saturation flow rate [veh/h]	1779	1751	1714	1755	1714	1766
c, Capacity [veh/h]	490	482	95	369	46	321
d1, Uniform Delay [s]	25.72	26.38	34.38	26.27	35.94	29.99
k, delay calibration	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	15.95	23.96	3.06	1.08	4.01	7.76
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.91	0.43	0.51	0.33	0.88
d, Delay for Lane Group [s/veh]	41.67	50.33	37.44	27.35	39.95	37.74
Lane Group LOS	D	D	D	C	D	D
Critical Lane Group	Yes	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	8.37	9.98	0.76	2.81	0.31	5.22
50th-Percentile Queue Length [ft]	209.22	249.52	18.99	70.25	7.63	130.49
95th-Percentile Queue Length [veh]	13.11	15.16	1.37	5.06	0.55	8.97
95th-Percentile Queue Length [ft]	327.83	379.05	34.19	126.45	13.73	224.16

Movement, Approach, & Intersection Results

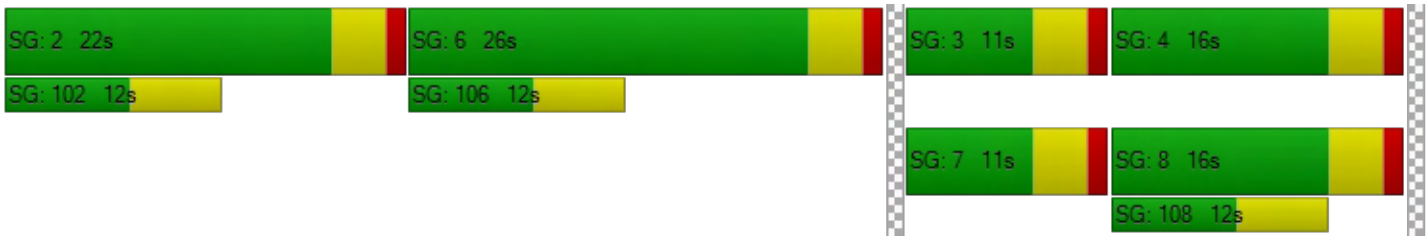
d_M, Delay for Movement [s/veh]	41.67	41.67	41.67	50.33	50.33	50.33	37.44	27.35	27.35	39.95	37.74	37.74
Movement LOS	D	D	D	D	D	D	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	41.67			50.33			29.16			37.86		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	41.54											
Intersection LOS	D											
Intersection V/C	0.724											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	27.31	0.00	27.31	27.31
l_p,int, Pedestrian LOS Score for Intersection	2.301	0.000	2.213	2.167
Crosswalk LOS	B	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	480	587	320	320
d_b, Bicycle Delay [s]	21.66	18.73	26.46	26.46
l_b,int, Bicycle LOS Score for Intersection	2.239	2.284	1.936	2.050
Bicycle LOS	B	B	A	B

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Hellman Avenue (NS) at Project Driveway (EW)

Control Type:	Two-way stop	Delay (sec / veh):	14.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.023

Intersection Setup

Name	Hellman Avenue		Hellman Avenue		Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	45.00		45.00		15.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Hellman Avenue		Hellman Avenue		Project Driveway	
Base Volume Input [veh/h]	0	330	326	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	0	2	2	8	3
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	330	328	2	8	3
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	90	89	1	2	1
Total Analysis Volume [veh/h]	1	359	357	2	9	3
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.02	0.00
d_M, Delay for Movement [s/veh]	7.98	0.00	0.00	0.00	14.27	10.44
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh]	1.25	1.25	0.00	0.00	0.08	0.08
95th-Percentile Queue Length [ft]	31.36	31.36	0.00	0.00	2.08	2.08
d_A, Approach Delay [s/veh]	0.02		0.00		13.31	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.23					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	All-way stop	Delay (sec / veh):	22.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.755

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	42	71	52	22	49	30	23	371	13	32	378	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	1	2	2	1	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	42	71	52	23	51	32	24	371	13	32	378	14
Peak Hour Factor	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	19	14	6	13	8	6	98	3	8	100	4
Total Analysis Volume [veh/h]	44	75	55	24	54	34	25	393	14	34	400	15
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	443	464	511	445	500	500	539	499	536	598
Degree of Utilization, x	0.13	0.13	0.11	0.17	0.07	0.05	0.76	0.07	0.75	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.46	0.44	0.36	0.63	0.22	0.16	6.61	0.22	6.42	0.08
95th-Percentile Queue Length [ft]	11.52	10.93	8.99	15.69	5.46	3.94	165.14	5.47	160.44	1.93
Approach Delay [s/veh]	11.44			11.86		26.14		24.82		
Approach LOS	B			B		D		C		
Intersection Delay [s/veh]	22.07									
Intersection LOS	C									

Intersection Level Of Service Report
Intersection 8: Archibald Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	12.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.532

Intersection Setup

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	32.00	100.00	100.00	90.00	100.00	100.00	120.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	50	1319	28	27	909	27	93	71	38	37	60	39
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	0	0	0	2	1	6	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	52	1319	28	27	909	27	95	72	44	37	60	39
Peak Hour Factor	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	344	7	7	237	7	25	19	11	10	16	10
Total Analysis Volume [veh/h]	54	1375	29	28	948	28	99	75	46	39	63	41
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	65
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	30	0	11	30	0	0	24	0	0	24	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	L	C
C, Cycle Length [s]	65	65	65	65	65	65	65	65	65	65
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	45	38	38	45	36	36	12	12	12	12
g / C, Green / Cycle	0.69	0.58	0.58	0.69	0.56	0.56	0.19	0.19	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.07	0.40	0.02	0.05	0.27	0.27	0.08	0.07	0.03	0.06
s, saturation flow rate [veh/h]	747	3427	1530	542	1800	1782	1311	1687	1291	1683
c, Capacity [veh/h]	581	1993	890	425	1003	993	246	322	232	321
d1, Uniform Delay [s]	4.25	9.51	5.80	5.92	8.76	8.76	28.28	22.95	27.53	22.70
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.32	1.98	0.07	0.06	1.70	1.72	1.06	0.73	0.34	0.58
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.09	0.69	0.03	0.07	0.49	0.49	0.40	0.38	0.17	0.32
d, Delay for Lane Group [s/veh]	4.56	11.49	5.87	5.99	10.47	10.49	29.34	23.67	27.86	23.28
Lane Group LOS	A	B	A	A	B	B	C	C	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.17	5.15	0.14	0.07	3.47	3.44	1.42	1.50	0.54	1.28
50th-Percentile Queue Length [ft]	4.23	128.63	3.38	1.70	86.76	86.00	35.58	37.59	13.40	31.88
95th-Percentile Queue Length [veh]	0.30	8.87	0.24	0.12	6.25	6.19	2.56	2.71	0.96	2.30
95th-Percentile Queue Length [ft]	7.61	221.63	6.08	3.05	156.17	154.81	64.05	67.67	24.12	57.38

Movement, Approach, & Intersection Results

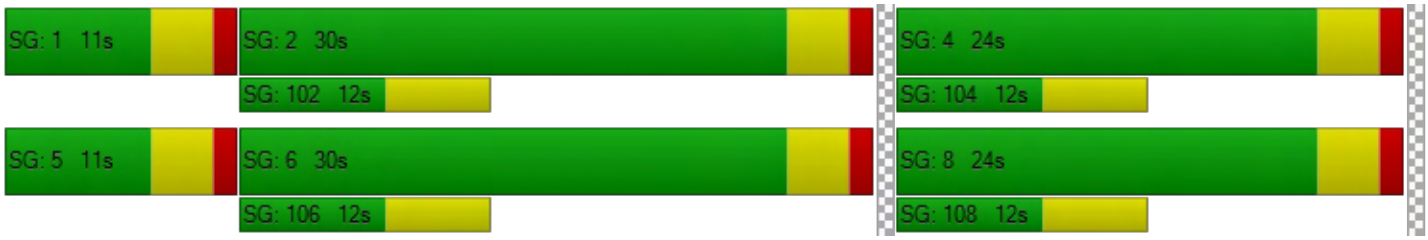
d_M, Delay for Movement [s/veh]	4.56	11.49	5.87	5.99	10.48	10.49	29.34	23.67	23.67	27.86	23.28	23.28
Movement LOS	A	B	A	A	B	B	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	11.12			10.35			26.22			24.53		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	12.70											
Intersection LOS	B											
Intersection V/C	0.532											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	22.43	22.43	22.43	22.43
l_p,int, Pedestrian LOS Score for Intersection	3.218	3.160	2.145	2.081
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	800	800	615	615
d_b, Bicycle Delay [s]	11.70	11.70	15.58	15.58
l_b,int, Bicycle LOS Score for Intersection	2.762	2.388	1.923	1.796
Bicycle LOS	C	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Opening Year (2020) Without Project

8th Street & Hellman Avenue Project

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Report File: \...\AMOY.pdf

Scenario 1 Opening Year (2020) Without Project
4/13/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Vineyard Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Left	0.365	13.0	B
4	Hellman Avenue (NS) at Arrow Route (EW)	Signalized	HCM 6th Edition	EB Left	0.322	20.2	C
5	Hellman Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	WB Left	0.409	24.1	C
7	Hellman Avenue (NS) at 6th Street (EW)	All-way stop	HCM 6th Edition	EB Thru	0.589	14.4	B
8	Archibald Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	EB Left	0.475	11.5	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Vineyard Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	13.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.365

Intersection Setup

Name				Vineyard Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	98.00	100.00	100.00	57.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name				Vineyard Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	30	486	25	29	589	74	120	66	44	9	46	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	4	6	0	0	7	0	0	35	4	0	72	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	34	492	25	29	596	74	120	101	48	9	118	35
Peak Hour Factor	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	133	7	8	161	20	32	27	13	2	32	9
Total Analysis Volume [veh/h]	37	533	27	31	645	80	130	109	52	10	128	38
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	25	0	19	33	0	0	16	0	0	16	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	33	33	3	33	33	12	12	12	12	12	12
g / C, Green / Cycle	0.05	0.55	0.55	0.05	0.55	0.55	0.20	0.20	0.20	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.02	0.16	0.16	0.02	0.21	0.21	0.10	0.05	0.05	0.01	0.07	0.02
s, saturation flow rate [veh/h]	1714	1800	1770	1714	1800	1731	1282	1800	1611	1245	1800	1530
c, Capacity [veh/h]	96	991	974	85	979	942	259	361	323	281	361	307
d1, Uniform Delay [s]	27.40	7.21	7.21	27.69	7.87	7.88	26.58	20.15	20.20	22.97	20.69	19.71
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.52	0.72	0.74	2.63	1.11	1.16	1.50	0.32	0.38	0.05	0.59	0.18
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.39	0.28	0.29	0.37	0.38	0.38	0.50	0.23	0.24	0.04	0.35	0.12
d, Delay for Lane Group [s/veh]	29.91	7.93	7.95	30.32	8.98	9.03	28.07	20.47	20.59	23.02	21.28	19.89
Lane Group LOS	C	A	A	C	A	A	C	C	C	C	C	B
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	No	No
50th-Percentile Queue Length [veh]	0.55	1.74	1.72	0.45	2.17	2.11	1.74	0.88	0.84	0.11	1.41	0.40
50th-Percentile Queue Length [ft]	13.86	43.40	42.89	11.27	54.31	52.65	43.61	22.04	20.95	2.86	35.18	9.91
95th-Percentile Queue Length [veh]	1.00	3.13	3.09	0.81	3.91	3.79	3.14	1.59	1.51	0.21	2.53	0.71
95th-Percentile Queue Length [ft]	24.95	78.13	77.19	20.28	97.75	94.77	78.50	39.66	37.71	5.15	63.32	17.84

Movement, Approach, & Intersection Results

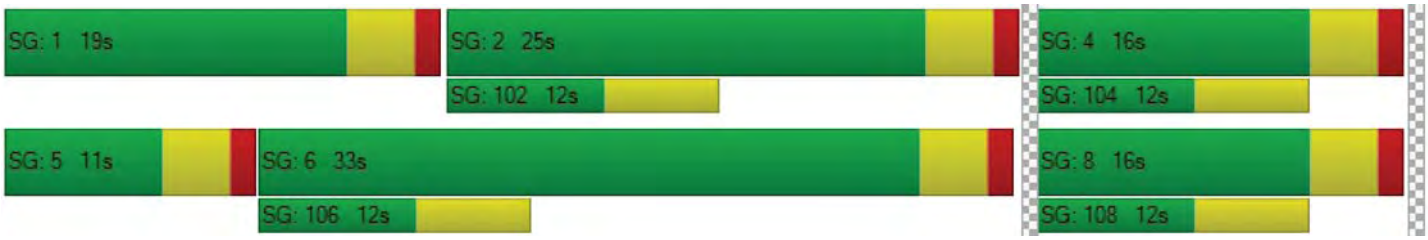
d_M, Delay for Movement [s/veh]	29.91	7.94	7.95	30.32	9.00	9.03	28.07	20.50	20.59	23.02	21.28	19.89
Movement LOS	C	A	A	C	A	A	C	C	C	C	C	B
d_A, Approach Delay [s/veh]	9.30			9.88			23.90			21.08		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	13.01											
Intersection LOS	B											
Intersection V/C	0.365											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.656	2.888	2.305	2.378
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	967	400	400
d_b, Bicycle Delay [s]	12.68	8.01	19.20	19.20
l_b,int, Bicycle LOS Score for Intersection	2.052	2.183	1.800	1.850
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Hellman Avenue (NS) at Arrow Route (EW)

Control Type:	Signalized	Delay (sec / veh):	20.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.322

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	50.00	100.00	100.00	50.00	100.00	100.00	102.00	100.00	100.00	63.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Base Volume Input [veh/h]	12	69	54	83	179	80	35	536	60	52	519	51
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	18	0	0	12	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	69	54	83	179	80	35	554	60	52	531	51
Peak Hour Factor	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	18	14	21	46	21	9	143	15	13	137	13
Total Analysis Volume [veh/h]	12	71	56	85	184	82	36	571	62	54	547	53
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	14	33	0	11	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	30	30	30	30	30	30	3	14	14	4	15	15
g / C, Green / Cycle	0.50	0.50	0.50	0.50	0.50	0.50	0.05	0.23	0.23	0.07	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.01	0.04	0.04	0.07	0.08	0.08	0.02	0.18	0.18	0.03	0.17	0.17
s, saturation flow rate [veh/h]	1131	1800	1553	1284	1800	1618	1714	1800	1739	1714	1800	1745
c, Capacity [veh/h]	596	904	780	690	904	812	94	409	395	123	438	425
d1, Uniform Delay [s]	10.19	7.74	7.77	9.95	8.07	8.10	27.44	21.88	21.90	26.78	20.71	20.73
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.06	0.15	0.20	0.37	0.36	0.42	2.53	3.39	3.56	2.47	1.98	2.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.02	0.07	0.08	0.12	0.15	0.16	0.38	0.79	0.79	0.44	0.69	0.70
d, Delay for Lane Group [s/veh]	10.25	7.89	7.97	10.31	8.43	8.52	29.97	25.27	25.46	29.25	22.70	22.79
Lane Group LOS	B	A	A	B	A	A	C	C	C	C	C	C
Critical Lane Group	No	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	0.08	0.36	0.35	0.59	0.79	0.75	0.52	4.04	3.94	0.75	3.56	3.48
50th-Percentile Queue Length [ft]	2.10	8.90	8.73	14.69	19.77	18.85	12.89	101.08	98.46	18.76	89.05	86.89
95th-Percentile Queue Length [veh]	0.15	0.64	0.63	1.06	1.42	1.36	0.93	7.28	7.09	1.35	6.41	6.26
95th-Percentile Queue Length [ft]	3.78	16.02	15.71	26.44	35.59	33.93	23.21	181.94	177.24	33.77	160.29	156.40

Movement, Approach, & Intersection Results

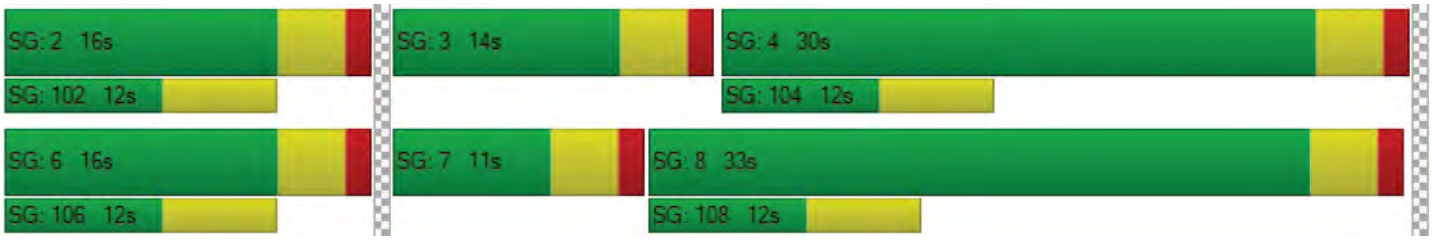
d_M, Delay for Movement [s/veh]	10.25	7.90	7.97	10.31	8.45	8.52	29.97	25.35	25.46	29.25	22.74	22.79
Movement LOS	B	A	A	B	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	8.13			8.92			25.61			23.28		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	20.20											
Intersection LOS	C											
Intersection V/C	0.322											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.406	2.427	2.678	2.798
Crosswalk LOS	B	B	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	967	867
d_b, Bicycle Delay [s]	19.20	19.20	8.01	9.63
l_b,int, Bicycle LOS Score for Intersection	1.674	1.849	2.112	2.099
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Hellman Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	24.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.409

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	45.00	100.00	100.00	150.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	8	150	21	8	179	11	16	78	5	9	99	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	35	0	0	72	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	150	21	8	179	11	16	113	5	9	171	21
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	42	6	2	50	3	4	31	1	3	48	6
Total Analysis Volume [veh/h]	9	167	23	9	199	12	18	126	6	10	190	23
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	12	17	0	12	16	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	17	17	2	10	1	9
g / C, Green / Cycle	0.28	0.28	0.03	0.16	0.02	0.15
(v / s)_i Volume / Saturation Flow Rate	0.11	0.12	0.01	0.07	0.01	0.12
s, saturation flow rate [veh/h]	1760	1779	1714	1786	1714	1766
c, Capacity [veh/h]	483	488	56	295	35	270
d1, Uniform Delay [s]	17.89	18.11	28.50	22.68	29.11	24.60
k, delay calibration	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.58	2.98	3.23	1.06	4.47	5.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.41	0.45	0.32	0.45	0.29	0.79
d, Delay for Lane Group [s/veh]	20.47	21.09	31.73	23.74	33.58	29.72
Lane Group LOS	C	C	C	C	C	C
Critical Lane Group	Yes	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	2.26	2.55	0.28	1.57	0.17	2.95
50th-Percentile Queue Length [ft]	56.58	63.73	7.00	39.23	4.30	73.82
95th-Percentile Queue Length [veh]	4.07	4.59	0.50	2.82	0.31	5.32
95th-Percentile Queue Length [ft]	101.85	114.72	12.59	70.62	7.74	132.88

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	20.47	20.47	20.47	21.09	21.09	21.09	31.73	23.74	23.74	33.58	29.72	29.72
Movement LOS	C	C	C	C	C	C	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	20.47			21.09			24.70			29.89		
Approach LOS	C			C			C			C		
d_I, Intersection Delay [s/veh]	24.10											
Intersection LOS	C											
Intersection V/C	0.409											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	0.00	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	1.995	0.000	2.094	2.103
Crosswalk LOS	A	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	433	400
d_b, Bicycle Delay [s]	19.20	19.20	18.41	19.20
l_b,int, Bicycle LOS Score for Intersection	1.888	1.923	1.807	1.928
Bicycle LOS	A	A	A	A

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	All-way stop	Delay (sec / veh):	14.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.589

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	4	49	26	8	37	15	35	227	13	40	132	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	63	0	0	141	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	49	26	8	37	15	35	290	13	40	273	16
Peak Hour Factor	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	14	8	2	11	4	10	86	4	12	81	5
Total Analysis Volume [veh/h]	5	58	31	9	44	18	41	343	15	47	323	19
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	512	517	575	506	569	559	608	552	598	677
Degree of Utilization, x	0.06	0.06	0.05	0.10	0.03	0.07	0.59	0.09	0.54	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.20	0.19	0.17	0.35	0.10	0.24	3.83	0.28	3.22	0.09
95th-Percentile Queue Length [ft]	4.91	4.85	4.27	8.73	2.45	5.92	95.72	6.95	80.53	2.16
Approach Delay [s/veh]	9.88			10.29		16.02		14.51		
Approach LOS	A			B		C		B		
Intersection Delay [s/veh]	14.37									
Intersection LOS	B									

Intersection Level Of Service Report
Intersection 8: Archibald Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	11.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.475

Intersection Setup

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	32.00	100.00	100.00	90.00	100.00	100.00	120.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	40	645	26	33	1031	47	43	56	22	28	33	23
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	10	2	0	18	0	0	35	0	1	72	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	40	655	28	33	1049	47	43	91	22	29	105	23
Peak Hour Factor	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	180	8	9	288	13	12	25	6	8	29	6
Total Analysis Volume [veh/h]	44	719	31	36	1151	52	47	100	24	32	115	25
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	25	0	11	25	0	0	24	0	0	24	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	L	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	42	35	35	42	34	34	10	10	10	10
g / C, Green / Cycle	0.69	0.58	0.58	0.69	0.57	0.57	0.17	0.17	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.07	0.21	0.02	0.04	0.34	0.34	0.04	0.07	0.02	0.08
s, saturation flow rate [veh/h]	641	3427	1530	865	1800	1773	1269	1741	1287	1745
c, Capacity [veh/h]	521	1973	881	698	1022	1007	198	298	210	299
d1, Uniform Delay [s]	4.39	6.84	5.51	3.21	8.45	8.46	27.46	22.21	26.61	22.43
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.32	0.52	0.07	0.03	2.53	2.57	0.61	0.93	0.33	1.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.08	0.36	0.04	0.05	0.59	0.59	0.24	0.42	0.15	0.47
d, Delay for Lane Group [s/veh]	4.70	7.36	5.59	3.24	10.98	11.03	28.07	23.14	26.94	23.57
Lane Group LOS	A	A	A	A	B	B	C	C	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.11	1.74	0.13	0.06	4.05	4.01	0.62	1.44	0.41	1.65
50th-Percentile Queue Length [ft]	2.87	43.55	3.24	1.54	101.21	100.14	15.57	36.11	10.27	41.35
95th-Percentile Queue Length [veh]	0.21	3.14	0.23	0.11	7.29	7.21	1.12	2.60	0.74	2.98
95th-Percentile Queue Length [ft]	5.16	78.40	5.83	2.78	182.19	180.25	28.02	65.00	18.48	74.44

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	4.70	7.36	5.59	3.24	11.00	11.03	28.07	23.14	23.14	26.94	23.57	23.57
Movement LOS	A	A	A	A	B	B	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	7.14			10.78			24.49			24.20		
Approach LOS	A			B			C			C		
d_I, Intersection Delay [s/veh]	11.52											
Intersection LOS	B											
Intersection V/C	0.475											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	3.114	2.938	2.141	2.114
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	700	667	667
d_b, Bicycle Delay [s]	12.68	12.68	13.33	13.33
l_b,int, Bicycle LOS Score for Intersection	2.215	2.582	1.842	1.843
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



8th Street & Hellman Avenue Project

Vistro File: J:\...\PMOY.vistro
Report File: \...\PMOY.pdf

Scenario 1 Opening Year (2020) Without Project
4/16/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Vineyard Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Left	0.461	14.8	B
4	Hellman Avenue (NS) at Arrow Route (EW)	Signalized	HCM 6th Edition	EB Left	0.516	19.4	B
5	Hellman Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Thru	0.782	49.0	D
7	Hellman Avenue (NS) at 6th Street (EW)	All-way stop	HCM 6th Edition	EB Thru	1.199	86.8	F
8	Archibald Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	EB Left	0.613	14.8	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Vineyard Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	14.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.461

Intersection Setup

Name				Vineyard Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	98.00	100.00	100.00	57.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name				Vineyard Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	42	902	21	21	719	101	131	98	62	26	98	86
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	8	12	0	0	12	0	0	98	8	0	69	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	914	21	21	731	101	131	196	70	26	167	86
Peak Hour Factor	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	249	6	6	199	28	36	53	19	7	46	23
Total Analysis Volume [veh/h]	55	997	23	23	797	110	143	214	76	28	182	94
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	31	0	12	32	0	0	17	0	0	17	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	33	33	2	31	31	13	13	13	13	13	13
g / C, Green / Cycle	0.07	0.55	0.55	0.04	0.51	0.51	0.22	0.22	0.22	0.22	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.03	0.28	0.28	0.01	0.26	0.26	0.12	0.08	0.09	0.03	0.10	0.06
s, saturation flow rate [veh/h]	1714	1800	1786	1714	1800	1725	1221	1800	1643	1106	1800	1530
c, Capacity [veh/h]	124	979	971	68	920	881	239	391	357	245	391	332
d1, Uniform Delay [s]	26.75	8.74	8.74	28.13	9.68	9.68	27.61	20.11	20.16	24.27	20.51	19.64
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.48	2.00	2.01	2.94	1.97	2.05	2.38	0.62	0.70	0.20	0.86	0.46
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.44	0.52	0.52	0.34	0.50	0.50	0.60	0.38	0.39	0.11	0.47	0.28
d, Delay for Lane Group [s/veh]	29.23	10.74	10.76	31.07	11.65	11.74	29.99	20.72	20.86	24.47	21.37	20.10
Lane Group LOS	C	B	B	C	B	B	C	C	C	C	C	C
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No
50th-Percentile Queue Length [veh]	0.80	3.91	3.89	0.35	3.36	3.24	2.02	1.62	1.53	0.34	2.02	0.99
50th-Percentile Queue Length [ft]	20.06	97.82	97.16	8.66	83.93	80.94	50.49	40.45	38.21	8.42	50.45	24.86
95th-Percentile Queue Length [veh]	1.44	7.04	7.00	0.62	6.04	5.83	3.64	2.91	2.75	0.61	3.63	1.79
95th-Percentile Queue Length [ft]	36.10	176.07	174.89	15.58	151.07	145.70	90.89	72.81	68.78	15.16	90.81	44.75

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	29.23	10.75	10.76	31.07	11.69	11.74	29.99	20.76	20.86	24.47	21.37	20.10
Movement LOS	C	B	B	C	B	B	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	11.69			12.17			23.83			21.26		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	14.83											
Intersection LOS	B											
Intersection V/C	0.461											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.791	3.114	2.394	2.442
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	900	933	433	433
d_b, Bicycle Delay [s]	9.08	8.53	18.41	18.41
l_b,int, Bicycle LOS Score for Intersection	2.446	2.327	1.917	2.061
Bicycle LOS	B	B	A	B

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Hellman Avenue (NS) at Arrow Route (EW)

Control Type:	Signalized	Delay (sec / veh):	19.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.516

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	50.00	100.00	100.00	50.00	100.00	100.00	102.00	100.00	100.00	63.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Base Volume Input [veh/h]	29	246	95	81	105	78	99	827	29	36	755	166
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	40	0	0	36	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	246	95	81	105	78	99	867	29	36	791	166
Peak Hour Factor	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	66	25	22	28	21	27	233	8	10	212	45
Total Analysis Volume [veh/h]	31	264	102	87	113	84	106	931	31	39	849	178
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	12	33	0	11	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	22	22	22	22	22	22	6	23	23	3	21	21
g / C, Green / Cycle	0.36	0.36	0.36	0.36	0.36	0.36	0.10	0.39	0.39	0.06	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.03	0.10	0.11	0.08	0.06	0.06	0.06	0.27	0.27	0.02	0.29	0.29
s, saturation flow rate [veh/h]	1204	1800	1634	1032	1800	1557	1714	1800	1780	1714	1800	1693
c, Capacity [veh/h]	460	642	583	373	642	555	169	694	687	100	621	585
d1, Uniform Delay [s]	15.90	13.91	13.96	18.72	13.20	13.26	26.05	15.52	15.52	27.31	18.27	18.27
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.15	0.15
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.28	1.16	1.34	1.47	0.53	0.67	3.78	1.27	1.29	2.49	4.63	4.93
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.07	0.29	0.30	0.23	0.16	0.17	0.63	0.70	0.70	0.39	0.85	0.85
d, Delay for Lane Group [s/veh]	16.19	15.07	15.31	20.19	13.73	13.92	29.83	16.79	16.81	29.80	22.90	23.20
Lane Group LOS	B	B	B	C	B	B	C	B	B	C	C	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.30	1.72	1.64	1.01	0.87	0.82	1.48	4.67	4.62	0.55	6.32	6.00
50th-Percentile Queue Length [ft]	7.58	42.91	40.96	25.21	21.74	20.62	36.90	116.80	115.56	13.87	158.10	150.02
95th-Percentile Queue Length [veh]	0.55	3.09	2.95	1.82	1.56	1.48	2.66	8.22	8.15	1.00	10.45	10.02
95th-Percentile Queue Length [ft]	13.65	77.24	73.73	45.38	39.12	37.12	66.42	205.42	203.71	24.96	261.20	250.45

Movement, Approach, & Intersection Results

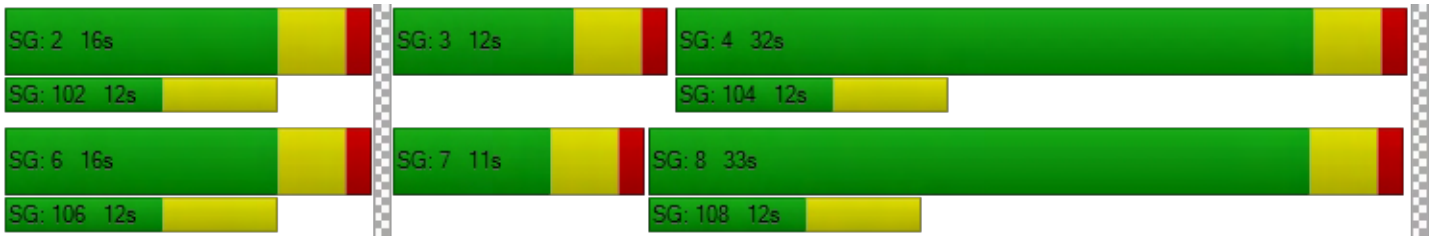
d_M, Delay for Movement [s/veh]	16.19	15.14	15.31	20.19	13.75	13.92	29.83	16.80	16.81	29.80	23.01	23.20
Movement LOS	B	B	B	C	B	B	C	B	B	C	C	C
d_A, Approach Delay [s/veh]	15.26			15.77			18.09			23.29		
Approach LOS	B			B			B			C		
d_I, Intersection Delay [s/veh]	19.43											
Intersection LOS	B											
Intersection V/C	0.516											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.447	2.521	2.916	3.040
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	967	933
d_b, Bicycle Delay [s]	19.20	19.20	8.01	8.53
l_b,int, Bicycle LOS Score for Intersection	1.887	1.794	2.441	2.439
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Hellman Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	49.0
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.782

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	45.00	100.00	100.00	150.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	16	287	40	15	344	20	30	151	9	17	189	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	98	0	0	69	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	16	287	40	15	344	20	30	249	9	17	258	41
Peak Hour Factor	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	88	12	5	105	6	9	76	3	5	79	13
Total Analysis Volume [veh/h]	20	350	49	18	420	24	37	304	11	21	315	50
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	21	0	0	33	0	12	20	0	11	19	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C
C, Cycle Length [s]	85	85	85	85	85	85
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	23	4	20	3	19
g / C, Green / Cycle	0.27	0.27	0.05	0.24	0.03	0.22
(v / s)_i Volume / Saturation Flow Rate	0.24	0.26	0.02	0.18	0.01	0.21
s, saturation flow rate [veh/h]	1759	1780	1714	1789	1714	1758
c, Capacity [veh/h]	478	484	83	422	56	387
d1, Uniform Delay [s]	29.60	30.46	39.36	30.15	40.29	32.66
k, delay calibration	0.50	0.50	0.11	0.11	0.11	0.15
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	19.69	31.11	3.72	2.66	4.12	14.77
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.95	0.45	0.75	0.38	0.94
d, Delay for Lane Group [s/veh]	49.29	61.56	43.08	32.81	44.41	47.43
Lane Group LOS	D	E	D	C	D	D
Critical Lane Group	Yes	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	10.12	12.69	0.80	5.84	0.47	8.42
50th-Percentile Queue Length [ft]	253.00	317.36	20.02	145.99	11.85	210.48
95th-Percentile Queue Length [veh]	15.34	18.54	1.44	9.80	0.85	13.18
95th-Percentile Queue Length [ft]	383.43	463.44	36.04	245.07	21.33	329.44

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	49.29	49.29	49.29	61.56	61.56	61.56	43.08	32.81	32.81	44.41	47.43	47.43
Movement LOS	D	D	D	E	E	E	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	49.29			61.56			33.89			47.27		
Approach LOS	D			E			C			D		
d_I, Intersection Delay [s/veh]	48.96											
Intersection LOS	D											
Intersection V/C	0.782											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	32.21	0.00	32.21	32.21
l_p,int, Pedestrian LOS Score for Intersection	2.348	0.000	2.283	2.306
Crosswalk LOS	B	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	682	376	353
d_b, Bicycle Delay [s]	27.20	18.45	28.01	28.82
l_b,int, Bicycle LOS Score for Intersection	2.251	2.322	2.140	2.197
Bicycle LOS	B	B	B	B

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	All-way stop	Delay (sec / veh):	86.8
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.199

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	45	73	54	26	57	38	24	382	13	33	389	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	174	0	0	121	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	45	73	54	26	57	38	24	556	13	33	510	14
Peak Hour Factor	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	19	14	7	15	10	6	147	3	9	135	4
Total Analysis Volume [veh/h]	48	77	57	28	60	40	25	589	14	35	540	15
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	405	422	459	414	458	470	603	467	540	552
Degree of Utilization, x	0.15	0.15	0.12	0.21	0.09	0.05	1.20	0.07	1.08	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.54	0.52	0.42	0.79	0.29	0.17	22.56	0.24	16.99	0.08
95th-Percentile Queue Length [ft]	13.54	12.88	10.55	19.86	7.15	4.20	563.98	6.04	424.80	2.09
Approach Delay [s/veh]	12.55			12.98		126.62		83.43		
Approach LOS	B			B		F		F		
Intersection Delay [s/veh]	86.84									
Intersection LOS	F									

Intersection Level Of Service Report
Intersection 8: Archibald Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	14.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.613

Intersection Setup

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	32.00	100.00	100.00	90.00	100.00	100.00	120.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	55	1357	32	32	935	30	96	76	39	38	65	40
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	28	2	0	23	0	0	98	0	2	69	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	55	1385	34	32	958	30	96	174	39	40	134	40
Peak Hour Factor	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	361	9	8	250	8	25	45	10	10	35	10
Total Analysis Volume [veh/h]	57	1444	35	33	999	31	100	181	41	42	140	42
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	65
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	37	0	11	37	0	0	17	0	0	17	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	L	C
C, Cycle Length [s]	65	65	65	65	65	65	65	65	65	65
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	44	37	37	44	35	35	13	13	13	13
g / C, Green / Cycle	0.68	0.57	0.57	0.68	0.55	0.55	0.20	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.08	0.42	0.02	0.06	0.29	0.29	0.08	0.13	0.04	0.11
s, saturation flow rate [veh/h]	731	3427	1530	536	1800	1781	1221	1743	1177	1730
c, Capacity [veh/h]	550	1936	864	401	979	969	206	350	176	347
d1, Uniform Delay [s]	4.87	10.66	6.31	7.39	9.51	9.51	30.14	23.85	30.15	23.26
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.38	2.67	0.09	0.09	2.04	2.06	1.77	1.91	0.69	1.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.10	0.75	0.04	0.08	0.53	0.53	0.49	0.63	0.24	0.52
d, Delay for Lane Group [s/veh]	5.25	13.33	6.40	7.47	11.55	11.57	31.91	25.77	30.84	24.49
Lane Group LOS	A	B	A	A	B	B	C	C	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.19	6.06	0.17	0.09	3.94	3.91	1.53	2.96	0.62	2.33
50th-Percentile Queue Length [ft]	4.80	151.49	4.36	2.16	98.52	97.64	38.22	73.90	15.57	58.34
95th-Percentile Queue Length [veh]	0.35	10.10	0.31	0.16	7.09	7.03	2.75	5.32	1.12	4.20
95th-Percentile Queue Length [ft]	8.64	252.41	7.85	3.88	177.34	175.75	68.79	133.03	28.02	105.01

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	5.25	13.33	6.40	7.47	11.56	11.57	31.91	25.77	25.77	30.84	24.49	24.49
Movement LOS	A	B	A	A	B	B	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	12.87			11.43			27.68			25.68		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	14.81											
Intersection LOS	B											
Intersection V/C	0.613											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	22.43	22.43	22.43	22.43
l_p,int, Pedestrian LOS Score for Intersection	3.246	3.199	2.237	2.181
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1015	1015	400	400
d_b, Bicycle Delay [s]	7.88	7.88	20.80	20.80
l_b,int, Bicycle LOS Score for Intersection	2.827	2.437	2.091	1.929
Bicycle LOS	C	B	B	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Opening Year (2020) With Project

8th Street & Hellman Avenue Project

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Scenario 2 Opening Year (2020) With Project
4/13/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Vineyard Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Left	0.365	13.1	B
2	Project West Driveway (NS) at 8th Street (EW)	Two-way stop	HCM 6th Edition	NB Left	0.012	11.1	B
3	Project East Driveway (NS) at 8th Street (EW)	Two-way stop	HCM 6th Edition	NB Right	0.001	9.5	A
4	Hellman Avenue (NS) at Arrow Route (EW)	Signalized	HCM 6th Edition	EB Left	0.323	20.2	C
5	Hellman Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	WB Left	0.417	24.3	C
6	Hellman Avenue (NS) at Project Driveway (EW)	Two-way stop	HCM 6th Edition	EB Left	0.003	11.1	B
7	Hellman Avenue (NS) at 6th Street (EW)	All-way stop	HCM 6th Edition	EB Thru	0.590	14.4	B
8	Archibald Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	EB Left	0.478	11.7	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Vineyard Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	13.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.365

Intersection Setup

Name				Vineyard Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	98.00	100.00	100.00	57.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name				Vineyard Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	30	486	25	29	589	74	120	66	44	9	46	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	4	6	9	2	7	0	0	39	4	5	73	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	34	492	34	31	596	74	120	105	48	14	119	35
Peak Hour Factor	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237	0.9237
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	133	9	8	161	20	32	28	13	4	32	9
Total Analysis Volume [veh/h]	37	533	37	34	645	80	130	114	52	15	129	38
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	26	0	18	33	0	0	16	0	0	16	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	33	33	3	33	33	12	12	12	12	12	12
g / C, Green / Cycle	0.05	0.55	0.55	0.05	0.55	0.55	0.20	0.20	0.20	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.02	0.16	0.16	0.02	0.21	0.21	0.10	0.05	0.05	0.01	0.07	0.02
s, saturation flow rate [veh/h]	1714	1800	1759	1714	1800	1731	1281	1800	1616	1239	1800	1530
c, Capacity [veh/h]	96	985	963	90	979	942	259	361	324	279	361	307
d1, Uniform Delay [s]	27.40	7.34	7.35	27.54	7.87	7.88	26.61	20.18	20.23	23.13	20.71	19.71
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.52	0.75	0.77	2.56	1.11	1.16	1.51	0.33	0.40	0.08	0.60	0.18
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.39	0.29	0.29	0.38	0.38	0.38	0.50	0.24	0.25	0.05	0.36	0.12
d, Delay for Lane Group [s/veh]	29.91	8.10	8.12	30.10	8.98	9.03	28.12	20.51	20.63	23.21	21.30	19.89
Lane Group LOS	C	A	A	C	A	A	C	C	C	C	C	B
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	No	No
50th-Percentile Queue Length [veh]	0.55	1.80	1.77	0.49	2.17	2.11	1.75	0.91	0.87	0.17	1.42	0.40
50th-Percentile Queue Length [ft]	13.86	45.01	44.28	12.24	54.31	52.65	43.66	22.75	21.65	4.32	35.48	9.91
95th-Percentile Queue Length [veh]	1.00	3.24	3.19	0.88	3.91	3.79	3.14	1.64	1.56	0.31	2.55	0.71
95th-Percentile Queue Length [ft]	24.95	81.02	79.71	22.04	97.76	94.77	78.59	40.95	38.96	7.78	63.86	17.84

Movement, Approach, & Intersection Results

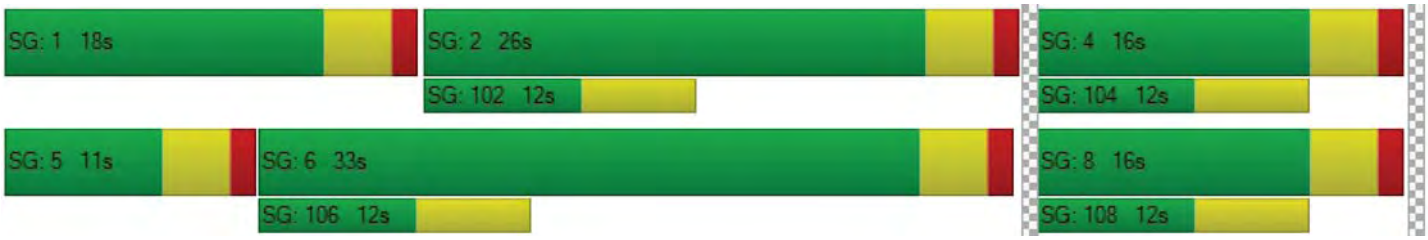
d_M, Delay for Movement [s/veh]	29.91	8.11	8.12	30.10	9.00	9.03	28.12	20.54	20.63	23.21	21.30	19.89
Movement LOS	C	A	A	C	A	A	C	C	C	C	C	B
d_A, Approach Delay [s/veh]	9.44			9.95			23.89			21.17		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	13.13											
Intersection LOS	B											
Intersection V/C	0.365											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.666	2.889	2.307	2.385
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	733	967	400	400
d_b, Bicycle Delay [s]	12.03	8.01	19.20	19.20
l_b,int, Bicycle LOS Score for Intersection	2.060	2.186	1.804	1.860
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 2: Project West Driveway (NS) at 8th Street (EW)

Control Type:	Two-way stop	Delay (sec / veh):	11.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.012

Intersection Setup

Name	Project West Driveway		8th Street		8th Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project West Driveway		8th Street		8th Street	
Base Volume Input [veh/h]	0	0	120	0	0	118
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	6	0	42	8	8	72
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	0	162	8	8	190
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	0	44	2	2	52
Total Analysis Volume [veh/h]	7	0	176	9	9	207
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	11.06	9.22	0.00	0.00	7.58	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.04	0.04	0.00	0.00	0.54	0.54
95th-Percentile Queue Length [ft]	0.88	0.88	0.00	0.00	13.61	13.61
d_A, Approach Delay [s/veh]	11.06		0.00		0.32	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.36					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 3: Project East Driveway (NS) at 8th Street (EW)

Control Type:	Two-way stop	Delay (sec / veh):	9.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Project East Driveway		8th Street		8th Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project East Driveway		8th Street		8th Street	
Base Volume Input [veh/h]	0	0	179	0	0	193
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	1	36	6	0	80
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1	215	6	0	273
Peak Hour Factor	0.9500	0.9200	0.9200	0.9200	0.9500	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	58	2	0	74
Total Analysis Volume [veh/h]	0	1	234	7	0	297
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	9.47	0.00	0.00	0.00	0.00
Movement LOS		A	A	A		A
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.09	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.47		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.02					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 4: Hellman Avenue (NS) at Arrow Route (EW)

Control Type:	Signalized	Delay (sec / veh):	20.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.323

