TOWN OF APPLE VALLEY

INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

Project Title:	Buffalo Trading Post Plaza
Case No.	Development Permit 2023-004 Special Use Permit 2023-001 Tentative Parcel Map 20702
Assessor's Parcel No.	311-217-116, -117, -118
Lead Agency Name and Address:	Town of Apple Valley
Project Location:	Southeast corner of U.S. Highway 18 and Rancherias Road, Apple Valley, California.
Project Sponsor's Name and Address:	Ara Tchaghlassian Hwy 18 Rancherias LLC 4490 Ayers Avenue Vernon, CA 90058
General Plan Designation(s):	General Commercial (C-G)
Zoning:	General Commercial (C-G)
Contact Person:	Amanda Malone, Associate Planner
Phone Number:	760-240-7000, ext. 7202
Date Prepared:	August, 2024

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CHAPTER 1: INTRODUCTION

Project Location

The Buffalo Trading Post Plaza (referred to hereafter as the Project and/or the proposed Project) is located on the southeast corner of U.S. Highway 18 and Rancherias Road, in the Town of Apple Valley, San Bernardino County, California (Exhibits 1 and 2).

The Project site is mostly undeveloped, with the exception of an unoccupied existing single-story commercial building and associated parking in the northwest corner of the property. The site is comprised of Assessor's Parcel Numbers (APNs) 311-217-116, -117, and -118. APN 311-217-118 is occupied by the existing building, which will be demolished as part of the proposed Project. The combined Project site consists of approximately 11.82 acres, configured in an irregular shape.

The site is designated in the General Plan and zoned for General Commercial (C-G), and is surrounded by General Commercial to the north, northwest, and east, Medium Density Residential (R-M) to the southwest, and Open Space (O-S) to the west and southeast.

The property has mostly been disturbed, but the southern portion of the site has some natural vegetation remaining. It is relatively flat, with a gentle slope down towards the northwest.

Project Description

The proposed Buffalo Trading Post Plaza would result the development of a mixed-use commercial plaza. The Project is comprised of Development and Special Use Permit applications and Tentative Parcel Map No. 20702. The Tentative Parcel Map will subdivide the site into nine parcels, seven of which (Parcels 1-7) are proposed for commercial development during phase one of the Project. One parcel (Parcel 8) is proposed for future development, and one parcel (Parcel 9) is to remain undisturbed.

The site is designated as General Commercial in the Town's General Plan, and General Commercial per the Town's Zoning Map. This designation allows a broad range of land uses, such as retail, offices, and services, to serve Apple Valley residents in a shopping center setting.[1] According to the C-G zoning designation, the Project is permitted a maximum floor area ratio (F.A.R.) of 0.5. As shown in Table 1, phase one of the Project proposes the development of a coffee shop with a drive-through, car wash, retail buildings, a tire shop, and two drive-through restaurants, totaling approximately 43,909 square feet on approximately 7.6 acres of the site. An additional three acres will be

[1] Town of Apple Valley General Plan (2009).

developed in a second phase and would potentially include general retail, office, or additional drive-through restaurants. The remaining 1.07-acres will not be disturbed, and will be left as open space.

Specific users for buildings 1, 3, 4, and 5 have been identified. Building 1 will be occupied by an Aldi grocery store, building 3 by Chipotle Mexican Grill, building 4 by Wendy's, and building 6 by Dutch Bros Coffee. No specific user is currently known for buildings 2, 5, or 7, however building 2 will be used as a tire shop, building 5 as a car wash, and building 7 as retail.

Table 1
Proposed Land Uses

Phase	Building No.	Land Use	Building Area (square feet)
Phase 1	Building 1 and 7	Retail	27,864 (20,599 and 7,265)
	Building 2	Tire shop	5,700
	Building 3 and 4	Drive through restaurants	4,705 (2,305 and 2,400)
	Building 5	Car wash	4,660
	Building 6	Coffee shop w/ drive-through	980
Phase 2	Future development	To be determined	35,000 [1]

[1] Building coverage for the future development area is assumed to be 26.6% based on the Traffic Impact Analysis Report prepared for the Project by Linscott, Law & Greenspan Engineers.

Utilities and Service Providers

The following agencies and companies will provide service to the project site:

1. Sanitary Sewer: Town of Apple Valley (collection) and Victor Valley Wastewater Reclamation Authority (treatment)
2. Water: Liberty Utilities – Apple Valley
3. Electricity: Southern California Edison and Apple Valley Choice Energy
4. Gas: Southwest Gas Corporation
5. Telephone: Verizon Communications
6. Trash disposal: Burrtec Waste Industries, Inc.

Surrounding Land Uses:

North: Highway 18, then commercial shopping center approximately 220 feet from the site.
South: Rocky hills, then vacant.
East: Walmart, Taco Bell, and O'Reilly Auto Parts immediately adjacent within 100 feet from the site.

West: Rancherias Road, then a vacant corner lot and Apple Valley Golf Course within 120 feet of the site.

Other public agencies whose approval is required:

Mojave Desert Air Quality Management District
Regional Water Quality Control Board
California Department of Transportation



Source: Google Maps, 11.2022

11.30.22

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Buffalo Trading Post Plaza
Regional Location Map
Apple Valley, California

Exhibit

1



Source: ESRI, July 2022

11.30.22

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Buffalo Trading Post Plaza
Vicinity Map
Apple Valley, California

Exhibit
2



Source: MMA Architechture, Re-Submittal 7.11.2024; ESRI, 11.2022

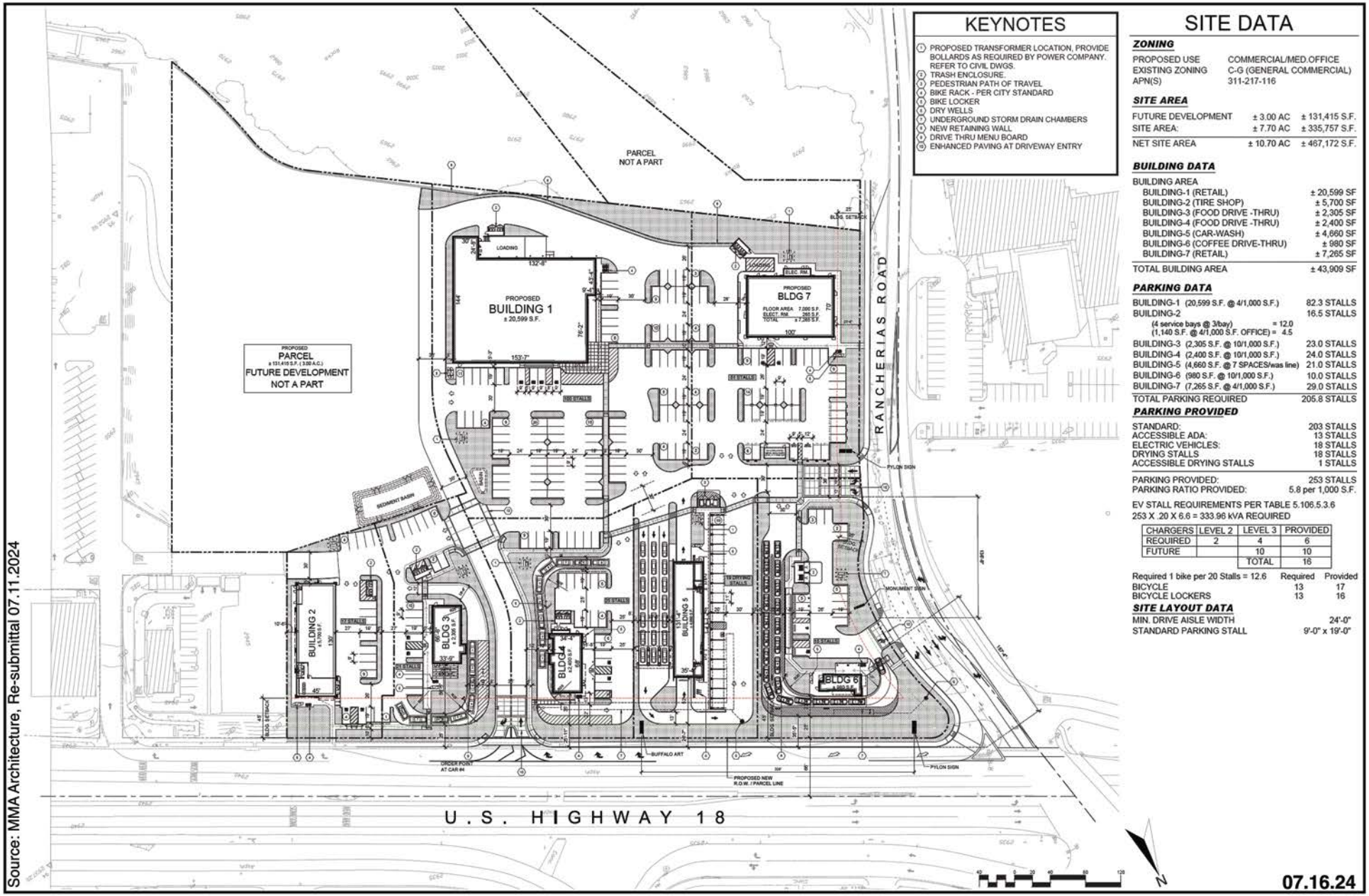
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Buffalo Trading Post Plaza
Project Location Map
Apple Valley, California

Exhibit

3



KEYNOTES

1. PROPOSED TRANSFORMER LOCATION, PROVIDE BOLLARDS AS REQUIRED BY POWER COMPANY. REFER TO CIVIL DWGS.
2. TRASH ENCLOSURE.
3. PEDESTRIAN PATH OF TRAVEL
4. BIKE RACK - PER CITY STANDARD
5. BIKE LOCKER
6. DRY WELLS
7. UNDERGROUND STORM DRAIN CHAMBERS
8. NEW RETAINING WALL
9. DRIVE THRU MENU BOARD
10. ENHANCED PAVING AT DRIVEWAY ENTRY

SITE DATA

ZONING

PROPOSED USE	COMMERCIAL/MED.OFFICE
EXISTING ZONING	C-G (GENERAL COMMERCIAL)
APN(S)	311-217-116

SITE AREA

FUTURE DEVELOPMENT	± 3.00 AC	± 131,415 S.F.
SITE AREA:	± 7.70 AC	± 335,757 S.F.
NET SITE AREA	± 10.70 AC	± 467,172 S.F.

BUILDING DATA

BUILDING AREA	
BUILDING-1 (RETAIL)	± 20,599 SF
BUILDING-2 (TIRE SHOP)	± 5,700 SF
BUILDING-3 (FOOD DRIVE -THRU)	± 2,305 SF
BUILDING-4 (FOOD DRIVE -THRU)	± 2,400 SF
BUILDING-5 (CAR-WASH)	± 4,660 SF
BUILDING-6 (COFFEE DRIVE-THRU)	± 980 SF
BUILDING-7 (RETAIL)	± 7,265 SF
TOTAL BUILDING AREA	± 43,909 SF

PARKING DATA

BUILDING-1 (20,599 S.F. @ 4/1,000 S.F.)	82.3 STALLS
BUILDING-2	16.5 STALLS
(4 service bays @ 3/bay) = 12.0	
(1,140 S.F. @ 4/1,000 S.F. OFFICE) = 4.5	
BUILDING-3 (2,305 S.F. @ 10/1,000 S.F.)	23.0 STALLS
BUILDING-4 (2,400 S.F. @ 10/1,000 S.F.)	24.0 STALLS
BUILDING-5 (4,660 S.F. @ 7 SPACES/was line)	21.0 STALLS
BUILDING-6 (980 S.F. @ 10/1,000 S.F.)	10.0 STALLS
BUILDING-7 (7,265 S.F. @ 4/1,000 S.F.)	29.0 STALLS
TOTAL PARKING REQUIRED	205.8 STALLS

PARKING PROVIDED

STANDARD:	203 STALLS
ACCESSIBLE ADA:	13 STALLS
ELECTRIC VEHICLES:	18 STALLS
DRYING STALLS	18 STALLS
ACCESSIBLE DRYING STALLS	1 STALLS
PARKING PROVIDED:	253 STALLS
PARKING RATIO PROVIDED:	5.8 per 1,000 S.F.

EV STALL REQUIREMENTS PER TABLE 5.106.5.3.6
253 X .20 X 6.6 = 333.96 kVA REQUIRED

CHARGERS	LEVEL 2	LEVEL 3	PROVIDED
REQUIRED	2	4	6
FUTURE		10	10
		TOTAL	16

Required 1 bike per 20 Stalls = 12.6	Required	Provided
BICYCLE	13	17
BICYCLE LOCKERS	13	16

SITE LAYOUT DATA

MIN. DRIVE AISLE WIDTH	24'-0"
STANDARD PARKING STALL	9'-0" x 19'-0"

Source: MMA Architecture, Re-submittal 07.11.2024

07.16.24

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Buffalo Trading Post Plaza
Site Plan
Apple Valley, California

Exhibit

4

Environmental Factors Potentially Affected:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agricultural and Forestry Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Energy
☐ Geology/ Soils	☐ Greenhouse Gas Emissions	☐ Hazards and Hazardous Materials
☐ Hydrology/ Water Quality	☐ Land Use/ Planning	☐ Mineral Resources
☐ Noise	☐ Population/ Housing	☐ Public Services
☐ Recreation	☐ Transportation	☐ Tribal Cultural Resources
☐ Utilities/ Service Systems	☐ Wildfire	☐ Mandatory Findings of Significance

CHAPTER 2: ENVIRONMENTAL ANALYSIS AND DETERMINATION

DETERMINATION: The Town of Apple Valley Planning Department finds

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

■ I find that although the proposed project could have a significant effect on the environment there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Amanda Malone

Amanda Malone
Associate Planner
Town of Apple Valley

August 22, 2024

Date

PURPOSE OF THIS INITIAL STUDY

This Initial Study has been prepared consistent with CEQA Guidelines Section 15063, to determine if the project, as proposed, may have a significant effect upon the environment. Based upon the findings contained within this report, the Initial Study will be used in support of the preparation of a Mitigated Negative Declaration.

EVALUATION OF ENVIRONMENTAL IMPACTS

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

    a) Earlier Analysis Used. Identify and state where they are available for review.
    b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such

effects were addressed by mitigation measures based on the earlier analysis.

c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures, which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:
   a) The significance criteria or threshold, if any, used to evaluate each question; and
   b) The mitigation measure identified, if any, to reduce the impacts to less than significance.

I. AESTHETICS Except as provided in Public Resources Code Section 21099, would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?			✓	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				✓
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?			✓	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			✓	

Sources: Town of Apple Valley General Plan Environmental Impact Report (2009); Town of Apple Valley General Plan (2009); Town of Apple Valley Development Code; Caltrans California State Scenic Highway System Map; "Historical/Archaeological Resources Survey Report for Rancherias Road & SR 18 Project" prepared by CRM Tech (December 2022).

Environmental Setting

The Town of Apple Valley, including the Project site, is situated in the Victor Valley, in the western Mojave Desert. The Mojave Desert is a high elevation desert bordered by the Sierra Nevada mountains to the west, and by the Sonoran Desert to the south and east. The local topography primarily features gradual slopes that incline towards the San Bernardino Mountains to the south, as well as low mountains to the north and east of Apple Valley.

The Project site is located in an urbanized area with a diverse mix of public and commercial services. The 11.82-acre site is mostly flat, apart from a 1.07-acre area in the southern portion of the site, which is comprised of hilly terrain and which is to remain undisturbed. It fronts onto a major roadway, State Highway 18, in the north, and is

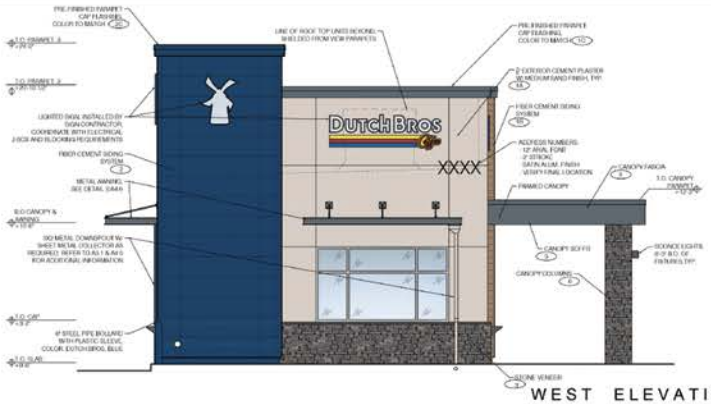
surrounded by a hill, open space, and commercial development to the south, west, and east, respectively. The hill to the south of the property is rocky and covered with desert vegetation.

According to the EIR for the Town's General Plan, the natural visual resources in Apple Valley are characterized by expansive 'wide skies' and vistas of distant mountains. While these visual resources have been impacted to some extent in much of the Town by intervening development, areas of undeveloped desert, as well as buildings with historic character, also occur. The most urbanized parts of the Town, particularly those in the southwestern portion, may be impacted by light and glare from vehicle headlights as well as building and streetlights.

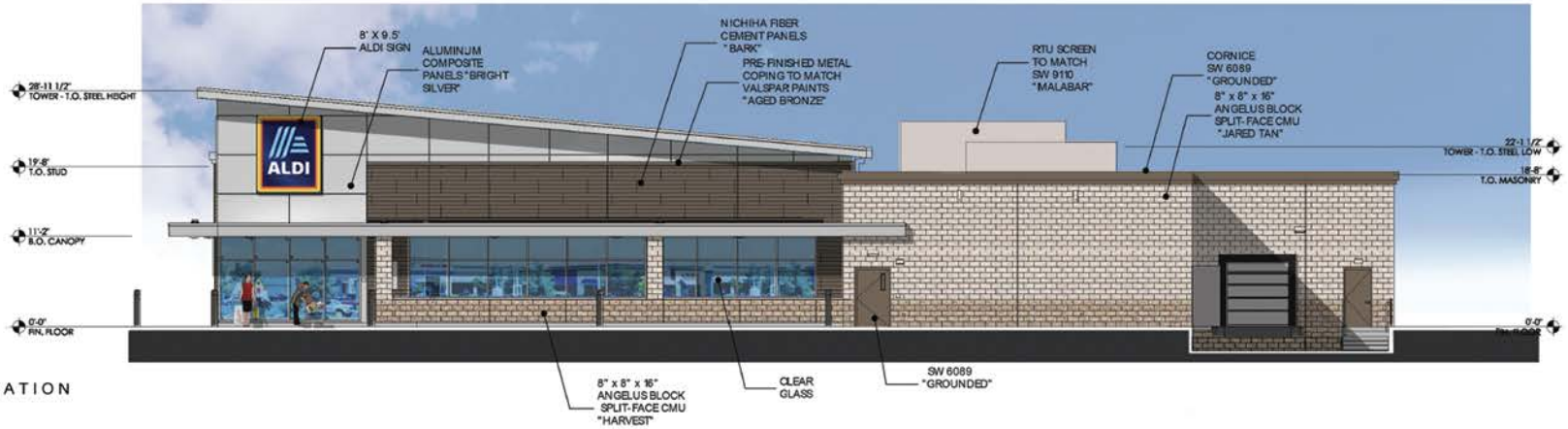
The property is currently vacant, except for an existing commercial building in the northeastern corner of the site which dates to 1955. Buildout of the Project would result in the existing building being demolished, and the development of a commercial plaza comprised of retail uses, restaurants, and office uses. Proposed structures would be no more than 35 feet in height and will be set back from Highway 18 by at least 45 feet. Exhibit 5 depicts typical building elevations included in the application materials.



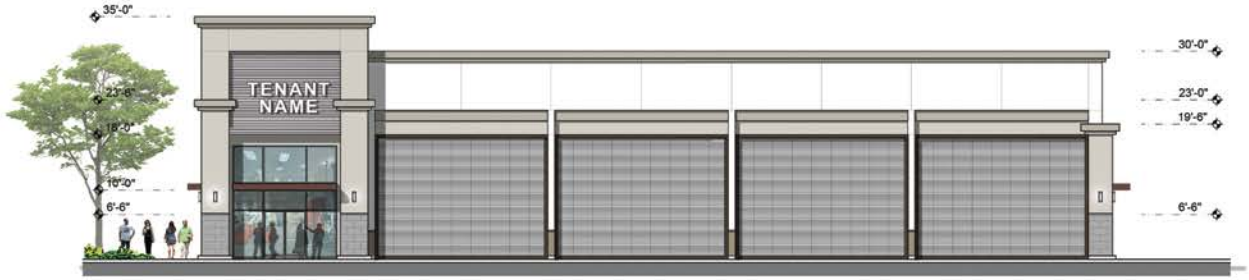
SOUTH ELEVATION



WEST ELEVATION



WEST ELEVATION





NORTH ELEVATION

Source: MMA Architecture, Re-submittal 07.11.2024

07.16.24

Exhibit

5

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Buffalo Trading Post Plaza
Typical Elevations
Apple Valley, California







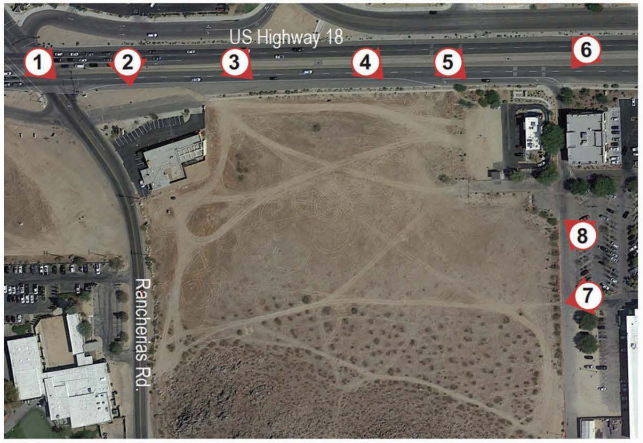












KEYPLAN

Source: MMA Architecture, 02.24.23

03.03.23

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Buffalo Trading Post Plaza
Views of Project Site
Apple Valley, California

Exhibit
6

Discussion of Impacts

a) Less Than Significant Impact. The Project proposes the development of a shopping plaza on a site zoned for General Commercial. The development would be consistent with surrounding land uses, particularly the shopping plazas to the east and north of the subject site. Scenic vistas in the area include the wide skies, nearby desert hills, and distant mountains.

Construction of the Project would require the use of heavy equipment for grading, paving and building construction. Construction activities would be visible from surrounding properties; however, impacts from construction would be temporary.

Consistent with the development standards for the site, the Project proposes buildings no taller than 35 feet and at a density not exceeding a floor area ratio of 0.5. Therefore, while the proposed development would likely have some impacts on scenic vistas, adherence to the Town's development standards pertaining to height and massing requirements (Development Code Chapter 9.35 Commercial and Office Districts) will ensure that these impacts are less than significant. In particular, the limited height of the proposed development would ensure that vistas of wide-open skies and open space from surrounding sites would generally be unimpeded by the Project.

The rocky hill behind the subject site is currently visible from Highway 18. Development of the proposed Project would partially impede the view of the bottom of the slope, however the higher elevations would remain visible from the highway. The hill would also remain visible through view corridors in between the buildings. As shown in the proposed site plan (Exhibit 3), the proposed configuration of the site would provide multiple view corridors looking south from the highway. Likewise, while the proposed development would partially impede views looking east from Rancherias Road, the configuration of the proposed buildings would provide corridors with eastward views. While these views are already partially impeded by existing developments, the higher elevations of distant mountains are visible.

The existing shopping plaza to the east of the Project currently has views of the nearby hills northwest of the subject site. While these views would be partially impeded within the shopping plaza, the mid- and high elevations of the hills would remain unimpeded from view from Highway 18. The Project would mostly be hidden from sight from south of the property due to the intervening hills. Vistas looking north from on top of the hills would be unimpeded because proposed structures are less than 35 feet in height.

Overall, adherence to the Town's development standards will ensure that the overall aesthetic experience of open skies would not be significantly impacted by the Project. Some views of nearby hills and distant mountains would be partially

obstructed by the proposed development, however the configuration of the Project would ensure that view corridors would remain. Furthermore, given that the Project is consistent with the land use designated for the site in the Town's General Plan, it can be assumed that any marginal impacts to scenic vistas have already been accounted for by the Town. Overall, impacts to scenic vistas as a result of the proposed development would be less than significant.

b) **No Impact.** The subject site is mostly vacant, with one existing structure which the Project proposes to demolish. This structure, originally the Buffalo Trading Post, was built in 1955. According to §15064.5 of the CEQA guidelines, a resource is 'historically significant' if it meets the criteria for listing on the California Register of Historical Resources.[2] The Cultural Resources Report prepared for the Project (Appendix C) determined that because the building has been substantially altered over time, it is no longer considered historically significant (see Section V Cultural Resources for detailed analysis). The Project would therefore not impact the character of a historic building.

The Project site is currently sparsely vegetated and contains no trees or other natural scenic resources. A rocky hill does occur immediately to the south of the subject site, but it would not be disturbed by the proposed Project. Most of the hill would remain visible from Highway 18 behind the Project, and even the lowest points in the hill would remain visible from Rancherias Road.

According to the Caltrans California State Scenic Highway System Map[3], there are no state scenic highways in the Project vicinity. Highway 18 is classified as an "Eligible State Scenic Highway" according to Caltrans but has not been officially designated. The Project would therefore have no impacts on scenic resources within a state scenic highway.

c) **Less Than Significant Impact**. The subject site is designated and zoned for General Commercial uses. The proposed Project conforms to the policies and regulations associated with this zone and designation, and would not conflict with applicable policies governing scenic quality in Apple Valley. Per the development standards for the General Commercial zone, the Project will include buildings no more than 35 feet tall, will be no denser than a floor area ratio of 0.5, and will be set back from Highway 18 and Rancherias Road by 45 feet and 25 feet, respectively. Additionally, the Project will include 21% landscaping, well above the 10% required by the Development Code.

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2 California Code of Resources Title 14 §15064.5(a)(1)-(3).

3 California Department of Transportation, California State Scenic Highway System Map (2019), https://caltrans.maps.arcgis.com/apps/webappviewer/index.html?id=465dfd3d807c46cc8e8057116f1aacaa (accessed March 2023).

The Project will also conform with the architectural design standards provided in §9.37.080 of the Town's Development Code. As shown in Exhibit 4, the proposed buildings will be designed to reflect the Town's desert setting and long-term values, while incorporating elements of tenant branding as necessary. The Project will incorporate the historic Buffalo Trading Post sign as an element of public art on the site, which will highlight a locally-important piece of the Town's culture and history. Per §9.37050 of the Development Code, the Project will incorporate desert landscaping through the use of native and drought tolerant plants, recognizing the Town's desert climate.

Overall, the Project will not conflict with applicable zoning and other regulations governing scenic quality. Impacts will be less than significant.

d) Less Than Significant Impact. The subject site is in an urbanized area in the Town of Apple Valley. The corridor along Highway 18 is where much of the Town's commercial development is concentrated. As such, areas along this corridor, including the vicinity of the Project site, are currently impacted by light and glare from vehicle headlights, streetlights, parking lot lighting, other outdoor lighting, and glare from reflective surfaces such as vehicles, building materials, and windows.

Short-Term (Construction-Related) Impacts

During the construction phase, there would be no need to add security lighting for construction areas or construction staging areas, because nighttime construction is not anticipated. Therefore, impacts related to new sources of light and glare during construction would be less than significant.

Long-Term (Operations-Related) Impacts

Development of the proposed Project would convert a mostly vacant lot into a shopping plaza, which would increase the amount of light and glare emitted from the site. However, the light and glare emitted by the Project is expected to be similar to that of surrounding commercial developments, namely those to the east and north of the site. On-site lighting will conform to the Town's lighting standards for commercial and office districts. The proposed development will be subject to review by the Town to ensure that the Project complies with standards and requirements in §9.37.090 of the Development Code intended to control light pollution. Compliance with these policies and regulations will ensure that the proposed Project has less than significant impacts related to the creation of new sources of light and glare.

Mitigation Measures:
Non required.

Monitoring:
Non required.

II. AGRICULTURAL AND FORESTRY RESOURCES				
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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?				✓
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				✓
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				✓

d)	Result in the loss of forest land or conversion of forest land to non-forest use?				
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?				

Sources: Town of Apple Valley General Plan (2009); California Department of Conservation Important Farmland Finder; San Bernardino County Assessor.

Environmental Setting

The Town of Apple Valley contains no forest lands. While agriculture figures prominently in the history of Apple Valley, no significant agricultural lands remain within the Town's boundaries. Former agricultural lands have trended towards equestrian uses and animal keeping. There is only one Williamson Act contract in effect in the Town. It is comprised of 2 acres of land located on the north side of Seneca Road, east of the Project site.

Discussion of Impacts

a-b) No Impacts.

Conversion of farmland: The Project site is located in a developed area of Apple Valley. As stated in the Town's General Plan, no significant agricultural lands remain within the Town.[4] According to the California Department of Conservation DLRP Important Farmland Finder, the subject property is on a mix of 'Other Land' and 'Urban and Built-Up Land'. The site is not on, or in proximity to farmland of any kind.

Williamson Act: According to the Town of Apple Valley General Plan, the land is currently zoned for General Commercial (C-G). It is not zoned for agriculture. No agricultural lands or uses occur in the vicinity of the Project site. The San Bernardino County Assessor classifies the property for commercial use, and it is not covered by the Williamson Act. The Project would therefore have no impacts to farmland, land zoned for agricultural use, or land covered by the Williamson Act, nor would it convert agricultural lands to non-agricultural uses. There would be no impacts.

[4] Town of Apple Valley General Plan (2009), p.III-23.

c) - e) No Impacts.

Forest Land: The Project site is mostly vacant, apart from the existing building in the northeastern corner. There are no forest lands on or around the property. The Project would not affect forest land or convert forest lands to non-forest uses. It would have no impacts related to forestry.

Mitigation Measures: None required.

Monitoring: None required.

III. AIR QUALITY				
Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?			✓	
b) 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?			✓	
c) Expose sensitive receptors to substantial pollutant concentrations?			✓	
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			✓	

Sources: MDAQMD California Environmental Quality Act (CEQA) and Federal Conformity Guidelines (February 2020); California Emissions Estimator Model Version 2020.4.0; Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).

Environmental Setting

Criteria air pollutants are air pollutants for which acceptable levels of exposure have been determined, and which are regulated by Ambient Air Quality Standards (AAQS). The current criteria air pollutants are: ozone (O_3), carbon monoxide (CO), particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), lead (Pb), sulfur dioxide (SO_2), and hydrogen sulfide (H_2S).

The Town of Apple Valley is within the Mojave Desert Air Basin (MDAB) and under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD). The MDAB encompasses the high desert portion of San Bernardino County, as well as portions of eastern Kern County, northeastern Los Angeles County, and eastern Riverside County. The MDAB is currently designated as being in nonattainment for regional levels of particulate matter (PM_{10}) and ozone (O_3).

According to the MDAQMD, any project is significant if it triggers or exceeds the most appropriate evaluation criteria. The District will clarify upon request which threshold is most appropriate for a given project; in general, the emissions comparison (criteria number 1) is sufficient:

1. Generates total emissions (direct and indirect) in excess of the thresholds given in Table 2, below;
2. Generates a violation of any ambient air quality standard when added to the local background;
3. Does not conform with the applicable attainment or maintenance plan(s);
4. Exposes sensitive receptors to substantial pollutant concentrations, including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1.[5]

Table 2
MDAQMD Emissions Thresholds

Criteria Pollutant	Annual Threshold (short tons)	Daily Threshold (pounds)
Carbon Monoxide (CO)	100	548
Oxides of Nitrogen (NO_x)	25	137
Volatile Organic Compounds (VOC)	25	137
Oxides of Sulfur (SO_x)	25	137
Particulate Matter (PM_{10})	15	82
Fine Particulate Matter ($PM_{2.5}$)	12	65
Hydrogen Sulfide (H_2S)	10	54
Lead (Pb)	0.6	3
Source: MDAQMD CEQA Guidelines (February 2020).		

Discussion of Impacts

a) Less Than Significant Impact. The Project is located in the MDAB, under the jurisdiction of the MDAQMD. All development within the MDAB, including the proposed Project, is subject to any applicable air quality management plan that establishes control strategies and guidance on regional pollutant emission reductions. Such plans include the Mojave Desert Planning Area Federal Particulate Matter Attainment Plan, which was adopted by the District in 1995 in order to bring the region into attainment for PM_{10}. The MDAQMD State and Federal Ozone Attainment Plan was adopted in 2004 and the MDAQMD Western

[5] MDAQMD California Environmental Quality Act (CEQA) and Federal Conformity Guidelines (February 2020).

Mojave Desert Non-attainment Area Ozone Attainment Plan was adopted in 2008. These plans were adopted with the aim of bringing the MDAB into federal attainment for ozone.

The MDAQMD CEQA Guidelines state that a project is considered conforming if it "complies with all proposed control measures that are not yet adopted from the applicable plan(s) and is consistent with the growth forecasts in the applicable plan(s)." The Southern California Association of Governments (SCAG) adopted the 2024-2050 Regional Transportation Plan/Sustainable Communities Strategy (2024 RTP/SCS) to comply with the metropolitan planning organization requirements under the Sustainable Community and Climate Protection Act. The growth forecasts provided in the RTP/SCS form the basis of the land use and transportation controls in the MDAQMD air quality plans. The 2024 RTP/SCS forecasts that by 2050, the Town of Apple Valley will have 38,700 households.[6]

According to the MDAQMD, a project can be assumed to conform with a growth forecast if it is consistent with a land use plan used in the development of the growth forecast.[7] The Project site is designated for General Commercial (C-G) according to the Town's General Plan. This land use designation "allows a broad range of retail uses, as well as office and service land uses… including all types of consumed goods, furniture and appliance sales, auto repair and sales… restaurants, both sit-down and fast food, gasoline service stations and general office."[8] The proposed shopping plaza aligns with the uses allowed under this designation. Given that the Project is consistent with the applicable land use plan, it can therefore be assumed to be consistent with the SCAG growth forecasts used in the MDAQMD attainment plans.

Also, as shown in Tables 3 and 4, below, both construction and operation of the Project will result in criteria emissions below the MDAQMD significance thresholds, and neither would violate any air quality standard. Thus, impacts from Project emissions are less than significant, and would not conflict with applicable air quality plans.

The MDAQMD CEQA Guidelines also state that a project can be considered as conforming with applicable air quality plans if it complies with all proposed control measures. According to the Town's General Plan, development in Apple Valley is subject to the MDAQMD Rule Book.[9] The current MDAQMA rule book contains 18 regulations and associated rules. Excerpts of applicable regulations to the Project are listed below. The complete list and full text of the current rule book is available on the MDAQMD website.

6 SCAG 2024-2050 Regional Transportation Plan/Sustainable Communities Strategy, Demographics and Growth Forecast Technical Report, Jurisdiction-Level Growth Forecast.

7 MDAQMD California Environmental Quality Act (CEQA) and Federal Conformity Guidelines (February 2020).

8 Town of Apple Valley General Plan (2009) Community Development, p.II-5.

9 MDAQMD Rule Book, https://www.mdaqmd.ca.gov/rules/rule-book (accessed March 2023).

Regulation II – Permits

Rule 201: Permits to Construct: *A person shall not build, erect, install, alter or replace any equipment, the use of which may cause the issuance of air contaminants or the use of which may eliminate, reduce or control the issuance of air contaminants without first obtaining written authorization for such construction from the Air Pollution Control Officer. A permit to construct shall remain in effect until the permit to operate the equipment for which the application was filed is granted or denied, or the application is canceled.*

Regulation IV – Prohibitions

Rule 402: Nuisance: *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 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.*

Rule 403: Fugitive Dust Control: *Purpose - The purpose of this rule is to reduce the amount of PM10 entrained in the ambient air from anthropogenic Fugitive Dust sources within the District by requiring actions to prevent, reduce, or mitigate Fugitive Dust.*

Rule 404: Particulate Matter Concentration: *A person shall not discharge into the atmosphere from any source, particulate matter except liquid sulfur compounds, in excess of the concentration at standard conditions, shown in Table 404(a). Where the volume discharged is between figures listed in the table, the exact concentration permitted to be discharged shall be determined by linear interpolation.*

Regulation XI – Source Specific Standards

Rule 1103: Cutback and Emulsified Asphalt: *To reduce emissions of volatile organic compounds (VOC) from the use of cutback and emulsified asphalts. The provisions of this rule apply to the manufacture, mixing, storage, use, and application of cutback and emulsified asphalts.*

Rule 1113: Architectural Coatings: *The purpose of this rule is to limit the quantity of Volatile Organic Compounds (VOC) in Architectural Coatings. Except as provided in subsection (A)(3), this Rule is applicable to any person who supplies, sells, offers for sale, manufactures, blends or repackages any Architectural Coating for use within the Mojave Desert Air Quality Management District as well as any person who applies or solicits the application of any Architectural Coating within the District.*

The Project would be required to comply with the contents of the Rule Book, including the implementation of fugitive dust control measures and the prohibition of nuisance odors. The Project would also be subject to Rule 201, which mandates that developments receive a permit from the Air Pollution Control Office, and Rule 13 which requires a review of project plans to ensure that new developments do not interfere with the attainment of ambient air quality standards. Compliance with these rules would ensure that the Project does not conflict with or obstruct the implementation of applicable air quality plans. Impacts would be less than significant.

b) **Less Than Significant Impact**. A project is considered to have significant air quality impacts if there is a cumulatively considerable net increase of any criteria pollutant for which the project is in non-attainment under the federal and state ambient air quality standards. The Project is located in the West Mojave Desert portion of the Mojave Desert Air Basin, which is currently designated as being in non-attainment for PM_{10} and ozone.

The air quality and greenhouse gas emissions expected to be generated by the proposed Project were estimated using the California Emissions Estimator Model (CalEEMod) Version 2020.4.0 (Appendix A). For analysis purposes, the commercial uses proposed by the Project were aggregated under the shopping plaza land use category (ITE Land Use Code 821). The proposed supermarket, tire store, restaurants, and car wash are all typical uses of a shopping plaza. Air quality projections were based on an assumed total of 73,209 square feet of building area, comprised of 43,909 square feet of building area resulting from Phase 1 of development and 35,000 square feet of building area resulting from Phase 2. The Phase 2 building area is based on the Traffic Impact Analysis Report prepared for the Project by Linscott, Law & Greenspan.

As shown in Tables 3 and 4, the Project will result in the emission of criteria air pollutants during its construction and operational phases.

Construction Emissions:
For analysis purposes, it is assumed that the Project will be operational by 2026/2027. Construction would take place over 2025 and 2026. The Project proposes two phases of development. However, for analysis purposes, construction of the whole Project was assumed to occur over a 20-month period, in order to provide the most conservative, worst-case scenario analysis. It is likely that development of Phase 2 would occur after completion of Phase 1, thereby reducing emission concentrations described below. The construction period will include demolition, site preparation, grading, paving, building construction, and application of architectural coatings. It is assumed that paving and architectural coating will occur concurrently with building construction.

Table 3 shows that the emissions generated by construction of the Project would not exceed the MDAQMD thresholds for any criteria air pollutants. The data in the tables below represent daily unmitigated emissions over the 20-month construction period, including winter and summer conditions, and assuming that required dust control measures have been applied to particulate matter emissions, per MDAQMD Rule 403. Given that the District's thresholds of significance for criteria air pollutants would not be exceeded during unmitigated construction activities, impacts would be less than significant.

Table 3
Maximum Daily Construction-Related Emissions Summary
(pounds per day)

Construction Emissions	CO	NO_x	ROG	SO_2	PM_{10}	$PM_{2.5}$
Daily Maximum	31.2	31.7	3.39	0.07	9.26	5.25
MDAQMD Threshold	548	137	137	137	82	65
Exceeds?	No	No	No	No	No	No

Operational Emissions:
Operational emissions refer to the ongoing emissions over the lifespan of a project. They include area source emissions, emissions from energy demand (i.e. electricity and natural gas), and mobile source (i.e. vehicular) emissions.

A Traffic Impact Analysis Report was prepared for the Project that estimated the Project would generate 8,750 daily trips (see Section XVII Transportation). Weekend trip rates were derived using ITE Land Use Code 821 for Shopping Plazas (40,000 to 150,000 square feet),[10] resulting in an estimated average of 8,503 trips on Saturdays, and 6,213 trips on Sundays.[11]

As shown in Table 4, the daily emissions estimated to be generated over the Project's operational life would not exceed the MDAQMD thresholds for any criteria air pollutants. Impacts would therefore be less than significant.

Table 4
Maximum Daily Operational-Related Emissions Summary
(pounds per day)

Operational Emissions	**CO**	**NO_x**	**ROG**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Daily Maximum	296	34.3	41.7	0.68	58.7	15.3
MDAQMD Threshold	548	137	137	137	82	65
Exceeds?	No	No	No	No	No	No

10 Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).

11 The daily trips estimated for the purposes of air quality and GHG analysis differ slightly from those projected in the Traffic Impact Analysis Report and used in Section XVII, Transportation. Air quality and GHG analysis aggregated the proposed land uses under the ITE Land Use Code for Shopping Plazas, while the Traffic Impact Analysis (Appendix D) considered the total trips from each proposed land use.

Cumulative Contribution – Non-Attainment Criteria Pollutants:
Given the dispersing nature of pollutant emissions and aggregate impacts from neighboring jurisdictions, cumulative air quality is evaluated at a regional scale. As previously stated, the West Mojave Desert portion of the Mojave Desert Air Basin is a designated non-attainment region for PM_{10} and ozone. Any development resulting in emissions of PM_{10}, ozone, or ozone precursors, will, to some extent, contribute to the region's existing non-attainment.

The MDAQMD does not currently provide thresholds of significance for the cumulative emissions of multiple projects. A project's potential cumulative contributions can instead be analyzed using the criteria for project-specific impacts. This method assumes that if an individual development generates less than significant construction and operational emissions, then it would not generate a cumulatively considerable increase in non-attainment criteria pollutants.

The Project is located in a non-attainment area for PM_{10} and ozone. The emission of ozone precursors, such as CO, NO_x, and ROG would also contribute to the region's ozone non-attainment. As shown in Tables 3 and 4, above, the Project's emissions of CO, NO_x, ROG, and PM_{10} are projected to be below the MDAQMD thresholds for project impacts. Standard best practices would be implemented in accordance with the MDAQMD rules, including dust control measures per Rule 403. Therefore, while the Project would contribute to incremental increases in emissions of criteria pollutants for which the region is in non-attainment, the Project's impact on regional PM_{10} and ozone levels would not be cumulatively considerable.

Summary:
The construction and operation of the proposed Project would result in emissions below the MDAQMD thresholds for criteria pollutants. The Project is also not anticipated to make significant contributions to the region's existing air quality violations. Therefore, the Project's impacts would be less than significant and would not be cumulatively considerable.

c) Less Than Significant Impact. The Project proposes a shopping plaza including a supermarket, tire store, drive-through restaurants, sit down restaurants, car wash, and retail space. The MDAQMD considers residences, schools, day care centers, playgrounds, and medical facilities as sensitive receptor land uses. Sensitive receptors in the Project area include residences to the north, northeast, and northwest. The nearest sensitive receptors to the subject site are single-family residences on the west side of Rancherias Road, approximately 375 feet west of the Project.

According to the MDAQMD CEQA Guidelines, certain project types on sites within a specified distance of a sensitive receptor must be evaluated using significance threshold criteria number 4:

> (4) [A project is significant if it] *Exposes sensitive receptors to substantial pollutant concentrations, including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1*.

The threshold distances that specific project types must be from sensitive receptors, as specified by the MDAQMA, are as follows:

- Any industrial project within 1000 feet;
- A distribution center (40 or more trucks per day) within 1000 feet;
- A major transportation project (50,000 or more vehicle per day) within 1000 feet;
- A dry cleaner using perchloroethylene within 500 feet;
- A gasoline dispensing facility within 300 feet.[12]

The Project does no propose industrial uses, a distribution center, a major transportation project, or gas station, and therefore would have no impacts related to such uses. While the Project does not propose a dry cleaner at this time, dry cleaners are a permitted use in the General Commercial land use designation. Building 7 is the nearest open retail space proposed by the Project that could potentially be used as a dry cleaner and is located 515 feet southeast of the nearest sensitive receptor (single-family residence). Because the nearest sensitive receptor would be more than 500 feet away, the Project would therefore not be anticipated to expose sensitive receptors to substantial pollutant concentrations, and impacts would be less than significant.

Health Impacts

According to the MDAQMD CEQA Guidelines, the District does not currently have a methodology to correlate the expected air quality emissions of a project to the likely health consequences of those emissions consistently and meaningfully.[13] With the technology available today, there are several factors that make it scientifically impossible to calculate the degree to which an individual's health would be impacted by exposure to various levels of criteria pollutant emissions:

- Differing medical histories mean that not all individuals would be affected equally. Some individuals may have medical pre-dispositions, and diet and exercise levels vary across a population.

[12] MDAQMD California Environmental Quality Act (CEQA) and Federal Conformity Guidelines (February 2020).

[13] Ibid.

- Due to the dispersing nature of pollutants, it is difficult to locate and identify which individuals will be impacted, either directly or indirectly.
- There are currently no agreed upon methodologies or studies upon which to base assumptions, such as baseline health levels or emissions level-to-health risk ratios.

While the District, and the field of study in general, do not have methodologies available to analyze the specific health consequences of a project's emissions, MDAQMD does recommend using of tools such as CalEEMod for the purposes of project evaluation.

Given these limitations, the extent to which the proposed Project poses a health risk is uncertain, but unavoidable. However, the results of the CalEEMod projections indicate that the Project's emissions are below the MDAQMD thresholds, and the application of the MDAQMD sensitive receptor guidelines also indicate that the Project is not within the threshold distance. Based on these findings, it is therefore anticipated that the Project's impacts and associated health effects resulting from criteria pollutants will overall be less than significant.

d) Less Than Significant Impact. Some land uses can be sources of odors that, while not necessarily physically harmful, may be unpleasant and distressing to the public. The MDAQMD regulates odors as a nuisance according to Rule 402 (Nuisance). The rule states that:

> *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 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.*

Land uses which are likely to generate odors, other than agricultural operations which are exempted, include chemical plants, composting operations, dairies, fiberglass molding, landfills, refineries, rail yards, and wastewater treatment plants.[14] The standard shopping plaza uses proposed for the Project may produce some odors, but these odors are not expected to be objectionable or long term. Kitchen exhaust ventilation will be required in all restaurant cooking areas to effectively remove grease, smoke, steam, vapors, heat, or odors from the air, per the San Bernardino Department of Public Health guidelines.[15] Likewise, while some odors may be generated during construction of the Project, their production

[14] SCAQMD Guidance Document, Chapter 2: Air Quality Issues Regarding Land Use.

[15] "Guidelines for Constructing or Remodeling Permanent Food Facilities" prepared by County of San Bernardino Department of Public Health, Environmental Health Services, October 2013.

would be short term and would likely disperse quickly with distance from the site even while they are being emitted. Overall, impacts from objectionable odors during construction and operation would be less than significant.

Mitigation Measures: None required.

Monitoring: None required.

IV. BIOLOGICAL RESOURCES **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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 Game or U.S. Fish and Wildlife Service?		✓		
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 Game or US Fish and Wildlife Service?				✓
c) Have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				✓
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?				✓
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?		✓		
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?		✓		

Sources: "Buffalo Trading Post Plaza Project, Biological Resources Assessment, Town of Apple Valley, California" prepared by Wood Environment & Infrastructure Solutions, Inc. (September 2022); Town of Apple Valley General Plan (2009).

Environmental Setting

The Town of Apple Valley is located in the Mojave Desert, a high desert with elevations from 2,000 to 5,000 feet above mean sea level. The climate in the Mojave Desert is characterized by extreme fluctuations of daily temperatures, high winds, and little precipitation. According to the Town's General Plan, areas of Apple Valley which have been minimally disturbed fall into the following natural communities: Saltbush Scrub plant in lower elevation areas, Creosote Scrub in mid-elevation areas, and Mojave Mixed Woody Scrub or Joshua Tree Woodland in the highest elevations.

In addition to federal and state plans and policies, biological resources in Apple Valley are subject to the Town's ordinances and policies. Additionally, the Town and San Bernardino County have been working with the Bureau of Land Management, the U.S. Fish and Wildlife Service, and the California Department of Fish and Wildlife to prepare a Multi-Species Habitat Conservation Plan/Natural Community Conservation Plan (MSHCP/NCCP).[16]

The Project site is located in a developed area of Apple Valley. Approximately 75% of the property has been disturbed and/or developed. The southern boundary of the property has been less disturbed, and is occupied by small pockets of Mojave mixed scrub. According to the biological resources assessment prepared for the Project, the natural community which the majority of the site most closely corresponds to is the "Sonora-Mojave Creosotebush-White Bursage Desert Scrub" community in the proposed in the MSHCP/NCCP.

The following analysis is primarily based on a biological resources assessment report (BRAR) prepared for the Project by Wood Environment and Infrastructure Solutions, Inc. (Appendix B)

Discussion of Impacts

a) Less Than Significant with Mitigation Incorporated. The literature review in the BRAR found seventeen special status plant species, three special status invertebrates, one special status reptile, six special status mammals, and seventeen special status birds known to occur in the Project area.

Plants: While sixteen special status plant species are known to occur in the Project area, two are not expected to occur on the subject site due to lack of habitat, and twelve additional species only have a very low to low potential for occurrence. As stated in BIO-1, if any of the twelve special status plants with a very low to low potential of occurrence are incidentally detected during other preconstruction biological surveys, then it is recommended that any unavoidable plants be transplanted, have seeds collected, and/or have the topsoil around them related to preserve individuals and/or the seedbank.

[16] Notice of Preparation for the Apple Valley Multispecies Habitat Conservation Plan and Natural Community Conservation Plan (Apple Valley MSHCP/NCCP) (April 2021).

Two special status plants were observed on the Project site: honey mesquite and western Joshua tree. Honey mesquite is covered by the Town's Plant Protection and Management Code, requiring consultation prior to removal of any mesquite with stems two inches or greater in diameter or six feet or greater in height. As such, the trees cannot be moved or impacted without consultation with the California Department of Fish and Wildlife (CDFW) and/or the Town of Apple Valley. Implementation of BIO-9 will assure that impacts to honey mesquite will be reduced to less than significant levels. Joshua trees are a candidate for state coverage as a threatened species, are covered by the Town's Plant Protection and Management code, and are proposed for coverage under the proposed MSHCP/NCCP. As of July 2023, western Joshua trees are also protected from take by the Western Joshua Tree Conservation Act (WJTCA). Five western Joshua trees exist on the site. The Project proposes the relocation of these trees from the area proposed for development to Parcel 9, which is to be left as undisturbed open space. As stated in BIO-10, this relocation will require an incidental take permit (ITP) from the CDFW, and must be done in accordance with Section 1927.3(a)(4)(A) of the Fish and Game Code and with CDFW protocols. Compliance with these requirements will ensure that impacts to western Joshua trees will be less than significant.

Invertebrates: Three special status invertebrates have the potential to occur on the subject property, one of which, the Victorville shoulderband, has no onsite habitat and therefore cannot occur. The other two species, the monarch butterfly and the San Emigdio blue butterfly have a low potential for occurrence on the site. The main threat to monarch butterflies would be impacts to milkweed, the larval foodplant. However, no milkweeds have been observed on the site. Likewise, the main threat to San Edmigdio blue butterfly would be impacts to *Atriplex canescens*, the species' foodplant. *Atriplex canescens* is present onsite in small numbers. Mitigation measure BIO-2 is required to reduce potential impacts to these state and federal candidate species to less than significant levels: preconstruction surveys should be conducted for the two foodplants. If the plant species are unavoidable, they should be inspected for caterpillars. If caterpillars are identified, then they should be moved to safe host plants with authorization from US Fish and Wildlife Service, CDFW, and/or the Town.

Fish, Amphibians, and Reptiles: The only special status fish, amphibian, or reptile with the potential to occur on the subject site is the desert tortoise. While no desert tortoise critical habitat has been designated on the Project site, and no tortoises or their burrows were observed during the field survey, the vegetation communities on the property are those typically used by desert tortoises. However, any reported occurrences of desert tortoises in the area have been north of the developed part of Apple Valley, and the site is isolated from any contiguous habitat. Therefore, while the potential for desert tortoise to occur on

the site is low, BIO-3 to BIO-5 will prevent the remote possibility of take. If desert tortoise is detected on the Project site, a qualified biologist will be required to make appropriate recommendations for avoidance or relocation, consistent with existing protocol for the species. Implementation of these mitigation measures will reduce the impacts to desert tortoise to less than significant levels.

Mammals: Six special status mammals have been known to occur in the Project area. Two of the species, the pallid bat and the hoary bat may forage over the site but would not be directly impacted by the proposed development because no roosting habitat occurs on-site. Neither Mohave River vole nor Mojave ground squirrel are expected to occur on the subject site due to lack of suitable habitat or the distance from the species' known range. No further action is required to address either species at this time. Likewise, the desert kit fox and the pallid San Diego pocket mouse each have a very low potential of occurring on the site. Given the low potential for occurring on-site, no further action is required. However, if an unanticipated desert kit fox den is identified on the property and cannot be avoided, then, per BIO-6, the CDFW and/or the Town should be consulted.