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	50.00	100.00	100.00	50.00	100.00	100.00	102.00	100.00	100.00	63.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Base Volume Input [veh/h]	12	69	54	83	179	80	35	536	60	52	519	51
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	1	0	0	2	0	0	18	1	0	12	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	70	54	83	181	80	35	554	61	52	531	51
Peak Hour Factor	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	18	14	21	47	21	9	143	16	13	137	13
Total Analysis Volume [veh/h]	12	72	56	85	186	82	36	571	63	54	547	53
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	13	33	0	11	31	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	30	30	30	30	30	30	3	14	14	4	15	15
g / C, Green / Cycle	0.50	0.50	0.50	0.50	0.50	0.50	0.05	0.23	0.23	0.07	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.01	0.04	0.04	0.07	0.08	0.08	0.02	0.18	0.18	0.03	0.17	0.17
s, saturation flow rate [veh/h]	1129	1800	1555	1282	1800	1619	1714	1800	1738	1714	1800	1745
c, Capacity [veh/h]	594	903	780	689	903	812	94	409	395	123	439	426
d1, Uniform Delay [s]	10.22	7.75	7.78	9.97	8.09	8.12	27.44	21.87	21.89	26.78	20.69	20.71
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.06	0.16	0.20	0.37	0.36	0.42	2.53	3.39	3.56	2.47	1.97	2.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.02	0.07	0.08	0.12	0.15	0.16	0.38	0.79	0.79	0.44	0.69	0.70
d, Delay for Lane Group [s/veh]	10.28	7.91	7.98	10.33	8.45	8.54	29.97	25.26	25.45	29.25	22.66	22.76
Lane Group LOS	B	A	A	B	A	A	C	C	C	C	C	C
Critical Lane Group	No	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	0.08	0.36	0.35	0.59	0.80	0.76	0.52	4.05	3.94	0.75	3.56	3.47
50th-Percentile Queue Length [ft]	2.10	8.98	8.81	14.71	19.95	19.03	12.89	101.24	98.58	18.76	88.97	86.81
95th-Percentile Queue Length [veh]	0.15	0.65	0.63	1.06	1.44	1.37	0.93	7.29	7.10	1.35	6.41	6.25
95th-Percentile Queue Length [ft]	3.78	16.17	15.85	26.49	35.92	34.25	23.21	182.22	177.44	33.77	160.14	156.25

Movement, Approach, & Intersection Results

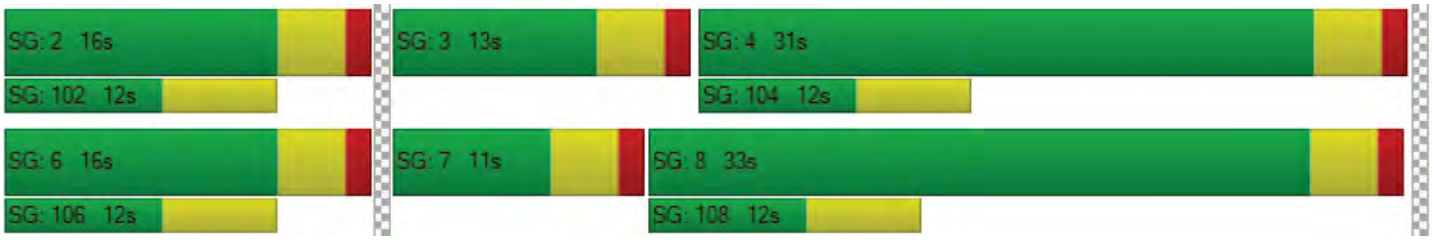
d_M, Delay for Movement [s/veh]	10.28	7.91	7.98	10.33	8.47	8.54	29.97	25.34	25.45	29.25	22.71	22.76
Movement LOS	B	A	A	B	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	8.14			8.94			25.60			23.25		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	20.17											
Intersection LOS	C											
Intersection V/C	0.323											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.407	2.428	2.678	2.798
Crosswalk LOS	B	B	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	967	900
d_b, Bicycle Delay [s]	19.20	19.20	8.01	9.08
l_b,int, Bicycle LOS Score for Intersection	1.675	1.851	2.112	2.099
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 5: Hellman Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	24.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.417

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	45.00	100.00	100.00	150.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	8	150	21	8	179	11	16	78	5	9	99	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	1	1	0	2	1	0	36	1	5	77	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	151	22	8	181	12	16	114	6	14	176	21
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	42	6	2	50	3	4	32	2	4	49	6
Total Analysis Volume [veh/h]	11	168	24	9	201	13	18	127	7	16	196	23
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	12	17	0	12	16	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	16	16	2	10	2	9
g / C, Green / Cycle	0.27	0.27	0.03	0.16	0.03	0.16
(v / s)_i Volume / Saturation Flow Rate	0.12	0.13	0.01	0.08	0.01	0.12
s, saturation flow rate [veh/h]	1759	1778	1714	1784	1714	1767
c, Capacity [veh/h]	480	485	56	284	51	277
d1, Uniform Delay [s]	18.03	18.23	28.50	23.03	28.64	24.49
k, delay calibration	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.73	3.12	3.23	1.21	3.43	5.08
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.42	0.46	0.32	0.47	0.31	0.79
d, Delay for Lane Group [s/veh]	20.76	21.36	31.73	24.24	32.07	29.56
Lane Group LOS	C	C	C	C	C	C
Critical Lane Group	Yes	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	2.33	2.61	0.28	1.62	0.25	3.03
50th-Percentile Queue Length [ft]	58.26	65.15	7.00	40.42	6.33	75.67
95th-Percentile Queue Length [veh]	4.19	4.69	0.50	2.91	0.46	5.45
95th-Percentile Queue Length [ft]	104.87	117.28	12.59	72.76	11.40	136.20

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	20.76	20.76	20.76	21.36	21.36	21.36	31.73	24.24	24.24	32.07	29.56	29.56
Movement LOS	C	C	C	C	C	C	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	20.76			21.36			25.13			29.73		
Approach LOS	C			C			C			C		
d_I, Intersection Delay [s/veh]	24.33											
Intersection LOS	C											
Intersection V/C	0.417											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	0.00	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.005	0.000	2.099	2.110
Crosswalk LOS	B	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	433	400
d_b, Bicycle Delay [s]	19.20	19.20	18.41	19.20
l_b,int, Bicycle LOS Score for Intersection	1.895	1.928	1.810	1.947
Bicycle LOS	A	A	A	A

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Hellman Avenue (NS) at Project Driveway (EW)

Control Type:	Two-way stop	Delay (sec / veh):	11.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.003

Intersection Setup

Name	Hellman Avenue		Hellman Avenue		Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	45.00		45.00		15.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Hellman Avenue		Hellman Avenue		Project Driveway	
Base Volume Input [veh/h]	0	179	193	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	2	0	8	2	1
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	181	193	8	2	1
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	49	52	2	1	0
Total Analysis Volume [veh/h]	3	197	210	9	2	1
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.65	0.00	0.00	0.00	11.08	9.36
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh]	0.51	0.51	0.00	0.00	0.01	0.01
95th-Percentile Queue Length [ft]	12.86	12.86	0.00	0.00	0.34	0.34
d_A, Approach Delay [s/veh]	0.11		0.00		10.51	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.13					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	All-way stop	Delay (sec / veh):	14.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.590

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	4	49	26	8	37	15	35	227	13	40	132	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	0	1	2	63	0	0	141	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	51	26	8	37	16	37	290	13	40	273	17
Peak Hour Factor	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	15	8	2	11	5	11	86	4	12	81	5
Total Analysis Volume [veh/h]	5	60	31	9	44	19	44	343	15	47	323	20
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	511	517	574	505	568	558	607	551	597	674
Degree of Utilization, x	0.06	0.06	0.05	0.10	0.03	0.08	0.59	0.09	0.54	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.20	0.20	0.17	0.35	0.10	0.26	3.84	0.28	3.24	0.09
95th-Percentile Queue Length [ft]	5.08	5.02	4.27	8.74	2.59	6.40	96.11	6.97	80.94	2.29
Approach Delay [s/veh]	9.91			10.29		16.04		14.56		
Approach LOS	A			B		C		B		
Intersection Delay [s/veh]	14.39									
Intersection LOS	B									

Intersection Level Of Service Report
Intersection 8: Archibald Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	11.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.478

Intersection Setup

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	32.00	100.00	100.00	90.00	100.00	100.00	120.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	40	645	26	33	1031	47	43	56	22	28	33	23
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	6	10	2	0	18	2	0	35	2	1	73	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	46	655	28	33	1049	49	43	91	24	29	106	23
Peak Hour Factor	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112	0.9112
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	180	8	9	288	13	12	25	7	8	29	6
Total Analysis Volume [veh/h]	50	719	31	36	1151	54	47	100	26	32	116	25
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	25	0	11	25	0	0	24	0	0	24	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	L	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	42	34	34	42	34	34	10	10	10	10
g / C, Green / Cycle	0.69	0.57	0.57	0.69	0.56	0.56	0.17	0.17	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.08	0.21	0.02	0.04	0.34	0.34	0.04	0.07	0.02	0.08
s, saturation flow rate [veh/h]	650	3427	1530	865	1800	1772	1267	1737	1285	1745
c, Capacity [veh/h]	525	1970	880	697	1011	995	198	299	210	300
d1, Uniform Delay [s]	4.49	6.87	5.54	3.23	8.71	8.71	27.44	22.19	26.63	22.39
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.36	0.52	0.07	0.03	2.64	2.69	0.61	0.95	0.33	1.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.10	0.36	0.04	0.05	0.60	0.60	0.24	0.42	0.15	0.47
d, Delay for Lane Group [s/veh]	4.85	7.39	5.61	3.26	11.34	11.40	28.04	23.14	26.96	23.53
Lane Group LOS	A	A	A	A	B	B	C	C	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.13	1.75	0.13	0.06	4.18	4.13	0.62	1.47	0.41	1.66
50th-Percentile Queue Length [ft]	3.29	43.73	3.25	1.56	104.39	103.24	15.56	36.71	10.27	41.61
95th-Percentile Queue Length [veh]	0.24	3.15	0.23	0.11	7.52	7.43	1.12	2.64	0.74	3.00
95th-Percentile Queue Length [ft]	5.92	78.71	5.85	2.81	187.90	185.83	28.01	66.07	18.49	74.89

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	4.85	7.39	5.61	3.26	11.37	11.40	28.04	23.14	23.14	26.96	23.53	23.53
Movement LOS	A	A	A	A	B	B	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	7.16			11.13			24.47			24.17		
Approach LOS	A			B			C			C		
d_I, Intersection Delay [s/veh]	11.71											
Intersection LOS	B											
Intersection V/C	0.478											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	3.116	2.939	2.152	2.115
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	700	667	667
d_b, Bicycle Delay [s]	12.68	12.68	13.33	13.33
l_b,int, Bicycle LOS Score for Intersection	2.220	2.583	1.845	1.845
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



8th Street & Hellman Avenue Project

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Report File: \...\PMOYp.pdf

Scenario 2 Opening Year (2020) With Project
4/16/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Vineyard Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Left	0.463	14.9	B
2	Project West Driveway (NS) at 8th Street (EW)	Two-way stop	HCM 6th Edition	NB Left	0.032	13.4	B
3	Project East Driveway (NS) at 8th Street (EW)	Two-way stop	HCM 6th Edition	NB Right	0.012	11.2	B
4	Hellman Avenue (NS) at Arrow Route (EW)	Signalized	HCM 6th Edition	EB Left	0.516	19.4	B
5	Hellman Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Thru	0.791	50.1	D
6	Hellman Avenue (NS) at Project Driveway (EW)	Two-way stop	HCM 6th Edition	EB Left	0.025	15.1	C
7	Hellman Avenue (NS) at 6th Street (EW)	All-way stop	HCM 6th Edition	EB Thru	1.202	87.4	F
8	Archibald Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	EB Left	0.613	14.7	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Vineyard Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	14.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.463

Intersection Setup

Name				Vineyard Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	98.00	100.00	100.00	57.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name				Vineyard Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	42	902	21	21	719	101	131	98	62	26	98	86
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	8	12	4	0	12	0	0	99	8	8	73	2
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	914	25	21	731	101	131	197	70	34	171	88
Peak Hour Factor	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167	0.9167
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	249	7	6	199	28	36	54	19	9	47	24
Total Analysis Volume [veh/h]	55	997	27	23	797	110	143	215	76	37	187	96
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	31	0	12	32	0	0	17	0	0	17	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	33	33	2	31	31	13	13	13	13	13	13
g / C, Green / Cycle	0.07	0.55	0.55	0.04	0.51	0.51	0.22	0.22	0.22	0.22	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.03	0.29	0.29	0.01	0.26	0.26	0.12	0.08	0.09	0.03	0.10	0.06
s, saturation flow rate [veh/h]	1714	1800	1783	1714	1800	1725	1215	1800	1644	1105	1800	1530
c, Capacity [veh/h]	124	979	970	68	920	881	236	391	357	245	391	332
d1, Uniform Delay [s]	26.75	8.76	8.76	28.13	9.68	9.68	27.76	20.11	20.16	24.49	20.57	19.67
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.48	2.02	2.03	2.94	1.97	2.05	2.51	0.62	0.71	0.28	0.91	0.47
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.44	0.53	0.53	0.34	0.50	0.50	0.61	0.38	0.39	0.15	0.48	0.29
d, Delay for Lane Group [s/veh]	29.23	10.78	10.79	31.07	11.65	11.74	30.27	20.73	20.87	24.77	21.48	20.14
Lane Group LOS	C	B	B	C	B	B	C	C	C	C	C	C
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No
50th-Percentile Queue Length [veh]	0.80	3.94	3.91	0.35	3.36	3.24	2.03	1.62	1.53	0.45	2.08	1.02
50th-Percentile Queue Length [ft]	20.06	98.49	97.71	8.66	83.93	80.94	50.87	40.60	38.36	11.24	52.05	25.43
95th-Percentile Queue Length [veh]	1.44	7.09	7.04	0.62	6.04	5.83	3.66	2.92	2.76	0.81	3.75	1.83
95th-Percentile Queue Length [ft]	36.10	177.27	175.89	15.58	151.07	145.70	91.56	73.08	69.05	20.24	93.69	45.78

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	29.23	10.78	10.79	31.07	11.69	11.74	30.27	20.77	20.87	24.77	21.48	20.14
Movement LOS	C	B	B	C	B	B	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	11.73			12.17			23.92			21.46		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	14.92											
Intersection LOS	B											
Intersection V/C	0.463											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.806	3.114	2.396	2.448
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	900	933	433	433
d_b, Bicycle Delay [s]	9.08	8.53	18.41	18.41
l_b,int, Bicycle LOS Score for Intersection	2.450	2.327	1.918	2.088
Bicycle LOS	B	B	A	B

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 2: Project West Driveway (NS) at 8th Street (EW)

Control Type:	Two-way stop	Delay (sec / veh):	13.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.032

Intersection Setup

Name	Project West Driveway		8th Street		8th Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project West Driveway		8th Street		8th Street	
Base Volume Input [veh/h]	0	0	190	0	0	225
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	13	2	100	3	1	70
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	2	290	3	1	295
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	79	1	0	80
Total Analysis Volume [veh/h]	14	2	315	3	1	321
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	13.41	10.22	0.00	0.00	7.87	0.00
Movement LOS	B	B	A	A	A	A
95th-Percentile Queue Length [veh]	0.11	0.11	0.00	0.00	1.03	1.03
95th-Percentile Queue Length [ft]	2.66	2.66	0.00	0.00	25.70	25.70
d_A, Approach Delay [s/veh]	13.01		0.00		0.02	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.33					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 3: Project East Driveway (NS) at 8th Street (EW)

Control Type:	Two-way stop	Delay (sec / veh):	11.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.012

Intersection Setup

Name	Project East Driveway		8th Street		8th Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project East Driveway		8th Street		8th Street	
Base Volume Input [veh/h]	0	0	343	0	0	370
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	6	100	2	0	71
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	6	443	2	0	441
Peak Hour Factor	0.9500	0.9200	0.9200	0.9200	0.9500	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	2	120	1	0	120
Total Analysis Volume [veh/h]	0	7	482	2	0	479
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	11.20	0.00	0.00	0.00	0.00
Movement LOS		B	A	A		A
95th-Percentile Queue Length [veh]	0.00	0.04	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.90	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	11.20		0.00		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.08					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 4: Hellman Avenue (NS) at Arrow Route (EW)

Control Type:	Signalized	Delay (sec / veh):	19.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.516

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	50.00	100.00	100.00	50.00	100.00	100.00	102.00	100.00	100.00	63.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Base Volume Input [veh/h]	29	246	95	81	105	78	99	827	29	36	755	166
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	2	0	0	1	0	0	40	0	0	36	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	248	95	81	106	78	99	867	29	36	791	166
Peak Hour Factor	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316	0.9316
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	67	25	22	28	21	27	233	8	10	212	45
Total Analysis Volume [veh/h]	32	266	102	87	114	84	106	931	31	39	849	178
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	12	33	0	11	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	22	22	22	22	22	22	6	23	23	3	21	21
g / C, Green / Cycle	0.36	0.36	0.36	0.36	0.36	0.36	0.10	0.39	0.39	0.06	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.03	0.11	0.11	0.08	0.06	0.06	0.06	0.27	0.27	0.02	0.29	0.29
s, saturation flow rate [veh/h]	1203	1800	1635	1030	1800	1558	1714	1800	1780	1714	1800	1693
c, Capacity [veh/h]	459	642	583	372	642	556	169	694	687	100	621	585
d1, Uniform Delay [s]	15.93	13.92	13.97	18.75	13.20	13.26	26.05	15.52	15.52	27.31	18.27	18.27
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.15	0.15
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.29	1.17	1.35	1.47	0.53	0.67	3.78	1.27	1.29	2.49	4.63	4.93
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.07	0.30	0.31	0.23	0.16	0.17	0.63	0.70	0.70	0.39	0.85	0.85
d, Delay for Lane Group [s/veh]	16.22	15.09	15.32	20.22	13.74	13.93	29.83	16.79	16.81	29.80	22.90	23.20
Lane Group LOS	B	B	B	C	B	B	C	B	B	C	C	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.31	1.73	1.65	1.01	0.87	0.83	1.48	4.67	4.62	0.55	6.32	6.00
50th-Percentile Queue Length [ft]	7.84	43.18	41.22	25.24	21.85	20.73	36.90	116.80	115.56	13.87	158.10	150.02
95th-Percentile Queue Length [veh]	0.56	3.11	2.97	1.82	1.57	1.49	2.66	8.22	8.15	1.00	10.45	10.02
95th-Percentile Queue Length [ft]	14.11	77.73	74.19	45.44	39.33	37.32	66.42	205.42	203.71	24.96	261.20	250.45

Movement, Approach, & Intersection Results

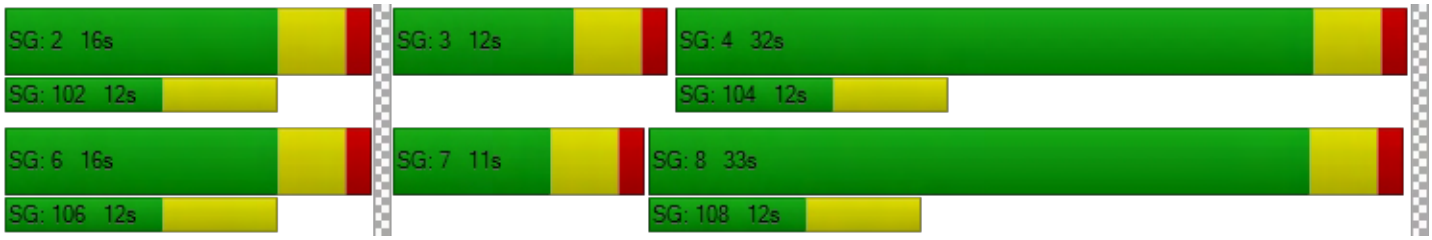
d_M, Delay for Movement [s/veh]	16.22	15.16	15.32	20.22	13.76	13.93	29.83	16.80	16.81	29.80	23.01	23.20
Movement LOS	B	B	B	C	B	B	C	B	B	C	C	C
d_A, Approach Delay [s/veh]	15.29			15.78			18.09			23.29		
Approach LOS	B			B			B			C		
d_I, Intersection Delay [s/veh]	19.43											
Intersection LOS	B											
Intersection V/C	0.516											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.448	2.522	2.917	3.040
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	967	933
d_b, Bicycle Delay [s]	19.20	19.20	8.01	8.53
l_b,int, Bicycle LOS Score for Intersection	1.890	1.795	2.441	2.439
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Hellman Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	50.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.791

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	45.00	100.00	100.00	150.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	16	287	40	15	344	20	30	151	9	17	189	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	2	5	0	1	0	1	103	2	1	70	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	17	289	45	15	345	20	31	254	11	18	259	41
Peak Hour Factor	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196	0.8196
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	88	14	5	105	6	9	77	3	5	79	13
Total Analysis Volume [veh/h]	21	353	55	18	421	24	38	310	13	22	316	50
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	21	0	0	33	0	11	20	0	11	20	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C
C, Cycle Length [s]	85	85	85	85	85	85
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	23	4	20	3	19
g / C, Green / Cycle	0.27	0.27	0.05	0.24	0.03	0.22
(v / s)_i Volume / Saturation Flow Rate	0.24	0.26	0.02	0.18	0.01	0.21
s, saturation flow rate [veh/h]	1756	1780	1714	1787	1714	1758
c, Capacity [veh/h]	477	484	84	419	58	385
d1, Uniform Delay [s]	29.85	30.48	39.31	30.40	40.22	32.74
k, delay calibration	0.50	0.50	0.11	0.11	0.11	0.15
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	22.49	31.54	3.72	3.02	4.05	15.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.90	0.96	0.45	0.77	0.38	0.95
d, Delay for Lane Group [s/veh]	52.33	62.02	43.04	33.42	44.27	48.40
Lane Group LOS	D	E	D	C	D	D
Critical Lane Group	Yes	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	10.73	12.78	0.82	6.06	0.49	8.54
50th-Percentile Queue Length [ft]	268.18	319.41	20.54	151.57	12.36	213.52
95th-Percentile Queue Length [veh]	16.10	18.64	1.48	10.10	0.89	13.33
95th-Percentile Queue Length [ft]	402.46	465.96	36.97	252.52	22.25	333.34

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.33	52.33	52.33	62.02	62.02	62.02	43.04	33.42	33.42	44.27	48.40	48.40
Movement LOS	D	D	D	E	E	E	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	52.33			62.02			34.44			48.17		
Approach LOS	D			E			C			D		
d_I, Intersection Delay [s/veh]	50.14											
Intersection LOS	D											
Intersection V/C	0.791											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	32.21	0.00	32.21	32.21
l_p,int, Pedestrian LOS Score for Intersection	2.359	0.000	2.289	2.313
Crosswalk LOS	B	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	682	376	376
d_b, Bicycle Delay [s]	27.20	18.45	28.01	28.01
l_b,int, Bicycle LOS Score for Intersection	2.267	2.324	2.155	2.200
Bicycle LOS	B	B	B	B

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Hellman Avenue (NS) at Project Driveway (EW)

Control Type:	Two-way stop	Delay (sec / veh):	15.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.025

Intersection Setup

Name	Hellman Avenue		Hellman Avenue		Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	45.00		45.00		15.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Hellman Avenue		Hellman Avenue		Project Driveway	
Base Volume Input [veh/h]	0	343	370	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	0	2	2	8	3
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	343	372	2	8	3
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	93	101	1	2	1
Total Analysis Volume [veh/h]	1	373	404	2	9	3
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.02	0.00
d_M, Delay for Movement [s/veh]	8.10	0.00	0.00	0.00	15.09	10.80
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh]	1.40	1.40	0.00	0.00	0.09	0.09
95th-Percentile Queue Length [ft]	35.02	35.02	0.00	0.00	2.25	2.25
d_A, Approach Delay [s/veh]	0.02		0.00		14.02	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.22					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	All-way stop	Delay (sec / veh):	87.4
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.202

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	45	73	54	26	57	38	24	382	13	33	389	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	1	2	2	1	174	0	0	121	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	45	73	54	27	59	40	25	556	13	33	510	14
Peak Hour Factor	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	19	14	7	16	11	7	147	3	9	135	4
Total Analysis Volume [veh/h]	48	77	57	29	62	42	26	589	14	35	540	15
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	404	421	458	414	457	469	603	466	540	550
Degree of Utilization, x	0.15	0.15	0.12	0.22	0.09	0.06	1.20	0.08	1.08	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.54	0.52	0.42	0.83	0.30	0.18	22.66	0.24	17.08	0.08
95th-Percentile Queue Length [ft]	13.57	12.91	10.57	20.71	7.54	4.39	566.59	6.05	427.09	2.10
Approach Delay [s/veh]	12.57			13.05		127.56		84.30		
Approach LOS	B			B		F		F		
Intersection Delay [s/veh]	87.35									
Intersection LOS	F									

Intersection Level Of Service Report
Intersection 8: Archibald Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	14.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.613

Intersection Setup

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	32.00	100.00	100.00	90.00	100.00	100.00	120.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	55	1357	32	32	935	30	96	76	39	38	65	40
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	28	2	0	23	0	2	99	6	2	69	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	57	1385	34	32	958	30	98	175	45	40	134	40
Peak Hour Factor	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592	0.9592
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	361	9	8	250	8	26	46	12	10	35	10
Total Analysis Volume [veh/h]	59	1444	35	33	999	31	102	182	47	42	140	42
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	42	0	11	42	0	0	17	0	0	17	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	L	C
C, Cycle Length [s]	70	70	70	70	70	70	70	70	70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	49	42	42	49	40	40	13	13	13	13
g / C, Green / Cycle	0.70	0.59	0.59	0.70	0.57	0.57	0.19	0.19	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.08	0.42	0.02	0.06	0.29	0.29	0.08	0.13	0.04	0.11
s, saturation flow rate [veh/h]	719	3427	1530	524	1800	1781	1221	1737	1170	1730
c, Capacity [veh/h]	554	2034	908	402	1031	1020	181	324	145	322
d1, Uniform Delay [s]	4.56	10.02	5.93	6.92	8.99	8.99	33.32	26.74	33.77	25.94
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.39	2.13	0.08	0.09	1.75	1.77	2.72	2.84	1.09	1.55
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.11	0.71	0.04	0.08	0.50	0.50	0.56	0.71	0.29	0.56
d, Delay for Lane Group [s/veh]	4.95	12.15	6.01	7.01	10.74	10.76	36.04	29.58	34.85	27.50
Lane Group LOS	A	B	A	A	B	B	D	C	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.20	6.00	0.18	0.09	3.94	3.91	1.76	3.49	0.71	2.64
50th-Percentile Queue Length [ft]	4.97	150.08	4.38	2.16	98.53	97.63	43.96	87.35	17.65	65.90
95th-Percentile Queue Length [veh]	0.36	10.02	0.32	0.16	7.09	7.03	3.17	6.29	1.27	4.75
95th-Percentile Queue Length [ft]	8.94	250.53	7.88	3.88	177.36	175.74	79.13	157.23	31.76	118.63

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	4.95	12.15	6.01	7.01	10.75	10.76	36.04	29.58	29.58	34.85	27.50	27.50
Movement LOS	A	B	A	A	B	B	D	C	C	C	C	C
d_A, Approach Delay [s/veh]	11.74			10.63			31.57			28.88		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	14.66											
Intersection LOS	B											
Intersection V/C	0.613											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	24.86	24.86	24.86	24.86
l_p,int, Pedestrian LOS Score for Intersection	3.251	3.207	2.250	2.187
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1086	1086	371	371
d_b, Bicycle Delay [s]	7.31	7.31	23.21	23.21
l_b,int, Bicycle LOS Score for Intersection	2.828	2.437	2.106	1.929
Bicycle LOS	C	B	B	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Horizon Year (2040) Without Project

8th Street & Hellman Avenue Project

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Report File: \...\AMHY.pdf

Scenario 1 Horizon Year (2040) Without Project
4/13/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Vineyard Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	NB Left	0.389	13.1	B
4	Hellman Avenue (NS) at Arrow Route (EW)	Signalized	HCM 6th Edition	EB Left	0.400	19.1	B
5	Hellman Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	WB Left	0.458	24.6	C
7	Hellman Avenue (NS) at 6th Street (EW)	All-way stop	HCM 6th Edition	EB Thru	0.573	12.7	B
8	Archibald Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	EB Left	0.447	9.8	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Vineyard Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	13.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.389

Intersection Setup

Name				Vineyard Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	98.00	100.00	100.00	57.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name				Vineyard Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	34	606	52	54	696	79	143	134	59	15	63	51
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	34	606	52	54	696	79	143	134	59	15	63	51
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	159	14	14	183	21	38	35	16	4	17	13
Total Analysis Volume [veh/h]	36	638	55	57	733	83	151	141	62	16	66	54
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	13	28	0	16	31	0	0	16	0	0	16	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	32	32	4	33	33	12	12	12	12	12	12
g / C, Green / Cycle	0.05	0.53	0.53	0.07	0.55	0.55	0.20	0.20	0.20	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.02	0.18	0.19	0.03	0.22	0.22	0.11	0.06	0.06	0.01	0.03	0.03
s, saturation flow rate [veh/h]	1810	1900	1848	1810	1900	1833	1357	1900	1710	1198	1900	1615
c, Capacity [veh/h]	97	1006	978	132	1042	1005	304	376	339	258	376	320
d1, Uniform Delay [s]	27.44	8.16	8.16	26.67	7.84	7.84	25.25	20.45	20.50	23.82	20.02	19.99
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.32	0.96	0.99	2.24	1.14	1.18	1.25	0.40	0.47	0.10	0.22	0.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.37	0.35	0.35	0.43	0.40	0.40	0.50	0.28	0.29	0.06	0.18	0.17
d, Delay for Lane Group [s/veh]	29.76	9.11	9.15	28.91	8.98	9.02	26.50	20.85	20.97	23.92	20.24	20.24
Lane Group LOS	C	A	A	C	A	A	C	C	C	C	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	No	No
50th-Percentile Queue Length [veh]	0.54	2.41	2.35	0.78	2.44	2.37	1.95	1.13	1.06	0.19	0.69	0.57
50th-Percentile Queue Length [ft]	13.42	60.20	58.85	19.57	61.07	59.23	48.66	28.19	26.62	4.71	17.32	14.23
95th-Percentile Queue Length [veh]	0.97	4.33	4.24	1.41	4.40	4.26	3.50	2.03	1.92	0.34	1.25	1.02
95th-Percentile Queue Length [ft]	24.16	108.37	105.94	35.22	109.92	106.62	87.59	50.74	47.92	8.47	31.17	25.61

Movement, Approach, & Intersection Results

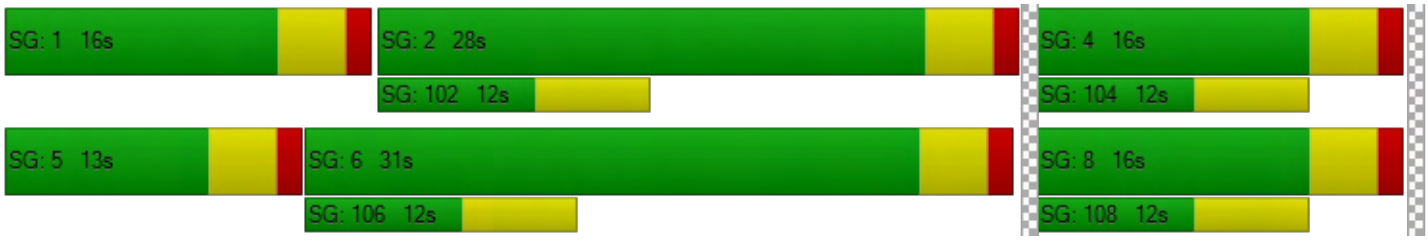
d_M, Delay for Movement [s/veh]	29.76	9.13	9.15	28.91	9.00	9.02	26.50	20.88	20.97	23.92	20.24	20.24
Movement LOS	C	A	A	C	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	10.15			10.30			23.29			20.67		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	13.12											
Intersection LOS	B											
Intersection V/C	0.389											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.703	2.994	2.306	2.391
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	800	900	400	400
d_b, Bicycle Delay [s]	10.80	9.08	19.20	19.20
l_b,int, Bicycle LOS Score for Intersection	2.161	2.280	1.852	1.784
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Hellman Avenue (NS) at Arrow Route (EW)

Control Type:	Signalized	Delay (sec / veh):	19.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.400

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	50.00	100.00	100.00	50.00	100.00	100.00	102.00	100.00	100.00	63.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Base Volume Input [veh/h]	16	81	68	88	249	86	39	645	109	81	554	55
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	16	81	68	88	249	86	39	645	109	81	554	55
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	21	18	23	66	23	10	170	29	21	146	14
Total Analysis Volume [veh/h]	17	85	72	93	262	91	41	679	115	85	583	58
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	19	33	0	11	25	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	27	27	27	27	27	27	4	16	16	5	18	18
g / C, Green / Cycle	0.45	0.45	0.45	0.45	0.45	0.45	0.06	0.26	0.26	0.09	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.02	0.04	0.05	0.07	0.10	0.10	0.02	0.21	0.21	0.05	0.17	0.17
s, saturation flow rate [veh/h]	1044	1900	1629	1249	1900	1737	1810	1900	1805	1810	1900	1840
c, Capacity [veh/h]	482	845	725	596	845	772	109	504	479	164	562	544
d1, Uniform Delay [s]	13.04	9.68	9.73	12.44	10.26	10.29	27.19	20.66	20.67	26.11	18.00	18.01
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.14	0.22	0.29	0.56	0.58	0.66	2.15	3.12	3.29	2.54	0.95	0.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.04	0.10	0.11	0.16	0.22	0.22	0.38	0.81	0.81	0.52	0.58	0.58
d, Delay for Lane Group [s/veh]	13.17	9.91	10.02	12.99	10.84	10.95	29.34	23.78	23.96	28.65	18.95	18.99
Lane Group LOS	B	A	B	B	B	B	C	C	C	C	B	B
Critical Lane Group	No	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	0.14	0.53	0.51	0.77	1.28	1.22	0.57	4.95	4.73	1.15	3.37	3.27
50th-Percentile Queue Length [ft]	3.62	13.26	12.85	19.23	32.03	30.43	14.36	123.66	118.22	28.82	84.15	81.83
95th-Percentile Queue Length [veh]	0.26	0.95	0.93	1.38	2.31	2.19	1.03	8.59	8.29	2.07	6.06	5.89
95th-Percentile Queue Length [ft]	6.51	23.87	23.14	34.61	57.65	54.78	25.84	214.85	207.37	51.87	151.47	147.29

Movement, Approach, & Intersection Results

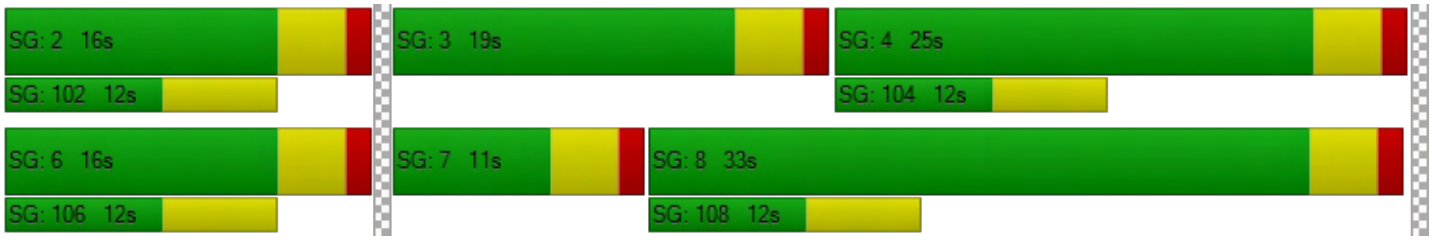
d_M, Delay for Movement [s/veh]	13.17	9.91	10.02	12.99	10.87	10.95	29.34	23.85	23.96	28.65	18.97	18.99
Movement LOS	B	A	B	B	B	B	C	C	C	C	B	B
d_A, Approach Delay [s/veh]	10.28			11.33			24.14			20.11		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	19.07											
Intersection LOS	B											
Intersection V/C	0.400											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.463	2.462	2.748	2.869
Crosswalk LOS	B	B	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	967	700
d_b, Bicycle Delay [s]	19.20	19.20	8.01	12.68
l_b,int, Bicycle LOS Score for Intersection	1.703	1.928	2.248	2.159
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Hellman Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	24.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.458

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	45.00	100.00	100.00	150.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	12	209	29	12	275	16	24	119	7	11	125	27
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	209	29	12	275	16	24	119	7	11	125	27
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	55	8	3	72	4	6	31	2	3	33	7
Total Analysis Volume [veh/h]	13	220	31	13	289	17	25	125	7	12	132	28
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	17	17	0	12	11	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	17	17	2	8	1	7
g / C, Green / Cycle	0.29	0.29	0.04	0.13	0.02	0.11
(v / s)_i Volume / Saturation Flow Rate	0.14	0.17	0.01	0.07	0.01	0.09
s, saturation flow rate [veh/h]	1857	1879	1810	1882	1810	1843
c, Capacity [veh/h]	535	542	77	253	43	213
d1, Uniform Delay [s]	17.80	18.39	28.03	24.29	28.94	25.83
k, delay calibration	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.22	4.64	2.43	1.66	3.54	5.27
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.49	0.59	0.33	0.52	0.28	0.75
d, Delay for Lane Group [s/veh]	21.02	23.04	30.46	25.95	32.47	31.09
Lane Group LOS	C	C	C	C	C	C
Critical Lane Group	Yes	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	3.04	3.89	0.37	1.67	0.20	2.28
50th-Percentile Queue Length [ft]	75.93	97.30	9.19	41.67	4.90	56.99
95th-Percentile Queue Length [veh]	5.47	7.01	0.66	3.00	0.35	4.10
95th-Percentile Queue Length [ft]	136.67	175.14	16.54	75.01	8.83	102.58

Movement, Approach, & Intersection Results

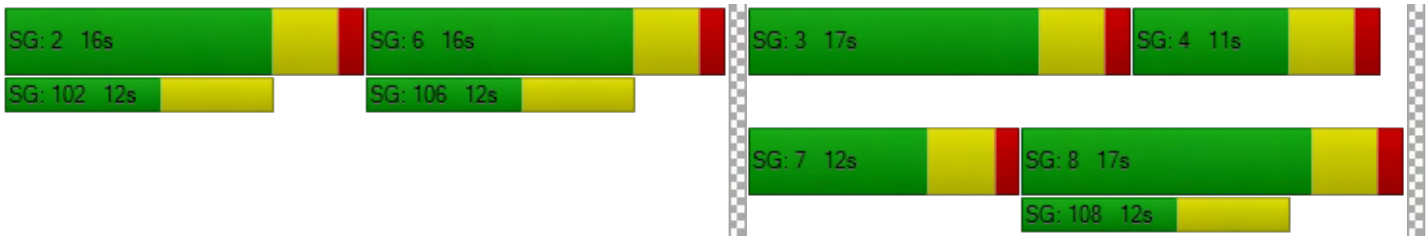
d_M, Delay for Movement [s/veh]	21.02	21.02	21.02	23.04	23.04	23.04	30.46	25.95	25.95	32.47	31.09	31.09
Movement LOS	C	C	C	C	C	C	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	21.02			23.04			26.67			31.19		
Approach LOS	C			C			C			C		
d_I, Intersection Delay [s/veh]	24.62											
Intersection LOS	C											
Intersection V/C	0.458											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	0.00	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.111	0.000	2.073	2.084
Crosswalk LOS	B	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	433	233
d_b, Bicycle Delay [s]	19.20	19.20	18.41	23.41
l_b,int, Bicycle LOS Score for Intersection	1.995	2.086	1.819	1.843
Bicycle LOS	A	B	A	A

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	All-way stop	Delay (sec / veh):	12.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.573

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	9	127	54	9	55	17	59	307	23	62	164	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	127	54	9	55	17	59	307	23	62	164	24
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	33	14	2	14	4	16	81	6	16	43	6
Total Analysis Volume [veh/h]	9	134	57	9	58	18	62	323	24	65	173	25
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	535	540	603	521	585	555	606	526	568	638
Degree of Utilization, x	0.13	0.13	0.09	0.13	0.03	0.11	0.57	0.12	0.30	0.04

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.46	0.45	0.31	0.44	0.10	0.37	3.62	0.42	1.28	0.12
95th-Percentile Queue Length [ft]	11.47	11.35	7.80	10.98	2.38	9.37	90.45	10.48	32.03	3.05
Approach Delay [s/veh]	10.10			10.29		15.35		11.17		
Approach LOS	B			B		C		B		
Intersection Delay [s/veh]	12.65									
Intersection LOS	B									

Intersection Level Of Service Report
Intersection 8: Archibald Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	9.8
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.447

Intersection Setup

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	32.00	100.00	100.00	90.00	100.00	100.00	120.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	52	858	28	35	1188	61	56	59	25	30	37	26
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	52	858	28	35	1188	61	56	59	25	30	37	26
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	226	7	9	313	16	15	16	7	8	10	7
Total Analysis Volume [veh/h]	55	903	29	37	1251	64	59	62	26	32	39	27
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	42	0	11	42	0	0	17	0	0	17	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	L	C
C, Cycle Length [s]	70	70	70	70	70	70	70	70	70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	53	45	45	53	44	44	9	9	9	9
g / C, Green / Cycle	0.76	0.65	0.65	0.76	0.63	0.63	0.13	0.13	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.09	0.25	0.02	0.05	0.35	0.35	0.04	0.05	0.02	0.04
s, saturation flow rate [veh/h]	597	3618	1615	752	1900	1868	1357	1806	1330	1772
c, Capacity [veh/h]	526	2348	1048	653	1206	1186	188	231	172	227
d1, Uniform Delay [s]	3.60	5.74	4.39	2.57	7.17	7.18	32.15	27.99	32.25	27.66
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.40	0.48	0.05	0.04	1.80	1.84	0.94	1.03	0.52	0.70
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.10	0.38	0.03	0.06	0.55	0.55	0.31	0.38	0.19	0.29
d, Delay for Lane Group [s/veh]	4.00	6.22	4.44	2.61	8.97	9.02	33.09	29.02	32.77	28.36
Lane Group LOS	A	A	A	A	A	A	C	C	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.12	2.13	0.11	0.05	4.22	4.17	0.95	1.30	0.51	0.96
50th-Percentile Queue Length [ft]	3.11	53.13	2.77	1.26	105.38	104.29	23.81	32.59	12.80	24.03
95th-Percentile Queue Length [veh]	0.22	3.83	0.20	0.09	7.58	7.51	1.71	2.35	0.92	1.73
95th-Percentile Queue Length [ft]	5.59	95.63	4.99	2.27	189.56	187.71	42.86	58.67	23.03	43.26

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	4.00	6.22	4.44	2.61	8.99	9.02	33.09	29.02	29.02	32.77	28.36	28.36
Movement LOS	A	A	A	A	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	6.04			8.82			30.66			29.80		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	9.80											
Intersection LOS	A											
Intersection V/C	0.447											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	24.86	24.86	24.86	24.86
l_p,int, Pedestrian LOS Score for Intersection	3.177	3.055	2.127	2.072
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1086	1086	371	371
d_b, Bicycle Delay [s]	7.31	7.31	23.21	23.21
l_b,int, Bicycle LOS Score for Intersection	2.374	2.675	1.802	1.721
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



8th Street & Hellman Avenue Project

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Scenario 1 Horizon Year (2040) Without Project
4/13/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Vineyard Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Left	0.477	15.4	B
4	Hellman Avenue (NS) at Arrow Route (EW)	Signalized	HCM 6th Edition	EB Left	0.557	19.5	B
5	Hellman Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Thru	0.815	51.6	D
7	Hellman Avenue (NS) at 6th Street (EW)	All-way stop	HCM 6th Edition	WB Thru	1.190	74.8	F
8	Archibald Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	EB Left	0.595	16.9	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Vineyard Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	15.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.477

Intersection Setup

Name	Vineyard Avenue			Vineyard Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	98.00	100.00	100.00	57.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Vineyard Avenue			Vineyard Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	53	1005	32	34	821	142	140	124	66	38	175	134
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	53	1005	32	34	821	142	140	124	66	38	175	134
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	264	8	9	216	37	37	33	17	10	46	35
Total Analysis Volume [veh/h]	56	1058	34	36	864	149	147	131	69	40	184	141
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	31	0	11	31	0	0	18	0	0	18	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	31	31	3	30	30	14	14	14	14	14	14
g / C, Green / Cycle	0.07	0.51	0.51	0.05	0.49	0.49	0.23	0.23	0.23	0.23	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.03	0.29	0.29	0.02	0.27	0.27	0.12	0.05	0.06	0.03	0.10	0.09
s, saturation flow rate [veh/h]	1810	1900	1879	1810	1900	1804	1219	1900	1687	1201	1900	1615
c, Capacity [veh/h]	132	973	962	99	938	891	266	444	394	308	444	377
d1, Uniform Delay [s]	26.67	10.08	10.08	27.41	10.61	10.61	26.47	18.68	18.73	22.14	19.56	19.35
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.14	2.37	2.40	2.20	2.35	2.48	1.78	0.27	0.32	0.19	0.62	0.61
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.42	0.56	0.56	0.36	0.55	0.55	0.55	0.23	0.24	0.13	0.41	0.37
d, Delay for Lane Group [s/veh]	28.82	12.45	12.48	29.61	12.97	13.09	28.25	18.95	19.05	22.33	20.17	19.97
Lane Group LOS	C	B	B	C	B	B	C	B	B	C	C	B
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No
50th-Percentile Queue Length [veh]	0.81	4.69	4.65	0.51	4.09	3.92	1.99	1.04	0.98	0.45	1.96	1.49
50th-Percentile Queue Length [ft]	20.18	117.23	116.18	12.75	102.35	97.98	49.77	26.09	24.47	11.28	48.90	37.24
95th-Percentile Queue Length [veh]	1.45	8.24	8.18	0.92	7.37	7.05	3.58	1.88	1.76	0.81	3.52	2.68
95th-Percentile Queue Length [ft]	36.32	206.01	204.57	22.95	184.23	176.37	89.59	46.96	44.04	20.31	88.02	67.04

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	28.82	12.46	12.48	29.61	13.02	13.09	28.25	18.97	19.05	22.33	20.17	19.97
Movement LOS	C	B	B	C	B	B	C	B	B	C	C	B
d_A, Approach Delay [s/veh]	13.26			13.60			22.92			20.33		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	15.42											
Intersection LOS	B											
Intersection V/C	0.477											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.832	3.187	2.378	2.443
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	900	900	467	467
d_b, Bicycle Delay [s]	9.08	9.08	17.63	17.63
l_b,int, Bicycle LOS Score for Intersection	2.507	2.425	1.846	2.162
Bicycle LOS	B	B	A	B

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Hellman Avenue (NS) at Arrow Route (EW)

Control Type:	Signalized	Delay (sec / veh):	19.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.557

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	50.00	100.00	100.00	50.00	100.00	100.00	102.00	100.00	100.00	63.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Base Volume Input [veh/h]	44	328	140	87	128	84	106	884	39	53	881	177
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	44	328	140	87	128	84	106	884	39	53	881	177
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	86	37	23	34	22	28	233	10	14	232	47
Total Analysis Volume [veh/h]	46	345	147	92	135	88	112	931	41	56	927	186
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	14	33	0	11	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	21	21	21	21	21	6	23	23	4	21	21
g / C, Green / Cycle	0.35	0.35	0.35	0.35	0.35	0.35	0.10	0.38	0.38	0.07	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.04	0.13	0.14	0.10	0.06	0.06	0.06	0.26	0.26	0.03	0.30	0.30
s, saturation flow rate [veh/h]	1176	1900	1712	919	1900	1660	1810	1900	1872	1810	1900	1791
c, Capacity [veh/h]	435	656	591	311	656	573	182	726	715	132	674	635
d1, Uniform Delay [s]	16.77	14.90	14.95	20.98	13.73	13.78	25.94	15.47	15.47	26.67	17.93	17.95
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.16	0.16
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.49	1.75	2.00	2.42	0.59	0.72	3.36	1.10	1.12	2.14	4.52	4.87
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.11	0.39	0.40	0.30	0.18	0.19	0.62	0.67	0.67	0.42	0.85	0.85
d, Delay for Lane Group [s/veh]	17.26	16.65	16.95	23.40	14.31	14.50	29.31	16.57	16.59	28.82	22.45	22.82
Lane Group LOS	B	B	B	C	B	B	C	B	B	C	C	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.47	2.49	2.33	1.19	1.01	0.96	1.54	4.68	4.61	0.77	6.75	6.45
50th-Percentile Queue Length [ft]	11.81	62.35	58.37	29.86	25.28	23.92	38.46	116.89	115.28	19.19	168.83	161.18
95th-Percentile Queue Length [veh]	0.85	4.49	4.20	2.15	1.82	1.72	2.77	8.22	8.13	1.38	11.01	10.61
95th-Percentile Queue Length [ft]	21.25	112.24	105.06	53.74	45.51	43.06	69.22	205.55	203.32	34.55	275.37	265.29

Movement, Approach, & Intersection Results

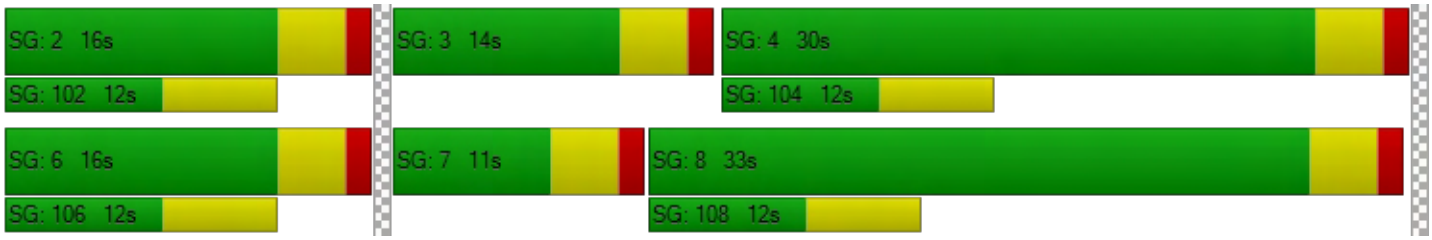
d_M, Delay for Movement [s/veh]	17.26	16.72	16.95	23.40	14.34	14.50	29.31	16.58	16.59	28.82	22.59	22.82
Movement LOS	B	B	B	C	B	B	C	B	B	C	C	C
d_A, Approach Delay [s/veh]	16.83			17.03			17.90			22.92		
Approach LOS	B			B			B			C		
d_I, Intersection Delay [s/veh]	19.52											
Intersection LOS	B											
Intersection V/C	0.557											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.503	2.558	2.970	3.092
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	967	867
d_b, Bicycle Delay [s]	19.20	19.20	8.01	9.63
l_b,int, Bicycle LOS Score for Intersection	2.003	1.819	2.454	2.524
Bicycle LOS	B	A	B	B

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Hellman Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	51.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.815

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	45.00	100.00	100.00	150.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	23	400	56	23	526	31	46	227	14	22	239	52
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	400	56	23	526	31	46	227	14	22	239	52
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	105	15	6	138	8	12	60	4	6	63	14
Total Analysis Volume [veh/h]	24	421	59	24	554	33	48	239	15	23	252	55
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	33	0	0	41	0	0	21	0	0	21	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C
C, Cycle Length [s]	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	30	30	23	23	23	23
g / C, Green / Cycle	0.32	0.32	0.24	0.24	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.27	0.33	0.04	0.14	0.02	0.17
s, saturation flow rate [veh/h]	1857	1878	1089	1880	1143	1842
c, Capacity [veh/h]	592	599	149	444	190	435
d1, Uniform Delay [s]	30.25	32.36	43.28	32.07	39.27	33.28
k, delay calibration	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	14.31	41.94	1.24	1.17	0.28	2.12
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	1.02	0.32	0.57	0.12	0.71
d, Delay for Lane Group [s/veh]	44.57	74.30	44.52	33.23	39.55	35.40
Lane Group LOS	D	F	D	C	D	D
Critical Lane Group	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	12.33	19.66	1.11	5.01	0.49	6.36
50th-Percentile Queue Length [ft]	308.30	491.56	27.69	125.28	12.20	159.04
95th-Percentile Queue Length [veh]	18.09	27.29	1.99	8.68	0.88	10.50
95th-Percentile Queue Length [ft]	452.28	682.34	49.85	217.06	21.96	262.46

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	44.57	44.57	44.57	74.30	74.30	74.30	44.52	33.23	33.23	39.55	35.40	35.40
Movement LOS	D	D	D	E	E	E	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	44.57			74.30			35.03			35.69		
Approach LOS	D			E			D			D		
d_I, Intersection Delay [s/veh]	51.64											
Intersection LOS	D											
Intersection V/C	0.815											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	0.00	37.14	37.14
l_p,int, Pedestrian LOS Score for Intersection	2.551	0.000	2.240	2.260
Crosswalk LOS	B	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	611	779	358	358
d_b, Bicycle Delay [s]	22.93	17.71	32.02	32.02
l_b,int, Bicycle LOS Score for Intersection	2.391	2.568	2.058	2.104
Bicycle LOS	B	B	B	B

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	All-way stop	Delay (sec / veh):	74.8
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.190

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street			6th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street			6th Street		
Base Volume Input [veh/h]	50	94	57	57	139	85	34	448	17	44	516	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	94	57	57	139	85	34	448	17	44	516	21
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	25	15	15	37	22	9	118	4	12	136	6
Total Analysis Volume [veh/h]	53	99	60	60	146	89	36	472	18	46	543	22
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	382	395	427	412	453	434	490	430	543	499
Degree of Utilization, x	0.20	0.19	0.14	0.50	0.20	0.08	1.06	0.11	1.19	0.04

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.73	0.70	0.48	2.72	0.72	0.27	15.39	0.36	20.69	0.14
95th-Percentile Queue Length [ft]	18.29	17.52	12.12	68.03	18.07	6.74	384.87	8.92	517.34	3.45
Approach Delay [s/veh]	13.72			17.70		81.26		117.94		
Approach LOS	B			C		F		F		
Intersection Delay [s/veh]	74.78									
Intersection LOS	F									

Intersection Level Of Service Report
Intersection 8: Archibald Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	16.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.595

Intersection Setup

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	32.00	100.00	100.00	90.00	100.00	100.00	120.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	62	1545	39	52	1086	46	108	99	42	41	93	57
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	62	1545	39	52	1086	46	108	99	42	41	93	57
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	16	407	10	14	286	12	28	26	11	11	24	15
Total Analysis Volume [veh/h]	65	1626	41	55	1143	48	114	104	44	43	98	60
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	16	0	35	40	0	0	34	0	0	34	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	L	C
C, Cycle Length [s]	85	85	85	85	85	85	85	85	85	85
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	59	50	50	59	49	49	18	18	18	18
g / C, Green / Cycle	0.69	0.58	0.58	0.69	0.58	0.58	0.22	0.22	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.10	0.45	0.03	0.11	0.32	0.32	0.09	0.08	0.03	0.09
s, saturation flow rate [veh/h]	648	3618	1615	496	1900	1873	1248	1805	1259	1781
c, Capacity [veh/h]	479	2105	940	360	1097	1081	233	392	242	386
d1, Uniform Delay [s]	6.19	13.49	7.62	10.37	11.09	11.10	36.33	28.39	33.70	28.60
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.59	2.82	0.09	0.19	1.96	1.99	1.59	0.60	0.35	0.70
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.14	0.77	0.04	0.15	0.55	0.55	0.49	0.38	0.18	0.41
d, Delay for Lane Group [s/veh]	6.78	16.31	7.71	10.57	13.05	13.09	37.93	28.99	34.04	29.30
Lane Group LOS	A	B	A	B	B	B	D	C	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.33	10.11	0.29	0.23	6.20	6.13	2.27	2.47	0.79	2.66
50th-Percentile Queue Length [ft]	8.30	252.83	7.18	5.82	155.05	153.33	56.71	61.85	19.63	66.62
95th-Percentile Queue Length [veh]	0.60	15.33	0.52	0.42	10.29	10.19	4.08	4.45	1.41	4.80
95th-Percentile Queue Length [ft]	14.95	383.22	12.93	10.48	257.15	254.87	102.08	111.33	35.33	119.92

Movement, Approach, & Intersection Results

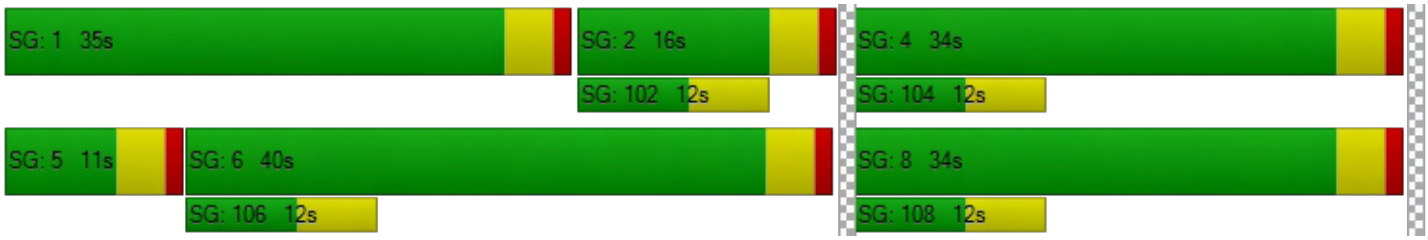
d_M, Delay for Movement [s/veh]	6.78	16.31	7.71	10.57	13.07	13.09	37.93	28.99	28.99	34.04	29.30	29.30
Movement LOS	A	B	A	B	B	B	D	C	C	C	C	C
d_A, Approach Delay [s/veh]	15.75			12.96			32.88			30.31		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	16.89											
Intersection LOS	B											
Intersection V/C	0.595											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	32.21	32.21	32.21	32.21
l_p,int, Pedestrian LOS Score for Intersection	3.325	3.350	2.223	2.180
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	282	847	706	706
d_b, Bicycle Delay [s]	31.35	14.12	17.79	17.79
l_b,int, Bicycle LOS Score for Intersection	2.989	2.588	1.992	1.891
Bicycle LOS	C	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Horizon Year (2040) With Project

8th Street & Hellman Avenue Project

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Report File: \...\AMHYp.pdf

Scenario 2 Horizon Year (2040) With Project
4/13/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Vineyard Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	NB Left	0.389	13.2	B
2	Project West Driveway (NS) at 8th Street (EW)	Two-way stop	HCM 6th Edition	NB Left	0.010	11.3	B
3	Project East Driveway (NS) at 8th Street (EW)	Two-way stop	HCM 6th Edition	NB Right	0.001	9.6	A
4	Hellman Avenue (NS) at Arrow Route (EW)	Signalized	HCM 6th Edition	EB Left	0.401	19.1	B
5	Hellman Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	WB Left	0.466	24.9	C
6	Hellman Avenue (NS) at Project Driveway (EW)	Two-way stop	HCM 6th Edition	EB Left	0.004	12.6	B
7	Hellman Avenue (NS) at 6th Street (EW)	All-way stop	HCM 6th Edition	EB Thru	0.574	12.7	B
8	Archibald Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	EB Left	0.450	9.9	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Vineyard Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	13.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.389

Intersection Setup

Name				Vineyard Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	98.00	100.00	100.00	57.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name				Vineyard Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	34	606	52	54	696	79	143	134	59	15	63	51
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	9	2	0	0	0	4	0	5	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	34	606	61	56	696	79	143	138	59	20	64	51
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	159	16	15	183	21	38	36	16	5	17	13
Total Analysis Volume [veh/h]	36	638	64	59	733	83	151	145	62	21	67	54
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	13	29	0	15	31	0	0	16	0	0	16	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	32	32	4	33	33	12	12	12	12	12	12
g / C, Green / Cycle	0.05	0.53	0.53	0.07	0.55	0.55	0.20	0.20	0.20	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.02	0.19	0.19	0.03	0.22	0.22	0.11	0.06	0.06	0.02	0.04	0.03
s, saturation flow rate [veh/h]	1810	1900	1840	1810	1900	1833	1355	1900	1713	1194	1900	1615
c, Capacity [veh/h]	99	1004	972	136	1043	1006	304	374	337	257	374	318
d1, Uniform Delay [s]	27.41	8.23	8.23	26.59	7.83	7.83	25.28	20.57	20.62	23.98	20.12	20.08
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.20	0.98	1.02	2.16	1.14	1.18	1.26	0.42	0.49	0.13	0.23	0.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.36	0.35	0.36	0.43	0.40	0.40	0.50	0.29	0.30	0.08	0.18	0.17
d, Delay for Lane Group [s/veh]	29.61	9.21	9.25	28.75	8.97	9.01	26.54	20.98	21.10	24.12	20.35	20.33
Lane Group LOS	C	A	A	C	A	A	C	C	C	C	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	No	No
50th-Percentile Queue Length [veh]	0.53	2.47	2.40	0.81	2.44	2.37	1.95	1.15	1.09	0.25	0.71	0.57
50th-Percentile Queue Length [ft]	13.37	61.65	60.06	20.17	61.07	59.24	48.67	28.84	27.26	6.21	17.63	14.26
95th-Percentile Queue Length [veh]	0.96	4.44	4.32	1.45	4.40	4.27	3.50	2.08	1.96	0.45	1.27	1.03
95th-Percentile Queue Length [ft]	24.07	110.97	108.10	36.30	109.93	106.63	87.61	51.91	49.06	11.19	31.73	25.67

Movement, Approach, & Intersection Results

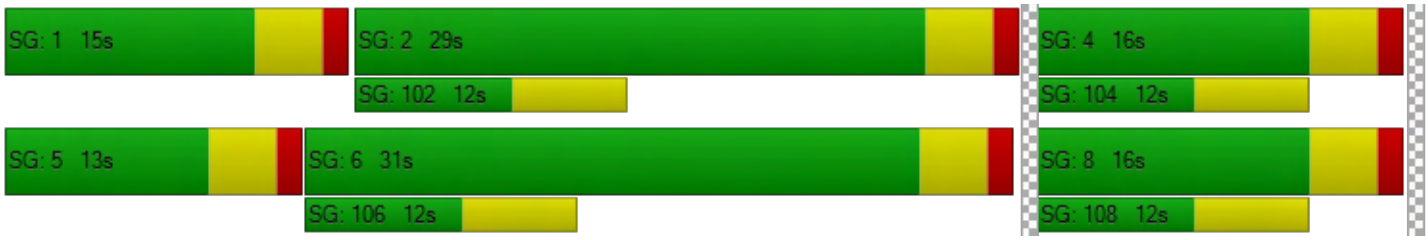
d_M, Delay for Movement [s/veh]	29.61	9.23	9.25	28.75	8.99	9.01	26.54	21.01	21.10	24.12	20.35	20.33
Movement LOS	C	A	A	C	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	10.22			10.32			23.36			20.90		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	13.21											
Intersection LOS	B											
Intersection V/C	0.389											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.713	2.995	2.307	2.397
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	833	900	400	400
d_b, Bicycle Delay [s]	10.21	9.08	19.20	19.20
l_b,int, Bicycle LOS Score for Intersection	2.168	2.281	1.855	1.794
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 2: Project West Driveway (NS) at 8th Street (EW)

Control Type:	Two-way stop	Delay (sec / veh):	11.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.010

Intersection Setup

Name	Project West Driveway		8th Street		8th Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project West Driveway		8th Street		8th Street	
Base Volume Input [veh/h]	0	0	240	0	0	153
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	6	0	7	8	8	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	0	247	8	8	153
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	0	65	2	2	40
Total Analysis Volume [veh/h]	6	0	260	8	8	161
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	11.34	9.68	0.00	0.00	7.77	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.03	0.03	0.00	0.00	0.44	0.44
95th-Percentile Queue Length [ft]	0.79	0.79	0.00	0.00	11.10	11.10
d_A, Approach Delay [s/veh]	11.34		0.00		0.37	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.29					
Intersection LOS	B					

Intersection Level Of Service Report

Intersection 3: Project East Driveway (NS) at 8th Street (EW)

Control Type:	Two-way stop	Delay (sec / veh):	9.6
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Project East Driveway		8th Street		8th Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project East Driveway		8th Street		8th Street	
Base Volume Input [veh/h]	0	0	250	0	0	293
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	1	1	6	0	8
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1	251	6	0	301
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	66	2	0	79
Total Analysis Volume [veh/h]	0	1	264	6	0	317
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	9.64	0.00	0.00	0.00	0.00
Movement LOS		A	A	A		A
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.10	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.64		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.02					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 4: Hellman Avenue (NS) at Arrow Route (EW)

Control Type:	Signalized	Delay (sec / veh):	19.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.401

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	50.00	100.00	100.00	50.00	100.00	100.00	102.00	100.00	100.00	63.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Base Volume Input [veh/h]	16	81	68	88	249	86	39	645	109	81	554	55
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	1	0	0	2	0	0	0	1	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	16	82	68	88	251	86	39	645	110	81	554	55
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	22	18	23	66	23	10	170	29	21	146	14
Total Analysis Volume [veh/h]	17	86	72	93	264	91	41	679	116	85	583	58
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	19	33	0	11	25	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	27	27	27	27	27	27	4	16	16	5	18	18
g / C, Green / Cycle	0.45	0.45	0.45	0.45	0.45	0.45	0.06	0.26	0.26	0.09	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.02	0.04	0.05	0.07	0.10	0.10	0.02	0.21	0.21	0.05	0.17	0.17
s, saturation flow rate [veh/h]	1043	1900	1631	1248	1900	1738	1810	1900	1805	1810	1900	1840
c, Capacity [veh/h]	481	844	725	595	844	772	109	505	479	164	562	545
d1, Uniform Delay [s]	13.07	9.70	9.74	12.46	10.28	10.30	27.19	20.65	20.66	26.11	17.99	18.00
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.14	0.23	0.29	0.56	0.59	0.67	2.15	3.12	3.29	2.54	0.94	0.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.04	0.10	0.11	0.16	0.22	0.22	0.38	0.81	0.81	0.52	0.58	0.58
d, Delay for Lane Group [s/veh]	13.20	9.92	10.04	13.02	10.86	10.97	29.34	23.77	23.95	28.65	18.93	18.97
Lane Group LOS	B	A	B	B	B	B	C	C	C	C	B	B
Critical Lane Group	No	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	0.14	0.53	0.52	0.77	1.29	1.23	0.57	4.95	4.73	1.15	3.36	3.27
50th-Percentile Queue Length [ft]	3.62	13.36	12.95	19.25	32.26	30.66	14.36	123.81	118.32	28.82	84.09	81.77
95th-Percentile Queue Length [veh]	0.26	0.96	0.93	1.39	2.32	2.21	1.03	8.60	8.30	2.07	6.05	5.89
95th-Percentile Queue Length [ft]	6.52	24.05	23.31	34.66	58.07	55.18	25.84	215.05	207.51	51.87	151.35	147.18

Movement, Approach, & Intersection Results

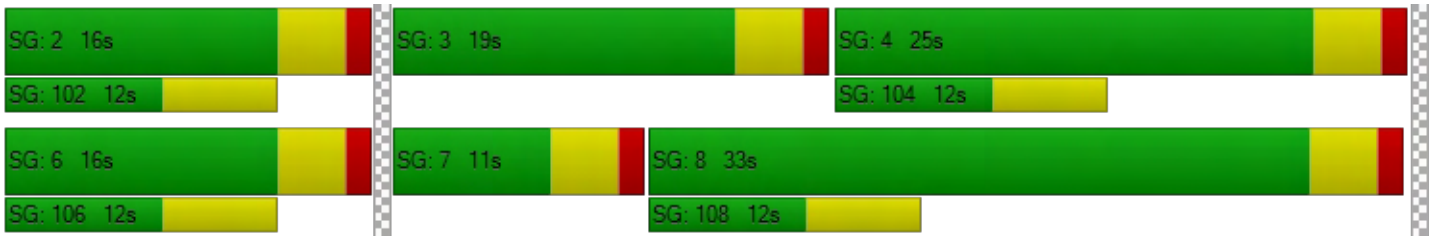
d_M, Delay for Movement [s/veh]	13.20	9.93	10.04	13.02	10.90	10.97	29.34	23.84	23.95	28.65	18.95	18.97
Movement LOS	B	A	B	B	B	B	C	C	C	C	B	B
d_A, Approach Delay [s/veh]	10.29			11.35			24.13			20.09		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	19.06											
Intersection LOS	B											
Intersection V/C	0.401											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.465	2.462	2.748	2.869
Crosswalk LOS	B	B	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	967	700
d_b, Bicycle Delay [s]	19.20	19.20	8.01	12.68
l_b,int, Bicycle LOS Score for Intersection	1.704	1.929	2.249	2.159
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 5: Hellman Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	24.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.466

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	45.00	100.00	100.00	150.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	12	209	29	12	275	16	24	119	7	11	125	27
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	1	1	0	2	1	0	1	1	5	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	210	30	12	277	17	24	120	8	16	130	27
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	55	8	3	73	4	6	32	2	4	34	7
Total Analysis Volume [veh/h]	15	221	32	13	292	18	25	126	8	17	137	28
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	17	17	0	12	11	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	17	17	2	8	2	7
g / C, Green / Cycle	0.29	0.29	0.04	0.13	0.03	0.12
(v / s)_i Volume / Saturation Flow Rate	0.14	0.17	0.01	0.07	0.01	0.09
s, saturation flow rate [veh/h]	1856	1878	1810	1880	1810	1845
c, Capacity [veh/h]	532	538	77	244	57	219
d1, Uniform Delay [s]	17.93	18.52	28.03	24.58	28.56	25.71
k, delay calibration	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.38	4.88	2.43	1.92	2.91	5.18
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.50	0.60	0.33	0.55	0.30	0.75
d, Delay for Lane Group [s/veh]	21.31	23.40	30.46	26.50	31.47	30.89
Lane Group LOS	C	C	C	C	C	C
Critical Lane Group	Yes	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	3.11	3.98	0.37	1.72	0.26	2.34
50th-Percentile Queue Length [ft]	77.78	99.55	9.19	42.92	6.57	58.52
95th-Percentile Queue Length [veh]	5.60	7.17	0.66	3.09	0.47	4.21
95th-Percentile Queue Length [ft]	140.00	179.19	16.54	77.25	11.83	105.34

Movement, Approach, & Intersection Results

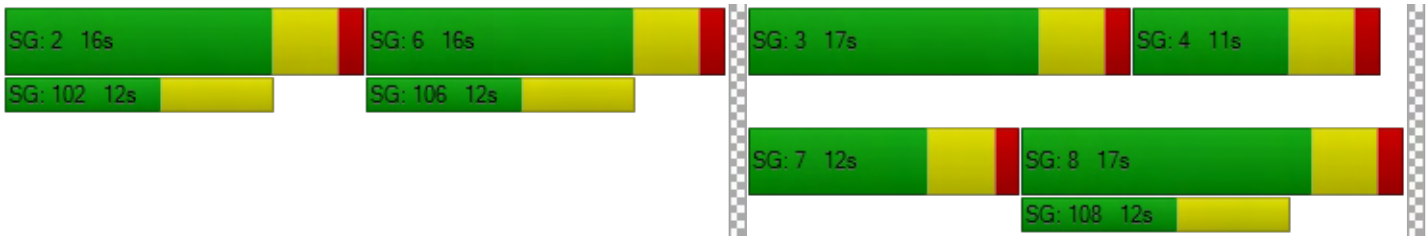
d_M, Delay for Movement [s/veh]	21.31	21.31	21.31	23.40	23.40	23.40	30.46	26.50	26.50	31.47	30.89	30.89
Movement LOS	C	C	C	C	C	C	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	21.31			23.40			27.12			30.95		
Approach LOS	C			C			C			C		
d_I, Intersection Delay [s/veh]	24.91											
Intersection LOS	C											
Intersection V/C	0.466											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	0.00	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.120	0.000	2.078	2.090
Crosswalk LOS	B	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	433	233
d_b, Bicycle Delay [s]	19.20	19.20	18.41	23.41
l_b,int, Bicycle LOS Score for Intersection	2.002	2.093	1.822	1.860
Bicycle LOS	B	B	A	A

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Hellman Avenue (NS) at Project Driveway (EW)

Control Type:	Two-way stop	Delay (sec / veh):	12.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Hellman Avenue		Hellman Avenue		Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	45.00		45.00		15.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Hellman Avenue		Hellman Avenue		Project Driveway	
Base Volume Input [veh/h]	0	250	293	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	2	0	8	2	1
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	252	293	8	2	1
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	66	77	2	1	0
Total Analysis Volume [veh/h]	3	265	308	8	2	1
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.87	0.00	0.00	0.00	12.59	9.95
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh]	0.81	0.81	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft]	20.22	20.22	0.00	0.00	0.42	0.42
d_A, Approach Delay [s/veh]	0.09		0.00		11.71	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.10					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	All-way stop	Delay (sec / veh):	12.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.574

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	9	127	54	9	55	17	59	307	23	62	164	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	0	1	2	0	0	0	0	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	129	54	9	55	18	61	307	23	62	164	25
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	34	14	2	14	5	16	81	6	16	43	7
Total Analysis Volume [veh/h]	9	136	57	9	58	19	64	323	24	65	173	26
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	535	540	602	521	585	555	605	525	567	637
Degree of Utilization, x	0.14	0.13	0.09	0.13	0.03	0.12	0.57	0.12	0.31	0.04

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.47	0.46	0.31	0.44	0.10	0.39	3.63	0.42	1.28	0.13
95th-Percentile Queue Length [ft]	11.67	11.55	7.81	10.99	2.52	9.73	90.71	10.51	32.12	3.19
Approach Delay [s/veh]	10.12			10.29		15.37		11.18		
Approach LOS	B			B		C		B		
Intersection Delay [s/veh]	12.67									
Intersection LOS	B									

Intersection Level Of Service Report

Intersection 8: Archibald Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	9.9
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.450

Intersection Setup

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	32.00	100.00	100.00	90.00	100.00	100.00	120.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	52	858	28	35	1188	61	56	59	25	30	37	26
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	6	0	0	0	0	2	0	0	2	0	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	58	858	28	35	1188	63	56	59	27	30	38	26
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	226	7	9	313	17	15	16	7	8	10	7
Total Analysis Volume [veh/h]	61	903	29	37	1251	66	59	62	28	32	40	27
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	42	0	11	42	0	0	17	0	0	17	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	L	C
C, Cycle Length [s]	70	70	70	70	70	70	70	70	70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	53	45	45	53	44	44	9	9	9	9
g / C, Green / Cycle	0.76	0.65	0.65	0.76	0.63	0.63	0.13	0.13	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.10	0.25	0.02	0.05	0.35	0.35	0.04	0.05	0.02	0.04
s, saturation flow rate [veh/h]	604	3618	1615	752	1900	1867	1355	1801	1327	1774
c, Capacity [veh/h]	529	2346	1047	653	1197	1176	188	232	171	228
d1, Uniform Delay [s]	3.69	5.77	4.41	2.59	7.35	7.37	32.13	27.98	32.28	27.62
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.44	0.48	0.05	0.04	1.85	1.89	0.94	1.06	0.52	0.71
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.12	0.38	0.03	0.06	0.55	0.56	0.31	0.39	0.19	0.29
d, Delay for Lane Group [s/veh]	4.13	6.25	4.46	2.62	9.21	9.26	33.07	29.04	32.80	28.33
Lane Group LOS	A	A	A	A	A	A	C	C	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.14	2.13	0.11	0.05	4.33	4.28	0.95	1.33	0.51	0.98
50th-Percentile Queue Length [ft]	3.49	53.37	2.78	1.27	108.18	107.02	23.80	33.35	12.81	24.38
95th-Percentile Queue Length [veh]	0.25	3.84	0.20	0.09	7.74	7.67	1.71	2.40	0.92	1.76
95th-Percentile Queue Length [ft]	6.27	96.06	5.01	2.29	193.47	191.86	42.84	60.04	23.05	43.88

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	4.13	6.25	4.46	2.62	9.23	9.26	33.07	29.04	29.04	32.80	28.33	28.33
Movement LOS	A	A	A	A	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	6.07			9.05			30.63			29.77		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	9.94											
Intersection LOS	A											
Intersection V/C	0.450											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	24.86	24.86	24.86	24.86
l_p,int, Pedestrian LOS Score for Intersection	3.178	3.055	2.138	2.073
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1086	1086	371	371
d_b, Bicycle Delay [s]	7.31	7.31	23.21	23.21
l_b,int, Bicycle LOS Score for Intersection	2.379	2.677	1.805	1.723
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



8th Street & Hellman Avenue Project

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Scenario 2 Horizon Year (2040) With Project
4/13/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Vineyard Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Left	0.479	15.5	B
2	Project West Driveway (NS) at 8th Street (EW)	Two-way stop	HCM 6th Edition	NB Left	0.033	13.8	B
3	Project East Driveway (NS) at 8th Street (EW)	Two-way stop	HCM 6th Edition	NB Right	0.011	11.4	B
4	Hellman Avenue (NS) at Arrow Route (EW)	Signalized	HCM 6th Edition	EB Left	0.558	19.5	B
5	Hellman Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	SB Thru	0.821	52.4	D
6	Hellman Avenue (NS) at Project Driveway (EW)	Two-way stop	HCM 6th Edition	EB Left	0.034	20.8	C
7	Hellman Avenue (NS) at 6th Street (EW)	All-way stop	HCM 6th Edition	WB Thru	1.193	75.2	F
8	Archibald Avenue (NS) at 8th Street (EW)	Signalized	HCM 6th Edition	EB Left	0.597	17.1	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Vineyard Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	15.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.479

Intersection Setup

Name	Vineyard Avenue			Vineyard Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	98.00	100.00	100.00	57.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Vineyard Avenue			Vineyard Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	53	1005	32	34	821	142	140	124	66	38	175	134
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	4	0	0	0	0	1	0	8	4	2
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	53	1005	36	34	821	142	140	125	66	46	179	136
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	264	9	9	216	37	37	33	17	12	47	36
Total Analysis Volume [veh/h]	56	1058	38	36	864	149	147	132	69	48	188	143
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	31	0	11	31	0	0	18	0	0	18	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	31	31	3	30	30	14	14	14	14	14	14
g / C, Green / Cycle	0.07	0.51	0.51	0.05	0.49	0.49	0.23	0.23	0.23	0.23	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.03	0.29	0.29	0.02	0.27	0.27	0.12	0.05	0.06	0.04	0.10	0.09
s, saturation flow rate [veh/h]	1810	1900	1877	1810	1900	1804	1214	1900	1688	1200	1900	1615
c, Capacity [veh/h]	132	973	961	99	938	891	263	444	395	307	444	377
d1, Uniform Delay [s]	26.67	10.10	10.10	27.41	10.61	10.61	26.60	18.69	18.74	22.30	19.60	19.38
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.14	2.39	2.42	2.20	2.35	2.48	1.85	0.27	0.32	0.23	0.64	0.63
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.42	0.57	0.57	0.36	0.55	0.55	0.56	0.23	0.25	0.16	0.42	0.38
d, Delay for Lane Group [s/veh]	28.82	12.49	12.52	29.61	12.97	13.09	28.45	18.95	19.06	22.54	20.24	20.01
Lane Group LOS	C	B	B	C	B	B	C	B	B	C	C	C
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No
50th-Percentile Queue Length [veh]	0.81	4.72	4.67	0.51	4.09	3.92	2.00	1.05	0.98	0.55	2.00	1.51
50th-Percentile Queue Length [ft]	20.18	117.99	116.82	12.75	102.35	97.98	50.02	26.22	24.60	13.65	50.11	37.83
95th-Percentile Queue Length [veh]	1.45	8.28	8.22	0.92	7.37	7.05	3.60	1.89	1.77	0.98	3.61	2.72
95th-Percentile Queue Length [ft]	36.32	207.06	205.45	22.95	184.23	176.37	90.04	47.20	44.28	24.57	90.19	68.10

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	28.82	12.51	12.52	29.61	13.02	13.09	28.45	18.98	19.06	22.54	20.24	20.01
Movement LOS	C	B	B	C	B	B	C	B	B	C	C	C
d_A, Approach Delay [s/veh]	13.30			13.60			22.99			20.44		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	15.48											
Intersection LOS	B											
Intersection V/C	0.479											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.845	3.188	2.379	2.448
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	900	900	467	467
d_b, Bicycle Delay [s]	9.08	9.08	17.63	17.63
l_b,int, Bicycle LOS Score for Intersection	2.510	2.425	1.847	2.185
Bicycle LOS	B	B	A	B

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 2: Project West Driveway (NS) at 8th Street (EW)

Control Type:	Two-way stop	Delay (sec / veh):	13.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.033

Intersection Setup

Name	Project West Driveway		8th Street		8th Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project West Driveway		8th Street		8th Street	
Base Volume Input [veh/h]	0	0	287	0	0	347
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	13	2	2	3	1	1
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	2	289	3	1	348
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	1	76	1	0	92
Total Analysis Volume [veh/h]	14	2	304	3	1	366
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	13.81	10.17	0.00	0.00	7.85	0.00
Movement LOS	B	B	A	A	A	A
95th-Percentile Queue Length [veh]	0.11	0.11	0.00	0.00	1.21	1.21
95th-Percentile Queue Length [ft]	2.78	2.78	0.00	0.00	30.32	30.32
d_A, Approach Delay [s/veh]	13.36		0.00		0.02	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.32					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 3: Project East Driveway (NS) at 8th Street (EW)

Control Type:	Two-way stop	Delay (sec / veh):	11.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.011

Intersection Setup

Name	Project East Driveway		8th Street		8th Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project East Driveway		8th Street		8th Street	
Base Volume Input [veh/h]	0	0	479	0	0	562
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	6	2	2	0	2
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	6	481	2	0	564
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	2	127	1	0	148
Total Analysis Volume [veh/h]	0	6	506	2	0	594
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.01	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	0.00	11.39	0.00	0.00	0.00	0.00
Movement LOS		B	A	A		A
95th-Percentile Queue Length [veh]	0.00	0.03	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.80	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	11.39		0.00		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.06					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 4: Hellman Avenue (NS) at Arrow Route (EW)

Control Type:	Signalized	Delay (sec / veh):	19.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.558

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	50.00	100.00	100.00	50.00	100.00	100.00	102.00	100.00	100.00	63.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			Arrow Route			Arrow Route		
Base Volume Input [veh/h]	44	328	140	87	128	84	106	884	39	53	881	177
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	2	0	0	1	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	45	330	140	87	129	84	106	884	39	53	881	177
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	87	37	23	34	22	28	233	10	14	232	47
Total Analysis Volume [veh/h]	47	347	147	92	136	88	112	931	41	56	927	186
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	16	0	0	16	0	14	33	0	11	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	21	21	21	21	21	6	23	23	4	21	21
g / C, Green / Cycle	0.35	0.35	0.35	0.35	0.35	0.35	0.10	0.38	0.38	0.07	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.04	0.14	0.14	0.10	0.06	0.06	0.06	0.26	0.26	0.03	0.30	0.30
s, saturation flow rate [veh/h]	1175	1900	1712	917	1900	1661	1810	1900	1872	1810	1900	1791
c, Capacity [veh/h]	435	656	591	310	656	574	182	726	715	132	674	635
d1, Uniform Delay [s]	16.79	14.91	14.96	21.01	13.73	13.78	25.94	15.47	15.47	26.67	17.93	17.95
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.16	0.16
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.50	1.76	2.01	2.43	0.59	0.72	3.36	1.10	1.12	2.14	4.52	4.87
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.11	0.39	0.40	0.30	0.18	0.19	0.62	0.67	0.67	0.42	0.85	0.85
d, Delay for Lane Group [s/veh]	17.29	16.67	16.97	23.44	14.32	14.51	29.31	16.57	16.59	28.82	22.45	22.82
Lane Group LOS	B	B	B	C	B	B	C	B	B	C	C	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.48	2.51	2.35	1.20	1.02	0.96	1.54	4.68	4.61	0.77	6.75	6.45
50th-Percentile Queue Length [ft]	12.08	62.66	58.65	29.90	25.41	24.04	38.46	116.89	115.28	19.19	168.83	161.18
95th-Percentile Queue Length [veh]	0.87	4.51	4.22	2.15	1.83	1.73	2.77	8.22	8.13	1.38	11.01	10.61
95th-Percentile Queue Length [ft]	21.75	112.79	105.57	53.82	45.73	43.27	69.22	205.55	203.32	34.55	275.37	265.29

Movement, Approach, & Intersection Results

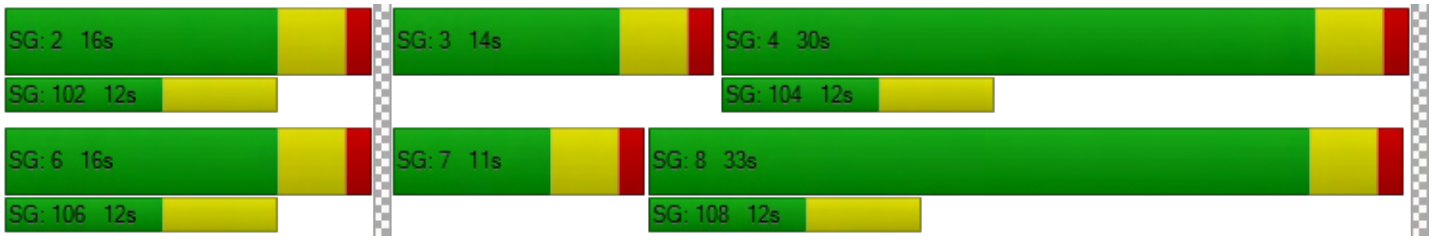
d_M, Delay for Movement [s/veh]	17.29	16.75	16.97	23.44	14.35	14.51	29.31	16.58	16.59	28.82	22.59	22.82
Movement LOS	B	B	B	C	B	B	C	B	B	C	C	C
d_A, Approach Delay [s/veh]	16.85			17.04			17.90			22.92		
Approach LOS	B			B			B			C		
d_I, Intersection Delay [s/veh]	19.52											
Intersection LOS	B											
Intersection V/C	0.558											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	20.01	20.01	20.01
l_p,int, Pedestrian LOS Score for Intersection	2.504	2.558	2.972	3.092
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	400	967	867
d_b, Bicycle Delay [s]	19.20	19.20	8.01	9.63
l_b,int, Bicycle LOS Score for Intersection	2.006	1.820	2.454	2.524
Bicycle LOS	B	A	B	B

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 5: Hellman Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	52.4
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.821

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	45.00	100.00	100.00	150.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	23	400	56	23	526	31	46	227	14	22	239	52
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	2	5	0	1	0	1	5	2	1	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	24	402	61	23	527	31	47	232	16	23	240	52
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	106	16	6	139	8	12	61	4	6	63	14
Total Analysis Volume [veh/h]	25	423	64	24	555	33	49	244	17	24	253	55
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	33	0	0	41	0	0	21	0	0	21	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C
C, Cycle Length [s]	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	30	30	23	23	23	23
g / C, Green / Cycle	0.32	0.32	0.24	0.24	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.28	0.33	0.05	0.14	0.02	0.17
s, saturation flow rate [veh/h]	1855	1878	1088	1878	1136	1842
c, Capacity [veh/h]	590	598	150	446	187	437
d1, Uniform Delay [s]	30.52	32.40	43.20	32.08	39.50	33.17
k, delay calibration	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	15.83	43.09	1.25	1.22	0.31	2.08
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.87	1.02	0.33	0.59	0.13	0.70
d, Delay for Lane Group [s/veh]	46.34	75.49	44.45	33.30	39.80	35.25
Lane Group LOS	D	F	D	C	D	D
Critical Lane Group	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	12.81	19.81	1.13	5.16	0.51	6.37
50th-Percentile Queue Length [ft]	320.21	495.24	28.25	129.10	12.79	159.23
95th-Percentile Queue Length [veh]	18.68	27.54	2.03	8.89	0.92	10.51
95th-Percentile Queue Length [ft]	466.95	688.54	50.85	222.27	23.02	262.71