Birds: Seventeen special status birds are known to occur in the Project area, however nine of those species have no habitat on the subject property and thus are not expected to occur. An additional four species – Cooper's hawk, Swainson's hawk, golden eagle, and prairie falcon – have no nesting habitat on the site, and thus should simply be avoided if temporarily present for foraging. Cost's hummingbird, loggerhead Shrike, and Le Conte's thrasher all either occur on-site or have nesting habitat on-site. Under the Migratory Bird Treaty Act and State Fish and Game Code, mitigation measure BIO-7 must be applied to ensure there are no impacts to nesting birds.

Nesting habitat is also present on the site for burrowing owl. The BRAR concluded with a high degree of certainty that no burrowing owl currently occur on the Project site. However, given the presence of burrows suitable for burrowing owl occupation, mitigation is needed to minimize any risk of impacts. BIO-8 proposes two preconstruction surveys in order to be certain that no burrowing owl are present prior to commencing any ground disturbing activities.

Summary: In conclusion, various plants, invertebrates, reptiles, mammals, and birds identified as a candidate, sensitive, or special status species in local or regional plans, or by the CDFW and USFWS, have the potential to occur on the Project site. Implementation of BIO-1 through BIO-8 will ensure that there are no substantial adverse effects to these species, and that impacts are less than significant.

b, c) **No Impact.** The Project is in a developed area on a site which has mostly been disturbed. The plants onsite most closely correspond to the "Mojave Mid-Elevation Mixed Desert Scrub" natural community proposed in the MSHCP/NCCP. The biological resources assessment report (BRAR) prepared for the Project did not identify any riparian habitat or sensitive natural communities on the property. While stormwater features occur on the site, the BRAR determined that the waters are not jurisdictional. Given the absence of state or federally protected wetlands on the subject site, as well as the absence of riparian habitat or other sensitive natural communities, it can be concluded that the Project would have no impacts on these resources.

d) **No Impact.** The subject property is in a developed area in the core of Apple Valley. The habitat present on-site is relatively isolated from contiguous habitat. Therefore, the site is unlikely to serve as a migratory corridor, and thus the proposed development is unlikely to interfere with the movement of resident or migratory wildlife. The stormwater features on the subject property do not connect hydrologically with jurisdictional waters, and do not contain any fish. The Project would thus not interfere with any migratory fish movement. Furthermore, given that the biological resources assessment did not identify any nursery sites on the property, the Project would not impede the use of native wildlife nursery sites. Overall, given this evidence, it can be concluded that the proposed development would have no impacts on the movement or nursery sites of resident or migratory wildlife.

e) **Less Than Significant with Mitigation Incorporated.** Chapter 9.76 of the Town's Code of Ordinances provides the Plant Protection and Management code. As described above, two plants subject to the Town's Plant Protection and Management code were observed on the Project site: the western Joshua tree and honey mesquite. Both plants were observed on the subject property, and thus it is recommended that they are avoided if possible, or relocated if needed. As stated in mitigation measure BIO-9, if avoidance is not possible, consultation with the Town would be required prior to the removal of any honey mesquite with stems two inches or greater in diameter, or six feet or greater in height. As stated in BIO-10, an incidental take permit (ITP) will be required from CDFW prior to the relocation of the existing western Joshua trees.

Compliance with the Town's Plant Protection and Management code will ensure that the Project does not conflict with any local policies or ordinances protecting biological resources. However, it should be noted that the Town's Plant Protection and Management code is currently on a temporary hold from CDFW. During this temporary hold, Incidental Take Permits (ITP) may also need to be obtained from CDFW prior to the removal of honey mesquite. Compliance with the provided mitigation measures will ensure that the Project complies with all applicable local

policies or ordinances protecting biological resources, and that impacts would be less than significant.

f) Less Than Significant with Mitigation Incorporated. The Town of Apple Valley is working with San Bernardino County, the Bureau of Land Management, USFWS, and CDFW on the preparation of a Multi-Species Habitat Conservation Plan / Natural Community Conservation Plan (MSHCP/NCCP). This plan is still in progress and is not yet approved. Given that work on the plan, including the list of proposed species, has been underway for over a decade, the biological resources assessment prepared for the Project considered multiple lists of species proposed for coverage. As part of the biological resources assessment, a field reconnaissance survey was conducted to evaluate the suitability of existing habitat on site to support special status biological resources. Results of that field survey are as follows:

Plants: Six plant species proposed for coverage under the Town's MSHCP/NCCP have the potential to occur on the Project site. The western Joshua tree was observed on the property, and the white pygmy-poppy, desert cymopterus, Mojave monkeyflower, Booth's evening primrose, and beaver dam breadroot all have a very low to low potential of occurring on the site because as stated in the biological report's Table 1, habitat is marginal and/or disturbed, and/or occurrences have occurred miles from the Project site. The Town must be consulted if any of these species are detected on the Project property.

Invertebrates: As described under impact a), the San Emigdio blue butterfly, which is proposed for coverage under the MSHCP/NCCP, has a low potential to occur on the subject site. Mitigation measure BIO-2 will ensure that the butterfly's foodplant is avoided if possible, and otherwise a preconstruction survey to relocate any identified caterpillars to safe host plants with authorization from the Town is required.

Fish, amphibians, and reptiles: As described under impact a), there is a low potential for the desert tortoise to occur on the Project site. The tortoise is proposed for coverage under the MSHCP/NCCP. Mitigation measures BIO-3 to BIO-5 will ensure that if any desert tortoise are detected on site, that take would be prevented. The Town must also be notified if any desert tortoise are observed.

Mammals: The MSHCP/NCCP may include the desert kit fox as a covered species. While there is a low potential for this species to occur on the Project site because as stated in the biological report's Table 2, there are no dens on the Project site, and the site is isolated from adjoining habitat which discourages habitation, , if a desert kit fox den is identified and cannot be avoided, then the CDFW and/or the Town should be consulted for potential mitigation measures, as provided in BIO-6.

Birds: Three of the special status birds with the potential for nesting habitat on the subject site are also proposed for coverage under the MSHCP/NCCP: burrowing owl, loggerhead shrike, and Le Conte's thrasher. As described in impact a), implementation of mitigation measures BIO-7 through BIO-8 would ensure that the Project is compliant with the proposed MSHCP/NCCP.

Mitigation Measures:

BIO-1 If any unanticipated special status plant species are discovered during other preconstruction biological resource surveys, then any unavoidable plants shall be transplanted, have seeds collected, and/or have the topsoil around them relocated to preserve individuals and/or the seedbank. All removal, transplant, and relocation plans shall be prepared by a qualified biologist, following Town and CDFW guidelines and protocols.

BIO-2 Preconstruction surveys shall be conducted by a qualified biologist, following US Fish and Wildlife Service, CDFW, and/or Town appropriate guidelines and protocols, for milkweed and *Atriplex canescens*, the respective foodplants of the monarch butterfly and the San Edmigdio blue butterfly. If present on site, qualified biologists shall flag the plants for avoidance. If the plant species cannot be avoided, they shall be inspected for caterpillars. If caterpillars are identified, then they shall be moved to safe host plants with authorization from US Fish and Wildlife Service, CDFW, and/or the Town.

BIO-3 A worker's environmental awareness program (WEAP) shall be implemented to educate the construction crew of potential special status species present on the Project site.

BIO-4 Construction and maintenance personnel will be required to inspect for desert tortoises under vehicles prior to moving the vehicle. If a desert tortoise is found, it shall not be moved until the tortoise has left of its own accord. All desert tortoise observations shall be reported to a qualified biologist and the wildlife agencies (US Fish and Wildlife Service, CDFW).

BIO-5 Any open trenches adjacent to habitat shall be fenced and/or covered to prevent entry by desert tortoises when not under active use. Exit ramps shall be present within open trenches.

BIO-6 If an unavoidable desert kit fox den is encountered on the subject site during or prior to construction, the CDFW and/or Town shall be consulted for potential mitigation measures, if any are required.

BIO-7 Any vegetation removal or grading occurring during the nesting season (February 1 through August 31) will require at least one nesting bird survey to be conducted by a qualified biologist no more than three days prior to such activity. If no nests are found, construction may proceed. If active nests are found, impact avoidance measures (e.g. 'no work' buffers; sound and/or visual barriers) will be put in place around the nest until young have fledged. Additionally, if offsite nests are identified, then the CDFW recommended buffers of 500 feet for birds-of-prey and 100 to 300 feet for other birds shall be applied.

BIO-8 Preconstruction surveys for burrowing owl shall be conducted 14 days to 24 hours before ground-disturbing activities, and a final sweep shall be conducted within 24 hours prior to ground disturbance. If burrowing owls and/or signs of burrowing owls are found during the preconstruction survey, and if the burrows are unavoidable or subject to indirect impacts, then guidelines in CDFG (2012) will need to be followed. In this scenario, consultation with CDFW and the Town may be required, and a full breeding season survey (February 15 to June 16) may also be required.

BIO-9 Any species occurring on the subject property and covered by the Town's Plant Protection and Management code shall be avoided if possible. If not possible, consultation with the Town is required prior to the removal of any covered species with stems two inches or greater in diameter or six feet or greater in height. Given that the Town's Plan Protection and Management code is currently on hold, an incidental take permit (ITP) may need to be obtained from CDFW instead.

BIO-10 Prior to the relocation of any western Joshua trees, an incidental take permit (ITP) must be obtained from CDFW, and requirements of the Western Joshua Tree Conservation Act shall be followed. Relocation of western Joshua trees must be conducted by a qualified biologist and must be conducted in accordance with CDFW protocols and Section 1927.3(a)(4)(A) of the California Fish and Game Code.

Monitoring:

BIO-A Prior to the issuance of any permit to allow ground disturbance on the site, the Project shall provide the Town with pre-construction survey reports for all species listed in BIO-1 through BIO-8, following appropriate guidelines and protocols.
Responsible Parties: Project applicant, Project biologist, Planning Department, Town Engineer.

V. CULTURAL RESOURCES **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?				✓
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?		✓		
c) Disturb any human remains, including those interred outside of formal cemeteries?		✓		

Sources: "Historical/Archaeological Resources Survey Report for Rancherias Road & SR 18 Project" prepared by CRM Tech (December 2022).

Environmental Setting

The Town of Apple Valley is situated within the Victor Valley, which is part of Mojave River watershed. The area had four high stands of Lake Mojave and other lakes during the Late Pleistocene and early Holocene periods. These lakes provided a valuable water source to local aboriginal populations and were supplemented by the Mojave River in between high stands. As a result, most of the archaeological sites found in the Victor Valley are concentrated along the Mojave River. Sites found in this area of California often contain fragments of flat slab metates and plano-convex scrapers along with projectile points, suggesting a reliance on seed resources, plant pulp, and smaller game animals.

The Victor Valley is part of the homeland of the Serrano people, which is primarily centered around the San Bernardino Mountains. The name "Serrano" comes from a Spanish term meaning "mountaineer" or "highlander". The long-term settlements of the Serrano people were mostly located on elevated terraces, hills, and finger ridges near reliable sources of water, particularly in foothill areas and along major rivers. Spanish influence on the Serrano people was minimal until the 1810s, though contact with Europeans may have occurred in the early 1770s. Between 1810 and 1834, most of the Serrano were removed from the western portion of their territory. Between 1866-1877, most of the Serrano in the eastern portion of the territory were subject to punitive expeditions, resulting in the death or displacement of most of the remaining population in the San Bernardino Mountains. Most of the Serrano descendants are now associated with the Yuhaaviatam of San Manuel Nation, the Morongo Band of Missions Indians, or the Serrano Nation of Indians.

The first European exploration of the Victor Valley occurred in 1776, and the first European settlement appeared as early as 1860. Development of this region of California was generally slow until the second half of the 20th century. The Victor Valley has served as an essential link for major transportation corridors, including the Old Spanish Trail in the early 1830s, the Mormon Trail or Salt Lake Trail in the 1850s, the Santa Fe Railway since the 1880s, U.S. Route 66 during the first half of the 20th century, and now Interstate 15.

The Town of Apple Valley grew out of agricultural activity beginning in the early 20th century. The Town is named after an early effort in growing apples in the area, which was soon after followed by successful apple orchards. From the early 1940s to 1950s, Apple Valley became a popular tourism destination with guest ranches and rural retreats. However, by the mid-20th century, both apple orchards and guest ranches had largely disappeared from the Town. Apple Valley began to take its current shape in 1945, when Newton T. Bass and Bernard J. "Bud" Westlund acquired 25,000 acres of land for development into thousands of residential and commercial properties.

History of the Buffalo Trading Post: Zeke and Frances Cornia, a couple that moved to Apple Valley from Long Beach in 1947, had the Buffalo Trading Post constructed in 1955. The signage for the shop, a free-standing sign featuring a buffalo, was added to the corner of the property in 1960. The Cornia Family had a prior business in Apple Valley, the Black Horse Motel and adjoining gift shop that sold Native American-theme souvenirs. The Buffalo Trading Post building housed both a gift shop and the Cornia family's living quarters.

The Buffalo Trading Post building was designed by architect Douglas McFarland of the Los-Angeles-based firm McFarland-Bonsall. The building was conceived of as an adobe brick design, with a full-length arcade supported by lodge poles and posts. The building incorporated various Native American-inspired elements into the Pueblo design. The architect, McFarland, also designed the Town's first bank and real estate sale office but was most known for private residential projects.

Discussion of Impacts

In preparing the historical/ archaeological resource survey for the Project, CRM Tech conducted a records search at the South Central Coastal Information Center (SCCIC), a Sacred Lands File search via the Native American Heritage Commission (NAHC), and a field survey. The findings of these research methods are summarized below.

a) **No Impacts**. The SCCIC records search found that the Project site has not been surveyed for cultural resources before now. Past studies found two historical/archaeological resources, one of which is the 1948 Apple Valley Inn, and the other of which has been removed from the inventory. Both were located approximately half a mile southeast of the Project site and thus were determined to not warrant further consideration.

The historical and archaeological resources survey report prepared for the Project by CRM Tech found one potential historic resource on the subject property, the former Buffalo Trading Post building.[17] This building would be removed as part of the proposed Project.

Originally built in 1955, the Buffalo Trading Post building has since undergone numerous extensions and alterations. It has also been repurposed to accommodate various businesses run by subsequent owners of the property, including a bank, realty office, dental office, antique store, and most recently a carpet and granite business. The historical resources survey found that while the building is well known as a longstanding feature in the local landscape, it has been substantially altered from its original Pueblo architecture style. According to the historical resources survey, alterations include the extension of the main building, the addition of a full-length boxed parapet along the Highway 18 façade, the conversion of the living quarters' garage to a storefront along the Rancherias façade, and commercial window and door replacements throughout. Furthermore, after the Cornias' ownership, and for at least the past 40 years, the building has been repurposed to accommodate various businesses including a bank, a realty office, a dental office, an antique store, and most recently a carpet and granite business. It is also noteworthy that the highly distinctive free-standing buffalo sign, added to the site in 1960, was removed for storage early in 2022. The proposed Project includes the relocation of the sign to the site, as an on-site art piece in the landscape frontage.

According to §15064.5 of the CEQA guidelines, a resource is 'historically significant' if it meets the criteria for listing on the California Register of Historical Resources.[18] A resource may be listed in the California Register if it meets any of the following criteria:

1) Is associated with events that have made a significant contribution to the broad patters 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 historic.[19]

Given the substantial alterations to the building as a result of its use for various businesses, the historical resources survey found that it no longer retains a sufficient level of historical, architectural, or aesthetical qualities, nor sufficient

[17] "Historical/Archaeological Resources Survey Report for Rancherias Road & SR 18 Project" prepared by CRM Tech (December 2022).

[18] California Code of Resources Title 14 §15064.5(a)(1)-(3).

[19] Public Resources Code §5024.1(c).

historic integrity, to be considered eligible for listing in the California Register of Historical Resources. As such, it does not meet CEQA's definition of a historical resource. The proposed Project, including the removal of the former Buffalo Trading Post building, would therefore not cause a substantial adverse change in the significance of a historic resource, and there would be no impacts.

b) **Less Than Significant With Mitigation**. The historical/archaeological resource survey also analyzed the potential for archaeological resources on the site.

SCCIC records search: The SCCIC records search found that the Project site has not been surveyed for cultural resources before now. However, 19 previous studies have been conducted within a 1-mile radius of the subject site between 1979 and 2013.

Sacred Lands File search: CRM TECH submitted an inquiry to the Native American Heritage Commission (NAHC) for a search of the Sacred Lands File. The Sacred Lands File identified no Native American cultural resources in the Project vicinity. The NAHC notes that the absence of information on the File does not guarantee the absence of resources, and provided a list of potential tribal contacts for reference by the Town of Apple Valley for potential future government-to-government consultation.

While no evidence of archaeological resources was found for the Project vicinity, there is the potential for buried cultural resources to be discovered during earth moving operations. If archaeological or other cultural resources are discovered during earth-moving operations for the development of the Project, all work in that area must be halted or diverted until a qualified archeologist can evaluate the nature and significance of the finds, as stated in mitigation measure CUL-1. Furthermore, as stated in CUL-1 and CUL-2, the Yuhaaviatam of San Manuel Nation shall be contacted if any resources are discovered, and a Monitoring and Treatment Plan may be required. With the implementation of these mitigation measures, the Project would not cause any substantial adverse changes in the significance of an archaeological resource. Impacts would be less than significant with mitigation.

c) **Less Than Significant with Mitigation**. No evidence of human remains was observed during the cultural resources survey. Nor did the records search or Sacred Lands File search suggest any past use of the Project site as a cemetery or burial ground. However, implementation of CUL-3 would ensure that if any human remains, including those interred outside of formal cemeteries, are discovered during Project-related earth-moving operations, all work in the area would be halted or diverted until the coroner is notified and able to determine the nature of the remains, as well as whether Native American consultation would

be required, consistent with State law. Implementation of this mitigation measure would ensure that impacts are less than significant.

Mitigation Measures:

CUL-1 If buried cultural materials are discovered during any earth-moving operations associated with the Project, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior 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. Additionally, the Yuhaaviatam of San Manuel Nation Cultural Resources Department (YSMN) shall be contacted, as detailed within TCR-1, regarding any pre-contact and/or historic-era finds and be provided information after the archaeologist makes their initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment.

CUL-2 If significant pre-contact and/or historic-era cultural resources, as defined by CEQA, as discovered and avoidance cannot be ensured, the archaeologist shall develop a Monitoring and Treatment Plan, the drafts of which shall be provided to YSMN for review and comment, as detailed in TCR-1. The archaeologist shall monitor the remainder of the Project and implement the Monitoring and Treatment Plan accordingly.

CUL-3 If human remains, including those interred outside of formal cemeteries, or funerary objects are discovered during any earth-moving operations associated with the Project, all work within a 100-foot buffer of the find shall cease, 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.

Monitoring:

CUL-A The archaeological monitor shall provide the Town with a report of findings within 30 days of completion of earth moving activities.
Responsible Parties: Project applicant, Project archaeologist, Tribal monitor, Planning Department.

VI. ENERGY **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			✓	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?			✓	

Sources: California Energy Emissions Model 2020.4.0; California Energy Commission Total System Electric Generation.

Environmental Setting

Primary sources of energy are fossil fuel (natural gas, oil, coal), nuclear energy, and renewable sources such as wind, solar, geothermal, and hydro. These primary sources are converted to electricity, a secondary energy source. In California, 48.35% of electricity is generated from natural gas, and 33.35% is generated from renewables.[20] Other than for electricity generation, natural gas is used for space heating, cooking, water heating, industrial processes, and transportation fuel.

Southern California Edison (SCE) provides electricity to the Town of Apple Valley. Southwest Gas Corporation (SWG) provides natural gas to the Town.

Discussion of Impacts

a, b) Less Than Significant Impact. The Project would use energy resources on a short-term basis during its construction and on a long-term basis for operations. Grading and construction would primarily require petroleum and diesel in order to operate heavy equipment, haul materials, and transport construction workers. Some electricity may be required during construction to charge and operate electronic equipment, as well as for construction site lighting and power for temporary worksite offices. The Project consists of typical commercial development and has no characteristics that would result in unusually high use of energy for construction. Construction practices would be subject to current MDAQMD rules and regulations, such as source-specific standards for engines and limits on equipment idling duration. The Project would also adhere to state Low Carbon Fuel Standards for construction equipment and heavy-duty vehicle efficiency standards. These standards would reduce fuel consumption, help maximize fuel efficiency, and reduce pollutant emissions. In summary, energy use during

[20] 2020 Total System Electric Generation, California Energy Commission.

construction would be temporary, minimal, and would not be wasteful or inefficient.

Once operational, the Project would consume energy for building and site lighting, space heating and cooling, as well as for customer and employee transportation to and from the site. As shown in Table 5, the Project's estimated annual energy consumption would be 1,031,864 kWh of electricity and 175,932 kBTU of natural gas.

Table 5
Project Energy Consumption

Land Use	Electricity Use (kWh/yr)	Natural Gas Use (kBTU/yr)
Parking Lot	61,040	0
Shopping Plaza	970,824	175,932
Total	**1,031,864**	**175,932**

Source: CalEEMod 2020.4.0 (see Appendix A for full output).

The Project's electricity use of 1,031,864 kWh per year represents approximately 0.31% of the 329,848,695 kilowatt-hours used by the Town in 2019. Operation of the Project is estimated to use approximately 175,932 kBTU (1,759.74 therms) of natural gas per year, which represents approximately 0.01% of the 15,526,732 therms used Town-wide in 2019. Overall, the energy use required by the Project would make up a small fraction of Apple Valley's total energy consumption.

Furthermore, the Project would be subject to applicable policies in the Town's Climate Action Plan (CAP).[21] For example, the Project would be required to comply with the applicable standards in the California Green Building Code and Energy Efficiency Standards. This would include meeting or exceeding the state performance for water heating, space heating and cooling, and ensuring that buildings on the site are solar-ready.

Conclusion

The Project's energy use during construction would be temporary and minimal. The electricity and natural gas consumed by the Project once operational would make up a small fraction of the Town-wide energy consumption, as provided in the CAP. The Project's energy use would therefore not be wasteful, inefficient, or unnecessary. The Project's proportionately small energy use and compliance with applicable policies in the CAP, including compliance the California Green Building Code and Energy Efficiency Standards, means that it would not conflict with or obstruct the implementation of a local or state energy efficiency plan. Overall, the Project's impacts related to energy would be less than significant.

Mitigation Measures: None required.
Monitoring: None required.

[21] Town of Apple Valley, Climate Action Plan 2019 Update (Adopted May 2021).

VII. GEOLOGY AND SOILS **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) 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.				✓
ii) Strong seismic ground shaking?		✓		
iii) Seismic related ground failure, including liquefaction?			✓	
iv) Landslides?				✓
b) Result in substantial soil erosion or the loss of topsoil?			✓	
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?			✓	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?				✓
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?				✓

VII. GEOLOGY AND SOILS Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				✓

Sources: "Geotechnical and Infiltration Evaluation, Proposed Retail/Commercial Development APNs 3112-171-16 and Portion of 3112-171-17, California State Highway 18 and Rancherias Road" prepared by GeoTek, Inc. (August 2022); Town of Apple Valley General Plan (2009).

Environmental Setting

Geology

The Project site is located in the Mojave Desert geomorphic province, a wedge-shaped area bounded by the San Andreas fault zone and the Transverse Ranges to the southwest, the Garlock fault zone and Tehachapi Mountains to the northeast, and the Nevada and Arizona state lines to the east.

The local geological character is largely influenced by its proximity to large active fault systems. The San Andreas, Helendale, Lenwood, and Lockhart fault zones are mostly found in the western half of the area, and generally run northwest-southeast. Additional, smaller fault zones occur across the province.

The Project site is located in an area generally underlain by younger alluvium. Granite and quartz monzonite bedrock occur just south of the property.

Soils

The Project site is generally flat and mostly disturbed. The existing building on the northeastern corner of the property is accompanied by asphalt concrete pavement and other improvements. According to the results of the Geotechnical Evaluation conducted for the Project by Geotek, groundwater is estimated to be more than 50 feet below the existing grade.

Soil mapping for the Project site found that three soil series occur: Bryman loamy fine sand, 0 to 2 percent slopes; Wasco sandy loam, cool, 2 to 5 percent slopes; and rock outcrop-lithic torriorthents complex, 15 to 50 percent slopes.[22] According to samples taken on-site, earth materials on the property are primarily comprised of undocumented fill and alluvium. The undocumented fill consisted predominantly of silty sands and was found in borings conducted throughout the property. The alluvial soil, also found throughout the property, consisted of silty sands and sandy silts (SM and ML soil types).

[22] "Buffalo Trading Post Plaza Project, Biological Resources Assessment, Town of Apple Valley, California" prepared by Wood Environment & Infrastructure Solutions, Inc. (September 2022)

Paleontological Resources

Younger Quaternary alluvium occurs throughout most of the Town. These relatively young surface deposits have a low potential for containing significant paleontological resources. No fossils have been reported in the Town.

The following analysis is primarily based on the Geotechnical and Infiltration Evaluation prepared for the Project by GeoTek, Inc. (Appendix D)

Discussion of Impacts

a, i) **No Impact.** Fault rupture occurs when movement in a deep fault in the earth breaks through to the surface. While the site is located in a seismically active region, it is not situated within an Alquist-Priolo Earthquake Fault Zone. It is also not within a seismic hazard area as identified in the San Bernardino County Geologic Hazards Overlay Maps. No active or potentially active fault is known to exist at this site. Given this evidence, the Project would not experience adverse effects related to fault rupture. There would be no impacts.

a, ii) **Less Than Significant with Mitigation**. The Project is located in a seismically active region. The nearest faults are the Helendale-South Lockhart fault, approximately 8 miles northeast of the subject site, and the San Andreas fault, approximately 22 miles to the southwest. The site is not within an Alquist-Priolo Fault Zone, nor is it in a seismic hazard area as defined by the San Bernadino County Geologic Hazards Overlay Map. However, because the region is seismically active, strong ground shaking could occur. Seismic design measures should thus be integrated into the Project to minimize potential adverse effects. The Project will be required to be built in accordance with the most recent edition of the California Building Code, including considerations for earthwork, foundation design, grading, and seismic design parameters (GEO-1). Furthermore, the Project's structural engineer will be responsible for the selection of the appropriate seismic design coefficients (GEO-2). With the implementation of these measures, impacts related to ground shaking will be less than significant.

a, iii) **No Impact**. Liquefaction occurs when earthquake-induced ground shaking causes movement of soil particles to result in a liquified soil/water mix being formed and pushed to the surface. A soil is at risk of liquefaction when susceptible soils, groundwater at a depth of less than 50 feet, and strong seismic shaking all occur.

The geotechnical investigation prepared for the Project estimated on-site groundwater depth to be more than 50 feet below the existing grade. Based on this finding, the site is not considered to be susceptible to liquefaction during a seismic event. No impacts are anticipated.

a, iv) **No Impact.** The Project site has generally flat terrain, with a slope of approximately 1 to 2 percent gradient down to the northwest, and approximately 20 feet of elevation differential across the site. Based on this topographic condition, the geotechnical report determined that the site has not potential for seismic induced landslides or lateral spreading. There would therefore be no impacts.

b) **Less Than Significant.** According to the Town's General Plan, Apple Valley is susceptible to wind erosion. In order to minimize erosion and dust during Project grading and construction, applicable grading policies and regulations from the Town and the California Building Code should be adhered to. For example, Program 2.A.1 of the Town's Open Space and Conservation Element requires erosion control measures and Best Management Practices to be included as a component of grading plans. Additionally, the Town will require the implementation of a dust control plan, consistent with MDAQMD Rule 403. Implementation of these standard measures will ensure that the Project does not result in substantial soil erosion or loss of topsoil. Impacts will be less than significant.

c) **Less than Significant Impact.** The Project site is situated on dense alluvial soil and has a groundwater depth greater than 50 feet. Given these conditions, the geotechnical investigation prepared for the Project concluded that the site is not susceptible to liquefaction, settlement, or lateral spread. Due to the relative flatness of the subject site, the geotechnical report also concluded that there is no risk of landslide. Therefore, because the Project is not located on an unstable geological unit or soils, there would be less than significant impacts related to landslide, lateral spreading, subsidence, liquefaction, or collapse. Given that the current soil conditions are considered to be suitable for development, and provided that the Project's earthwork and grading comply with standard Town, County, and State requirements, on-site soils would not become unstable as a result of the Project. Overall, impacts will be less than significant.

d) **No Impact.** The Project site is located on alluvial soil consisting of silty sands and sandy silts (SM and ML soil types). Laboratory testing of upper soil samples, conducted for the geotechnical investigation found a "very low" (0-20) expansion potential. The Project can thus be concluded to not be located on expansive soils, and would not create risks to life or property as a result. There would be no impacts.

e) **No Impact**. The subject property is located in a developed area in the core of Apple Valley. Sewage disposal will be provided to the Project by the public sewer system. Septic tanks or alternative wastewater disposal systems will not be required. There will be no impacts.

f) **No Impact.** According to the Town's General Plan, the soils in Apple Valley are relatively young and thus have a low potential for containing significant

paleontological remains. Furthermore, most of the Project site has been disturbed and no unique geologic features have been identified. Paleontological resources or unique geologic features are not expected to occur on the subject property and would thus not be destroyed by the Project. There will be no impacts.

Mitigation Measures:

GEO-1 The subject development must comply with all applicable seismic design policies the most recent California Building Code.

GEO-2 Based on the final selection of appropriate seismic design coefficients made by the Project's structural engineer, adherence to corresponding seismic building practices will be required.

Monitoring: Prior to the issuance of any permit to allow ground disturbance on the subject site, the Project shall provide the Town with engineering reports.
Responsible parties: Project applicant, Project engineer, Planning Department, Town Engineer.

VIII. GREENHOUSE GAS EMISSIONS **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			✓	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			✓	

Sources: CalEEMod Version 2020.4.0; MDAQMD California Environmental Quality Act (CEQA) and Federal Conformity Guidelines (February 2020); Town of Apple Valley 2019 Climate Action Plan Update; Town of Apple Valley General Plan (2009).

Environmental Setting

Certain gases, known as greenhouse gases (GHGs), allow solar radiation into the earth's atmosphere but prevent heat from escaping. The principle GHGs are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), and fluorinated compounds (hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride). These gases are produced from natural processes and human activities, but their production increased significantly in the last century, resulting in climate change.

Assembly Bill 32 (AB 32) and Senate Bill 32 (SB 32) require California to reduce GHG emissions to 40% below 1990 levels by 2030. The California Air Resource Board (CARB) 2022 Scoping Plan sets the target of state-wide carbon neutrality by 2045.

The Town of Apple Valley approved its Climate Action Plan (CAP) update in 2019, establishing its strategies to meet state GHG reduction targets. The CAP found that Town-wide CO2e emissions in 2019 were approximately 597,681 MTCO2e. In order to achieve its 2030 target of 40% below 2005 emissions levels, Town-wide emissions would need to be reduced by an additional 299,565 MTCO2e.

Apple Valley is under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD). The District's threshold to evaluate the significance of project-related GHG emissions is 100,000 tons per year or 548,00 pounds per day.

Discussion of Impacts

According to the MDAQMD, any project is significant if it triggers or exceeds the most appropriate evaluation criteria. The District will clarify upon request which threshold is most appropriate for a given project; in general, the emissions comparison (criteria number 1) is sufficient:

1. Generates total emissions (direct and indirect) in excess of the thresholds given in Table 2.9-1 of the MDAQMD CEQA Guidelines;
2. Generates a violation of any ambient air quality standard when added to the local background;
3. Does not conform with the applicable attainment or maintenance plan(s);
4. Exposes sensitive receptors to substantial pollutant concentrations, including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1.[23]

Table 6
MDAQMD Significance Thresholds

Criteria Pollutant	Annual Threshold (short tons)
Greenhouse Gases (CO2e)	100,000
Source: MDAQMD CEQA Guidelines (February 2020).	

a) Less Than Significant Impact. California Emissions Estimator Model (CalEEMod) Version 2020.4.0 was used to project the greenhouse gas emissions (GHG) expected from the Project. The proposed development would generate GHG emissions during construction and operations. As stated in Section III, Air Quality, air quality and GHG emissions were calculated based on an assumed total of 73,209 square feet of building area, aggregated under the Shopping Plaza land use (ITE Land Use Code 821).

Construction:
Construction of the Project would result in temporary GHG emissions resulting from the operation of construction equipment as well as vehicle emissions from construction employee commutes and materials hauling. As shown in Table 7, the Project would generate a total of 735 metric tons of carbon dioxide equivalent (CO_2e) over the two-year construction period.

There are currently no GHG emissions thresholds for the construction-related emissions from projects of this nature. Therefore, construction emissions resulting from the Project were amortized over a 30-year period and added to the annual operational emissions. The combined amortized construction and total operational emissions were then compared with the MDAQMD significance threshold for CO2e to determine whether construction emissions would result in a cumulatively considerable impact.

[23] MDAQMD California Environmental Quality Act (CEQA) and Federal Conformity Guidelines (February 2020).

Operation

Five categories of emissions would contribute to the Project's annual GHG emissions during its operational life: area emissions (e.g. pavement and architectural coating off-gassing), energy use, mobile source emissions (vehicle emissions), solid waste, water use, and refrigerant use. Table 7 shows the Project's estimated annual emissions from each category.

Table 7
Projected GHG Emissions Summary
(Metric Tons)

Phase	CO_2e (MT/YR)
Construction	
2023	534
2024	201
Construction Total	735
Operation	
Area	1.07
Energy	158
Mobile	10,376
Waste	24
Water	12.4
Refrigerants	0.08
Construction: 30-year amortized [1]	24.5
Total Operational	10,596.05
MDAQMD Annual Threshold	100,000
Exceeds?	No

1. Buildout construction GHG emissions were amortized over 30-years then added to buildout operational GHG emissions. 735/30 = 24.5

Source: CalEEMod Version 2022.1.1.26

As shown in the above table, the Project's annual operational emissions, including the amortized construction emissions, would be below the MDAQMD annual threshold for CO_2e. It can therefore be concluded that the greenhouse gas emissions generated by the Project either directly or indirectly would have a less than significant impact on the environment.

b) **Less than Significant Impact.** The Town's 2019 Climate Action Plan (CAP) Update provides Apple Valley's comprehensive strategy for greenhouse gas emissions reductions. It establishes Apple Valley's strategy for meeting the SB 32 emissions reductions targets by reducing the Town's emissions to 40% below 2005 levels by 2030.

According to the MDAQMD CEQA Guidelines, a project is deemed to conform with an emissions reduction plan if it is consistent with the existing land use plan. The Project proposes the development of a shopping plaza including uses such as a supermarket, tire store, sit-down restaurant, drive-through restaurant, drive-through coffee shop, and car wash. The Project site is designated for General Commercial (C-G), which, according to the General Plan, "allows a broad range of retail uses, as well as office and service land uses… including all types of consumed goods, furniture and appliance sales, auto repair and sales… restaurants, both sit-down and fast food, gasoline service stations and general office."[24] The uses proposed for the Project conform with those allowed for the C-G land use designation. Therefore, given that the Apple Valley CAP is based on the growth projected to occur from buildout of the General Plan, the Project's conformance with the General Plan implies compliance with the CAP.

The Project would also comply with applicable policies in the CAP, such as ND-12 which requires that new developments meet the state Title 24 Energy Efficiency Standards. Title 24 includes efficiency performance standards for space heating and cooling, water heating, solar control, lighting, and landscaping. The Project would also be subject to all MDAQMD Rules as applicable to greenhouse gases. Rule 201, which requires preconstruction plan review by the Air Pollution Control Office, would ensure that the Project complies with all applicable rules.

Overall, conformance with the land use plan and implementation of the CAP would ensure that the Project does not conflict with applicable plans, policies, or regulations adopted for the purpose of reducing greenhouse gas emissions. Impacts would be less than significance.

Mitigation Measures: None required.

Monitoring: None required.

[24] Town of Apple Valley General Plan (2009) Community Development, p.II-5.

IX. HAZARDS AND HAZARDOUS MATERIALS **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?		✓		
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?		✓		
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				✓
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?			✓	
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 or excessive noise for people residing or working in the project area?				✓
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			✓	
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?			✓	

Sources: Town of Apple Valley General Plan; "Phase 1 Environmental Assessment: 12.23± Acres, Apple Valley, CA" prepared by ALTEC Land Planning (January 2022); California Department of Forestry and Fire Protection's Fire and Resources Assessment Program (FRAP) FHSZ Viewer, https://egis.fire.ca.gov/FHSZ/, (accessed December 2022); California Department of Toxic Substances Control EnviroStor Database (accessed December 2022); California State Waterboard GeoTracker Database (accessed December 2022).

Environmental Setting

The California Health and Safety Code (HSC) defines a 'hazardous material' as "a substance or waste, that, because of its physical, chemical, or other characteristics, may pose a risk of endangering human health or safety or of degrading the environment".[25] In this section, the term "hazardous materials" refers to both hazardous substances and hazardous waste.

The federal government and the State of California require businesses and facilities that involve hazardous or toxic substances to report chemical releases and transfers of toxic waste to off-site locations.

Hazards and hazardous materials are managed in San Bernardino County by Environmental Health Services (EHS), which works to protect public health and prevent environmental hazards, and the County Fire Protection District, which is a Certified Unified Program Agency (CUPA). CUPAs are responsible for applying state standards for the issuance of permits, inspections, and hazardous materials and waste enforcement. Hazards are also managed by the Town and the Apple Valley Fire Protection District. Policies in the Town's General Plan, Municipal Code, Emergency Operations Plan (2014) and Local Hazard Mitigation Plan (2017) provide local regulations for hazardous materials as well as response plans for other hazards.

The following analysis is based in part on a Phase 1 Environmental Assessment prepared for the Project by ALTEC Land Planning.

Discussion of Impacts

a, b) Less Than Significant with Mitigation Incorporated. The Project proposes the development of a commercial plaza including general retail space, drive-through restaurants, a carwash, tire shop, and general office space.

Construction of the proposed development could involve the use of potentially hazardous materials such as fuels and oils for the operation and maintenance of heavy vehicles and equipment. All potentially hazardous materials used during Project construction must be stored, used, and disposed of in accordance with the manufacturers' instruction, and be handled in compliance with applicable federal, state, and local regulations.

Once constructed, the development may include tenants such as a dry cleaner, car wash, tire shop, medical or dental office. These businesses may include medical and hazardous wastes. The routine transport and use of these substances, as well as the potential risk of release of these substances, could create hazards to the public and/or the environment. However, the Project will

[25] California Health and Safety Code, Section 25260 (d)

be subject to federal, state, and local regulations pertaining to the handling, storage, and transportation of hazardous materials. Compliance with such regulations, including the Hazardous Materials Transportation Act, the California Health and Safety Code, and programs administered by the San Bernardino County CUPA, will ensure that adequate safety and emergency response measures will be implemented. Additionally, as provided in mitigation measure HAZ-1, the Phase 1 Environmental Site Assessment prepared for the Project recommends design safeguards for any storage tanks and systems proposed for the development. Compliance with applicable regulations and implementation of this mitigation measure will reduce any potential hazards to the public or the environment including any risks to the public and environment related to the potential risk of hazardous materials being released. Impacts are anticipated to be less than significant with implementation of mitigation measure HAZ-1.

c) No Impacts. As stated above, future uses within the Project may involve the transport, used, and storage of hazardous stances. However, the Project site is not located within one-quarter mile of an existing of proposed school. The nearest existing school is Phoenix Academy, located approximately 2,900 feet northeast of the subject property. As such, the Project would have no impacts related to the handling of hazardous substances within one-quarter mile of an existing or proposed school.

d) Less Than Significant Impacts. According to the State Water Board GeoTracker database, there are two completed leaking underground storage tank (LUST) sites in proximity to the subject property. Both the Apple Valley Country Club cleanup site and Rebel Gas cleanup site are located within 700 feet of the Project site and involved potential gasoline contamination, but both cleanup cases are now completed. The subject property is not on or in proximity to any other sites included on a list of hazardous sites compiled pursuant to Government Code §65962.5. Furthermore, a broad records search conducted for the Phase 1 ESA found no issues of environmental concern. Overall, given that no issues were identified and that the Project is not located on a property listed as a hazardous materials site, impacts would be less than significant.

e) No Impacts. The subject property is located approximately 3.4 miles south of the Apple Valley Airport. The site in not located within the airport influence areas.[26] Any safety hazards or excessive noise related to the airport are not expected to impact the Project Site. There would be no impacts.

[26] Town of Apple Valley General Plan (2009), Exhibit II-4.

f) Less Than Significant Impacts. The proposed Project would not impair the implementation of an adopted emergency response plan or emergency evacuation plan. The proposed development is consistent with the General Commercial (G-C) designation assigned to it in the Town's General Plan. The Apple Valley Emergency Operations Plan (2014) and Local Hazard Mitigation Plan (2017) integrate with the Town's General Plan. It can therefore be assumed that alignment with the General Plan would indicate the Project's alignment with the Town's emergency response and mitigation plans.

According to the Town's Local Hazard Mitigation Plan, interstates serve as major emergency response and evacuation routes.[27] The Project would have direct access to Highway 18, which connects to Interstate-15. As described in the Traffic Study prepared for the Project (Appendix D), the development would have two access points on Rancherias Road, and one access point on Highway 18. Review of the site plans by the Apple Valley Fire Protection District prior to the issuance of development permits will ensure that the Project would not have significant impacts on the Town's emergency response plans. Overall, impacts would be less than significant.

g) Less Than Significant Impacts. The majority of the Town of Apple Valley, including the Project site, is within a Local Responsibility Area (LRA) according to the CALFire Fire and Resource Assessment Program (FRAP). The most up to date FRAP maps only display the fire hazard severity in LRAs for very high fire hazard severity zones (VHFHSZ). According to FRAP maps, there are no fire hazard severity zones in the LRA encompassing most of Apple Valley.

According to the Town of Apple Valley Local Hazard Mitigation Plan, the subject property is within the Apple Valley LRA fire hazard severity zone designated as moderate. However, given the sites location in a developed area in central Apple Valley, development of the Project is not expected to expose people or structures to a significant risk of loss, injury, or death involving wildland fires. The Project is required to implement all applicable policies in the California Building Code and California Fire Code, and the Project plans will be subject to review by the Apple Valley Fire Protection District. These measures will reduce the potential risks related to wildland fires to less than significant levels.

Mitigation Measures:

HAZ-1 Any storage tanks or other potentially hazardous products that would require storage tanks or systems shall use the following attributes to safeguard against potential soil and groundwater contamination:

[27] Town of Apple Valley Local Hazard Mitigation Plan 2017 Update, p.4-76.

Table 8 Recommended Storage Tank Design Safeguards	
Component	**Design Feature**
Tanks	Use of above ground tanks and double-walled design
Piping System	Use of piping distribution systems with double-walled design
Leak Detection	Use of Annulus leak detector system
Refilling	Use of fuel tank supply (refilling) containment boxes)
Dispenser	Use of containment boxes, if applicable
Source: "Phase 1 Environmental Assessment: 12.23± Acres, Apple Valley, CA" prepared by ALTEC Land Planning (January 2022).	

Monitoring: The applicant shall provide design specifications for storage tanks or similar equipment to the Town as part of the building permit application.
Responsible parties: Project applicant, Project engineer, Planning Department, Town Engineer.

None required.

X. HYDROLOGY AND WATER QUALITY **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			✓	
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			✓	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:			✓	
i) result in substantial erosion or siltation on- or off-site;			✓	
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;			✓	
iii) 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; or			✓	
iv) impede or redirect flood flows?			✓	
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?			✓	
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?				✓

Sources: Liberty Utilities Urban Water Management Plan (2020); American Water Works Association Research Foundation Commercial and Institutional End Uses of Water; Apple Valley General Plan EIR; Mojave River Watershed Group Small Municipal Separate Storm Sewer System General Permit, Fiscal Year 2011-12 Annual Report.

Environmental Setting

Domestic Water

Most of Apple Valley, including the Project site, receives domestic water from Liberty Utilities. Liberty Utilities sources all of its water from the Mojave groundwater basin, from 18 deep wells located throughout the Town. Liberty Utilities is a subcontractor of the Mojave Water Agency, which imports water from the California State Water Project to help recharge local groundwater. The Liberty Utilities – Apple Valley system has 20,957 service connections and a total supply of 14,979 acre-feet as of 2020 (Liberty Utilities – Apple Valley Final 2020 Urban Water Management Plan).

The proposed Project would connect to the existing water lines in the Highway 18 and Rancherias Road rights of way.

Water Quality

Water quality in the Town of Apple Valley is generally good to excellent. According to the annual Liberty Utilities Water Quality Report, there have been no contaminants detected that exceed federal or state drinking water standards (Annual Water Quality Report, 2021 Consumer Confidence Report on Water Quality for 2020, Liberty Utilities).

The National Pollutant Discharge Elimination System (NPDES) implements the federal Clean Water Act. The NPDES requires municipalities to develop, adopt, and implement storm water management plans and programs. The Project site is located in the Mojave River Watershed, under the jurisdiction of the Lahontan Regional Water Quality Control Board (LRWQCB).

Wastewater Treatment and Sewer Systems

The Town's Department of Public Works Wastewater Division operates and maintains approximately 140 miles of collector sewer, trunk lines and interceptors, as well as nine sewer lift (pump) stations. The Town is a member of the Victor Valley Wastewater Reclamation Authority (VVWRA), a joint power agency. The Town's sewer system conveys wastewater to the Regional Wastewater Reclamation Facility (RWWRF) operated by VVWRA in Victorville. Additionally, the Apple Valley Subregional Water Recycling facility, located at Brewster Park, was completed in 2018. The facility uses recycled wastewater to irrigate Brewster Park and the Civic Center Park in Apple Valley. The facility only treats wastewater and returns solid waste to the sewer line where it continues to the RWWRF in Victorville for treatment.

The proposed Project would connect to the existing sewer system in the Highway 18 and Rancherias Road right of ways.

Floodplain Management

The Town's Flood Hazard Overlay District Ordinance (Municipal Development Code Chapter 9.62) establishes development standards within areas identified as FEMA flood

hazards zones in order to reduce potential hazards. According to the Town's General Plan EIR and FEMA flood zone mapping, the Project site is within Zone X, which identifies areas that have been determined to be outside the 500-year floodplains.

Discussion of Impacts

a) **Less Than Significant Impact.** A Mojave River Watershed Water Quality Management Plan (WQMP) was prepared for the Project by Adkan Engineers. The WQMP was prepared in compliance with the requirements of the County of San Bernardino and the Phase II Small MS4 General Permit for the Mojave River Watershed. The Phase II Small MS4 General Permit is intended to mitigate potentially adverse impacts to surface water quality by establishing controls on stormwater discharges.[28] The Project proponent is responsible for implementing the plan in order to ensure that the site is consistent with the MS4 Permit.

The WQMP provides Best Management Practices (BMPs) to manage potential pollutants generated on the site, such as sediments, oil and grease, trash, and pesticides/herbicides. Proposed BMPs for the Project include source control BMPs, such as regulations on fertilizer and pesticide use, required spill contingency plans, and trash storage design requirements, as well as site design BMPs, such as minimizing impervious areas and preservation of existing drainage patterns. Implementation of these measures would ensure that the Project complies with the Mojave River Watershed Small MS4 Permit requirements. As required by the Town, the Project will obtain applicable permits for the NPDES for developments which generate discharges that flow into surface water. Given that it complies with the MS4 and NPDES permit programs, the Project would have less than significant impacts to surface and ground water quality.

b) **Less Than Significant Impact.** The proposed Project would require water during construction and for operation of the retail and restaurants proposed for the shopping plaza. During construction, water demand will be limited and temporary and used for dust control purposes, including the routine spraying of ground surfaces and construction equipment. The American Water Works Association Research Foundation (AWWARF) has developed operational demand factors for land use categories including retail and restaurants. Table 9 shows the water demand estimated for the project based on full buildout of the 10.59-acre Project site.

[28] Mojave River Watershed Group Small Municipal Separate Storm Sewer System General Permit, Fiscal Year 2011-12 Annual Report.

Table 9 Project Water Demand			
Proposed Land Use	**Max/Min Allowed**	**Water Consumption Factor [1]**	**Total Water Demand (AFY)**
General Retail and Restaurants	10.59	1.92 acre-feet per acre per year (AFY)	20.33 AFY
[1] American Water Works Association Research Foundation (AWWARF).			

As shown in the table above, based on a water consumption factor of 1.92 acre-feet of water per acre of land per year, the total water demand estimated for the Project would be 20.33 acre-feet (AF) per year. Liberty Utilities' actual domestic water demand for 2020 was 10,067 acre-feet (AF), and the projected water demand in 2045 is 13,948 AF.[29] The Project's water demand of 20.33 AFY therefore accounts for approximately 0.5% of the water provider's total supply in 2020, or 0.2% percent of the expected total planned increase in demand by 2045.

According to Liberty Utilities' Urban Water Management Plan, the water provider has adequate water supplies to meet demand during normal, single-dry, and multiple dry years for at least the next 25 years. The Project is also consistent with the General Plan land use designation for the property, on which Liberty Utilities based its water demand projections. Given that the Project's water demand would represent a small fraction of the provider's total supply, and that the land uses proposed were planned for in the Urban Water Management Plan, it can be assumed that adequate supply would be available for the Project without causing substantial decreases in groundwater supplies or interfering substantially with groundwater recharge. Impacts would be less than significant.

c) Less Than Significant Impact.

Existing Drainage

The subject site is relatively flat, with an approximately 1 to 2 percent grade to the northwest. Apart from an existing commercial building in the northwestern corner of the site, the property is comprised of vacant, unimproved land with sparse vegetation. A portion of the existing onsite flows flow towards the Highway 18 and Rancherias Road intersection in the northwest of the site. Runoff from developed areas to the east of the subject site mostly flows towards Highway 18. The remaining portion flows to an existing off-site retention basin to the east of the property.

[29] Liberty Utilities Urban Water Management Plan (2020), Table 6-9.

Proposed Drainage System

The WQMP and Hydrology Report prepared for the Project describe the proposed drainage system. The Project proposes underground retention/detention chambers to manage on-site storm water disposal. These chambers would be approximately 5-feet below the existing grade. The site would include two drainage areas, which would drain to the on-site storm drain and to the Rancherias Road catch basin.

Flooding and Storm Sewer Capacity

According to the Hydrology Report, the proposed drainage system demonstrates that ability to convey the 24-hour 100-year storm event. The proposed Project would thus not increase the rate of amount of surface runoff in a manner that would result in flooding on- or off-site. The proposed retention chambers would ensure that the Project would not contribute runoff exceeding the capacity of the existing stormwater drainage system.

Erosion and On- or Off-Site Siltation

The WQMP includes BMPs that would minimize the potential for erosion and siltation, such as design specifications for graded slopes to prevent erosion. Given that the proposed drainage system would manage stormwater runoff in compliance with the requirements of the Town and watershed, it would not result in substantial erosion or siltation on- or off-site.

d) **Less than Significant Impact**. As stated above, the Project is located in FEMA flood Zone X, which identifies areas that are determined to be outside the 500-year floodplain. The Town of Apple Valley is in the high desert, approximately 75 miles inland from the Pacific Ocean. It is thus not at risk of a tsunami. Earthquakes have the potential to cause a seiche, and resulting damage to water reservoirs in the Town could cause flooding. The Project site is approximately 4,500 feet northwest of the nearest reservoir, Apple Pond. However, water reservoirs in the Town are reinforced and baffled in order to reduce this potential hazard, and impacts would thus be less than significant.

e) **No Impact**. As previously stated, a Project-specific WQMP was prepared in compliance with the Mojave River Watershed NPDES requirements. In implementing the WQMP, and in order to receive the Phase II Small MS4 General Permit and applicable NPDES permit, the Project would be required to comply with all applicable water quality standards during construction and operations. The water demand estimated for the Project would also represent a small fraction of Liberty Utilities' planned water supplies, and would thus not conflict with the UWMP. The Project would therefore have no impacts that would conflict with or obstruct the implementation of applicable water quality or water management plans.

Mitigation Measures: None required.
Monitoring: None required.

XI. LAND USE AND PLANNING Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?				✓
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?				✓

Sources: Town of Apple Valley General Plan (2009); Town of Apple Valley Development Code (as amended).

Environmental Setting

The Project site is designated for General Commercial (C-G) land uses in the Town's General Plan. This designation is intended to serve the needs of residents and business in Apple Valley, and permits land uses including general retail stores, auto repair and sales, sit-down and drive through restaurants, and general office.

a) **No Impact**. The proposed developed would not physically divide an established community. The Project site is bound to the north by Highway 18, and to the west by Rancherias Road. The Apple Valley Golf Course occupies the land on the west side of Rancherias Road. The land immediately to the east of the Project property is used for commercial uses, including a Wal-Mart. The section of Highway 18 on which the subject property is situated is mostly occupied by commercial land uses, with some residential uses on the highway further east and west from the Project. While there is also residential development to the southwest of the of the Project, there is open space and the Apple Valley Golf Course on the intervening land.

The subject property has already been partially in use for commercial purposes for several decades. The existing building on site has been used for commercial purposes since the late 1950s. Further development of the site will not physically divide any existing communities, particularly given that the adjoining land uses vary on each side of the property. There will be no impacts.

b) **No Impact**. The Project would conform to the land use policies and regulations provided in the Town's General Plan and Development Code. The proposed convenience store, car wash, retail buildings, tire shop, and drive-through restaurants are permitted uses in the General – Commercial (C-G) designation

and zone. The proposed Project would conform to the development standards for the C-G zone. The Project would not conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect, and thus would have no resulting impacts on the environment.

Mitigation Measures: None required.

Monitoring: None required.

XII. MINERAL RESOURCES Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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?				✓
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?				✓

Sources: Apple Valley General Plan (2009).

Environmental Setting

The main mineral deposits found in Apple Valley are aggregates, such as sand, gravel, and crushed stone. Aggregates are a major component of essential building materials such as concrete, plaster, stucco, road base, and fill. Most mineral resources in Apple Valley occur in the vicinity of the Mojave River.

Discussion of Impacts

a, b) No Impact. The Project site is within Mineral Resource Zone (MRZ) 3-a, which is defined as "areas containing known mineral occurrences of undetermined mineral resources significance. Further exploration work within these areas could result in the reclassification of specific localities."[30] However, the Project site is zoned for General Commercial (C-G) and is not planned for mining or other uses related to mineral resources. There are no existing mining operations within several miles of the proposed Project. The proposed Project would result in no impacts to mineral resources.

Mitigation Measures: None required.

Monitoring: None required.

[30] Town of Apple Valley General Plan (2009), p. III-84.

XIII. NOISE **Would the project result in:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			✓	
b) Generation of excessive groundborne vibration or groundborne noise levels?			✓	
c) For a project located within the vicinity of a private airstrip or 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?			✓	

Sources: Town of Apple Valley General Plan (2009); Town of Apple Valley Development Code Chapter 9.73 Noise Control.

Environmental Setting

Noise can be defined as unwanted sound. According to the Town's General Plan, major sources of noise in Apple Valley include traffic noise, aircraft noise, rail noise, as well as industrial and commercial noise. Heavily traveled roads, such as Highway 18 on which the Project site fronts, generate more noise than local roads. The Apple Valley Airport is associated with aircraft noise in the Town, however it is located approximately 5 miles north of the subject site.

Residences, schools, hospitals, and churches are typically more sensitive to noise than commercial or industrial developments. People are also sensitive to vibration. Through its General Plan and Municipal Code, the Town of Apple Valley has established goals, policies, and ordinances to limit and reduce the effects of intrusive noise on sensitive land uses.

Community-wide noise standards are established in the Noise Ordinance in §9.73 of the Town of Apple Valley Development Code. According to the Ordinance, daytime exterior noise should not exceed 65 dBA on general commercial properties and should

not exceed 50 dBA on multi-family residential properties. The Town's Noise Ordinance also established prohibited noise levels for construction projects.

The Noise Element in the Town's General Plan provides measurements of existing ambient noise levels across the Town, as well as the noise contours projected for buildout of the General Plan.

Discussion of Impacts

a) Less Than Significant Impact. The Project site is currently vacant and undeveloped other than one existing building on the northeast corner of the property. The main source of noise in the area is Highway 18, which runs along the northern frontage of the subject property. The area surrounding the Project is occupied by commercial and open space uses or is currently vacant. The nearest sensitive receptors are residential buildings on the east side of Rancherias Road, with approximately 500 feet of intervening vacant land.

Construction Noise

The Project proposes the development of a commercial plaza which would include a car wash, two retail buildings, a tire shop, and two drive-through restaurants and a drive through coffee shop.. A second phase of development could additionally include general retail, office, and/or additional drive-through restaurants. Construction is expected to occur over a two-year period, with completion of the development expected by 2025.[31]

Construction activities could generate elevated noise levels due to the use of heavy equipment, however this noise would be temporary and periodic in nature. Data compiled by the US Environmental Protection Agency (USEPA), shown in Table 10, shows the noise generated by common construction equipment.

Table 10
Construction Equipment Noise Levels

Construction Equipment	Noise Level in dBA Leq at 50 Feet[1]
Front Loader	73 - 86
Truck	82 - 95
Saw	72 - 82
Jackhammer	81 - 98
Pump	68 - 72
Generator	71 - 83
Compressor	75 - 87
Concrete Mixer	75 - 88

[31] "Traffic Impact Analysis Report, Buffalo Trading Post Plaza, Apple Valley, California" prepared by Linscott, Law and Greenspan, Engineers (December 2022).

Table 10 Construction Equipment Noise Levels	
Backhoe	73 - 95
Tractor	77 - 98
Scraper/Grader	80 - 93
Paver	85 - 88
Source: US Environmental Protection Agency, Noise from Construction Equipment and Operations, Building Equipment and Home Appliances (1971). [1] dBA = A-weighted decibel; Leq = equivalent energy noise level	

The noise levels shown in the above table would diminish rapidly with distance from the construction site at a rate of approximately 6 dBA per doubling of distance. For example, a noise level of 86 dBA at 50 feet from a front loader would reduce to 80 dBA at a distance of 100 feet. Therefore, while construction of the Project could temporarily and periodically generate elevated noise levels, the noise would be greatly reduced for the nearest sensitive receptors which are located approximately 375 feet from the site.

Furthermore, the Town's Noise Ordinance limits permitted construction hours to minimize the potential disruptions related to noise. According to the Ordinance, maximum noise levels allowed from 7a.m. to 7 p.m. on weekends and Saturdays for mobile and stationary equipment near semi-residential and commercial areas is 85 dBA and 70 dBA, respectively. During weekdays nighttime hours (7 p.m. to 7 a.m.) and all day on Sundays and holidays, the maximum noise level is 70 dBA for mobile equipment and 60 dBA for stationary equipment.[32]

Operational Noise

Once operational, the primary sources of noise associated with the Project would include vehicular traffic accessing the site, grounds maintenance equipment, as well as heating, ventilation, and air conditions (HVAC) units. Given that the Project is adjacent to existing commercial uses as well as Highway 18, the vehicle mix would be expected to be similar to existing vehicles on surrounding roads. The Project is consistent with the General Plan designation for the property, and thus noise levels and traffic levels are not expected to increase substantially beyond those projected for General Plan buildout. At buildout of the General Plan noise levels at 100 feet from Highway 18 between Rancherias Road and Dale Evans Parkway are expected to be 72.1 dBA CNEL. The noise level would drop to 60 dBA CNEL at 644 feet from Highway 18.[33]

The residential units north of the Apple Valley Golf Course are the nearest existing sensitive receptors to the Project site. These units are, however, closer to Highway 18 than they are to the Project site, and thus the operation of the proposed

[32] Town of Apple Valley Development Code Chapter 9.73 Noise Control.

[33] Town of Apple Valley General Plan, Table IV-5 General Plan Buildout Noise Contours.

development would not be expected to have a significant impact on the noise levels at those units. Property to the south of the Project site, while currently vacant, is zoned for residential uses. However, a rocky hill separates that subject property from the potential future houses, sheltering them from any noise associated with the Project.

Summary

Given that noise generated by construction of the Project would be required to comply with the Town's Noise Ordinance, it would not exceed local standards. Based on the development's conformity with the General Plan designation for the site, and distance from sensitive land uses, noise associated with the operation of the Project would also be within the Town's General Plan noise standards. Impacts are therefore expected to be less than significant.

b) Less Than Significant Impact. Groundborne vibration is sound radiated through the ground. The Project does not propose land uses that require the use of heavy equipment or machinery that would result in significant groundborne vibration. It may, however, generate groundborne vibration during construction. It is expected that ground-borne vibration from project construction activities would cause only intermittent, localized intrusion due to heavy construction equipment and trucks. The Municipal Code exempts construction activities from short-term, short-duration noise standards when they are conducted during permitted time frames. The Town will require that construction activity comply with the Noise Ordinance, which limits construction activity to hours discussed in response a), above. These requirements will reduce impacts to less sensitive daytime hours and assure that short-term ground-borne impacts will be less than significant.

The subject property is surrounded by commercial and vacant lands. Groundborne vibration or noise is thus not expected to impact sensitive receptors such as residences. Furthermore, per the Town's Noise Ordinance, the operation of any device that creates a vibration which is above the vibration perception threshold of an individual at or beyond the property boundary is prohibited.

To conclude, groundborne vibration or noise associated with construction of the Project would be temporary, the Project is not located in proximity to any sensitive receptors, and the excessive generation of vibration is prohibited by the Noise Ordinance. Given these facts, it can be concluded that impacts related to the generation of groundborne vibration or noise would be less than significant.

c) Less Than Significant Impact. The Apple Valley Airport is approximately five miles northeast of the Project site. As stated in the Town's General Plan, the 60 dBA noise contour for the airport falls within the airport property, noise levels on surrounding properties are therefore not significantly affected. Given the Project's distance

from the airport, the development would not subject employees to excessive noise levels and thus impacts would be less than significant.

Mitigation Measures: None required.

Monitoring: None required**.**

XIV. POPULATION AND HOUSING Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial unplanned 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)?			✓	
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				✓

Sources: Town of Apple Valley General Plan (2009); Town of Apple Valley Development Code (as amended); 2000 and 2010 U.S. Census; California Department of Finance, E-5 Population and Housing Estimates for Cities, Counties, and the State, Table 2 (accessed December 2022).

Environmental Setting

The Town of Apple Valley is in the Victor Valley region of San Bernardino County. Between 2000 and 2010, Apple Valley's population increased by 27.5 percent, from 54,239 to 69,135 residents. Between 2010 and 2018, the Town's population increased by an additional 4.7 percent.[34] According to the 2020 Census, Apple Valley had an estimated population of 76,224 in 2021.[35] In 2022, Apple Valley has an estimated population of 75,628 people.[36]

Discussion of Impacts

a) **Less Than Significant Impact**. The proposed development conforms with the General Commercial (C-G) land use designation and zone as provided in the Town's General Plan and Municipal Code. The proposed uses, density, and setbacks would comply with the development standards for the C-G zone. Alignment with the applicable land use provisions in the General Plan indicates that any growth induced by the Project would be approximately as projected by the Town for buildout of the General Plan.

[34] 2000 and 2010 U.S. Census; American Community Survey 2014-2019 5-year estimates

[35] United States Census Bureau, Population Estimates, July 2021 https://www.census.gov/quickfacts/fact/table/applevalleytowncalifornia/PST045221 (Accessed November 2022).

[36] California Department of Finance, E-5 Population and Housing Estimates for Cities, Counties, and the State, Table 2, (accessed December 2022).

The Project will generate a variety of new jobs, including construction, restaurant, and retail jobs and could attract new residents to the town. Most jobs are expected to be filled by people already living in the area or future residents coming to the area as part of expected growth. The Southern California Association of Governments (SCAG 2024-2050 RTP/SCS) estimates that the town will have a total employment of 30,100 in 2050, which is an increase of 9,400 jobs from the Town's 2019 total employment of 20,700. While the proposed development could induce some growth as a result of new businesses and construction jobs, this growth would not be substantial or unplanned, but would rather support residential development anticipated in Town per General Plan and SCAG projections. Impacts would therefore be less than significant.

b) **No Impact.** The Project site is currently vacant, except for one building. The existing building has been used for commercial purposes for decades. There is not housing on the subject property. The proposed development would therefore not displace any people or housing, and it would not necessitate the construction of replacement housing elsewhere. There would be no impacts.

Mitigation Measures: None required.

Monitoring: None required.

XV. PUBLIC SERVICES Would the project result in:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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 any of the public services:				
a) Fire protection?			✓	
b) Police protection?			✓	
c) Schools?			✓	
d) Parks?			✓	
e) Other public facilities?			✓	

Sources: Apple Valley Fire Protection District, About Us https://avfpd.org/about-us/ (accessed December 2022); Town of Apple Valley – Development Impact Fees https://www.applevalley.org/services/building-and-safety/development-impact-fees (accessed December 2022).

Environmental Setting

Fire Protection

The Project site is served by the Apple Valley Fire Protection District (AVFPD), which provides fire protection services to the Town of Apple Valley, Apple Valley SOI, and unincorporated areas of San Bernardino County. The Apple Valley Fire Protection District has 51 full time and 3 part time employees. The AVFPD aims for a staffing ratio of 1 full time employee per 1,500 residents and an estimated response time of 6 minutes. Given the District's estimated service area population of 90,000 residents,[37] it currently has a staffing ratio of approximately 1 employee per 1,765 people. The nearest fire station, AVFPD Station 333, is approximately 3,700 feet east of the Project site, at 20604 Highway 18.

Police Protection

The San Bernardino County Sheriff's Department is contracted by the Town of Apple Valley to provide police protection services to the Town, including the Project site. The department, known as the Apple Valley Police Department, has its patrol station at 14931 Dale Evans Parkway, less than one mile from the subject property. The AVPD

[37] Apple Valley Fire Protection District, About Us https://avfpd.org/about-us/ (accessed December 2022).

consists of 51 sworn personnel and 13 general employees. It aims to respond to high priority calls within 3 to 7 minutes.

Schools
The Apple Valley Unified School District (AVUSD) operates a total of 15 public schools which service the population of the Town of Apple Valley. The nearest schools to the Project site are Phoenix Academy, a K-8 school located less than a mile northeast of the site, and Granite Hills High School, located approximately 5 miles southeast of the site.

Parks
Discussed in Section XVI, below.

Discussion of Impacts

a) **Less Than Significant Impact.** The Project would be served by the AVFPD station on Highway 18, less than a mile from the site, and is not expected to require the construction of new or expanded facilities. The Project site is currently vacant except for one existing building. Development of the proposed Project would increase demand on existing fire protection services by introducing additional employees and buildings to the site. While the AFVPD is already exceeding its preferred staffing ratio, it is not expected that the Project would have a significant impact.

The AVFPD is primarily funded by property tax and special tax revenues. The development of the Project would increase tax revenues, thereby helping to offset any increased demand for fire protection. Additionally, the Project would be subject to the Town's development impact fee for fire protection ($0.586 per square foot for commercial and office uses).[38] The AVFPD would review the Project site plans to ensure they meet applicable fire standards and regulations. The Project would also be required to comply with the California Fire Code.

Overall, the Project is not expected to result in substantial adverse physical impacts associated with the provision of new or expanded fire protection facilities.

b) **Less Than Significant Impact**. Except for one existing building, the subject property is currently vacant. New buildings and employees on-site due to the Project would thus lead to an increase in demand for police services. The Project plans would be subject to review by the AVPD to ensure that adequate access is available for police vehicles and to ensure that the Project would not interfere with police operations. The Project would be subject to the Town's Development Impact Fee

[38] Town of Apple Valley – Development Impact Fees https://www.applevalley.org/services/building-and-safety/development-impact-fees (accessed December 2022).

for law enforcement facilities ($0.228 per square foot)[39] and would contribute to property tax and sales tax revenues, some of which help fund the police department. Payment of these fees and taxes will help offset any increase in demand on the police force, helping to ensure that adequate police protection services can be provided. Overall, the proposed Project is not expected to require new or expanded police facilities, and would thus have a less than significant impact.

c) **Less Than Significant Impact**. The Project does not propose any residential development and thus would not directly generate new student population. While the new jobs created by the Project could attract new residents to the Town, the number of new residents and students would be minimal. Pursuant to SB 50, AVUSD can collect school impact fees as new development occurs. The Project would be subject to the Town's Development Impact Fee for schools ($0.78 per square foot for commercial and office uses)[40], and to the mandated State school fees, payment of which would offset any marginal impacts to demand for schools. Impacts to school resources would thus be less than significant.

d, e) **Less Than Significant Impact.** The Project's potential impacts on parks are discussed in Section XVI, below. New jobs created by the Project are expected to mostly be filled by existing residents of the Town, and thus impacts to other public services are expected to be less than significant.

Mitigation Measures: None required.

Monitoring: None required.

[39] Town of Apple Valley – Development Impact Fees https://www.applevalley.org/services/building-and-safety/development-impact-fees (accessed December 2022).

[40] Ibid.

XVI. RECREATION Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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?			✓	
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?			✓	

Sources: Town of Apple Valley Master Plan of Parks and Recreation (2013); Town of Apple Valley General Plan (2009); Town of Apple Valley 2021-22 Municipal Fee Schedule, Schedule J Development Impact Fees.

Environmental Setting

The Town of Apple Valley has a total of 370 acres of parks and open space, distributed over 17 sites, managed by the Apple Valley Park and Recreation Department.[41] The Town's inventory and goals for parks and recreation are established in the Master Plan of Parks and Recreation (2013) and in the General Plan (2009). As of 2013, Apple Valley's parks level of service was 4.6 acres per 1,000 residents, which is comparable to its benchmark communities such as Lancaster, Temecula, and Hesperia.[42]

The Town's park inventory includes four classes of parks: mini parks, neighborhood parks, community parks, and special use parks. Recreation facilities in Apple Valley include the Town Hall Recreation Center, James Woody Community Center, a gymnasium, an equestrian center, and numerous ball fields. Residents of Apple Valley also have access to regional recreation resources such as the Mojave Narrows Regional Park, the Desert Conservation Area, the San Bernardino National Forest, Rodman Mountains and Grapevine Canyon Recreation Area, Deep Creek Hot Springs, and the Stoddard Valley Open Area.

Discussion of Impacts

a, b) Less Than Significant Impact. The Project proposes the development of a commercial plaza which would include a car wash, two retail buildings, a tire shop, and two drive-through restaurants and a drive-through coffee shop. A

[41] Town of Apple Valley Master Plan of Parks and Recreation.

[42] Apple Valley Parks and Recreation Master Plan, p.15.

second phase of development could additionally include general retail, office, and/or additional drive-through restaurants. These commercial uses would generate jobs, which could induce a marginal increase in the Town's population. However, this induced population growth would not be substantial, nor would it be expected to increase the use of existing parks and recreational facilities such that substantial deterioration would occur or be accelerated. The Project does not propose recreational facilities, nor would it be expected to require the construction or expansion of facilities which might have adverse effects on the environment.

While the Project is not expected to induce significant demand on parks or recreational facilities, the required payment into the Quimby Fee and Parks Development Impact Fee would offset any marginal impacts. Overall, impacts would be less than significant.

Mitigation Measures: None required.

Monitoring: None required.

XVII. TRANSPORTATION **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?		✓		
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?			✓	
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				✓
d) Result in inadequate emergency access?				✓

Sources: "Traffic Impact Analysis Report, Buffalo Trading Post Plaza, Apple Valley, California" prepared by Linscott, Law & Greenspan, Engineers (December 2022); Town of Apple Valley General Plan (2009); Town of Apple Valley Climate Action Plan Update 2019; San Bernardino County Transportation Impact Study Guidelines (July 2019); Caltrans Interim Land Development and Intergovernmental Review Safety Review Practitioners Guidance (July 2020).

Environmental Setting

The Town of Apple Valley had approximately 500 miles of paved roads within its jurisdiction as of the 2009 General Plan. Roads in the town fall into one of seven classes: major divided parkway, major divided arterials, major roads, secondary roads, collector streets, local industrial/commercial streets, and local streets.[43]

The capacity of a roadway and the degree to which it is being used are referred to as Level of Service (LOS). LOS considers speed, travel time, driving comfort, safety, and traffic interruptions. It is usually graded on a scale from A, which represents ideal free flow conditions, to F, which indicates the worst conditions. The Town of Apple Valley has traditionally used LOS C as its standard for acceptable roadway conditions.[44]

According to the Town's Climate Action Plan, the Town-wide total vehicle miles traveled (VMT) was 925,551,631 miles in 2019.

[43] Town of Apple Valley General Plan (2009).

[44] Ibid.

The main roads serving the Project site are Highway 18, Rancherias Road, and Apple Valley Road:

- Highway 18 is a four-lane divided roadway bordering the northern frontage of the Project site. According to the Town's road designations, Highway 18 is a Major Divided Arterial (128' ROW). It will provide right-in/right-out access to the site.
- Rancherias Road is a two-lane undivided roadway bordering the western frontage of the Project. In the Project vicinity, Rancherias Road is designated as a secondary road (88' ROW). It provides full access to the subject property.
- Apple Valley Road is a two-lane divided roadway that intersects with Highway 18 approximately 2.8 miles west of the Project site. North of Highway 18, Apple Valley Road is a major divided arterial (128' ROW), and south of the highway it is designated as a major road (104' ROW).

The Project site is served by a Class III bicycle lane on Rancherias Road. Class III Bikeways are defined as unmarked routes identified only by signage, which allow shared travel with pedestrians and motor vehicles.[45]

Victor Valley Transportation Authority (VVTA) provides bus transit service in Apple Valley, including the Project area. VVTA operates two routes in the vicinity of the Project site. Route 40 runs from the Apple Valley Post Office to the Walmart, along Thunderbird Road and Central Road. Route 41 runs from the Post Office to the Victor Valley Transit Center along Highway 18. The existing sidewalk network east of the Project provides direct connectivity from the Project to the VVTA bus stop on Highway 18 at Bass Hill Road.

The following analysis is primarily based on the Traffic Impact Analysis Report prepared for the Project by Linscott, Law and Greenspan Engineers (Appendix E).[46]

Discussion of Impacts

a) Less Than Significant with Mitigation. A Traffic Impact Analysis Report was prepared for the Project. Since completion of the Traffic Impact Analysis Report the Project site plan was revised, and the gas station was replaced with a drive-through restaurant. As shown in Table 11, daily trips generated by the gas station are greater than trips generated by the drive-through restaurant. Therefore, the traffic report likely overstates the Projects actual daily trips and associated impacts. For analysis purposes, the higher Project trip rate analyzed in the traffic report is used, representing worst-case scenario traffic conditions.

45 Town of Apple Valley General Plan (2009).

46 "Traffic Impact Analysis Report, Buffalo Trading Post Plaza, Apple Valley, California" prepared by Linscott, Law & Greenspan, Engineers (December 2022).

The report used the following ITE Land Use Codes for trip generation analysis (prior to revised site plan):

- 822: Strip Retail Plaza less than 40k
- 848: Tire Store
- 850: Supermarket
- 930: Fast Casual Restaurant
- 934: Fast Food Restaurant With Drive Through Window
- 937: Coffee/Donut Shop With Drive Through Window
- 945: Gasoline Service Station with Convenience Market (no longer proposed)
- Empirical Trip Generation Estimates for Speedwash

Based on these land uses, as shown in Table 4, the proposed Project is expected to generate 8,750 daily trips, with 339 trips produced in the AM peak hours and 563 trips produced in the PM peak hour. The Project trip distribution was submitted to the Town for review and approval.[47]

Table 11
Project Trip Generation Rates and Forecast

Land Use (Square Feet)	Daily	AM Peak Hour			PM Peak Hour		
	2-way	Enter	Exit	Total	Enter	Exit	Total
Supermarket (20,599 SF)	1,740	31	22	53	70	70	140
Tire Store (5,700 SF)	142	9	4	13	7	9	16
Fast Food with Drive Through (2,305 SF)	808	26	25	51	18	16	34
Coffee/Donut Shop with Drive Through Window (950 SF)	380	21	20	41	14	14	28
Express Wash (140 Feet of Tunnel)	910	29	21	50	47	49	96
Gasoline Service Station (12 Vehicle Fueling Spots) (no longer proposed)	2,386	23	23	46	28	27	55
Fast Casual Restaurant (7,650 SF)	669	5	5	10	30	25	55
Future Development – Strip Retail Plaza (35,000 SF)	1,715	45	30	75	70	69	139
Project Total Trip Generation	**8,750**	**189**	**150**	**339**	**284**	**279**	**563**

Source: "Traffic Impact Analysis Report, Buffalo Trading Post Plaza, Apple Valley, California" prepared by Linscott, Law & Greenspan, Engineers (December 2022).

Thirteen intersections were selected for evaluation according to Town of Apple Valley Traffic Impact Analysis criteria and coordinated with the Town and Caltrans. The key study intersections are as follows:

1. Apple Valley Road at Highway 18
2. Kasota Road at Highway 18

[47] "Traffic Impact Analysis Report, Buffalo Trading Post Plaza, Apple Valley, California" prepared by Linscott, Law & Greenspan, Engineers (December 2022), p.11.

3. Corwin Road at Highway 18
4. Tao Road at Highway 18
5. Rimrock Road/Piute Road at Highway 18
6. Rancherias Roach at Thunderbird Road
7. Rancherias Road at Highway 18
8. Rancherias Road at Tomahawk Road
9. Bass Hill Road at Highway 18
10. Dale Evans Parkway at Highway 18
11. Flathead Road at Highway 18
12. Kiowa Road at Highway 18
13. Navajo Road at Highway 18

Construction Traffic Conditions

Trips generated by construction workers accessing the site would be temporary and end once Project construction has been completed. Construction plans will be coordinated with the Town and emergency providers so that construction activity does not interfere with traffic on adjacent and nearby roads.

Traffic Impact Analysis – Existing Traffic Conditions

Of the thirteen key study intersections, one currently operates at unacceptable (LOS F) levels of service during the AM peak hour. That intersection is Kiowa Road at Highway 18. The other twelve key study intersections currently operate at acceptable LOS during the AM and PM peak hours.

Traffic Impact Analysis – Existing with Project Traffic Conditions

The traffic analysis found that one of thirteen intersections, Kiowa Road at Highway 18, would continue to operate at unacceptable levels of service during the AM peak hour. Mitigation measure TRA-2 is recommended to ensure that this intersection would operate at an acceptable LOS.

Traffic Impact Analysis – Year 2025 Without Project Traffic Conditions

Analysis of future condition forecasted for 2025 found that without the Project's traffic, the Kiowa Road at Highway 18 intersection would continue to operate at LOS F. The twelve other key study intersections would continue to operate at an acceptable level.

Traffic Impact Analysis – Year 2025 With Project Traffic Conditions

Analysis of forecasted operating conditions for 2025 with the Project's traffic found that the same intersection, Kiowa Road at Highway 18 would continue to operate at LOS F. The twelve other intersections would continue to operate at an acceptable LOS. Implementation of the mitigation measures in TRA-2 would ensure that the impacted intersection would operate at a better LOS than pre-Project conditions.

As described above, the intersection at Kiowa Road and Highway 18 is operating at below acceptable LOS in current conditions and in projected conditions with or without Project traffic. It is thus recommended in TRA-2 that improvements be made to this intersection in order to mitigate impacts. The recommended mitigation measure entails the modification of the existing traffic signal to provide Kiowa Road with protected left turn phasing. These improvements will ensure that the Project does not conflict with the Town's General Plan roadway policies. Impacts will be less than significant with mitigation.

Table 12
Year 2025 Conditions Peak Hour Intersection Capacity Analysis

	Key Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2025 Without Project Traffic Conditions		(3) Year 2025 With Project Traffic Conditions		(4) Significant Impact	(5) Year 2025 With Project With Mitigation	
				Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Yes/No	Delay (s/v)	LOS
1.	Apple Valley Road at	D	AM	32.4	C	34.3	C	34.6	C	No	--	--
	US Highway 18		PM	30.8	C	37.9	D	38.1	D	No	--	--
2.	Kasota Road at	D	AM	20.0	B	20.7	C	20.8	C	No	--	--
	US Highway 18		PM	17.2	B	20.1	C	20.8	C	No	--	--
3.	Corwin Road at	D	AM	17.7	B	24.4	C	24.9	C	No	--	--
	US Highway 18		PM	13.8	B	23.3	C	24.2	C	No	--	--
4.	Tao Road at	D	AM	12.0	B	12.6	B	12.5	B	No	--	--
	US Highway 18		PM	14.3	B	15.6	B	15.8	B	No	--	--
5.	Rimrock Road/Piute Road at	D	AM	15.8	C	16.1	C	16.6	C	No	--	--
	US Highway 18		PM	14.9	B	16.8	C	17.8	C	No	--	--
6.	Rancherias Road at	D	AM	12.1	B	11.1	B	11.6	B	No	--	--
	Thunderbird Road		PM	11.6	B	12.3	B	13.2	B	No	--	--
7.	Rancherias Road at	D	AM	21.7	C	21.5	C	26.4	C	No	--	--
	US Highway 18		PM	24.4	C	28.0	C	30.2	C	No	--	--
8.	Rancherias Road at	D	AM	11.3	B	11.6	B	12.4	B	No	--	--
	Tomahawk Road		PM	15.5	C	16.2	C	20.0	C	No	--	--

Table 12 (continued)
Year 2025 Conditions Peak Hour Intersection Capacity Analysis

Key Intersection		Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2025 Without Project Traffic Conditions		(3) Year 2025 With Project Traffic Conditions		(4) Significant Impact	(5) Year 2025 With Project With Mitigation	
				Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Yes/No	Delay (s/v)	LOS
9.	Bass Hill Road at	D	AM	18.8	B	18.2	B	17.8	B	No	--	--
	US Highway 18		PM	26.6	C	29.1	C	27.1	C	No	--	--
10.	Dale Evans Parkway at	D	AM	15.3	B	15.3	B	15.6	B	No	--	--
	US Highway 18		PM	20.0	C	21.0	C	21.6	C	No	--	--
11.	Flathead Road at	D	AM	11.8	B	11.4	B	11.2	B	No	--	--
	US Highway 18		PM	12.3	B	13.1	B	13.2	B	No	--	--
12.	Kiowa Road at	D	AM	**143.0**	**F**	**130.1**	**F**	**123.9**	**F**	**Yes**	20.6	C
	US Highway 18		PM	43.9	D	43.3	D	41.2	D	No	23.5	C
13.	Navajo Road at	D	AM	20.5	C	20.7	C	20.2	C	No	--	--
	US Highway 18		PM	24.5	C	25.3	C	24.6	C	No	--	--

Notes:

- s/v = seconds per vehicle (delay)
- LOS = Level of Service, please refer to *Tables 3-1* and *3-2* for the LOS definitions
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

Active Transportation

The Project will provide bike racks and bike lockers on site per the Town's standard. There is currently a class III bikeway on Rancherias Road and pedestrian facilities along the Project frontage on Highway 18. The widening of Rancherias Road and Highway 18 along the Project's frontages will accommodate bicycle traffic and the construction of sidewalks to meet Town standards, and the Town will condition the Project to construct these facilities. These improvements will ensure that the Project conforms to the Town's policies promoting bicycling in the General Plan and guidance for pedestrian and bicyclist safety in the Caltrans Interim Land Development and Intergovernmental Review Safety Review Practitioners Guidance.

Public Transit

The subject site is approximately 1,100 feet from the nearest bus stop, which is at Highway 18 and Bass Hill Road (VVTA bus stop 2010). The bus stop is serviced by VVTA Routes 40 and 41. The proposed sidewalk improvements along Highway 18 will connect to the existing pedestrian network to the east of the Project, thereby providing a direct connection to the bus service for pedestrians and bicycles.

b) Less Than Significant Impacts. According to CEQA Guidelines §15064.3, subdivision (b), transportation impacts are to be evaluated based on a project's effect on vehicle miles travelled. The Project was analyzed for VMT screening using the criteria in the San Bernardino County Transportation Impact Study Guidelines.[48] According to these criteria, projects do not have to complete VMT assessment if they will serve the local community and have the potential to reduce VMT. Projects that are considered to serve the local community per the San Bernardino County guidelines are as follows:

- K-12 schools
- ***Local-serving retail less than 50,000 square feet***
- Local parks
- Day care centers
- Local serving gas stations
- Local serving banks
- Student housing projects
- Local serving community colleges that are consistent with the assumptions noted in the RTP/SCS

Because the Project consists of local-serving retail land uses with no building greater than 50,000 square feet, it can be screened from VTM assessment and can be assumed to have less than significant impacts on VMT.

[48] San Bernardino County Transportation Impact Study Guidelines (July 9, 2019).

c, d) No Impact. The Project will be accessible from Highway 18 and Rancherias Road. Regional access to the will be provided by Highway 18 and Apple Valley Road. The Project-specific and off-site improvements recommended in mitigation measures TRA-1 and TRA-2 will ensure adequate emergency access to the site and will ensure that there are no increased hazards.

The Apple Valley Fire Protection District will review site plans prior to the issuance of building permits to ensure adequate emergency access and that no substantial hazards from geometric features occur.

Given that the Project is consistent with the General Commercial (C-G) designation per the Town's General Plan and will conform to Town standards for roadway and internal circulation design, there will be no increased hazards due to incompatible uses. Overall, there will be no impacts.

Mitigation Measures:

TRA-1 Intersection at Rancherias Road and Highway 18.
To ensure adequate access and egress to the site, the following design features are to be implemented in conjunction with the development of the proposed Project:

- Widen and restripe the northbound approach of Rancherias Road to Highway 18 to provide a second northbound through lane and a free northbound right-turn lane.
- Modify the existing traffic signal phasing to protected/permissive on Rancherias Road (north-south directions).

TRA-2 Intersection at Kiowa Road at Highway 18.
The following improvements address the traffic impacts resulting from the Existing and 2025 with Project conditions:

- At Kiowa Road and Highway 18, modify the existing traffic signal to an eight-phase signal providing Kiowa Road with protected left-turn phasing (north-south directions).

Monitoring: The City Engineer shall approve project improvement plans prior to the issuance of grading permits. Project improvements shall be completed prior to the occupancy of any portion of the Project.
Responsible Parties: Project applicant, project engineer, City Engineer.

XVIII. TRIBAL CULTURAL RESOURCES				
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:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
i) 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		✓		
ii) 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.		✓		

Sources: "Historical/Archaeological Resources Survey Report for Rancherias Road & SR 18 Project" prepared by CRM Tech (December 2022).

Environmental Setting

The Victor Valley is part of the homeland of the Serrano people, which is primarily centered around the San Bernardino Mountains. The name "Serrano" comes from a Spanish term meaning "mountaineer" or "highlander". The long-term settlements of the Serrano people were mostly located on elevated terraces, hills, and finger ridges near reliable sources of water, particularly in foothill and major rivers.

Spanish influence on the Serrano people was minimal until the 1810s, though contact with Europeans may have occurred in the early 1770s. Between 1810 and 1834, most of the Serrano were removed from the western portion of their territory. Between 1866-1877, most of the Serrano in the eastern portion of the territory were subject to punitive

expeditions, resulting in the death or displacement of most of the remaining population in the San Bernardino Mountains.

Now, most Serrano descendants are associated with the Yuhaaviatam of San Manuel Nation, the Morongo Band of Missions Indians, or the Serrano Nation of Indians.

Discussion of Impacts

a, i, ii) Less Than Significant With Mitigation Incorporated. As discussed in Section V, Cultural Resources, the historical/archaeological resource survey prepared for the Project by CTM Tech did not find any evidence of archaeological resources on site. The historic resource on the property, the Buffalo Trading Post building originally built in 1955, was not identified as having a significance to a California Native American tribe. The Sacred Lands File search conducted by the Native American Heritage Commissions at the request of CRM Tech did not identify any Native American cultural resources in the Project vicinity.

However, regarding the Sacred Lands File search, the NAHC noted that the absence of information on the File does not guarantee the absence of resources, and provided a list of potential tribal contacts for reference by the Town of Apple Valley for potential future government-to-government consultation. Furthermore, the mitigation measure CUL-1 provided in Section V will ensure that if any cultural resources are discovered during earth-moving operations for the development of the Project, all work in that area would be halted or diverted until a qualified archeologist can evaluate the nature and significance of the finds. Likewise, as provided in CUL-2, if any evidence of human remains is identified during earth-moving activities, all work in the area would be halted or diverted until the coroner is notified and able to determine the nature of the remains, as well as whether Native American consultation would be required.

In addition, the Town has completed Tribal Consultation as required by AB 52 resulting in additional mitigation measures (TCR-1 and -2) requested by the Yuhaaviatam of San Manuel Nation. With the implementation of these mitigation measures, the Project would not cause any substantial adverse changes in the significance of a cultural resource as defined in Public Resources Code section 5020.1(k) or in subdivision (c) of Public Resources Code Section 5024.1. Impacts would be less than significant with mitigation.

Mitigation Measures:

TCR-1 The Yuhaaviatam of San Manuel Nation Cultural Resources Department (YSMN) shall be contacted, as detailed in CUL-1, of any pre-contact and/or historic-era cultural resources discovered during project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA, a cultural resources Monitoring and Treatment Plan shall be created by the archaeologist, in coordination with YSMN, and all subsequent finds shall be subject to this Plan. This Plan shall allow for a monitor to be present that represents YSMN for the remainder of the project, should YSMN elect to place a monitor on-site.

TCR-2 Any and all archaeological/cultural documents created as a part of the project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied to the applicant and Lead Agency for dissemination to YSMN. The Lead Agency and/or applicant shall, in good faith, consult with YSMN throughout the life of the project.

Monitoring: See Section V (Cultural Resources).

XIX. UTILITIES AND SERVICE SYSTEMS **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?			✓	
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?			✓	
c) 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?			✓	
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?			✓	
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?			✓	

Sources: Town of Apple Valley Sewer System Management Plan (2019); CalRecycle Estimated Solid Waste Generation Rates; Liberty Utilities Urban Water Management Plan (2020); 2020 Total System Electric Generation, California Energy Commission.

Environmental Setting

Domestic Water

Most of Apple Valley, including the Project site, receives domestic water from Liberty Utilities. Liberty Utilities sources all of its water from the Mojave groundwater basin, from

18 deep wells located throughout the Town. Liberty Utilities is a subcontractor of the Mojave Water Agency, which imports water from the California State Water Project to help recharge local groundwater. The Liberty Utilities – Apple Valley system has 20,957 service connections and a total supply of 14,979 acre-feet as of 2020 (Liberty Utilities – Apple Valley Final 2020 Urban Water Management Plan).

Wastewater Treatment and Sewer

The Apple Valley Department of Public Works Wastewater Division operates the Town's sewer system. The Town is a member of the Victor Valley Wastewater Reclamation Authority (VVWRA), which operates the regional sewer system and wastewater reclamation plants. The Town's sewer system conveys wastewater to the Regional Wastewater Reclamation Facility (RWWRF) in Victorville, operated by the VVWRA. The RWWRF has a design capacity of 18 mgd. Additionally, the Apple Valley Subregional Water Recycling Facility, used to irrigate Brewster Park and the Civic Center Park, can produce one million gallons per day of recycled water. The facility only treats wastewater and returns solid waste to the sewer line where it continues to the RWWRF in Victorville for treatment.

Electricity

In California, 48.35% of electricity is generated from natural gas, and 33.35% is generated from renewables.[49] According to the Town of Apple Valley Climate Action Plan 2019 Update, Town-wide electricity demand in Apple Valley in 2019 was 329,848,695 kilowatt-hours (kWh).

Southern California Edison (SCE) provides electricity to the Town of Apple Valley. The Town also receives electricity through the Apple Valley Choice Energy (AVCE) project. The program allows residents and commercial customers to receive energy from a higher proportion of renewable sources than that provided by SCE.

Natural Gas

Southwest Gas Corporation (SWG) provides natural gas to the Town.

Other than for electricity generation, natural gas is used for space heating, cooking, water heating, industrial processes, and transportation fuel. According to the Town of Apple Valley Climate Action Plan 2019 Update, Town-wide natural gas demand in Apple Valley in 2019 was 15,526,732 therms.

Telecommunications

Frontier and Charter Communications will provide telecommunications services to the Town. An existing telecommunications line runs in the Highway 18 and Rancherias Road rights of way.

[49] 2020 Total System Electric Generation, California Energy Commission.

Solid Waste Management

The Town contracts with Burrtec for solid water collection and disposal. The nearest landfill is the Victorville Landfill operated by San Bernardino County. The landfill's remaining capacity is estimated to be 79,400,000 cubic yards.[50]

Discussion of Impacts

a-c) Less Than Significant Impact.

Water

The proposed Project would connect to the existing 12" water lines under the Highway 18 and Rancherias Road rights of ways, and thus would not require the relocation of facilities.

As discussed in Table 9 in the Hydrology and Water Quality section, the total water demand estimated for the Project would be 20.33 acre-feet (AF) per year. Liberty Utilities' actual domestic water demand for 2020 was 10,067 acre-feet (AF), and the projected water demand in 2045 is 13,948 AF.[51] The Project's water demand of 20.33 AFY therefore accounts for approximately 0.5% of the water provider's total supply in 2020, or 0.2% percent of the expected total planned increase in demand by 2045.

According to Liberty Utilities' Urban Water Management Plan, the water provider has adequate water supplies to meet demand during normal, single-dry, and multiple dry years for at least the next 25 years. Given that the Project's water demand would represent a small fraction of the provider's total supply, and the Project is consistent with the land use expected for the site, it can be assumed that adequate supply would be available for the Project, and that new or expanded water facilities would not be required. Water use associated with construction of the Project would be short-term and can be accommodated by local water supplies. Impacts are less than significant.

Wastewater Treatment

Wastewater collection for the Project would be provided by the Town's Public Works Wastewater Division. The Town's sewer system will convey wastewater to the new Apple Valley Sub-Regional Wastewater Treatment Plant as well as the Regional Wastewater Reclamation Facility (RWWRF), both operated by the Victor Valley Wastewater Reclamation Authority (VVWRA).

50 https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/1870?siteID=2652

51 Liberty Utilities Urban Water Management Plan (2020), Table 6-9.

The Project would be required to construct on-site sewage infrastructure in order to connect to the 15" sewer in the Highway 18 right of way, and the existing 8" sewer in the Rancherias Road right of way.[52]

The Town's plan check process includes thorough review of plans for development projects to ensure that sewers are properly design with sufficient capacity, and that any impacts of a proposed project on the existing sewer system are mitigated prior to approval. Given that the proposed Project is consistent with the General Commercial designation provided in the Town's General Plan, the wastewater generated on site would likely be consistent with the sewer capacity expected by the Town's Public Works Department. Wastewater generated by construction of the Project would be short-term and would not exceed sewer capacity. Impacts are less than significant.

Drainage System

According to the WQMP and Hydrology Report prepared for the Project, underground retention/detention chambers would manage on-site storm water disposal. These chambers would be approximately 5-feet below the existing grade. The site would include two drainage areas, which would drain to the on-site storm drain and to the Rancherias Road catch basin. According to the Hydrology Report, the proposed drainage system demonstrates that ability to convey the 24-hour 100-year storm event. Apart from the drainage system proposed under the Project, the proposed development would not require the relocation or expansion of drainage facilities. Impacts are less than significant.

Electricity

The Project would receive electricity from Southern California Edison (SCE). Existing power lines occur overhead along Rancherias Road, and underground in the Highway 18 right of way. As stated in Section VI, Energy, the Project's electricity use of 1,031,864 kWh per year would represent approximately 0.31% of the 329,848,695 kilowatt-hours used by the Town in 2019. Given that existing electricity infrastructure is available at the site, and that the Project's electricity use would represent a small fraction of the Town total, it is unlikely that new or expanded facilities would be required. Some electricity may be required during construction to charge and operate electronic equipment, as well as for construction site lighting and power for temporary worksite offices. The Project consists of typical commercial development and has no characteristics that would result in unusually high use of energy for construction, and construction energy demands would cease upon Project completion. Impacts are less than significant.

[52] Town of Apple Valley Sewer System Management Plan (2019).

Natural Gas

The Project would receive natural gas from Southwest Gas Corporation (SWG), and would connect to existing gas lines under the Highway 18 and Rancherias Road rights of way. Operation of the Project is estimated to use approximately 1,759.74 therms of natural gas per year, which would represent approximately 0.01% of the 15,526,732 therms used Town-wide in 2019. Project construction is not expected to require natural gas. Impacts are less than significant.

Telecommunications

The Project would connect to existing telecommunications infrastructure with Frontier Communications. It would not require the addition or expansion of facilities. Project construction will not require additional telecommunication infrastructure. Impacts are less than significant.

Summary

The Project is located in a developed area in Apple Valley with existing water, sewage, electricity, natural gas, and telecommunications facilities. The Project's demand would be typical of the uses permitted for the site under the General Commercial designation, and thus would be unlikely to exceed the Town's planned utilities capacities. Overall, impacts would be less than significant.

d, e) Less than Significant Impact. The proposed Project would generate solid waste during the construction and operations phases. Solid waste generation associated with construction of the Project would be short-term and local landfills have sufficient capacity to accommodate it. All construction debris must be disposed of in accordance with local and state requirements. Per the County of San Bernardino IWM Plan, construction material must be disposed of at an appropriate CDI debris processing facility. As required by CalGreen, a minimum of 65% of construction waste materials will be reused or recycled, and a construction waste management plan must be prepared and submitted to the Town during the building permit application process.

The Town contracts with Burrtec for solid water collection and disposal. Table 10 shows the estimated waste that the Project would generate during operations. Using solid waste generation factors provided by CalRecycle, and accounted for the 50% diversion required by Assembly Bill 939, the proposed Project is estimated to result in the generation of approximately 18.23 tons of solid waste per year.

Table 13
Project Estimated Solid Waste Generation

Land Use	Generation Rate	Proposed Development	Total (pounds per day)	Total (tons per year)
Commercial (retail)	2.5 lbs / 1000 sq ft / day	79,969 sq ft	199.95	36.49
			With 50% solid waste diversion:	**18.23**

Source: Estimated Solid Waste Generation Rates for Commercial Retail (April 1992), CalRecycle https://www2.calrecycle.ca.gov/wastecharacterization/general/rates (accessed January 2023).

Victorville Sanitary Landfill, which serves the Project area, has a remaining capacity of about 79,400,000 cubic yards as of 2020. The Project would contribute approximately 0.00002% annually to the remaining capacity, and can therefore be assumed to not exceed the capacity of local infrastructure. Burrtec is responsible for ensuring that solid waste operations comply with federal, state, and local regulations. The Project's impacts related to solid waste disposal would be less than significant.

Mitigation Measures: None required.

Monitoring: None required.

XX. WILDFIRE If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?				✓
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?				✓
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?				✓
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?				✓

Sources: CALFire Fire and Resource Assessment Program (FRAP) maps (accessed December 2022); Town of Apple Valley General Plan (2009); Town of Apple Valley Local Hazard Mitigation Plan 2017 Update.

Environmental Setting

Most of the Town of Apple Valley is within a Local Responsibility Area (LRA) according to the CALFire Fire and Resource Assessment Program (FRAP). The most up to date FRAP maps only display the fire hazard severity in LRAs for very high fire hazard severity zones (VHFHSZ). According to FRAP maps, there are no fire hazard severity zones in the LRA encompassing most of Apple Valley.

According to the Town of Apple Valley Local Hazard Mitigation Plan, the subject property is within the Apple Valley LRA fire hazard severity zone designated as moderate. The plan described wildfires as a major concern for the Town, which has seen

six significant wildland fires in its vicinity in the past five years. Wildfires are a particular threat for unincorporated areas in the Town's vicinity, which are more likely to be on the wildland-urban interface. During the extremely dry and hot summer months, these areas face a significant risk of wildfire.

Discussion of Impacts

a-d) No Impact. The Project site is located in a developed area within the core of the Town of Apple Valley, which is a Local Responsibility Area. It is not located in or near state responsibility areas or lands classified as very high fire hazard severity zones. It would therefore have no impacts.

As described in Section IX Hazards and Hazardous Materials, the Project would comply with the Town's Emergency Operations Plan (2014) and Local Hazard Mitigation Plan (2017). Site plan review by the Apple Valley Fire Protection District (AVFPD) would ensure that the Project would not impact the Town's emergency evacuation plans.

The Project would not require the installation or maintenance of infrastructure that would exacerbate fire risk. While rocky hills occur to the south of the Project site, the slopes are not steep enough for landslides to occur, and vegetation is limited, so fire risk is not significant.

Mitigation Measures: None required.

Monitoring: None required.

XXI. MANDATORY FINDINGS OF SIGNIFICANCE

NOTE: If there are significant environmental impacts which cannot be mitigated and no feasible project alternatives are available, then complete the mandatory findings of significance and attach to this initial study as an appendix. This is the first step for starting the environmental impact report (EIR) process. **Does the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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?		✓		
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)?			✓	
c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?			✓	

a) Less Than Significant Impact with Mitigation Incorporated.

Biological Resources: The Project site is in a developed area in Apple Valley and is unlikely to serve as a wildlife corridor or biological linkage area. No riparian

habitat or other sensitive natural communities have been identified on the property, and no species of fish occur on the site.

Mitigation measures (BIO-1 to BIO-10) provided in this document ensure that the Project would have less than significant impacts to the sensitive plant and wildlife species known to occur in the Project area.

The proposed Project would not significantly reduce the habitat of a fish or wildlife species, cause such populations to drop below self-sustaining levels, threaten a plan or animal community, or reduce the number or range of a endangered species with the implementation of the mitigation measures contained in this document.

Cultural Resources: The Project would not eliminate important examples of the major periods of California history or prehistory. The cultural resources assessment prepared for the Project found no evidence of archaeological resources on the subject site. Mitigation measures CUL-1 and CUL-3 ensure that any buried cultural materials or human remains discovered on the site during earth-moving operations would be handled appropriately.

While a potentially historic building, dating to 1955, occurs on the site, it was determined to no longer retain a sufficient level of historical, architectural, or aesthetic qualities or integrity to be considered a historical resource under CEQA.

Overall, there will be no significant environmental impacts which cannot be mitigated. Project-related impacts are considered less than significant with the implementation of mitigation measures contained in this document.

b) **Less Than Significant Impact**. A significant impact could occur if the proposed Project, in conjunction with related projects, would result in impacts that would be less than significant when view separately, but would be significant when viewed together. In this case, the impacts of the proposed Project are individually limited and not cumulatively considerable. The proposed development is consistent with the development envisioned for this area per the Town's General Plan. The Project would not significantly intensify the land use in the area beyond what is envisioned in the General Plan. All environmental impacts that could occur as a result of the proposed Project would be less than significant with the implementation of the mitigations measures included in this document, and when viewed in conjunction with other closely relatedly past, present, or reasonably foreseeable future projects, would be less than significant.

c) **Less Than Significant Impact**. The proposed Project would not have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly, with the implementation of the Town's Municipal Code, other standards requirements and laws, and the mitigation measures included in this document.

Appendix A
Air Quality and GHG Modeling

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Buffalo Trading Post Plaza

Mojave Desert Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Strip Mall	79.97	1000sqft	8.59	79,969.00	0
Parking Lot	436.00	Space	2.00	174,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2025
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 10.59-acre Strip Mall development. For analysis, proposed supermarket, tire store, 2 drive-through QSRs, drive-through car wash, gas station and c-store, retail, and future retail dev will be aggregated under Strip Mall land use.

Land Use - Supermarket, tire store, fast food, car wash, gas station/c-store, restaurant, and future strip retail aggregated because all uses are typical of Strip Mall. Parking based on 5.4 stalls per 1000 SF.

Construction Phase - Assumes two year buildout, starting in Feb 2023 and operational by 2025. Assumes paving and architectural coating are concurrent with building construction phase.

Grading - Per project grading plans: 8,295.25 CU YD cut, 19,073.54 CU YD fill, 10,778.29 CU YD import.

Vehicle Trips - Trip rates based on ITE (11th ed) 821: Shopping Plaza (40,000 to 150,000 SF). Av. trip rate = 94.49 weekday, 116.15 saturday, 84.87 sunday.