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	46.34	46.34	46.34	75.49	75.49	75.49	44.45	33.30	33.30	39.80	35.25	35.25
Movement LOS	D	D	D	E	E	E	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	46.34			75.49			35.07			35.58		
Approach LOS	D			E			D			D		
d_I, Intersection Delay [s/veh]	52.44											
Intersection LOS	D											
Intersection V/C	0.821											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	0.00	37.14	37.14
l_p,int, Pedestrian LOS Score for Intersection	2.561	0.000	2.245	2.266
Crosswalk LOS	B	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	611	779	358	358
d_b, Bicycle Delay [s]	22.93	17.71	32.02	32.02
l_b,int, Bicycle LOS Score for Intersection	2.404	2.569	2.071	2.107
Bicycle LOS	B	B	B	B

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Hellman Avenue (NS) at Project Driveway (EW)

Control Type:	Two-way stop	Delay (sec / veh):	20.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.034

Intersection Setup

Name	Hellman Avenue		Hellman Avenue		Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	45.00		45.00		15.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Hellman Avenue		Hellman Avenue		Project Driveway	
Base Volume Input [veh/h]	0	479	562	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	0	2	2	8	3
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	479	564	2	8	3
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	126	148	1	2	1
Total Analysis Volume [veh/h]	1	504	594	2	8	3
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane	No	No	No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No	No	No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.01	0.00	0.03	0.01
d_M, Delay for Movement [s/veh]	8.64	0.00	0.00	0.00	20.77	12.63
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh]	2.98	2.98	0.00	0.00	0.12	0.12
95th-Percentile Queue Length [ft]	74.39	74.39	0.00	0.00	3.09	3.09
d_A, Approach Delay [s/veh]	0.02		0.00		18.55	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	0.19					
Intersection LOS	C					

Intersection Level Of Service Report

Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	All-way stop	Delay (sec / veh):	75.2
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.193

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street			6th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street			6th Street		
Base Volume Input [veh/h]	50	94	57	57	139	85	34	448	17	44	516	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	1	2	2	1	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	94	57	58	141	87	35	448	17	44	516	21
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	25	15	15	37	23	9	118	4	12	136	6
Total Analysis Volume [veh/h]	53	99	60	61	148	92	37	472	18	46	543	22
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	381	394	426	411	453	433	490	429	543	497
Degree of Utilization, x	0.20	0.19	0.14	0.51	0.20	0.09	1.06	0.11	1.19	0.04

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.73	0.70	0.49	2.79	0.75	0.28	15.47	0.36	20.78	0.14
95th-Percentile Queue Length [ft]	18.34	17.56	12.15	69.77	18.82	6.96	386.65	8.94	519.58	3.46
Approach Delay [s/veh]	13.75			17.86		81.85		118.93		
Approach LOS	B			C		F		F		
Intersection Delay [s/veh]	75.16									
Intersection LOS	F									

Intersection Level Of Service Report
Intersection 8: Archibald Avenue (NS) at 8th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	17.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.597

Intersection Setup

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	32.00	100.00	100.00	90.00	100.00	100.00	120.00	100.00	100.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Archibald Avenue			Archibald Avenue			8th Street			8th Street		
Base Volume Input [veh/h]	62	1545	39	52	1086	46	108	99	42	41	93	57
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	0	0	0	2	1	6	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	64	1545	39	52	1086	46	110	100	48	41	93	57
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	407	10	14	286	12	29	26	13	11	24	15
Total Analysis Volume [veh/h]	67	1626	41	55	1143	48	116	105	51	43	98	60
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	6.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	7	7	0	7	7	0	0	7	0	0	7	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	16	0	35	40	0	0	34	0	0	34	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	5	0	0	5	0	0	5	0	0	5	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	L	C
C, Cycle Length [s]	85	85	85	85	85	85	85	85	85	85
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	58	49	49	58	49	49	19	19	19	19
g / C, Green / Cycle	0.69	0.58	0.58	0.69	0.58	0.58	0.22	0.22	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.10	0.45	0.03	0.11	0.32	0.32	0.09	0.09	0.03	0.09
s, saturation flow rate [veh/h]	650	3618	1615	496	1900	1873	1248	1796	1250	1781
c, Capacity [veh/h]	479	2099	937	359	1092	1077	235	393	238	389
d1, Uniform Delay [s]	6.27	13.60	7.68	10.47	11.23	11.23	36.25	28.42	33.91	28.48
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.61	2.86	0.09	0.20	1.99	2.02	1.60	0.65	0.36	0.68
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.14	0.77	0.04	0.15	0.55	0.55	0.49	0.40	0.18	0.41
d, Delay for Lane Group [s/veh]	6.88	16.46	7.77	10.66	13.21	13.25	37.85	29.07	34.27	29.16
Lane Group LOS	A	B	A	B	B	B	D	C	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.35	10.18	0.29	0.24	6.26	6.19	2.31	2.62	0.79	2.66
50th-Percentile Queue Length [ft]	8.65	254.57	7.23	5.88	156.50	154.76	57.66	65.41	19.72	66.42
95th-Percentile Queue Length [veh]	0.62	15.42	0.52	0.42	10.36	10.27	4.15	4.71	1.42	4.78
95th-Percentile Queue Length [ft]	15.56	385.41	13.01	10.59	259.08	256.77	103.78	117.73	35.49	119.56

Movement, Approach, & Intersection Results

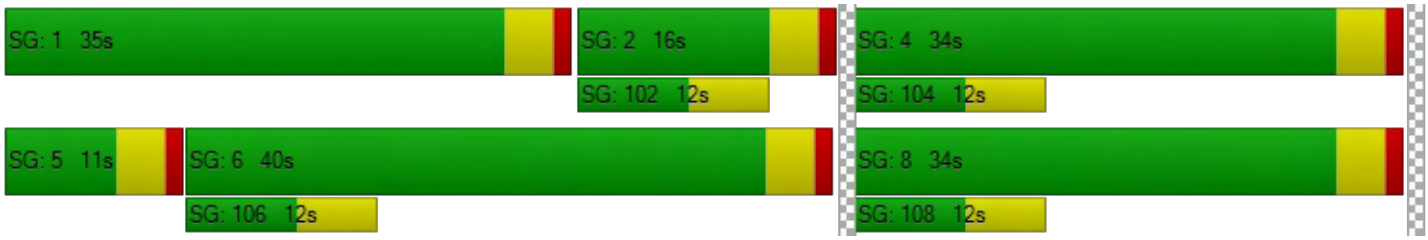
d_M, Delay for Movement [s/veh]	6.88	16.46	7.77	10.66	13.23	13.25	37.85	29.07	29.07	34.27	29.16	29.16
Movement LOS	A	B	A	B	B	B	D	C	C	C	C	C
d_A, Approach Delay [s/veh]	15.89			13.12			32.81			30.25		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	17.06											
Intersection LOS	B											
Intersection V/C	0.597											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	32.21	32.21	32.21	32.21
l_p,int, Pedestrian LOS Score for Intersection	3.326	3.353	2.230	2.180
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	282	847	706	706
d_b, Bicycle Delay [s]	31.35	14.12	17.79	17.79
l_b,int, Bicycle LOS Score for Intersection	2.990	2.588	2.008	1.891
Bicycle LOS	C	B	B	A

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Opening Year (2020) Without Project

With Improvements

8th Street & Hellman Avenue Project

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Report File: \...\AMOY_IMP.pdf

Scenario 1 Opening Year (2020) Without Project
4/17/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
7	Hellman Avenue (NS) at 6th Street (EW)	Signalized	HCM 6th Edition	WB Left	0.246	19.3	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	19.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.246

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	4	49	26	8	37	15	35	227	13	40	132	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	63	0	0	141	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	49	26	8	37	15	35	290	13	40	273	16
Peak Hour Factor	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	14	8	2	11	4	10	86	4	12	81	5
Total Analysis Volume [veh/h]	5	58	31	9	44	18	41	343	15	47	323	19
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	65
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	31	0	0	31	0	0	34	0	0	34	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	C	R	L	C	L	C	R
C, Cycle Length [s]	65	65	65	65	65	65	65	65	65	65
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	38	38	38	38	38	19	19	19	19	19
g / C, Green / Cycle	0.59	0.59	0.59	0.59	0.59	0.29	0.29	0.29	0.29	0.29
(v / s)_i Volume / Saturation Flow Rate	0.02	0.02	0.02	0.03	0.01	0.04	0.20	0.05	0.18	0.01
s, saturation flow rate [veh/h]	1703	1638	1530	1725	1530	1074	1787	1040	1800	1530
c, Capacity [veh/h]	1060	958	895	1073	895	229	522	202	526	447
d1, Uniform Delay [s]	5.71	5.71	5.72	5.77	5.67	26.78	20.37	28.35	19.85	16.49
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.05	0.06	0.07	0.09	0.04	0.37	1.61	0.59	1.17	0.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.03	0.03	0.03	0.05	0.02	0.18	0.69	0.23	0.61	0.04
d, Delay for Lane Group [s/veh]	5.77	5.77	5.79	5.86	5.71	27.15	21.98	28.93	21.02	16.53
Lane Group LOS	A	A	A	A	A	C	C	C	C	B
Critical Lane Group	No	No	No	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.15	0.14	0.14	0.24	0.08	0.56	4.37	0.70	4.07	0.20
50th-Percentile Queue Length [ft]	3.65	3.43	3.55	5.99	2.04	13.94	109.17	17.57	101.83	4.89
95th-Percentile Queue Length [veh]	0.26	0.25	0.26	0.43	0.15	1.00	7.79	1.26	7.33	0.35
95th-Percentile Queue Length [ft]	6.58	6.18	6.38	10.79	3.67	25.08	194.85	31.62	183.30	8.80

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	5.77	5.77	5.79	5.86	5.86	5.71	27.15	21.98	21.98	28.93	21.02	16.53
Movement LOS	A	A	A	A	A	A	C	C	C	C	C	B
d_A, Approach Delay [s/veh]	5.77			5.82			22.51			21.76		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	19.31											
Intersection LOS	B											
Intersection V/C	0.246											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	22.43	0.00	22.43
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.241	0.000	2.573
Crosswalk LOS	F	B	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	831	831	923	923
d_b, Bicycle Delay [s]	11.11	11.11	9.42	9.42
l_b,int, Bicycle LOS Score for Intersection	1.637	1.677	2.218	2.201
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



8th Street & Hellman Avenue Project

Vistro File: J:\...\PMOY.vistro
Report File: \...\PMOY_IMP.pdf

Scenario 1 Opening Year (2020) Without Project
4/17/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
7	Hellman Avenue (NS) at 6th Street (EW)	Signalized	HCM 6th Edition	WB Left	0.415	18.1	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	18.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.415

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	45	73	54	26	57	38	24	382	13	33	389	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	174	0	0	121	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	45	73	54	26	57	38	24	556	13	33	510	14
Peak Hour Factor	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	19	14	7	15	10	6	147	3	9	135	4
Total Analysis Volume [veh/h]	48	77	57	28	60	40	25	589	14	35	540	15
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	65
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	31	0	0	31	0	0	34	0	0	34	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	C	R	L	C	L	C	R
C, Cycle Length [s]	65	65	65	65	65	65	65	65	65	65
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	30	30	30	30	30	27	27	27	27	27
g / C, Green / Cycle	0.46	0.46	0.46	0.46	0.46	0.42	0.42	0.42	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.05	0.04	0.04	0.05	0.03	0.03	0.34	0.04	0.30	0.01
s, saturation flow rate [veh/h]	1281	1638	1530	1649	1530	879	1793	829	1800	1530
c, Capacity [veh/h]	686	751	702	829	702	223	750	178	753	640
d1, Uniform Delay [s]	11.09	9.91	9.90	10.02	9.78	25.47	16.57	28.66	15.71	11.11
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.25	0.11	0.19	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.26	0.22	0.23	0.26	0.16	0.22	4.71	0.53	2.31	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.09	0.08	0.08	0.11	0.06	0.11	0.80	0.20	0.72	0.02
d, Delay for Lane Group [s/veh]	11.35	10.13	10.12	10.28	9.94	25.69	21.28	29.20	18.02	11.12
Lane Group LOS	B	B	B	B	A	C	C	C	B	B
Critical Lane Group	No	No	No	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.52	0.45	0.41	0.63	0.29	0.33	7.29	0.53	6.36	0.12
50th-Percentile Queue Length [ft]	12.91	11.25	10.30	15.85	7.14	8.18	182.13	13.19	159.00	2.95
95th-Percentile Queue Length [veh]	0.93	0.81	0.74	1.14	0.51	0.59	11.71	0.95	10.50	0.21
95th-Percentile Queue Length [ft]	23.24	20.24	18.54	28.54	12.84	14.73	292.79	23.73	262.40	5.31

Movement, Approach, & Intersection Results

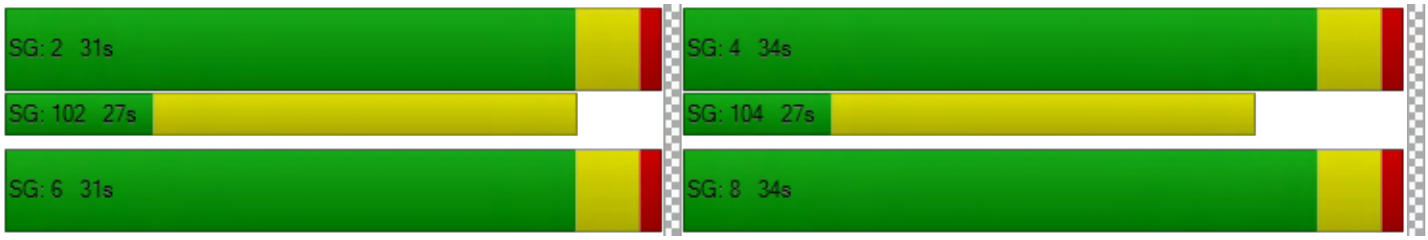
d_M, Delay for Movement [s/veh]	11.35	10.35	10.12	10.28	10.28	9.94	25.69	21.28	21.28	29.20	18.02	11.12
Movement LOS	B	B	B	B	B	A	C	C	C	C	B	B
d_A, Approach Delay [s/veh]	10.54			10.17			21.46			18.51		
Approach LOS	B			B			C			B		
d_I, Intersection Delay [s/veh]	18.08											
Intersection LOS	B											
Intersection V/C	0.415											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	22.43	0.00	22.43
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.238	0.000	2.680
Crosswalk LOS	F	B	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	831	831	923	923
d_b, Bicycle Delay [s]	11.11	11.11	9.42	9.42
l_b,int, Bicycle LOS Score for Intersection	1.710	1.771	2.596	2.533
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Opening Year (2020) With Project

With Improvements

8th Street & Hellman Avenue Project

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Scenario 2 Opening Year (2020) With Project
4/17/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
7	Hellman Avenue (NS) at 6th Street (EW)	Signalized	HCM 6th Edition	WB Left	0.246	19.3	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	19.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.246

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	4	49	26	8	37	15	35	227	13	40	132	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	0	1	2	63	0	0	141	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	51	26	8	37	16	37	290	13	40	273	17
Peak Hour Factor	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464	0.8464
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	15	8	2	11	5	11	86	4	12	81	5
Total Analysis Volume [veh/h]	5	60	31	9	44	19	44	343	15	47	323	20
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	65
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	31	0	0	31	0	0	34	0	0	34	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	C	R	L	C	L	C	R
C, Cycle Length [s]	65	65	65	65	65	65	65	65	65	65
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	38	38	38	38	38	19	19	19	19	19
g / C, Green / Cycle	0.59	0.59	0.59	0.59	0.59	0.29	0.29	0.29	0.29	0.29
(v / s)_i Volume / Saturation Flow Rate	0.02	0.02	0.02	0.03	0.01	0.04	0.20	0.05	0.18	0.01
s, saturation flow rate [veh/h]	1718	1638	1530	1724	1530	1074	1787	1040	1800	1530
c, Capacity [veh/h]	1069	958	895	1073	895	229	522	202	526	447
d1, Uniform Delay [s]	5.71	5.71	5.72	5.77	5.67	26.85	20.37	28.35	19.85	16.50
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.06	0.06	0.07	0.09	0.04	0.40	1.61	0.58	1.17	0.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.03	0.03	0.03	0.05	0.02	0.19	0.69	0.23	0.61	0.04
d, Delay for Lane Group [s/veh]	5.77	5.77	5.79	5.86	5.72	27.26	21.98	28.93	21.02	16.54
Lane Group LOS	A	A	A	A	A	C	C	C	C	B
Critical Lane Group	No	No	No	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.15	0.14	0.14	0.24	0.09	0.60	4.37	0.70	4.07	0.21
50th-Percentile Queue Length [ft]	3.78	3.53	3.55	5.99	2.15	15.01	109.16	17.57	101.83	5.15
95th-Percentile Queue Length [veh]	0.27	0.25	0.26	0.43	0.16	1.08	7.79	1.26	7.33	0.37
95th-Percentile Queue Length [ft]	6.81	6.36	6.38	10.79	3.88	27.01	194.84	31.62	183.29	9.27

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	5.77	5.77	5.79	5.86	5.86	5.72	27.26	21.98	21.98	28.93	21.02	16.54
Movement LOS	A	A	A	A	A	A	C	C	C	C	C	B
d_A, Approach Delay [s/veh]	5.78			5.82			22.55			21.74		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	19.29											
Intersection LOS	B											
Intersection V/C	0.246											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	22.43	0.00	22.43
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.247	0.000	2.573
Crosswalk LOS	F	B	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	831	831	923	923
d_b, Bicycle Delay [s]	11.11	11.11	9.42	9.42
l_b,int, Bicycle LOS Score for Intersection	1.639	1.678	2.223	2.203
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



8th Street & Hellman Avenue Project

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Scenario 2 Opening Year (2020) With Project
4/17/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
7	Hellman Avenue (NS) at 6th Street (EW)	Signalized	HCM 6th Edition	WB Left	0.417	18.1	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	18.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.417

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	45	73	54	26	57	38	24	382	13	33	389	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	1	2	2	1	174	0	0	121	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	45	73	54	27	59	40	25	556	13	33	510	14
Peak Hour Factor	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446	0.9446
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	19	14	7	16	11	7	147	3	9	135	4
Total Analysis Volume [veh/h]	48	77	57	29	62	42	26	589	14	35	540	15
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	65
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	31	0	0	31	0	0	34	0	0	34	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	C	R	L	C	L	C	R
C, Cycle Length [s]	65	65	65	65	65	65	65	65	65	65
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	30	30	30	30	30	27	27	27	27	27
g / C, Green / Cycle	0.46	0.46	0.46	0.46	0.46	0.42	0.42	0.42	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.05	0.04	0.04	0.06	0.03	0.03	0.34	0.04	0.30	0.01
s, saturation flow rate [veh/h]	1277	1638	1530	1649	1530	879	1793	829	1800	1530
c, Capacity [veh/h]	684	751	702	829	702	223	750	178	753	640
d1, Uniform Delay [s]	11.11	9.91	9.90	10.04	9.80	25.50	16.57	28.66	15.71	11.11
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.25	0.11	0.19	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.26	0.22	0.23	0.27	0.16	0.23	4.71	0.53	2.31	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.09	0.08	0.08	0.11	0.06	0.12	0.80	0.20	0.72	0.02
d, Delay for Lane Group [s/veh]	11.37	10.13	10.12	10.30	9.96	25.73	21.28	29.20	18.02	11.12
Lane Group LOS	B	B	B	B	A	C	C	C	B	B
Critical Lane Group	No	No	No	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.52	0.45	0.41	0.66	0.30	0.34	7.29	0.53	6.36	0.12
50th-Percentile Queue Length [ft]	12.92	11.26	10.30	16.43	7.50	8.52	182.13	13.19	159.00	2.95
95th-Percentile Queue Length [veh]	0.93	0.81	0.74	1.18	0.54	0.61	11.71	0.95	10.50	0.21
95th-Percentile Queue Length [ft]	23.26	20.27	18.54	29.57	13.51	15.34	292.79	23.73	262.40	5.31

Movement, Approach, & Intersection Results

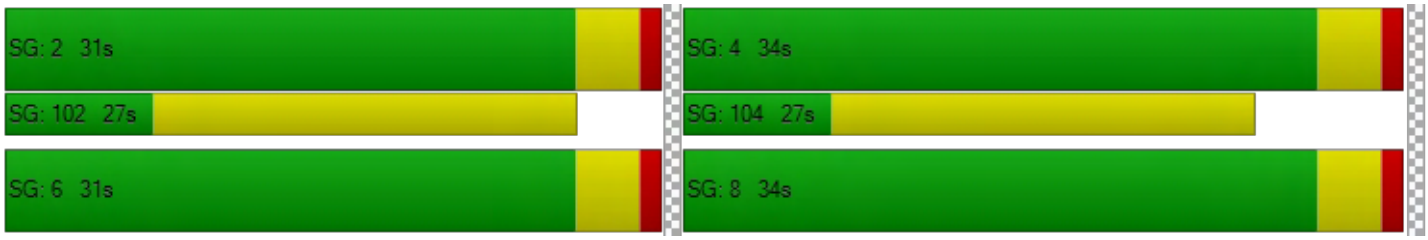
d_M, Delay for Movement [s/veh]	11.37	10.36	10.12	10.30	10.30	9.96	25.73	21.28	21.28	29.20	18.02	11.12
Movement LOS	B	B	B	B	B	A	C	C	C	C	B	B
d_A, Approach Delay [s/veh]	10.55			10.20			21.47			18.51		
Approach LOS	B			B			C			B		
d_I, Intersection Delay [s/veh]	18.06											
Intersection LOS	B											
Intersection V/C	0.417											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	22.43	0.00	22.43
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.242	0.000	2.682
Crosswalk LOS	F	B	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	831	831	923	923
d_b, Bicycle Delay [s]	11.11	11.11	9.42	9.42
l_b,int, Bicycle LOS Score for Intersection	1.710	1.779	2.597	2.533
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Horizon Year (2040) Without Project

With Improvements

8th Street & Hellman Avenue Project

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Scenario 1 Horizon Year (2040) Without Project
4/17/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
7	Hellman Avenue (NS) at 6th Street (EW)	Signalized	HCM 6th Edition	WB Left	0.238	19.4	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	19.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.238

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	9	127	54	9	55	17	59	307	23	62	164	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	127	54	9	55	17	59	307	23	62	164	24
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	33	14	2	14	4	16	81	6	16	43	6
Total Analysis Volume [veh/h]	9	134	57	9	58	18	62	323	24	65	173	25
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	75
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	31	0	0	31	0	0	34	0	0	34	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	C	R	L	C	L	C	R
C, Cycle Length [s]	75	75	75	75	75	75	75	75	75	75
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	46	46	46	46	46	21	21	21	21	21
g / C, Green / Cycle	0.61	0.61	0.61	0.61	0.61	0.28	0.28	0.28	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.04	0.04	0.04	0.04	0.01	0.05	0.18	0.06	0.09	0.02
s, saturation flow rate [veh/h]	1810	1729	1615	1808	1615	1231	1877	1050	1900	1615
c, Capacity [veh/h]	1164	1060	990	1163	990	323	526	194	532	452
d1, Uniform Delay [s]	5.84	5.84	5.82	5.82	5.67	26.29	23.84	32.85	21.38	19.74
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.11	0.12	0.11	0.09	0.03	0.29	1.42	1.00	0.35	0.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.07	0.06	0.06	0.02	0.19	0.66	0.33	0.33	0.06
d, Delay for Lane Group [s/veh]	5.95	5.96	5.93	5.91	5.71	26.58	25.26	33.85	21.73	19.79
Lane Group LOS	A	A	A	A	A	C	C	C	C	B
Critical Lane Group	Yes	No	No	No	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.38	0.36	0.29	0.34	0.09	0.90	5.08	1.16	2.36	0.31
50th-Percentile Queue Length [ft]	9.46	8.90	7.37	8.53	2.27	22.60	127.08	29.11	59.04	7.86
95th-Percentile Queue Length [veh]	0.68	0.64	0.53	0.61	0.16	1.63	8.78	2.10	4.25	0.57
95th-Percentile Queue Length [ft]	17.03	16.01	13.26	15.35	4.08	40.69	219.52	52.40	106.27	14.15

Movement, Approach, & Intersection Results

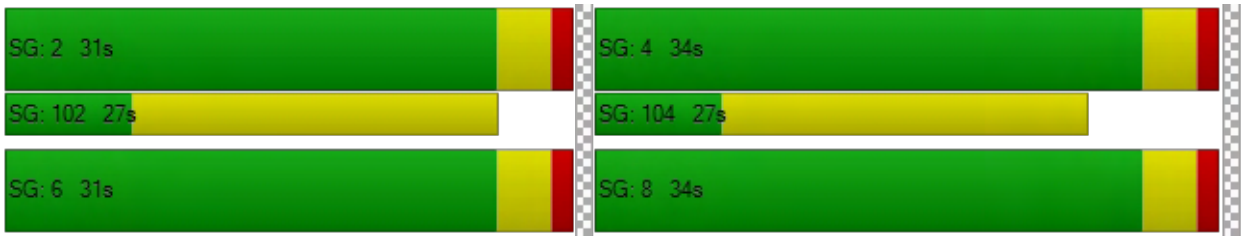
d_M, Delay for Movement [s/veh]	5.95	5.96	5.93	5.91	5.91	5.71	26.58	25.26	25.26	33.85	21.73	19.79
Movement LOS	A	A	A	A	A	A	C	C	C	C	C	B
d_A, Approach Delay [s/veh]	5.95			5.87			25.46			24.54		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	19.39											
Intersection LOS	B											
Intersection V/C	0.238											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	27.31	0.00	27.31
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.321	0.000	2.562
Crosswalk LOS	F	B	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	720	720	800	800
d_b, Bicycle Delay [s]	15.36	15.36	13.50	13.50
l_b,int, Bicycle LOS Score for Intersection	1.725	1.700	2.234	1.994
Bicycle LOS	A	A	B	A

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



8th Street & Hellman Avenue Project

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Scenario 1 Horizon Year (2040) Without Project
4/17/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
7	Hellman Avenue (NS) at 6th Street (EW)	Signalized	HCM 6th Edition	EB Left	0.429	20.2	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	20.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.429

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street			6th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street			6th Street		
Base Volume Input [veh/h]	50	94	57	57	139	85	34	448	17	44	516	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	94	57	57	139	85	34	448	17	44	516	21
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	25	15	15	37	22	9	118	4	12	136	6
Total Analysis Volume [veh/h]	53	99	60	60	146	89	36	472	18	46	543	22
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	75
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	31	0	0	31	0	0	34	0	0	34	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	C	R	L	C	L	C	R
C, Cycle Length [s]	75	75	75	75	75	75	75	75	75	75
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	40	40	40	40	40	27	27	27	27	27
g / C, Green / Cycle	0.53	0.53	0.53	0.53	0.53	0.36	0.36	0.36	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.06	0.05	0.04	0.12	0.06	0.04	0.26	0.05	0.29	0.01
s, saturation flow rate [veh/h]	1180	1729	1615	1709	1615	877	1888	921	1900	1615
c, Capacity [veh/h]	711	918	858	970	858	159	684	191	688	585
d1, Uniform Delay [s]	10.40	8.64	8.56	9.24	8.72	33.71	20.60	31.72	21.35	15.46
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.19	0.11	0.24	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.28	0.19	0.16	0.50	0.24	0.72	2.52	0.64	4.50	0.03
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.10	0.09	0.07	0.21	0.10	0.23	0.72	0.24	0.79	0.04
d, Delay for Lane Group [s/veh]	10.68	8.83	8.72	9.74	8.96	34.43	23.11	32.36	25.86	15.49
Lane Group LOS	B	A	A	A	A	C	C	C	C	B
Critical Lane Group	No	No	No	Yes	No	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	0.64	0.57	0.43	1.57	0.64	0.62	6.90	0.80	8.75	0.24
50th-Percentile Queue Length [ft]	16.10	14.36	10.63	39.29	16.09	15.58	172.47	19.94	218.86	5.89
95th-Percentile Queue Length [veh]	1.16	1.03	0.77	2.83	1.16	1.12	11.21	1.44	13.61	0.42
95th-Percentile Queue Length [ft]	28.99	25.86	19.13	70.73	28.97	28.05	280.16	35.90	340.18	10.61

Movement, Approach, & Intersection Results

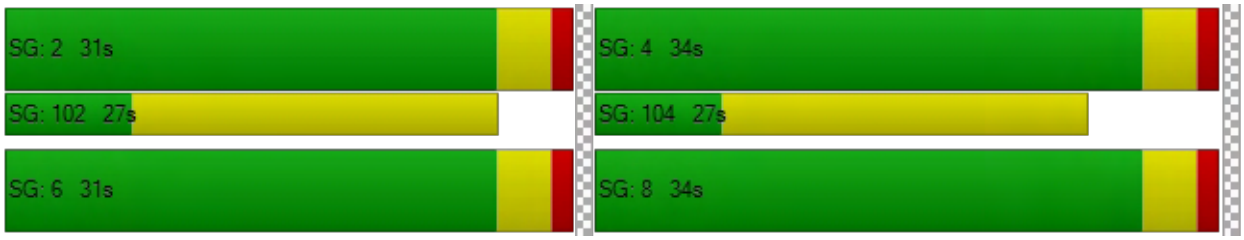
d_M, Delay for Movement [s/veh]	10.68	9.18	8.72	9.74	9.74	8.96	34.43	23.11	23.11	32.36	25.86	15.49
Movement LOS	B	A	A	A	A	A	C	C	C	C	C	B
d_A, Approach Delay [s/veh]	9.42			9.51			23.89			25.97		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	20.22											
Intersection LOS	C											
Intersection V/C	0.429											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	27.31	0.00	27.31
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.337	0.000	2.724
Crosswalk LOS	F	B	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	720	720	800	800
d_b, Bicycle Delay [s]	15.36	15.36	13.50	13.50
l_b,int, Bicycle LOS Score for Intersection	1.735	2.046	2.428	2.568
Bicycle LOS	A	B	B	B

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Horizon Year (2040) With Project

With Improvements

8th Street & Hellman Avenue Project

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Scenario 2 Horizon Year (2040) With Project
4/17/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
7	Hellman Avenue (NS) at 6th Street (EW)	Signalized	HCM 6th Edition	WB Left	0.239	19.4	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	19.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.239

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street					
Base Volume Input [veh/h]	9	127	54	9	55	17	59	307	23	62	164	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	0	1	2	0	0	0	0	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	129	54	9	55	18	61	307	23	62	164	25
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	34	14	2	14	5	16	81	6	16	43	7
Total Analysis Volume [veh/h]	9	136	57	9	58	19	64	323	24	65	173	26
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	75
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	31	0	0	31	0	0	34	0	0	34	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	C	R	L	C	L	C	R
C, Cycle Length [s]	75	75	75	75	75	75	75	75	75	75
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	46	46	46	46	46	21	21	21	21	21
g / C, Green / Cycle	0.61	0.61	0.61	0.61	0.61	0.28	0.28	0.28	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.04	0.04	0.04	0.04	0.01	0.05	0.18	0.06	0.09	0.02
s, saturation flow rate [veh/h]	1817	1729	1615	1808	1615	1231	1877	1050	1900	1615
c, Capacity [veh/h]	1168	1060	990	1163	990	323	526	194	532	452
d1, Uniform Delay [s]	5.85	5.85	5.82	5.82	5.68	26.33	23.84	32.85	21.38	19.75
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.11	0.12	0.11	0.09	0.04	0.30	1.42	1.00	0.35	0.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.07	0.06	0.06	0.02	0.20	0.66	0.33	0.32	0.06
d, Delay for Lane Group [s/veh]	5.95	5.97	5.93	5.91	5.71	26.63	25.26	33.85	21.73	19.80
Lane Group LOS	A	A	A	A	A	C	C	C	C	B
Critical Lane Group	Yes	No	No	No	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.38	0.36	0.29	0.34	0.10	0.94	5.08	1.16	2.36	0.33
50th-Percentile Queue Length [ft]	9.62	9.01	7.37	8.53	2.39	23.38	127.07	29.11	59.03	8.18
95th-Percentile Queue Length [veh]	0.69	0.65	0.53	0.61	0.17	1.68	8.78	2.10	4.25	0.59
95th-Percentile Queue Length [ft]	17.31	16.22	13.27	15.35	4.31	42.08	219.51	52.39	106.26	14.73

Movement, Approach, & Intersection Results

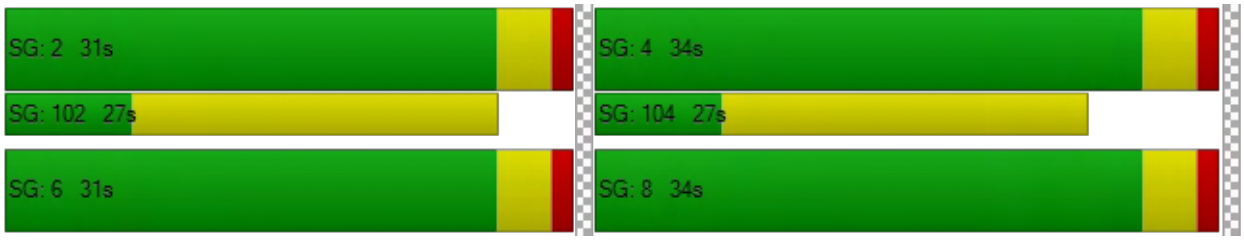
d_M, Delay for Movement [s/veh]	5.95	5.96	5.93	5.91	5.91	5.71	26.63	25.26	25.26	33.85	21.73	19.80
Movement LOS	A	A	A	A	A	A	C	C	C	C	C	B
d_A, Approach Delay [s/veh]	5.95			5.87			25.47			24.52		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	19.37											
Intersection LOS	B											
Intersection V/C	0.239											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	27.31	0.00	27.31
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.326	0.000	2.562
Crosswalk LOS	F	B	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	720	720	800	800
d_b, Bicycle Delay [s]	15.36	15.36	13.50	13.50
l_b,int, Bicycle LOS Score for Intersection	1.726	1.702	2.238	1.995
Bicycle LOS	A	A	B	A

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



8th Street & Hellman Avenue Project

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Scenario 2 Horizon Year (2040) With Project
4/17/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
7	Hellman Avenue (NS) at 6th Street (EW)	Signalized	HCM 6th Edition	EB Left	0.431	20.1	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 7: Hellman Avenue (NS) at 6th Street (EW)

Control Type:	Signalized	Delay (sec / veh):	20.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.431

Intersection Setup

Name	Hellman Avenue			Hellman Avenue			6th Street			6th Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	65.00	100.00	100.00	35.00	100.00	125.00
Speed [mph]	45.00			45.00			45.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			No			Yes		

Volumes

Name	Hellman Avenue			Hellman Avenue			6th Street			6th Street		
Base Volume Input [veh/h]	50	94	57	57	139	85	34	448	17	44	516	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	1	2	2	1	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	94	57	58	141	87	35	448	17	44	516	21
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	25	15	15	37	23	9	118	4	12	136	6
Total Analysis Volume [veh/h]	53	99	60	61	148	92	37	472	18	46	543	22
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	75
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	31	0	0	31	0	0	34	0	0	34	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	C	R	L	C	L	C	R
C, Cycle Length [s]	75	75	75	75	75	75	75	75	75	75
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	40	40	40	40	40	27	27	27	27	27
g / C, Green / Cycle	0.53	0.53	0.53	0.53	0.53	0.36	0.36	0.36	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.06	0.05	0.04	0.12	0.06	0.04	0.26	0.05	0.29	0.01
s, saturation flow rate [veh/h]	1177	1729	1615	1709	1615	877	1888	921	1900	1615
c, Capacity [veh/h]	708	917	857	969	857	160	685	192	689	586
d1, Uniform Delay [s]	10.44	8.67	8.58	9.29	8.76	33.68	20.55	31.65	21.31	15.43
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.19	0.11	0.24	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.28	0.19	0.16	0.51	0.25	0.73	2.50	0.64	4.46	0.03
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.10	0.09	0.07	0.22	0.11	0.23	0.72	0.24	0.79	0.04
d, Delay for Lane Group [s/veh]	10.73	8.86	8.74	9.80	9.02	34.41	23.05	32.28	25.77	15.45
Lane Group LOS	B	A	A	A	A	C	C	C	C	B
Critical Lane Group	No	No	No	Yes	No	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	0.65	0.58	0.43	1.60	0.67	0.64	6.89	0.80	8.74	0.24
50th-Percentile Queue Length [ft]	16.14	14.41	10.65	40.03	16.71	16.01	172.17	19.91	218.43	5.89
95th-Percentile Queue Length [veh]	1.16	1.04	0.77	2.88	1.20	1.15	11.19	1.43	13.58	0.42
95th-Percentile Queue Length [ft]	29.05	25.93	19.17	72.05	30.07	28.82	279.76	35.85	339.62	10.60

Movement, Approach, & Intersection Results

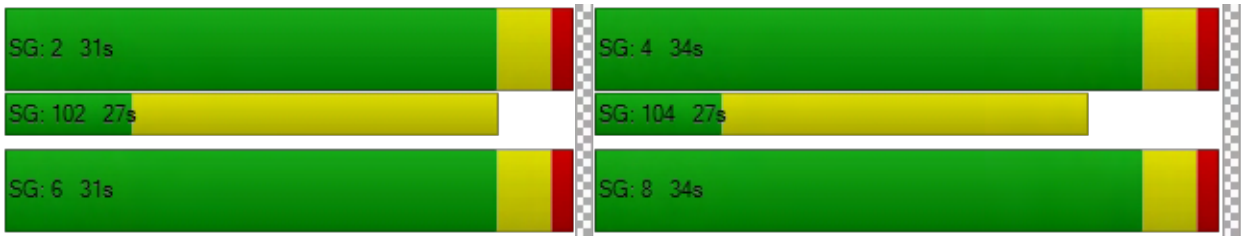
d_M, Delay for Movement [s/veh]	10.73	9.20	8.74	9.80	9.80	9.02	34.41	23.05	23.05	32.28	25.77	15.45
Movement LOS	B	A	A	A	A	A	C	C	C	C	C	B
d_A, Approach Delay [s/veh]	9.45			9.56			23.85			25.89		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	20.15											
Intersection LOS	C											
Intersection V/C	0.431											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	27.31	0.00	27.31
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.341	0.000	2.725
Crosswalk LOS	F	B	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	720	720	800	800
d_b, Bicycle Delay [s]	15.36	15.36	13.50	13.50
l_b,int, Bicycle LOS Score for Intersection	1.735	2.056	2.429	2.568
Bicycle LOS	A	B	B	B

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX G

Hellman Avenue and 8th Street Widening and At Grade Crossing Improvement Project

CITY OF RANCHO CUCAMONGA

HELLMAN AVENUE AND 8TH STREET WIDENING AND AT GRADE CROSSING IMPROVEMENT PROJECT

GENERAL NOTES

1. All work shall conform to the City of Rancho Cucamonga Standard Drawings and the Standard Specifications for Public Works Construction, (Green Book), 2015 Edition and 2016 supplements.
2. Public and Private utilities and substructures shown hereon are from available records. The Contractor shall be responsible for protecting all utilities and substructures as shown within the construction limits of this project and shall be responsible for any damage as a result of the construction operations.
3. The Contractor shall notify Underground Service Alert 1-800-422-4133 and the following utilities two working days prior to construction or regarding any problems.

Southern California Edison Co.	(909) 930-8576
Southern California Gas Co.	(909) 335-7655
Frontier Communication (former Verizon)	(909) 469-6336
Cucamonga Valley Water District	(909) 483-7313
Charter Communication	(626) 419-7334
Metropolitan Water District	(213) 217-7670

4. The contractor shall notify the City of Rancho Cucamonga Police Department, The City of Rancho Cucamonga Fire Department and any affected school district, 72 hours prior to construction indicating any detour and/or road closures.
5. For inspection of this project, the Contractor shall contact the Public Works Section at (909) 477-2740, Monday - Thursday, and at least two working days prior to the construction start date.
6. A permit shall be obtained from the City of Rancho Cucamonga prior to any construction or encroachment within any City of Rancho Cucamonga easement or rights-of-way.
7. During the construction operations at least one 12' lane in each direction shall be provided for each direction of travel on all streets at all times. The traffic lanes shall be maintained on pavement and shall remain unobstructed.
8. The Contractor shall familiarize himself with all underground utilities, pipes and structures, and shall take sole responsibility for the repair/replacement, at no cost to the City, for any damage to said underground utilities, pipes and structures.
9. Contractor shall verify all conditions and dimensions shown on the plans at the site prior to commencement of any work. All discrepancies shall be reported for direction immediately to the City.
10. On the date and at the time of the submittal of the Bidder's Proposal the Prime Contractor shall possess any and all contractor licenses, in form and class as required by any and all applicable laws with respect to any and all of the work to be performed under this contract; Including but not limited to a Class "A" License (General Engineering Contractor) or a Specialty Class "C-12" license (Earthwork and Paving Contractor) sufficient to cover all the work to be performed by the Prime Contractor in accordance with the provisions of the Contractor's License Law (California Business and Professions Code, Section 7000 et. seq.) and rules and regulations adopted pursuant thereto.

EXISTING SURVEY MONUMENTATION

All existing survey monuments that will be disturbed by this project shall be referenced and reset by the City Construction Surveyor in accordance with Section 8771 of the California Surveyors Act. Found monuments are shown on the plans and described as follows:

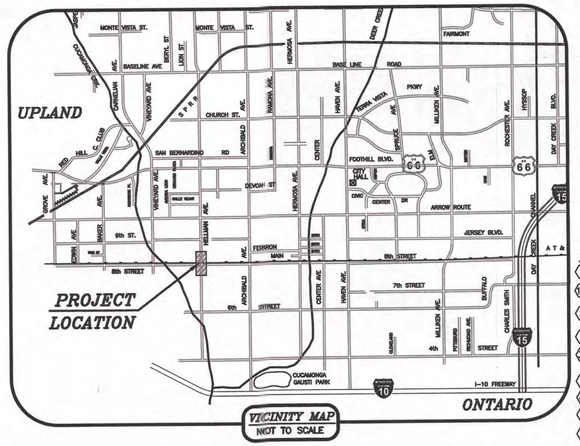
(SEE PLAN)

STRIPING GENERAL NOTES

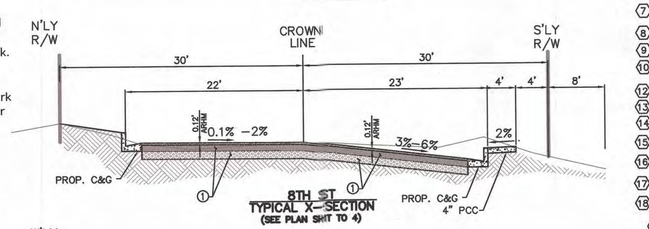
1. All details and dimensions for traffic striping and markings and the installation thereof shall conform to Caltrans, Standard Specifications, Traffic Manual, Maintenance Manual and Standard Plans and City Standard plan no. 133, unless otherwise approved or directed by the City Engineer.
2. Procedures for painting of striping and pavement markings and installation of pavements markers shall conform to the Standard Specifications for Public Works Construction and the following provisions.
   - A. All pavement markings shall conform to the city maintenance stencils, (S.A.E) unless otherwise noted.
   - B. All conflicting traffic striping and pavement markings shall be removed by WET SANDBLASTING.
   - C. Sufficient control points and spotting removed during sandblasting shall be replaced prior to installation of striping and markings.
   - D. All control points and spotting removed during sandblasting shall be replaced prior to installation of striping and markings.
   - E. All control points and spotting shall be inspected and approved by the City Traffic Engineer prior to installation of new or replacement striping and markings.
   - F. All striping and pavement markings installed on new road surfaces shall be approved low VOC type, 15 mil thick (wet). Installation shall be in two coats with the second a minimum of two weeks after the first, unless otherwise noted.
   - G. All thermoplastic striping and pavement markings shall be installed in one coat and be 10 mil thick (dry), unless otherwise noted.
   - H. Under no conditions shall a roadway be left over night, weekends or holidays without appropriate striping and markings to the satisfaction of the City Engineer.
   - I. All traffic striping and pavement markings shall be installed with all appropriate permits and traffic control measures, in accordance with the city and state standards.
   - J. Temporary or construction striping and markings shall be in accordance with the city and state standards and as directed by the City Engineer.
3. Street Name Signs shall be installed per City Standard Plan No. 401-A.
4. Traffic Signs shall be installed per City Standard Plan No. 401-B.