Construction Off-road Equipment Mitigation - Assumes standard dust control measures per MDAQMD Rule 403.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	300.00	434.00
tblConstructionPhase	NumDays	20.00	430.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	NumDays	20.00	430.00
tblConstructionPhase	PhaseEndDate	6/3/2024	12/6/2024
tblConstructionPhase	PhaseEndDate	7/1/2024	12/27/2024
tblConstructionPhase	PhaseEndDate	7/29/2024	12/27/2024
tblConstructionPhase	PhaseStartDate	6/4/2024	5/8/2023
tblConstructionPhase	PhaseStartDate	7/2/2024	5/8/2023
tblGrading	MaterialImported	0.00	10,778.29
tblLandUse	LandUseSquareFeet	79,970.00	79,969.00
tblLandUse	LotAcreage	1.84	8.59
tblLandUse	LotAcreage	3.92	2.00
tblVehicleTrips	ST_TR	42.04	116.15
tblVehicleTrips	SU_TR	20.43	84.87
tblVehicleTrips	WD_TR	44.32	94.49

2.0 Emissions Summary

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
2023	0.7765	3.4608	4.0524	8.2900e-003	0.3790	0.1559	0.5349	0.1439	0.1455	0.2893	0.0000	735.7638	735.7638	0.1529	0.0187	745.1525
2024	0.9851	3.2694	4.5925	8.7600e-003	0.1688	0.1463	0.3151	0.0456	0.1368	0.1825	0.0000	774.1618	774.1618	0.1567	0.0163	782.9212
Maximum	**0.9851**	**3.4608**	**4.5925**	**8.7600e-003**	**0.3790**	**0.1559**	**0.5349**	**0.1439**	**0.1455**	**0.2893**	**0.0000**	**774.1618**	**774.1618**	**0.1567**	**0.0187**	**782.9212**

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					
2023	0.7765	3.4608	4.0524	8.2900e-003	0.2344	0.1559	0.3903	0.0795	0.1455	0.2250	0.0000	735.7632	735.7632	0.1529	0.0187	745.1519
2024	0.9851	3.2694	4.5925	8.7600e-003	0.1688	0.1463	0.3151	0.0456	0.1368	0.1825	0.0000	774.1611	774.1611	0.1567	0.0163	782.9205
Maximum	**0.9851**	**3.4608**	**4.5925**	**8.7600e-003**	**0.2344**	**0.1559**	**0.3903**	**0.0795**	**0.1455**	**0.2250**	**0.0000**	**774.1611**	**774.1611**	**0.1567**	**0.0187**	**782.9205**

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	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**	**26.40**	**0.00**	**17.01**	**33.94**	**0.00**	**13.63**	**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	**1-17-2023**	**4-16-2023**	1.0733	1.0733
2	**4-17-2023**	**7-16-2023**	1.0260	1.0260
3	**7-17-2023**	**10-16-2023**	1.1704	1.1704
4	**10-17-2023**	**1-16-2024**	1.1608	1.1608
5	**1-17-2024**	**4-16-2024**	1.0960	1.0960
6	**4-17-2024**	**7-16-2024**	1.0946	1.0946
7	**7-17-2024**	**9-30-2024**	0.9141	0.9141
		Highest	1.1704	1.1704

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	0.4228	4.0000e-005	4.7300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.2200e-003	9.2200e-003	2.0000e-005	0.0000	9.8200e-003
Energy	9.5000e-004	8.6200e-003	7.2400e-003	5.0000e-005		6.6000e-004	6.6000e-004		6.6000e-004	6.6000e-004	0.0000	192.3848	192.3848	0.0156	2.0400e-003	193.3847
Mobile	3.0780	4.0410	23.7421	0.0438	4.4723	0.0410	4.5132	1.1945	0.0384	1.2329	0.0000	4,044.7643	4,044.7643	0.3048	0.2565	4,128.8146
Waste						0.0000	0.0000		0.0000	0.0000	17.0452	0.0000	17.0452	1.0073	0.0000	42.2286
Water						0.0000	0.0000		0.0000	0.0000	1.8793	20.8322	22.7115	0.1948	4.7700e-003	29.0026
Total	**3.5017**	**4.0496**	**23.7541**	**0.0438**	**4.4723**	**0.0416**	**4.5139**	**1.1945**	**0.0391**	**1.2336**	**18.9244**	**4,257.9906**	**4,276.9150**	**1.5225**	**0.2633**	**4,393.4403**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	0.4228	4.0000e-005	4.7300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.2200e-003	9.2200e-003	2.0000e-005	0.0000	9.8200e-003
Energy	9.5000e-004	8.6200e-003	7.2400e-003	5.0000e-005		6.6000e-004	6.6000e-004		6.6000e-004	6.6000e-004	0.0000	192.3848	192.3848	0.0156	2.0400e-003	193.3847
Mobile	3.0780	4.0410	23.7421	0.0438	4.4723	0.0410	4.5132	1.1945	0.0384	1.2329	0.0000	4,044.7643	4,044.7643	0.3048	0.2565	4,128.8146
Waste						0.0000	0.0000		0.0000	0.0000	17.0452	0.0000	17.0452	1.0073	0.0000	42.2286
Water						0.0000	0.0000		0.0000	0.0000	1.8793	20.8322	22.7115	0.1948	4.7700e-003	29.0026
Total	**3.5017**	**4.0496**	**23.7541**	**0.0438**	**4.4723**	**0.0416**	**4.5139**	**1.1945**	**0.0391**	**1.2336**	**18.9244**	**4,257.9906**	**4,276.9150**	**1.5225**	**0.2633**	**4,393.4403**

	ROG	NOx	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**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	1/17/2023	2/13/2023	5	20	
2	Site Preparation	Site Preparation	2/14/2023	2/27/2023	5	10	
3	Grading	Grading	2/28/2023	4/10/2023	5	30	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4	Building Construction	Building Construction	4/11/2023	12/6/2024	5	434	
5	Paving	Paving	5/8/2023	12/27/2024	5	430	
6	Architectural Coating	Architectural Coating	5/8/2023	12/27/2024	5	430	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 90

Acres of Paving: 2

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 119,954; Non-Residential Outdoor: 39,985; Striped Parking Area: 10,464 (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	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	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

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	1,347.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	99.00	42.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2023

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	0.0227	0.2148	0.1964	3.9000e-004		9.9800e-003	9.9800e-003		9.2800e-003	9.2800e-003	0.0000	33.9921	33.9921	9.5200e-003	0.0000	34.2301
Total	**0.0227**	**0.2148**	**0.1964**	**3.9000e-004**		**9.9800e-003**	**9.9800e-003**		**9.2800e-003**	**9.2800e-003**	**0.0000**	**33.9921**	**33.9921**	**9.5200e-003**	**0.0000**	**34.2301**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

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	4.6000e-004	3.3000e-004	3.7900e-003	1.0000e-005	1.2100e-003	1.0000e-005	1.2200e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	0.9433	0.9433	3.0000e-005	3.0000e-005	0.9527
Total	**4.6000e-004**	**3.3000e-004**	**3.7900e-003**	**1.0000e-005**	**1.2100e-003**	**1.0000e-005**	**1.2200e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**0.9433**	**0.9433**	**3.0000e-005**	**3.0000e-005**	**0.9527**

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	0.0227	0.2148	0.1964	3.9000e-004		9.9800e-003	9.9800e-003		9.2800e-003	9.2800e-003	0.0000	33.9920	33.9920	9.5200e-003	0.0000	34.2300
Total	**0.0227**	**0.2148**	**0.1964**	**3.9000e-004**		**9.9800e-003**	**9.9800e-003**		**9.2800e-003**	**9.2800e-003**	**0.0000**	**33.9920**	**33.9920**	**9.5200e-003**	**0.0000**	**34.2300**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

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	4.6000e-004	3.3000e-004	3.7900e-003	1.0000e-005	1.2100e-003	1.0000e-005	1.2200e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	0.9433	0.9433	3.0000e-005	3.0000e-005	0.9527
Total	**4.6000e-004**	**3.3000e-004**	**3.7900e-003**	**1.0000e-005**	**1.2100e-003**	**1.0000e-005**	**1.2200e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**0.9433**	**0.9433**	**3.0000e-005**	**3.0000e-005**	**0.9527**

3.3 Site Preparation - 2023

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					0.0983	0.0000	0.0983	0.0505	0.0000	0.0505	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0133	0.1376	0.0912	1.9000e-004		6.3300e-003	6.3300e-003		5.8200e-003	5.8200e-003	0.0000	16.7254	16.7254	5.4100e-003	0.0000	16.8606
Total	**0.0133**	**0.1376**	**0.0912**	**1.9000e-004**	**0.0983**	**6.3300e-003**	**0.1046**	**0.0505**	**5.8200e-003**	**0.0563**	**0.0000**	**16.7254**	**16.7254**	**5.4100e-003**	**0.0000**	**16.8606**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

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	2.8000e-004	2.0000e-004	2.2800e-003	1.0000e-005	7.3000e-004	0.0000	7.3000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.5660	0.5660	2.0000e-005	2.0000e-005	0.5717
Total	**2.8000e-004**	**2.0000e-004**	**2.2800e-003**	**1.0000e-005**	**7.3000e-004**	**0.0000**	**7.3000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.5660**	**0.5660**	**2.0000e-005**	**2.0000e-005**	**0.5717**

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					0.0383	0.0000	0.0383	0.0197	0.0000	0.0197	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0133	0.1376	0.0912	1.9000e-004		6.3300e-003	6.3300e-003		5.8200e-003	5.8200e-003	0.0000	16.7253	16.7253	5.4100e-003	0.0000	16.8606
Total	**0.0133**	**0.1376**	**0.0912**	**1.9000e-004**	**0.0383**	**6.3300e-003**	**0.0447**	**0.0197**	**5.8200e-003**	**0.0255**	**0.0000**	**16.7253**	**16.7253**	**5.4100e-003**	**0.0000**	**16.8606**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

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	2.8000e-004	2.0000e-004	2.2800e-003	1.0000e-005	7.3000e-004	0.0000	7.3000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.5660	0.5660	2.0000e-005	2.0000e-005	0.5717
Total	**2.8000e-004**	**2.0000e-004**	**2.2800e-003**	**1.0000e-005**	**7.3000e-004**	**0.0000**	**7.3000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.5660**	**0.5660**	**2.0000e-005**	**2.0000e-005**	**0.5717**

3.4 Grading - 2023

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					0.1388	0.0000	0.1388	0.0549	0.0000	0.0549	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0498	0.5177	0.4208	9.3000e-004		0.0214	0.0214		0.0197	0.0197	0.0000	81.8028	81.8028	0.0265	0.0000	82.4642
Total	**0.0498**	**0.5177**	**0.4208**	**9.3000e-004**	**0.1388**	**0.0214**	**0.1602**	**0.0549**	**0.0197**	**0.0746**	**0.0000**	**81.8028**	**81.8028**	**0.0265**	**0.0000**	**82.4642**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

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	1.6800e-003	0.0750	0.0209	3.8000e-004	0.0116	9.1000e-004	0.0125	3.2000e-003	8.7000e-004	4.0700e-003	0.0000	36.3938	36.3938	9.0000e-005	5.7200e-003	38.1008
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	9.2000e-004	6.6000e-004	7.5900e-003	2.0000e-005	2.4200e-003	1.0000e-005	2.4300e-003	6.4000e-004	1.0000e-005	6.5000e-004	0.0000	1.8866	1.8866	6.0000e-005	6.0000e-005	1.9055
Total	**2.6000e-003**	**0.0757**	**0.0285**	**4.0000e-004**	**0.0141**	**9.2000e-004**	**0.0150**	**3.8400e-003**	**8.8000e-004**	**4.7200e-003**	**0.0000**	**38.2804**	**38.2804**	**1.5000e-004**	**5.7800e-003**	**40.0062**

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					0.0541	0.0000	0.0541	0.0214	0.0000	0.0214	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0498	0.5177	0.4208	9.3000e-004		0.0214	0.0214		0.0197	0.0197	0.0000	81.8027	81.8027	0.0265	0.0000	82.4641
Total	**0.0498**	**0.5177**	**0.4208**	**9.3000e-004**	**0.0541**	**0.0214**	**0.0755**	**0.0214**	**0.0197**	**0.0411**	**0.0000**	**81.8027**	**81.8027**	**0.0265**	**0.0000**	**82.4641**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

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	1.6800e-003	0.0750	0.0209	3.8000e-004	0.0116	9.1000e-004	0.0125	3.2000e-003	8.7000e-004	4.0700e-003	0.0000	36.3938	36.3938	9.0000e-005	5.7200e-003	38.1008
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	9.2000e-004	6.6000e-004	7.5900e-003	2.0000e-005	2.4200e-003	1.0000e-005	2.4300e-003	6.4000e-004	1.0000e-005	6.5000e-004	0.0000	1.8866	1.8866	6.0000e-005	6.0000e-005	1.9055
Total	**2.6000e-003**	**0.0757**	**0.0285**	**4.0000e-004**	**0.0141**	**9.2000e-004**	**0.0150**	**3.8400e-003**	**8.8000e-004**	**4.7200e-003**	**0.0000**	**38.2804**	**38.2804**	**1.5000e-004**	**5.7800e-003**	**40.0062**

3.5 Building Construction - 2023

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	0.1486	1.3594	1.5351	2.5500e-003		0.0661	0.0661		0.0622	0.0622	0.0000	219.0555	219.0555	0.0521	0.0000	220.3582
Total	**0.1486**	**1.3594**	**1.5351**	**2.5500e-003**		**0.0661**	**0.0661**		**0.0622**	**0.0622**	**0.0000**	**219.0555**	**219.0555**	**0.0521**	**0.0000**	**220.3582**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2023

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	5.5500e-003	0.1509	0.0689	7.8000e-004	0.0265	1.2900e-003	0.0278	7.6500e-003	1.2300e-003	8.8800e-003	0.0000	74.9241	74.9241	3.2000e-004	0.0105	78.0502
Worker	0.0287	0.0206	0.2366	6.4000e-004	0.0754	3.8000e-004	0.0758	0.0200	3.5000e-004	0.0204	0.0000	58.8343	58.8343	1.9100e-003	1.8100e-003	59.4226
Total	**0.0342**	**0.1714**	**0.3055**	**1.4200e-003**	**0.1020**	**1.6700e-003**	**0.1036**	**0.0277**	**1.5800e-003**	**0.0293**	**0.0000**	**133.7583**	**133.7583**	**2.2300e-003**	**0.0123**	**137.4728**

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	0.1486	1.3594	1.5351	2.5500e-003		0.0661	0.0661		0.0622	0.0622	0.0000	219.0552	219.0552	0.0521	0.0000	220.3580
Total	**0.1486**	**1.3594**	**1.5351**	**2.5500e-003**		**0.0661**	**0.0661**		**0.0622**	**0.0622**	**0.0000**	**219.0552**	**219.0552**	**0.0521**	**0.0000**	**220.3580**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2023

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	5.5500e-003	0.1509	0.0689	7.8000e-004	0.0265	1.2900e-003	0.0278	7.6500e-003	1.2300e-003	8.8800e-003	0.0000	74.9241	74.9241	3.2000e-004	0.0105	78.0502
Worker	0.0287	0.0206	0.2366	6.4000e-004	0.0754	3.8000e-004	0.0758	0.0200	3.5000e-004	0.0204	0.0000	58.8343	58.8343	1.9100e-003	1.8100e-003	59.4226
Total	**0.0342**	**0.1714**	**0.3055**	**1.4200e-003**	**0.1020**	**1.6700e-003**	**0.1036**	**0.0277**	**1.5800e-003**	**0.0293**	**0.0000**	**133.7583**	**133.7583**	**2.2300e-003**	**0.0123**	**137.4728**

3.5 Building Construction - 2024

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	0.1803	1.6469	1.9804	3.3000e-003		0.0751	0.0751		0.0707	0.0707	0.0000	284.0152	284.0152	0.0672	0.0000	285.6942
Total	**0.1803**	**1.6469**	**1.9804**	**3.3000e-003**		**0.0751**	**0.0751**		**0.0707**	**0.0707**	**0.0000**	**284.0152**	**284.0152**	**0.0672**	**0.0000**	**285.6942**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2024

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	6.9800e-003	0.1935	0.0866	1.0000e-003	0.0344	1.6700e-003	0.0360	9.9200e-003	1.6000e-003	0.0115	0.0000	95.1117	95.1117	3.9000e-004	0.0133	99.0719
Worker	0.0344	0.0236	0.2827	8.0000e-004	0.0978	4.7000e-004	0.0983	0.0260	4.3000e-004	0.0264	0.0000	73.8068	73.8068	2.2400e-003	2.1800e-003	74.5111
Total	**0.0414**	**0.2171**	**0.3693**	**1.8000e-003**	**0.1322**	**2.1400e-003**	**0.1343**	**0.0359**	**2.0300e-003**	**0.0379**	**0.0000**	**168.9185**	**168.9185**	**2.6300e-003**	**0.0154**	**173.5830**

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	0.1803	1.6469	1.9804	3.3000e-003		0.0751	0.0751		0.0707	0.0707	0.0000	284.0148	284.0148	0.0672	0.0000	285.6939
Total	**0.1803**	**1.6469**	**1.9804**	**3.3000e-003**		**0.0751**	**0.0751**		**0.0707**	**0.0707**	**0.0000**	**284.0148**	**284.0148**	**0.0672**	**0.0000**	**285.6939**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2024

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	6.9800e-003	0.1935	0.0866	1.0000e-003	0.0344	1.6700e-003	0.0360	9.9200e-003	1.6000e-003	0.0115	0.0000	95.1117	95.1117	3.9000e-004	0.0133	99.0719
Worker	0.0344	0.0236	0.2827	8.0000e-004	0.0978	4.7000e-004	0.0983	0.0260	4.3000e-004	0.0264	0.0000	73.8068	73.8068	2.2400e-003	2.1800e-003	74.5111
Total	**0.0414**	**0.2171**	**0.3693**	**1.8000e-003**	**0.1322**	**2.1400e-003**	**0.1343**	**0.0359**	**2.0300e-003**	**0.0379**	**0.0000**	**168.9185**	**168.9185**	**2.6300e-003**	**0.0154**	**173.5830**

3.6 Paving - 2023

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	0.0878	0.8663	1.2397	1.9400e-003		0.0434	0.0434		0.0399	0.0399	0.0000	170.2284	170.2284	0.0551	0.0000	171.6048
Paving	1.0400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0888**	**0.8663**	**1.2397**	**1.9400e-003**		**0.0434**	**0.0434**		**0.0399**	**0.0399**	**0.0000**	**170.2284**	**170.2284**	**0.0551**	**0.0000**	**171.6048**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2023

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	3.9100e-003	2.8000e-003	0.0322	9.0000e-005	0.0103	5.0000e-005	0.0103	2.7300e-003	5.0000e-005	2.7800e-003	0.0000	8.0181	8.0181	2.6000e-004	2.5000e-004	8.0983
Total	**3.9100e-003**	**2.8000e-003**	**0.0322**	**9.0000e-005**	**0.0103**	**5.0000e-005**	**0.0103**	**2.7300e-003**	**5.0000e-005**	**2.7800e-003**	**0.0000**	**8.0181**	**8.0181**	**2.6000e-004**	**2.5000e-004**	**8.0983**

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	0.0878	0.8663	1.2397	1.9400e-003		0.0434	0.0434		0.0399	0.0399	0.0000	170.2282	170.2282	0.0551	0.0000	171.6045
Paving	1.0400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0888**	**0.8663**	**1.2397**	**1.9400e-003**		**0.0434**	**0.0434**		**0.0399**	**0.0399**	**0.0000**	**170.2282**	**170.2282**	**0.0551**	**0.0000**	**171.6045**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2023

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	3.9100e-003	2.8000e-003	0.0322	9.0000e-005	0.0103	5.0000e-005	0.0103	2.7300e-003	5.0000e-005	2.7800e-003	0.0000	8.0181	8.0181	2.6000e-004	2.5000e-004	8.0983
Total	**3.9100e-003**	**2.8000e-003**	**0.0322**	**9.0000e-005**	**0.0103**	**5.0000e-005**	**0.0103**	**2.7300e-003**	**5.0000e-005**	**2.7800e-003**	**0.0000**	**8.0181**	**8.0181**	**2.6000e-004**	**2.5000e-004**	**8.0983**

3.6 Paving - 2024

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	0.1285	1.2382	1.9014	2.9600e-003		0.0609	0.0609		0.0560	0.0560	0.0000	260.3449	260.3449	0.0842	0.0000	262.4499
Paving	1.5800e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1300**	**1.2382**	**1.9014**	**2.9600e-003**		**0.0609**	**0.0609**		**0.0560**	**0.0560**	**0.0000**	**260.3449**	**260.3449**	**0.0842**	**0.0000**	**262.4499**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2024

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	5.5300e-003	3.8000e-003	0.0455	1.3000e-004	0.0157	7.0000e-005	0.0158	4.1800e-003	7.0000e-005	4.2500e-003	0.0000	11.8675	11.8675	3.6000e-004	3.5000e-004	11.9808
Total	**5.5300e-003**	**3.8000e-003**	**0.0455**	**1.3000e-004**	**0.0157**	**7.0000e-005**	**0.0158**	**4.1800e-003**	**7.0000e-005**	**4.2500e-003**	**0.0000**	**11.8675**	**11.8675**	**3.6000e-004**	**3.5000e-004**	**11.9808**

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	0.1285	1.2382	1.9014	2.9600e-003		0.0609	0.0609		0.0560	0.0560	0.0000	260.3446	260.3446	0.0842	0.0000	262.4496
Paving	1.5800e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1300**	**1.2382**	**1.9014**	**2.9600e-003**		**0.0609**	**0.0609**		**0.0560**	**0.0560**	**0.0000**	**260.3446**	**260.3446**	**0.0842**	**0.0000**	**262.4496**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2024

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	5.5300e-003	3.8000e-003	0.0455	1.3000e-004	0.0157	7.0000e-005	0.0158	4.1800e-003	7.0000e-005	4.2500e-003	0.0000	11.8675	11.8675	3.6000e-004	3.5000e-004	11.9808
Total	**5.5300e-003**	**3.8000e-003**	**0.0455**	**1.3000e-004**	**0.0157**	**7.0000e-005**	**0.0158**	**4.1800e-003**	**7.0000e-005**	**4.2500e-003**	**0.0000**	**11.8675**	**11.8675**	**3.6000e-004**	**3.5000e-004**	**11.9808**

3.7 Architectural Coating - 2023

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	0.3903					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0163	0.1108	0.1539	2.5000e-004		6.0200e-003	6.0200e-003		6.0200e-003	6.0200e-003	0.0000	21.7027	21.7027	1.3000e-003	0.0000	21.7351
Total	**0.4066**	**0.1108**	**0.1539**	**2.5000e-004**		**6.0200e-003**	**6.0200e-003**		**6.0200e-003**	**6.0200e-003**	**0.0000**	**21.7027**	**21.7027**	**1.3000e-003**	**0.0000**	**21.7351**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2023

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	5.2100e-003	3.7400e-003	0.0430	1.2000e-004	0.0137	7.0000e-005	0.0138	3.6400e-003	6.0000e-005	3.7000e-003	0.0000	10.6909	10.6909	3.5000e-004	3.3000e-004	10.7978
Total	**5.2100e-003**	**3.7400e-003**	**0.0430**	**1.2000e-004**	**0.0137**	**7.0000e-005**	**0.0138**	**3.6400e-003**	**6.0000e-005**	**3.7000e-003**	**0.0000**	**10.6909**	**10.6909**	**3.5000e-004**	**3.3000e-004**	**10.7978**

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	0.3903					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0163	0.1108	0.1539	2.5000e-004		6.0200e-003	6.0200e-003		6.0200e-003	6.0200e-003	0.0000	21.7026	21.7026	1.3000e-003	0.0000	21.7351
Total	**0.4066**	**0.1108**	**0.1539**	**2.5000e-004**		**6.0200e-003**	**6.0200e-003**		**6.0200e-003**	**6.0200e-003**	**0.0000**	**21.7026**	**21.7026**	**1.3000e-003**	**0.0000**	**21.7351**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2023

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	5.2100e-003	3.7400e-003	0.0430	1.2000e-004	0.0137	7.0000e-005	0.0138	3.6400e-003	6.0000e-005	3.7000e-003	0.0000	10.6909	10.6909	3.5000e-004	3.3000e-004	10.7978
Total	**5.2100e-003**	**3.7400e-003**	**0.0430**	**1.2000e-004**	**0.0137**	**7.0000e-005**	**0.0138**	**3.6400e-003**	**6.0000e-005**	**3.7000e-003**	**0.0000**	**10.6909**	**10.6909**	**3.5000e-004**	**3.3000e-004**	**10.7978**

3.7 Architectural Coating - 2024

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	0.5970					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0235	0.1584	0.2353	3.9000e-004		7.9200e-003	7.9200e-003		7.9200e-003	7.9200e-003	0.0000	33.1923	33.1923	1.8700e-003	0.0000	33.2390
Total	**0.6205**	**0.1584**	**0.2353**	**3.9000e-004**		**7.9200e-003**	**7.9200e-003**		**7.9200e-003**	**7.9200e-003**	**0.0000**	**33.1923**	**33.1923**	**1.8700e-003**	**0.0000**	**33.2390**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2024

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	7.3800e-003	5.0600e-003	0.0606	1.7000e-004	0.0210	1.0000e-004	0.0211	5.5700e-003	9.0000e-005	5.6600e-003	0.0000	15.8234	15.8234	4.8000e-004	4.7000e-004	15.9743
Total	**7.3800e-003**	**5.0600e-003**	**0.0606**	**1.7000e-004**	**0.0210**	**1.0000e-004**	**0.0211**	**5.5700e-003**	**9.0000e-005**	**5.6600e-003**	**0.0000**	**15.8234**	**15.8234**	**4.8000e-004**	**4.7000e-004**	**15.9743**

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	0.5970					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0235	0.1584	0.2353	3.9000e-004		7.9200e-003	7.9200e-003		7.9200e-003	7.9200e-003	0.0000	33.1923	33.1923	1.8700e-003	0.0000	33.2390
Total	**0.6205**	**0.1584**	**0.2353**	**3.9000e-004**		**7.9200e-003**	**7.9200e-003**		**7.9200e-003**	**7.9200e-003**	**0.0000**	**33.1923**	**33.1923**	**1.8700e-003**	**0.0000**	**33.2390**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2024

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	7.3800e-003	5.0600e-003	0.0606	1.7000e-004	0.0210	1.0000e-004	0.0211	5.5700e-003	9.0000e-005	5.6600e-003	0.0000	15.8234	15.8234	4.8000e-004	4.7000e-004	15.9743
Total	**7.3800e-003**	**5.0600e-003**	**0.0606**	**1.7000e-004**	**0.0210**	**1.0000e-004**	**0.0211**	**5.5700e-003**	**9.0000e-005**	**5.6600e-003**	**0.0000**	**15.8234**	**15.8234**	**4.8000e-004**	**4.7000e-004**	**15.9743**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	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	3.0780	4.0410	23.7421	0.0438	4.4723	0.0410	4.5132	1.1945	0.0384	1.2329	0.0000	4,044.7643	4,044.7643	0.3048	0.2565	4,128.8146
Unmitigated	3.0780	4.0410	23.7421	0.0438	4.4723	0.0410	4.5132	1.1945	0.0384	1.2329	0.0000	4,044.7643	4,044.7643	0.3048	0.2565	4,128.8146

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		
Strip Mall	7,556.37	9,288.52	6787.05	11,848,881	11,848,881
Total	7,556.37	9,288.52	6,787.05	11,848,881	11,848,881

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	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Strip Mall	9.50	7.30	7.30	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
Parking Lot	0.535455	0.056260	0.172409	0.133149	0.028776	0.007661	0.007273	0.023440	0.000521	0.000192	0.028266	0.001153	0.005445
Strip Mall	0.535455	0.056260	0.172409	0.133149	0.028776	0.007661	0.007273	0.023440	0.000521	0.000192	0.028266	0.001153	0.005445

5.0 Energy Detail

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	182.9964	182.9964	0.0155	1.8700e-003	183.9405
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	182.9964	182.9964	0.0155	1.8700e-003	183.9405
NaturalGas Mitigated	9.5000e-004	8.6200e-003	7.2400e-003	5.0000e-005		6.6000e-004	6.6000e-004		6.6000e-004	6.6000e-004	0.0000	9.3884	9.3884	1.8000e-004	1.7000e-004	9.4442
NaturalGas Unmitigated	9.5000e-004	8.6200e-003	7.2400e-003	5.0000e-005		6.6000e-004	6.6000e-004		6.6000e-004	6.6000e-004	0.0000	9.3884	9.3884	1.8000e-004	1.7000e-004	9.4442

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
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
Strip Mall	175932	9.5000e-004	8.6200e-003	7.2400e-003	5.0000e-005		6.6000e-004	6.6000e-004		6.6000e-004	6.6000e-004	0.0000	9.3884	9.3884	1.8000e-004	1.7000e-004	9.4442
Total		**9.5000e-004**	**8.6200e-003**	**7.2400e-003**	**5.0000e-005**		**6.6000e-004**	**6.6000e-004**		**6.6000e-004**	**6.6000e-004**	**0.0000**	**9.3884**	**9.3884**	**1.8000e-004**	**1.7000e-004**	**9.4442**

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					
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
Strip Mall	175932	9.5000e-004	8.6200e-003	7.2400e-003	5.0000e-005		6.6000e-004	6.6000e-004		6.6000e-004	6.6000e-004	0.0000	9.3884	9.3884	1.8000e-004	1.7000e-004	9.4442
Total		**9.5000e-004**	**8.6200e-003**	**7.2400e-003**	**5.0000e-005**		**6.6000e-004**	**6.6000e-004**		**6.6000e-004**	**6.6000e-004**	**0.0000**	**9.3884**	**9.3884**	**1.8000e-004**	**1.7000e-004**	**9.4442**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	61040	10.8252	9.1000e-004	1.1000e-004	10.8810
Strip Mall	970824	172.1713	0.0145	1.7600e-003	173.0595
Total		**182.9964**	**0.0154**	**1.8700e-003**	**183.9405**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	61040	10.8252	9.1000e-004	1.1000e-004	10.8810
Strip Mall	970824	172.1713	0.0145	1.7600e-003	173.0595
Total		**182.9964**	**0.0154**	**1.8700e-003**	**183.9405**

6.0 Area Detail

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	0.4228	4.0000e-005	4.7300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.2200e-003	9.2200e-003	2.0000e-005	0.0000	9.8200e-003
Unmitigated	0.4228	4.0000e-005	4.7300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.2200e-003	9.2200e-003	2.0000e-005	0.0000	9.8200e-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	0.0987					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3236					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	4.7300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.2200e-003	9.2200e-003	2.0000e-005	0.0000	9.8200e-003
Total	**0.4228**	**4.0000e-005**	**4.7300e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**9.2200e-003**	**9.2200e-003**	**2.0000e-005**	**0.0000**	**9.8200e-003**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

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	0.0987					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3236					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	4.7300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.2200e-003	9.2200e-003	2.0000e-005	0.0000	9.8200e-003
Total	**0.4228**	**4.0000e-005**	**4.7300e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**9.2200e-003**	**9.2200e-003**	**2.0000e-005**	**0.0000**	**9.8200e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	22.7115	0.1948	4.7700e-003	29.0026
Unmitigated	22.7115	0.1948	4.7700e-003	29.0026

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Strip Mall	5.92358 / 3.63058	22.7115	0.1948	4.7700e-003	29.0026
Total		**22.7115**	**0.1948**	**4.7700e-003**	**29.0026**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Strip Mall	5.92358 / 3.63058	22.7115	0.1948	4.7700e-003	29.0026
Total		**22.7115**	**0.1948**	**4.7700e-003**	**29.0026**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	17.0452	1.0073	0.0000	42.2286
Unmitigated	17.0452	1.0073	0.0000	42.2286

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Strip Mall	83.97	17.0452	1.0073	0.0000	42.2286
Total		**17.0452**	**1.0073**	**0.0000**	**42.2286**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Strip Mall	83.97	17.0452	1.0073	0.0000	42.2286
Total		**17.0452**	**1.0073**	**0.0000**	**42.2286**

9.0 Operational Offroad

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Buffalo Trading Post Plaza

Mojave Desert Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Strip Mall	79.97	1000sqft	8.59	79,969.00	0
Parking Lot	436.00	Space	2.00	174,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2025
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 10.59-acre Strip Mall development. For analysis, proposed supermarket, tire store, 2 drive-through QSRs, drive-through car wash, gas station and c-store, retail, and future retail dev will be aggregated under Strip Mall land use.

Land Use - Supermarket, tire store, fast food, car wash, gas station/c-store, restaurant, and future strip retail aggregated because all uses are typical of Strip Mall. Parking based on 5.4 stalls per 1000 SF.

Construction Phase - Assumes two year buildout, starting in Feb 2023 and operational by 2025. Assumes paving and architectural coating are concurrent with building construction phase.

Grading - Per project grading plans: 8,295.25 CU YD cut, 19,073.54 CU YD fill, 10,778.29 CU YD import.

Vehicle Trips - Trip rates based on ITE (11th ed) 821: Shopping Plaza (40,000 to 150,000 SF). Av. trip rate = 94.49 weekday, 116.15 saturday, 84.87 sunday.

Construction Off-road Equipment Mitigation - Assumes standard dust control measures per MDAQMD Rule 403.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	300.00	434.00
tblConstructionPhase	NumDays	20.00	430.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	NumDays	20.00	430.00
tblConstructionPhase	PhaseEndDate	6/3/2024	12/6/2024
tblConstructionPhase	PhaseEndDate	7/1/2024	12/27/2024
tblConstructionPhase	PhaseEndDate	7/29/2024	12/27/2024
tblConstructionPhase	PhaseStartDate	6/4/2024	5/8/2023
tblConstructionPhase	PhaseStartDate	7/2/2024	5/8/2023
tblGrading	MaterialImported	0.00	10,778.29
tblLandUse	LandUseSquareFeet	79,970.00	79,969.00
tblLandUse	LotAcreage	1.84	8.59
tblLandUse	LotAcreage	3.92	2.00
tblVehicleTrips	ST_TR	42.04	116.15
tblVehicleTrips	SU_TR	20.43	84.87
tblVehicleTrips	WD_TR	44.32	94.49

2.0 Emissions Summary

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
2023	7.9520	39.2790	37.3017	0.0888	19.8049	1.4862	21.0716	10.1417	1.3695	11.3071	0.0000	8,835.3469	8,835.3469	1.9553	0.4241	9,010.5974
2024	7.7568	25.9222	36.9251	0.0706	1.3857	1.1615	2.5472	0.3740	1.0866	1.4606	0.0000	6,882.2001	6,882.2001	1.3638	0.1439	6,959.1834
Maximum	**7.9520**	**39.2790**	**37.3017**	**0.0888**	**19.8049**	**1.4862**	**21.0716**	**10.1417**	**1.3695**	**11.3071**	**0.0000**	**8,835.3469**	**8,835.3469**	**1.9553**	**0.4241**	**9,010.5974**

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					
2023	7.9520	39.2790	37.3017	0.0888	7.8141	1.4862	9.0809	3.9792	1.3695	5.1446	0.0000	8,835.3469	8,835.3469	1.9553	0.4241	9,010.5974
2024	7.7568	25.9222	36.9251	0.0706	1.3857	1.1615	2.5472	0.3740	1.0866	1.4606	0.0000	6,882.2001	6,882.2001	1.3638	0.1439	6,959.1833
Maximum	**7.9520**	**39.2790**	**37.3017**	**0.0888**	**7.8141**	**1.4862**	**9.0809**	**3.9792**	**1.3695**	**5.1446**	**0.0000**	**8,835.3469**	**8,835.3469**	**1.9553**	**0.4241**	**9,010.5974**

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	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	56.59	0.00	50.77	58.60	0.00	48.27	0.00	0.00	0.00	0.00	0.00	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	2.3189	4.8000e-004	0.0525	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1129	0.1129	2.9000e-004		0.1203
Energy	5.2000e-003	0.0473	0.0397	2.8000e-004		3.5900e-003	3.5900e-003		3.5900e-003	3.5900e-003		56.7065	56.7065	1.0900e-003	1.0400e-003	57.0434
Mobile	26.1799	24.8813	162.8858	0.3096	30.2175	0.2718	30.4893	8.0588	0.2550	8.3138		31,539.2974	31,539.2974	2.0594	1.8069	32,129.2495
Total	**28.5040**	**24.9291**	**162.9780**	**0.3099**	**30.2175**	**0.2756**	**30.4931**	**8.0588**	**0.2588**	**8.3176**		**31,596.1168**	**31,596.1168**	**2.0607**	**1.8080**	**32,186.4132**

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	2.3189	4.8000e-004	0.0525	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1129	0.1129	2.9000e-004		0.1203
Energy	5.2000e-003	0.0473	0.0397	2.8000e-004		3.5900e-003	3.5900e-003		3.5900e-003	3.5900e-003		56.7065	56.7065	1.0900e-003	1.0400e-003	57.0434
Mobile	26.1799	24.8813	162.8858	0.3096	30.2175	0.2718	30.4893	8.0588	0.2550	8.3138		31,539.2974	31,539.2974	2.0594	1.8069	32,129.2495
Total	**28.5040**	**24.9291**	**162.9780**	**0.3099**	**30.2175**	**0.2756**	**30.4931**	**8.0588**	**0.2588**	**8.3176**		**31,596.1168**	**31,596.1168**	**2.0607**	**1.8080**	**32,186.4132**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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	1/17/2023	2/13/2023	5	20	
2	Site Preparation	Site Preparation	2/14/2023	2/27/2023	5	10	
3	Grading	Grading	2/28/2023	4/10/2023	5	30	
4	Building Construction	Building Construction	4/11/2023	12/6/2024	5	434	
5	Paving	Paving	5/8/2023	12/27/2024	5	430	
6	Architectural Coating	Architectural Coating	5/8/2023	12/27/2024	5	430	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 90

Acres of Paving: 2

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 119,954; Non-Residential Outdoor: 39,985; Striped Parking Area: 10,464 (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

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	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	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	1,347.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	99.00	42.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

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	2.2691	21.4844	19.6434	0.0388		0.9975	0.9975		0.9280	0.9280		3,746.9840	3,746.9840	1.0494		3,773.2183
Total	**2.2691**	**21.4844**	**19.6434**	**0.0388**		**0.9975**	**0.9975**		**0.9280**	**0.9280**		**3,746.9840**	**3,746.9840**	**1.0494**		**3,773.2183**

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	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
Worker	0.0548	0.0300	0.4416	1.1200e-003	0.1232	6.1000e-004	0.1238	0.0327	5.6000e-004	0.0333		113.6947	113.6947	3.2400e-003	3.0200e-003	114.6745
Total	**0.0548**	**0.0300**	**0.4416**	**1.1200e-003**	**0.1232**	**6.1000e-004**	**0.1238**	**0.0327**	**5.6000e-004**	**0.0333**		**113.6947**	**113.6947**	**3.2400e-003**	**3.0200e-003**	**114.6745**

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

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	2.2691	21.4844	19.6434	0.0388		0.9975	0.9975		0.9280	0.9280	0.0000	3,746.9840	3,746.9840	1.0494		3,773.2183
Total	**2.2691**	**21.4844**	**19.6434**	**0.0388**		**0.9975**	**0.9975**		**0.9280**	**0.9280**	**0.0000**	**3,746.9840**	**3,746.9840**	**1.0494**		**3,773.2183**

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	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
Worker	0.0548	0.0300	0.4416	1.1200e-003	0.1232	6.1000e-004	0.1238	0.0327	5.6000e-004	0.0333		113.6947	113.6947	3.2400e-003	3.0200e-003	114.6745
Total	**0.0548**	**0.0300**	**0.4416**	**1.1200e-003**	**0.1232**	**6.1000e-004**	**0.1238**	**0.0327**	**5.6000e-004**	**0.0333**		**113.6947**	**113.6947**	**3.2400e-003**	**3.0200e-003**	**114.6745**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

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					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647		3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**19.6570**	**1.2660**	**20.9230**	**10.1025**	**1.1647**	**11.2672**		**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

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	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
Worker	0.0658	0.0360	0.5299	1.3500e-003	0.1479	7.3000e-004	0.1486	0.0392	6.8000e-004	0.0399		136.4336	136.4336	3.8800e-003	3.6200e-003	137.6094
Total	**0.0658**	**0.0360**	**0.5299**	**1.3500e-003**	**0.1479**	**7.3000e-004**	**0.1486**	**0.0392**	**6.8000e-004**	**0.0399**		**136.4336**	**136.4336**	**3.8800e-003**	**3.6200e-003**	**137.6094**

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

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					7.6662	0.0000	7.6662	3.9400	0.0000	3.9400			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647	0.0000	3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**7.6662**	**1.2660**	**8.9323**	**3.9400**	**1.1647**	**5.1047**	**0.0000**	**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

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	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
Worker	0.0658	0.0360	0.5299	1.3500e-003	0.1479	7.3000e-004	0.1486	0.0392	6.8000e-004	0.0399		136.4336	136.4336	3.8800e-003	3.6200e-003	137.6094
Total	**0.0658**	**0.0360**	**0.5299**	**1.3500e-003**	**0.1479**	**7.3000e-004**	**0.1486**	**0.0392**	**6.8000e-004**	**0.0399**		**136.4336**	**136.4336**	**3.8800e-003**	**3.6200e-003**	**137.6094**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

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					9.2541	0.0000	9.2541	3.6614	0.0000	3.6614			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105		6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**9.2541**	**1.4245**	**10.6786**	**3.6614**	**1.3105**	**4.9719**		**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

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	0.1164	4.7234	1.3809	0.0252	0.7877	0.0609	0.8486	0.2161	0.0582	0.2743		2,672.2763	2,672.2763	6.7600e-003	0.4200	2,797.6145
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
Worker	0.0731	0.0400	0.5888	1.5000e-003	0.1643	8.2000e-004	0.1651	0.0436	7.5000e-004	0.0443		151.5929	151.5929	4.3100e-003	4.0200e-003	152.8993
Total	**0.1894**	**4.7634**	**1.9697**	**0.0267**	**0.9520**	**0.0617**	**1.0137**	**0.2597**	**0.0590**	**0.3187**		**2,823.8692**	**2,823.8692**	**0.0111**	**0.4241**	**2,950.5138**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

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					3.6091	0.0000	3.6091	1.4280	0.0000	1.4280			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105	0.0000	6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**3.6091**	**1.4245**	**5.0336**	**1.4280**	**1.3105**	**2.7385**	**0.0000**	**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

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	0.1164	4.7234	1.3809	0.0252	0.7877	0.0609	0.8486	0.2161	0.0582	0.2743		2,672.2763	2,672.2763	6.7600e-003	0.4200	2,797.6145
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
Worker	0.0731	0.0400	0.5888	1.5000e-003	0.1643	8.2000e-004	0.1651	0.0436	7.5000e-004	0.0443		151.5929	151.5929	4.3100e-003	4.0200e-003	152.8993
Total	**0.1894**	**4.7634**	**1.9697**	**0.0267**	**0.9520**	**0.0617**	**1.0137**	**0.2597**	**0.0590**	**0.3187**		**2,823.8692**	**2,823.8692**	**0.0111**	**0.4241**	**2,950.5138**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2023

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	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

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	0.0000
Vendor	0.0612	1.5132	0.7175	8.2900e-003	0.2849	0.0136	0.2985	0.0820	0.0130	0.0950		872.9289	872.9289	3.7600e-003	0.1217	909.2992
Worker	0.3617	0.1982	2.9145	7.4200e-003	0.8133	4.0400e-003	0.8173	0.2157	3.7200e-003	0.2194		750.3850	750.3850	0.0214	0.0199	756.8514
Total	**0.4228**	**1.7114**	**3.6320**	**0.0157**	**1.0981**	**0.0176**	**1.1158**	**0.2978**	**0.0167**	**0.3145**		**1,623.3139**	**1,623.3139**	**0.0251**	**0.1416**	**1,666.1506**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2023

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	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

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	0.0000
Vendor	0.0612	1.5132	0.7175	8.2900e-003	0.2849	0.0136	0.2985	0.0820	0.0130	0.0950		872.9289	872.9289	3.7600e-003	0.1217	909.2992
Worker	0.3617	0.1982	2.9145	7.4200e-003	0.8133	4.0400e-003	0.8173	0.2157	3.7200e-003	0.2194		750.3850	750.3850	0.0214	0.0199	756.8514
Total	**0.4228**	**1.7114**	**3.6320**	**0.0157**	**1.0981**	**0.0176**	**1.1158**	**0.2978**	**0.0167**	**0.3145**		**1,623.3139**	**1,623.3139**	**0.0251**	**0.1416**	**1,666.1506**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2024

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	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

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	0.0000
Vendor	0.0594	1.4974	0.6949	8.1200e-003	0.2849	0.0136	0.2985	0.0820	0.0130	0.0951		854.8346	854.8346	3.6000e-003	0.1190	890.3813
Worker	0.3345	0.1756	2.6800	7.1800e-003	0.8133	3.8000e-003	0.8171	0.2157	3.5000e-003	0.2192		726.0034	726.0034	0.0192	0.0184	731.9749
Total	**0.3939**	**1.6730**	**3.3749**	**0.0153**	**1.0981**	**0.0174**	**1.1156**	**0.2978**	**0.0165**	**0.3143**		**1,580.8380**	**1,580.8380**	**0.0228**	**0.1374**	**1,622.3561**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2024

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	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769	0.0000	2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**	**0.0000**	**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

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	0.0000
Vendor	0.0594	1.4974	0.6949	8.1200e-003	0.2849	0.0136	0.2985	0.0820	0.0130	0.0951		854.8346	854.8346	3.6000e-003	0.1190	890.3813
Worker	0.3345	0.1756	2.6800	7.1800e-003	0.8133	3.8000e-003	0.8171	0.2157	3.5000e-003	0.2192		726.0034	726.0034	0.0192	0.0184	731.9749
Total	**0.3939**	**1.6730**	**3.3749**	**0.0153**	**1.0981**	**0.0174**	**1.1156**	**0.2978**	**0.0165**	**0.3143**		**1,580.8380**	**1,580.8380**	**0.0228**	**0.1374**	**1,622.3561**

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2023

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	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0122					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0449**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

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	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
Worker	0.0548	0.0300	0.4416	1.1200e-003	0.1232	6.1000e-004	0.1238	0.0327	5.6000e-004	0.0333		113.6947	113.6947	3.2400e-003	3.0200e-003	114.6745
Total	**0.0548**	**0.0300**	**0.4416**	**1.1200e-003**	**0.1232**	**6.1000e-004**	**0.1238**	**0.0327**	**5.6000e-004**	**0.0333**		**113.6947**	**113.6947**	**3.2400e-003**	**3.0200e-003**	**114.6745**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2023

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	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0122					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0449**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

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	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
Worker	0.0548	0.0300	0.4416	1.1200e-003	0.1232	6.1000e-004	0.1238	0.0327	5.6000e-004	0.0333		113.6947	113.6947	3.2400e-003	3.0200e-003	114.6745
Total	**0.0548**	**0.0300**	**0.4416**	**1.1200e-003**	**0.1232**	**6.1000e-004**	**0.1238**	**0.0327**	**5.6000e-004**	**0.0333**		**113.6947**	**113.6947**	**3.2400e-003**	**3.0200e-003**	**114.6745**

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2024

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	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310		2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0122					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0004**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**		**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

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	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
Worker	0.0507	0.0266	0.4061	1.0900e-003	0.1232	5.8000e-004	0.1238	0.0327	5.3000e-004	0.0332		110.0005	110.0005	2.9100e-003	2.7900e-003	110.9053
Total	**0.0507**	**0.0266**	**0.4061**	**1.0900e-003**	**0.1232**	**5.8000e-004**	**0.1238**	**0.0327**	**5.3000e-004**	**0.0332**		**110.0005**	**110.0005**	**2.9100e-003**	**2.7900e-003**	**110.9053**

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2024

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	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310	0.0000	2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0122					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0004**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**	**0.0000**	**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

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	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
Worker	0.0507	0.0266	0.4061	1.0900e-003	0.1232	5.8000e-004	0.1238	0.0327	5.3000e-004	0.0332		110.0005	110.0005	2.9100e-003	2.7900e-003	110.9053
Total	**0.0507**	**0.0266**	**0.4061**	**1.0900e-003**	**0.1232**	**5.8000e-004**	**0.1238**	**0.0327**	**5.3000e-004**	**0.0332**		**110.0005**	**110.0005**	**2.9100e-003**	**2.7900e-003**	**110.9053**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2023

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	4.5920					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**4.7836**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

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	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
Worker	0.0731	0.0400	0.5888	1.5000e-003	0.1643	8.2000e-004	0.1651	0.0436	7.5000e-004	0.0443		151.5929	151.5929	4.3100e-003	4.0200e-003	152.8993
Total	**0.0731**	**0.0400**	**0.5888**	**1.5000e-003**	**0.1643**	**8.2000e-004**	**0.1651**	**0.0436**	**7.5000e-004**	**0.0443**		**151.5929**	**151.5929**	**4.3100e-003**	**4.0200e-003**	**152.8993**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2023

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	4.5920					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**4.7836**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

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	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
Worker	0.0731	0.0400	0.5888	1.5000e-003	0.1643	8.2000e-004	0.1651	0.0436	7.5000e-004	0.0443		151.5929	151.5929	4.3100e-003	4.0200e-003	152.8993
Total	**0.0731**	**0.0400**	**0.5888**	**1.5000e-003**	**0.1643**	**8.2000e-004**	**0.1651**	**0.0436**	**7.5000e-004**	**0.0443**		**151.5929**	**151.5929**	**4.3100e-003**	**4.0200e-003**	**152.8993**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2024

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	4.5920					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609		281.4481	281.4481	0.0159		281.8443
Total	**4.7727**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**		**281.4481**	**281.4481**	**0.0159**		**281.8443**

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	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
Worker	0.0676	0.0355	0.5414	1.4500e-003	0.1643	7.7000e-004	0.1651	0.0436	7.1000e-004	0.0443		146.6674	146.6674	3.8800e-003	3.7200e-003	147.8737
Total	**0.0676**	**0.0355**	**0.5414**	**1.4500e-003**	**0.1643**	**7.7000e-004**	**0.1651**	**0.0436**	**7.1000e-004**	**0.0443**		**146.6674**	**146.6674**	**3.8800e-003**	**3.7200e-003**	**147.8737**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2024

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	4.5920					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609	0.0000	281.4481	281.4481	0.0159		281.8443
Total	**4.7727**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**	**0.0000**	**281.4481**	**281.4481**	**0.0159**		**281.8443**

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	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
Worker	0.0676	0.0355	0.5414	1.4500e-003	0.1643	7.7000e-004	0.1651	0.0436	7.1000e-004	0.0443		146.6674	146.6674	3.8800e-003	3.7200e-003	147.8737
Total	**0.0676**	**0.0355**	**0.5414**	**1.4500e-003**	**0.1643**	**7.7000e-004**	**0.1651**	**0.0436**	**7.1000e-004**	**0.0443**		**146.6674**	**146.6674**	**3.8800e-003**	**3.7200e-003**	**147.8737**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	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	26.1799	24.8813	162.8858	0.3096	30.2175	0.2718	30.4893	8.0588	0.2550	8.3138		31,539.2974	31,539.2974	2.0594	1.8069	32,129.2495
Unmitigated	26.1799	24.8813	162.8858	0.3096	30.2175	0.2718	30.4893	8.0588	0.2550	8.3138		31,539.2974	31,539.2974	2.0594	1.8069	32,129.2495

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		
Strip Mall	7,556.37	9,288.52	6787.05	11,848,881	11,848,881
Total	7,556.37	9,288.52	6,787.05	11,848,881	11,848,881

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	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.535455	0.056260	0.172409	0.133149	0.028776	0.007661	0.007273	0.023440	0.000521	0.000192	0.028266	0.001153	0.005445
Strip Mall	0.535455	0.056260	0.172409	0.133149	0.028776	0.007661	0.007273	0.023440	0.000521	0.000192	0.028266	0.001153	0.005445

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	5.2000e-003	0.0473	0.0397	2.8000e-004		3.5900e-003	3.5900e-003		3.5900e-003	3.5900e-003		56.7065	56.7065	1.0900e-003	1.0400e-003	57.0434
NaturalGas Unmitigated	5.2000e-003	0.0473	0.0397	2.8000e-004		3.5900e-003	3.5900e-003		3.5900e-003	3.5900e-003		56.7065	56.7065	1.0900e-003	1.0400e-003	57.0434

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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
Strip Mall	482.005	5.2000e-003	0.0473	0.0397	2.8000e-004		3.5900e-003	3.5900e-003		3.5900e-003	3.5900e-003		56.7065	56.7065	1.0900e-003	1.0400e-003	57.0434
Total		**5.2000e-003**	**0.0473**	**0.0397**	**2.8000e-004**		**3.5900e-003**	**3.5900e-003**		**3.5900e-003**	**3.5900e-003**		**56.7065**	**56.7065**	**1.0900e-003**	**1.0400e-003**	**57.0434**

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
Strip Mall	0.482005	5.2000e-003	0.0473	0.0397	2.8000e-004		3.5900e-003	3.5900e-003		3.5900e-003	3.5900e-003		56.7065	56.7065	1.0900e-003	1.0400e-003	57.0434
Total		**5.2000e-003**	**0.0473**	**0.0397**	**2.8000e-004**		**3.5900e-003**	**3.5900e-003**		**3.5900e-003**	**3.5900e-003**		**56.7065**	**56.7065**	**1.0900e-003**	**1.0400e-003**	**57.0434**

6.0 Area Detail

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	2.3189	4.8000e-004	0.0525	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1129	0.1129	2.9000e-004		0.1203
Unmitigated	2.3189	4.8000e-004	0.0525	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1129	0.1129	2.9000e-004		0.1203

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	0.5410					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.7731					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.8400e-003	4.8000e-004	0.0525	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1129	0.1129	2.9000e-004		0.1203
Total	**2.3189**	**4.8000e-004**	**0.0525**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1129**	**0.1129**	**2.9000e-004**		**0.1203**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

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	0.5410					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.7731					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.8400e-003	4.8000e-004	0.0525	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1129	0.1129	2.9000e-004		0.1203
Total	**2.3189**	**4.8000e-004**	**0.0525**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1129**	**0.1129**	**2.9000e-004**		**0.1203**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Buffalo Trading Post Plaza

Mojave Desert Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Strip Mall	79.97	1000sqft	8.59	79,969.00	0
Parking Lot	436.00	Space	2.00	174,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2025
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 10.59-acre Strip Mall development. For analysis, proposed supermarket, tire store, 2 drive-through QSRs, drive-through car wash, gas station and c-store, retail, and future retail dev will be aggregated under Strip Mall land use.

Land Use - Supermarket, tire store, fast food, car wash, gas station/c-store, restaurant, and future strip retail aggregated because all uses are typical of Strip Mall. Parking based on 5.4 stalls per 1000 SF.

Construction Phase - Assumes two year buildout, starting in Feb 2023 and operational by 2025. Assumes paving and architectural coating are concurrent with building construction phase.

Grading - Per project grading plans: 8,295.25 CU YD cut, 19,073.54 CU YD fill, 10,778.29 CU YD import.

Vehicle Trips - Trip rates based on ITE (11th ed) 821: Shopping Plaza (40,000 to 150,000 SF). Av. trip rate = 94.49 weekday, 116.15 saturday, 84.87 sunday.

Construction Off-road Equipment Mitigation - Assumes standard dust control measures per MDAQMD Rule 403.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	300.00	434.00
tblConstructionPhase	NumDays	20.00	430.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	NumDays	20.00	430.00
tblConstructionPhase	PhaseEndDate	6/3/2024	12/6/2024
tblConstructionPhase	PhaseEndDate	7/1/2024	12/27/2024
tblConstructionPhase	PhaseEndDate	7/29/2024	12/27/2024
tblConstructionPhase	PhaseStartDate	6/4/2024	5/8/2023
tblConstructionPhase	PhaseStartDate	7/2/2024	5/8/2023
tblGrading	MaterialImported	0.00	10,778.29
tblLandUse	LandUseSquareFeet	79,970.00	79,969.00
tblLandUse	LotAcreage	1.84	8.59
tblLandUse	LotAcreage	3.92	2.00
tblVehicleTrips	ST_TR	42.04	116.15
tblVehicleTrips	SU_TR	20.43	84.87
tblVehicleTrips	WD_TR	44.32	94.49

2.0 Emissions Summary

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
2023	7.8980	39.5572	36.5451	0.0887	19.8049	1.4862	21.0716	10.1417	1.3696	11.3071	0.0000	8,823.8858	8,823.8858	1.9549	0.4250	8,999.3995
2024	7.7074	26.0242	36.2394	0.0695	1.3857	1.1616	2.5472	0.3740	1.0867	1.4607	0.0000	6,776.4824	6,776.4824	1.3642	0.1449	6,853.7787
Maximum	**7.8980**	**39.5572**	**36.5451**	**0.0887**	**19.8049**	**1.4862**	**21.0716**	**10.1417**	**1.3696**	**11.3071**	**0.0000**	**8,823.8858**	**8,823.8858**	**1.9549**	**0.4250**	**8,999.3995**

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					
2023	7.8980	39.5572	36.5451	0.0887	7.8141	1.4862	9.0809	3.9792	1.3696	5.1446	0.0000	8,823.8858	8,823.8858	1.9549	0.4250	8,999.3995
2024	7.7074	26.0242	36.2394	0.0695	1.3857	1.1616	2.5472	0.3740	1.0867	1.4607	0.0000	6,776.4824	6,776.4824	1.3642	0.1449	6,853.7787
Maximum	**7.8980**	**39.5572**	**36.5451**	**0.0887**	**7.8141**	**1.4862**	**9.0809**	**3.9792**	**1.3696**	**5.1446**	**0.0000**	**8,823.8858**	**8,823.8858**	**1.9549**	**0.4250**	**8,999.3995**

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	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	56.59	0.00	50.77	58.60	0.00	48.27	0.00	0.00	0.00	0.00	0.00	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	2.3189	4.8000e-004	0.0525	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1129	0.1129	2.9000e-004		0.1203
Energy	5.2000e-003	0.0473	0.0397	2.8000e-004		3.5900e-003	3.5900e-003		3.5900e-003	3.5900e-003		56.7065	56.7065	1.0900e-003	1.0400e-003	57.0434
Mobile	20.6481	26.4779	149.4682	0.2850	30.2175	0.2723	30.4897	8.0588	0.2555	8.3142		29,048.6040	29,048.6040	2.1840	1.8496	29,654.3771
Total	**22.9723**	**26.5256**	**149.5605**	**0.2853**	**30.2175**	**0.2760**	**30.4935**	**8.0588**	**0.2592**	**8.3180**		**29,105.4234**	**29,105.4234**	**2.1854**	**1.8506**	**29,711.5408**

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	2.3189	4.8000e-004	0.0525	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1129	0.1129	2.9000e-004		0.1203
Energy	5.2000e-003	0.0473	0.0397	2.8000e-004		3.5900e-003	3.5900e-003		3.5900e-003	3.5900e-003		56.7065	56.7065	1.0900e-003	1.0400e-003	57.0434
Mobile	20.6481	26.4779	149.4682	0.2850	30.2175	0.2723	30.4897	8.0588	0.2555	8.3142		29,048.6040	29,048.6040	2.1840	1.8496	29,654.3771
Total	**22.9723**	**26.5256**	**149.5605**	**0.2853**	**30.2175**	**0.2760**	**30.4935**	**8.0588**	**0.2592**	**8.3180**		**29,105.4234**	**29,105.4234**	**2.1854**	**1.8506**	**29,711.5408**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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	1/17/2023	2/13/2023	5	20	
2	Site Preparation	Site Preparation	2/14/2023	2/27/2023	5	10	
3	Grading	Grading	2/28/2023	4/10/2023	5	30	
4	Building Construction	Building Construction	4/11/2023	12/6/2024	5	434	
5	Paving	Paving	5/8/2023	12/27/2024	5	430	
6	Architectural Coating	Architectural Coating	5/8/2023	12/27/2024	5	430	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 90

Acres of Paving: 2

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 119,954; Non-Residential Outdoor: 39,985; Striped Parking Area: 10,464 (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

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	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	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	1,347.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	99.00	42.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

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	2.2691	21.4844	19.6434	0.0388		0.9975	0.9975		0.9280	0.9280		3,746.9840	3,746.9840	1.0494		3,773.2183
Total	**2.2691**	**21.4844**	**19.6434**	**0.0388**		**0.9975**	**0.9975**		**0.9280**	**0.9280**		**3,746.9840**	**3,746.9840**	**1.0494**		**3,773.2183**

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	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
Worker	0.0492	0.0311	0.3543	1.0000e-003	0.1232	6.1000e-004	0.1238	0.0327	5.6000e-004	0.0333		101.1484	101.1484	3.3000e-003	3.0800e-003	102.1487
Total	**0.0492**	**0.0311**	**0.3543**	**1.0000e-003**	**0.1232**	**6.1000e-004**	**0.1238**	**0.0327**	**5.6000e-004**	**0.0333**		**101.1484**	**101.1484**	**3.3000e-003**	**3.0800e-003**	**102.1487**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

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	2.2691	21.4844	19.6434	0.0388		0.9975	0.9975		0.9280	0.9280	0.0000	3,746.9840	3,746.9840	1.0494		3,773.2183
Total	**2.2691**	**21.4844**	**19.6434**	**0.0388**		**0.9975**	**0.9975**		**0.9280**	**0.9280**	**0.0000**	**3,746.9840**	**3,746.9840**	**1.0494**		**3,773.2183**

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	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
Worker	0.0492	0.0311	0.3543	1.0000e-003	0.1232	6.1000e-004	0.1238	0.0327	5.6000e-004	0.0333		101.1484	101.1484	3.3000e-003	3.0800e-003	102.1487
Total	**0.0492**	**0.0311**	**0.3543**	**1.0000e-003**	**0.1232**	**6.1000e-004**	**0.1238**	**0.0327**	**5.6000e-004**	**0.0333**		**101.1484**	**101.1484**	**3.3000e-003**	**3.0800e-003**	**102.1487**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

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					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647		3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**19.6570**	**1.2660**	**20.9230**	**10.1025**	**1.1647**	**11.2672**		**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

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	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
Worker	0.0591	0.0373	0.4251	1.2000e-003	0.1479	7.3000e-004	0.1486	0.0392	6.8000e-004	0.0399		121.3781	121.3781	3.9600e-003	3.7000e-003	122.5784
Total	**0.0591**	**0.0373**	**0.4251**	**1.2000e-003**	**0.1479**	**7.3000e-004**	**0.1486**	**0.0392**	**6.8000e-004**	**0.0399**		**121.3781**	**121.3781**	**3.9600e-003**	**3.7000e-003**	**122.5784**

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

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					7.6662	0.0000	7.6662	3.9400	0.0000	3.9400			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647	0.0000	3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**7.6662**	**1.2660**	**8.9323**	**3.9400**	**1.1647**	**5.1047**	**0.0000**	**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

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	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
Worker	0.0591	0.0373	0.4251	1.2000e-003	0.1479	7.3000e-004	0.1486	0.0392	6.8000e-004	0.0399		121.3781	121.3781	3.9600e-003	3.7000e-003	122.5784
Total	**0.0591**	**0.0373**	**0.4251**	**1.2000e-003**	**0.1479**	**7.3000e-004**	**0.1486**	**0.0392**	**6.8000e-004**	**0.0399**		**121.3781**	**121.3781**	**3.9600e-003**	**3.7000e-003**	**122.5784**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

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					9.2541	0.0000	9.2541	3.6614	0.0000	3.6614			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105		6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**9.2541**	**1.4245**	**10.6786**	**3.6614**	**1.3105**	**4.9719**		**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

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	0.1063	5.0002	1.4128	0.0253	0.7877	0.0609	0.8487	0.2161	0.0583	0.2744		2,677.5435	2,677.5435	6.2900e-003	0.4209	2,803.1177
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
Worker	0.0657	0.0414	0.4724	1.3300e-003	0.1643	8.2000e-004	0.1651	0.0436	7.5000e-004	0.0443		134.8646	134.8646	4.4000e-003	4.1100e-003	136.1983
Total	**0.1720**	**5.0416**	**1.8852**	**0.0266**	**0.9520**	**0.0618**	**1.0138**	**0.2597**	**0.0591**	**0.3188**		**2,812.4081**	**2,812.4081**	**0.0107**	**0.4250**	**2,939.3159**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

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					3.6091	0.0000	3.6091	1.4280	0.0000	1.4280			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105	0.0000	6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**3.6091**	**1.4245**	**5.0336**	**1.4280**	**1.3105**	**2.7385**	**0.0000**	**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

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	0.1063	5.0002	1.4128	0.0253	0.7877	0.0609	0.8487	0.2161	0.0583	0.2744		2,677.5435	2,677.5435	6.2900e-003	0.4209	2,803.1177
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
Worker	0.0657	0.0414	0.4724	1.3300e-003	0.1643	8.2000e-004	0.1651	0.0436	7.5000e-004	0.0443		134.8646	134.8646	4.4000e-003	4.1100e-003	136.1983
Total	**0.1720**	**5.0416**	**1.8852**	**0.0266**	**0.9520**	**0.0618**	**1.0138**	**0.2597**	**0.0591**	**0.3188**		**2,812.4081**	**2,812.4081**	**0.0107**	**0.4250**	**2,939.3159**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2023

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	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

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	0.0000
Vendor	0.0569	1.6080	0.7410	8.3200e-003	0.2849	0.0136	0.2985	0.0820	0.0130	0.0951		875.3862	875.3862	3.5700e-003	0.1222	911.9039
Worker	0.3250	0.2051	2.3382	6.6000e-003	0.8133	4.0400e-003	0.8173	0.2157	3.7200e-003	0.2194		667.5796	667.5796	0.0218	0.0203	674.1814
Total	**0.3818**	**1.8131**	**3.0792**	**0.0149**	**1.0981**	**0.0177**	**1.1158**	**0.2978**	**0.0168**	**0.3145**		**1,542.9658**	**1,542.9658**	**0.0253**	**0.1426**	**1,586.0853**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2023

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	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

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	0.0000
Vendor	0.0569	1.6080	0.7410	8.3200e-003	0.2849	0.0136	0.2985	0.0820	0.0130	0.0951		875.3862	875.3862	3.5700e-003	0.1222	911.9039
Worker	0.3250	0.2051	2.3382	6.6000e-003	0.8133	4.0400e-003	0.8173	0.2157	3.7200e-003	0.2194		667.5796	667.5796	0.0218	0.0203	674.1814
Total	**0.3818**	**1.8131**	**3.0792**	**0.0149**	**1.0981**	**0.0177**	**1.1158**	**0.2978**	**0.0168**	**0.3145**		**1,542.9658**	**1,542.9658**	**0.0253**	**0.1426**	**1,586.0853**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2024

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	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

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	0.0000
Vendor	0.0551	1.5912	0.7187	8.1500e-003	0.2849	0.0137	0.2985	0.0820	0.0131	0.0951		857.2638	857.2638	3.4200e-003	0.1195	892.9527
Worker	0.3012	0.1816	2.1559	6.3900e-003	0.8133	3.8000e-003	0.8171	0.2157	3.5000e-003	0.2192		646.1040	646.1040	0.0196	0.0188	652.2015
Total	**0.3563**	**1.7729**	**2.8745**	**0.0145**	**1.0981**	**0.0175**	**1.1156**	**0.2978**	**0.0166**	**0.3143**		**1,503.3677**	**1,503.3677**	**0.0231**	**0.1383**	**1,545.1542**

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2024

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	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769	0.0000	2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**	**0.0000**	**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

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	0.0000
Vendor	0.0551	1.5912	0.7187	8.1500e-003	0.2849	0.0137	0.2985	0.0820	0.0131	0.0951		857.2638	857.2638	3.4200e-003	0.1195	892.9527
Worker	0.3012	0.1816	2.1559	6.3900e-003	0.8133	3.8000e-003	0.8171	0.2157	3.5000e-003	0.2192		646.1040	646.1040	0.0196	0.0188	652.2015
Total	**0.3563**	**1.7729**	**2.8745**	**0.0145**	**1.0981**	**0.0175**	**1.1156**	**0.2978**	**0.0166**	**0.3143**		**1,503.3677**	**1,503.3677**	**0.0231**	**0.1383**	**1,545.1542**

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2023

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	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0122					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0449**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

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	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
Worker	0.0492	0.0311	0.3543	1.0000e-003	0.1232	6.1000e-004	0.1238	0.0327	5.6000e-004	0.0333		101.1484	101.1484	3.3000e-003	3.0800e-003	102.1487
Total	**0.0492**	**0.0311**	**0.3543**	**1.0000e-003**	**0.1232**	**6.1000e-004**	**0.1238**	**0.0327**	**5.6000e-004**	**0.0333**		**101.1484**	**101.1484**	**3.3000e-003**	**3.0800e-003**	**102.1487**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2023

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	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0122					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0449**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

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	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
Worker	0.0492	0.0311	0.3543	1.0000e-003	0.1232	6.1000e-004	0.1238	0.0327	5.6000e-004	0.0333		101.1484	101.1484	3.3000e-003	3.0800e-003	102.1487
Total	**0.0492**	**0.0311**	**0.3543**	**1.0000e-003**	**0.1232**	**6.1000e-004**	**0.1238**	**0.0327**	**5.6000e-004**	**0.0333**		**101.1484**	**101.1484**	**3.3000e-003**	**3.0800e-003**	**102.1487**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2024

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	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310		2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0122					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0004**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**		**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

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	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
Worker	0.0456	0.0275	0.3267	9.7000e-004	0.1232	5.8000e-004	0.1238	0.0327	5.3000e-004	0.0332		97.8945	97.8945	2.9800e-003	2.8500e-003	98.8184
Total	**0.0456**	**0.0275**	**0.3267**	**9.7000e-004**	**0.1232**	**5.8000e-004**	**0.1238**	**0.0327**	**5.3000e-004**	**0.0332**		**97.8945**	**97.8945**	**2.9800e-003**	**2.8500e-003**	**98.8184**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2024

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	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310	0.0000	2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0122					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0004**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**	**0.0000**	**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

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	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
Worker	0.0456	0.0275	0.3267	9.7000e-004	0.1232	5.8000e-004	0.1238	0.0327	5.3000e-004	0.0332		97.8945	97.8945	2.9800e-003	2.8500e-003	98.8184
Total	**0.0456**	**0.0275**	**0.3267**	**9.7000e-004**	**0.1232**	**5.8000e-004**	**0.1238**	**0.0327**	**5.3000e-004**	**0.0332**		**97.8945**	**97.8945**	**2.9800e-003**	**2.8500e-003**	**98.8184**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2023

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	4.5920					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**4.7836**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

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	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
Worker	0.0657	0.0414	0.4724	1.3300e-003	0.1643	8.2000e-004	0.1651	0.0436	7.5000e-004	0.0443		134.8646	134.8646	4.4000e-003	4.1100e-003	136.1983
Total	**0.0657**	**0.0414**	**0.4724**	**1.3300e-003**	**0.1643**	**8.2000e-004**	**0.1651**	**0.0436**	**7.5000e-004**	**0.0443**		**134.8646**	**134.8646**	**4.4000e-003**	**4.1100e-003**	**136.1983**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2023

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	4.5920					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**4.7836**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

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	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
Worker	0.0657	0.0414	0.4724	1.3300e-003	0.1643	8.2000e-004	0.1651	0.0436	7.5000e-004	0.0443		134.8646	134.8646	4.4000e-003	4.1100e-003	136.1983
Total	**0.0657**	**0.0414**	**0.4724**	**1.3300e-003**	**0.1643**	**8.2000e-004**	**0.1651**	**0.0436**	**7.5000e-004**	**0.0443**		**134.8646**	**134.8646**	**4.4000e-003**	**4.1100e-003**	**136.1983**

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2024

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	4.5920					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609		281.4481	281.4481	0.0159		281.8443
Total	**4.7727**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**		**281.4481**	**281.4481**	**0.0159**		**281.8443**

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	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
Worker	0.0609	0.0367	0.4355	1.2900e-003	0.1643	7.7000e-004	0.1651	0.0436	7.1000e-004	0.0443		130.5261	130.5261	3.9700e-003	3.8000e-003	131.7579
Total	**0.0609**	**0.0367**	**0.4355**	**1.2900e-003**	**0.1643**	**7.7000e-004**	**0.1651**	**0.0436**	**7.1000e-004**	**0.0443**		**130.5261**	**130.5261**	**3.9700e-003**	**3.8000e-003**	**131.7579**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2024

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	4.5920					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609	0.0000	281.4481	281.4481	0.0159		281.8443
Total	**4.7727**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**	**0.0000**	**281.4481**	**281.4481**	**0.0159**		**281.8443**

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	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
Worker	0.0609	0.0367	0.4355	1.2900e-003	0.1643	7.7000e-004	0.1651	0.0436	7.1000e-004	0.0443		130.5261	130.5261	3.9700e-003	3.8000e-003	131.7579
Total	**0.0609**	**0.0367**	**0.4355**	**1.2900e-003**	**0.1643**	**7.7000e-004**	**0.1651**	**0.0436**	**7.1000e-004**	**0.0443**		**130.5261**	**130.5261**	**3.9700e-003**	**3.8000e-003**	**131.7579**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	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	20.6481	26.4779	149.4682	0.2850	30.2175	0.2723	30.4897	8.0588	0.2555	8.3142		29,048.6040	29,048.6040	2.1840	1.8496	29,654.3771
Unmitigated	20.6481	26.4779	149.4682	0.2850	30.2175	0.2723	30.4897	8.0588	0.2555	8.3142		29,048.6040	29,048.6040	2.1840	1.8496	29,654.3771

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		
Strip Mall	7,556.37	9,288.52	6787.05	11,848,881	11,848,881
Total	7,556.37	9,288.52	6,787.05	11,848,881	11,848,881

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	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.535455	0.056260	0.172409	0.133149	0.028776	0.007661	0.007273	0.023440	0.000521	0.000192	0.028266	0.001153	0.005445
Strip Mall	0.535455	0.056260	0.172409	0.133149	0.028776	0.007661	0.007273	0.023440	0.000521	0.000192	0.028266	0.001153	0.005445

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	5.2000e-003	0.0473	0.0397	2.8000e-004		3.5900e-003	3.5900e-003		3.5900e-003	3.5900e-003		56.7065	56.7065	1.0900e-003	1.0400e-003	57.0434
NaturalGas Unmitigated	5.2000e-003	0.0473	0.0397	2.8000e-004		3.5900e-003	3.5900e-003		3.5900e-003	3.5900e-003		56.7065	56.7065	1.0900e-003	1.0400e-003	57.0434

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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
Strip Mall	482.005	5.2000e-003	0.0473	0.0397	2.8000e-004		3.5900e-003	3.5900e-003		3.5900e-003	3.5900e-003		56.7065	56.7065	1.0900e-003	1.0400e-003	57.0434
Total		**5.2000e-003**	**0.0473**	**0.0397**	**2.8000e-004**		**3.5900e-003**	**3.5900e-003**		**3.5900e-003**	**3.5900e-003**		**56.7065**	**56.7065**	**1.0900e-003**	**1.0400e-003**	**57.0434**

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
Strip Mall	0.482005	5.2000e-003	0.0473	0.0397	2.8000e-004		3.5900e-003	3.5900e-003		3.5900e-003	3.5900e-003		56.7065	56.7065	1.0900e-003	1.0400e-003	57.0434
Total		**5.2000e-003**	**0.0473**	**0.0397**	**2.8000e-004**		**3.5900e-003**	**3.5900e-003**		**3.5900e-003**	**3.5900e-003**		**56.7065**	**56.7065**	**1.0900e-003**	**1.0400e-003**	**57.0434**

6.0 Area Detail

Buffalo Trading Post Plaza - Mojave Desert Air Basin, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	2.3189	4.8000e-004	0.0525	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1129	0.1129	2.9000e-004		0.1203
Unmitigated	2.3189	4.8000e-004	0.0525	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1129	0.1129	2.9000e-004		0.1203

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	0.5410					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.7731					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.8400e-003	4.8000e-004	0.0525	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1129	0.1129	2.9000e-004		0.1203
Total	**2.3189**	**4.8000e-004**	**0.0525**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1129**	**0.1129**	**2.9000e-004**		**0.1203**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

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	0.5410					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.7731					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.8400e-003	4.8000e-004	0.0525	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1129	0.1129	2.9000e-004		0.1203
Total	**2.3189**	**4.8000e-004**	**0.0525**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1129**	**0.1129**	**2.9000e-004**		**0.1203**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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

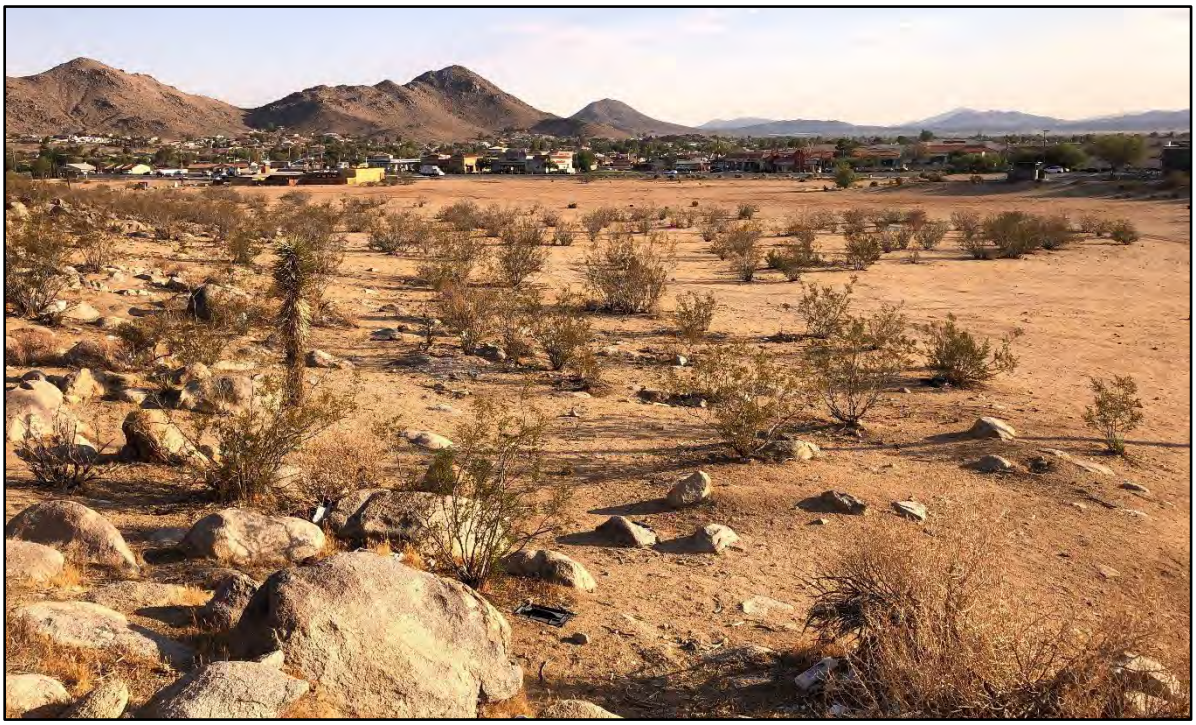
User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix B
Biological Resources Assessment Report

BUFFALO TRADING POST PLAZA PROJECT
BIOLOGICAL RESOURCES ASSESSMENT



TOWN OF APPLE VALLEY, SAN BERNARDINO COUNTY, CALIFORNIA

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22 September 2022

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1.0 INTRODUCTION

Wood Environment & Infrastructure Solutions, Inc. (Wood) was contracted by Terra Nova Planning and Research to conduct a biological resources assessment at the site of the proposed Buffalo Trading Post Plaza Project (project) in the Town of Apple Valley, San Bernardino County, California. This biological resources assessment report (BRAR) provides methods, results, and a discussion of the assessment.

1.1 Project Location and Topography

The project is entirely within the Town of Apple Valley, San Bernardino County, California (Figure 1). It is located on the 7.5-minute Apple Valley North, Calif. United States Geological Survey (USGS) quadrangle (Figure 2). It is in Township 5 North, Range 3 West, Sections 17 and 18. Project topography is roughly level, rising slightly to the south. Elevation ranges from approximately 2,935 to 2,965 feet (895-905 meters).

1.2 Project and Site Description

The proposed project is a 10.6-acre commercial center consisting of multiple retail buildings, including a gas station and convenience store, restaurants and general retail. It is south of the intersection of State Route 18 and Rancherias Road (Figure 3). The Assessor's Parcel Number is 311-217-116. The project site is largely undeveloped, but with an existing business at the northwest corner.

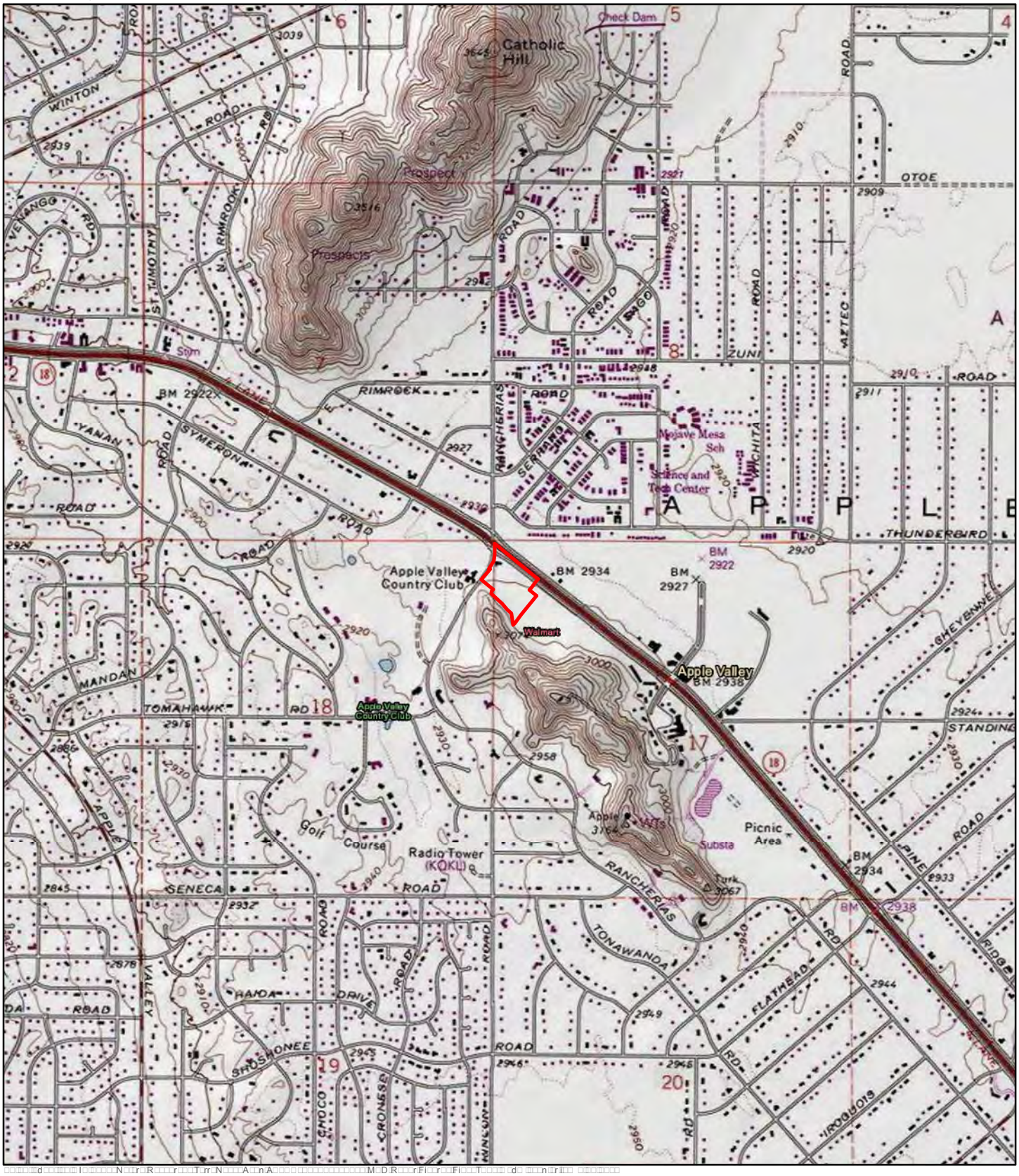


wood.

FIGURE 1

Project Vicinity
The Buffalo Trading Post Plaza Project
Town of Apple Valley, San Bernardino County, CA

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wood.

FIGURE 2

USGS 7.5' Quad: Apple Valley North
The Buffalo Trading Post Plaza Project
Town of Apple Valley, San Bernardino County, CA

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Source: McKently Malak Architects, 2022

FIGURE 3

Site Location and Plan
The Buffalo Trading Post Plaza Project
Town of Apple Valley, San Bernardino, CA

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2.0 REGULATORY FRAMEWORK

2.1 Federal

Endangered Species Act (ESA) – The United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service are the designated federal agencies accountable for administering the ESA. The ESA defines species as "endangered" or "threatened" and provides regulatory protection at the federal level.

- Section 9 of the ESA prohibits the "take" of listed (i.e., endangered or threatened) species. The ESA definition of take is "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct." Recognizing that take cannot always be avoided, Section 10(a) includes provisions for take that is incidental to, but not the purpose of, otherwise lawful activities. Specifically, Section 10(a) (1) (A) permits (authorized take permits) are issued for scientific purposes. Section 10(a) (1) (B) permits (incidental take permits) are issued for the incidental take of listed species that does not jeopardize the species.
- Section 7 (a) (2) requires federal agencies to evaluate the proposed project with respect to listed or proposed listed, species and their respective critical habitats (if applicable). Federal agencies must employ programs for the conservation of listed species and are prohibited from authorizing, funding, or carrying out any action that would jeopardize a listed species or destroy or modify its "critical habitat."
- Section 10(a) of the ESA authorizes the issuance of incidental take permits and establishes standards for the content of habitat conservation plans. The project site is in a proposed Habitat Conservation Plan (HCP), see Section 2.3.

As defined by the ESA, "individuals, organizations, states, local governments, and other non-federal entities are affected by the designation of critical habitat only if their actions occur on federal lands, require a federal permit, license, or other authorization, or involve federal funding.

Migratory Bird Treaty Act (MBTA) – Treaties signed by the U.S., Great Britain, Mexico, Japan, and the republics of the former Soviet Union make it unlawful to pursue, capture, kill, and/or possess, or attempt to engage in any such conduct to any migratory bird, nest, egg or parts thereof listed in this document. As with the ESA, the MBTA also allows the Secretary of the Interior to grant permits for the incidental take of these protected migratory bird species. Impacts include direct disturbance to/destruction of nests, eggs, and birds as well as indirect effects such as loud construction noises (e.g., drilling, operation of heavy equipment, etc. in excess of 60 dB at the nest site) and increased site activities (e.g., moving vehicles, use of guard dogs, presence of personnel) in close proximity to active nests.

Bald and Golden Eagle Protection Act (BGEPA) - The BGEPA, enacted in 1940, and amended several times since, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts (including feathers), nests, or eggs.

The BGEPA provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part (including feathers), nest, or egg thereof."

The BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Regulations further define "disturb" as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior"

National Environmental Policy Act (NEPA) – Portions of the proposed project could fall under the jurisdiction of a federal agency (i.e., U.S. Army Corps of Engineers). The NEPA establishes certain criteria that must be adhered to for any project that is "financed, assisted, conducted or approved by a federal agency. The federal lead agency is required to "determine whether the proposed action will significantly affect the quality of the human environment."

Section 404 of the Clean Water Act (CWA) – This section of the CWA, administered by the U.S. Army Corps of Engineers (USACE), regulates the discharge of dredged and fill material into "waters of the United States (WUS)." The USACE has created a series of nationwide permits that authorize certain activities within WUS provided that the proposed activity does not exceed the impact threshold for each of the permits, takes steps to avoid impacts to wetlands where practicable, minimize potential impacts to wetlands, and provide compensation for any remaining, unavoidable impacts through activities to restore or create wetlands. For projects that exceed the threshold for nationwide permits, individual permits under Section 404 can be issued.

2.2 State of California

Regional Water Quality Control Board (RWQCB) – The RWQCB regulates activities pursuant to Section 401(a)(1) of the CWA. Section 401 of the CWA specifies that certification from the State is required for any applicant requesting a federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities that may result in any discharge into navigable waters. Through the Porter Cologne Water Quality Control Act, the RWQCB asserts jurisdiction over Waters of the State of California (WSC) which is generally the same as WUS, but may also include isolated waterbodies. The Porter Cologne Act defines WSC as "surface water or ground water, including saline waters, within the boundaries of the state".

Sections 1600-1603 of the State Fish and Game Code – The California Fish and Game Code (FGC), pursuant to Sections 1600 through 1603, regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake that supports fish or wildlife resources. Under state code, a stream is defined as a body of water that flows at least periodically, or intermittently, through a bed or channel with hydro geomorphology distinct top-of-embankment to top-of-embankment limits, that may or may not support fish or other aquatic

biota. Included in this definition are watercourses with surface or subsurface flows that support, or have supported in the past, riparian vegetation. Specifically, Section 1601 governs public projects, while Section 1603 governs private discretionary actions. The California Department of Fish and Wildlife (CDFW) requires that public and private interests apply for a "Streambed Alteration Agreement" for any project that may impact a streambed or wetland. The CDFW has maintained a "no net loss" policy regarding impacts to streams and waterways and requires replacement of lost habitats of at least a 1:1 ratio.

California Endangered Species Act (CESA) – This legislation is similar to the federal ESA, however it is administered by the CDFW. The CDFW is authorized to enter into "memoranda of understanding" with individuals, public agencies, and other institutions to import, export, take, or possess state-listed species for scientific, educational, or management purposes. The CESA prohibits the take of state-listed species except as otherwise provided in state law. Unlike the federal ESA, the CESA applies the take prohibitions to species currently petitioned for state-listing status (candidate species). State lead agencies are required to consult with the CDFW to ensure that actions are not likely to jeopardize the continued existence of any state-listed species or result in the destruction or degradation of occupied habitat.

Section 2081 of the State Fish and Game Code – Under Section 2081 of the FGC, the CDFW authorizes individuals or public agencies to import, export, take, or possess state endangered, threatened, or candidate species in California through permits or memoranda of understanding. These acts, which are otherwise prohibited, may be authorized through permits or "memoranda of understanding" if (1) the take is incidental to otherwise lawful activities, (2) impacts of the take are minimized and fully mitigated, (3) the permit is consistent with regulations adopted in accordance with any recovery plan for the species in question, and (4) the applicant ensures suitable funding to implement the measures required by the CDFW. The CDFW shall make this determination based on the best scientific information available and shall include consideration of the species' capability to survive and reproduce.

California Environmental Quality Act (CEQA) – The basic goal of the CEQA is to retain a high-quality environment now and in the future. The specific goals are for California's public agencies to:

- Identify the significant environmental effects of their actions; and, either
- Avoid those significant environmental effects, where feasible; or
- Mitigate those significant environmental effects, where feasible.

The CEQA applies to "projects" proposed to be undertaken or requiring approval by State and/or local governmental agencies. projects are activities which have the potential to have a physical impact on the environment and may include the enactment of zoning ordinances, the issuance of conditional use permits and the approval of tentative subdivision maps. Where a project requires

approvals from more than one public agency, the CEQA requires one of these public agencies to serve as the "lead agency."

A "lead agency" must complete the environmental review process required by the CEQA. The most basic steps of the environmental review process are:

- Determine if the activity is a "project" subject to the CEQA;
- Determine if the "project" is exempt from the CEQA;
- Perform an Initial Study to identify the environmental impacts of the project and determine whether the identified impacts are "significant". Based on its findings of "significance", the lead agency prepares one of the following environmental review documents:
    - Negative Declaration if it finds no "significant" impacts;
    - Mitigated Negative Declaration if it finds "significant" impacts but revises the project to avoid or mitigate those significant impacts;
    - Environmental Impact Report (EIR) if it finds "significant" impacts.

While there is no ironclad definition of "significance", Article 5 of the CEQA Guidelines provides criteria to lead agencies in determining whether a project may have significant effects.

The purpose of an EIR is to provide state and local agencies and the public with detailed information on the potentially significant environmental effects which a proposed project is likely to have and to provide ways in which those effects may be minimized and indicate alternatives to the project.

Sections of the State Fish and Game Code pertaining to the protection of birds – Section 3503 makes it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3505.5 makes it unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds-of-prey, i.e.: owls, hawks, eagles, etc.) or to take, possess, or destroy the nest or eggs of any bird-of-prey. Section 3513 makes it unlawful to take or possess any migratory nongame bird as designated in the MBTA.

The Native Plant Protection Act (NPPA) – The NPPA includes measures to preserve, protect, and enhance rare and endangered native plant species. Definitions for "rare and endangered" are different from those contained in the CESA. However, the list of species afforded protection in accordance with the NPPA includes those listed as rare and endangered under the CESA. The NPPA provides limitations on take as follows: "no person will import into this state, or take, possess, or sell within this state" any rare or endangered native plants, except in accordance with the provisions outlined in the act. If a landowner is notified by the CDFW, pursuant to section 1903.5 that a rare or endangered plant species is growing on their property, the landowner shall

notify the CDFW at least 10 days prior to the changing of land uses to allow the CDFW to salvage the plants.

Natural Community Conservation Planning (NCCP) Program – A NCCP, which is managed by the CDFW, is intended to conserve multiple species and their associated habitats, while also providing for compatible use of private lands. Through local planning, the NCCP planning process is designed to provide protection for wildlife and natural habitats before the environment becomes so fragmented or degraded by development that species listing are required under CESA. Instead of conserving small, often isolated "islands" of habitat for just one listed species, agencies, local jurisdictions, and/or other interested parties have an opportunity through the NCCP to work cooperatively to develop plans that consider broad areas of land for conservation that would provide habitat for many species. Partners enroll in the programs and, by mutual consent, areas considered to have high conservation priorities or values are set aside and protected from development. Partners may also agree to study, monitor, and develop management plans for these high value "reserve" areas. The NCCP provides an avenue for fostering economic growth by allowing approved development in areas with lower conservation value. The project site is in a proposed NCCP, see Section 2.3.

2.3 Local

Multiple-Species Habitat/Natural Community Conservation Plan - The Town of Apple Valley (Town) and San Bernardino County (County) are working in coordination with the Bureau of Land Management (BLM), USFWS, and CDFW to prepare a "Multi-Species Habitat Conservation Plan/Natural Community Conservation Plan" (MSHCP/NCCP). The goal is to achieve consistent and complimentary conservation planning goals between the MSHCP/NCCP and state and federal land use plans to achieve conservation benefits at a landscape level. The MSHCP/NCCP will safeguard features and areas that warrant protection; plus ensure that future development within the Town and surrounding County lands in the Town's sphere of influence is compliant with the ESA and CESA. The MSHCP/NCCP will guide the Town's and County's conservation efforts in the MSHCP/NCCP area, allowing for the preservation of open space and protection of threatened and endangered species (Town 2022a). The MSHCP/NCCP Planning Area includes 46,948 acres within the Town's incorporated limits and an additional 122,921 acres within the Town's sphere of influence for a total of 169,869 acres (Town 2022b).

Besides creating environmental benefits, an approved MSHCP/NCCP will also provide permitting advantages to the Town and County by streamlining the environmental permitting process. The process established under the MSHCP/NCCP will increase control over local land use decisions and establish a one-stop shop for environmental permitting.

Work on the proposed plan has been underway for well over a decade, and the list of proposed covered species has changed several times. For this document we are including proposed species from CDFW (2015) and Town (2017, 2021).

Town of Apple Valley, Code of Ordinances, Title 9 - Development Code - Chapter 9.76 of the Town's code is *Plant Protection and Management* (Municode 2022). The Town finds that it is in the public interest to promote the continued health of the Town's abundant and diverse plant resources by providing regulations and guidelines for the management of the plant resources in the Town on property or combinations of property under private or public ownership for the following purposes:

- 1. To promote and sustain the health, vigor and productivity of plant life and aesthetic values within the Town through appropriate management techniques;
- 2. To conserve the native plant life heritage for the benefit of all, including future generations;
- 3. To protect native trees and plants from indiscriminate removal, and to regulate such activity;
- 4. To provide a uniform standard for appropriate removal of native trees and plants in public and private places and streets to promote conservation of these valuable natural resources;
- 5. To protect and maintain water productivity and quality in local watersheds; and
- 6. To preserve rare plants and protect animals with limited or specialized habitats.

These following desert native plants or any part thereof except the fruit, shall not be harvested or removed except under a permit issued by the Town Manager, or designee. No existing Joshua Tree shall be disturbed, moved (transplanted or otherwise), removed or destroyed unless such disturbance, move, removal or destruction is first reviewed and approved by the Town. The code specifically protects **all Joshua trees (mature and immature)** and the following desert native plants with stems two inches or greater in diameter or six feet or greater in height:

- *Dalea, Spinosa* (smoketree) [sic].
- All species of the family Agavaceae* (century plants, nolinas, yuccas, cacti) including the following known to the Town: Mohave Yucca (*Yucca schidigera*), Lords candle (*Yucca whipplei*), and Barrel cactus (*Ferocactus acanthodes*) [sic] (**Note that these are the species as listed under this ordinance by the Town, but botanically, nomenclature and taxonomy is not entirely accurate*).
- All species of the genus *Prosopis* (mesquites).
- Creosote Rings [sic], ten feet or greater in diameter.

- Plants protected or regulated by the State Desert Native Plant Act (i.e., Food and Agricultural Code 80001, et. seq.) shall be required to comply with the provisions of those statutes prior to the issuance of any county development permit or land use application approval. The Town Manager, or designee, is responsible for the issuance of any required wood tags, seals or permits. The following are the native plants specifically named in state Food and Agricultural Code 80001 (California Legislative Information 2022b):
- All species of Burseraceae family (elephant tree).
- *Carnegiea gigantea* (sahuaro cactus).
- *Ferocactus acanthodes* (barrel cactus).
- *Castela emoryi* (crucifixion thorn).
- *Dudleya saxosa* (panamint dudleya) [sic].
- *Pinus longaeva* (bristlecone pine).
- *Washingtonia filifera* (fan palm).
- All species of the family Agavaceae (century plants, nolinas, yuccas).
- All species of the family Cactaceae (cacti)
- All species of the family Fouquieriaceae (ocotillo, candlewood).
- All species of the genus *Prosopis* (mesquites).
- All species of the genus *Cercidium* (palos verdes).
- *Acacia greggii* (catclaw).
- *Atriplex hymenelytra* (desert-holly).
- *Dalea spinosa* (smoke tree).
- *Olneya tesota* (desert ironwood)

3.0 METHODS

3.1 Literature Review and Records Search

A literature review and record search was conducted to identify occurrences of special status biological resources in the project vicinity. The review included:

- A report from the CDFW's California Natural Diversity Data Base (CNDDB) for a five-mile radius around the project site (CDFW 2022, Appendix A),
- The USFWS (2022a) Environmental Conservation Online System (ECOS) including critical habitat mapping and an Information for Planning and Consultation (IPaC) report (Appendix B).
- The California Native Plant Society (CNPS) Rare Plant Inventory (CNPS 2022) including records from the following California USGS 7.5-minute topographic quadrangles which are within five miles of the project: *Apple Valley North, Apple Valley South, Hesperia, and Victorville, Calif*. (Appendix C). Note that CDFW has changed the name of "CNPS List" or "CNPS Ranks" to "California Rare Plant Rank" (CRPR) to reduce confusion over the fact that rank assignments are the product of a collaborative effort between CNPS and CDFW and not solely a CNPS assignment (CDFW 2022c),
- Consortium of California Herbaria (2022) plant specimens,
- iNaturalist (2022) photographic species records,
- Aerial photographs, and
- Pertinent documents from the Wood library and project files (*e.g.*, other biological surveys from the general vicinity) and the collective knowledge of Wood biologists.

3.2 Biological Resources Assessment

The field reconnaissance survey was conducted by Wood senior biologist John F. Green 18 August 2022 to evaluate the suitability of existing habitat on site to support special status biological resources. The survey was conducted from 0630 to 0820 hours and entailed walking transects across the site and around the project perimeter with special focus on the less disturbed southern area and stormwater affected areas, as they provided slightly better conditions for plants and wildlife. Weather conditions were 72.8 to 79.4 degrees Fahrenheit, 5 to 30 percent cloud cover, wind speeds of 0-2 mph, and with no precipitation.

Representative photos were taken and are included in Appendix D. All plant and wildlife species observed or otherwise detected were recorded in field notes and a list of them is included in Appendix E. Plant species of uncertain identity were collected for later identification by University of California, Riverside Herbarium Collections Manager, Andrew Sanders.

4.0 RESULTS

4.1 Literature Review

The results of the literature review are presented in Tables 1 and 2, along with the results of the field reconnaissance survey conducted 18 August 2022. Species which are not known to occur at project elevations are generally not included.

Table 1. Special Status Plants Occurring or Potentially Occurring

Scientific Name	Common Name	Status[1]			Habitat (for plants includes elevational range in meters & blooming period)	Occurrence Probability[2]
		Federal	State	Other		
Canbya candida	white pygmy-poppy	None	S3S4	CRPR 4.2, MSHCP /NCCP: 2017	Joshua tree "woodland", Mojavean desert scrub, pinyon and juniper woodland on granitic, gravelly, sandy soils. 600-1460 m. B: March-June.	Low Suitable, but disturbed, habitat. Nearest known records approximately 3.5 miles to west
Castilleja plagiotoma	Mojave paintbrush	None	S4	CRPR 4.3	Great Basin scrub, Joshua tree "woodland", Lower montane coniferous forest, Pinyon and juniper woodland. 300-2500 m. B: April – June.	Low Suitable, but disturbed, habitat. Nearest known records approximately 3.5 miles to west
Chorizanthe spinosa	Mojave spineflower	None	S4	CRPR 4.2	Chenopod scrub, Joshua tree "woodland", Mojavean desert scrub, playas, sometimes in alkaline places. 6-1300 m. B: March – July.	Very Low Habitat marginal, nearest record in Hesperia quadrangle.
Cymopterus deserticola	desert cymopterus	None	S2	CRPR 1B.2, MSHCP /NCCP: 2015, 2017	Joshua tree woodland and Mojavean desert scrub in sandy areas. 630-1500 m. B: March - May.	Low Habitat suitable, but disturbed. Historic population onsite not seen since 1941.
Diplacus (Mimulus) mohavensis	Mojave monkeyflower	None	S2	CRPR 1B.2, MSHCP /NCCP: 2015, 2017	Joshua tree woodland and Mojavean desert scrub. Most often in washes; sometimes in gravely and sandy areas. 600-1200 m. B: April - June.	Low Habitat suitable, but disturbed. Recorded within site quadrangle.

Table 1. Special Status Plants Occurring or Potentially Occurring						
Scientific Name	**Common Name**	**Status[1]**			**Habitat (for plants includes elevational range in meters & blooming period)**	**Occurrence Probability[2]**
		Federal	**State**	**Other**		
Eremothera boothii ssp boothii	Booth's evening-primrose	None	S3	CRPR 2B.3, MSHCP /NCCP: 2015, 2017	Joshua tree "woodland", pinyon and juniper woodland. 815-2400 m. B: April-September.	Very low Habitat marginal and disturbed. There are 3 CNDDB records associated with the Mojave River approximately three miles to the west. The Town of Apple Valley region is far outside of expected geographic range of ssp. *boothii* (Jepson Flora Project 2022), and the CNDDB states that all local specimens show signs of introgression.
Larrea tridentata	creosote bush (rings ten feet or greater in diameter)	None	None	Town code	Widespread shrub of western deserts.	Absent (rings) The species is onsite, but Town code specifically protects only creosote rings. Creosote bushes can produce offshoots or "clones" that grow in circular clusters (rings). We did not see any obvious rings onsite or in aerial photography.
Loeflingia squarrosa var. artemisiarum	sagebrush loeflingia	None	S2	2B.2	Sandy places in desert dunes, Great Basin scrub, Sonoran desert scrub. 700-1615 m. B: April-May	Very Low Habitat marginal and disturbed, nearest record in Apple Valley South quadrangle.
Lycium torreyi	Torrey's box-thorn	None	S3	CRPR 4.2	Mojavean & Sonoran desert scrub in rocky, sandy places; streambanks, washes. -50-1220 m. B: (January-February) March-June (September-November).	Very Low-Absent Habitat marginal and disturbed and this shrub was not seen. Although there is a CNPS record for *L. torreyi* in the Victorville quadrangle, CNPS also states "plants in California outside vicinity of Colorado River are likely misidentifications."
Muilla coronata	crowned muilla	None	S3	4.2	Chenopod scrub, Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland. 670-1960 m. B: March-April (May)	Low Habitat present but disturbed, nearest record in Apple Valley South quadrangle.

Table 1. Special Status Plants Occurring or Potentially Occurring						
Scientific Name	**Common Name**	**Status[1]**			**Habitat (for plants includes elevational range in meters & blooming period)**	**Occurrence Probability[2]**
		Federal	**State**	**Other**		
Opuntia basilaris var. *brachyclada*	short-joint beavertail	None	S3	1B.2	Chaparral, Joshua tree "woodland", Mojavean desert scrub, pinyon and juniper woodland. 425-1800 m. B: April-June (August).	Very Low *Opuntia basilaris* present just offsite in rocky hills to south. Because offsite, not identified to subspecies. Not believed to be present onsite.
Pediomelum castoreum	beaver dam breadroot	None	S2	CRPR 1B.2, MSHCP /NCCP: 2017	Joshua tree "woodland", Mojavean desert scrub on roadsides, in sandy places, and in washes. 610-1525 m. B: April-May.	Low Suitable habitat but disturbed. Nearest known record approximately 3 miles to west from 1932 or earlier.
Prosopis glandulosa	honey mesquite	None	None	Town code	Widespread desert species which indicates the presence of subterranean water.	Occurs In stormwater areas (Figure 4)
Sclerocactus polyancistrus	Mojave fish-hook cactus	None	S3	CRPR 4.2	Great Basin scrub, Joshua tree "woodland", Mojavean desert scrub usually on carbonate soils. 640-2320 m. B: April-July.	Very Low Suitable habitat, but this small cactus wasn't seen. Nearest known occurrence is on the Victorville quadrangle.
Scutellaria bolanderi ssp. *austromontana*	southern mountains skullcap	None	S3	CRPR 1B.2, MSHCP /NCCP: 2015, 2017	Mesic areas in chaparral, cismontane woodland, lower montane coniferous forest. 425-2000 m. B: June-August.	Absent Suitable habitat not present. Records from the Mojave River, 3 miles west, may be waifs washed down from the mountains.
Symphyotrichum defoliatum	San Bernardino aster	None	S2	CRPR 1B.2, MSHCP /NCCP: 2015, 2017	Streambanks in cismontane woodland, coastal scrub, lower montane coniferous forest, marshes and swamps, meadows and seeps, valley and foothill grassland. 2-2040 m. B: July-November.	Absent Suitable habitat not present.
Yucca brevifolia	western Joshua tree	None	SCT	CRPR None, MSHCP /NCCP: 2021, Town code	Mojavean desert scrub, Joshua tree "woodland." 750 - 2,100 m, but individuals slightly lower or higher. B: January - May, rarely as early as November (CDFW 2022c).	Occurs Several small trees on or immediately adjacent to site (Figure 4).