NOTE: LEGEND, SYMBOL, LIMIT LINE AND CROSSWALK SHALL BE THERMOPLASTIC.

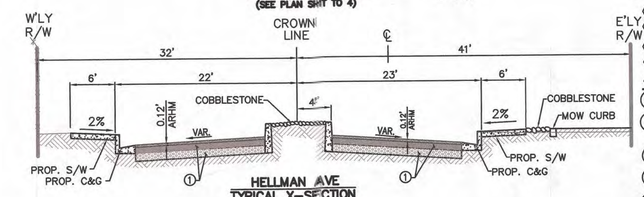
RANCHO CUCAMONGA



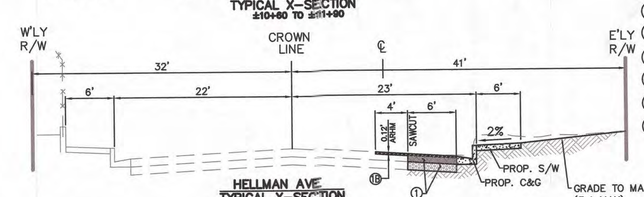
VICINITY MAP
NOT TO SCALE



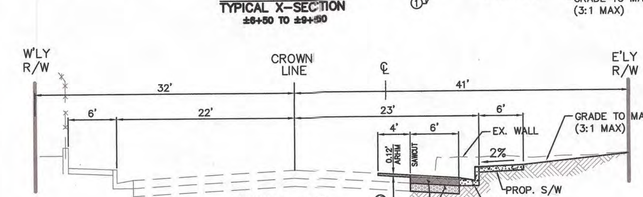
8TH ST
TYPICAL X-SECTION
(SEE PLAN SHT TO 4)



HELLMAN AVE
TYPICAL X-SECTION
±10+80 TO ±11+90



HELLMAN AVE
TYPICAL X-SECTION
±8+50 TO ±9+50



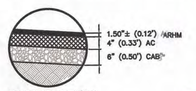
HELLMAN AVE
TYPICAL X-SECTION
±4+50 TO ±6+50

SHEET INDEX:

SHEET 1	TITLE SHEET
SHEET 1A	SCRRA GENERAL NOTES
SHEET 2-4	PLAN & PROFILE
SHEET 4A	SIDEWALK & DWY DET. & X-SEC (HELLMAN AVE)
SHEET 5	STRIPING PLAN
SHEET 6	TYP. CROSS SECTIONS
SHEET 7	AT-GRADE CURB DETAILS
SHEET 8	MISC. DETAILS
SHEET 9-10	SD PLANS AND DETAILS
SHEET 11-12	RAILROAD AT GRADE IMPROVEMENTS
SHEET 13	TRAFFIC SIGNAL
SHEET 14	ST. LIGHTING PLAN

SIGNING & STRIPING NOTES

1. INSTALL THERMOPLASTIC LEGEND, SYMBOL OR ARROW TYPE IV (S.A.E.)
1A. INSTALL THERMOPLASTIC LANE REDUCTION ARROW TYPE VI
2. PAINT 4" DOUBLE SOLID YELLOW STRIPE WITH TYPE "D" MARKERS PER CITY STANDARD NO. 133.
3. INSTALL 12" SOLID WHITE STRIPE, THERMOPLASTIC. PER PLAN
3A. PAINT 4" SKIP YELLOW CENTERLINE EXTENSIONS THROUGH INTERSECTION PER CALTRANS STD. DETAIL 41.
4. PAINT 4" SOLID WHITE EDGE LINE PER CALTRANS STD. DETAILS 27B.
4A. PAINT 12" WHITE CHEVRONS 45' AT 1/0' O.C.
5. INSTALL HYDRANT MARKERS PER CITY STD. NO. 134.
6. PAINT 8" WHITE SOLID STRIPE WITH TYPE "G" MARKERS PER CITY STANDARD NO. 133.
7. INSTALL NEW LOOPS DETECTOR. (see detail SHEET 8)
8. REMOVE SIGN AND INSTALL SIGN PER PLAN.
9. PAINT 12" SOLID WHITE STRIPE
10. PAINT 4" SKIP YELLOW CENTER LINE WITH TYPE "D" MARKERS PER CITY OF RANCHO CUCAMONGA STANDARD PLAN 133.
12. INSTALL SIGN AND POST.
13. INSTALL SIGN ON ST LT POST.
14. PAINT MEDIAN NOSE YELLOW AND AND PLACE RPM'S 2'O.C. TYPE "D" PER SCRRA STD. ES04006
15. PAINT 4" YELLOW MARKING AROUND MEDIAN PER CALTRANS DETAIL 24 PER SCRRA STD. ES04006
16. PAINT 24" SOLID WHITE STOP LINE PER CALTRANS STD. PLAN A24B AND PER SCRRA STD. ES04006
17. INSTALL PAVEMENT MARKING AS PER CALTRANS STANDARD PLAN A24A OR A24D OR A24E OR CA MUTCD (LATTEST EDITION)
18. PAINT 4" YELLOW EDGE LINE AND MARKER PER CALTRANS DETAIL 25 AND AS PER SCRRA STD. ES04006
19. PAINT 4" SOLID RETRO REFLECTIVE STRIPE PER SCRRA STD. ES4016
20. PAINT DOUBLE YELLOW STRIPING WITH YELLOW MARKER PER CALTRANS DETAIL 21 PER SCRRA STD. ES04006 AND ES4016
21. REMOVE EXISTING TYPE VI ARROW BY WET SAND BLASTING
22. REMOVE EXISTING EXIST. 4" EDGELINE AND MARKERS AND REPLACE WITH 4" SOLID WHITE EDGE LINE WITH MARKERS PER CITY STANDARD PALN 406
23. REMOVE AND RECONSTRUCT AC BERM AND SIGNAGE PER STANDARD PLAN 406
51. CONSTRUCT MODIFIED JUNCTION STRUCTURE NO.4 CASE 1 PER CITY OF R.C. DRAWING NO. 333.
52. RE-GRADE R/R SIDE SIDE SLOPE AND FILL DIRT CHANNEL AS SHOWN ON PLAN (SEE TYP. SECTION ON SHT. 8) NOTE: GRADE TO FLOW WESTERLY TO THE PROPOSED CB INLET
53. INSTALL NEW 6' CHAIN LINK FENCE IN LIKE AND KIND (AFTER CONSTRUCTION)
54. CONNECT LATERAL PIPE TO EXIST 36"/48" DIA. STUB OUT. (POT HOLE AND FIELD LOCATE)
55. INSTALL INSTALL 24" CMP PIPE
56. CONSTRUCT PCC DRAIN STRUCTURE WITH FRAME AND GRATE INLET BY GRATING PACIFIC 12'X16" THP8EZ OR EQUAL (SEE SHT 10 PER DETAIL)
57. PLUG PIPE WITH MORTAR AND BRICK PER SBCFCD STD. DWG. SP 176 TYPE "B"
57A. INSTALL 6" DIA. CLEAN OUT INCLUDING 6" PVC SCH. 80 PIPE AND COVER (NDS 8"X8" STRUCTURAL FOAM POLYOTEFIN GRATE) COMPLETE IN PLACE SEE SHEET 10 FOR DETAIL
58. CONSTRUCT PCC COLLAR PER CITY OF RC STD. DWG. NO. 329
59. CONSTRUCT UNGROUTED RIPRAP TYPE 3 (8" TO 22" DIA.)



PAVING DETAIL

STREET IMPROVEMENT CONSTRUCTION NOTES:

1. REMOVE EXIST. PAVEMENT AND CONSTRUCT 4" A.C. OVER 6" AGGREGATE BASE WITH 0.12' ARHM OVERLAY.
1A. CONSTRUCT 4" A.C. OVER 4" AGGREGATE BASE.
1B. 4' OF 0.12' COLD PLANE AND 0.12' ARHM OVERLAY.
1C. 25' VARIABLE COLD PLANE (0.12'-0') AND 0.12' ARHM OVERLAY PER JOINT DIETAIL ON SHT. 7
2. CONSTRUCT 4" THICK PCC SIDEWALK, WIDTH PER PLAN, PER CITY STD. DWG. 101 AND 103.
3. CONSTRUCT ACCESS RAMP PER CITY STD. NO. 102.
4. CONSTRUCT 8" CURB & GUTTER (A2-8) PER CITY STD. DWG. NO. 104.
4A. CONSTRUCT ROLLED CURB AND GUTTER PER CITY STD. NO. 105-A.
4B. CONSTRUCT 10' LONG LIMITED ACCESS CURB PER STD. DWG. NO. 105-C
5. REMOVE PORTION OF THE AFFECTED 6' WROUGHT IRON FENCE (MODIFY TO FIT)
6. CONSTRUCT 6' HIGH MASONRY GARDEN WALL 8" THICK SPLIT FACE, DOUBLE SIDED WALL WITH CAP PER SPPWC (2012 EDITION) 601-4
7. CONSTRUCT DRIVE APPROACH PER CITY STD. NO. 101 AND PER DETAIL.
7A. CONSTRUCT DRIVE APPROACH TYPE C PER CITY STD. NO. 101.
8. INSTALL STREET LIGHT 9500 LUMEN (INCLUDING CONDUITS, WIRINGS AND PULLBOX AND PULL ROPE SEE SHT 14)
9. CONSTRUCT 8" PCC MEDIAN CURB PER PLAN AND PER STD. DETAIL 104 & 5#12 SHT 7.
10. CONSTRUCT MODIFIED CURB RAMP PER CALTRANS STD. DETAILS A-88A CASE-C (GROOVE ELIMINATED)
10A. INSTATALL DETECTABLE WARNING SURFACE (RAISED TRUNCATED DOME PER CALTRANS STD. A88A
11. INSTALL COBBLESTONES PER CITY STD. NO. 542. AND PER DETAILS
12. RELOCATE AFFECTED POWER/COMM. POLE & GUY WIRE NECESSARY (BY OTHERS).
13. REMOVE OR RELOCATE SIGNS.
14. ADJUST TO GRADE (MH, VALVES, METER, P.C.C. BOX COVER SURVEY MONUMENTS, P.C.C. PAVEMENT AND OTHER APPURTENANCE.)
14A. RELOCATE / RELOCATE (BY OTHERS)
15. REMOVE EXIST. SIGNS, A.C. PAVEMENT, RET. WALL & PCC CURB, GUTTER, SIDIEWALK ETC.
17. REMOVE AND REPLACE EXISTING MAIL BOX WITH GIBRALTAR PEDESTAL MAILBOX: SEE DETAIL SEE SETAIL ON SHEET 8 COMPLETE IN PLACE.
18. REMOVE TREE.
18A. REMOVE SHRUBS AND PLANTS
19. RELOCATE VENT.
20. PROTECT IN PLACE
21. REMOVE EXIST. PAVEMENT.
22. GRADE DIRT TO MATCH PROPOSED GRADE. (3:1 MAX)
23. REMOVE BERM
24. REMOVE EXIST. WOOD FENCE
25A. CONSTRUCT 24"X24" CONC PILLAR PER DETAIL ON SHT.8
25. CUT REMOVE OBSTRUCTING WALLS, POST OR PILLARS
26. CONSTRUCT BOX CULVERT (1.5'D X 10'W X 10'L) CONNECTION BEHIND C.B. PIER DETAIL ON SHT. 9
27. REMOVE EXIST. RET. WALL (8"-24"HIGH)
28. PLUG EXIST. 18" PIPE WITH BRICK AND MORTAR PER SBCFCD 176A
29. CONSTRUCT CURB OPENING CATCH BASIN PER CITY OF RC. STD. DWG. NO. 300 (SEE SHT. 9 FOR DETAIL)
29A. CONSTRUCT MONOLITHIC CURB OPENING CATCH BASIN WITH CULVERT CONNECTION (SEE SHT. 9 FOR DETAIL)
30. CONSTRUCT LOCAL DEPRESSION PER CITY OF R.C. STD. DWG. NO. 307, CASE A.
31. CONSTRUCT CATCH BASIN 36" DIA. CONNECTOR PER CITY OF R.C. STD. DWG. NO. 308.
32. FILL AND GRADE TO DRAIN CREATE FLOW LINE 2% MIN. TOWARDS C.B. PER AS SHOWN ON PLAN AND DETAILS.
33. REMOVE PORTION OF EXIST. CONCRETE PAVEMENT
34. CONSTRUCT 8" A.C. BERM.
35. SAWCUT EXIST. PAVEMENT (AC OR PCC)
36. CONSTRUCT 6" PCC PAVEMENT OVER COMPACTED NATIVE PER PLAN
37. RELOCATE AND REINSTALL EXISTING WROUGHT IRON GATE AND FENCE.
38. REMOVE PORTION OF CHAINLINK FENCE.
38A. REMOVE AND RELOCATE HOSE BIB AND WATER LINE 12' MAX FROM EXIST
38B. REMOVE AND RELOCATE CHAIN LINK ROLLING GATE
39. REMOVE / FILL EXISTING MANHOLE
40. CONSTRUCT RETAINING CURB PER CITY STD. DWG. 104. AND PER DETAILS ON SHEET 7
40A. CONSTRUCT RETAINING WALL TYPE "A" (16" CF) PER DETAIL ON SHT. 8
41. CONSTRUCT A.C. DRIVEWAY 5" THICK OVER COMPACTED NATIVE LENGTH AND WIDTH PER PLAN.
42. REMOVE AND REPLACE EXISTING C.L. FENCH AND GATE IN LIKE AND KIIND.
43. INSTALL 48" DIA. R.C.P. (1750 D) STORM DRAIN, PER PLAN (SEE SHT. 10 FOR DETAIL)
44. INSTALL 36" DIA. R.C.P. (1750 D) STORM DRAIN, PER PLAN (SEE SHT. 10 FOR DETAILS)
45. CONSTRUCT CURB OPENING CATCH BASIN PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 300. (SEE SHT. 10 FOR DETAILS)
46. CONSTRUCT MONOLITHIC CATCH BASIN CONNECTION PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 308.
47. CONSTRUCT LOCAL DEPRESSION PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 307, CASE A.
47A. CONSTRUCT LOCAL DEPRESSION CASE PEIR CITY OF RC STD. DWG. NO. 307 CASE "B"
48. REMOVE EXIST. CMP INLET AND 18" CMP LINE AND REINSTALL TEMPORARY CMP CATCH BASIN PER CITY OF RC STANDARD DRAWING NO. 311 AND PER DETAIL ON SHT. 10
49. CONSTRUCT JUNCTION STRUCTURE NO. 2 PER CITY OF RANCHO CUCAMONNGA STANDARD DRAWING NO. 331.
50. INSTALL 12"ø DIA. SCH. 80 PVC DRAIN PIPE INCLUDING CLEAN OUTS (SEE SHT. 3 AND 10) FOR TIE-IN LOCATIONS AND DETAILS

REGISTERED PROFESSIONAL ENGINEER — JASON C. WELDAY — No. 67514 — Exp. 06-30-17 — CIVIL — STATE OF CALIFORNIA

REF. XING:
CPUC XING NO. 101 SG-39.6
DOT XING NO. 026164R

Underground Service Alert
CALL BEFORE YOU DIG
Call: TOLL FREE
1-800 422-4133
TWO WORKING DAYS BEFORE YOU DIG

FILE: 800-2016-06

DESCRIPTION OF REVISION	DATE	CITY APPROVED:

CITY OF RANCHO CUCAMONGA

TITLE SHEET

HELLMAN AVENUE AND 8TH STREET WIDENING AND AT GRADE CROSSING IMPROVEMENT PROJECT

APPROVED BY: CITY ENGINEER
DATE: 3/7/17
RCE: 67514

DESIGN	RD-1
DRAWN	RD-1
CHECKED	RD2

PLAN PREPARED BY:
CITY OF RANCHO CUCAMONGA
10500 CIVIC CENTER DRIVE
RANCHO CUCAMONGA, CA 91730

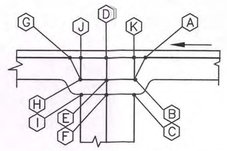
RECOMMENDED
SHEET 1 OF 14
DRAWING NO. 2420

PROJECT SHEET NO. 1 OF 16

BENCHMARK

FD. 1" ROUND HEAD BOLT IN CONC. CURB STAMPED "SB CO BM 01691" AT SOUTHEAST CORNER OF FOOTHILL BLVD. AND HELLMAN AVE., 1 FT. WEST OF END OF CURB RETURN.

ELEV: 1203.623



DRIVEWAY ELEV. DIAGRAM

STA. 7+35.39

DRIVEWAY NO. 3		
POINT	ELEV.	REMARKS:
A	87.12	TX @upstr
B	87.13	F/SW @upstr
C	87.21	B/SW @upstr
D	85.73	LIP @mid
E	86.45	F/SW @mid
F	86.53	B/SW @mid
G	85.56	TX @dwnstr
H	85.78	F/SW @dwnstr
I	85.86	B/SW @upstr
J	85.06	LIP @dwnstr
K	86.41	LIP @upstr

STA. 6+42.30

DRIVEWAY NO. 4		
POINT	ELEV.	REMARKS:
A	84.91	TX @upstr
B	84.97	F/SW @upstr
C	85.05	B/SW @upstr
D	84.14	LIP @mid
E	84.86	F/SW @mid
F	84.94	B/SW @mid
G	84.59	TX @dwnstr
H	84.75	F/SW @dwnstr
I	84.83	B/SW @upstr
J	84.03	LIP @dwnstr
K	84.25	LIP @upstr

STA. 5+49.28

DRIVEWAY NO. 5		
POINT	ELEV.	REMARKS:
A	83.62	TX @upstr
B	83.69	F/SW @upstr
C	83.77	B/SW @upstr
D	82.83	LIP @mid
E	83.55	F/SW @mid
F	83.63	B/SW @mid
G	83.26	TX @dwnstr
H	83.41	F/SW @dwnstr
I	83.49	B/SW @upstr
J	82.69	LIP @dwnstr
K	82.97	LIP @upstr

STA. 12+87.05

DRIVEWAY NO. 6		
POINT	ELEV.	REMARKS:
D	1098.28	LIP @mid
E	1099.06	F/SW @mid
F	1099.14	B/SW @mid

Curb Returns				
Curve #	Length	Radius	Delta	TANGENT
C12	74.96	50.00	85.90	46.55
C13	55.69	50.00	63.81	31.13
C14	55.41	35.00	90.71	35.43

REF. XING:
CPUC XING NO. 101 SG-39.6
DOT XING NO. 026164R

STREET IMPROVEMENT CONSTRUCTION NOTES:

(1) REMOVE EXIST. PAVEMENT AND CONSTRUCT 4" A.C. OVER 6" AGGREGATE BASE WITH 0.12' ARHM OVERLAY.
(1A) CONSTRUCT 4" A.C. OVER 4" AGGREGATE BASE.
(1B) 4' OF 0.12' COLD PLANE AND 0.12' ARHM OVERLAY.
(1C) 25' VARIABLE COLD PLANE (0.12'-0') AND 0.12' ARHM OVERLAY PER JOINT DETAIL ON SHT. 7
(2) CONSTRUCT 4" THICK PCC SIDEWALK, WIDTH PER PLAN, PER CITY STD. DWG. 101 AND 103.
(3) CONSTRUCT ACCESS RAMP PER CITY STD. NO. 102.
(4) CONSTRUCT 8" CURB & GUTTER (A2-8) PER CITY STD. DWG. NO. 104.
(4A) CONSTRUCT ROLLED CURB AND GUTTER PER CITY STD. NO. 105-A.
(4B) CONSTRUCT 10' LONG LIMITED ACCESS CURB PER STD. DWG. NO. 105-C
(5) REMOVE PORTION OF THE AFFECTED 6' WROUGHT IRON FENCE (MODIFY TO FIT)
(6) CONSTRUCT 6' HIGH MASONRY GARDEN WALL 8" THICK SPLIT FACE, DOUBLE SIDED WALL WITH CAP PER SPPWC (2012 EDITION) 801-4
(7) CONSTRUCT DRIVE APPROACH PER CITY STD. NO. 101 AND PER DETAIL.
(7A) CONSTRUCT DRIVE APPROACH TYPE C PER CITY STD. NO. 101.
(8) INSTALL STREET LIGHT 9500 LUMEN (INCLUDING CONDUITS, WIRINGS, PULLBOX AND PULL ROPE SEE SHT. 14)
(9) CONSTRUCT 8" PCC MEDIAN CURB PER PLAN AND PER STD. DETAIL 104 & 542 SHT 7.
(10) CONSTRUCT MODIFIED CURB RAMP PER CALTRANS STD. DETAILS A-88A CASE-C (GROOVE ELIMINATED)
(10A) INSTALL DETECTABLE WARNING SURFACE (RAISED TRUNCATED DOME PER CALTRANS STD. A88A
(11) INSTALL COBBLESTONES PER CITY STD. NO. 542. AND PER DETAILS
(12) RELOCATE AFFECTED POWER/COMM. POLE & GUY WIRE NECESSARY (BY OTHERS).
(13) REMOVE OR RELOCATE SIGNS.
(14) ADJUST TO GRADE (MH, VALVES, METER, P.C.C. BOX COVER SURVEY MONUMENTS, P.C.C. PAVEMENT AND OTHER APPURTENANCE.)
(14A) ADJUST / RELOCATE (BY OTHERS)
(15) REMOVE EXIST. SIGNS, A.C. PAVEMENT, RET. WALL & PCC CURB, GUTTER, SIDEWALK ETC.
(17) REMOVE AND REPLACE EXISTING MAIL BOX WITH GIBRALTAR PEDESTAL MAILBOX SEE DETAIL SEE SETAIL ON SHEET 8 COMPLETE IN PLACE.
(18) REMOVE TREE.
(18A) REMOVE SHRUBS AND PLANTS
(20) PROTECT IN PLACE
(21) REMOVE EXIST. PAVEMENT.
(22) GRADE DIRT TO MATCH PROPOSED GRADE, (3:1 MAX)
(23) REMOVE BERM
(24) REMOVE EXIST. WOOD FENCE
(25) CUT REMOVE OBSTRUCTING WALLS, POST OR PILLARS
(25A) CONSTRUCT 24"X24" CONC PILLAR PER DETAIL ON SHT.8
(27) REMOVE EXIST. RET. WALL (6"-36" HIGH)
(28) PLUG EXIST 18" PIPE WITH BRICK AND MORTAR PER SBCFCD STD PLAN 176A
(33) REMOVE PORTION OF EXIST. CONCRETE PAVEMENT (DRIVEWAY OR SIDEWALK)
(35) SAWCUT EXIST. PAVEMENT (AC OR PCC)
(36) CONSTRUCT 6" PCC PAVEMENT OVER COMPACTED NATIVE AND MATCH EXISTING GRADE
(37) RELOCATE WROUGHT IRON GATE.
(38) REMOVE PORTION OF CHAINLINK FENCE.
(38A) REMOVE AND RELOCATE HOSE BIB AND WATER LINE 12' MAX FROM EXIST
(38B) REMOVE AND RELOCATE CHAIN LINK ROLLING GATE
(39) REMOVE DRAINAGE STRUCTURE.
(40) CONSTRUCT RETAINING CURB PER CITY STD. DWG. 104. AND OR PER DETAILS ON SHEET 7
(40A) CONSTRUCT RETAINING WALL TYPE "A" (16" CF) PER DETAIL ON SHT. 8
(43) INSTALL 48" DIA. R.C.P. (1750 D) STORM DRAIN, PER PLAN (SEE SHT. 10 FOR DETAIL)
(44) INSTALL 36" DIA. R.C.P. (1750 D) STORM DRAIN, PER PLAN (SEE SHT. 10 FOR DETAILS)
(48) REMOVE EXIST. CMP INLET AND 18" CMP LINE AND REINSTALL TEMPORARY CMP CATCH BASIN PER CITY OF RC STANDARD DRAWING NO. 311 AND PER DETAIL ON SHT. 10
(50) INSTALL 12"ø DIA. SCH. 80 PVC DRAIN PIPE INCLUDING CLEAN OUTS (SEE SHT. 10 FOR DETAILS)
(53) INSTALL NEW 6' CHAIN LINK FENCE IN LIKE AND KIND (AFTER CONSTRUCTION)
(54) CONNECT LATERAL PIPE TO EXIST 36"/48" DIA. STUB OUT. (POT HOLE AND FIELD LOCATE)
(55) INSTALL INSTALL 24" CMP PIPE (SEE SHT 10 FOR DETAIL)
(56) CONSTRUCT PCC DRAIN STRUCTURE WITH FRAME AND GRATE INLET BY GRATING PACIFIC 12'X16" THP8BEZ OR EQUAL (SEE SHT 10 PER DETAIL)
(57) PLUG PIPE WITH MORTAR AND BRICK PER SBCFCD STD. DWG. SP 176 TYPE "B" (SEE SHT.10)
(57A) INSTALL 6" DIA. CLEAN OUT INCLUDING 6" PVC SCH. 80 PIPE AND COVER (NDS 8"X8" STRUCTURAL FOAM POLYOTEFIN GRATE) COMPLETE IN PLACE SEE SHEET 10 FOR DETAIL.

SEE SD DETAILED PLAN ON SHT. 10

SEE DETAILED AT-GRADE IMPROVEMENT ON SHT. 7, 11 & 12

SCALE: 1"=40'

LEGEND:

4" A.C. OVER 6" AGGREGATE BASE AND 0.12' ARHM OVERLAY

COLD PLANE (0-0.12') AND 0.12' ARHM OVERLAY

NOTE: CONCRETE PANELS AND RAILROAD GATES SHALL BE INSTALLED BY SCRRA

REGISTERED PROFESSIONAL ENGINEER
JASON C. WELDAY
No. 67514
Exp. 05-30-17
CIVIL
STATE OF CALIFORNIA

DESCRIPTION OF REVISION	DATE	CITY APPROVED:

CITY OF RANCHO CUCAMONGA

PLAN PROFILE

HELLMAN AVENUE AND 8TH STREET WIDENING AND AT GRADE CROSSING IMPROVEMENT PROJECT

APPROVED BY: CITY ENGINEER

DATE: 3/7/17
RCE: 67514

DESIGN	RD1
DRAWN	RD1
CHECKED	RD2

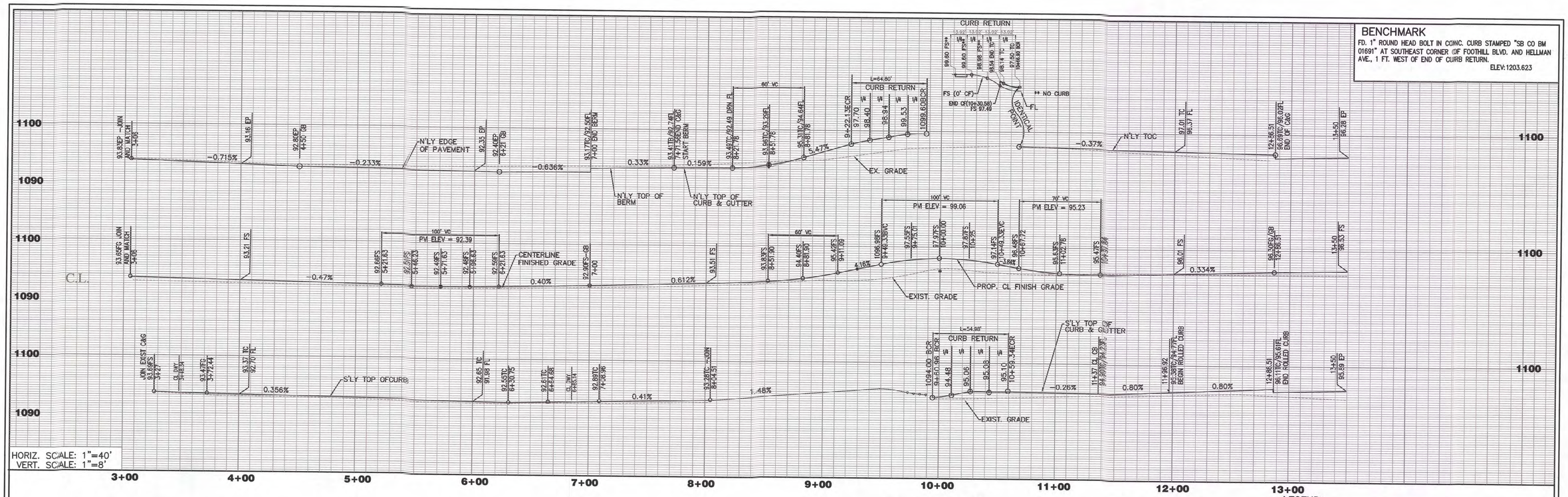
PLAN PREPARED BY:
CITY OF RANCHO CUCAMONGA
10500 CIVIC CENTER DRIVE
RANCHO CUCAMONGA, CA 91730

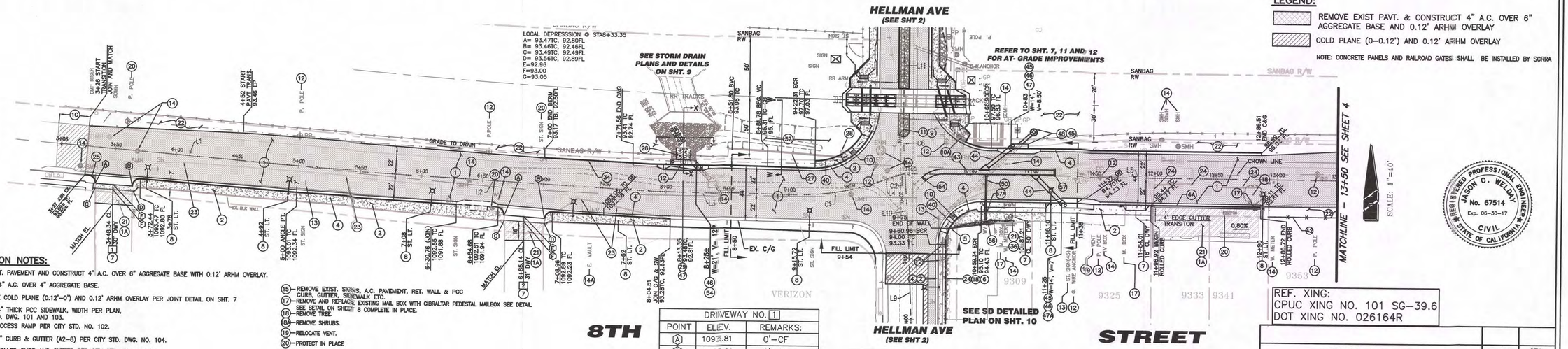
RECOMMENDED:

SHEET 2 OF 14

DRAWING NO. 2420

PROJECT SHEET NO. 3 OF 16





CONSTRUICTION NOTES:

1. REMOVE EXIST. PAVEMENT AND CONSTRUCT 4" A.C. OVER 6" AGGREGATE BASE WITH 0.12' ARHM OVERLAY.
1A. CONSTRUCT 4" A.C. OVER 4" AGGREGATE BASE.
1C. 25' VARIABLE COLD PLANE (0.12'–0') AND 0.12' ARHM OVERLAY PER JOINT DETAIL ON SHT. 7
2. CONSTRUICT 4" THICK PCC SIDEWALK, WIDTH PER PLAN, PER CITY STD. DWG. 101 AND 103.
3. CONSTRUICT ACCESS RAMP PER CITY STD. NO. 102.
4. CONSTRUICT 8" CURB & GUTTER (A2–8) PER CITY STD. DWG. NO. 104.
4A. CONSTRUICT ROLLED CURB AND GUTTER PER CITY STD. NO. 105–A.
4B. CONSTRUICT 10' LONG LIMITED ACCESS CURB PER STD. DWG. NO. 105–C
5. REMOVE (PORTION OF THE AFFECTED 6' WROUGHT IRON FENCE (MODIFY TO FIT)
6. CONSTRUICT 6' HIGH MASONRY GARDEN WALL 8" THICK SPLIT FACE, DOUBLE SIDED WALL WITH CAP PER SPPWC (2012 EDITION) 601–4
7. CONSTRUICT DRIVE APPROACH PER CITY STD. NO. 101 AND PER DETAIL.
7A. CONSTRUICT DRIVE APPROACH TYPE C PER CITY STD. NO. 101.
8. INSTALL STREET LIGHT 9500 LUMEN (INCLUDING CONDUITS, WIRINGS, PULLBOX AND PULL ROPE SEE SHT. 14)
9. CONSTRUICT 8" PCC MEDIAN CURB PER PLAN AND PER STD. DETAIL 104 & 542 SHT 7.
10. CONSTRUICT MODIFIED CURB RAMP PER CALTRANS STD. DETAILS A–88A CASE–C (GROOVE ELIMINATED)
10A. INSTALL DETECTABLE WARNING SURFACE (RAISED TRUNCATED DOME) PER CALTRANS STD. A88A
11. INSTALL COBBLESTONES PER CITY STD. NO. 542. AND PER DETAILS
12. RELOCATE AFFECTED POWER/COMM. POLE & GUY WIRE NECESSARY (BY OTHERS).
13. REMOVE OR RELOCATE SIGNS.
14. ADJUST TO GRADE (MH, VALVES, METER, P.C.C. BOX COVER SURVEY MONUMENTS, P.C.C. PAVEMENT AND OTHER APPURTENANCE.)
14A. ADJUST OR RELOCATE (BY OTHERS)
15. REMOVE EXIST. SIGNS, A.C. PAVEMENT, RET. WALL & PCC CURB, GUTTER, SIDEWALK ETC.
17. REMOVE AND REPLACE EXISTING MAIL BOX WITH GIBRALTAR PEDESTAL MAILBOX SEE DETAIL SEE SETAIL ON SHEET 8 COMPLETE IN PLACE.
18. REMOVE TREE.
18A. REMOVE SHRUBS.
19. RELOCATE VENT.
20. PROTECT IN PLACE
21. REMOVE EXIST. PAVEMENT.
22. GRADE DIRT TO MATCH PROPOSED GRADE, (3:1 MAX)
23. REMOVE BERM
24. REMOVE EXIST. WOOD FENCE
25. CUT REMOVE OBSTRUCTING WALL
26. CONSTRUCT BOX CULVERT (1.5'D X 10'W X 10'L) CONNECTION BEHIND C.B. PER DETAIL ON SHT. 9
27. REMOVE EXIST. RET. WALL (6"–36" HIGH)
28. PLUG EXIST. 18" PIPE WITH BRICK AND MORTAR PER SBCFCD 176A.
29. CONSTRUCT CURB OPENING CATCH BASIN PER CITY OF RC. STD. DWG. NO. 300 (SEE SHT. 9 FOR DETAIL)
29A. CONSTRUCT MONOLITHIC CURB OPENING CATCH BASIN WITH CULVERT CONNECTION (SEE SHT. 9 FOR DETAIL)
30. CONSTRUCT LOCAL DEPRESSION PER CITY OF R.C. STD. DWG. NO. 307, CASE A.
32. FILL AND GRADE TO DRAIN CREATE FLOW LINE 2% MIN. TOWARDS C.B. PER AS SHOWN ON PLAN AND DETAILS.
34. CONSTRUICT 8" A.C. BERM
36. CONSTRUICT 6" PCC PAVEMENT OVER COMPACTED NATIVE PER PLAN
40. CONSTRUCT RETAINING CURB PER CITY STD. DWG. 104. AND PER DETAILS ON SHEET 7
42. REMOVE AND REPLACE EXISTING C.L. FENCH AND GATE IN LIKE AND KIND.
43. INSTALL 48" DIA. R.C.P. (1750 D) STORM DRAIN, PER PLAN (SEE SHT. 10 FOR DETAIL)
44. INSTALL 36" DIA. R.C.P. (1750 D) STORM DRAIN, PER PLAN (SEE SHT. 10 FOR DETAILS)
45. CONSTRUCT CURB OPENING CATCH BASIN PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 300. (SEE SHT. 10 FOR DETAILS)
46. CONSTRUCT MONOLITHIC CATCH BASIN CONNECTION PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 308.
47. CONSTRUCT LOCAL DEPRESSION PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 307, CASE A.
47A. CONSTRUCT LOCAL DEPRESSION PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 307, CASE A. (SEE ELEV. HEREIN)
48. REMOVE EXIST. CMP INLET AND 18" CMP LINE AND REINSTALL TEMPORARY CMP CATCH BASIN PER CITY OF RC STANDARD DRAWING NO. 311 AND PER DETAIL ON SHT. 10
50. INSTALL 12"ø DIA. SCH. 80 PVC DRAIN PIPE INCLUDING CLEAN OUTS (SEE SHT. 3 AND 10) FOR TIE–IN LOCATIONS AND DETAILS
54. CONNECT LATERAL PIPE TO EXIST 48" DIA. STUB OUT. (POT HOLE AND FIELD LOCATE)
57A. NSTALL 6" DIA. CLEAN OUT INCLUDING 6" PVC SCH. 80 PIPE AND COVER (NDS 8"X8" STRUCTURAL FOAM POLYOTE/FIN GRATE) COMPLETE IN PLACE SEE SHEET 10 FOR DETAIL.