Table 2. Special Status Wildlife Occurring or Potentially Occurring						
Scientific Name	**Common Name**	**Status[1]**			**Habitat**	**Occurrence Probability[2]**
		Federal	**State**	**Other**		
Invertebrates						
Plebulina emigdionis	San Emigdio blue butterfly	None	S1S2	MSHCP /NCCP: 2015, 2017	Found in desert canyons and along riverbeds. Host plant is *Atriplex canescens*; and possibly *Lotus purshianus*.	Very Low. Host plant onsite, but not near a riverbed or canyon. Nearest record approximately 2.5 miles west.
Helminthoglypta mohaveana	Victorville shoulderband	None	S1	MSHCP /NCCP: 2015, 2017	Known only from along the Mojave River in San Bernardino County. Found among granite boulders and at the base of rocky cliffs.	Absent No suitable habitat
Danaus plexippus	monarch butterfly	**FC**	S2S3	None	Western winter roost sites primarily occur along the coast from northern Mendocino to Baja California, Mexico, located in wind-protected tree groves (*Eucalyptus* species, Monterey pine (*Pinus radiata*), cypress), with nectar and water sources nearby. During breeding season, adults widespread but scarce in the desert. Larvae require milkweed.	Low Seldom seen in the desert, no milkweed detected.
Fish						
Siphateles bicolor mohavensis	Mohave tui chub	FE	SE	MSHCP /NCCP: 2015, 2017	Found in the Mojave river as well as drainage and sewer systems with year-round water.	Absent No year-round water available

Table 2. Special Status Wildlife Occurring or Potentially Occurring						
Scientific Name	**Common Name**	**Status[1]**			**Habitat**	**Occurrence Probability[2]**
		Federal	**State**	**Other**		
Amphibians						
Anaxyrus californicus	arroyo toad	**FE**	SSC, S2S3	MSHCP /NCCP: 2017	Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian, desert wash, etc. Rivers with sandy banks, willows, cottonwoods, and sycamores; loose, gravelly areas of streams in drier parts of range.	Absent No suitable habitat.
Rana draytonii	California red-legged frog	**FT**	SSC, S2S3	MSHCP /NCCP: 2017	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	Absent No suitable habitat.
Reptiles						
Emys (Actinemys) marmorata (pallida)	western pond turtle	None	SSC, S3	MSHCP /NCCP: 2015, 2017	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	Absent No suitable habitat

Table 2. Special Status Wildlife Occurring or Potentially Occurring						
Scientific Name	**Common Name**	**Status[1]**			**Habitat**	**Occurrence Probability[2]**
		Federal	**State**	**Other**		
Gopherus agassizii	desert tortoise	**FT**	**ST**, S2S3	MSHCP /NCCP: 2015, 2017, 2021	Prefers Joshua tree, desert wash & scrub, especially creosote bush (*Larrea tridentata*) habitats; but in most desert habitats. Large wildflower blooms preferred. Burrows & nests require friable soil.	Very Low Site and area to south contain suitable habitat, but it is a patch surrounded by development. No corridors to similar habitat. Desert tortoise is unlikely to persist in this situation. Nearest records approximately 2 miles to north. From 1990
Phrynosoma blainvillii	coast horned lizard	None	SSC, S3S4	MSHCP /NCCP: 2015, 2017	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	Absent Habitat suitable, but site appears to be beyond the edge of the range of the species. Nearest known record 4 miles to southwest.
Birds						
Accipiter cooperii	Cooper's hawk	MBTA	WL, S4, FGC	MSHCP /NCCP: 2015, 2017	Woodland, chiefly of open, interrupted, or marginal type. Nest sites often in riparian deciduous trees and live oaks in canyon bottoms & on river flood-plains. Also uses suitable trees in parks, residential areas, etc.	Absent (nesting) Nesting, no suitable trees onsite. Moderate (foraging) May nest in nearby trees and forage onsite.

Table 2. Special Status Wildlife Occurring or Potentially Occurring						
Scientific Name	**Common Name**	**Status[1]**			**Habitat**	**Occurrence Probability[2]**
		Federal	**State**	**Other**		
Aquila chrysaetos	golden eagle	MBTA, BGEPA, BCC	S3, WL, FP, FGC	MSHCP /NCCP: 2015, 2017, 2021	Mountainous/hilly areas with cliffs and open fields required for habitat. Jackrabbits are primary food source.	Absent (nesting) No nesting habitat on site. Could potentially nest on rocky peaks to the immediate south, but they are likely too low & close to human activity. Low Foraging
Athene cunicularia	burrowing owl	MBTA, BCC	SC, S3, FGC	MSHCP /NCCP: 2015, 2017, 2021	Open, dry grasslands, deserts & scrublands with low-growing vegetation. Depends on burrowing mammals.	Low Not found during July reconnaissance survey, but appropriate habitat and potential burrows are present.
Buteo swainsoni	Swainson's hawk	MBTA, BCC	SE, S3, FGC	MSHCP /NCCP: 2015, 2017	Open plains, grasslands, dry grasslands. Migrates through Mojave Desert.	Absent (nesting) No nesting habitat on site. Low (foraging) Could potentially nest in the general area and forage on site. May also occur during migration.
Calypte costae	Costa's hummingbird	MBTA, BCC	S4, FGC	None	Primary habitats desert wash; edges of desert & valley foothill riparian; coastal, desert, & desert succulent scrub; palm oasis; & low elevation chaparral.	Occurs Nesting and foraging habitat present.
Coccyzus americanus (occidentalis)	yellow-billed cuckoo (western distinct population segment)	**FT**, MBTA	**SE**, S1, FGC	MSHCP /NCCP: 2015, 2017, 2021	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	Absent No suitable nesting or foraging habitat.

Table 2. Special Status Wildlife Occurring or Potentially Occurring						
Scientific Name	**Common Name**	**Status[1]**			**Habitat**	**Occurrence Probability[2]**
		Federal	**State**	**Other**		
Empidonax traillii extimus	southwestern willow flycatcher	**FE,** MBTA	**SE**, S1, FGC	MSHCP /NCCP: 2015, 2017, 2021	Southern California and southwestern USA riparian woodlands.	Absent No suitable nesting or foraging habitat.
Falco mexicanus	prairie falcon	MBTA, BCC	SC, S3, FGC	MSHCP /NCCP: 2015, 2017	Breeding sites located on cliffs, but forages far afield.	Absent (nesting) No nesting habitat on site. Could potentially nest on rocky peaks to the immediate south, but they are likely too low & close to human activity. Low Foraging
Gymnogyps californianus	California condor	**FE**, MBTA	**SE**, S1, FGC	None	Forages widely for carrion. Ledges and cliffs are used as roost and nest sites.	Absent Identified only by the IPaC report. Although capable of very long foraging flights from breeding and nesting areas, all members of the population are closely monitored. There is no nesting habitat on site and condors rarely, if ever, visit this area.
Icteria virens	yellow-breasted chat	MBTA	SSC, S3, FGC	MSHCP /NCCP: 2015, 2017	Summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian, consisting of willow, blackberry, wild grape.	Absent No suitable nesting or foraging habitat.
Lanius ludovicianus	loggerhead shrike	MBTA, BCC	SSC, S4, FGC	MSHCP /NCCP: 2017	Found in open habitats with widely spaced vegetation.	Low (nesting) Marginal nest sites. Moderate (foraging) habitat present.

Table 2. Special Status Wildlife Occurring or Potentially Occurring						
Scientific Name	**Common Name**	**Status[1]**			**Habitat**	**Occurrence Probability[2]**
		Federal	**State**	**Other**		
Piranga rubra	summer tanager	MBTA	SSC, S1, FGC	MSHCP /NCCP: 2015, 2017	Summer resident of desert riparian along lower Colorado River, and locally elsewhere in California deserts. Requires cottonwood-willow riparian for nesting and foraging; prefers older, dense stands along streams.	Absent No suitable nesting or foraging habitat.
Setophaga petechia	yellow warbler	BCC, MBTA	SSC, S3S4, FGC	MSHCP /NCCP: 2015, 2017	Riparian plant associations in close proximity to water. Also nests in montane shrubbery in open conifer forests. Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	Absent No suitable nesting or foraging habitat.
Spinus lawrencei	Lawrence's goldfinch	MBTA, BCC	S4, FGC	None	Pine forests, chaparral typically but breeds in other habitats. Can be found in dry open land in migration.	Absent Identified only by the IPaC resource report. Project lacks breeding and typical foraging habitat.
Toxostoma redivivum	California thrasher	MBTA, BCC	FGC	None	Chaparral & foothill habitats. Sometimes well-vegetated deserts.	Absent No suitable nesting or foraging habitat Identified only by the IPaC resource report.
Toxostoma lecontei	Le Conte's thrasher	MBTA, BCC	S3, FGC	MSHCP /NCCP: 2015, 2017	Desert: open washes, scrub; commonly nests in a dense, spiny shrub or cactus.	Low (nesting) Marginal nest sites. Low (foraging) Limited suitable foraging habitat present.

Table 2. Special Status Wildlife Occurring or Potentially Occurring						
Scientific Name	**Common Name**	**Status[1]**			**Habitat**	**Occurrence Probability[2]**
		Federal	**State**	**Other**		
Vireo bellii pusillus	least Bell's vireo	**FE**, MBTA	**SE**, S2, FGC	MSHCP /NCCP: 2015, 2017, 2021	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; usually below 2000 feet. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	Absent No suitable nesting or foraging habitat.
Mammals						
Antrozous pallidus	pallid bat	None	SSC, S3	WBWG-High, MSHCP /NCCP: 2017	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Absent (roosting) No suitable habitat. Low Foraging
Chaetodipus fallax pallidus	pallid San Diego pocket mouse	None	SSC, S3S4	MSHCP /NCCP: 2015, 2017	Desert border areas in desert wash, desert scrub, desert succulent scrub, pinyon-juniper, etc. Sandy, herbaceous areas, usually in association with rocks or coarse gravel.	Very Low Habitat suitable, but perhaps out of geographic range. Nearest record approximately 3 miles west.

Table 2. Special Status Wildlife Occurring or Potentially Occurring						
Scientific Name	**Common Name**	**Status[1]**			**Habitat**	**Occurrence Probability[2]**
		Federal	**State**	**Other**		
Lasiurus cinereus	hoary bat	None	S4	WBWG-Medium, MSHCP/NCCP: 2015	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	Absent (roosting) No suitable habitat. Low Foraging
Microtus californicus mohavensis	Mohave River vole	None	SSC, S1	MSHCP/NCCP: 2015, 2017	Occurs only in weedy herbaceous growth in wet areas along the Mojave River. May be found in some irrigated pastures. Burrows into soft soil. Feeds on leafy parts of grasses, sedges and herbs. Clips grasses to form runways from burrow.	Absent No suitable habitat
Vulpes macrotis arsipus	desert kit fox	None	FGC	MSHCP/NCCP: 2017, 2021	Annual grasslands or open areas with scattered brush, shrubs, & scrub. Dens in open, level areas with loose-textured, soils (CDFW 2016b)	Very Low No dens onsite. May forage, but isolated nature of adjoining habitat discourages occupation. Regulated as a fur-bearing mammal.
Xerospermophilus mohavensis	Mojave ground squirrel	None	ST	MSHCP/NCCP: 2015, 2017	Suitable habitat is sandy and gravelly soils. Burrows found at the base of shrubs.	Absent Nearest CNDDB record 3.5 miles to west, but from 1977 or earlier. Site not in or near current known range of species (Leitner 2008).

[1]Status Codes:

Federal
FE = Federal Endangered
FT = Federal Threatened
FC = Federal Candidate
BCC = Bird of Conservation Concern
BGEPA = Bald and Golden Eagle Protection Act
MBTA = Migratory Bird Treaty Act

State
SE = State Endangered
ST = State Threatened
SCT=State Candidate
FP = Fully Protected
SC = State Species of Concern
WL = Watch List
FGC = Fish & Game Code

The California Natural Diversity Database program is a member of the NatureServe Network of natural heritage programs, and uses the same conservation status methodology as other network programs.

Elements are ranked using standard criteria and definitions. This standardization makes the ranks comparable between organisms and across political boundaries.

The three main categories that are taken into consideration when assigning an element rank are rarity, threats, and trends. Within these three categories, various factors are considered, including:

• Range extent, area of occupancy, population size, total number of occurrences, and number of good occurrences (ranked A or B). Environmental specificity can also be used if other information is lacking.
• Overall threat impact as well as intrinsic vulnerability (if threats are unknown).
• Long-term and short-term trends.

S1 = Critically Imperiled – At very high risk of extirpation in the state due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.

S2 = Imperiled – At high risk of extirpation in the state due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

S3 = Vulnerable – At moderate risk of extirpation in the state due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

S4 = Apparently Secure – At a fairly low risk of extirpation in the state due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

S5 = Secure – At very low or no risk of extirpation in the state due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.

SX = Presumed Extirpated – Species is believed to be extirpated from the state. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered

SH = Possibly Extirpated – Known from only historical records but still some hope of rediscovery. There is evidence that the species may no longer be present in the state, but not enough to state this with certainty.

SNR = Unranked – State rank not yet assessed.

CRPR
1A = Presumed extirpated in California and either rare or extinct elsewhere
1B = Rare or Endangered in California and elsewhere
2A = Presumed extirpated in California, but more common elsewhere
2B = Rare or Endangered in California, but more common elsewhere
3 = Plants for which we need more information – Review list
4 = Plants of limited distribution – Watch list

Western Bat Working Group (WBWG)

The WBWG is composed of agencies, organizations, and individuals interested in bat research, management, and conservation from 13 western states and provinces. The goals of the group are to (1) facilitate communication among interested parties and reduce risks of species decline or extinction; (2) provide a mechanism by which current information on bat ecology, distribution, and research techniques can be readily accessed; and (3) develop a forum to discuss conservation strategies, provide technical assistance, and encourage education programs. Species are ranked as **High**, **Medium**, or **Low** Priority in each of 10 regions in western North America.

MSHCP/NCCP

Species proposed for coverage under the proposed MSHCP/NCCP (CDFW 2015; Town 2017, 2021).

[2]Occurrence Probability

Occurs = Observed on the site by Wood personnel or recorded there by other qualified biologists.
High = Observed in similar habitat in region by qualified biologists, or habitat on the site is a type often utilized by the species and the site is within the known range of the species.
Moderate = Reported sightings in surrounding region, or site is within the known range of the species and habitat on the site is a type occasionally used by the species.
Low = Site is within the known range of the species but habitat on the site is rarely used by the species.
Absent = A focused study failed to detect the species, or no suitable habitat is present.
Unknown = Distribution and habitat use has not been clearly determined.

4.2 Biological Resources Assessment Field Visit

The project site is largely undeveloped, but a review of historic aerial photos shows that an existing building at the northwest corner has been present since at least 1968 and that the site was partially cleared of vegetation prior to 1968 as well. It has continued in that condition since. It is surrounded by developed lands on all sides except the south, where a rocky hill is present covered with desert vegetation. That undeveloped contiguous habitat, however, is itself surrounded by development. There is no connectivity between the project site and extensive undeveloped habitats.

Roughly 75% of the project site is disturbed/developed. The primary natural vegetation community remaining is in the southern project site: disturbed creosote bush scrub. This community is dominated by creosote bush, with a few other species such as white-bursage (*Ambrosia dumosa*), but no real co-dominants. The natural community most closely corresponding to this in the proposed MSHCP/NCCP is "Sonora-Mojave Creosotebush-White Bursage Desert Scrub" (Town 2017).

Small pockets of Mojave mixed scrub occur along the southern boundary. This vegetation is associated with the rocky hill which is mostly offsite to the south. It contains a few small western Joshua trees and a variety of woody shrubs such as Nevada ephedra (*Ephedra nevadensis*), longspine horsebrush (*Tetradymia axillaris* var. *longispina*), and bladder-sage (*Scutellaria mexicana*). The natural community most closely corresponding to this in the proposed MSHCP/NCCP is "Mojave Mid-Elevation Mixed Desert Scrub" (Town 2017).

Where stormwater drains onto the site, an unnatural mix of species dependent on that extra water is present. Some may have been planted or may be the results of seeds washing down from landscaping species on the retail sites directly to the east. Some of the species in this area are western Joshua tree, rubber rabbitbrush (*Ericameria nauseosa*), Siberian elm (*Ulmus pumila*), honey mesquite (*Prosopis glandulosa*), and sand dropseed (*Sporobolus cryptandrus*). Vegetation is mapped on Figure 4.

There are no natural drainages onsite, but water is now channeled onto the site by retail development to the east (since at least 2003) at the northeast site corner (Figure 4). Two concrete lined inlets, at least one partial stretch of unlined channel, then a series of pools (all dry at the time of the site visit) are currently present onsite. Other channeling evidence may have been obliterated by offroad vehicle usage of the site, but past aerial photography suggests that in wet years flow may exit the project site in the northwestern area.

Soil mapping for the project site (United States Department of Agriculture, Natural Resources Conservation Service 2019) showed that three soil series occur on site: Bryman loamy fine sand, 0 to 2 percent slopes; Wasco sandy loam, cool, 2 to 5 percent slopes; and rock outcrop-lithic torriorthents complex, 15 to 50 percent slopes (Figure 5). The Bryman series consists of deep, well drained soils that formed in alluvium from dominantly granitic sources. Bryman soils are on terraces and older alluvial fans and have slopes of 0 to 15 percent. The Wasco series consists of

very deep, well drained soils on recent alluvial fans and flood plains. These soils formed in mixed alluvium derived mainly from igneous and/or sedimentary rock sources and may contain carbonates. Slope is 0 to 5 percent slopes. Rock outcrop is self-explanatory, while lithic torriorthents are the thin soils atop them, which are sometimes calcareous.



wood.

FIGURE 4

Vegetation, Joshua Trees, and Stormwater Inlets
The Buffalo Trading Post Plaza Project
Town of Apple Valley, San Bernardino, CA

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FIGURE 5

Soils and Incidental Burrow Detections
The Buffalo Trading Post Plaza Project
Town of Apple Valley, San Bernardino, CA

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5.0 DISCUSSION

5.1 Special Status Plants

Seventeen special status plant species are known from the project area (Table 1). Two are not expected to occur due to a lack of habitat (southern mountains skullcap and San Bernardino aster) and a third, creosote rings, were not observed. Twelve additional species (white pygmy-poppy, Mojave paintbrush, Mojave spineflower, desert cymopterus, Mojave monkeyflower, Booth's evening-primrose, sagebrush loeflingia, Torrey's box-thorn, crowned muilla, short-joint beavertail, beaver dam breadroot, and Mojave fish-hook cactus) have only a very low to low potential for occurrence. None of these species are federally or state listed as endangered or threatened. While impacts to these species could be considered significant under CEQA if plants found onsite were found to be important to survival of the overall population, this is not likely due to the extensive site disturbance and the minimal suitable habitat. We are not recommending focused surveys for any of these species. If any are incidental detections during other recommended preconstruction surveys, we recommend that any unavoidable plants be transplanted, have seeds collected, and/or have topsoil around them relocated to preserve individuals and/or the seedbank. Note that these activities may require coordination with the CDFW and/or Town due to state and local regulations.

Two special status species do occur onsite: the western Joshua tree and honey mesquite. Locations are shown on Figure 4 (specifically for western Joshua trees and stormwater areas for honey mesquites). The western Joshua tree is currently a state candidate for listing as a threatened species, so cannot be impacted without CDFW consultation. Further, under the Town's *Plant Protection and Management* code, no western Joshua trees of any size can be removed without Town permission. Honey mesquite is also protected by the *Plant Protection and Management* code. Before removing any mesquite with stems two inches or greater in diameter or six feet or greater in height, permission from the Town must be obtained. The individual plants of both of these species occur near site margins, and we recommend that they be avoided. If not possible, consultation with the CDFW and/or Town will be required.

Finally, the western Joshua tree and the potentially occurring white pygmy-poppy, desert cymopterus, Mojave monkeyflower, Booth's evening primrose, and beaver dam breadroot have been proposed for coverage under the proposed MSHCP/NCCP. Of these, the science advisory committee for the proposed MSHCP/NCCP singled out Mojave monkeyflower as potentially being of relatively high conservation or legal concern (Fleishman, et al 2016). If species proposed for coverage under the MSHCP/NCCP are detected, the Town should also be consulted.

5.2 Special Status Invertebrates

The literature review identified three special status invertebrates from the project area (Table 2). One, the Victorville shoulderband has no onsite habitat and cannot occur. The monarch butterfly, a federal candidate for ESA listing, identified only by IPaC, has a low potential for occurrence, as

does the San Emigdio blue butterfly which is state ranked S1S2 and under consideration for coverage under the proposed MSHCP/NCCP.

Monarchs are not expected to winter in the project area, but a few individual adults may forage in the warmer months. The main threat to the species would be impacts to milkweed, the larval foodplant. No milkweeds have been found on site to date. Milkweeds are not tracked as a special status species, but the Consortium of California Herbaria (2022) has two milkweed records within a five-mile radius of the site.

The foodplant for the San Emigdio blue butterfly, *Atriplex canescens*, is present onsite in small numbers but habitat is otherwise unfavorable.

We recommend that preconstruction surveys by qualified biologists flag milkweed plants (if any) and *Atriplex canescens* for avoidance. If unavoidable, these plants should be inspected for caterpillars. If present, they should be moved to safe host plants, with appropriate authorizations from USFWS, CDFW, and/or the Town.

5.3 Special Status Fish, Amphibians, and Reptiles

No habitat is present for the Mohave tui chub, arroyo toad, California red-legged frog, and western pond turtle and the site appears to be beyond the range of the coast horned lizard. Therefore, these species are considered absent and require no further consideration.

5.4 Desert Tortoise

The literature search identified desert tortoise as being of potential occurrence (Table 2). The Mojave population segment of the desert tortoise is federally and state listed as threatened by the USFWS and CDFW. The Mojave population segment includes all tortoises occurring west and north of the Colorado River. The desert tortoise is most common in desert scrub, desert wash, and Joshua tree habitats in a variety of terrain types, including alluvial fans, valleys, rocky hillsides, and washes. They require friable soil for burrow and nest construction. Burrows are typically found at the base of shrubs, in the interspaces between shrubs, and occasionally in caliche soil bank areas or underneath boulders/rocks. They are herbivores and feed on a variety of plants including annual herbs and perennial grasses.

Tortoise activity is greatest during the spring and early summer, and to a lesser extent during the fall; however, tortoises can be active at any time of the year during appropriate weather conditions. Although tortoises hibernate during the winter and typically emerge in late February or early March, hatchlings and juveniles can be fairly active during the winter months. Adults will also emerge from their burrows to drink if water resources have been limited during the previous activity season and/or winter precipitation has provided standing water. Their activity is usually much reduced during hot summer months, but they may be active following summer rains or if temperatures are moderate (Boarman 2003).

Threats to desert tortoises include loss or degradation of habitat, vandalism, poaching, intentional killing, predation on young tortoises by the common raven (*Corvus corax*) and other predators (*e.g.* kit fox, snakes, etc.), and disease (*e.g.* Mycoplasmosis). Off-road vehicles, military training maneuvers, mining, and livestock grazing also affect tortoise habitat by collapsing burrows, eroding soils, reducing availability of food plants, eliminating shrubs which would provide shade for tortoises and support for their burrows, and ultimately results in surface disturbance that promotes conditions more conducive to invasion by exotic plant species, which provide less nutritional value to tortoises than the native species that were replaced. Human activities, including garbage dumping, landfills, roads, increased nesting opportunities, irrigation, and increased vehicle use have led to increased numbers of common ravens in California deserts. Ultimately, the increased predation on young tortoises by common ravens reduces recruitment in breeding populations (Boarman 2003).

Tortoises are most often detected by their scats and burrows. Tortoises themselves can sometimes be detected in burrows by shining a light inside the burrow. Other tortoise sign includes carcasses, or fragments thereof, courtship rings, and drinking depressions. Presence of sign is an indication that tortoises either occur, or have recently occurred, at a particular location. Sign can be detected at any time of the year and always indicates suitable habitat, if not occupied habitat.

The vegetation communities occurring onsite are habitats typically utilized by desert tortoises. However, there is no desert tortoise critical habitat designated on the project site, and no desert tortoises or their burrows or sign were detected during the reconnaissance survey. Although the CNDDB reports three occurrences within a 5-mile radius, all are north of the core, developed Town. Because of the poor condition of the site, the isolated nature of the contiguous habitat, and the resultant anthropomorphic pressures on that habitat fragment, we consider it extremely unlikely that any desert tortoises persist onsite or in the adjacent habitat remnant.

We are not recommending a focused survey, but to avoid the remote possibility of desert tortoise take we recommend a preconstruction survey and the following mitigation and minimization measures:

1) A worker's environmental awareness program (WEAP) would be implemented to educate the construction crew of potential special status species present on the project site.
2) Construction and maintenance personnel would be required to inspect for desert tortoises under vehicles prior to moving the vehicle. If a desert tortoise is found beneath a vehicle, it would not be moved until the desert tortoise had left of its own accord. All desert tortoise observations would be reported to a qualified biologist and the wildlife agencies.
3) Any open trenches adjacent to habitat should be fenced and/or covered to prevent entry by desert tortoises when not under active use. Exit ramps should be present within open trenches.

Desert tortoises cannot be taken (harmed, harassed) under state and federal law. This report and recommended mitigation measures do not constitute authorization for incidental take of the desert tortoise. If desert tortoise is detected on site, consultation with the USFWS and CDFW may be required. Since desert tortoise is proposed for coverage under the MSHCP/NCCP, the Town may also need to be notified.

5.5 Mammals

The literature review identified six special status / protected mammals from the project area: the pallid bat, pallid San Diego pocket mouse, hoary bat, Mohave River vole, desert kit fox, and the Mohave ground squirrel (Table 2). The two bat species may forage over the site, but there are no potential roost sites, so they will not be directly impacted by the proposed project. They should simply be avoided if temporarily present.

The desert kit fox and pallid San Diego pocket mouse have a very low potential for occurrence. No dens or sign of the desert kit fox are onsite, but it may forage there. There are burrows of unidentified rodents onsite, primarily in the less disturbed southern portion. Because of the poor condition of the site, the isolated nature of the contiguous habitat, and the resultant anthropomorphic pressures on that habitat fragment, we consider it unlikely that any significant population of either is present in the project area, if they persist at all. We are not recommending any further action at this time.

The desert kit fox is a fur-bearing mammal regulated under the FGC but is not generally considered a special status species. The proposed MSHCP/NCCP may include it as a covered species. At this time, no impacts to desert kit fox are anticipated, however should an unavoidable den be established onsite in the future, the CDFW and/or Town should be consulted on mitigation measures that they will require, if any.

5.6 Special Status Birds

As shown on Table 2, seventeen special status bird species are known from the project area. Yellow-billed cuckoo, southwestern willow flycatcher, California condor, yellow-breasted chat, summer tanager, yellow warbler, Lawrence's goldfinch, California thrasher, and least Bell's vireo have no habitat onsite and are not expected to occur.

Cooper's hawk, golden eagle, Swainson's hawk, and prairie falcon may potentially forage over the site, but no nesting habitat is present. Therefore, no direct impacts are anticipated to these species. They should simply be avoided if temporarily present.

Costa's hummingbird occurs onsite and potential foraging and nesting habitat is also present for burrowing owl, loggerhead shrike, and Le Conte's thrasher. The latter three are also proposed for coverage under the proposed MSHCP/NCCP. All four of these species will be protected by the recommendations in Sections 5.7 and 5.8 below.

5.7 Migratory Bird Treaty Act and State Fish and Game Code

Native bird species which may nest on or adjacent to the project site could be subject to direct or indirect impacts from the project. The bird nesting season is generally February 1 through August 31, although nesting birds are always protected. To avoid impacts to such birds, including the special status species which occur or potentially occur on site, we recommend the following: any vegetation removal or grading occurring during the nesting season would require at least one nesting bird survey to be conducted by a qualified biologist no more than three days prior to such activity. If no nests are found, construction would proceed. If active nests are found, impact avoidance measures (*e.g.*, "no work" buffers; sound and/or visual barriers) would be put in place around the nest until young have fledged. This would also apply to offsite nests which may be indirectly impacted. While there is no established protocol for indirect impacts to nests, when consulted, the CDFW often recommends avoidance buffers of about 500 feet for birds-of-prey and listed species, and 100 – 300 feet for other unlisted birds. Vegetation removal and/or ground disturbance and construction activities conducted outside of the nesting season can generally avoid the nesting bird survey recommendation/requirement.

5.8 Burrowing Owl

The burrowing owl is uniquely vulnerable to ground disturbing activities since it both nests and roosts underground. Therefore, additional actions must be taken to protect against impacts to this species which would result in take. In addition to protection under the MBTA and FGC, the burrowing owl is also federally designated as a Bird of Conservation Concern and state designated as a Species of Concern. It is proposed for coverage under the proposed MSHCP/NCCP. It occurs in open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation (Haug et al. 2011). In southern California, burrowing owls are not only found in undisturbed natural areas, but also fallow agricultural fields, margins of active agricultural areas, livestock farms, airports, and vacant lots. It is a subterranean nester, typically utilizing pre-existing burrows or burrow surrogates (*e.g.* ground squirrel burrows, kit fox burrows, drain pipes, culverts, etc.). Burrowing owl occupied burrows and areas can be recognized by sign which includes tracks, molted feathers, cast pellets, prey remains, eggshell fragments, whitewash, nest burrow decoration materials (e.g., paper, foil, plastic items, livestock or other animal manure, etc.) (California Department of Fish and Game [CDFG] 2012). The species is active both day and night and may be seen perching conspicuously on fence posts or standing at the entrance of their burrows.

Analyses of regional patterns for breeding populations of burrowing owls have detected declines both locally in their central and southern coastal breeding areas, and statewide where the species has experienced breeding range retraction. Threat factors affecting burrowing owl populations include habitat loss, degradation and modification, and eradication of ground squirrels resulting in a loss of suitable burrows required by burrowing owls for nesting, protection from predators, and shelter. Conservation for burrowing owls may include but may not be limited to protecting

remaining breeding pairs or providing for population expansion, protecting, and enhancing breeding and essential habitat, and amending or augmenting land use plans to stabilize populations and other specific actions to avoid the need to list the species pursuant to the ESA or CESA (CDFG 2012).

No burrowing owls or their sign were detected on the project site during the reconnaissance survey, and we are confident that no burrowing owls are onsite at this time. Nevertheless, burrows suitable for burrowing owl occupation are present onsite (Figure 5). The undeveloped land to the south was not surveyed in the 150-meter survey buffer required by the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012), however that rocky slope provides marginal burrowing owl habitat at best. Given the presence of potential burrows, CDFG (2012) would typically require a full survey for potential burrows, including the buffer, followed by four breeding season surveys of those areas found to have potential for burrowing owl occupation. Regular disturbance of this site and its proximity to a busy highway and developed lands, however, makes burrowing owl occupation unlikely. We are proposing to conduct the full burrow survey only, as a preconstruction survey. Preconstruction surveys are done from 14 days to 24 hours before groundbreaking, with a recommended final sweep conducted within 24 hours prior to ground disturbance.

If burrowing owls and/or their sign are found by the preconstruction survey and the burrows are unavoidable or subject to indirect impacts, guidelines in CDFG (2012) will need to be followed. Consultation with CDFW is recommended and the full breeding season survey may be required. Breeding season focused surveys, if required, cannot begin sooner than 1 February and cannot be completed sooner than 16 June. Since the burrowing owl is proposed for coverage under the MSHCP/NCCP, the Town should also be consulted if burrowing owls are detected onsite.

5.9 Jurisdictional Waters

Wood wetlands specialist Dale Hameister conducted a desktop review of the data collected on the stormwater features found onsite (Figure 4). In his opinion, the features are not jurisdictional. They lack an ordinary high water mark (OHWM), and he would define them as upland swales. The concrete stormwater infrastructure does move water during a storm but has not created any areas with OHWM or a defined bed and bank at the outflow. Although there is evidence of past pooling, water often pools in the desert. If pools are not connected hydrologically with a potential jurisdictional drainage of supporting riparian vegetation, then they are not jurisdictional. We are not recommending any further action.

6.0 SUMMARY

The site is highly disturbed and has limited potential for the support of special status biological resources. Nevertheless, the following recommendations will serve to minimize or eliminate any potential impacts.

Two special status plant species occur onsite: the western Joshua tree and honey mesquite. The individual plants of both species occur near site margins. We recommend that they be avoided. If not possible, consultation with the CDFW and/or Town will be required. See Section 5.1 for details.

Although no significant populations are anticipated, a preconstruction survey should be conducted for the presence of any of the other potentially occurring special status plant species. If found, we recommend that any unavoidable plants be transplanted, have seeds collected, and/or have topsoil around them relocated to preserve individuals and/or the seedbank. Note that these activities may require coordination with the CDFW and/or Town due to state and local regulations such as Town code or the proposed MSHCP/NCCP. See Section 5.1 for details.

Two special status butterflies may occur: monarch and San Emigdio blue. We recommend that preconstruction surveys by qualified biologists flag milkweed plants (if any) and *Atriplex canescens* for avoidance. If unavoidable, these plants should be inspected for monarch and San Emigdio blue butterfly caterpillars. If present, they should be moved to safe host plants, with appropriate authorizations from USFWS, CDFW, and/or the Town. See Section 5.2 for details.

There is a remote possibility of desert tortoise occurrence onsite. We recommend a preconstruction survey and the following mitigation and minimization measures:

1) A WEAP would be implemented to educate the construction crew of potential special status species present on the project site.
2) Construction and maintenance personnel would be required to inspect for desert tortoises under vehicles prior to moving the vehicle. If a desert tortoise is found beneath a vehicle, it would not be moved until the desert tortoise had left of its own accord. All desert tortoise observations would be reported to a qualified biologist and the wildlife agencies.
3) Any open trenches adjacent to habitat should be fenced and/or covered to prevent entry by desert tortoises when not under active use. Exit ramps should be present within open trenches.

If desert tortoise is detected on site, consultation with the USFWS and CDFW may be required. Since desert tortoise is proposed for coverage under the MSHCP/NCCP, the Town may also need to be notified. See Section 5.4 for details.

At this time, no impacts to desert kit fox are anticipated, however should an unavoidable den be established onsite in the future, the CDFW and/or Town should be consulted on mitigation

measures that they will require, if any. Such dens, if any, would be easily detectable during other recommended preconstruction surveys. See Section 5.5 for details.

Nesting birds, including special status species, may occur onsite. Preconstruction surveys will be required during the nesting season of approximately 1 February through 31 August. See Section 5.7 for details.

There is a low possibility that burrowing owl may occur onsite. A preconstruction survey is proposed which would check the site and buffer for burrowing owls and/or their sign. If burrowing owls and/or their sign are found, a breeding season survey may be required, beginning no sooner than 15 February and ending no sooner than 16 June. See Section 5.8 for details.

Although stormwater is channeled onto the site, it is our opinion that it is not jurisdictional. We are not recommending further action. Nevertheless, federal, state, or local agencies may impose additional requirements. See Section 5.9 for details.

With implementation of these recommendations, the project should be able to move forward without any further biological considerations.

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Appendix A California Natural Diversity Database (CNDDB) RareFind 5 Report

SCIENTIFIC NAME	COMMON NAME	FEDERAL LIST	STATE LIST	STATE RANK	RARE PLANT RANK	CDFW STATUS
Accipiter cooperii	Cooper's hawk	None	None	S4		WL
Anaxyrus californicus	arroyo toad	Endangered	None	S2S3		SSC
Antrozous pallidus	pallid bat	None	None	S3		SSC
Aquila chrysaetos	golden eagle	None	None	S3		FP; WL
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Athene cunicularia	burrowing owl	None	None	S3		SSC
Buteo swainsoni	Swainson's hawk	None	Threatened	S3		
Canbya candida	white pygmy-poppy	None	None	S3S4	4.2	
Chaetodipus fallax pallidus	pallid San Diego pocket mouse	None	None	S3S4		SSC
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Threatened	Endangered	S1		
Cymopterus deserticola	desert cymopterus	None	None	S2	1B.2	
Empidonax traillii extimus	southwestern willow flycatcher	Endangered	Endangered	S1		
Emys marmorata	western pond turtle	None	None	S3		SSC
Eremothera boothii ssp. boothii	Booth's evening-primrose	None	None	S3	2B.3	
Eremothera boothii ssp. boothii	Booth's evening-primrose	None	None	S3	2B.3	
Eremothera boothii ssp. boothii	Booth's evening-primrose	None	None	S3	2B.3	
Falco mexicanus	prairie falcon	None	None	S4		WL
Falco mexicanus	prairie falcon	None	None	S4		WL
Gopherus agassizii	desert tortoise	Threatened	Threatened	S2S3		
Gopherus agassizii	desert tortoise	Threatened	Threatened	S2S3		
Gopherus agassizii	desert tortoise	Threatened	Threatened	S2S3		
Helminthoglypta mohaveana	Victorville shoulderband	None	None	S1		
Icteria virens	yellow-breasted chat	None	None	S3		SSC
Lanius ludovicianus	loggerhead shrike	None	None	S4		SSC
Lanius ludovicianus	loggerhead shrike	None	None	S4		SSC
Lasiurus cinereus	hoary bat	None	None	S4		
Microtus californicus mohavensis	Mohave river vole	None	None	S1		SSC
Microtus californicus mohavensis	Mohave river vole	None	None	S1		SSC
Pediomelum castoreum	Beaver Dam breadroot	None	None	S2	1B.2	
Phrynosoma blainvillii	coast horned lizard	None	None	S3S4		SSC
Piranga rubra	summer tanager	None	None	S1		SSC

Plebulina emigdionis	San Emigdio blue butterfly	None	None	S1S2		
Plebulina emigdionis	San Emigdio blue butterfly	None	None	S1S2		
Rana draytonii	California red-legged frog	Threatened	None	S2S3		SSC
Scutellaria bolanderi ssp. austromontana	southern mountains skullcap	None	None	S3	1B.2	
Setophaga petechia	yellow warbler	None	None	S3S4		SSC
Siphateles bicolor mohavensis	Mohave tui chub	Endangered	Endangered	S1		FP
Siphateles bicolor mohavensis	Mohave tui chub	Endangered	Endangered	S1		FP
Siphateles bicolor mohavensis	Mohave tui chub	Endangered	Endangered	S1		FP
Symphyotrichum defoliatum	San Bernardino aster	None	None	S2	1B.2	
Toxostoma lecontei	Le Conte's thrasher	None	None	S3		SSC
Toxostoma lecontei	Le Conte's thrasher	None	None	S3		SSC
Toxostoma lecontei	Le Conte's thrasher	None	None	S3		SSC
Toxostoma lecontei	Le Conte's thrasher	None	None	S3		SSC
Toxostoma lecontei	Le Conte's thrasher	None	None	S3		SSC
Vireo bellii pusillus	least Bell's vireo	Endangered	Endangered	S2		
Vireo bellii pusillus	least Bell's vireo	Endangered	Endangered	S2		
Vireo bellii pusillus	least Bell's vireo	Endangered	Endangered	S2		
Vireo bellii pusillus	least Bell's vireo	Endangered	Endangered	S2		
Vireo bellii pusillus	least Bell's vireo	Endangered	Endangered	S2		
Xerospermophilus mohavensis	Mohave ground squirrel	None	Threatened	S2S3		
Xerospermophilus mohavensis	Mohave ground squirrel	None	Threatened	S2S3		

Appendix B Information for Planning and Consultation (IPaC) Report

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Carlsbad Fish And Wildlife Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385
Phone: (760) 431-9440 Fax: (760) 431-5901

In Reply Refer To:
Project Code: 2022-0078666
Project Name: The Buffalo Trading Post Plaza

August 24, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A biological assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a biological assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a biological assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found at the Fish and Wildlife Service's Endangered Species Consultation website at:

https://www.fws.gov/endangered/what-we-do/faq.html

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Carlsbad Fish And Wildlife Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385
(760) 431-9440

Project Summary

Project Code: 2022-0078666
Project Name: The Buffalo Trading Post Plaza
Project Type: Commercial Development
Project Description: commercial center consisting of multiple retail buildings, including a gas station and convenience store, restaurants and general retail
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@34.527353,-117.22476756483118,14z



Counties: San Bernardino County, California

Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
California Condor *Gymnogyps californianus* Population: U.S.A. only, except where listed as an experimental population There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/8193	Endangered

Reptiles

NAME	STATUS
Desert Tortoise *Gopherus agassizii* Population: Wherever found, except AZ south and east of Colorado R., and Mexico There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/4481	Threatened

Fishes

NAME	STATUS
Mohave Tui Chub *Gila bicolor ssp. mohavensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8466	Endangered

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus*	Candidate

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9743

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: Wood
Name: John Green
Address: 1845 Chicago Ave., Ste D
City: Riverside
State: CA
Zip: 92507
Email bewickwren@earthlink.net
Phone: 9513698060

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

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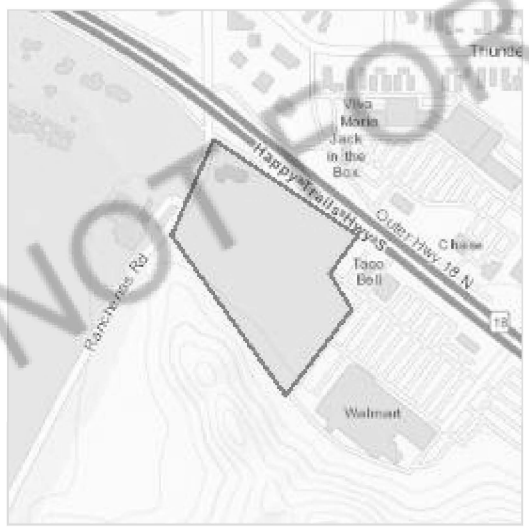
Project information

NAME

The Buffalo Trading Post Plaza

LOCATION

San Bernardino County, California



DESCRIPTION

Some(commercial center consisting of multiple retail buildings, including a gas station and convenience store, restaurants and general retail)

Local office

Carlsbad Fish And Wildlife Office

(760) 431-9440
(760) 431-5901

2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385

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Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS

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California Condor Gymnogyps californianus There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/8193	Endangered

Reptiles

NAME	STATUS
Desert Tortoise Gopherus agassizii There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/4481	Threatened

Fishes

NAME	STATUS
Mohave Tui Chub Gila bicolor ssp. mohavensis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8466	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

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Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

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NAME	BREEDING SEASON
California Thrasher Toxostoma redivivum This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jan 1 to Jul 31
Costa's Hummingbird Calypte costae This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9470	Breeds Jan 15 to Jun 10
Lawrence's Goldfinch Carduelis lawrencei This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (▪)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

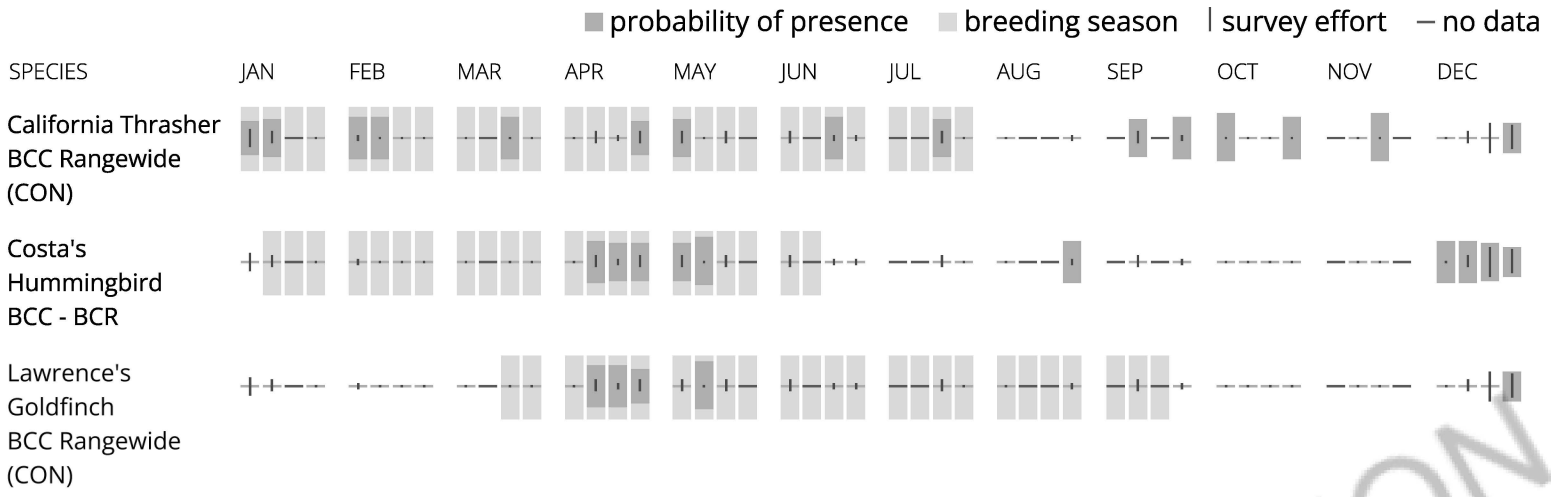
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

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Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

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How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of

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certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Coastal Barrier Resources System

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

There are no known coastal barriers at this location.

Data limitations

The CBRS boundaries used in IPaC are representations of the controlling boundaries, which are depicted on the official CBRS maps. The boundaries depicted in this layer are not to be considered authoritative for in/out determinations close to a CBRS boundary (i.e., within the "CBRS Buffer Zone" that appears as a hatched area on either side of the boundary). For projects that are very close to a CBRS boundary but do not clearly intersect a unit, you may contact the Service for an official determination by following the instructions here: https://www.fws.gov/service/coastal-barrier-resources-system-property-documentation

Data exclusions

CBRS units extend seaward out to either the 20- or 30-foot bathymetric contour (depending on the location of the unit). The true seaward extent of the units is not shown in the CBRS data, therefore projects in the offshore areas of units (e.g., dredging, breakwaters, offshore wind energy or oil and gas projects) may be subject to CBRA even if they do not intersect the CBRS data. For additional information, please contact CBRA@fws.gov.

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Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

This location did not intersect any wetlands mapped by NWI.

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

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Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or

local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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Appendix C California Native Plant Society Report

	A	B	C	D	E	F	G	H	I	J	K
1	Scientific Name	Common Name	California Rare Plant Rank	State Rank	California Endangered Species Act Plant Rank	Federal Endangered Species Act Plant Rank	Blooming Period	Habitat	Micro Habitat	Elevation Low meters	Elevation High meters
2	Canbya candida	white pygmy-poppy	4.2	S3S4	None	None	Mar-Jun	Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland	Granitic, Gravelly, Sandy	600	1460
3	Castilleja plagiotoma	Mojave paintbrush	4.3	S4	None	None	Apr-Jun	Great Basin scrub, Joshua tree "woodland", Lower montane coniferous forest, Pinyon and juniper woodland		300	2500
4	Chorizanthe spinosa	Mojave spineflower	4.2	S4	None	None	Mar-Jul	Chenopod scrub, Joshua tree "woodland", Mojavean desert scrub, Playas	Alkaline (sometimes)	6	1300
5	Cymopterus deserticola	desert cymopterus	1B.2	S2	None	None	Mar-May	Joshua tree "woodland", Mojavean desert scrub	Sandy	630	1500
6	Diplacus mohavensis	Mojave monkeyflower	1B.2	S2	None	None	Apr-Jun	Joshua tree "woodland", Mojavean desert scrub	Gravelly (sometimes), Sandy (sometimes), Washes (often)	600	1200
7	Eremothera boothii ssp. boothii	Booth's evening-primrose	2B.3	S3	None	None	Apr-Sep	Joshua tree "woodland", Pinyon and juniper woodland		815	2400
8	Loeflingia squarrosa var. artemisiarum	sagebrush loeflingia	2B.2	S2	None	None	Apr-May	Desert dunes, Great Basin scrub, Sonoran desert scrub	Sandy	700	1615
9	Lycium torreyi	Torrey's box-thorn	4.2	S3	None	None	(Jan-Feb)Mar-Jun(Sep-Nov)	Mojavean desert scrub, Sonoran desert scrub	Rocky, Sandy, Streambanks, Washes	-50	1220

	A	B	C	D	E	F	G	H	I	J	K
10	Muilla coronata	crowned muilla	4.2	S3	None	None	Mar-Apr(May)	Chenopod scrub, Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland		670	1960
11	Opuntia basilaris var. brachyclada	short-joint beavertail	1B.2	S3	None	None	Apr-Jun(Aug)	Chaparral, Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland		425	1800
12	Pediomelum castoreum	Beaver Dam breadroot	1B.2	S2	None	None	Apr-May	Joshua tree "woodland", Mojavean desert scrub	Roadsides, Sandy, Washes	610	1525
13	Sclerocactus polyancistrus	Mojave fish-hook cactus	4.2	S3	None	None	Apr-Jul	Great Basin scrub, Joshua tree "woodland", Mojavean desert scrub	Carbonate (usually)	640	2320
14	Scutellaria bolanderi ssp. austromontana	southern mountains skullcap	1B.2	S3	None	None	Jun-Aug	Chaparral, Cismontane woodland, Lower montane coniferous forest	Mesic	425	2000
15	Symphyotrichum defoliatum	San Bernardino aster	1B.2	S2	None	None	Jul-Nov	Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Marshes and swamps, Meadows and seeps, Valley and foothill grassland	Streambanks	2	2040
16	Yucca brevifolia		CBR	SNR							

Appendix D Site Photographs

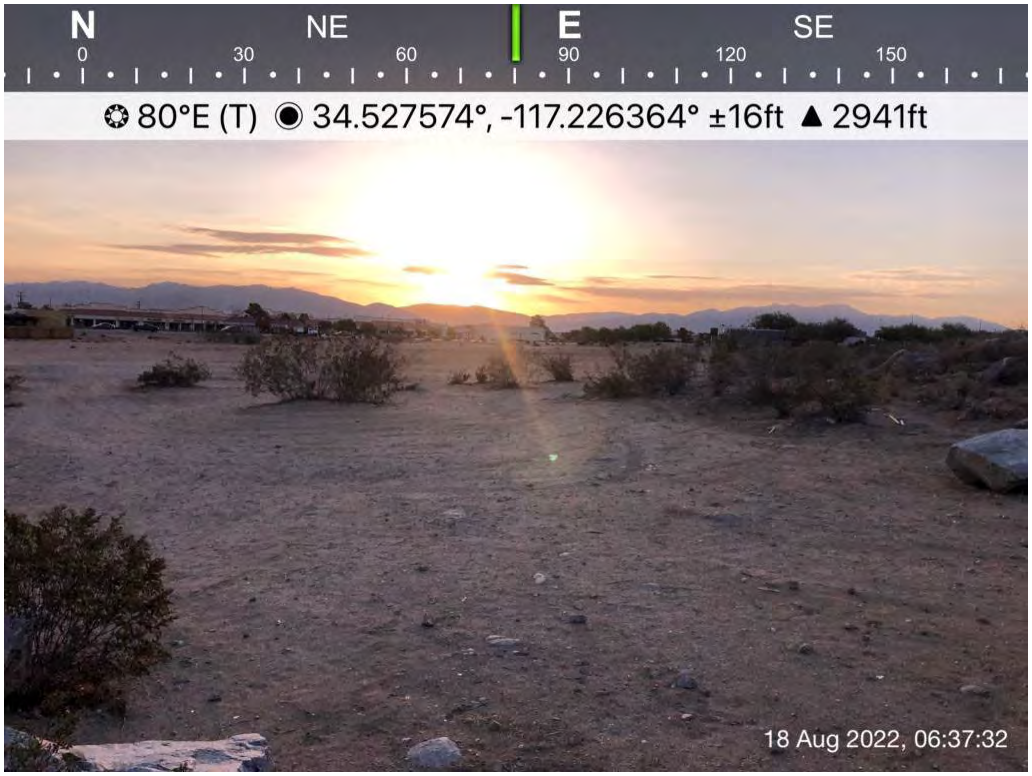


Photo 1. View from southwestern corner facing east. Creosote bush scrub and existing offsite retail center.



Photo 2. View from northwestern site facing southwest. Existing onsite retail at right, cleared lands and remnant creosote bushes at left.



Photo 3. View from northeast facing west. Cleared lands, remnant creosote bushes.



Photo 4. View from southeastern corner facing north-northeast. Existing offsite retail at right & creosote bush scrub.



Photo 5. Stormwater outlet and stormwater associated vegetation including honey mesquite (upper right).



Photo 6. Evidence of past pooling. Both stormwater outlets and their associated vegetation visible in background.