DRIVEWAY NO. 1		
POINT	ELEV.	REMARKS:
A	1093.81	0'–CF
B	1093.61	0'–CF
C	1093.88	EDGE S/W
D	1093.70	EDGE S/W
E	1093.72	MID F/SW
F	1093.80	MID B/SW

DRIVEWAY NO. 2		
POINT	ELEV.	REMARKS:
A	1092.82	0'–CF
B	1093.02	0'–CF
C	1092.90	EDGE S/W
D	1093.10	EDGE S/W
E	1092.92	MID F/SW
F	1093.00	MID B/SW

LINE TABLE (8TH ST EP) — NORTH SIDE

Line #/Curve #	Length	Bearing/Delta	Radius
L20	200.22	N87° 20' 28.01"E	
L21	154.75	S89° 29' 31.45"E	

LINE AND CURVE TABLE (8TH ST. EP) — SOUTH SIDE

Line #/Curve #	Length	Bearing/Delta	Radius
C21	87.03	8.02	622.00
L23	112.45	N89° 35' 02.18"W	
C22	82.00	8.13	578.00
L22	86.08	N89° 51' 27.88"W	

LEGEND:
- REMOVE EXIST PAVT. & CONSTRUCT 4" A.C. OVER 6" AGGREGATE BASE AND 0.12' ARHM OVERLAY
- COLD PLANE (0–0.12') AND 0.12' ARHM OVERLAY

NOTE: CONCRETE PANELS AND RAILROAD GATES SHALL BE INSTALLED BY SCRRA

REF. XING:
CPUC XING NO. 101 SG–39.6
DOT XING NO. 026164R

DESCRIPTION OF REVISION	DATE	CITY APPROVED:

CITY OF RANCHO CUCAMONGA

PLAN & PROFILE

HELLMAN AVENUE AND 8TH STREET WIDENING AND AT GRADE CROSSING IMPROVEMENT PROJECT

APPROVED BY: CITY ENGINEER — DATE: 3/7/17 RCE: 67514

REGISTERED PROFESSIONAL ENGINEER JASON C. WELDY No. 67514 Exp. 06–30–17 CIVIL STATE OF CALIFORNIA

DESIGN: RD1 | DRAWN: RD1 | CHECKED: RD2

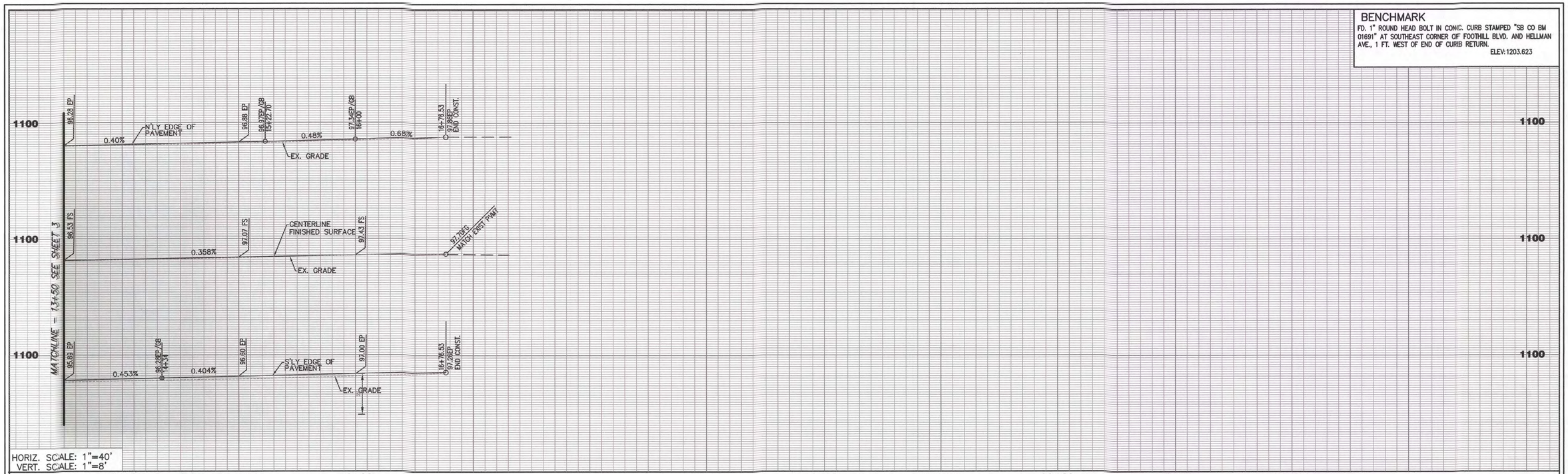
PLAN PREPARED: CITY OF RANCHO CUCAMONGA, 10500 CIVIC CENTER DRIVE, RANCHO CUCAMONGA, CA 91730

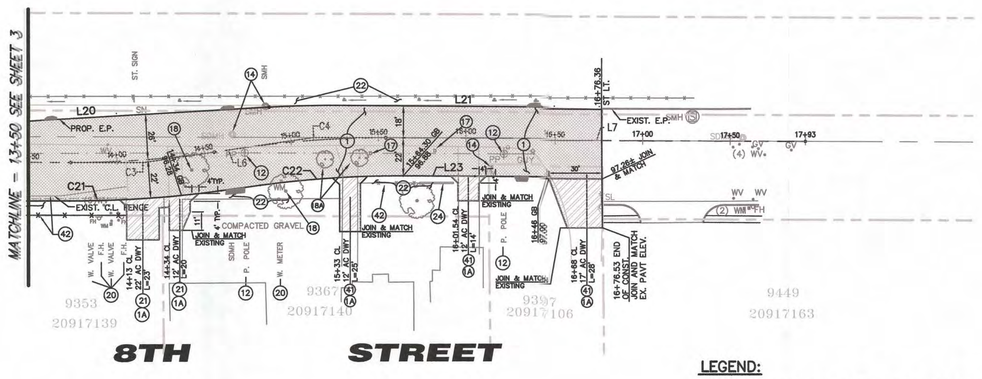
RECOMMENDED

SHEET 3 OF 14

DRAWING NO. 2420

PROJECT SHEET NO. 4 OF 16





8TH ST. REF. CL (CROWN LINE)					
Number	Length	Line/Chord Direction	Radius	DELTA	TANGENT
L1	209.342	S85° 07' 07.17"E			
L2	271.212	S86° 44' 45.23"E			
L3	113.163	S88° 52' 37.36"E			
C1	73.711	N81° 35' 51.22"E	196.184	021.5273	37.295
L4	15.976	N69° 52' 01.73"E			
C2	10.212	N79° 44' 23.69"E	28.482	020.5426	5.161
L5	374.283	S89° 43' 34.20"E			
C3	82.209	N85° 59' 30.50"E	550.000	008.5641	41.181
L6	16.153	N81° 42' 35.21"E			
C4	82.180	N85° 59' 25.10"E	550.000	008.5611	41.167
L7	238.817	S89° 43' 45.00"E			

HELLMAN AVE. REF. CL (CROWN LINE)					
Number	Length	Line/Chord Direction	Radius	DELTA	TANGENT
L8	560.889	N00° 22' 20.41"W			
C5	6.720	N01° 20' 06.84"W	199.945	001.9258	3.361
L9	64.642	N02° 17' 53.27"W			
L10	64.138	N03° 36' 03.76"W			
C6	30.835	N01° 50' 03.56"W	500.000	003.5334	15.422
L11	97.838	N00° 04' 03.36"W			
L12	681.672	N00° 03' 45.68"W			

SCALE: 1"=40'

STREET IMPROVEMENT CONSTRUCTION NOTES:

(1) REMOVE EXIST. PAVEMENT AND CONSTRUCT 4" A.C. OVER 6" AGGREGATE BASE WITH 0.12' ARHM OVERLAY.
(1A) CONSTRUCT 4" A.C. OVER 4" AGGREGATE BASE.
(12) RELOCATE AFFECTED POWER/COMM. POLE & GUY WIRE NECESSARY (BY OTHERS).
(14) ADJUST TO GRADE (MH, VALVES, METER, P.C.C. BOX COVER SURVEY MONUMENTS, P.C.C. PAVEMENT AND OTHER APPURTENANCE.)
(17) REMOVE AND REPLACE EXISTING MAIL BOX WITH GIBRALTAR PEDESTAL MAILBOX SEE DETAIL SEE SETAIL ON SHEET 8 COMPLETE IN PLACE.
(18) REMOVE TREE. INCLUDING ROOTS 24" MIN. BELOW GRADE.
(18A) REMOVE SHRUBS AND PLANTS
(20) PROTECT IN PLACE
(21) REMOVE EXIST. PAVEMENT.
(22) GRADE DIRT TO MATCH PROPOSED GRADE, (3:1 MAX)
(24) REMOVE EXIST. RET. WOOD FENCE
(41) CONSTRUCT A.C. DRIVEWAY 5" THICK OVER COMPACTED NATIVE LENGTH AND WIDTH PER PLAN.
(42) REMOVE EXISTING C.L. FENCE AND GATE AND REPLACE EX. C.L. FENCE AND GATE IN LIKE AND KIND. (NOTE: OLD GATE SHALL BE DELIVERED TO THE OWNER AS REQUESTED)

LEGEND:

4" A.C. OVER 6" AGGREGATE BASE AND 0.12' ARHM OVERLAY (SEE PAVING DETAIL SHT-1)

REMOVE EXIST AC AND CONST. 4" AC OVER 4" CAB

LINE TABLE (8TH ST EP) NORTH SIDE			
Line #/Curve #	Length	Bearing/Delta	Radius
L20	200.22	N87° 20' 28.01"E	
L21	154.75	S89° 29' 31.45"E	

LINE AND CURVE TABLE (8TH ST. EP) SOUTH SIDE			
Line #/Curve #	Length	Bearing/Delta	Radius
C21	87.03	8.02	622.00
L23	112.45	N89° 35' 02.18"W	
C22	82.00	8.13	578.00
L22	86.08	N89° 51' 27.88"W	

REGISTERED PROFESSIONAL ENGINEER
JASON C. WELDAY
No. 67514
Exp. 06-30-17
CIVIL
STATE OF CALIFORNIA

REF. XING:
CPUC XING NO. 101 SG-39.6
DOT XING NO. 026164R

DESCRIPTION OF REVISION	DATE	CITY APPROVED:

CITY OF RANCHO CUCAMONGA

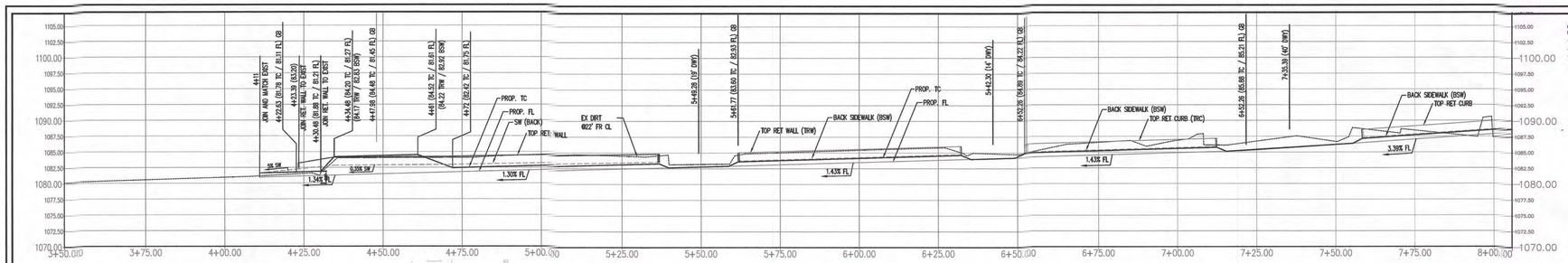
PLAN & PROFILE

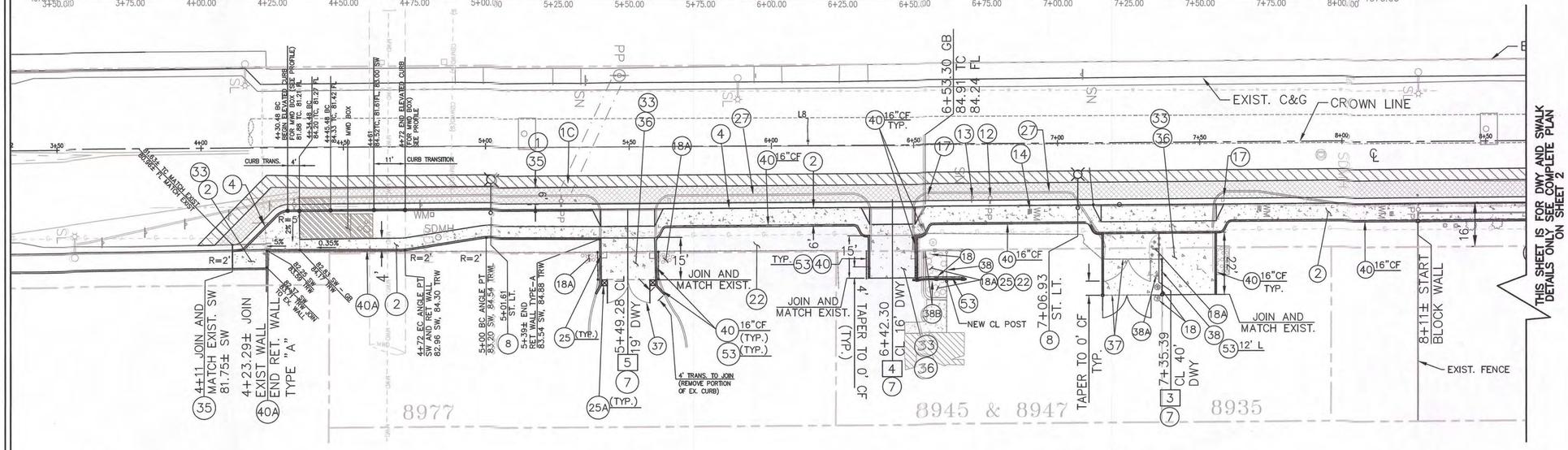
HELLMAN AVENUE AND 8TH STREET WIDENING AND AT GRADE CROSSING IMPROVEMENT PROJECT

APPROVED BY: CITY ENGINEER
DATE: 3/7/17
RCE: 67514

DESIGN	PLAN PREPARED BY:	RECOMMENDED
RD1	CITY OF RANCHO CUCAMONGA 10500 CIVIC CENTER DRIVE RANCHO CUCAMONGA, CA 91730	
DRAWN: RD1		SHEET: 4 OF 14
CHECKED: RD2		DRAWING NO. 2420

PROJECT SHEET NO. 5 OF 16

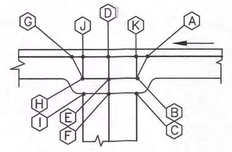




BENCHMARK

FD. 1" ROUND HEAD BOLT IN CONC. CURB STAMPED "SB CO BM 01691" AT SOUTHEAST CORNER OF FOOTHILL BLVD. AND HELLMAN AVE., 1 FT. WEST OF END OF CURB RETURN.

ELEV: 1203.623



DRIVEWAY ELEV. DIAGRAM

STA. 7+35.39

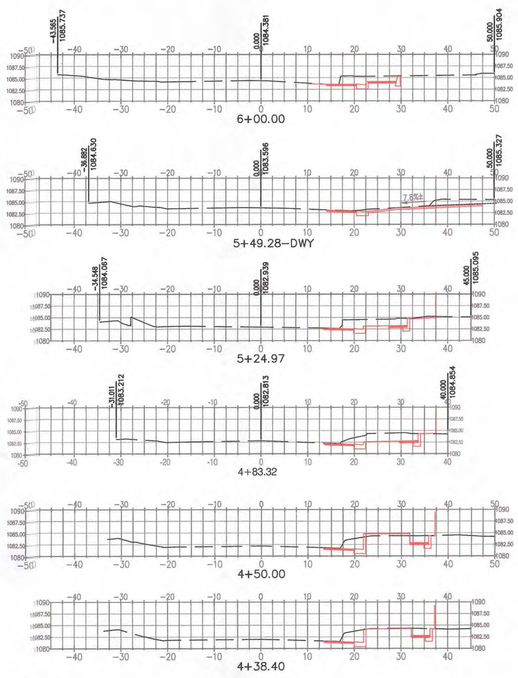
DRIVEWAY NO. 3		
POINT	ELEV.	REMARKS:
A	87.12	TX @upstr
B	87.13	F/SW @upstr
C	87.21	B/SW @upstr
D	85.73	LIP @mid
E	86.45	F/SW @mid
F	86.53	B/SW @mid
G	85.56	TX @dwnstr
H	85.78	F/SW @dwnstr
I	85.86	B/SW @upstr
J	85.06	LIP @dwnstr
K	86.41	LIP @upstr

STA. 6+42.30

DRIVEWAY NO. 4		
POINT	ELEV.	REMARKS:
A	84.91	TX @upstr
B	84.97	F/SW @upstr
C	85.05	B/SW @upstr
D	84.14	LIP @mid
E	84.86	F/SW @mid
F	84.94	B/SW @mid
G	84.59	TX @dwnstr
H	84.75	F/SW @dwnstr
I	84.83	B/SW @upstr
J	84.03	LIP @dwnstr
K	84.25	LIP @upstr

STA. 5+49.28

DRIVEWAY NO. 5		
POINT	ELEV.	REMARKS:
A	83.62	TX @upstr
B	83.69	F/SW @upstr
C	83.77	B/SW @upstr
D	82.83	LIP @mid
E	83.55	F/SW @mid
F	83.63	B/SW @mid
G	83.26	TX @dwnstr
H	83.41	F/SW @dwnstr
I	83.49	B/SW @upstr
J	82.69	LIP @dwnstr
K	82.97	LIP @upstr



SCALE:
H: 1"=15'
V: 1"=15'

CONSTRUCTION NOTES:

1. REMOVE EXIST. PAVEMENT AND CONSTRUCT 4" A.C. OVER 6" AGGREGATE BASE WITH 0.12' ARHM OVERLAY.
1C. 25' VARIABLE COLD PLANE (0.12'–0') AND 0.12' ARHM OVERLAY PER JOINT DETAIL ON SHT. 7
4. CONSTRUCT 8" CURB & GUTTER (A2–8) PER CITY STD. DWG. NO. 104.
2. CONSTRUCT 4" THICK PCC SIDEWALK, WIDTH PER PLAN, PER CITY STD. DWG. 101 AND 103.
7. CONSTRUCT DRIVE APPROACH PER CITY STD. NO. 101 AND PER DETAIL.
8. INSTALL STREET LIGHT 9500 LUMEN (INCLUDING CONDUITS, WIRINGS AND PULLBOX AND PULL ROPE SEE SHT 14)
12. RELOCATE AFFECTED POWER/COMM. POLE & GUY WIRE NECESSARY (BY OTHERS).
13. REMOVE OR RELOCATE SIGNS.
14. ADJUST TO GRADE (MH, VALVES, METER, P.C.C. BOX COVER SURVEY MONUMENTS, P.C.C. PAVEMENT AND OTHER APPURTENANCE.)
17. REMOVE AND REPLACE EXISTING MAIL BOX WITH GIBRALTAR PEDESTAL MAILBOX SEE DETAIL SEE SETAIL ON SHEET 8 COMPLETE IN PLACE.
18. REMOVE TREE.
18A. REMOVE SHRUBS AND PLANTS
22. GRADE DIRT TO MATCH PROPOSED GRADE, (3:1 MAX)
25. CUT REMOVE OBSTRUCTING WALLS, POST OR PILLARS
25A. CONSTRUCT 24"X24" CONC PILLAR PER DETAIL ON SHT.8
27. REMOVE EXIST. RET. WALL (8"–24"HIGH)
33. REMOVE PORTION OF EXIST. CONCRETE PAVEMENT
35. SAWCUT EXIST. PAVEMENT (AC OR PCC)
36. CONSTRUCT 6" PCC PAVEMENT OVER COMPACTED NATIVE PER PLAN
37. RELOCATE AND REINSTALL EXISTING WROUGHT IRON GATE AND FENCE.
38. REMOVE PORTION OF CHANILINK FENCE.
38A. REMOVE AND RELOCATE HOSE BIB AND WATER LINE 12' MAX FROM EXIST
38B. REMOVE AND RELOCATE CHAIN LINK ROLLING GATE
39. REMOVE / FILL EXISTING MANHOLE
40. CONSTRUCT RETAINING CURB PER CITY STD. DWG. 104. AND PER DETAILS ON SHEET 7
40A. CONSTRUCT RETAINING WALL TYPE "A" (16" CF) PER DETAIL ON SHT. 8
53. INSTALL NEW 6' CHAIN LINK FENCE IN LIKE AND KIND (AFTER CONSTRUCTION)

LEGEND:

4" A.C. OVER 6" AGGREGATE BASE AND 0.12' ARHM OVERLAY

COLD PLANE (0–0.12') AND 0.12' ARHM OVERLAY

NOTE: CONCRETE PANELS AND RAILROAD GATES SHALL BE INSTALLED BY SCRRA

REGISTERED PROFESSIONAL ENGINEER
JASON C. WELDAY
No. 67514
Exp. 06-30-17
CIVIL
STATE OF CALIFORNIA

REF. XING:
CPUC XING NO. 101 SG-39.6
DOT XING NO. 026164R

DESCRIPTION OF REVISION	DATE	CITY APPROVED:

CITY OF RANCHO CUCAMONGA

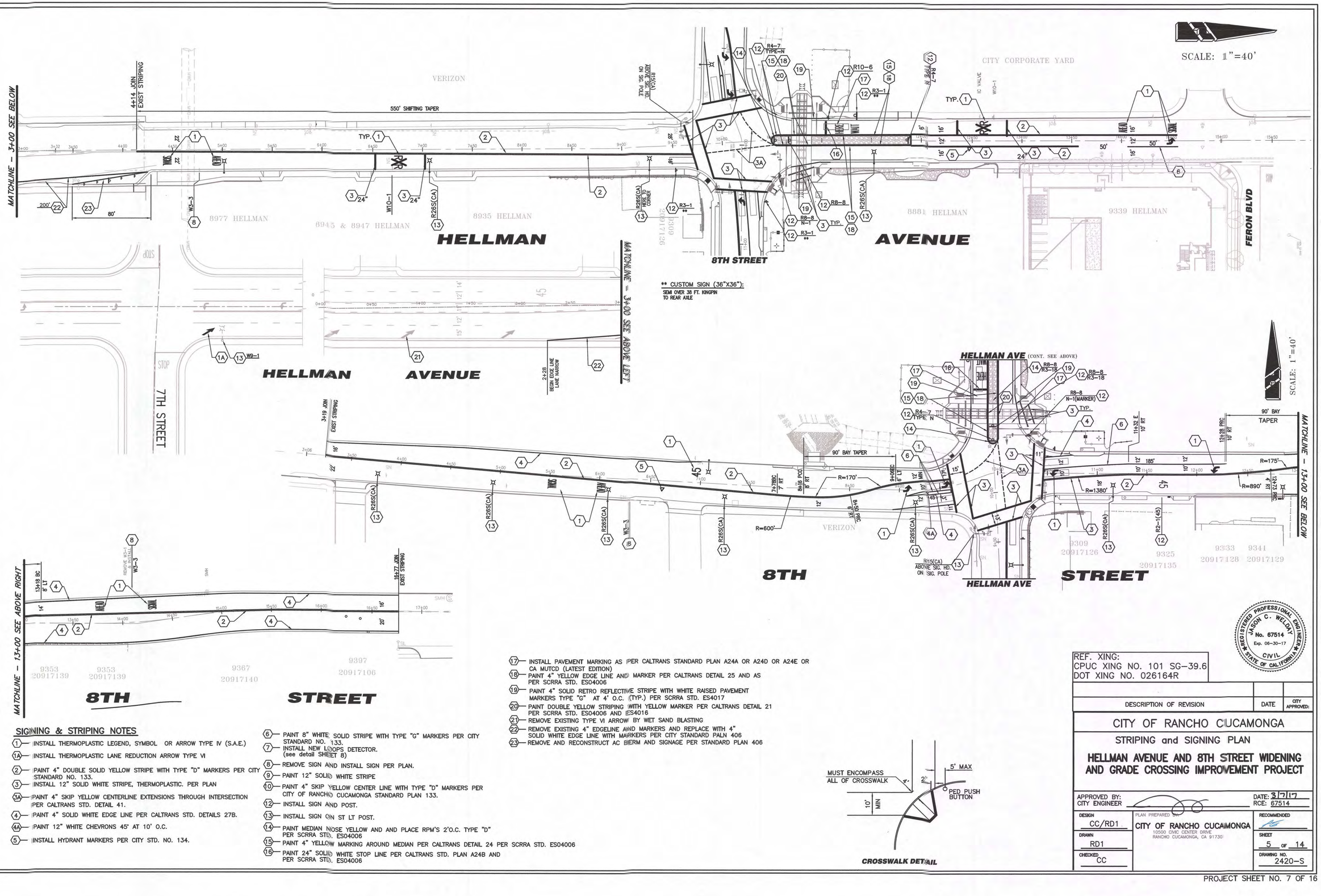
SIDEWALK AND DRIVEWAY DETAILS
(HELLMAN AVE. 4+00 TO 8+00)

HELLMAN AVENUE AND 8TH STREET WIDENING AND AT GRADE CROSSING IMPROVEMENT PROJECT

APPROVED BY: CITY ENGINEER

DATE: 3/7/17
RCE: 67514

DESIGN	PLAN PREPARED BY:	RECOMMENDED
RD1	CITY OF RANCHO CUCAMONGA 10500 CIVIC CENTER DRIVE RANCHO CUCAMONGA, CA 91730	
DRAWN: RD1		SHEET: 4A OF 14
CHECKED: RD2		DRAWING NO.: 2420



SIGNING & STRIPING NOTES

1. INSTALL THERMOPLASTIC LEGEND, SYMBOL OR ARROW TYPE IV (S.A.E.)
1A. INSTALL THERMOPLASTIC LANE REDUCTION ARROW TYPE VI
2. PAINT 4" DOUBLE SOLID YELLOW STRIPE WITH TYPE "D" MARKERS PER CITY STANDARD NO. 133.
3. INSTALL 12" SOLID WHITE STRIPE, THERMOPLASTIC. PER PLAN
3A. PAINT 4" SKIP YELLOW CENTERLINE EXTENSIONS THROUGH INTERSECTION PER CALTRANS STD. DETAIL 41.
4. PAINT 4" SOLID WHITE EDGE LINE PER CALTRANS STD. DETAILS 27B.
4A. PAINT 12" WHITE CHEVRONS 45' AT 10' O.C.
5. INSTALL HYDRANT MARKERS PER CITY STD. NO. 134.
6. PAINT 8" WHITE SOLID STRIPE WITH TYPE "G" MARKERS PER CITY STANDARD NO. 133.
7. INSTALL NEW LOOPS DETECTOR. (see detail SHEET 8)
8. REMOVE SIGN AND INSTALL SIGN PER PLAN.
9. PAINT 12" SOLID WHITE STRIPE
10. PAINT 4" SKIP YELLOW CENTER LINE WITH TYPE "D" MARKERS PER CITY OF RANCHO CUCAMONGA STANDARD PLAN 133.
12. INSTALL SIGN AND POST.
13. INSTALL SIGN ON ST LT POST.
14. PAINT MEDIAN NOSE YELLOW AND AND PLACE RPM'S 2'O.C. TYPE "D" PER SCRRA STD. ES04006
15. PAINT 4" YELLOW MARKING AROUND MEDIAN PER CALTRANS DETAIL 24 PER SCRRA STD. ES04006
16. PAINT 24" SOLID WHITE STOP LINE PER CALTRANS STD. PLAN A24B AND PER SCRRA STD. ES04006
17. INSTALL PAVEMENT MARKING AS PER CALTRANS STANDARD PLAN A24A OR A24D OR A24E OR CA MUTCD (LATEST EDITION)
18. PAINT 4" YELLOW EDGE LINE AND MARKER PER CALTRANS DETAIL 25 AND AS PER SCRRA STD. ES04006
19. PAINT 4" SOLID RETRO REFLECTIVE STRIPE WITH WHITE RAISED PAVEMENT MARKERS TYPE "G" AT 4' O.C. (TYP.) PER SCRRA STD. ES4017
20. PAINT DOUBLE YELLOW STRIPING WITH YELLOW MARKER PER CALTRANS DETAIL 21 PER SCRRA STD. ES04006 AND ES4016
21. REMOVE EXISTING TYPE VI ARROW BY WET SAND BLASTING
22. REMOVE EXISTING 4" EDGELINE AND MARKERS AND REPLACE WITH 4" SOLID WHITE EDGE LINE WITH MARKERS PER CITY STANDARD PALN 406
23. REMOVE AND RECONSTRUCT AC BERM AND SIGNAGE PER STANDARD PLAN 406

CROSSWALK DETAIL

REF. XING:
CPUC XING NO. 101 SG-39.6
DOT XING NO. 026164R

DESCRIPTION OF REVISION	DATE	CITY APPROVED:

CITY OF RANCHO CUCAMONGA

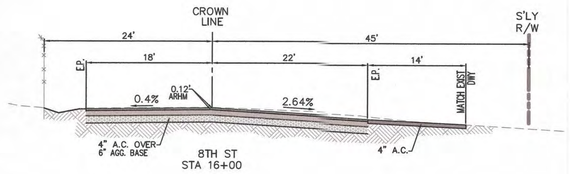
STRIPING and SIGNING PLAN

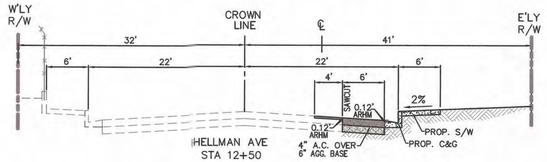
HELLMAN AVENUE AND 8TH STREET WIDENING AND GRADE CROSSING IMPROVEMENT PROJECT

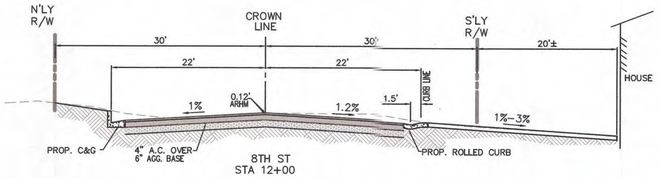
REGISTERED PROFESSIONAL ENGINEER – JASON C. WELDAY – No. 67514 – Exp. 06-30-17 – CIVIL – STATE OF CALIFORNIA

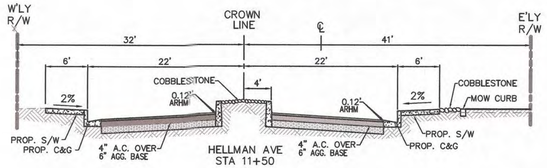
APPROVED BY: CITY ENGINEER — DATE: 3/7/17 — RCE: 67514

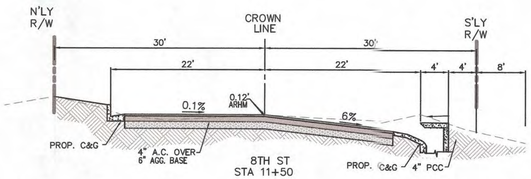
DESIGN	PLAN PREPARED BY	RECOMMENDED
CC/RD1	CITY OF RANCHO CUCAMONGA 10500 CIVIC CENTER DRIVE RANCHO CUCAMONGA, CA 91730	
DRAWN: RD1		SHEET: 5 OF 14
CHECKED: CC		DRAWING NO.: 2420-S

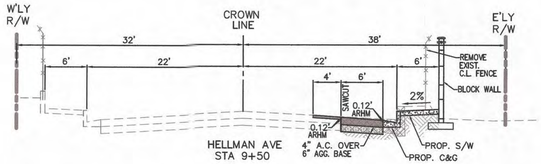


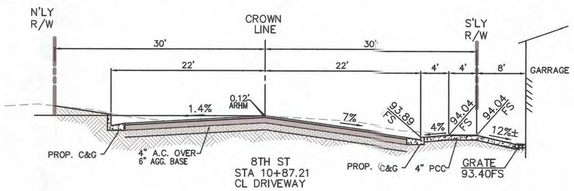


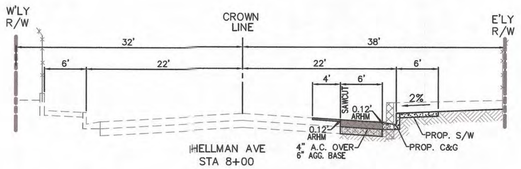


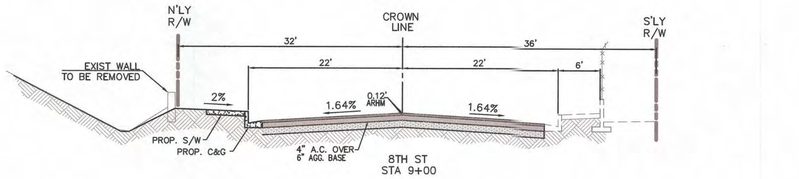


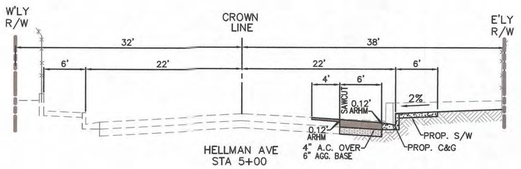


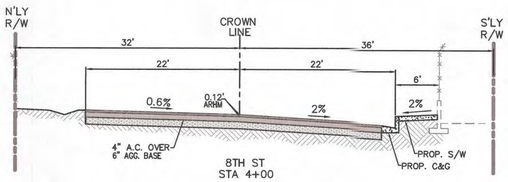












SCALE: H: 1"=10'
V: 1"=4'

REF. XING:
CPUC XING NO. 101 SG-39.6
DOT XING NO. 026164R

DESCRIPTION OF REVISION	DATE	CITY APPROVED:

CITY OF RANCHO CUCAMONGA

TYPICAL CROSS SECTIONS

HELLMAN AVENUE AND 8TH STREET WIDENING AND AT GRADE CROSSING IMPROVEMENT PROJECT

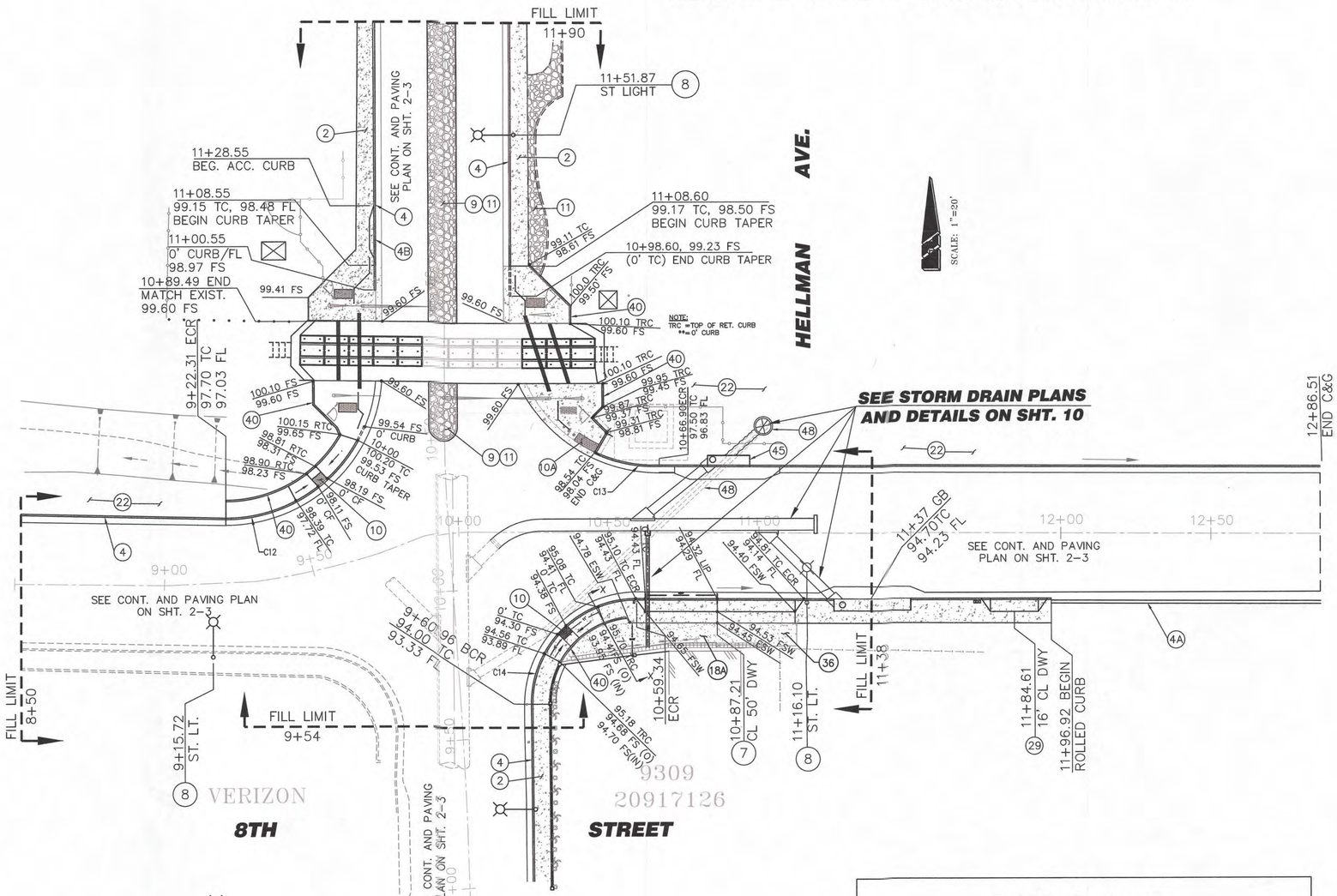
APPROVED BY: CITY ENGINEER
DATE: 3/7/17
RCE: 67514

DESIGN	PLAN PREPARED BY:	RECOMMENDED
RD-1	CITY OF RANCHO CUCAMONGA 10500 CIVIC CENTER DRIVE RANCHO CUCAMONGA, CA 91730	
DRAWN: RD-1		SHEET: 6 OF 14
CHECKED: RD2		DRAWING NO.: 2420

PROJECT SHEET NO. 8 OF 16

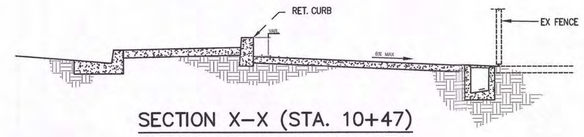
NOTE:

SEE SHEET 2 TO 3 FOR STREET AND STORM DRAIN IMPROVEMENTS AND SHEET 11 FOR THE AT GRADE CROSSING IMPROVEMENTS

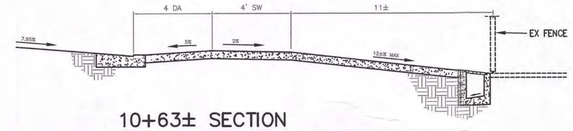


CONSTRUCTION NOTES:

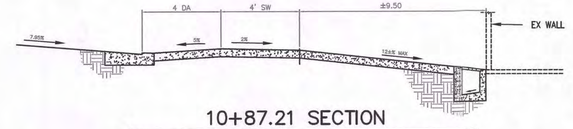
(2)—CONSTRUCT 4" THICK PCC SIDEWALK, WIDTH PER PLAN, PER CITY STD. DWG. 101 AND 103.
(4)—CONSTRUCT 8" CURB & GUTTER (A2-8) PER CITY STD. DWG. NO. 104.
(4A)—CONSTRUCT ROLLED CURB AND GUTTER PER CITY STD. NO. 105-A.
(4B)—CONSTRUCT 10' LONG LIMITED ACCESS CURB PER STD. DWG. NO. 105-C
(7)—CONSTRUCT DRIVE APPROACH PER CITY STD. NO. 101 AND PER DETAIL.
(8)—INSTALL STREET LIGHT 5800 LUMEN BY (SCE).
(9)—CONSTRUCT 8" PCC MEDIAN CURB PER PLAN AND PER STD. DETAIL 104 & 542 SHT 7.
(10)—CONSTRUCT MODIFIED CURB RAMP PER CALTRANS STD. DETAILS A-88A CASE-C (GROOVE ELIMINATED)
(DA)—INSTATALL DETECTABLE WARNING SURFACE (RAISED TRUNCATED DOME PER CALTRANS STD. A88A
(11)—INSTALL COBBLESTONES PER CITY STD. NO. 542.
(8A)—REMOVE SHRUBS.
(22)—GRADE DIRT TO MATCH PROPOSED (3:1 MAX)
(29)—CONSTRUCT CURB OPENING CATCH BASIN SEE SHT. 9 AND 10 FOR DETAIL
(36)—CONSTRUCT 6" PCC PAVEMENT AND MATCH EXISTING GRADE
(40)—CONSTRUCT RETAINING CURB PER CITY STD. DWG. 104. AND OR PER DETAIL
(45)—CONSTRUCT CURB OPENING CATCH BASIN PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 300.



SECTION X-X (STA. 10+47)
SE COR HELLMAN AND 8TH

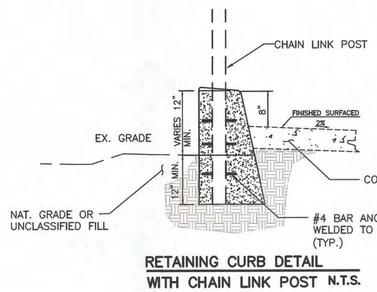


10+63± SECTION
AT DWY (SOUTH SIDE 8TH STREET)

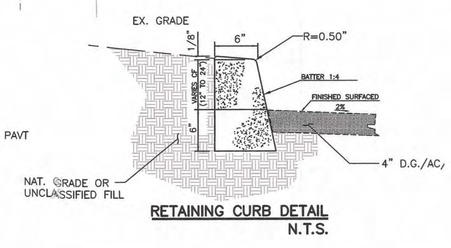


10+87.21 SECTION
CL DWY (SOUTH SIDE 8TH STREET)

CROSS SECTION
9309 8TH STREET



RETAINING CURB DETAIL
WITH CHAIN LINK POST N.T.S.



RETAINING CURB DETAIL
N.T.S.

Curb Returns				
Curve #	Length	Radius	Delta	TANGENT
C12	74.96	50.00	85.90	46.55
C13	55.69	50.00	63.81	31.13
C14	55.41	35.00	90.71	35.43

REGISTERED PROFESSIONAL ENGINEER
JASON C. WELDAY
No. 67514
Exp. 06-30-17
CIVIL
STATE OF CALIFORNIA

REF. XING:
CPUC XING NO. 101 SG-39.6
DOT XING NO. 026164R

Underground Service Alert
DIG ALERT
Call: TOLL FREE
1-800 422-4133
TWO WORKING DAYS BEFORE YOU DIG

FILE: 800-2016-06

DESCRIPTION OF REVISION	DATE	CITY APPROVED:

CITY OF RANCHO CUCAMONGA
CURB DETAILS AT GRADE CROSSINGS
HELLMAN AVENUE AND 8TH STREET WIDENING AND AT GRADE CROSSING IMPROVEMENT PROJECT

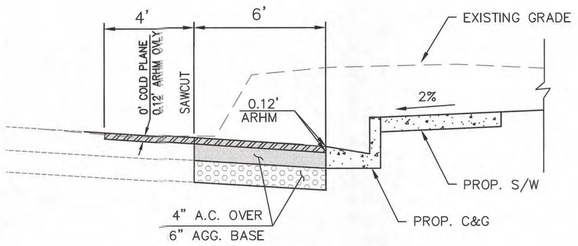
APPROVED BY: CITY ENGINEER
DATE: 3/17/17
RCE: 67514

DESIGN: RD-1
DRAWN: RD1
CHECKED: RD2

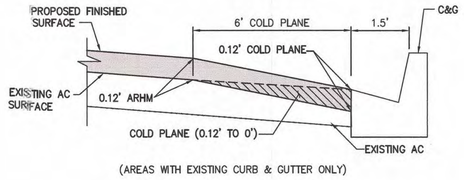
PLAN PREPARED BY:
CITY OF RANCHO CUCAMONGA
10500 CIVIC CENTER DRIVE
RANCHO CUCAMONGA, CA 91730

RECOMMENDED

SHEET 7 OF 14
DRAWING NO. 2420

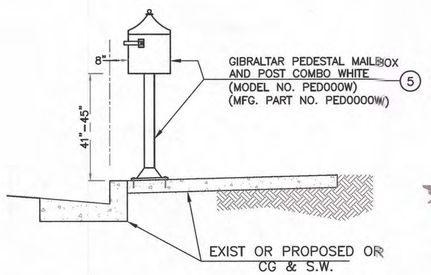


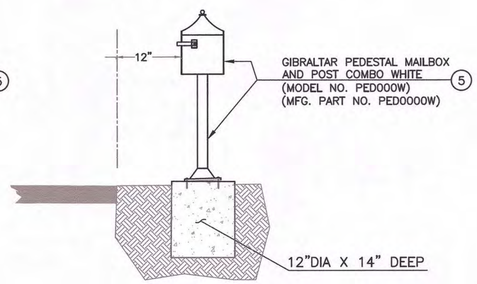
WIDENING AREA PAVING DETAIL
HELLMAN AVE STA. 4+50± TO 9+50± NTS



(AREAS WITH EXISTING CURB & GUTTER ONLY)

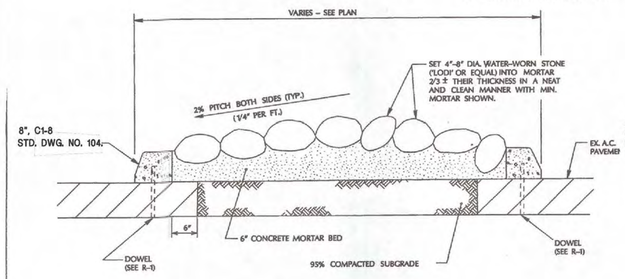
OVERLAY DETAIL ADJ. TO C&G
NTS





MAIL BOX PLACEMENT DETAILS
NTS

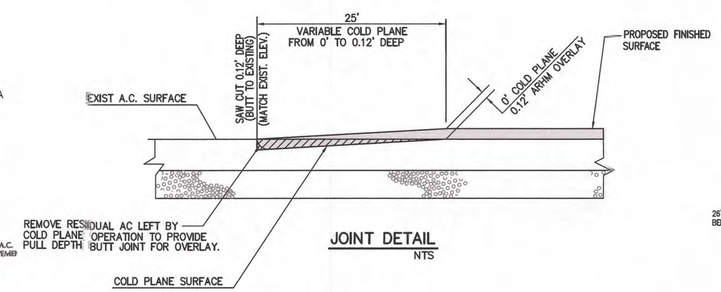
SEE DETAILS AND X-SECTIONS ON SHT. 4A



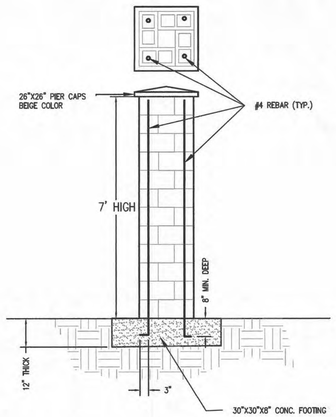
COBBLESTONE MEDIAN ISLAND
NTS

NOTE:

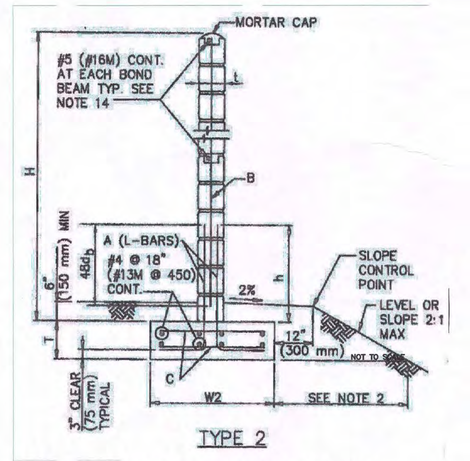
1. AFTER THE COBBLESTONE HAS BEEN SET INTO THE MORTAR, THE EXCESSIVE MORTAR IN BETWEEN THE JOINTS OF THE COBBLESTONES SHALL BE CAREFULLY REMOVED AND RAKED IN A SMOOTH JOINT (NO PROTRUSION OF MORTAR WILL BE ALLOWED).
2. SEAL FINAL SURFACE WITH WATER SEALER.