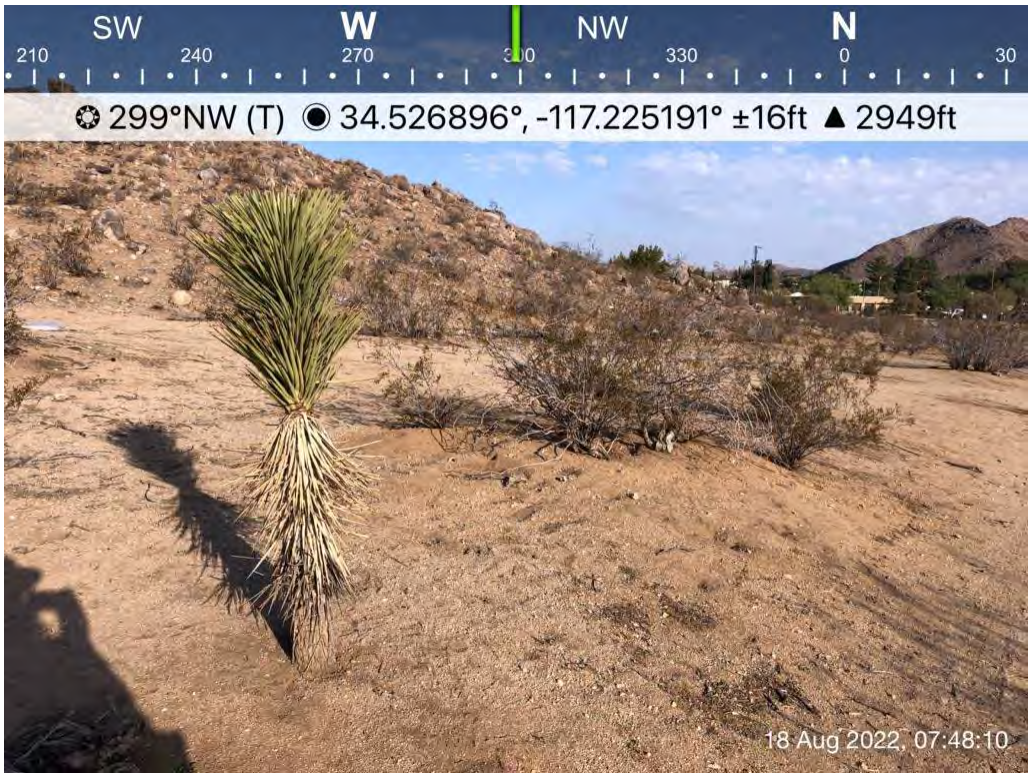


Photo 7. Onsite western Joshua tree.

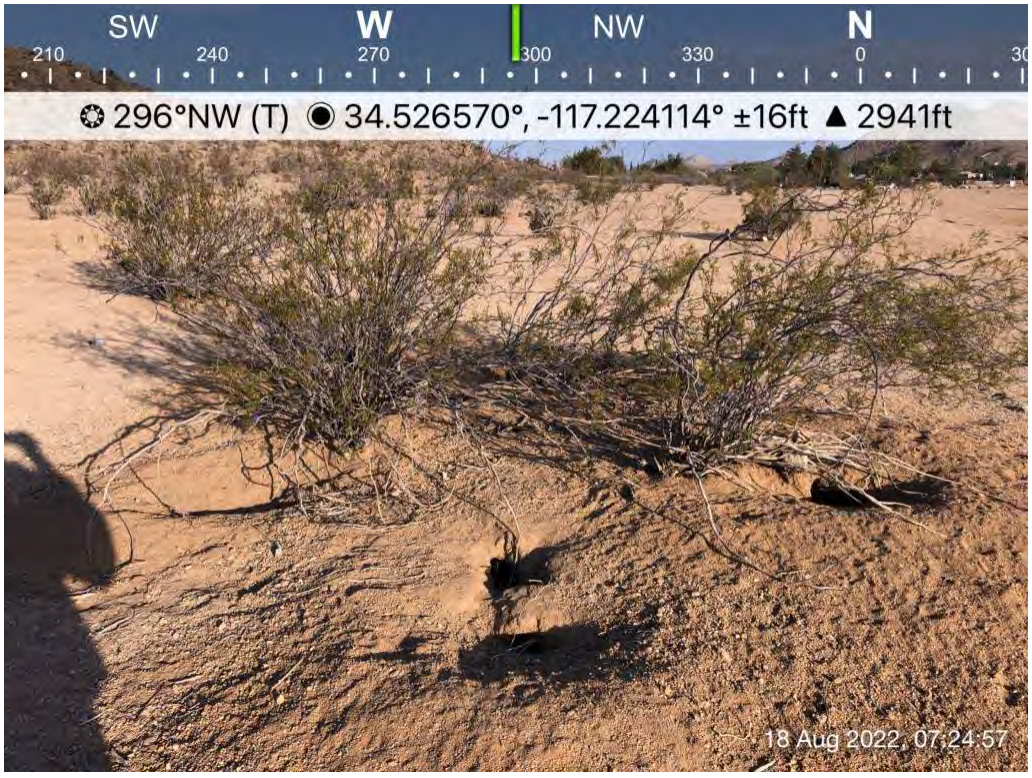


Photo 8. Burrows potentially usable by burrowing owls.

Appendix E Wildlife and Plant Species Observed

Plant Species Observed

GYMNOSPERMS (GYMNOSPERMAE)

Ephedraceae	**Ephedra Family**
Ephedra nevadensis	Nevada ephedra

EUDICOTS (EUDICOTIDAE)

Amaranthaceae	**Amaranth Family**
Amaranthus cf. *albus**	tumbleweed
Asteraceae	**Sunflower Family**
Ambrosia acanthicarpa	annual bur-sage
Ambrosia dumosa	white-bursage
Ambrosia salsola	cheesebush
Baileya pleniradiata	woolly desert marigold
Ericameria nauseosa	rubber rabbitbrush
Ericameria teretifolia	green rabbitbrush
Stephanomeria pauciflora	wire-lettuce
Tetradymia axillaris var. *longispina*	longspine horsebrush
Tetradymia stenolepis	Mojave cottonthorn
Brassicaceae	**Mustard Family**
*Brassica tournefortii**	Sahara mustard
*Hirschfeldia incana**	shortpod mustard
*Sisymbrium altissimum**	tumble mustard
*Sisymbrium irio**	London rocket
Chenopodiaceae	**Goosefoot Family**
Atriplex canescens	four-wing saltbush
Chenopodium sp.	pigweed
Grayia spinosa	spiny hopsage
*Salsola tragus**	Russian thistle
Euphorbiaceae	**Spurge Family**
Euphorbia albomarginata	rattlesnake sandmat
Fabaceae	**Legume Family**
*Parkinsonia aculeata**	Mexican palo verde
Prosopis glandulosa	honey mesquite
Geraniaceae	**Geranium Family**
*Erodium cicutarium**	redstem filaree

Lamiaceae	**Mint Family**
Scutellaria mexicana	bladder-sage
Malvaceae	**Mallow Family**
Sphaeralcea ambigua	desert globemallow
Polygonaceae	**Buckwheat Family**
Eriogonum fasciculatum	California buckwheat
Solanaceae	**Nightshade Family**
Lycium andersonii	water jacket
Ulmaceae	**Elm Family**
*Ulmus pumila**	Siberian elm
Zygophyllaceae	**Caltrop Family**
Larrea tridentata	creosote bush
*Tribulus terrestris**	puncture vine

MONOCOTS (MONOCOTYLEDONAE)

Agavaceae	**Century Plant Family**
*Yucca brevifolia***	western Joshua tree
Poaceae	**Grass Family**
*Bromus diandrus**	ripgut grass
*Bromus rubens**	red brome
*Bromus tectorum**	cheat grass
*Hordeum murinum**	wall barley
Schismus cf. *arabicus**	Arabian schismus
Sporobolus cryptandrus	sand dropseed

VERTEBRATE WILDLIFE DETECTED

CLASS REPTILIA REPTILES

Teiidae	**Whiptail Family**
Aspidoscelis tigris	tiger whiptail
Phrynosomatidae	**Spiny Lizards Family**
Uta stansburiana	common side-blotched lizard
Sceloporus uniformis	yellow-backed spiny lizard

CLASS AVES BIRDS

Columbidae	**Pigeon and Dove Family**
*Columba livia**	rock pigeon
Zenaida macroura	mourning dove
Trochilidae	**Hummingbird Family**
Calypte anna	Anna's hummingbird
*Calypte costae***	Costa's hummingbird
Tyrannidae Tyrant	**Flycatcher Family**
Myiarchus cinerascens	ash-throated flycatcher
Corvidae	**Crow and Jay Family**
Corvus corax	common raven

CLASS MAMMALIA MAMMALS

Sciuridae	**Squirrel, Chipmunk, and Marmot Family**
Ostospermophilus beecheyi	California ground squirrel
Rodentia	**Rodents**
Various sizes of burrows	

KEY

* = non-native species
** = special-status species
cf. = compares favorably with
sp. = plant identified to genus only

These lists report only plants and animals observed on the site by this study. Other species may have been overlooked or undetectable due to their growing season (plants) or their activity patterns and/or subterranean habitats (animals). Plant species of uncertain identity were collected for later identification by University of California, Riverside Herbarium Collections Manager Andrew Sanders. Plant nomenclature and systematics follows the Jepson Flora Project (2022) and/or United States Department of Agriculture, Natural Resources Conservation Service (2022). Nomenclature and taxonomy for fauna follows California Bird Records Committee (2022) for avifauna and California Department of Fish and Wildlife (2016a) for herpetofauna and mammals.

Appendix C
Historical/Archaeological Resources Study

HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT

RANCHERIAS ROAD & SR 18 PROJECT

Town of Apple Valley, San Bernardino County

For Submittal to:

Planning Division
Community Development Department
Town of Apple Valley
14955 Dale Evans Parkway
Apple Valley, CA 92307

Prepared for:

Terra Nova Planning and Research, Inc.
42635 Melanie Place, Suite 101
Palm Desert, CA 92211

Prepared by:

CRM TECH
1016 East Cooley Drive, Suite A/B
Colton, CA 92324

Bai "Tom" Tang, Principal Investigator
Michael Hogan, Principal Investigator

December 12, 2022
CRM TECH Contract No. 3933

Title: Historical/Archaeological Resources Survey Report: Rancherias Road & SR 18 Project, Town of Apple Valley, San Bernardino County, California

Author(s): Terri Jacquemain, Historian/Architectural Historian
Breidy Q. Vilcahuaman, Archaeologist/Report Writer
Hunter O'Donnell, Archaeologist

Consulting Firm: CRM TECH
1016 East Cooley Drive, Suite A/B
Colton, CA 92324
(909) 824-6400

Date: December 12, 2022

For Submittal to: Planning Division
Community Development Department
Town of Apple Valley
14955 Dale Evans Parkway
Apple Valley, CA 92307
(760) 240-7000

Prepared for: Nicole Sauviat Criste
Terra Nova Planning and Research, Inc.
42635 Melanie Place, Suite 101
Palm Desert, CA 92211
(760) 341-4800

USGS Quadrangle: Apple Valley North, Calif., 7.5' quadrangles; Sections 17 and 18, T5N R3W, San Bernardino Baseline and Meridian

Project Size: Approximately 10.59 acres

Resources: Former Buffalo Trading Post, constructed in 1955 by Zeke and Frances Cornia (altered); Architect Douglas McFarland; recorded during this study as Site 3933-1H*

* *Temporary designation, pending assignment of official primary numbers*

Keywords: Victor Valley area, southern Mojave Desert; Phase I historical/ archaeological resources survey; no "historical resources" under CEQA

MANAGEMENT SUMMARY

Between August and December 2022, at the request of Terra Nova Planning and Research, Inc., CRM TECH performed a cultural resources study on approximately 10.59 acres of mostly undeveloped land in the Town of Apple Valley, San Bernardino County, California. The subject property of the study consists of Assessor's Parcel Nos. 3112-171-16, -17, and -18, located to the southeast of the intersection of Rancherias Road and State Route (SR) 18 (a.k.a. Happy Trails Highway), in the northwest quarter of Section 17 and the northeast quarter of Section 18, Township 5 North Range 3 West, San Bernardino Baseline and Meridian.

The study is part of the environmental review process for a proposed commercial development project on the property that primarily entails the construction of seven stores or office buildings, a fueling station, and attendant parking and landscaping. The project additionally will require the removal of a circa 1955 building on the property, the former Buffalo Trading Post. The Town of Apple Valley, as the lead agency for the project, required the study in compliance with the California Environmental Quality Act (CEQA). The purpose of the study is to provide the Town of Apple Valley with the necessary information and analysis to determine whether the project would cause any substantial adverse change to a "historical resource," as defined by CEQA, that may exist in or near the project area. In order to identify such resources, CRM TECH conducted a historical/archaeological resources records search, initiated a Native American Sacred Lands File records search, consulted local historical organizations, pursued historical background research, and carried out an intensive-level field survey and field inspection of the building.

The results of these research procedures indicate that the former Buffalo Trading Post was the second location for a souvenir shop run by Zeke and Francis Cornia, who first operated the shop within a guest ranch they built in Apple Valley after arriving from Long Beach. The building was designed by Los Angeles-based architect Douglas McFarland, who featured adobe brick in this building as well as in the design for a bank, an adobe residence, and a real estate office in Apple Valley during the same general era. In light of its age and its existence as a long-lived feature on the local landscape, the building was recorded during this study with the temporary designation Site 3933-1H, pending assignment of an official identification number in the California Historical Resources Inventory.

Though well known as a long-lived visual feature on the local landscape, the building has been significantly altered from its original Pueblo-style design. Other familiar elements of the building that contributed to its distinctive presence have been removed, most notably a freestanding buffalo sign added in 1960, which was removed and stored earlier this year. Alterations include the extension of the main building, the addition of a full-length boxed parapet along the Highway 18 façade, the conversion of the living quarters' garage to a storefront along the Rancherias façade, and commercial window and door replacements throughout. Furthermore, after the Cornias' ownership, and for at least the past 40 years, the building has been repurposed to accommodate various businesses including a bank, a realty office, a dental office, an antique store, and most recently a carpet and granite business. As a result, while the building enjoys local historical interest as a structure from Bass and Westlund's visionary era in the town's development, and although the alterations were generally executed in keeping with the original design, it no longer retains a sufficient level of historical, architectural, or aesthetic qualities, nor sufficient historic integrity, to be considered eligible for listing in the California Register of Historical Resources.

Based on these findings, CRM TECH concludes that the former Buffalo Trading Post building at 20115-20129 Outer Highway 18 South does not meet CEQA's definition of a "historical resource." Accordingly, CRM TECH recommends to the Town of Apple Valley a finding of *No Impact* regarding "historical resources." No further cultural resources investigation is recommended for the project unless development plans undergo such changes as to include areas not covered by this study. However, if buried cultural materials are encountered during any earth-moving operations associated with the project, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

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INTRODUCTION

Between August and December 2022, at the request of Terra Nova Planning and Research, Inc., CRM TECH performed a cultural resources study on approximately 10.59 acres of mostly undeveloped land in the Town of Apple Valley, San Bernardino County, California (Fig. 1). The subject property of the study consists of Assessor's Parcel Nos. 3112-171-16, -17, and -18, located to the southeast of the intersection of Rancherias Road and State Route (SR) 18 (a.k.a. Happy Trails Highway), in the northwest quarter of Section 17 and the northeast quarter of Section 18, Township 5 North Range 3 West, San Bernardino Baseline and Meridian (Figs. 2. 3).

The study is part of the environmental review process for a proposed commercial development project on the property that primarily entails the construction of seven stores or office buildings, a fueling station, and attendant parking and landscaping. The project additionally will require the removal of a circa 1955 building on the property, the former Buffalo Trading Post. The Town of Apple Valley, as the lead agency for the project, required the study in compliance with the California Environmental Quality Act (CEQA; PRC §21000, et seq.). The purpose of the study is to provide the Town of Apple Valley with the necessary information and analysis to determine whether the project would cause any substantial adverse change to a "historical resource," as defined by CEQA, that may exist in or near the project area.

In order to identify such resources, CRM TECH conducted a historical/archaeological resources records search, initiated a Native American Sacred Lands File records search, consulted local historical organizations, pursued historical background research, and carried out an intensive-level field survey and field inspection of the building. The following report is a complete account of the methods, results, and conclusion of the study. Personnel who participated in the study are named in the appropriate sections below, and their qualifications are provided in Appendix 1.

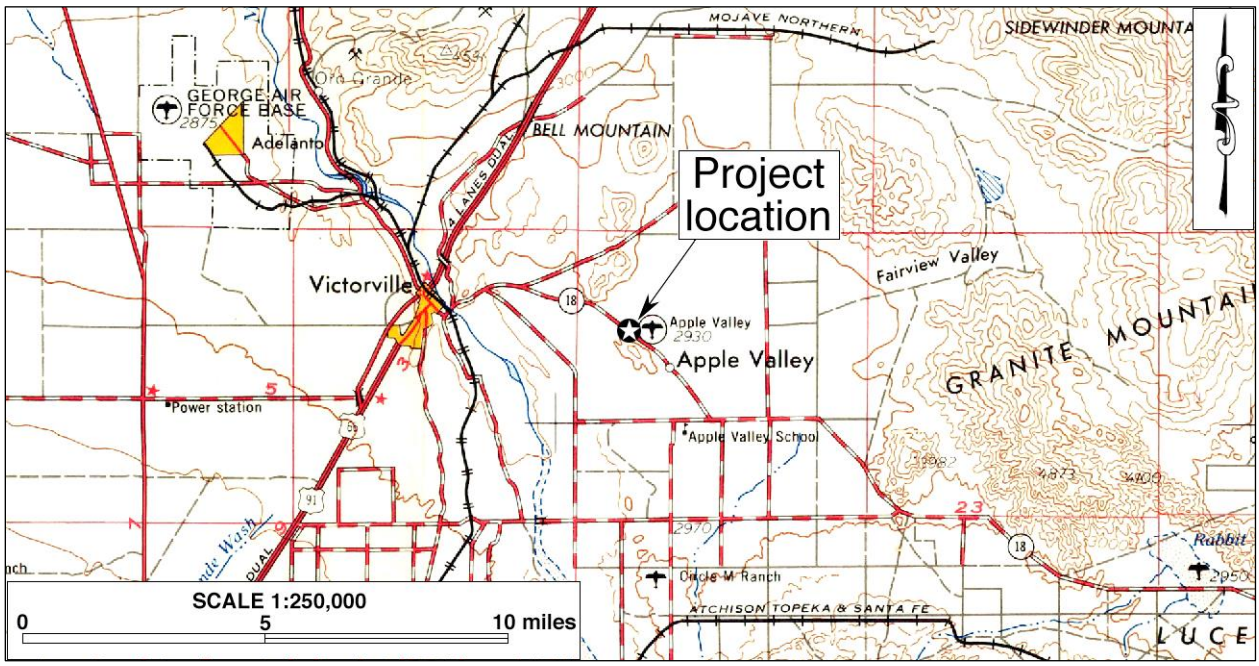


Figure 1. Project vicinity (based on USGS San Bernardino, Calif., 120'x60' quadrangle [USGS 1969]).

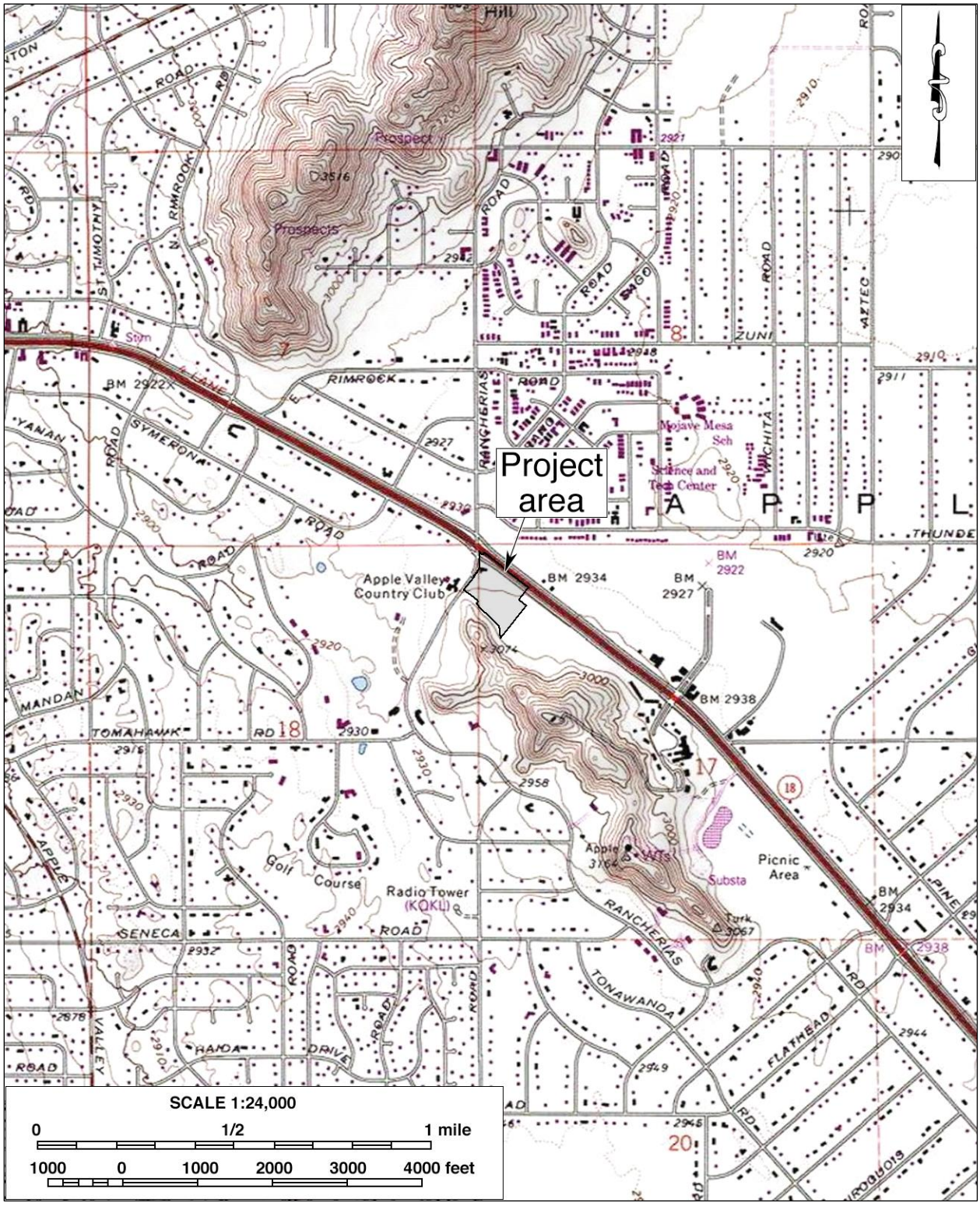


Figure 2. Project location (based on USGS Apple Valley North, Calif., 7.5' quadrangle [USGS 1993]).



Figure 3. Recent satellite image of the project area.

SETTING

CURRENT NATURAL SETTING

The Town of Apple Valley is situated in western Victor Valley, on the southern rim of the Mojave Desert and immediately north of the San Bernardino-San Gabriel mountain ranges. The climate and environment of the area is typical of southern California "high desert" country, so called because of its higher elevation than the Colorado Desert to the southeast. The climate is marked by extremes in temperature and aridity, with summer highs reaching well over 110ºF and winter lows dipping below freezing. Average annual precipitation is less than five inches.

The project area consists of approximately 10.59 acres of mostly open land (Fig. 4) in an irregular shape. It is situated at the southeast corner of Highway 18 South and Rancherias Road and is further bounded by Bass Hill on the southwest and by developed commercial property on the southeast. A medium-sized one-story commercial building, the former Buffalo Trading Post, occupies the northwestern corner of the property. Elevations range between approximately 2940 and 2965 feet above mean sea level over relatively level terrain, with a slight downwards slope from the hill. Ground disturbances to date have been mostly confined to the area around the building and where sidewalks have been installed along Highway 18. The sparse vegetation belongs to the Creosote Bush Scrub Plant Community, represented in the project area by creosote, rabbit brush, salt brush, and other small grasses.

The Victor Valley is a part of the Mojave River watershed. During the Late Pleistocene and early Holocene, the region experienced four separate high stands of Lake Mojave and other pluvial lakes.



Figure 4. Current natural setting of the project area (photograph taken on October 14, 2022; view to the west).

These episodes afforded the aboriginal population greater access to water, while the desiccation of the lakes forced them to move closer to the Mojave River, which provided not only a dependable source of water and other subsistence resources but also a major route for interregional trade. Not surprisingly, most of the Native American archaeological sites identified in and around the Victor Valley are concentrated along the Mojave River.

CULTURAL SETTING

Prehistoric Context

To better understand the progress of Native American cultures prior to European contact, archaeologists devised chronological frameworks based on artifacts and site types that date back some 12,000 years. Currently, the chronology most frequently applied in the Mojave Desert divides the region's prehistory into five periods marked by changes in archaeological remains, reflecting the various ways Native people adapted to their surroundings. As presented by Hall (2000) these periods included Lake Mojave (ca. 8000-5500 B.C.); Pinto (ca. 5500-2500 B.C.); Newberry (ca. 1500 B.C.-500 A.D.); Saratoga (ca. 500-1200 A.D.); and Tecopa (ca. 1200-1770s A.D.).

According to Hall (*ibid*.:14), it was small mobile groups of hunters and gatherers who inhabited the Mojave Desert during the Lake Mojave Period. Their material culture is represented by the Great Basin Stemmed points and flaked stone crescents. These small, highly mobile groups continued to inhabit the region during the Pinto Period, which saw an increased reliance on ground foods, small and large game animals, and the collection of vegetal resources, suggesting that "subsistence patterns were those of broad-based foragers" (*ibid*.:15). Artifact types found in association with this period include the Pinto points and *Olivella* sp. spire-lopped beads (*ibid*.). Distinct cultural changes occurred during the Newberry Period in comparison to the earlier periods, involving small residential groups moving between select localities," and long-distance trade (Hall 2000:16). Typical artifacts are the Elko and Gypsum Contracting Stem points and Split Oval beads.

The last two periods, Saratoga and Tecopa, are characterized by seasonal group settlements near accessible food resources and the intensification of the exploitation of plant foods, as evidenced by groundstone artifacts (*ibid*.:16). Hall (*ibid*.) states that "late prehistoric foraging patterns were more restricted in geographic routine and range, a consequence of increasing population density" and other variables. Saratoga Period artifact types include Rose Spring and Eastgate points as well as Anasazi grayware pottery. Artifacts from the Tecopa Period include Desert Side-notched and Cottonwood Triangular points, buffware and brownware pottery, and beads of the Thin Lipped, Tiny Saucer, Cupped, Cylinder, steatite, and glass types (*ibid*.).

Depending on the natural environment in which they were located, native groups adopted different types of subsistence economy, although they were all based on gathering, hunting, and/or fishing. As a result, ancient occupation sites in valleys and foothills often contain portable mortars and pestles along with large projectile points, suggesting a reliance on fleshy nut foods and larger game animals. Sites found in the more arid inland areas in southern California, such as the Victor Valley, often contain fragments of flat slab metates and plano-convex scrapers along with projectile points, suggesting a reliance on seed resources, plant pulp, and smaller game animals.

Ethnohistoric Context

The Victor Valley region is a part of the homeland of the Serrano people, which is centered in the San Bernardino Mountains but also includes part of the San Gabriel Mountains, much of the San Bernardino Valley, and the Mojave River valley in the southern portion of the Mojave Desert, reaching as far as the Cady, Bullion, Sheep Hole, and Coxcomb Mountains to the east, the Twentynine Palms area to the north, and possibly the southern edge of Kern County to the west. The name "Serrano" was derived from a Spanish term meaning "mountaineer" or "highlander." The basic written sources on Serrano culture are Kroeber (1925), Strong (1929), and Bean and Smith (1978). The following ethnographic discussion of the Serrano people is based mainly on these sources.

Prior to European contact, the Serrano were primarily hunter-gatherers and occasionally fishers, and their long-term settlements were located mostly on elevated terraces, hills, and finger ridges near reliable sources of water, especially in foothills and along major rivers. They were loosely organized into exogamous clans, which were led by hereditary heads, and the clans in turn were affiliated with one of two exogamous moieties. The clans were patrilineal, but their exact structure, function, and number are unknown, except that the clans were the largest autonomous political and landholding units. There was no pan-tribal political union among the clans, but they shared strong trade, ceremonial, and marital connections that sometimes also extended to other surrounding nations, such as the Kitanemuk, the Tataviam, and the Cahuilla.

Although contact with Europeans may have occurred as early as 1771 or 1772, Spanish influence on Serrano lifeways was minimal until the 1810s, when a mission *asistencia* was established on the southern edge of Serrano territory. Between then and the end of the mission era in 1834, most of the Serrano in the western portion of their traditional territory were removed to the nearby missions. In the eastern portion, a series of punitive expeditions in 1866-1870 resulted in the death or displacement of almost all remaining Serrano population in the San Bernardino Mountains. Today, most Serrano descendants are affiliated with the Yuhaaviatam of San Manuel Nation (formerly known as the San Manuel Band of Mission Indians), the Morongo Band of Mission Indians, or the Serrano Nation of Indians.

Historic Context

The first European visitor in the Victor Valley was famed Spanish explorer Francisco Garcés, who traveled through the area in 1776, shortly after the beginning of Spanish colonization Alta California in 1769 (Beck and Haas 1974:15). The earliest Euroamerican settlements appeared in the Victor Valley as early as 1860 (Peirson 1970:128). Despite their arrival, development in the arid high desert country of southern California was slow and limited for much of the historic period, and the Victor Valley overall remained only sparsely populated until the second half of the 20th century.

Garcés traveled through the Victor Valley along an ancient Indian trading route known today as the Mojave Trail (Beck and Haase 1974:15). In the early 1830s, parts of this trail were incorporated into the Old Spanish Trail, an important pack-train road that extended between southern California and Santa Fe, New Mexico (Warren 2004). Some 20 years later, when the historic wagon road known as the Mormon Trail or Salt Lake Trail was established between Utah and southern California, it

followed essentially the same route across the Victor Valley (NPS 2001:5). Since then, the Victor Valley has always served as a crucial link on a succession of major transportation arteries, where the heritage of the ancient Mojave Trail was carried on by the Santa Fe Railway since the 1880s, by the legendary U.S. Route 66 during the early and mid-20th century, and finally by today's Interstate Highway 15.

Although cattle ranchers are known to have grazed their herds along the Mojave River as early as the 1850s, the first settler to establish long-term residency in what is now Apple Valley is generally considered to be Silas Cox, a young Mormon cowboy who began using the area as a winter pasture for his family's cattle in 1860 (O'Rourke 2004:9). The next year, a small gold rush in the San Bernardino Mountains brought about an important transportation route from the Holcombe Valley across the southernmost portion of Apple Valley, commonly referred to as Van Dusen Road or Coxey Road. The road connected with the Cajon Pass Toll Road, built around the same time by San Bernardino pioneer John Brown, Sr. (Robinson 1989:51-52; Thompson n.d.:4).

Around 1870, Brown and his sons established a cattle ranch, later known as Rancho Verde, on the southwestern edge of present-day Apple Valley (Thompson n.d.:1, 2). This first permanent settlement in the area was followed shortly afterwards by John J. Atkinson's homestead near the Upper Mojave Narrows. and A. Frank McKenney and Jesse W. Taylor's supply station further downstream on the newly blazed Stoddard Wells Road, a shortcut on the original Salt Lake Trail (*ibid*.:2). In 1871-1878, when George M. Wheeler surveyed and mapped a large portion of the western United States, John Brown's ranch and McKenney and Taylor's station, identified then as "Huntington's," were the only settlements noted in the Apple Valley area (Wheeler 1878; Thompson n.d.:2).

With the completion of the Santa Fe Railway in the 1880s, settlement activities began in earnest in the Victor Valley and reached a peak in the 1910s. Thanks to the availability of fertile lands and the abundance of ground water, agriculture played a dominant role in the early development of the Victor Valley area. During the late 19th and early 20th centuries, settlers in the valley cultivated number of staple crops, such as alfalfa, deciduous fruits, and poultry, with limited success. The name of Apple Valley, adopted around the turn of the century, reflects one such endeavor in the vicinity (Gudde 1998:15).

In 1895, the Appleton Land and Water Company was organized to develop a valley-wide irrigation system and expansive apple orchards on the east side of the Mojave River (O'Rourke 2004:12). With the eventual success of the apple orchards, early settlers undertook a coordinated effort to enhance the image of the area through the creation of the Apple Valley Improvement Association in 1910 (*ibid*.:13). Ursula Poates, a dedicated promoter for the area who was given the title "Mayoress of Apple Valley" in 1911, is widely credited with coining the name of the town (*ibid.:*12; Lovato 2007:14). By 1914, there were at least 14 notable ranches in the Apple Valley area, clustered mostly along the Mojave River, however the total population in Apple Valley in the early 1920s stood at only 50 residents (Ryon 1964; O'Rourke 2004:14, 15).

The economic downturn of the Great Depression years somewhat softened the town's emergence as a relatively close getaway spot for the rich and famous of Hollywood, while the open landscape and climate also provided an attractive setting for film production (O'Rourke 2004:18-19). Many properties in Apple Valley were converted into guest ranches and rural retreats, ushering a tourism

heyday that began in the 1940s and lasted roughly a decade. After World War II, the dude ranch industry began to decline as city-dwellers' vacation options broadened, most notably through the rapid ascension of Las Vegas as a tourist destination and through increased air travel (Thompson 2001:13). Eventually, as the apple orchards before them, the guest ranches disappeared almost entirely from the landscape.

In 1945, Long Beach oilmen Newton T. Bass and Bernard J. "Bud" Westlund became partners in the acquisition of 25,000 acres of Apple Valley land and set about developing Apple Valley Ranchos (Ryon 1964; O'Rourke 2004:37). As the Apple Valley Building and Development Company, Bass and Westlund developed and marketed thousands of residences and commercial properties (Ryon 1964; O'Rourke 2004:37-38). Over the next decades, the community of Apple Valley continued to grow and acquire civic services such as a police force, fire stations, schools, and hospitals. True to Bass and Westlund's original vision for a modern Apple Valley Ranchos, the growth of the town has been largely driven by residential and commercial development. In 1988, the Town of Apple Valley was incorporated with a population of approximately 41,000 and an area of 78 square miles. After further boundary expansion in recent decades, total population in 2020 stood around 77,000 (USCB n.d.).

RESEARCH METHODS

RECORDS SEARCH

On October 6, 2022, CRM TECH archaeologist Nina Gallardo conducted the historical/ archaeological resources records search at the South Central Coastal Information Center (SCCIC), California State University, Fullerton. During the records search, Gallardo examined maps and records on file at the SCCIC for previously identified cultural resources and existing cultural resources reports within a one-mile radius of the project area. Previously identified cultural resources include properties designated as California Historical Landmarks, Points of Historical Interest, or San Bernardino County Landmarks, as well as those listed in the National Register of Historic Places, the California Register of Historical Resources, or the California Historical Resources Inventory.

SACRED LANDS FILE SEARCH

On August 19, 2022, CRM TECH submitted a written request to the State of California Native American Heritage Commission (NAHC) for a records search in the commission's Sacred Lands File. The NAHC is the State of California's trustee agency for the protection of "tribal cultural resources," as defined by California Public Resources Code §21074, and is tasked with identifying and cataloging properties of Native American cultural value throughout the state, including places of special religious, spiritual, or social significance and known graves and cemeteries. The NAHC's reply is summarized below and attached to this report in Appendix 2.

CONSULTATION WITH LOCAL COMMUNITY

As part of the research procedures, on November 28, 2022, a written inquiry was sent via e-mail to the Mohave Historical Society and the Town of Apple Valley Historical Advisory Committee for

additional information about the Buffalo Trading Post building and for comment or concerns over the building's removal. The responses received are summarized below and the information has been incorporated into the historical account as appropriate.

HISTORICAL RESEARCH

Historical background research for this study was completed in two phases. The contextual background research was conducted by CRM TECH principal investigator Bai "Tom" Tang based on published literature in local and regional history, historical and contemporary maps, and aerial/satellite photographs of the project vicinity. Among the maps consulted for this study were U.S. General Land Office (GLO) land survey plat maps dated 1856 and USGS topographic maps dated 1934-1993, which are available at the websites of the U.S. Bureau of Land Management and the USGS. The aerial and satellite photographs are available at the website of Nationwide Environmental Title Research (NETR) Online and through the Google Earth software.

For information specific to the circa 1952 Buffalo Trading Post building, CRM TECH historian/ architectural historian Terri Jacquemain pursued more specific and in-depth research on the history of the building to ascertain past owners and construction history. Sources consulted during this phase of the research included primarily the archival records of the County of San Bernardino and the City of Apple Valley, particularly real property tax assessment records and building safety records, along with archival newspaper accounts and genealogical databases.

FIELD SURVEY

On October 14, 2022, CRM TECH archaeologists Hunter O'Donnell and Steven Brierty conducted an intensive field survey of the project area by walking parallel southwest-northeast transects spaced 15 meters (approximately 50 feet) apart across the project area. In this way, the ground surface in the project area was carefully examined for any evidence of human activities dating to the prehistoric or historic periods (i.e., 50 years or older). Ground visibility was very good (95-100%) due to relatively sparse vegetation in the project area.

In conjunction with the archaeological field survey, O'Donnell carried out a field inspection of the building in the project area. To facilitate its proper recordation and evaluation, O'Donnell made detailed notations and preliminary photo-documentation of its structural and architectural characteristics and current conditions. The field observations form the basis of the building description and evaluation presented below, and the resulting California Historical Resources Inventory forms are attached to this report as Appendix 3.

RESULTS AND FINDINGS

RECORDS SEARCH

According to SCCIC records, the project area had not been surveyed for cultural resources prior to this study, and no cultural resources had been recorded on or adjacent to the property. Within the one-mile scope of the records search, a total of 19 previous studies dating between 1979 and 2013 have been completed on various tracts of land and linear features, including a 2012 linear study

along Rancherias Road adjacent to the northwest boundary of the project area (#1067481 in Fig. 5). As Figure 5 demonstrates, nearly all the other studies were completed to the east of the project area, attesting to the recent development in that area and along Highway 18. As a result of these past studies, two historical/archaeological resources were reported to the SCCIC, including the circa 1948 local landmark Apple Valley Inn at 20600 Highway 18. The other could not be located in SCCIC files and may have been removed from the inventory. In any case, both sites were located nearly a half-mile to the southeast of the project location and therefore require no further consideration during this study.

SACRED LANDS FILE SEARCH

In response to CRM TECH's inquiry, the NAHC reports in a letter dated October 20, 2022, that Sacred Lands File identified no Native American cultural resources in the project vicinity. Noting that the absence of specific information does not necessarily indicate the absence of such resources, however, the NAHC recommended that local Native American groups be consulted for further information and provided a referral list of potential tribal contacts. The NAHC's reply is attached to this report as Appendix 2 for reference by the City of Apple Valley in future government-to-government consultations with the pertinent tribal groups, if necessary.

CONSULTATION WITH LOCAL COMMUNITY

In response to the written inquiry, Apple Valley Legacy Museum President and Town of Apple Valley Historical Advisory Commissioner Macy Taylor responded in a telephone call on November 29, 2022. Ms. Taylor expressed dismay about the planned removal of the building, stating that "if a building can't be salvaged because it's trashed or due to fire or vandalism, then no, knock it down, but if it's a perfectly good historic building that has always been occupied and has been taken care of, I think it is a crime to knock it down." She stated the building is a local landmark and noted that the Legacy Museum has already collected many photos and items from the building in an effort to preserve its history, along with preserving two signs and totem poles. She further observed that input from local historical groups or community members appear to have little impact on preservation of historic-era properties in Apple Valley.

HISTORICAL RESEARCH

Overview

Historical sources consulted for this study yielded no evidence of any settlement or development activities within the project area prior to the 1950s era (Figs. 6-8). In the mid-1850s, when the U.S. government conducted the first systematic land survey in the vicinity, the surveyors noted no man-made features within a mile of the project area (Fig. 6). During the ensuing 70 years, the area remained largely undisturbed by settlement except for a loose network of crisscrossing roads and trails, including Bear Valley Road, the forerunner of today's SR 18 (Fig. 7).

By the 1950s, Bass and Westlund's Apple Valley Rancho had begun to take shape in the form of neatly laid out street grids dotted by single-family residences and community amenities that included the Apple Valley Country Club and a paved aircraft landing strip (Fig. 8; NETR Online 1952). Also

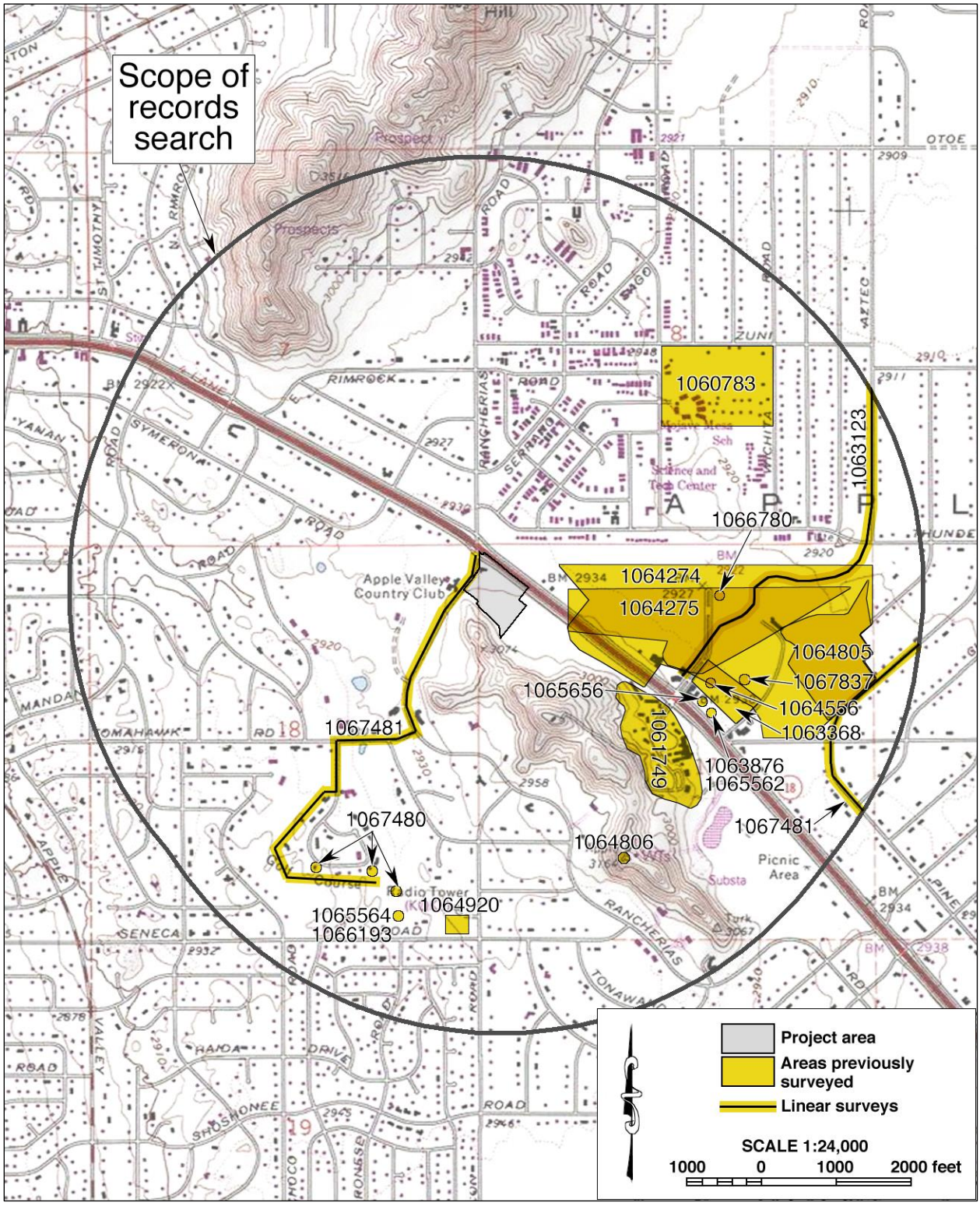


Figure 5. Previous cultural resources studies within the scope of the records search, listed by SCCIC file number. Location of historical/archaeological resources are not shown as a protective measure.

in place at this time was Rancherias Road and, overlooking the Apple Valley from atop Bass Hill behind the project area, Newton T. Bass's fabulous residence, Hilltop House (Fig. 8; Town of Apple Valley 2005). After the widening and paving of Highway 18 in the late 1960s, the project vicinity embarked on a period of rapid commercial development along this travel corridor, with residential growth continuing along the lateral streets. However, despite its location near the heart of Apple Valley's early development, the project area has remained largely undeveloped to the present time, except for construction of the Buffalo Trading Post (NETR Online 1969-2018).

History of the Buffalo Trading Post

The Buffalo Trading Post building was constructed in 1955 for property owners Zeke (1903-1988) and Frances (1905-1992) Cornia (Fig. 9) and designed by architect Douglas

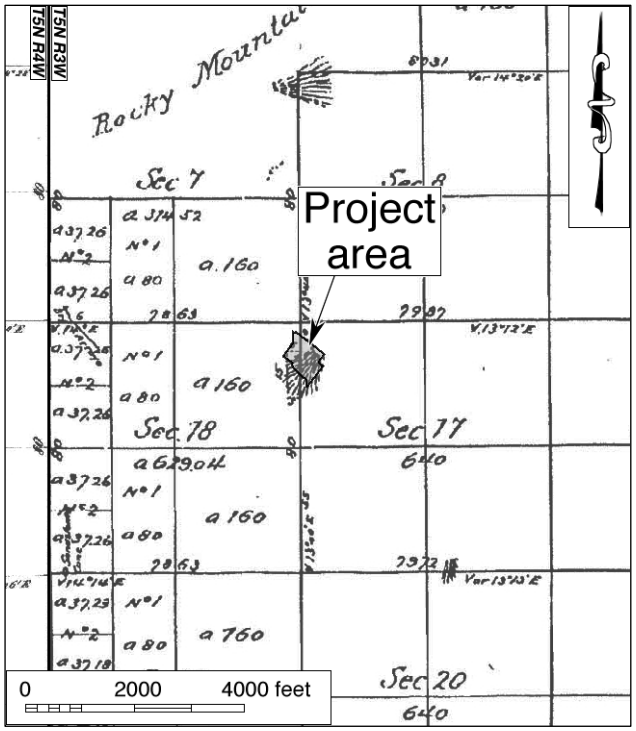


Figure 6. The project area and vicinity in 1855-1856 (source: GLO 1856a; 1856b).

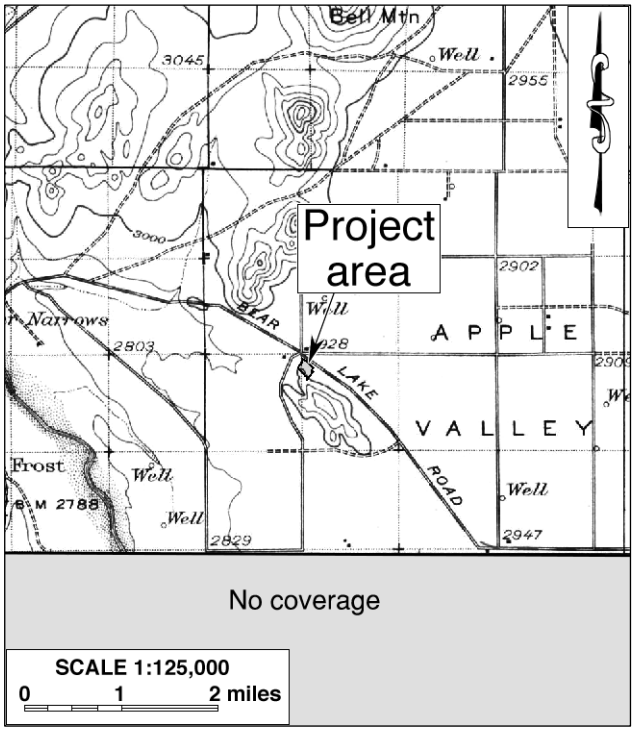


Figure 7. The project area and vicinity in 1920-1932 (source: USGS 1934).

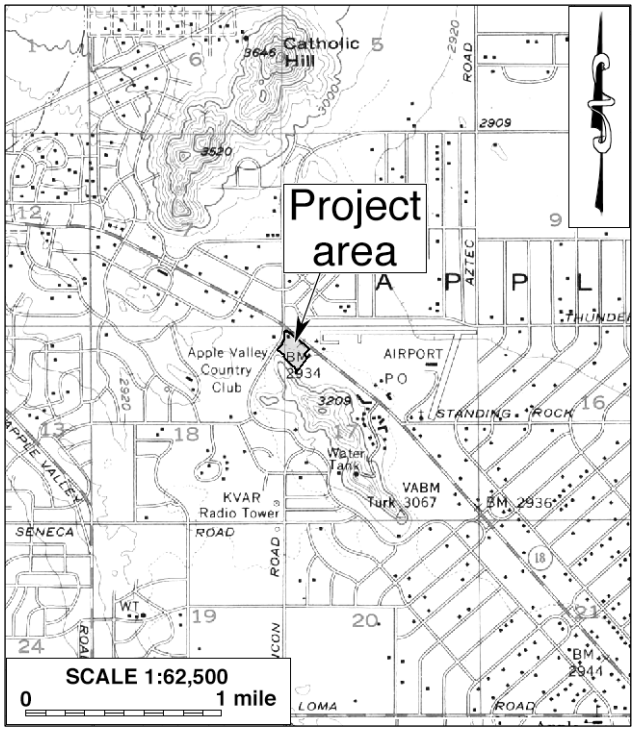


Figure 8. The project area and vicinity in 1952-1957 (source: USGS 1956; 1957).

McFarland of the Los Angeles-based firm McFarland-Bonsall (VVNG 2022). Previously, the couple and their son had arrived in the area from Long Beach, where Zeke worked as a foreman around 1947 and built the Black Horse Motel on Arapahoe Avenue in the "Village" area along Highway 18 to the southeast of the project area (Ancestry.com n.d.). The Black Horse Motel featured horse stables along with its eight guest rooms and, like many new ventures in the area at the time, catered to visitors seeking a ranch-themed get-away (O'Rourke 2013).

Soon room was made for a gift shop featuring Native American-themed jewelry and souvenirs, which became the family's main business interest after dude ranches faded as an attraction. As a result, the family bought the property at the corner of Rancherias Road and State Highway 18 and built the Buffalo Trading Post. A free-standing sign featuring a buffalo on the run was erected in 1960 near the corner of the property, becoming a local landmark (Villalobos 2019; Taylor 2022). An effort to restore the sign was sponsored by a new owner in 2018 and more recently was removed and stored (*ibid*.). Another store sign affixed to a low wall in front of the building and two totems have also been removed and stored (Taylor 2022).

Los Angeles architect Douglas McFarland conceived the Buffalo Trading Post building as an adobe brick and wood-frame building with a broad, full-length arcade attached at the roof level supported by lodge poles and posts. An adobe chimney at the western end was fashioned into a slanted form evocative of a teepee, thereby combining another Native American element into its Pueblo design. The building combined the shop and the Cornia family's living quarters, with the latter occupying the western portion. A secondary mass with a garage was attached to the shop's southwest corner. The result was a highly stylized building, rough-hewn in appearance by design and clearly suited to its desert surroundings (Fig. 10). The original store building was extended at the eastern end in keeping with the established design theme sometime between 1969 and 1973 (NETR Online 1969; UCSB 1973). Other apparent alterations include the addition of the boxed parapet across the storefront, the adaptation of the garage portion to a storefront, and new commercial windows and doors (Town of Apple Valley 1995-2021; also see Appendix 3).

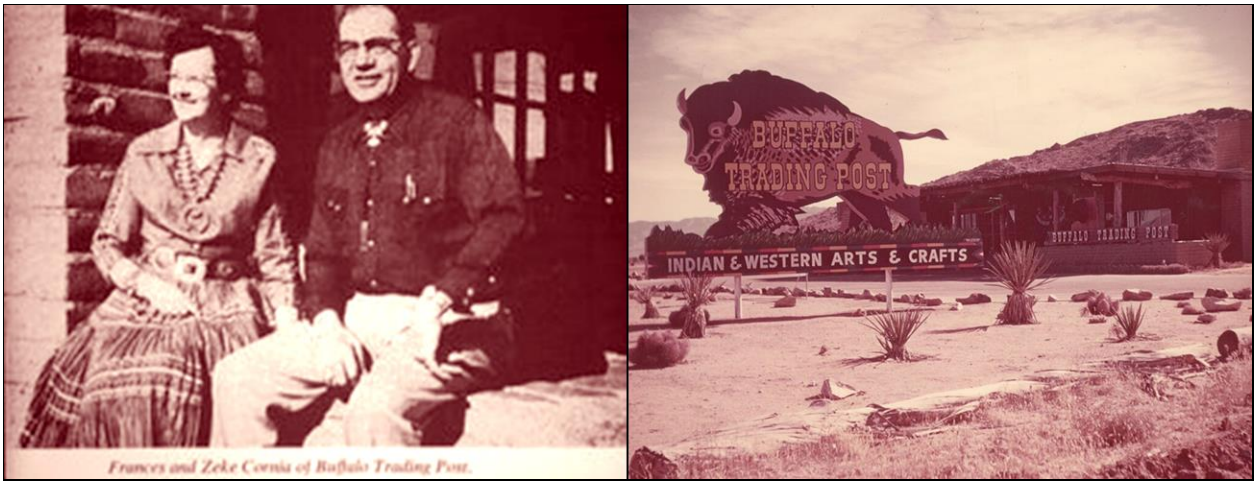


Figure 9. Frances and Zeke Cornia (*left*), owners of the circa 1955 Buffalo Trading Post (*right*; sources: Ancestry.com n.d. and Town of Apple Valley 2005).