JOINT DETAIL
NTS

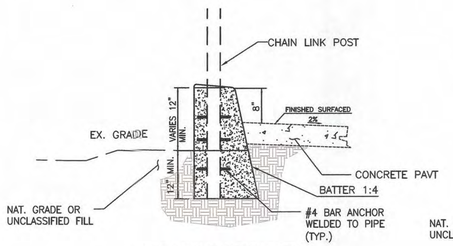


24"X24" CONC PILLAR
NTS

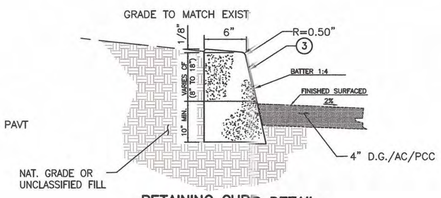


TYPE 2

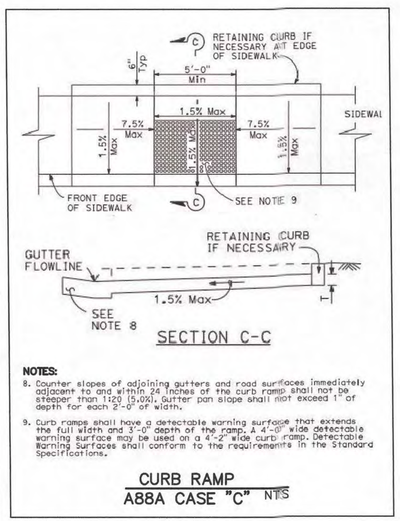
6 REINFORCED CONCRETE BLOCK WALL
REFER TO STD PLAN FOR PUBLIC WORKS CONSTRUCTION 601-4 FOR DETAILS AND REINFORCEMENTS



RETAINING CURB DETAIL WITH CHAIN LINK POST



RETAINING CURB DETAIL
N.T.S.

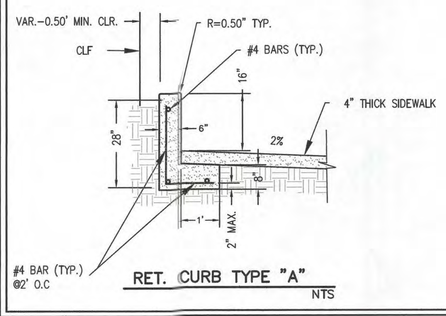


SECTION C-C

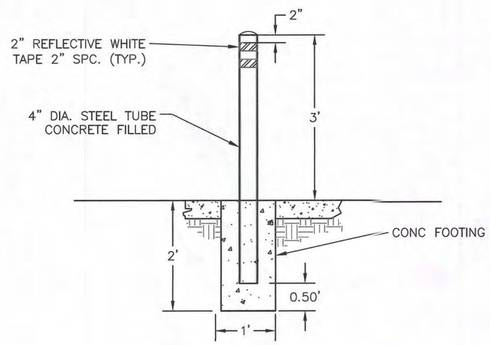
NOTES:

8. Counter slopes of adjoining gutters and road surfaces immediately adjacent to and within 24 inches of the curb ramp shall not be steeper than 1:20 (5.0%). Gutter pan slope shall not exceed 1" of depth for each 2'-0" of width.
9. Curb ramps shall have a detectable warning surface that extends the full width and 3'-0" depth of the ramp. A 4'-0" wide detectable warning surface may be used on a 4'-2" wide curb ramp. Detectable Warning Surfaces shall conform to the requirements in the Standard Specifications.

CURB RAMP
A88A CASE "C" NTS



RET. CURB TYPE "A"
NTS



BOLLARD DETAIL
NTS

REF. XING:
CPUC XING NO. 101 SG-39.6
DOT XING NO. 026164R

DESCRIPTION OF REVISION	DATE	CITY APPROVED:

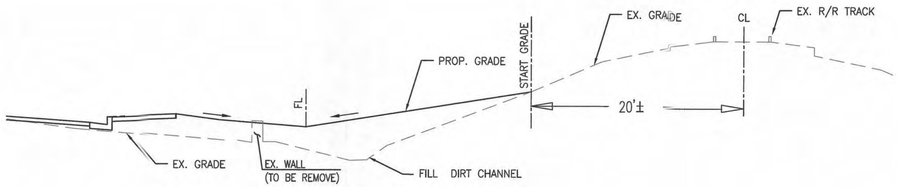
CITY OF RANCHO CUCAMONGA

MISC DETAILS

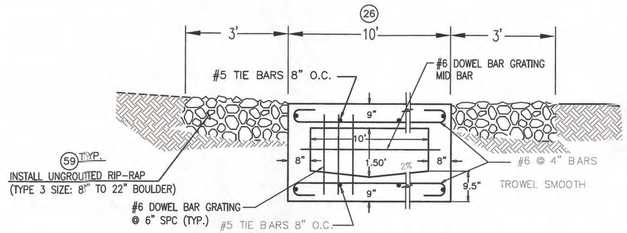
HELLMAN AVENUE AT METROLINK TRACK WIDENING AND TRAFFIC SIGNAL

APPROVED BY: CITY ENGINEER — DATE: 3/7/17 RCE: 67514

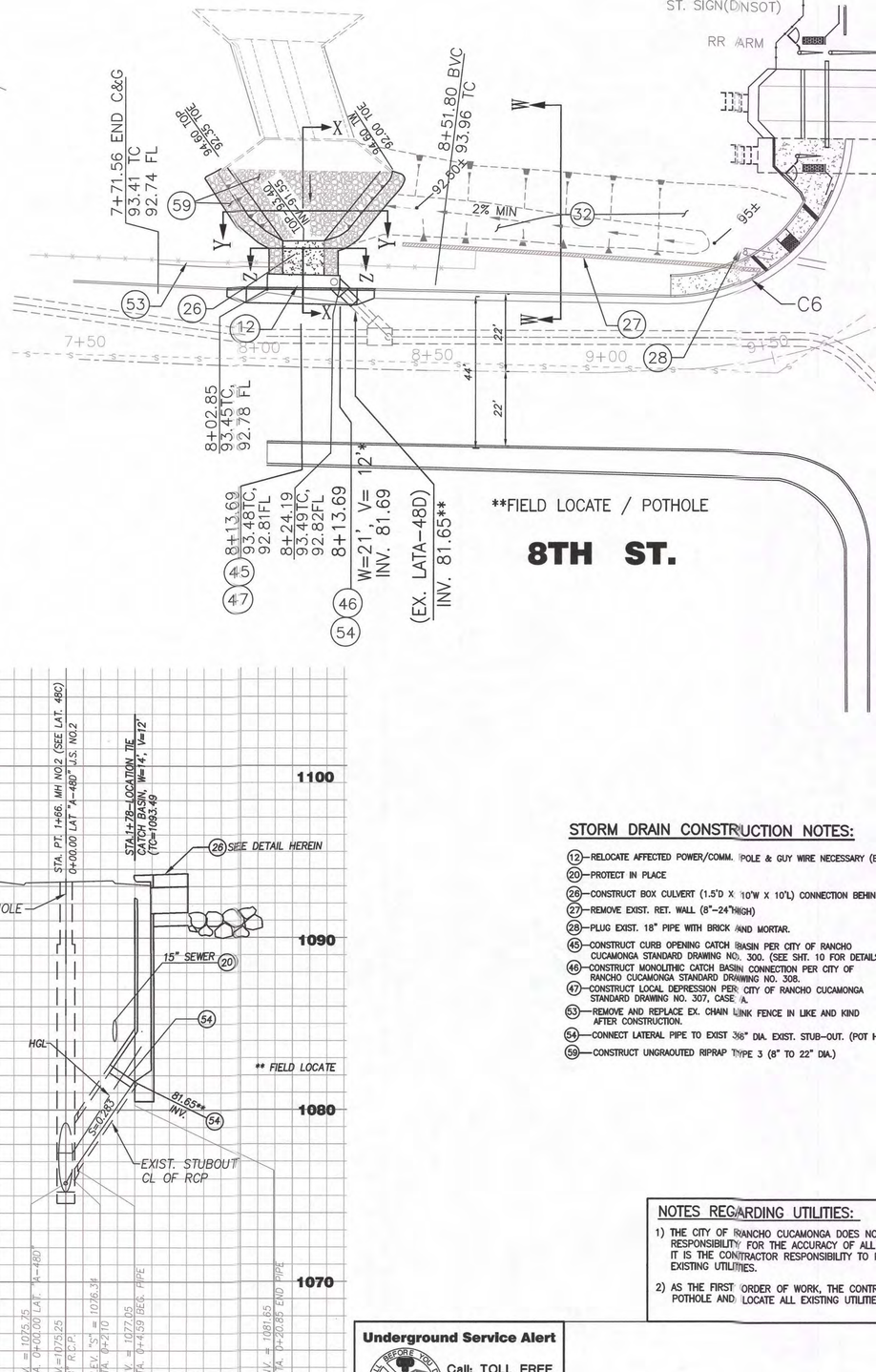
DESIGN	PLAN PREPARED BY:	RECOMMENDED:
RD-1	CITY OF RANCHO CUCAMONGA 10500 CIVIC CENTER DRIVE RANCHO CUCAMONGA, CA 91730	
DRAWN: RD-1		SHEET: 8 OF 14
CHECKED: RD2	R.C.E. NO. _____ DATE _____ FILE NO _____	DRAWING NO.: 2420



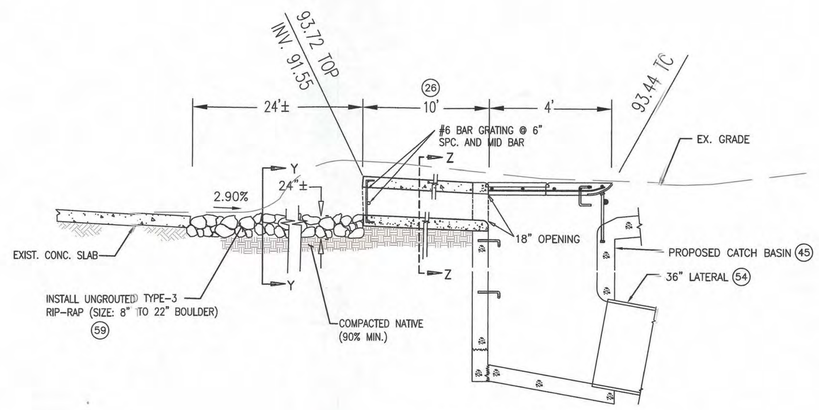
SECTION W-W
TYP. GRADING CROSS SECTIONS (S/O R/R)
NOT TO SCALE



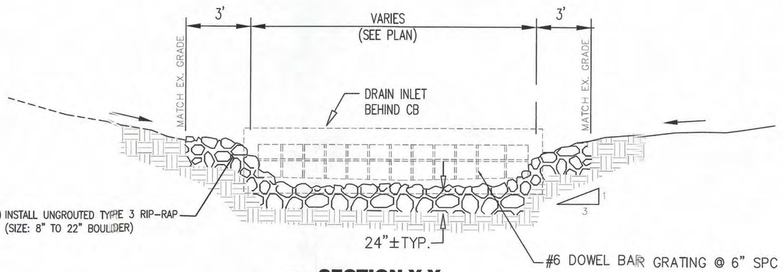
SECTION Z-Z
BOX CULVERT DETAIL
NOT TO SCALE



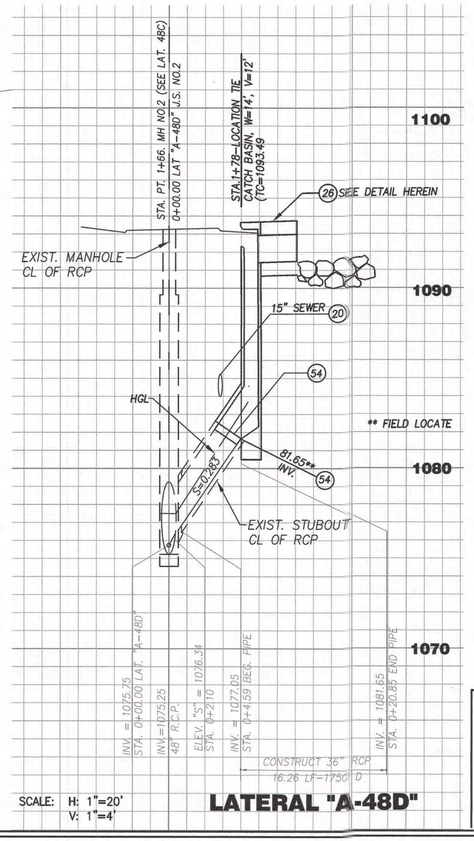
SCALE: 1"=20'



SECTION X-X
DRAINAGE CONNECTION DETAIL BEHIND CATCH BASIN
NOT TO SCALE



(47) **SECTION Y-Y**
RIP-RAP DETAIL NOT TO SCALE



SCALE: H: 1"=20'
V: 1"=4'

LATERAL "A-48D"

STORM DRAIN CONSTRUCTION NOTES:

(12)—RELOCATE AFFECTED POWER/COMM. POLE & GUY WIRE NECESSARY (BY OTHERS).
(20)—PROTECT IN PLACE
(26)—CONSTRUCT BOX CULVERT (1.5'D X 10'W X 10'L) CONNECTION BEHIND C.B. PER DETAIL ON SHT. 9
(27)—REMOVE EXIST. RET. WALL (8"-24"HIGH)
(28)—PLUG EXIST. 18" PIPE WITH BRICK AND MORTAR.
(45)—CONSTRUCT CURB OPENING CATCH BASIN PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 300. (SEE SHT. 10 FOR DETAILS)
(46)—CONSTRUCT MONOLITHIC CATCH BASIN CONNECTION PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 308.
(47)—CONSTRUCT LOCAL DEPRESSION PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 307, CASE A.
(53)—REMOVE AND REPLACE EX. CHAIN LINK FENCE IN LIKE AND KIND AFTER CONSTRUCTION.
(54)—CONNECT LATERAL PIPE TO EXIST 36" DIA. EXIST. STUB-OUT. (POT HOLE AND FIELD LOCATE)
(59)—CONSTRUCT UNGRAOUTED RIPRAP TYPE 3 (8" TO 22" DIA.)

REF. XING:
CPUC XING NO. 101 SG-39.6
DOT XING NO. 026164R

NOTES REGARDING UTILITIES:

1) THE CITY OF RANCHO CUCAMONGA DOES NOT ASSUME RESPONSIBILITY FOR THE ACCURACY OF ALL UTILITY LOCATION. IT IS THE CONTRACTOR RESPONSIBILITY TO PROTECT ALL EXISTING UTILITIES.
2) AS THE FIRST ORDER OF WORK, THE CONTRACTOR SHALL POTHOLE AND LOCATE ALL EXISTING UTILITIES, PRIOR TO

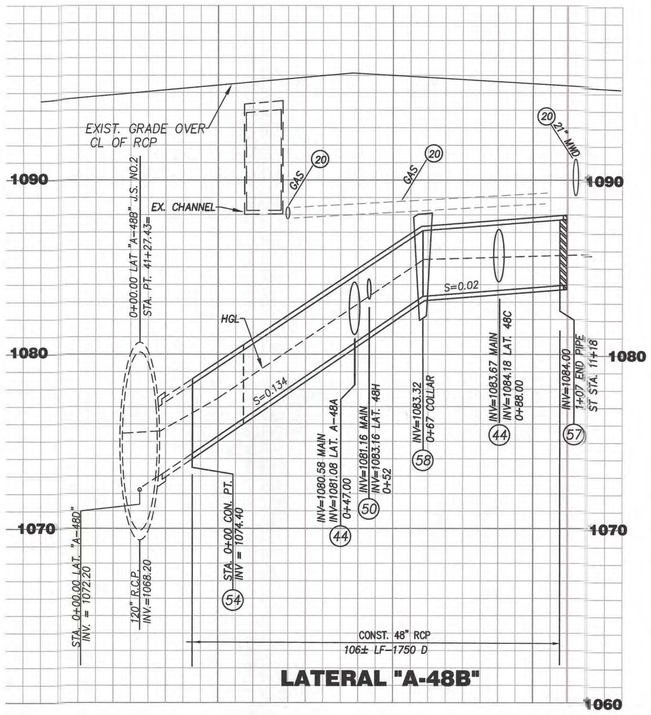
Underground Service Alert
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TWO WORKING DAYS BEFORE YOU DIG

NO.	DESCRIPTION OF REVISION	DATE	CITY APPROVED:

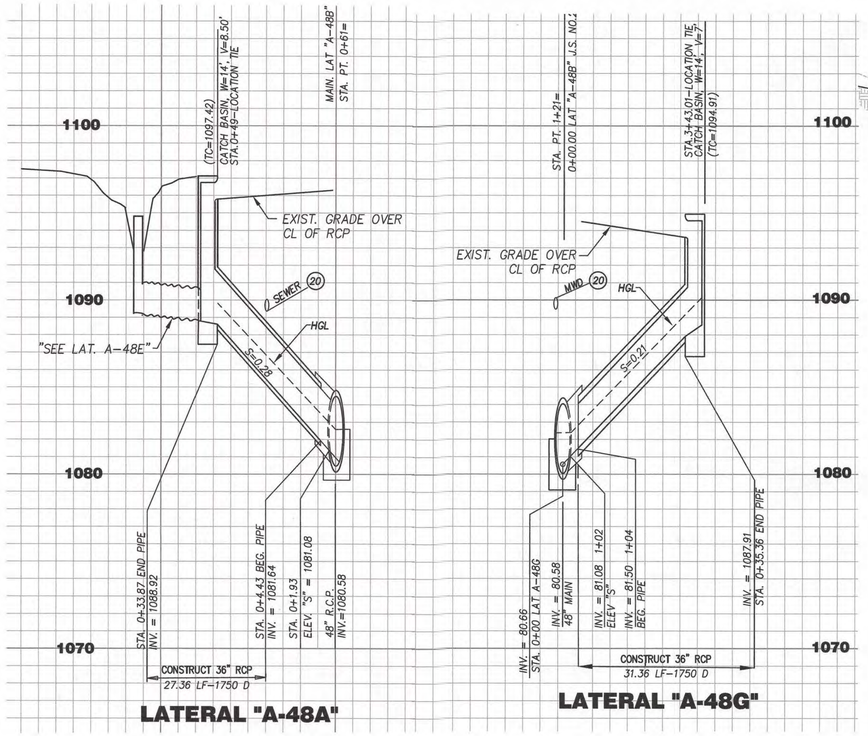
CITY OF RANCHO CUCAMONGA
STORM DRAIN OUT LET DETAILS
HELLMAN AVENUE AND 8TH STREET WIDENING AND AT GRADE CROSSING IMPROVEMENT PROJECT

APPROVED BY: CITY ENGINEER
DATE: 3/7/12
RCE: 53672

DESIGN: RD-1	PLAN PREPARED BY: CITY OF RANCHO CUCAMONGA, 10500 CIVIC CENTER DRIVE, RANCHO CUCAMONGA, CA 91730
DRAWN: RD-1	RECOMMENDED
CHECKED: RD2	SHEET 9 OF 14
	DRAWING NO. 2420-D

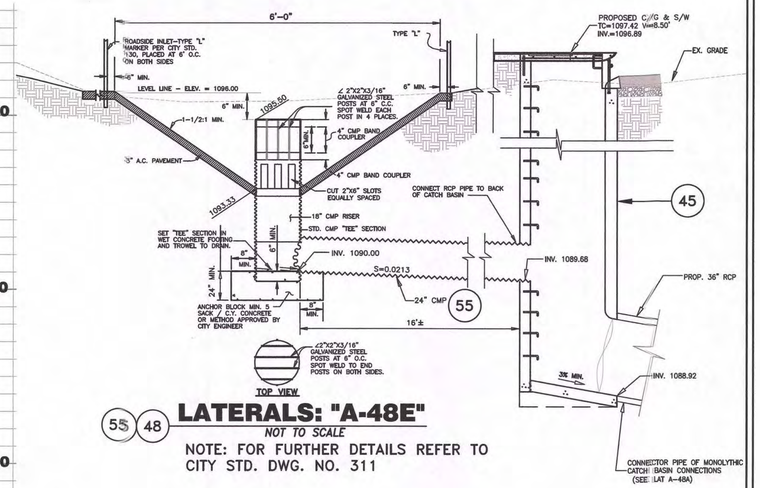


LATERAL "A-48B"



LATERAL "A-48A"

LATERAL "A-48G"



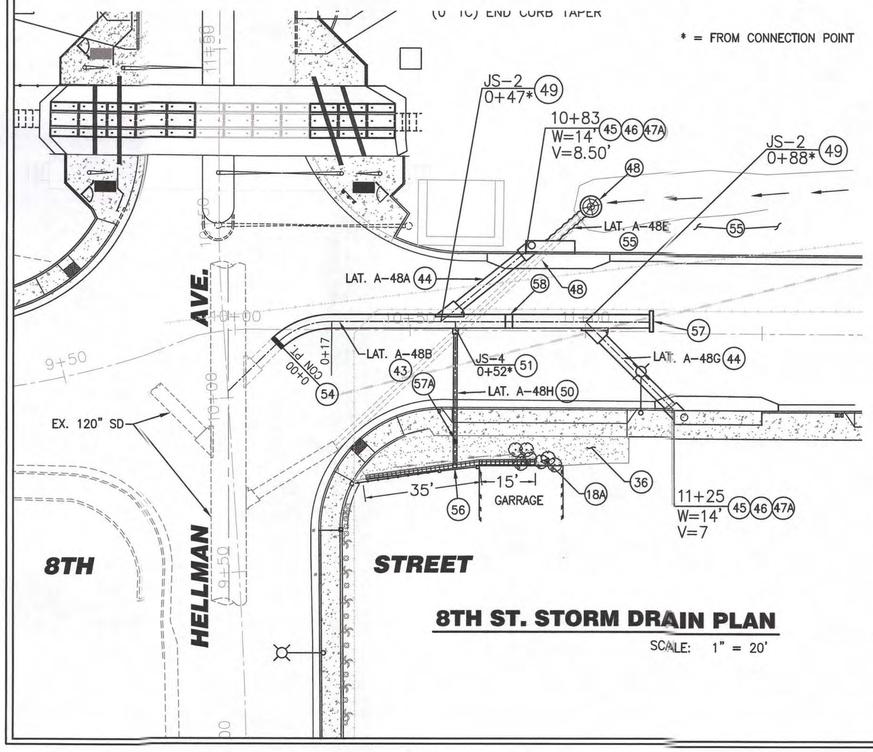
55 48 **LATERALS: "A-48E"**

NOT TO SCALE

NOTE: FOR FURTHER DETAILS REFER TO CITY STD. DWG. NO. 311

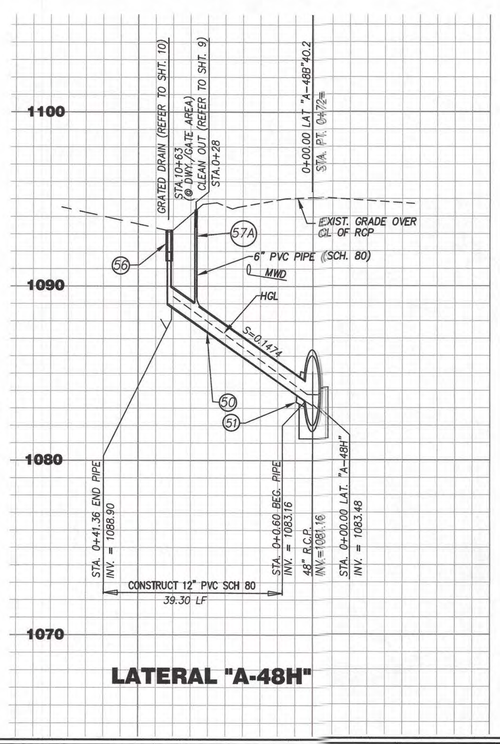
STORM DRAIN CONSTRUCTION NOTES:

- (8A) REMOVE SHRUBS.
- (20) PROTECT IN PLACE
- (36) CONSTRUCT 6" PCC PAVEMENT AND MATCH EXISTING GRADE
- (43) INSTALL 48" DIA. R.C.P. (1750 D) STORM DRAIN, PER PLAN
- (44) INSTALL 36" DIA. R.C.P. (1750 D) STORM DRAIN, PER PLAN
- (45) CONSTRUCT CURB OPENING CATCH BASIN PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 300. (SEE SHT. 10 FOR DETAILS)
- (46) CONSTRUCT MONOLITHIC CATCH BASIN CONNECTION PER CITY OF RANCHO CUCAMONGA STANDARD DRAWING NO. 308.
- (47A) CONST. CONSTRUCT LOCAL DEPRESSION PER CITY OF R.C. STD. 307, CASIE "B"
- (48) REMOVE EXIST. CMP INLET AND 18" CMP LINE AND REINSTALL TEMPORARY CMP CATCH BASIN PER CITY OF RC STANDARD DRAWING NO. 311 AND PER DETAIL ON SHT. 10
- (49) CONSTRUCT JUNCTION STRUCTURE NO. 2 PER CITY OF RANCHO CUCAMONNGA STANDARD DRAWING NO. 331.
- (50) INSTALL 12"ø DIA. SCH. 80 PVC DRAIN PIPE INCLUDING CLEAN OUTS (SEE SHT. 3 AND 10) FOR TIE-IN LOCATIONS AND DETAILS
- (51) CONSTRUCT MODIFIED JUNCTION STRUCTURE NO.4 CASE 1 PER CITY OF R.C. DRAWING NO. 333.
- (54) CONNECT LATERAL PIPE TO EXIST 48" DIA. STUB OUT (POT HOLE AND FIELD LOCATE).
- (55) INSTALL INSTALL 24" CMP PIPE
- (56) CONSTRUCT PCC DRAIN STRUCTURE WITH FRAME AND GRATE INLET BY GRATING PACIFIC 12'X16" THP8EZ OR EQUAL (SEE SHT 10 PER DETAIL)
- (57) PLUG PIPE WITH MORTAR AND BRICK PER SBCFCD STD. DWG. SP 176 TYPE "B"
- (57A) INSTALL 6" DIA. CLEAN OUT INCLUDING 6" PVC SCH. 80 PIPE AND COVER (NDS 8"X8" STRUCTURAL FOAM POLYOTEFIN GRATE) COMPLETE IN PLACE SEE SHEET 10 FOR DETAIL.
- (58) CONSTRUCT PCC COLLAR PER CITY OF RC STD. DWG. NO. 329
- (59) CONSTRUCT UNGRAOUTED RIPRAP TYPE 3 (8" TO 22" DIA.)



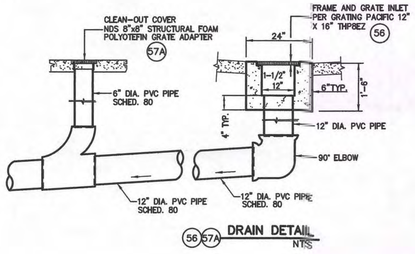
8TH ST. STORM DRAIN PLAN

SCALE: 1" = 20'



LATERAL "A-48H"

SCALE:
H: 1"=20'
V: 1"=4'



REF. XING:
CPUC XING NO. 101 SG-39.6
DOT XING NO. 026164R

NOTES REGARDING UTILITIES:

1) THE CITY OF RANCHO CUCAMONGA DOES NOT ASSUME RESPONSIBILITY FOR THE ACCURACY OF ALL UTILITY LOCATION, IT IS THE CONTRACTOR RESPONSIBILITY TO PROTECT ALL EXISTING UTILITIES.
2) AS THE FIRST ORDER OF WORK, THE CONTRACTOR SHALL POTHOLE AND LOCATE ALL EXISTING UTILITIES, PRIOR TO EXCAVATION.

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NO.	DESCRIPTION OF REVISION	DATE	CITY APPROVED:

DESCRIPTION OF REVISION	DATE	CITY APPROVED:

CITY OF RANCHO CUCAMONGA

SD LATERALS AND DETAILS

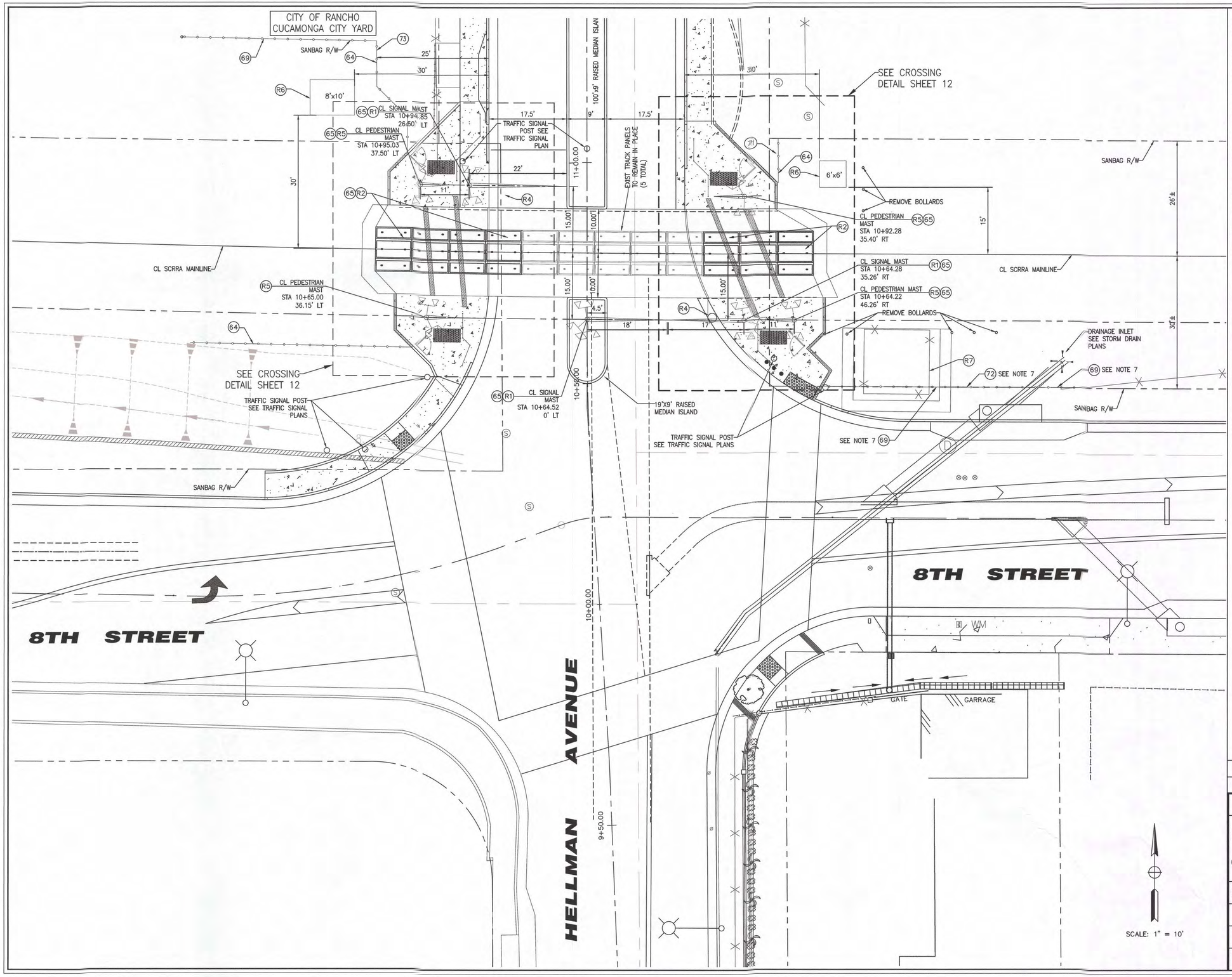
HELLMAN AVENUE AND 8TH STREET WIDENING AND AT GRADE CROSSING IMPROVEMENT PROJECT

APPROVED BY: CITY ENGINEER
DATE: 3/7/17
RCE: 67514

DESIGN: RD-1
DRAWN: RD-1
CHECKED: RD2

PLAN PREPARED BY:
CITY OF RANCHO CUCAMONGA
10500 CIVIC CENTER DRIVE
RANCHO CUCAMONGA, CA 91730

RECOMMENDED
SHEET 10 OF 14
DRAWING NO. 2420-D



WORK PERFORMED BY SCRRA RAILROAD

(R1) INSTALL #9 ENTRANCE GATE ARM AND FLASHING LIGHTS (BY OTHERS).

(R2) INSTALL CONCRETE CROSSING PANELS AND DRAIN PIPE PER SCRRA ES4201 (BY OTHERS).

(R4) REMOVE EXIST #9 GATE AND FLASHING LIGHTS (BY OTHERS).

(R5) INSTALL PEDESTRIAN GATE ARM PER SCRRA ES8308 (BY OTHERS).

(R6) INSTALL RAILROAD SIGNAL ENCLOSURE (BY OTHERS).

(R7) REMOVE EXISTING RAILROAD ENCLOSURE (BY OTHERS).

CONSTRUCTION NOTES:

(64) PROVIDE AND INSTALL 4' HIGH, 1" MESH FABRIC CHAIN LINK FENCE PER SCRRA ES5105 & ES4017.

(65) SEE SCRRA ES8400 FOR FLASHING LIGHT ALIGNMENT.

(68) PROVIDE AND INSTALL BOLLARDS, PER SCRRA ES4011 AND ES5107.

(69) PROVIDE AND INSTALL 6' HIGH WELDED WIRE MESH FENCING PER SCRRA ES5105.

(70) PROVIDE AND INSTALL SECURITY ACCESS GATE PER SCRRA ES5107.

(71) PROVIDE AND INSTALL 4' HIGH, 6' WIDE, 1" MESH FABRIC CHAIN LINK FENCE ACCESS GATE PER SCRRA ES5105 & ES5106 FOR GATE STANDARDS.

(72) PROVIDE AND INSTALL 6' HIGH, 6' WIDE WELDED WIRE MESH FENCE ACCESS GATE PER SCRRA ES5105 & ES5106 FOR GATE STANDARDS.

(73) PROVIDE AND INSTALL 4' HIGH, 12' WIDE WELDED WIRE MESH FENCE ACCESS GATE PER SCRRA ES5105 & ES5106 FOR GATE STANDARDS.

NOTES:

1 – FINAL LOCATION OF CITY CONTRACTOR PROVIDED BOLLARDS, SECURITY ACCESS GATE, AND RIGHT OF WAY SECURITY FENCE TO BE DETERMINED IN FIELD BY SCRRA.

2 – SEE STREET IMPROVEMENT PLANS FOR CURB, GUTTER, SIDEWALK, RETAINING CURB, AND OTHER RELATED IMPROVEMENTS NOT SHOWN ON THIS PLAN, INCLUDING SIDEWALK GRADES AND ELEVATIONS.

3 – SEE SIGNING AND STRIPING PLANS FOR SIGNAGE AND STREET STRIPING.

4 – SEE TRAFFIC SIGNAL PLANS FOR TRAFFIC SIGNAL DETAILS.

5 – SEE CROSSING DETAIL SHEET FOR CROSSING RELATED PEDESTRIAN TREATMENT DETAILS.

6 – SEE UTILITY PLAN FOR RAILROAD ELECTRICAL SERVICE PEDESTAL IN THE NORTHWEST QUADRANT OF THE GRADE CROSSING.

7 – CONTRACTOR TO COORDINATE WITH SCRRA TO INSTALL FENCE AND GATE AFTER SIGNAL HOUSE REMOVAL.

REGISTERED PROFESSIONAL ENGINEER
MARK S. HAGER
No. C 67659
CIVIL
STATE OF CALIFORNIA

DESCRIPTION OF REVISION	DATE	CITY APPROVED:

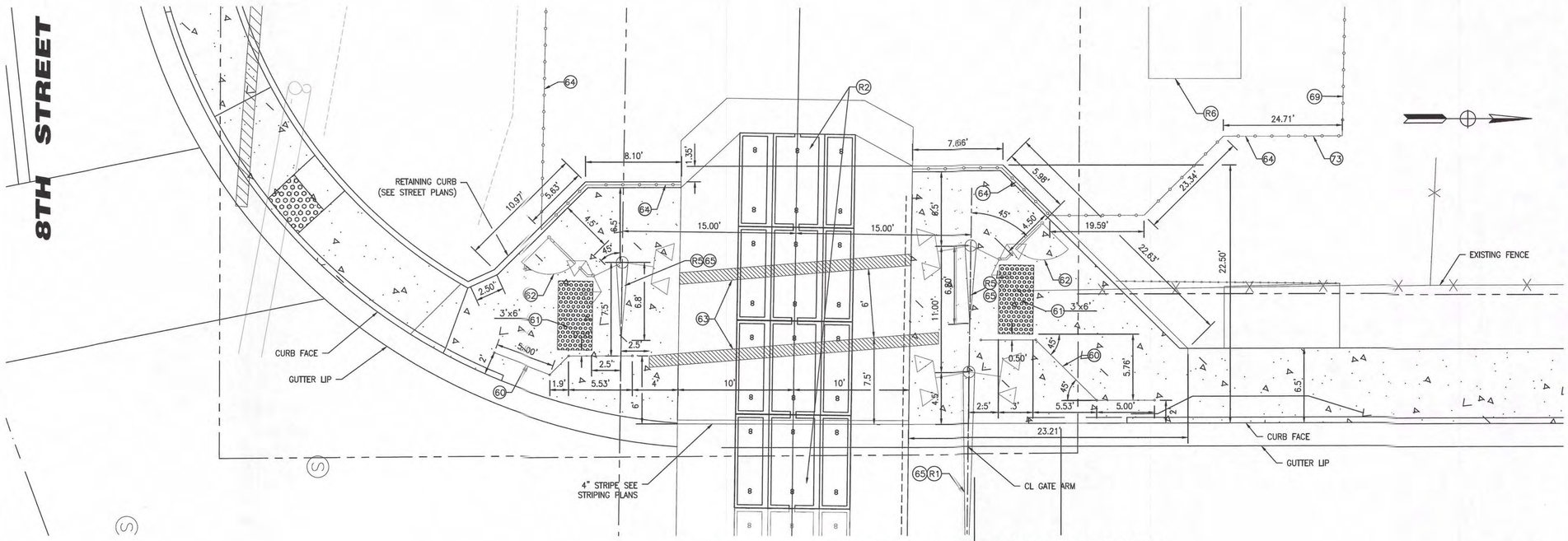
CITY OF RANCHO CUCAMONGA

RAILROAD AT-GRADE CROSSING PLAN
HELLMAN AVENUE 8TH STREET WIDENING AND AT GRADE CROSSING IMPROVEMENT PROJECT
CPUC XING NO. SG-39.6 DOT XING NO. 02616R
AT-GRADE CROSSING PLAN

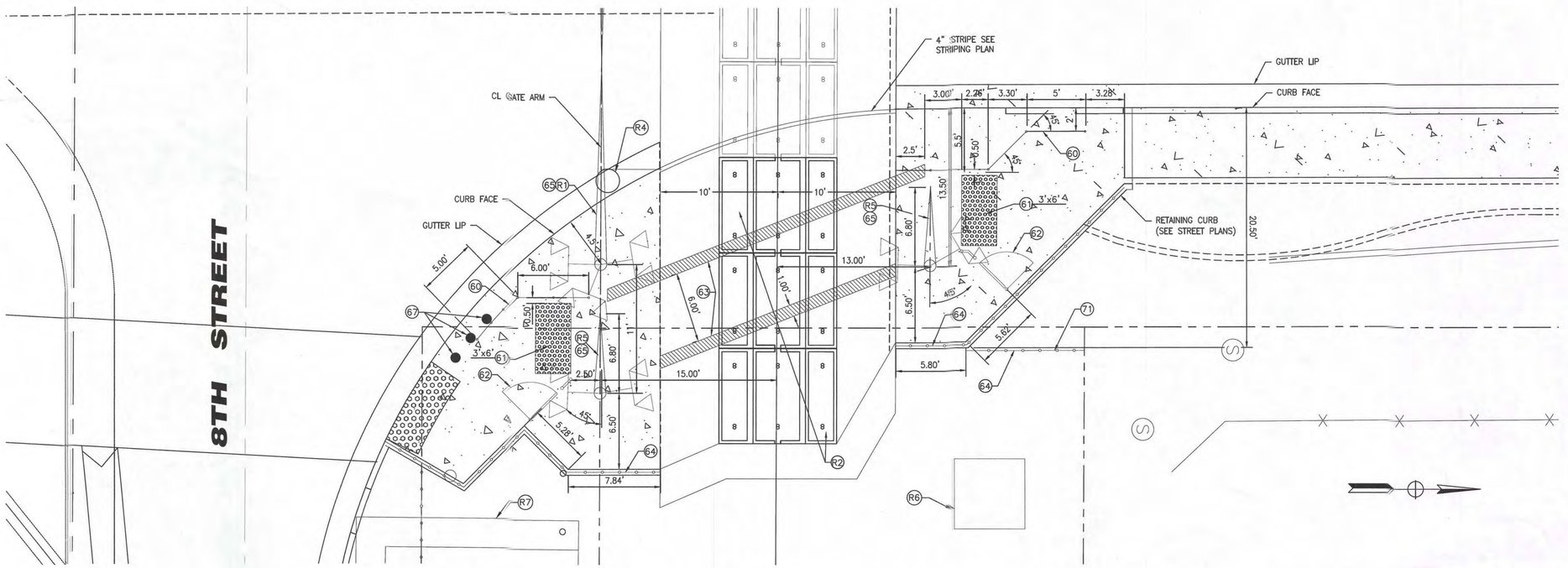
APPROVED BY: CITY ENGINEER — DATE: 3/7/17 — RCE: 67514

DESIGN	PLAN PREPARED BY:	RECOMMENDED
GNR	HDR ENGINEERING, INC. 2280 Market St, Suite 100 Riverside, CA 92501 (951) 320-7300	
DRAWN: PP	R.C.E. NO.	SHEET: 11 OF 14
CHECKED: MH	DATE: FILE NO.	DRAWING NO.: 2240-RR

1/20/2017



WEST SIDE - HELLMAN AVE.



EAST SIDE - HELLMAN AVE.

WORK PERFORMED BY SCRRA RAILROAD

(R1) INSTALL #9 ENTRANCE GATE ARM AND FLASHING LIGHTS (BY OTHERS).

(R2) INSTALL CONCRETE CROSSING PANELS AND DRAIN PIPE PER SCRRA ES4201 (BY OTHERS).

(R4) REMOVE EXIST #9 GATE AND FLASHING LIGHTS (BY OTHERS).

(R5) INSTALL PEDESTRIAN GATE ARM PER SCRRA ES8308 (BY OTHERS).

(R6) INSTALL RAILROAD SIGNAL ENCLOSURE (BY OTHERS).

(R7) REMOVE EXISTING RAILROAD ENCLOSURE (BY OTHERS).

CONSTRUCTION NOTES:

(60) PROVIDE AND INSTALL METAL HANDRAILING PER SCRRA ES4005, TYPE B

(61) PROVIDE AND INSTALL 3'X6' DETECTABLE WARNING STRIP PER CALTRANS STD PLAN A88A.

(62) PROVIDE AND INSTALL PEDESTRIAN SWING GATE WITH SIGNAGE PER SCRRA ES4002, AFTER PEDESTRIAN GATE & ARM (NOTE R5) IS INSTALLED.

(63) 12" SOLID WHITE CROSSWALK LINE PER CALTRANS STD PLAN A24E.

(64) PROVIDE AND INSTALL 4' HIGH, 1" MESH FABRIC CHAIN LINK FENCE PER SCRRA ES5105 & ES4017.

(65) SEE SCRRA ES8400 FOR FLASHING LIGHT ALIGNMENT.

(66) SEE SCRRA ES4006 FOR GRADE CROSSING MARKINGS AND SIGNAGE.

(67) PROVIDE AND INSTALL 4" DIAMETER CONCRETE FILLED BOLLARDS (3 TOTAL) PER THE DIRECTION OF CITY FIELD ENGINEER AT TIME OF SIGNAL FOUNDATION OR METAL RAILING PLACEMENT.

(68) PROVIDE AND INSTALL BOLLARDS, PER SCRRA ES4011 AND ES5107.

(69) PROVIDE AND INSTALL 6' HIGH WELDED WIRE MESH FENCING PER SCRRA ES5105.

(70) PROVIDE AND INSTALL SECURITY ACCESS GATE PER SCRRA ES5107.

(71) PROVIDE AND INSTALL 4' HIGH, 6' WIDE, 1" MESH FABRIC CHAIN LINK FENCE ACCESS GATE PER SCRRA ES5105 & ES5106 FOR GATE STANDARDS.

(72) PROVIDE AND INSTALL 6' HIGH, 6' WIDE WELDED WIRE MESH FENCING ACCESS GATE PER SCRRA ES5105 & ES5106 FOR GATE STANDARDS.

(73) PROVIDE AND INSTALL 4' HIGH, 12' WIDE WELDED WIRE MESH FENCE ACCESS GATE PER SCRRA ES5105 & ES5106 FOR GATE STANDARDS.

SCALE: 1" = 10'

REGISTERED PROFESSIONAL ENGINEER
MARK S. HAGER
No. C 67659
CIVIL
STATE OF CALIFORNIA

DESCRIPTION OF REVISION	DATE	CITY APPROVED:

CITY OF RANCHO CUCAMONGA

RAILROAD AT-GRADE CROSSING DETAILS
HELLMAN AVENUE 8TH STREET WIDENING AND AT GRADE CROSSING IMPROVEMENT PROJECT
CPUC XING NO. SG-39.6 DOT XING NO. 02616R
AT-GRADE CROSSING DETAILS

APPROVED BY: CITY ENGINEER — DATE: 3/7/17 RCE: 67514

DESIGN	PLAN PREPARED BY	RECOMMENDED
GNR	HDR ENGINEERING, INC. 2280 Market St, Suite 100 Riverside, CA 92501 (951) 320-7300	
DRAWN: PP	R.C.E. NO.	SHEET 12 OF 14
CHECKED: MH	DATE / FILE NO.	DRAWING NO. 2240-RR

1/20/2017

PROJECT SHEET NO. 14 OF 16

CONSTRUCTION NOTES:

43 INSTALL NEW TYPE 90 CONTROLLER ASSEMBLY, TYPE R CONTROLLER CABINET WITH ECONOLITE COBALT CONTROLLER ASSEMBLY, ITERIS VANTAGE EDGE VIDEO DETECTION SYSTEM AND VIDEO PROCESSING UNIT OR APPROVED EQUAL, CTC X-RPS RAILROAD PREEMPTION SYSTEM AND ALL OTHER EQUIPMENT NECESSARY TO COMPLETE THE INTENDED OPERATION. CONTROLLER DOOR SHALL FACE NORTH AS DIRECTED BY THE ENGINEER. FURNISH AND INSTALL BATTERY BACK-UP SYSTEM IN A SEPARATE CABINET MOUNTED ON THE SIDE OF THE CONTROLLER CABINET. FURNISH AND INSTALL ETHERWAN EX71620A0B FIBER SWITCH. SEE PROJECT SPECIAL PROVISIONS.

44 FURNISH AND INSTALL NEW TYPE III-BF SERVICE EQUIPMENT ENCLOSURE PER CALTRANS STD PLANS ES-2C AND ES-2E. SERVICE DOOR SHALL FACE NORTH.

45 FURNISH AND INSTALL ITERIS VANTAGE RZ-4 AWDR VIDEO DETECTION CAMERA (OR APPROVED EQUAL) ON LUMINAIRE MAST ARM OR ON SIGNAL MAST ARM PER MANUFACTURER'S RECOMMENDATIONS. THE DETECTION SYSTEM SHALL INCLUDE ALL NECESSARY HARDWARE AND CABLING TO PROVIDE A COMPLETE SYSTEM. THE CONTRACTOR IS RESPONSIBLE FOR THE COMPLETE INSTALLATION AND SETUP OF THE DETECTION SYSTEM.

46 INSTALL EMERGENCY VEHICLE PREEMPTION DETECTOR ON SIGNAL MAST ARM PER DETAIL SHOWN THIS SHEET. FINAL LOCATION TO BE DETERMINED BY THE ENGINEER IN THE FIELD.

47 STEEL BOLLARDS (3 EACH) AT POLE Ⓒ. SEE RAILROAD AT-GRADE CROSSING PLAN SHEET 12.

48 INSTALL BLANK OUT NO RIGHT TURN (R3-1) ON SIGNAL POLE.

49 INSTALL R73-3(CA) SIGN ON TRAFFIC SIGNAL MAST ARM.

50 INSTALL # SECTION VEHICLE SIGNAL HEAD. SEE DETAIL "A".

51 INSTALL R3-4 "NO U-TURN" SIGN ON TRAFFIC SIGNAL MAST ARM.

52 INSTALL R9-3 "NO PEDESTRIAN CROSSING" AND R9-3b "USE CROSSWALK" ON SIGNAL POLE. INSURE ARROW POINTS SOUTH ON SIGN R9-3b.

53 INSTALL R10-6 "STOP HERE ON RED" WITH ARROW AND R8-8 "DO NOT STOP ON TRACKS" UNDER SIGNAL HEAD ON SIGNAL POLE.

54 INSTALL SIGNS AND POST. INSTALL R10-6 "STOP HERE ON RED" WITH ARROW AND R8-8 "DO NOT STOP ON TRACKS".

55 COORDINATE RAILROAD PRE-EMPT INTERCONNECT, X-RPS RAILROAD PREEMPTION UNIT AND 12-24VDC HEALTH RELAY POWER SUPPLY WITH METROLINK AND PER STANDARD SPECIFICATIONS UNDER DIRECTION OF CITY ENGINEER.

56 COORDINATE POWER SERVICE WITH SOUTHERN CALIFORNIA EDISON UNDER DIRECTION OF CITY ENGINEER. FURNISH AND INSTALL 4"PVC SCH 80 CONDUIT WITH PULLROPE FROM HANDHOLE TO SERVICE CABINET PER SCE APPROVED DRAWINGS. AT LEAST TWO WEEKS ADVANCE NOTICE SHALL BE GIVEN TO THE SCE PLANNER BY CONTACTING ISAAC DOMINGUEZ AT (909) 930-8576.

57 INSTALL 4"C/INNERDUCT WITH 24 STRAND SMFO SIC AND 1-#10 TRACER WIRE TO ARCHIBALD AVE., ±2700'. INSTALL B40 PULLBOXES PER PROJECT SPECIAL PROVISIONS.

58 INSTALL R13A(CA) "NO RIGHT TURN ON RED" UNDER SIGNAL HEAD ON SIGNAL POLE.

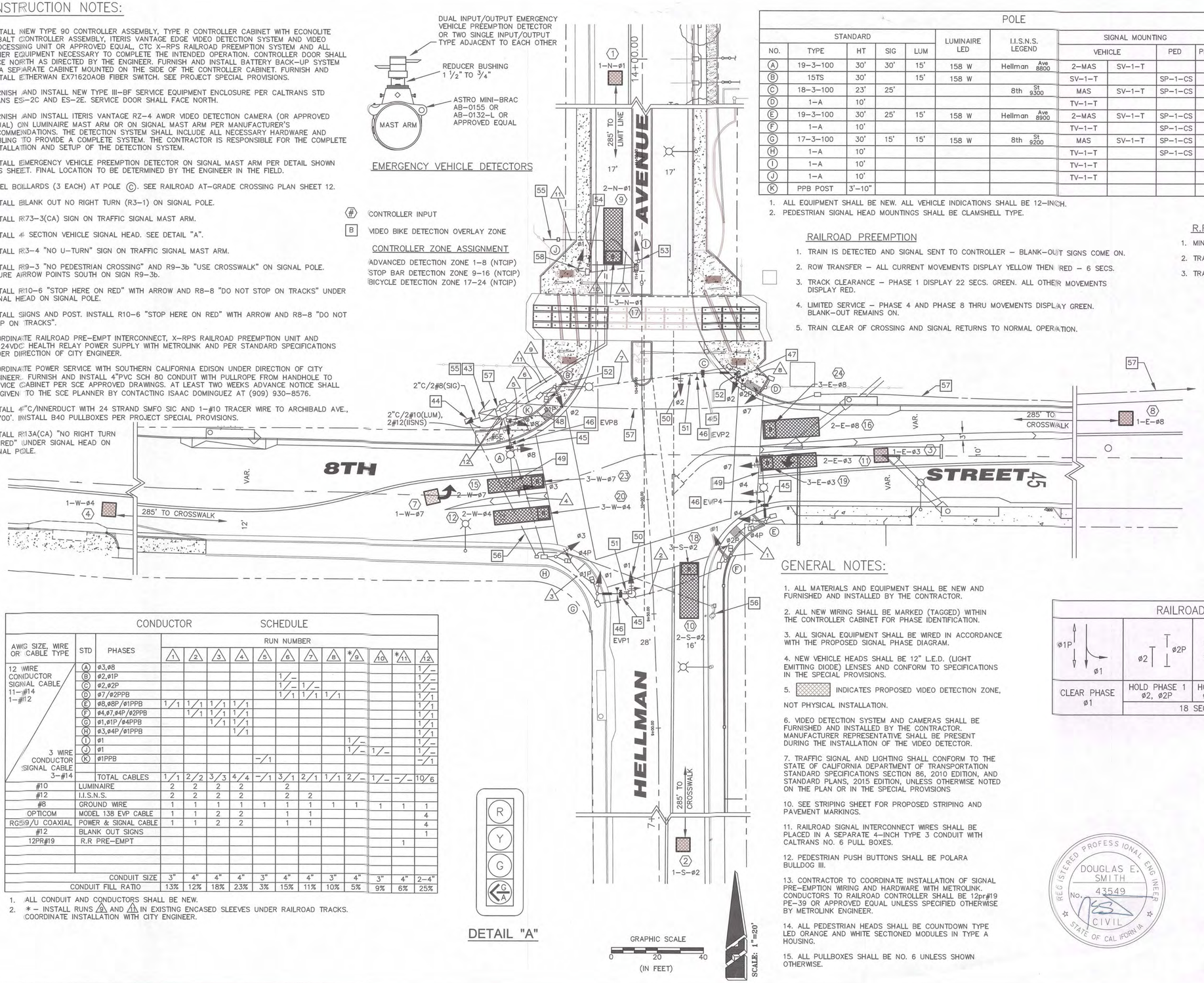
EMERGENCY VEHICLE DETECTORS

(#) CONTROLLER INPUT

[B] VIDEO BIKE DETECTION OVERLAY ZONE

CONTROLLER ZONE ASSIGNMENT

ADVANCED DETECTION ZONE 1-8 (NTCIP)
STOP BAR DETECTION ZONE 9-16 (NTCIP)
BICYCLE DETECTION ZONE 17-24 (NTCIP)



POLE SCHEDULE													
STANDARD					LUMINAIRE LED	I.I.S.N.S. LEGEND	SIGNAL MOUNTING			PPB PHASE	POLE LOCATION		REMARKS
NO.	TYPE	HT	SIG	LUM			VEHICLE		PED	PED ø		A	B	
Ⓐ	19-3-100	30'	30'	15'	158 W	Hellman Ave 8800	2-MAS	SV-1-T				14'	8'	F=17'
Ⓑ	15TS	30'		15'	158 W		SV-1-T		SP-1-CS	1		24'	8'	
Ⓒ	18-3-100	23'	25'			8th St 9300	MAS	SV-1-T	SP-1-CS	2		35'	3'	SPECIAL POLE HEIGHT TO MOUNT IISNS
Ⓓ	1-A	10'					TV-1-T				2	17'	3.5'	
Ⓔ	19-3-100	30'	25'	15'	158 W	Hellman Ave 8900	2-MAS	SV-1-T	SP-1-CS	4	2	11'	5.25'	F=12'
Ⓕ	1-A	10'					TV-1-T		SP-1-CS	2	4	10'	5.25'	
Ⓖ	17-3-100	30'	15'	15'	158 W	8th St 9200	MAS	SV-1-T	SP-1-CS	1	4	7'	2.5'	
Ⓗ	1-A	10'					TV-1-T		SP-1-CS	4	1	6'	2.5'	
Ⓘ	1-A	10'					TV-1-T							19' FROM TRACK PANEL
Ⓙ	1-A	10'					TV-1-T							15' FROM TRACK PANEL
Ⓚ	PPB POST	3'-10"									1	23'	5'	

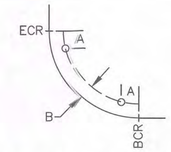
1. ALL EQUIPMENT SHALL BE NEW. ALL VEHICLE INDICATIONS SHALL BE 12-INCH.
2. PEDESTRIAN SIGNAL HEAD MOUNTINGS SHALL BE CLAMSHELL TYPE.

RAILROAD PREEMPTION

1. TRAIN IS DETECTED AND SIGNAL SENT TO CONTROLLER – BLANK-OUT SIGNS COME ON.
2. ROW TRANSFER – ALL CURRENT MOVEMENTS DISPLAY YELLOW THEN RED – 6 SECS.
3. TRACK CLEARANCE – PHASE 1 DISPLAY 22 SECS. GREEN. ALL OTHER MOVEMENTS DISPLAY RED.
4. LIMITED SERVICE – PHASE 4 AND PHASE 8 THRU MOVEMENTS DISPLAY GREEN. BLANK-OUT REMAINS ON.
5. TRAIN CLEAR OF CROSSING AND SIGNAL RETURNS TO NORMAL OPERATION.

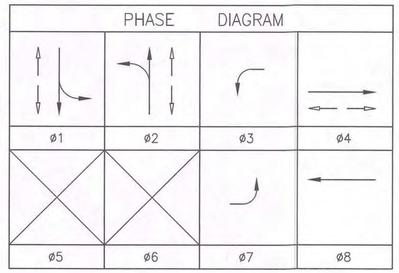
R.R PREEMPTION NOTES:

1. MINIMUM GREEN TIME = 4 SEC
2. TRACK CLEARANCE GREEN = 22 SEC
3. TRACK CLEARANCE RED = 6 SEC



POLE LOCATION DETAIL

PHASE DIAGRAM



CONDUCTOR SCHEDULE																
AWG SIZE, WIRE OR CABLE TYPE	STD	PHASES	RUN NUMBER													
			1	2	3	4	5	6	7	8	*9	10	*11	12
12 WIRE CONDUCTOR SIGNAL CABLE 11-#14 1-#12	Ⓐ	ø3,ø8												1/-
	Ⓑ	ø2,ø1P						1/-						1/-
	Ⓒ	ø2,ø2P						1/-	1/-					1/-
	Ⓓ	ø7/ø2PPB						1/1	1/1	1/1				1/1
	Ⓔ	ø8,ø8P/ø1PPB	1/1	1/1	1/1	1/1								1/1
	Ⓕ	ø4,ø7,ø4P/ø2PPB		1/1	1/1	1/1								1/1
	Ⓖ	ø1,ø1P/ø4PPB			1/1	1/1								1/1
	Ⓗ	ø3,ø4P/ø1PPB				1/1								1/1
	Ⓘ	ø1									1/-			1/-
3 WIRE CONDUCTOR SIGNAL CABLE 3-#14	Ⓙ	ø1									1/-	1/-		1/-
	Ⓚ	ø1PPB					-/1							-/1
		TOTAL CABLES	1/1	2/2	3/3	4/4	-/1	3/1	2/1	1/1	2/-	1/-	-/-	10/6
#10		LUMINAIRE	2	2	2	2		2						
#12		I.I.S.N.S.	2	2	2	2		2	2					
#8		GROUND WIRE	1	1	1	1	1	1	1	1	1	1	1	1
OPTICOM		MODEL 138 EVP CABLE	1	1	2	2		1	1					4
RG59/U COAXIAL		POWER & SIGNAL CABLE	1	1	2	2		1	1					4
#12		BLANK OUT SIGNS												1
12PR#19		R.R PRE-EMPT											1	
		CONDUIT SIZE	3"	4"	4"	4"	3"	4"	4"	3"	4"	3"	4"	2-4"
		CONDUIT FILL RATIO	13%	12%	18%	23%	3%	15%	11%	10%	5%	9%	6%	25%

1. ALL CONDUIT AND CONDUCTORS SHALL BE NEW.
2. * – INSTALL RUNS 2 AND 1 IN EXISTING ENCASED SLEEVES UNDER RAILROAD TRACKS. COORDINATE INSTALLATION WITH CITY ENGINEER.

DETAIL "A"

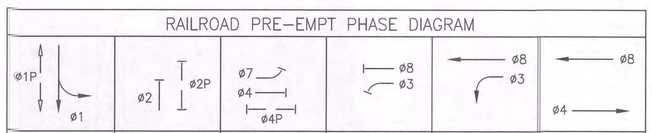
GRAPHIC SCALE
0 20 40
(IN FEET)

SCALE: 1"=20'

GENERAL NOTES:

1. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND FURNISHED AND INSTALLED BY THE CONTRACTOR.
2. ALL NEW WIRING SHALL BE MARKED (TAGGED) WITHIN THE CONTROLLER CABINET FOR PHASE IDENTIFICATION.
3. ALL SIGNAL EQUIPMENT SHALL BE WIRED IN ACCORDANCE WITH THE PROPOSED SIGNAL PHASE DIAGRAM.
4. NEW VEHICLE HEADS SHALL BE 12" L.E.D. (LIGHT EMITTING DIODE) LENSES AND CONFORM TO SPECIFICATIONS IN THE SPECIAL PROVISIONS.
5. ▨ INDICATES PROPOSED VIDEO DETECTION ZONE, NOT PHYSICAL INSTALLATION.
6. VIDEO DETECTION SYSTEM AND CAMERAS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. MANUFACTURER REPRESENTATIVE SHALL BE PRESENT DURING THE INSTALLATION OF THE VIDEO DETECTOR.
7. TRAFFIC SIGNAL AND LIGHTING SHALL CONFORM TO THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS SECTION 86, 2010 EDITION, AND STANDARD PLANS, 2015 EDITION, UNLESS OTHERWISE NOTED ON THE PLAN OR IN THE SPECIAL PROVISIONS
10. SEE STRIPING SHEET FOR PROPOSED STRIPING AND PAVEMENT MARKINGS.
11. RAILROAD SIGNAL INTERCONNECT WIRES SHALL BE PLACED IN A SEPARATE 4-INCH TYPE 3 CONDUIT WITH CALTRANS NO. 6 PULL BOXES.
12. PEDESTRIAN PUSH BUTTONS SHALL BE POLARA BULLDOG III.
13. CONTRACTOR TO COORDINATE INSTALLATION OF SIGNAL PRE-EMPTION WIRING AND HARDWARE WITH METROLINK. CONDUCTORS TO RAILROAD CONTROLLER SHALL BE 12pr#19 PE-39 OR APPROVED EQUAL UNLESS SPECIFIED OTHERWISE BY METROLINK ENGINEER.
14. ALL PEDESTRIAN HEADS SHALL BE COUNTDOWN TYPE LED ORANGE AND WHITE SECTIONED MODULES IN TYPE A HOUSING.
15. ALL PULLBOXES SHALL BE NO. 6 UNLESS SHOWN OTHERWISE.

RAILROAD PRE-EMPT PHASE DIAGRAM



REGISTERED PROFESSIONAL ENGINEER
DOUGLAS E. SMITH
No. 43549
CIVIL
STATE OF CALIFORNIA

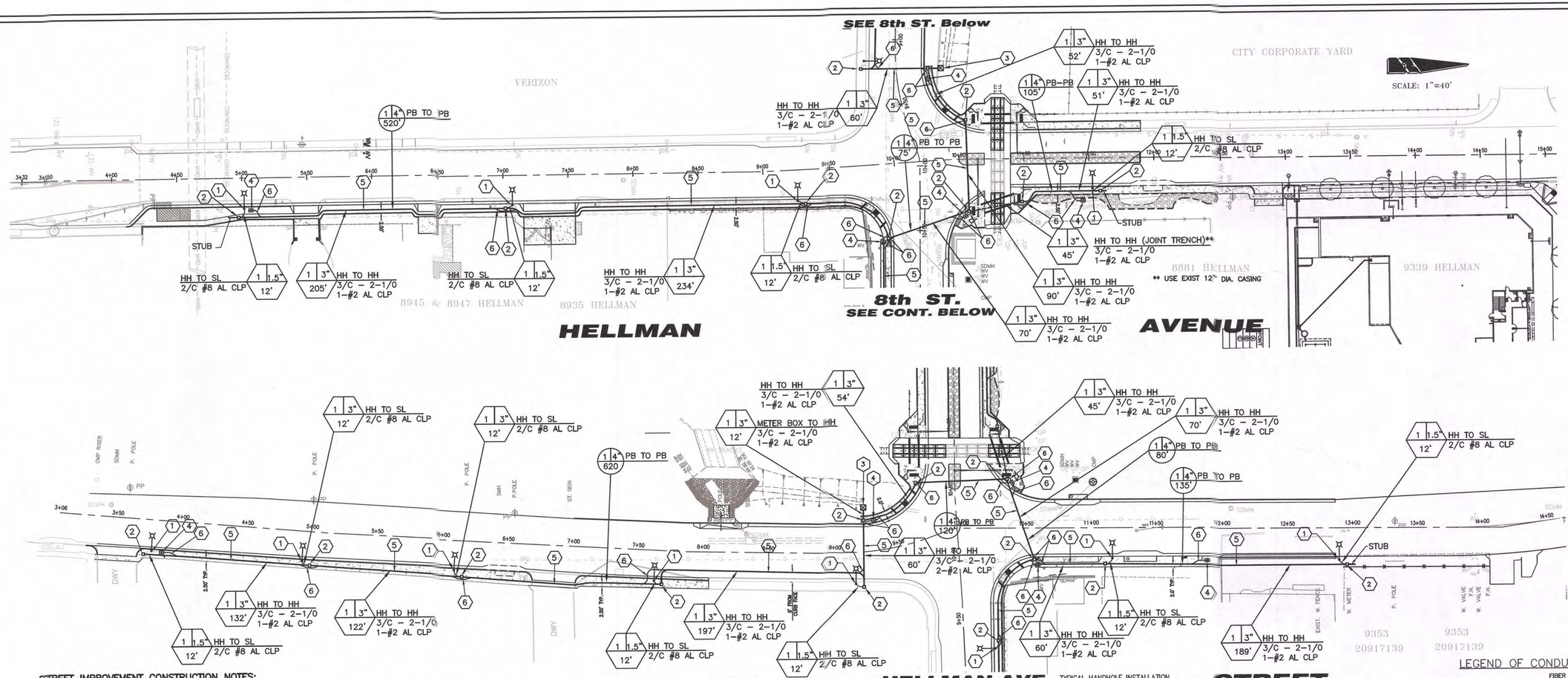
DESCRIPTION OF REVISION	DATE	CITY APPROVED:

CITY OF RANCHO CUCAMONGA

HELLMAN AVE & 8TH ST TRAFFIC SIGNAL PLAN
HELLMAN AVENUE 8TH STREET WIDENING AND AT GRADE CROSSING IMPROVEMENT PROJECT
CPUC XING NO. SG-39.6 DOT XING NO. 02616R

APPROVED BY: CITY ENGINEER _____ DATE: 3/7/17
RCE: 17514

DESIGN	PLAN PREPARED FOR:	RECOMMENDED
PJK	CITY OF RANCHO CUCAMONGA, 10500 CIVIC CENTER DRIVE, RANCHO CUCAMONGA, CA 91730	
DRAWN: PJK	PLAN PREPARED BY: HDR ENGINEERING INC., 2280 MARKET ST., SUITE 100, RIVERSIDE, CA 92501-2110	SHEET 13 OF 14
CHECKED: DES	SIGNATURE _____ R.C.E. NO. _____	DRAWING NO. 2240-TS



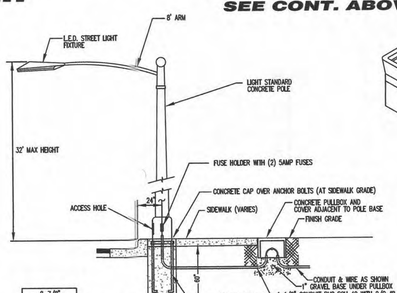
STREET IMPROVEMENT CONSTRUCTION NOTES:

1. INSTALL STREET LIGHTING STANDARD – 26' OCTAGONAL CONCRETE POLE WITH 6' MAST ARM AND 9500 LUMEN
2. INSTALL RCE HANDHOLE (13"X24"X24") PER DETAIL
3. INSTALL METER PEDESTAL (FOR ST. LIGHT AND TRAFFIC SIGNAL.) NOTE: CONNECT ST LIGHTING CONDUITS TO THE TRAFFIC SIGNAL SERVICE/METER PEDESTAL (SEE TRAFFIC SIGNAL PLAN, SHT. 13)
4. INSTALL CONCRETE FIBER OPTIC PULLBOX (14"X24"X36") 67PB BY BROOKS OR APPROVED EQUAL. CONC COVER SHALL BE MARK "RC FIBER OPTIC"
5. JOINT TRENCH 3" DIA. ST. LIGHT CONDUIT AND DIA. FIBER OPTIC CONDUIT (SEE TRENCH DETAIL HEREIN)
6. 4" DIA. FIBER OPTIC CONDUIT (TRENCH SEPARATION)

CONSTRUCTION NOTES

UNLESS OTHERWISE SPECIFIED ON THE WORKING DRAWING WHICH FORMS A PART OF THE SPECIFICATION, THE CONTRACTOR/DEVELOPER SHALL FURNISH THE FOLLOWING ITEMS AT NO COST TO THE CITY OF RANCHO CUCAMONGA.
THE ENGINEER HAS ATTEMPTED TO CORRECTLY SHOW ALL EXISTING UTILITIES AND SUBSTRUCTURES IN THE VICINITY OF THE WORK, BUT DOES NOT GUARANTEE THERE ARE NO OTHER SUBSTRUCTURES IN THE AREA. FAILURE OF THE ENGINEER TO SHOW ALL SUBSTRUCTURES IN THEIR CORRECT LOCATION WILL NOT BE A BASIS FOR A CLAIM FOR EXTRA WORK, AND THE CONTRACTOR SHALL BE RESPOSIBLE FOR ALL DAMAGES TO SUBSTRUCTURES WHETHER SHOWN OR NOT.

1. CONDUIT:
   A. MINIMUM COVER IN STREET OR PARKWAY IS 30" BELOW GUTTER GRADE, UNLESS NOTED OTHERWISE.
   B. MINIMUM COVER ON PRIVATE PROPERTY IS 30" BELOW FINISHED GRADE, UNLESS NOTED OTHERWISE.
   C. CONTRACTOR IS TO FURNISH AND INSTALL APPROVED CONDUIT TO CITY SPECIFICATIONS PER UGS–100.1, 110 AND 120.
   D. FOR THE TYPE OF CONDUIT FOR THIS JOB, SEE CITY SPECIFICATIONS.
   E. CAMP ALL MAINLINE CONDUITS AND SERVICE CONDUITS PER CITY SPECIFICATIONS.
   F. INSTALL BLANK CONDUIT PLUGS IN ALL CONDUITS TERMINATING INTO VAULTS, MANHOLE'S, PMH'S, SOE'S & ALL CAP LOCATIONS, PER CITY SPECIFICATIONS.
   G. INSTALL PULL ROPE IN ALL CONDUIT RUNS. PULL ROPE TO BE 3/16" POLYPROPYLENE OR POLYETHYLENE ROPE, BRAIDED OR TWISTED.
   H. ALL CONDUIT MUST BE MANDRELLED WITH A CITY APPROVED MANDRELL.
2. CONDUIT RADIUS REQUIREMENTS:
   A: THE MINIMUM RADIUS FOR BENDS ARE:
      36" FOR CONDUITS 3" IN DIAMETER OR SMALLER
      48" FOR CONDUITS 4" AND 5" IN DIAMETER
      60" FOR 6" DIAMETER CONDUIT
   B: THE MINIMUM RADIUS FOR ALL SWEEPS OF ALL MAINLINE CONDUITS IS 12'–6" (UNLESS NOTED OTHERWISE).
3. EXCAVATION AND BACKFILL:
   A. WORK AREA SHALL BE CLEARED AND ROUGH GRADED TO WITHIN FOUR INCHES OF FINAL GRADE PRIOR TO INSTALLATION OF CITY CONDUIT OR STRUCTURES.
   B. ALL EXCAVATIONS SHALL BE IN ACCORDANCE WITH THE CALIFORNIA STATE CONSTRUCTION SAFETY ORDERS (WHEN APPLICABLE), CITY SPECIFICATIONS, AND ALL GOVERNING LOCAL ORDINANCES.
   C. EACH TRENCH TO BE A UNIFORM DEPTH BELOW FINAL GRADE PRIOR TO INSTALLATION OF CITY CONDUIT OR STRUCTURES.
   D. BANCKFILL SHALL BE PROVIDED BY THE CONTRACTOR FOR ALL EXCAVATIONS AND SHALL INCLUDE CRUSHED ROCK, CONCRETE, AND/OR IMPORTED BACKFILL WHEN REQUIRED.
   E. BANCKFILL WITH A MINIMUM OF ONE SACK PER YARD SAND CEMENT SLURRY AROUND AND OVER VAULTS AND MANHOLES AND AROUND PMH'S WITHIN ONE FOOT OF FINISHED GRADE.
   F. BANCKFILL PER AGENCY SPECIFICATIONS, SHALL IMMEDIATELY FOLLOW SUBSTRUCTURE INSTALLATION. AT NO TIME SHALL CABLE BE LEFT EXPOSED OVER 24 HOURS.
   G. NO ROCKS ARE ALLOWED WITHIN 12 INCHES OF DIRECT–BURIED CABLES OR ANY CONDUIT WITHOUT CONCRETE ENCASEMENT. NNATIVE BACKFILL CAPABLE OF PASSING THROUGH A ONE–HALF INCH MESH SCREEN SHALL BE CONSIDERED TO BE "ROCK FREE". IF EXISTING BACKFILL DOES NOT PASS THROUGH A 1/2" SCREEN, PLACE IMPORTED SAND 3" BELOW AND 12" ABOVE CITY CABLES. AFTER THIS POINT, NO ROCKS LARGER THAN 12" DIAMETER ARE PERMITTED.
   H. ALL BACKFILL SHALL BE COMPACTED TO MEET OR EXCEED LOCAL ORDINANCES OR OTHER REQUIREMENTS. IT SHALL BE PLACED IN A MANNER THAT WILL NOT DAMAGE THE CONDUIT OR SUBSTRUCTURE OR ALLOW FUTURE SUBSIDENCE OF THE TRENCH OR STRUCTURES.
4. PAVING:
   REPAVING, WHERE REQUIRED, SHALL BE PLACED IN SUCH A MANNER THAT INTERFERENCE WITH TRAFFIC, INCLUDING PEDESTRIAN TRAFFIC, WILL BE KEPT TO A MINIMUM. THE CONTRACTOR SHALL ESTABLISH A PROGRAM OF REPAVING ACCEPTABLE TO THE MUNICIPALITY, COUNTY, OR OTHER AUTHORITY HAVING JURISDICTION AND WHICH IS ACCEPTABLE TO CITY.
5. STRUCTURES:
   A. ALL SUBSTRUCTURES SHALL BE CONSTRUCTED OR INSTALLED TO CITY SPECIFICATIONS.
   B. INSTALL PROTECTION BARRIERS WHEN REQUIRED IN AREAS EXPOSED TO TRAFFIC, PER CITY INSPECTOR.
   C. ALL CONDUIT LINES AND CONCRETE FLOORED SUBSTRUCTURES SHALL BE WATER TIGHT.
   D. ALL GROUNDING MATERIALS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
   E. CONTRACTOR TO PROVIDE SUBSTRUCTURE ENCLOSURE WALL DETAILS TO CITY INSPECTOR FOR APPROVAL PRIOR TO INSTALLATION.
6. RETAINING WALLS:
   WHEN REQUIRED, RETAINING WALLS SHALL BE PROVIDED BY THE CONTRACTOR. WALLS ARE REQUIRED WHEREVER GRADE RISES MORE THAN 18 INCHES ABOVE THE STRUCTURE OR 24" ABOVE THE PAD SURFACE AT A DISTANCE OF 5 FEET FROM THE SAME, OR IN AREAS SUBJECT TO EROSION. DESIGN AND INSTALLATION MUST COMPLY WITH LOCAL BUILDING ORDINANCES. REFER TO CITY INSPECTOR FOR TYPICAL SPACE REQUIREMENTS.
7. PERMITS:
   ALL PERMITS NECESSARY FOR EXCAVATION SHALL BE PROVIDED BY THE CONTRACTOR.
8. ACCESS:
   HEAVY TRUCK ACCESS SHALL BE MAINTAINED TO EQUIPMENT LOCATIONS. STRUCTURES MUST BE CLEAR OF ALL APPURTENANCES THAT WOULD OBSTRUCT THE LOADING OR UNLOADING OF EQUIPMENT.
9. SERVICES:
   A. METERS AND SERVICES SHALL COMPLY WITH CITY SERVICES REQUIREMENTS.
   B. WIRING MUST BE IN ACCORDANCE WITH APPLICABLE LOCAL ORDINANCES AND APPROVED BY LOCAL INSPECTION AUTHORITIES.
10. LOCATION:
    A. THE LOCATION OF EXCAVATIONS AND STRUCTURES FOR CITY SHALL BE AS SHOWN ON THE WORKING DRAWING. NO DEVIATION FROM THE PLANNED LOCATIONS WILL BE PERMITTED UNLESS APPROVED BY THE CITY INSPECTOR.
    B. ACTUAL LOCATION OF OBSTRUCTIONS, STORM DRAINS, AND/OR OTHER FOREIGN UTILITIES TO BE THE RESPONSIBILITY OF THE CONTRACTOR.
11. CONTRACTOR IS TO VERIFY LOCATION AND WIDTHS OF ALL SIDEWALKS AND DRIVEWAYS PRIOR TO STREET LIGHT INSTALLATION. WITH THE APPROVED STREET IMPROVEMENT PLANS, APPROVED STREET LIGHT PLANS AND THE ACTUAL FIELD CONDITIONS.
12. SURVEY:
    SURVEYING OF STREET IMPROVEMENTS SHALL BE PERFORMED BY CONTRACTOR, PROPERTY CORNERS, LOT LINES, FINISHED GRADE, ETC., NECESSARY FOR THE INSTALLATION OF UNDERGROUND FACILITIES MUST BE COMPLETED AND MARKERS OR STAKES PLACED PRIOR TO THE START OF THE INSTALLATION. IN ADDITION, CONTRACTOR SHALL MAINTAIN THE MARKERS DURING THE INSTALLATION AND INSPECTION BY INSPECTION BY AGENCY. GRADE AND PROPERTY LINE STAKES MUST SHOW ANY OFFSET MEASUREMENTS.
13. COORDINATION AND SUPERVISION:
    THE CONTRACTOR SHALL PROVIDE SUPERVISION OVER AND COORDINATION AMONG THE VARIOUS CONTRACTORS WORKING WITHIN THE DEVELOPMENT IN ORDER TO PREVENT DAMAGE TO CITY FACILITIES. HE IS RESPONSIBLE FOR THE COST OF REPAIRS, RE–PLACEMENT, RELOCATION OR OTHER CORRECTIONS TO CITY FACILITIES MADE NECESSARY BY HIS FAILURE TO PROVIDE SUPERVISION OR TO OTHERWISE COMPLY WITH THESE SPECIFICATIONS.
14. TELEPHONE AND OTHER UTILITY REQUIREMENTS:
    THE DRAWING PREPARED FOR THIS JOB MAY ALSO COVER THE FACILITIES TO BE INSTALLED FOR THE TELEPHONE COMPANY AND/OR OTHER UTILITY. ANY QUESTIONS CONCERNING DETAILS OF THEIR INSTALLATION SHOULD BE REFERRED TO THE COMPANY CONCERNED.
16. WARRANTY:
    CONTRACTOR EXPRESSLY REPRESENT AND WARRANT THAT ALL WORK PERFORMED AND ALL MATERIAL USED IN MEETING CONTRACTOR'S OBLIGATIONS HEREIN ARE FREE FROM DEFECTS IN WORKMANSHIP AND ARE IN CONFORMITY WITH AGENCY REQUIREMENTS. THIS WARRANTY SHALL COMMENCE UPON RECEIPT BY CONTRACTOR OF CITY'S FINAL ACCEPTANCE AND SHALL EXPIRE ONE YEAR FROM THAT DATE. CONTRACTOR AGREES TO PROMPTLY CORRECT TO THE CITY'S SATISFACTION AND THAT OF ANY GOVERNMENTAL AGENCY HAVING JURISDICTION AND AT CONTRACTOR'S EXPENSE ANY BREACH OF THIS WARRANTY WHICH MAY BECOME APPARENT THROUGH INSPECTOR OR OPERATION OF UNDERGROUND ELECTRIC SYSTEM BY CITY DURING THIS WARRANTY PERIOD.
17. INSPECTION:
    INSPECTION IS REQUIRED DURING THE CONSTRUCTION PERIOD. A 48 HOUR ADVANCE NOTICE OF INTENT TO START CONSTRUCTION IS REQUIRED FROM THE CONTRACTOR TO THE CITY OF RANCHO CUCAMONGA. PHONE:909–477–2740 X4018
18. AS–BUILTS:
    CONTRACTOR RESPONSIBLE TO MAINTAIN AS–BUILT DRAWINGS WHICH ARE TO BE UPDATED DAILY. CONTRACTORS SHALL KEEP AND MAINTAIN TWO COPIES OF THE AS–BUILTS. ONE SET IS FOR THE CONTRACTOR AND THE SECOND SET IS FOR THE CITY INSPECTOR.



STREET LIGHT DETAIL
(CONTRACTOR TO CONFIRM ALL DIMENSIONS)

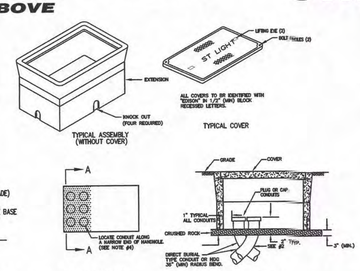
*PROPOSED L.E.D. STREET LIGHT PER RANCHO CUCAMONGA MUNICIPAL UTILITY STANDARDS

CONDUIT RADIUS REQUIREMENTS:

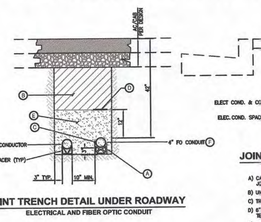
A: The minimum radius for bends are:
36" for conduits 3" in diameter or smaller
48" for conduits 4" and 5" in diameter
60" for 6" diameter conduit
B: The minimum radius for sweeps are:
36" for conduits 3" in diameter or smaller
12'–6" for conduits 4" in diameter and larger, unless otherwise noted.

UNDERGROUND SERVICE ALERT
1–800–422–4133
or
1–800–227–2600
Call USA
For Underground Locating
2 Working Days Before You Dig

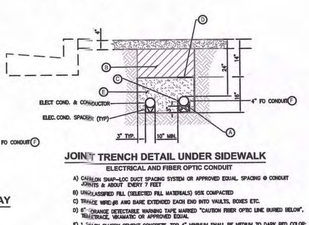
TYPICAL HANDHOLE INSTALLATION



NOTES: CONDUIT LOCATION
1. SEE UGS HP 200 FOR DIMENSIONS OF VARIOUS SIZE HANDHOLES AVAILABLE.
2. RADIUS ANGLE MAY BE REDUCED TO LESS THAN 90° PROVIDING THE PROJECTED CENTER LINE OF THE CONDUIT CLEARS HANDHOLE OPNING.
3. TWO HOLD DOWN DEVICES TO BE SUPPLIED WITH EACH HANDHOLE.
4. ALL CONDUITS SHOULD BE INSTALLED WITHIN THE SHADED AREA.



JOINT TRENCH DETAIL UNDER ROADWAY
ELECTRICAL AND FIBER OPTIC CONDUIT



JOINT TRENCH DETAIL UNDER SIDEWALK
ELECTRICAL AND FIBER OPTIC CONDUIT

A) CHERON DIAMOND DUCT SPACING SYSTEM OR APPROVED EQUAL SPACING @ CONDUIT JOINTS & ABOUT EVERY 7 FEET
B) UNCLASSIFIED FILL (SELECTED FILL MATERIALS) 90% COMPACTED
C) TRACE WIRE #8 AWG BARE EXTENDED EACH END INTO VAULTS, BOXES ETC.
D) 6" ORANGE DETECTABLE WARNING TAPE MARKED "CAUTION FIBER OPTIC LINE BURIED BELOW", TRUETRACE, SEAMGUARD OR APPROVED EQUAL
E) 1 SACK SLURRY CEMENT CONCRETE, TOP 4" MINIMUM SHALL BE MEDIUM TO DARK RED COLOR: LHL ROSEFIELD COMPANY, ORANGE OXBOARD, DAVIS COLORS OR APPROVED EQUAL
F) INSTALL 4" DIA. SCH. 80 PVC FIBER OPTIC CONDUIT
NOTE: FOR TRENCH WITHIN THE ROAD WAY AREA REFER TO STD. DWG. 135

GENERAL NOTES

1. UNLESS OTHERWISE NOTED, ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, CURRENT EDITION WITH ALL CURRENT SUPPLEMENTS, PUBLISHED BY BUILDING NEWS INC., LOCATED AT 612 S. ELEMENTINE STREET, ANAHEIM CA.
2. PRIOR TO BEGINNING ANY WORK, THE CONTRACTOR SHALL OBTAIN A PERMIT FROM THE CITY OF RANCHO CUCAMONGA, OFFICE AT 909–477–2740 X4018
3. ALL WORK COVERED BY THIS PLAN SHALL BE INSPECTED BY THE CITY ENGINEER. REQUEST FOR INSPECTION SERVICE SHALL BE MADE 24–HOURS IN ADVANCE AT 909–477–2740 X4018
4. 48–HOURS PRIOR TO ANY WORK, THE CONTRACTOR SHALL CALL THE UNDERGROUND SERVICE ALERT AT 1 (800) 422–4133 AND OBTAIN AN INQUIRY IDENTIFICATION NUMBER.
5. ALL MANHOLES SHALL BE ADJUSTED TO FINISHED GRADE IN ACCORDANCE WITH SECTION 301–1.6 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
6. THE CONTRACTOR SHALL PROTECT AND RESTORE EXISTING UTILITIES AND IMPROVEMENTS AS PER SECTION 5–1, 5–2, AND 7–9 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
7. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL UTILITIES OF EVERY NATURE, WHETHER SHOWN HEREON OR NOT, TO PROTECT THEM FROM DAMAGE. THE CONTRACTOR SHALL BEAR THE TOTAL EXPENSE OF REPAIR OR REPLACEMENT OF SAID UTILITIES DAMAGED BY OPERATIONS IN CONNECTION WITH THE PROSECUTION OF THE WORK.

LEGEND OF CONDUIT SYMBOLS

FIBER
NO. CONDUIT REQ'D. — SIZE OF CONDUIT / LENGTH OF TRENCH

ELECTRIC
NO. CONDUIT REQ'D. 1 — 3" SIZE OF CONDUIT / 189' LENGTH OF TRENCH

FULL ENCASEMENT IS REQUIRED FOR ALL ELECTRIC CONDUIT
SLURRY ENCASEMENT IS REQUIRED FOR ALL FIBER OPTIC CONDUIT

REGISTERED PROFESSIONAL ENGINEER
JASON C. WELDAY
No. 67514
Exp. 06–30–17
CIVIL
STATE OF CALIFORNIA

DESCRIPTION OF REVISION	DATE	CITY APPROVED:

CITY OF RANCHO CUCAMONGA

ST LIGHTING AND FIBER OPTIC PLAN

HELLMAN AVENUE AND 8TH STREET WIDENING AND AT GRADE CROSSING IMPROVEMENT PROJECT

APPROVED BY: CITY ENGINEER
DATE: 3/5/15
RCE: 67514

DESIGN	RD1
DRAWN	RD1
CHECKED	CB/RD2

PLAN PREPARED BY:
CITY OF RANCHO CUCAMONGA
10500 CIVIC CENTER DRIVE
RANCHO CUCAMONGA, CA 91730

RECOMMENDED
SHEET 14 OF 14
DRAWING NO. 2420

PROJECT SHEET NO. 16 OF 16



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