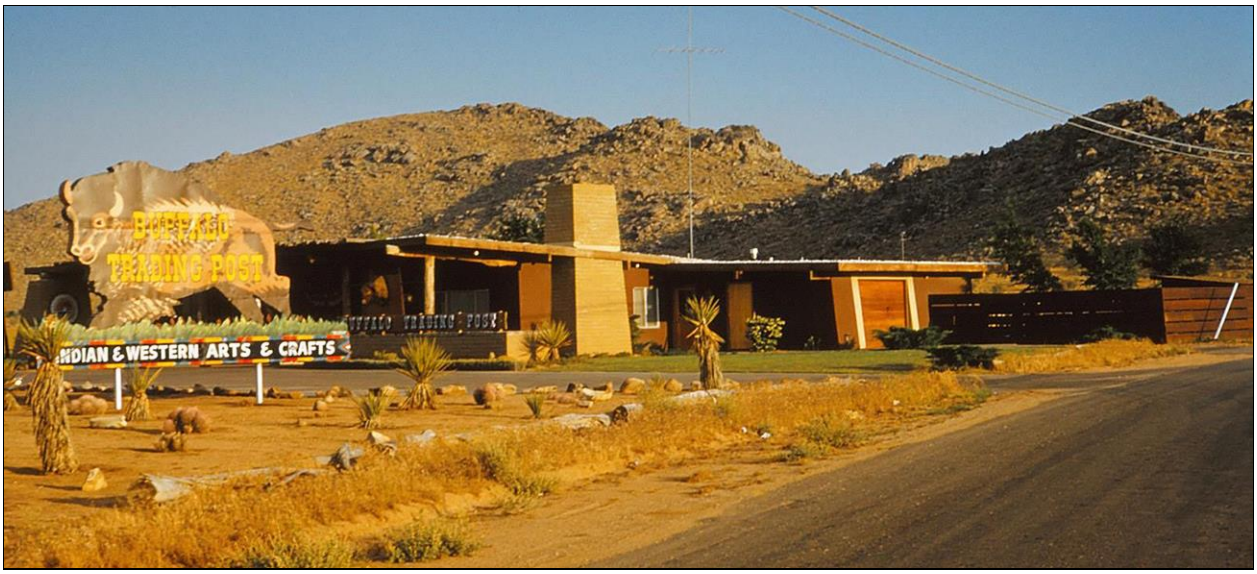


Figure 10. Early undated photo of the circa 1955 Buffalo Trading Post (source: Cramolini n.d.).

Philip Douglas McFarland (1910-1970) was born in Sand Point, Idaho, and attended the University of Washington before receiving his degree in architecture from the University of Southern California in 1934 (Ancestry.com n.d.). McFarland also designed the town's first bank, Bank of Apple Valley (1953), and the Adobe House at 14546 Riverside Drive (1958), but he was mostly engaged for private residential estates (Town of Apple Valley 2005:24; O'Rourke 2013; Ancestry.com n.d.).

FIELD SURVEY

The Buffalo Trading Post was recorded during the field survey and designated temporarily as Site 3933-1H, pending assignment of an official identification number in the California Historical Resources Information System. The alterations noted above were observed, as were a number of other changes that appear to be relatively recent (Figs. 11, 12). The adobe brick has been exposed



Figure 11. Current appearance of the western portion of the former Buffalo Trading Post building, view to the east (photograph taken on October 14, 2020).



Figure 12. Current appearance of the former Buffalo Trading Post building, view to the southeast (photograph taken on October 14, 2020).

on the western end while the remainder of the adobe walls and the rear of the building have been coated in tan or orange stucco. The lodge-pole arcade is still visible under the boxed overhang, and all of the windows appear to be updated with a mix of commercial plate-glass windows, with aluminum- and vinyl-framed windows with security bars on the rear of the building. The doors have similarly been updated with commercial steel and aluminum-framed doors.

The 1968-1973 additions can be distinguished from the original building by small but noticeable differences such as the lodgepole posts being installed on anchors instead of directly into the ground, the concrete in the arcade shifting suddenly in appearance, and the bricks on the east side of the building being of modern manufacture rather than adobe. A detailed description of the building and other details are included in the record forms attached to this study in Appendix 3. No other potential "historical resources" were encountered throughout the course of the survey.

DISCUSSION

DEFINITION

The purpose of this study is to identify any cultural resources in the project area and to assist the City of Apple Valley in determining whether they meet the official definition of "historical resources," as provided in the California Public Resources Code, in particular CEQA. According to PRC §5020.1(j), "'historical resource' includes, but is not limited to, any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California."

More specifically, CEQA guidelines state that the term "historical resources" applies to any such resources listed in or determined to be eligible for listing in the California Register of Historical Resources, included in a local register of historical resources, or determined to be historically significant by the lead agency (Title 14 CCR §15064.5(a)(1)-(3)). Regarding the proper criteria for the evaluation of historical significance, CEQA guidelines mandate that "generally a resource shall be considered by the lead agency to be 'historically significant' if the resource meets the criteria for listing on the California Register of Historical Resources" (Title 14 CCR §15064.5(a)(3)). A resource may be listed in the California Register if it meets any of the following 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. (PRC §5024.1(c))

In summary of the research results presented above, the circa 1955 Buffalo Trading Post was recorded within the project area during this study and designated temporarily as Site 3933-1H. No other potential "historical resources" were encountered within the project area, and the NAHC's Sacred Lands File did not identify any properties of Native American cultural value in the project vicinity.

EVALUATION

The results of these research procedures indicate that the former Buffalo Trading Post was the second location for a souvenir shop run by Zeke and Francis Cornia, who first operated the shop within a guest ranch they built in Apple Valley after arriving from Long Beach. The building was designed by Los Angeles-based architect Douglas McFarland, who featured adobe brick in this building as well in the design for a bank, an adobe residence, and a real estate office in Apple Valley during the same general era. Archival records reveal that private residence design was McFarland's forte, but no other examples were found despite diligent historical research. In light of its age and its existence as a long-lived feature on the local landscape, the building was recorded into the California Historical Resources Inventory during this study.

Though well known as a long-lived visual feature on the local landscape, the building has been significantly altered from its original Pueblo-style design. Other familiar elements of the building that contributed to its distinctive presence have been removed, most notably a freestanding buffalo sign added in 1960, which was removed and stored earlier this year. Alterations include the extension of the main building, the addition of a full-length boxed parapet along the Highway 18 façade, the conversion of the living quarters' garage to a storefront along the Rancherias Road façade, and commercial window and door replacements throughout.

Furthermore, after the Cornias' ownership, and for at least the past 40 years, the building has been repurposed to accommodate various businesses, including a bank, a realty office, a dental office, an antique store, and most recently a carpet and granite business (Town of Apple Valley 1995-2021). As a result, while the building enjoys local historical interest as a structure from Bass and

Westlund's visionary era in the town's development, and although the alterations were generally executed in keeping with the original design, it no longer retains a sufficient level of historical, architectural, or aesthetic qualities, nor sufficient historic integrity, to be considered eligible for listing in the California Register of Historical Resources.

CONCLUSION AND RECOMMENDATIONS

CEQA establishes that "a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment" (PRC §21084.1). "Substantial adverse change," according to PRC §5020.1(q), "means demolition, destruction, relocation, or alteration such that the significance of a historical resource would be impaired." The present study has concluded that the former Buffalo Trading Post building at 20115-20129 Outer Highway 18 South does not meets CEQA's definition of a "historical resource." Therefore, pursuant to PRC §21084.1, CRM TECH presents the following recommendations to the Town of Apple Valley:

- The proposed project will not cause a substantial adverse change to any known "historical resources."
- No further cultural resources investigation is necessary for the proposed project unless development plans undergo such changes as to include areas not covered by this study.
- If buried cultural materials are discovered during any earth-moving operations associated with the project, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

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APPENDIX 1
PERSONNEL QUALIFICATIONS

PRINCIPAL INVESTIGATOR/HISTORIAN
Bai "Tom" Tang, M.A.

Education

1988-1993	Graduate Program in Public History/Historic Preservation, University of California, Riverside.
1987	M.A., American History, Yale University, New Haven, Connecticut.
1982	B.A., History, Northwestern University, Xi'an, China.
2000	"Introduction to Section 106 Review," presented by the Advisory Council on Historic Preservation and the University of Nevada, Reno.
1994	"Assessing the Significance of Historic Archaeological Sites," presented by the Historic Preservation Program, University of Nevada, Reno.

Professional Experience

2002-	Principal Investigator, CRM TECH, Riverside/Colton, California.
1993-2002	Project Historian/Architectural Historian, CRM TECH, Riverside, California.
1993-1997	Project Historian, Greenwood and Associates, Pacific Palisades, California.
1991-1993	Project Historian, Archaeological Research Unit, University of California, Riverside.
1990	Intern Researcher, California State Office of Historic Preservation, Sacramento.
1990-1992	Teaching Assistant, History of Modern World, University of California, Riverside.
1988-1993	Research Assistant, American Social History, University of California, Riverside.
1985-1988	Research Assistant, Modern Chinese History, Yale University.
1985-1986	Teaching Assistant, Modern Chinese History, Yale University.
1982-1985	Lecturer, History, Xi'an Foreign Languages Institute, Xi'an, China.

Cultural Resources Management Reports

Preliminary Analyses and Recommendations Regarding California's Cultural Resources Inventory System (with Special Reference to Condition 14 of NPS 1990 Program Review Report). California State Office of Historic Preservation working paper, Sacramento, September 1990.

Numerous cultural resources management reports with the Archaeological Research Unit, Greenwood and Associates, and CRM TECH, since October 1991.

PRINCIPAL INVESTIGATOR/ARCHAEOLOGIST
Michael Hogan, Ph.D., RPA*

Education

1991	Ph.D., Anthropology, University of California, Riverside.
1981	B.S., Anthropology, University of California, Riverside; with honors.
1980-1981	Education Abroad Program, Lima, Peru.
2002	Section 106—National Historic Preservation Act: Federal Law at the Local Level. UCLA Extension Course #888.
2002	"Recognizing Historic Artifacts," workshop presented by Richard Norwood, Historical Archaeologist.
2002	"Wending Your Way through the Regulatory Maze," symposium presented by the Association of Environmental Professionals.
1992	"Southern California Ceramics Workshop," presented by Jerry Schaefer.
1992	"Historic Artifact Workshop," presented by Anne Duffield-Stoll.

Professional Experience

2002-	Principal Investigator, CRM TECH, Riverside/Colton, California.
1999-2002	Project Archaeologist/Field Director, CRM TECH, Riverside.
1996-1998	Project Director and Ethnographer, Statistical Research, Inc., Redlands.
1992-1998	Assistant Research Anthropologist, University of California, Riverside
1992-1995	Project Director, Archaeological Research Unit, U.C. Riverside.
1993-1994	Adjunct Professor, Riverside Community College, Mt. San Jacinto College, U.C. Riverside, Chapman University, and San Bernardino Valley College.
1991-1992	Crew Chief, Archaeological Research Unit, U.C. Riverside.
1984-1998	Archaeological Technician, Field Director, and Project Director for various southern California cultural resources management firms.

Research Interests

Cultural Resource Management, Southern Californian Archaeology, Settlement and Exchange Patterns, Specialization and Stratification, Culture Change, Native American Culture, Cultural Diversity.

Cultural Resources Management Reports

Author and co-author of, contributor to, and principal investigator for numerous cultural resources management study reports since 1986.

Memberships

* Register of Professional Archaeologists; Society for American Archaeology; Society for California Archaeology; Pacific Coast Archaeological Society; Coachella Valley Archaeological Society.

HISTORIAN/ARCHITECTURAL HISTORIAN
Terri Jacquemain, M.A.

Education

2004 M.A., Public History and Historic Resource Management, University of California, Riverside.
2002 B.S., Anthropology, University of California, Riverside.

Professional Experience

2003- Historian/Report Writer, CRM TECH, Riverside/Colton, California.
- Writer/co-author of cultural resources reports for CEQA and NHPA Section 106 compliance;
- Historic context development, historical/archival research, oral historical interviews, consultation with local historical societies;
- Historic building surveys and recordation, research in architectural history.

2002-2003 Teaching Assistant, Religious Studies Department, University of California, Riverside.
1997-1999 Reporter, *Inland Valley Daily Bulletin*, Ontario, California.
1991-1997 Reporter, *The Press-Enterprise*, Riverside, California.

Memberships

California Council for the Promotion of History.

PROJECT ARCHAEOLOGIST/REPORT WRITER
Breidy Q. Vilcahuaman, M.A., RPA (Registered Professional Archaeologist)

Education

2018 M.A., Anthropology, Georgia State University, Atlanta, Georgia.
2005 B.A., Anthropology, University Nacional del Centro del Peru.

Professional Experience

2022- Project Archaeologist, CRM TECH, Colton, California.
2021-2022 Archaeological Technician, Applied Earthwork, Inc., Hemet, California.
2021 Archaeologist/Crew Chief, Historical Research Associates, Inc., Portland, Oregon.
2020-2021 Archaeological Technician, Cogstone Resource Management, Orange, California.
2020 Archaeological Technician, McKenna et al., Whittier, California.

PROJECT ARCHAEOLOGIST
Hunter C. O'Donnell, B.A.

Education

2016-	M.A. Program, Applied Archaeology, California State University, San Bernardino.
2015	B.A. (*cum laude*), Anthropology, California State University, San Bernardino.
2012	A.A., Social and Behavioral Sciences, Mt. San Antonio College, Walnut, California.
2011	A.A., Natural Sciences and Mathematics, Mt. San Antonio College, Walnut, California.
2014	Archaeological Field School, Santa Rosa Mountains; supervised by Bill Sapp of the United States Forest Service and Daniel McCarthy of the San Manuel Band of Mission Indians.

Professional Experience

2017-	Project Archaeologist, CRM TECH, Colton, California.
2016-2018	Graduate Research Assistant, Applied Archaeology, California State University, San Bernardino.
2016-2017	Cultural Intern, Cultural Department, Pechanga Band of Luiseño Indians, Temecula, California.
2015	Archaeological Intern, U.S. Bureau of Land Management, Barstow, California.
2015	Peer Research Consultant: African Archaeology, California State University, San Bernardino.

APPENDIX 2

NATIVE AMERICAN SACRED LANDS FILE SEARCH RESULTS

NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
Laura Miranda
Luiseño

VICE CHAIRPERSON
Reginald Pagaling
Chumash

SECRETARY
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Miwok

COMMISSIONER
Isaac Bojorquez
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Yokayo Pomo, Yuki, Nomlaki

COMMISSIONER
Wayne Nelson
Luiseño

COMMISSIONER
Stanley Rodriguez
Kumeyaay

COMMISSIONER
[Vacant]

COMMISSIONER
[**Vacant**]

EXECUTIVE SECRETARY
Raymond C. Hitchcock
Miwok/Nisenan

NAHC HEADQUARTERS
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West Sacramento,
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October 20, 2022

Nina Gallardo
CRM TECH

Via Email to: ngallardo@crmtech.us

Re: Proposed Avant AV Project, San Bernardino County

Dear Ms. Gallardo:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Cameron.vela@nahc.ca.gov.

Sincerely,

Cameron Vela

Cameron Vela
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
San Bernardino County
10/20/2022

Agua Caliente Band of Cahuilla Indians
Reid Milanovich, Chairperson
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264
Phone: (760) 699 - 6800
Fax: (760) 699-6919
laviles@aguacaliente.net

Agua Caliente Band of Cahuilla Indians
Patricia Garcia-Plotkin, Director
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264
Phone: (760) 699 - 6907
Fax: (760) 699-6924
ACBCI-THPO@aguacaliente.net

Gabrieleno Band of Mission Indians - Kizh Nation
Andrew Salas, Chairperson
P.O. Box 393 — Gabrieleno
Covina, CA, 91723
Phone: (626) 926 - 4131
admin@gabrielenoindians.org

Gabrieleno/Tongva San Gabriel Band of Mission Indians
Anthony Morales, Chairperson
P.O. Box 693 — Gabrieleno
San Gabriel, CA, 91778
Phone: (626) 483 - 3564
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GTTribalcouncil@aol.com

Gabrielino /Tongva Nation
Sandonne Goad, Chairperson
106 1/2 Judge John Aiso St., #231 — Gabrielino
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Phone: (951) 807 - 0479
sgoad@gabrielino-tongva.com

Gabrielino Tongva Indians of California Tribal Council
Robert Dorame, Chairperson
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Bellflower, CA, 90707
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Fax: (562) 761-6417
gtongva@gmail.com

Gabrielino Tongva Indians of California Tribal Council
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Simi Valley, CA, 93094
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christina.marsden@alumni.usc.edu

Gabrielino-Tongva Tribe
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Kern Valley Indian Community
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Kern Valley Indian Community
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Kern Valley Indian Community
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bbutterbredt@gmail.com

Morongo Band of Mission Indians
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Phone: (951) 755 - 5110
Fax: (951) 755-5177
abrierty@morongo-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Proposed Avant AV Project, San Bernardino County.

Native American Heritage Commission
Native American Contact List
San Bernardino County
10/20/2022

Morongo Band of Mission Indians
Ann Brierty, THPO
12700 Pumarra Road — Cahuilla
Banning, CA, 92220 — Serrano
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Fax: (951) 572-6004
abrierty@morongo-nsn.gov

Quechan Tribe of the Fort Yuma Reservation
Manfred Scott, Acting Chairman
Kw'ts'an Cultural Committee
P.O. Box 1899 — Quechan
Yuma, AZ, 85366
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scottmanfred@yahoo.com

Quechan Tribe of the Fort Yuma Reservation
Jill McCormick, Historic Preservation Officer
P.O. Box 1899 — Quechan
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historicpreservation@quechantribe.com

San Fernando Band of Mission Indians
Donna Yocum, Chairperson
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Newhall, CA, 91322 — Vanyume
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ddyocum@comcast.net

San Manuel Band of Mission Indians
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26569 Community Center Drive — Serrano
Highland, CA, 92346
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Santa Rosa Band of Cahuilla Indians
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lsaul@santarosa-nsn.gov

Serrano Nation of Mission Indians
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Serrano Nation of Mission Indians
Wayne Walker, Co-Chairperson
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Patton, CA, 92369
Phone: (253) 370 - 0167
serranonation1@gmail.com

Soboba Band of Luiseno Indians
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San Jacinto, CA, 92581 — Luiseno
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Fax: (951) 654-4198
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Soboba Band of Luiseno Indians
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Fax: (951) 654-4198
jontiveros@soboba-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Proposed Avant AV Project, San Bernardino County.

Twenty-Nine Palms Band of Mission Indians
Darrell Mike, Chairperson
46-200 Harrison Place Chemehuevi
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Fax: (760) 863-2449
29chairman@29palmsbomi-nsn.gov

Twenty-Nine Palms Band of Mission Indians
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amadrigal@29palmsbomi-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Proposed Avant AV Project, San Bernardino County.

APPENDIX 3

CALIFORNIA HISTORICAL RESOURCES INVENTORY RECORD FORMS

Former Buffalo Trading Post
CRM TECH 3933-1H

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z
Other Listings
Review Code Reviewer Date

Page 1 of 7 *Resource Name or # (Assigned by recorder) CRM TECH 3933-1H

P1. Other Identifier: Former Buffalo Trading Post building

***P2. Location:** √ **Not for Publication** ___ **Unrestricted**

***a. County** San Bernardino **and (P2c, P2e. and P2b or P2d. Attach a Location Map as necessary.)**

***b. USGS 7.5' Quad** Apple Valley North, Calif. **Date** 1970, photorevised 1993
T 5N; **R** 3W; NW **1/4 of** NW **1/4 of Sec** 17 ; S.B. **B.M.**

c. Address 20115-20129 Outer Highway 18 South **City** Apple Valley **Zip** 92308

d. UTM: (Give more than one for large and/or linear resources) **Zone** 11 ; 479313 **mE/** 3820779 **mN**
UTM Derivation: ___ USGS Quad ___ GPS √ Google Earth

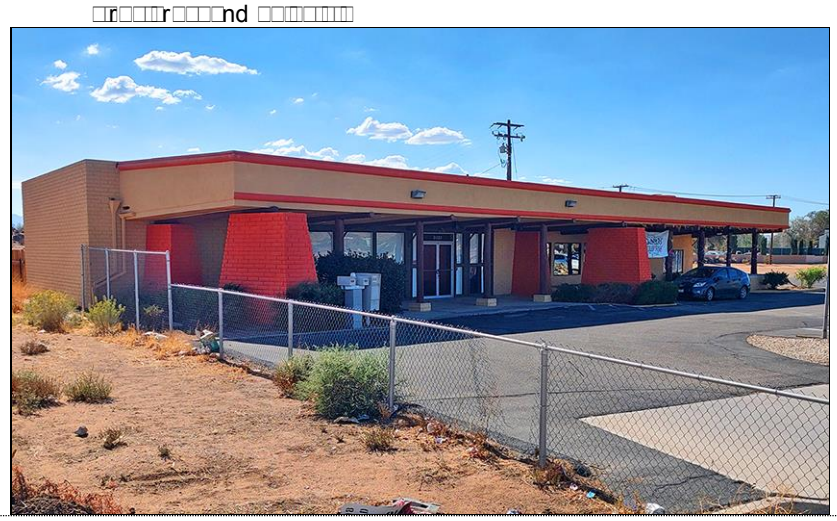
e. Other Locational Data: **(e.g., parcel #, directions to resource, elevation, decimal degrees, etc., as appropriate)** Assessor's Parcel No. 3112-171-18; at the southeast corner of Ranncherias Road and Highway 18.

***P3a. Description:** This one-story wood-framed commercial building rests on a concrete slab oriented slightly northwest-southeast on the property. It is comprised of a long rectangular original mass adjoined at the southwestern corner to a secondary squarish L-shaped mass. The building is surmounted by a flat roof sloped over a slightly lower, full-length sunshade that ends in a wide overhang boxed underneath by light tan 2x4s and is topped by an approximately two-foot-tall stucco parapet with rounded stucco trim near the top. The parapet continues in adobe brick form wrapping the eastern side and around a short portion of the rear. Over the L-portion, the roof ends in wide eaves and wide dark brown wood trim, with board supports under the eaves. Exterior walls are a mix of adobe and modern bricks, and stucco. (*Continued on p. 4*)

***P3b. Resource Attributes:** HP6: One-story commercial building

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other

P5a. Photograph or Drawing



P5b. Description of Photo Photo taken on October 14, 2022, view to southwest (*see also pp. 6, 7*)

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both Ca. 1955

***P7. Owner and Address:** Highway 18 and Rancherias, LLC, same address as above

***P8. Recorded by** Name, Address: Hunter O'Donnell, CRM TECH, 1016 East Cooley Drive, Suite A/B, Colton, CA 92324

***P9. Date Recorded:** October 14, 2022

***P10. Survey Type** Describe: Intensive-level survey for CEQA compliance

***P11. Report Citation:** Terri Jacquemain, Breidy Q. Vilcahuaman, and Hunter O'Donnell (2022): Historical/Archaeological Resources Survey Report: Rancherias Road & SR 18 Project, Town of Apple Valley, San Bernardino County, California

***Attachments:** ☐ None ☒ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List)

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 6Z

***Resource Name or #** (Assigned by recorder) CRM TECH 3933-1H

B1. Historic Name: Buffalo Trading Post

B2. Common Name:

B3. Original Use: Retail and Residence B4. Present Use: 3-unit commercial building

***B5. Architectural Style:** Pueblo (altered)

***B6. Construction History:** (Construction date, alterations, and date of alterations) The Buffalo Trading Post building was constructed in 1955 for property owners Zeke (1903-1988) and Frances (1905-1992) Cornia and designed by architect Douglas McFarland of the Los Angeles-based firm McFarland-Bonsall. McFarland conceived the building as an adobe brick and wood frame Pueblo-style structure featuring a broad, full-length arcade supported by lodge poles and posts. An adobe chimney at the western end was fashioned into a slanted form evocative of a teepee, thereby combining another Native American element into its Pueblo design. (*Continued on p. 4*)

***B7. Moved?** ☒ No ☐ Yes ☐ Unknown **Date:** ____ **Original Location:**

***B8. Related Features:** A free-standing sign featuring a buffalo installed in 1960 represented a familiar local landmark but was removed and stored elsewhere earlier this year. Some landscaping succulents near the roadway appear consistent with historic-era photographs of the Buffalo Trading Post.

B9a. Architect: Douglas McFarland b. Builder: Unknown

***B10. Significance: Theme** Post-World War II tourism and commercial development

Area Apple Valley **Period of Significance** 1955-1975

Property Type commercial/retail **Applicable Criteria** N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.) The building's period of potential significance is placed in the early post-World War II era, in the context of the waning tourism industry in Apple Valley as suburban residential development and services became the norm in Apple Valley, particularly along its major thoroughfares, such as Highway 18. This (*Continued on p. 5*)

B11. Additional Resource Attributes: (List attributes and codes) HP46: Walls/gates/fences

***B12. References:** San Bernardino County Assessor's real property tax assessment database; Town of Apple Valley building permits; genealogical database at Ancestry.com; news accounts from the *Victorville Daily Press* and the Victor Valley News Group

B13. Remarks:

***B14. Evaluator:** Terri Jacquemain, M.A.

***Date of Evaluation:** December 2, 2022

(Sketch Map with north arrow required.)



(This space reserved for official comments.)

*Required information

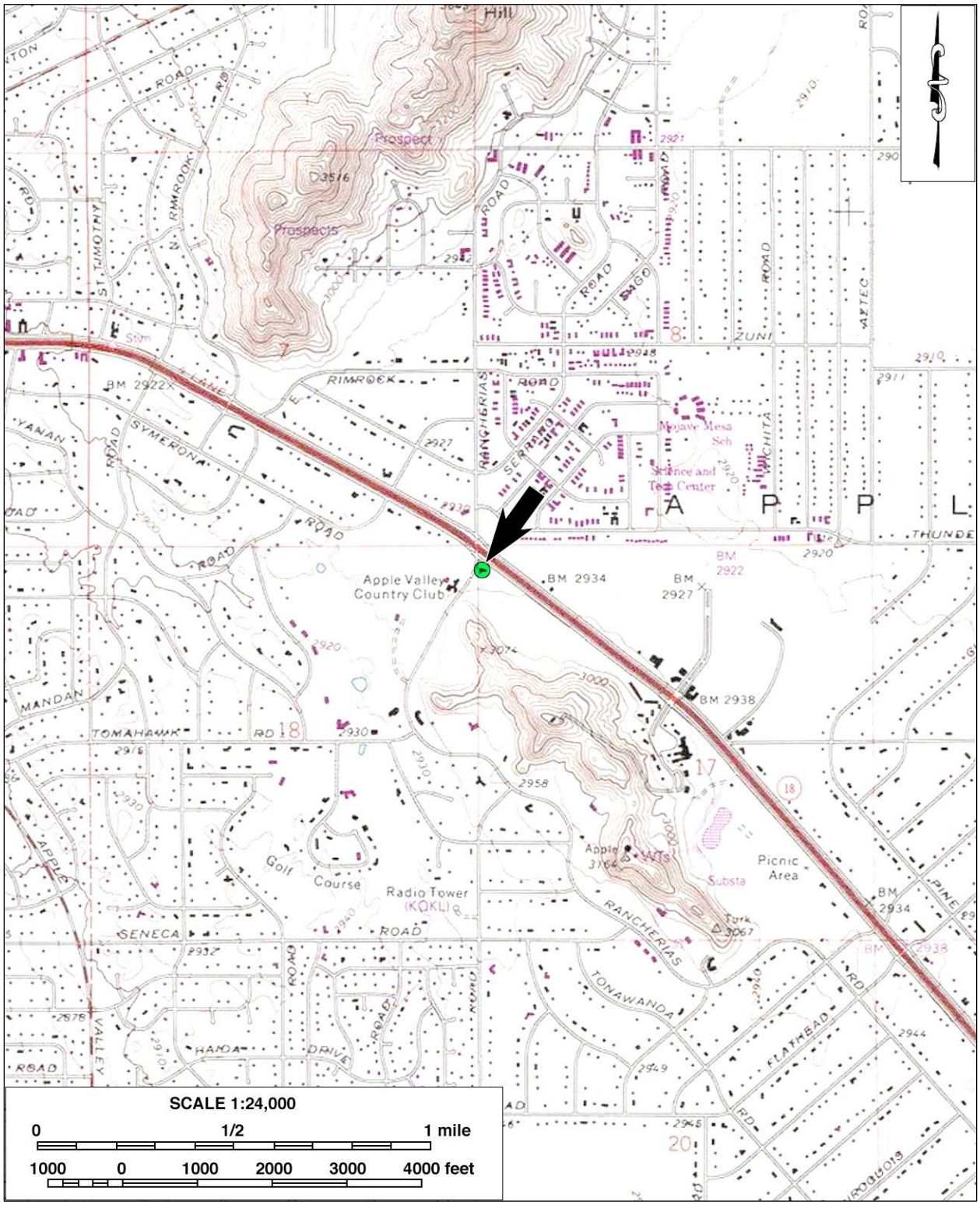
State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI #
Trinomial

*Resource Name or # Alternate Name or Number: CRM TECH 3933-1H

*Map Name: Apple Valley North, Calif.
*Scale: 1:24,000 *Date of Maps: 1970/1993



***P3a. Description** (continued): Spaced under and across the Highway 18-facing façade are lodge pole beams and posts, with steel shelf brackets attached to the building for additional support. Two beams rest on reddish-orange brick-clad forms evocative of teepees that are set under and extend slightly beyond the shade and also serve to bear the weight of the shade. At these two locations, similar but half-sized forms extend from the exterior wall, leaving enough room to walk the length of the shade, and are also joined together by a half wall to enclose the eastern end of the arcade. A third teepee form on the western façade near the square portion extends beyond the roof and serves as a fireplace chimney and is next to a vertically divided, aluminum-framed window.

The eastern portion of the rectangular mass is a later addition featuring full-length commercial plate glass windows that are divided horizontally and set on either side of double commercial glass doors with a transom and sidelights. The posts here are enclosed at the bottom by two courses of modern brick set on a scored concrete floor. The older portion sports a low planter and a flower bed, along with a single glass commercial door and transom next to a tripart sliding window. The two posts at this end are set about halfway into a wood-framed stucco box.

The mass on the western end has two entries on the north side filled with dark unglazed doors. A former single car garage door on the west-facing end is filled with a large plate-glass window next to a single commercial glass door. An unglazed door opens to the south and vinyl-framed sliding windows fill the interior of the L, with two more of these windows on the southern wall of this mass. Similar windows are found on the rear of the rectangular mass, which also has at least two other entries, one of them a single commercial door with a sidelight, and another on the newer section sheltered overhead by a rough-hewn shade. Security bars are affixed over the rear windows.

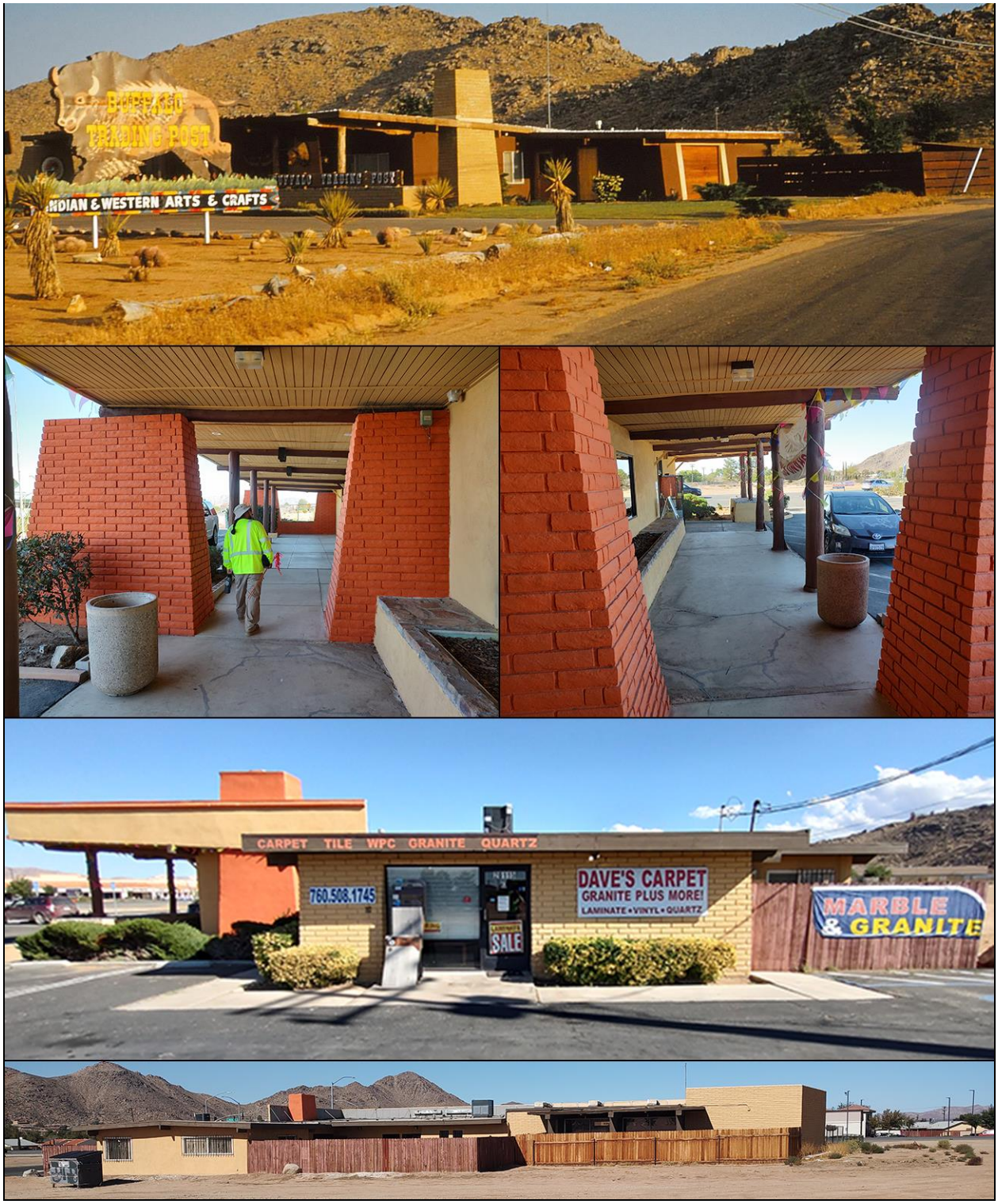
The building is divided into three suites, with the two westernmost ones currently occupied. The building stands on a corner lot with paved parking on the street sides and is enclosed by a chain-link fence on the other sides. It is in good condition.

***B6. Construction History (continued):** The building combined the shop and the Cornia family's living quarters, with the latter occupying the western portion and a secondary mass with a garage attached to the shop's southwest corner. The result was a highly stylized building, rough-hewn in appearance by design and clearly suited to its desert surroundings. The original store building was extended at the eastern end in keeping with the established design theme sometime between 1969 and 1973. Other apparent alterations include the addition of the boxed parapet across the storefront, the adaptation of the garage portion to a storefront, and new commercial windows and doors.

Permits on file include those issued for installation of an ATM teller and access lobby for occupant First Federal Bank in 1995, and for the parapet, illuminated signage, and interior work in 1998-1999 when it became the dental office of Alvin Dunn, DDS. Owners after the Cornias include Murielle H. and Alfred J. Link, Jr., from at least 1976 to 1981, when Murielle became the sole owner; Sally Brewster and Leonard E. Brewster (1982-1998); Alvin and Elsie Dunn (1998 to 2018); YK Capitol (2018-2022) and Highway 18 and Rancherias, LLC in 2022.

***B10. Significance (continued):** pattern of events as a whole has certainly left an important legacy in the growth of the area and the Victor Valley communities in general. The former Buffalo Trading Post was the second location for a souvenir shop run by Zeke and Francis Cornia, who first operated the shop within a guest ranch they built in Apple Valley after arriving from Long Beach. Though the Cornias' business was successful at this location for many years, as one of the numerous similar commercial establishments that sprang up in Apple Valley during the post-World War II boom, this property does not demonstrate a unique, important, or particularly close association with the pattern of events or with any other established themes in local history, nor do the Cornias sufficiently represent persons important in local history.

The building was designed by Los Angeles-based architect Douglas McFarland, who featured adobe brick in this building as well as in his designs for a local bank, an adobe residence, and a real estate office in Apple Valley during the same general era. The building in its original form would likely have represented a good example of McFarland's commercial work, but it does not embody his professional accomplishments or represent distinctive characteristics of a type, period, region, or method of construction. Archival records reveal that private residence design was McFarland's forte, but no other examples were found despite diligent historical research, likely due to the nature of his work. Lastly, as a relative latecomer to the heyday of Apple Valley resort and tourism industry, a topic well-documented in published literature, this modest commercial retail building holds little potential for any important data for the study of that aspect of local history.



From the top: circa 1960 photo of original design, view to southeast; current photographs (September 20, 2022) under the arcade, view to east (*left*) and west (*right*); western façade (view to east); rear façade (view to the north)



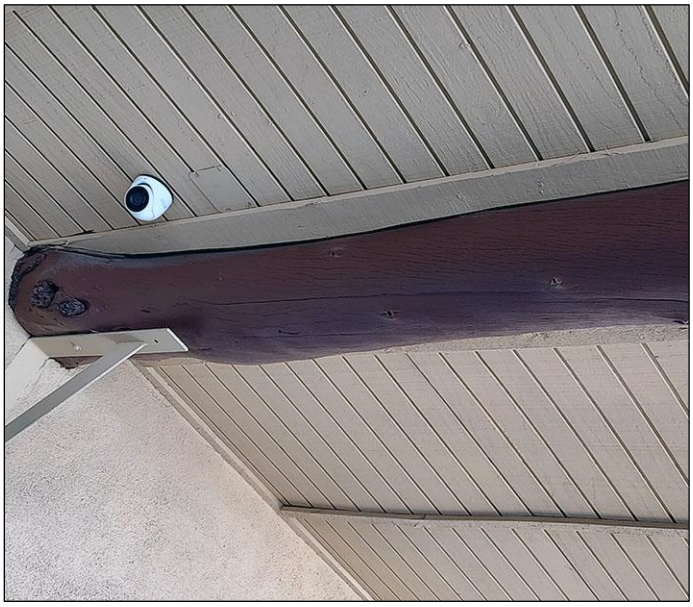
Eastern arcade



Arcade, view to the east



Western lodge-pole arcade



Lodge-pole beam detail

Appendix D
Geotechnical and Infiltration Evaluation Report

GEOTECHNICAL AND INFILTRATION EVALUATION
PROPOSED RETAIL/COMMERCIAL DEVELOPMENT
APN'S 3112-171-16 AND PORTION OF 3112-171-17
CALIFORNIA STATE HIGHWAY 18 AND RANCHERIAS ROAD
APPLE VALLEY, SAN BERNARDINO COUNTY, CALIFORNIA

PREPARED FOR

AVANT REAL ESTATE
4490 AYERS AVENUE
VERNON, CALIFORNIA 90058

PREPARED BY

GEOTEK, INC.
1548 NORTH MAPLE STREET
CORONA, CALIFORNIA 92878

PROJECT NO. 3275-CR **AUGUST 31, 2022**

GEOTEK

GeoTek, Inc.
1548 North Maple Street, Corona, California 92878
(951) 710-1160 Office (951) 710-1167 Fax www.geotekusa.com

August 31, 2022
Project No. 3275-CR

Avant Real Estate
4490 Ayers Avenue
Vernon, California 92101

Attention: Ms. Michelle Sanchez

Subject: **Geotechnical and Infiltration Evaluation**
Proposed Retail/Commercial Development
California State Highway 18 and Rancherias Road
Apple Valley, San Bernardino County, California

Dear Ms. Sanchez:

GeoTek, Inc. (GeoTek) is pleased to provide the results of this Geotechnical and Infiltration Evaluation for the subject project located adjacent to the southeast corner of California State Highway 18 and Rancherias Road, in the Town of Apple Valley, San Bernardino County, California. This report presents the results of GeoTek's evaluation, discussion of findings, and provides geotechnical recommendations for foundation design and construction.

Based upon review and evaluation, site development appears feasible from a geotechnical viewpoint provided that the recommendations included in this report are incorporated into the design and construction phases of the project.

The opportunity to be of service on this project is sincerely appreciated. If you should have any questions, please do not hesitate to contact GeoTek.

Respectfully
submitted,
GeoTek, Inc.





Bruce A. Hick
GE 2304, Exp. 12/31/22
Geotechnical Engineer

Edward H. LaMont
CEG 1892, Exp. 07/31/24
Principal Geologist

Anna M. Scott
Project Geologist

Distribution: (1) Addressee via email (one PDF file)

G:\Projects\3251 to 3300\3275CR Avant Real Estate Proposed Retail/Commercial Development Apple Valley\Geotechnical and Infiltration Report\3275CR Geotechnical and Infiltration Evaluation Proposed Retail/Commercial Development Apple Valley.doc

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Appendix B – Results of Laboratory Testing
Appendix C – Percolation Data Sheets & Porchet Calculations
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1. PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to evaluate the geotechnical engineering and geologic conditions at the project site, as outlined in GeoTek's proposal P-0602122-CR dated June 6, 2022. Services provided for this study included the following:

- Research and review of available geologic data and general information pertinent to the site,
- Site exploration consisting of the excavation, logging, and sampling of seven (7) exploratory test borings extending to depths ranging from about 16 to 51.5 feet below grade,
- Excavation of two (2) additional borings to depths of about 5 feet below grade and performing an infiltration test in each boring,
- Laboratory testing of soil samples collected during the field investigation,
- Review and evaluation of site seismicity, and
- Preparation of this geotechnical report which presents GeoTek's findings, conclusions, and recommendations for this site.

2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

2.1 SITE DESCRIPTION

The approximate 11-acre irregular-shaped project site is located adjacent to the southeast corner of California State Highway 18 and Rancherias Road, in the Town of Apple Valley, San Bernardino County, California (see Figure 1, Site Location and Topography Map). Access to the site is available from California State Highway 18 and Rancherias Road, both paved, improved streets located adjacent to the northern and western boundaries of the site, respectively. Numerous dirt trails trend through the site. Existing commercial developments are located adjacent to the eastern boundary of the site with vacant hillside land (Bass Hills) located adjacent to the southern boundary of the site.

Topographically, the site consists of relatively flat land that slopes down at an approximate 1 to 2 percent gradient to the northwest. The elevation of the site is approximately 2,935 feet. There is approximately 20 feet of elevation differential across the site.

The project site currently contains an existing commercial development (single-story building, adjacent parking, hardscape and utility improvements) in the extreme northwestern corner of the site. GeoTek understands that this development will be demolished as part of the site development. The remainder of the property consists of vacant, unimproved land. Site vegetation consists of a sparse covering of low grasses and weeds and scattered small brush..

2.2 PROJECT DESCRIPTION

Based upon review of the preliminary site plan provided, it is proposed to construct a retail/commercial development consisting of seven (7) buildings: a 20,442 square foot retail building; a 5,700 square foot tire shop; a 2,305 square foot drive-thru restaurant; a 2,319 square foot drive-thru restaurant; a 3,800 square foot car wash; a 3,360 square foot gas station; and a 7,650 square foot retail building. Storm water facilities and typical hardscape, landscaping, utility and parking area/drive areas are anticipated as part of the project development.

It is assumed that the proposed structures will be single or two-story, of wood frame or masonry construction which will be supported by conventional shallow spread footings and most likely include conventional slab on-grade floor systems. GeoTek has assumed maximum column and wall loads on the order of 100 kips and 3.5 kips per foot, respectively. Once actual loads are known, that information should be provied to GeoTek to determine if modifications to the recommendations presented in this report are warranted.

Based on the site topography, it is anticipated that the maximum depths of cut and fill will be about 10 feet or less not including remedial excavations. Construction of small retaining walls (less than five feet in height) and loading docks are anticipated. Sewage disposal is anticipated to be be provided by a public swer system.

On-site storm water disposal is proposed by means be of underground retention/detention chambers. Approximate depth of the planned stormwater disposal is on the order of five feet below existing/proposed grades.

If site development differs from the assumptions made herein, the recommendations included in this report should be subject to further review and evaluation. Site development plans should be reviewed by GeoTek when they become available.

3. FIELD EXPLORATION AND LABORATORY TESTING

3.1 FIELD EXPLORATION

The field exploration for this report was conducted on August 8, 2022 and included the excavation of seven (7) geotechnical exploratory test borings with a hollow-stem drill rig to depths ranging from about 16 to 51.5 feet below grade. The approximate locations of the GeoTek excavations are shown on the Boring and Infiltration Test Location Map (Figure 2). A geologist/engineer from GeoTek logged the excavations and collected soil samples for use in subsequent laboratory testing. The logs of the exploratory borings are included in Appendix A.

Relatively undisturbed soil samples were recovered at various intervals in the geotechnical borings with a California sampler. The California sampler is a 3-inch outside diameter, 2.5-inch inside diameter, split barrel sampler lined with brass rings. The sampler was 18 inches long. The sampler conformed to the requirements of ASTM D 3550. A 140-pound automatic trip hammer was utilized, dropping 30 inches for each blow. The relatively undisturbed samples, together with bulk samples of representative soil types, were returned to the laboratory for testing and evaluation. The California sampler test data are presented on the logs.

In Boring B-7 standard penetration tests (SPT) were performed with a 2.0-inch outside diameter, 1.5-inch inside diameter, split-barrel sampler. The sampler was 18 inches long. The inside diameter of the sampler shoe was 1.4 inches. The sampler was unlined. The sampler conformed to the requirements of ASTM D 1586. A 140-pound automatic trip hammer was utilized, dropping 30 inches for each blow. The sampler penetration test data are presented on the Log for Boring for Boring B-1.

Percolation Testing

In addition to the geotechnical exploratory borings, two borings (I-1 and I-2) were excavated in the area of the proposed water quality detention basin to depths of about 5 feet. Infiltration/percolation testing was conducted in these borings in general accordance with the requirements of the County of San Bernardino.

The percolation tests consisted of drilling an eight-inch diameter test hole to the desired depth and installing approximately two inches of gravel in the bottom of the hole. A three-inch diameter perforated PVC pipe, wrapped in a filter sock, was placed in the excavations and the annular space was filled with gravel to prevent caving within the boring. Water was then

placed in the borings to presoak the holes and percolation testing was performed the following the pre-soak period. Following presoaking, the percolation tests were performed which consisted of adding water to each test hole and measuring the water drop over a 30-minute period. The water drop was recorded for twelve test intervals. Water was added to the test holes after each test interval. The field percolation rates were then converted to an infiltration rate using the Porchet Method.

The results of the conversions indicate infiltration rates of approximately 0.90 inches per hour (I-1) to approximately 1.06 inches per hour (I-2). Copies of the percolation data sheets and the Porchet infiltration rate conversion calculations are presented in Appendix C. No factors of safety were applied to the rates provided. Over the lifetime of the infiltration areas, the infiltration rates may be affected by sediment build up and biological activities, as well as local variations in near surface soil conditions. A suitable factor of safety should be applied to the field rate in designing the infiltration system.

It should be noted that the infiltration rates provided above were performed in relatively undisturbed on-site soils. Infiltration rates will vary and are mostly dependent on the underlying consistency of the site soils and relative density. Infiltration rates may be impacted by weight of equipment travelling over the soils, placement of engineered fill and other various factors. GeoTek assumes no responsibility or liability for the ultimate design or performance of the storm water facility.

3.2 LABORATORY TESTING

Laboratory testing was performed on selected relatively undisturbed ring and bulk samples collected during the field exploration. The purpose of the laboratory testing was to confirm the field classification of the materials encountered and to evaluate their physical properties for use in the engineering design and analysis. Results of the laboratory testing program along with a brief description and relevant information regarding testing procedures are included on the exploratory borings logs included in Appendix A.

4. GEOLOGIC AND SOILS CONDITIONS

4.1 REGIONAL SETTING

The property is situated in the Mojave Desert geomorphic province. The Mojave Desert province is a wedge-shaped area that is enclosed on the southwest by the San Andreas fault zone, the Transverse Ranges province and the Colorado Desert province, on the north and northeast by the Garlock fault zone, the Tehachapi Mountains and the Basin and Range province, and on the east by the Nevada and Arizona state lines, and the Colorado River. The area is dominated by broad alluviated basins that are mostly aggrading surfaces that are receiving non-marine continental deposits from the adjacent upland areas.

The primary fault zones of the area are found in the western half of the province and have a general northwest-southeast trend. These zones are the San Andreas, Helendale, Lenwood and Lockhart in the subject site vicinity. In addition to these major zones, there are numerous secondary fault zones in the area and many smaller fault zones in the eastern half of the province. Many of the secondary fault zones in the province have a general east-west trend.

More specific to the subject property, the site is located in an area geologically mapped to be underlain by younger alluvium with granite and quartz monzonite bedrock just south of the project site (Dibblee, T. W., and Minch, J. A. 2008).

4.2 GENERAL SOIL CONDITIONS

A brief description of the earth materials encountered is presented in the following section. Based on the site reconnaissance, GeoTek's exploratory excavations and review of published geologic maps, the area investigated is locally underlain by undocumented fill, older alluvium and tonalite bedrock.

Undocumented Fill

4.2.1 Undocumented Fill

Asphalt concrete pavement (asphalt concrete and aggregate base) and existing improvements are present within an existing development in the extreme northwest corner of the site. Undocumented fill materials were encountered in all the borings and extended to a maximum depth of approximately three feet below the existing ground surface at the boring locations. As encountered in the borings, the fill deposits consisted predominately of silty sands (SM soil type based upon the Unified Soil Classification System). The fill materials were found to be

loose to medium dense and to contain variable amounts of organic material. It should be realized that thicker deposits of undocumented fill may be encountered in unexplored areas of the site.

4.2.2 Alluvium

Alluvial soil was present within all borings to the maximum depth explored (Boring B-7, 51.5 feet). The alluvium consisted of interbedded layers of silty sands and sandy silts (SM and ML soil types). The upper one to two feet of the alluvium was found to be relatively loose and non-uniform. The alluvium below a depth of approximately two feet alluvium was found to be medium dense to very dense.

Based on the results of laboratory testing, the upper site soils sampled and tested are considered to have a "very low" (0-20) expansion potential (ASTM D 4829). Based on the laboratory test results, the near surface soils have a soluble sulfate content of less than 0.1 percent (ASTM D 4327). The test results are provided in Appendix B.

4.3 SURFACE WATER AND GROUNDWATER

4.3.1 Surface Water

If encountered during earthwork operations, surface water on this site is the result of precipitation or possibly some minor surface run-off from the surrounding areas. Overall site area drainage varies due to the site topography. Provisions for surface drainage will need to be accounted for by the project civil engineer.

4.3.2 Groundwater

Groundwater was not encountered in any of the borings at the time of drilling. Based upon the field exploration, the depth to groundwater estimated is deeper than 50 feet below existing site grade. Based on the results of the field exploration, review of site area geomorphology and geology, groundwater is not anticipated to adversely affect the proposed improvements.

4.4 FAULTING AND SEISMICITY

4.4.1 Faulting

The geologic structure of the entire southern California area is dominated mainly by northwest-trending faults associated with the San Andreas system. The site is in a seismically

active region. No active or potentially active fault is presently known to exist at this site nor is the site situated within an *"Alquist-Priolo"* Earthquake Fault Zone. The site is also not within a seismic hazard area as identified on the San Bernardino County Geologic Hazards Overlay Maps. The nearest zoned faults are then Helendale-South Lockhart fault, located about 8 miles to the northeast and the San Andreas fault system situated about 22 miles to the southwest.

4.4.2 Seismic Design Parameters

The site is located at approximately 34.5272 degrees West Latitude and -117.2245 degrees North Longitude. Site spectral accelerations (Ss and S_1), for 0.2 and 1.0 second periods for a Class "D" site, were determined from the SEAOC/OSHPD web interface that utilizes the USGS web services and retrieves the seismic design data and presents that information in a report format. Using the ASCE 7-16 option on the SEAOC/OSHPD website results in the values for S_{M1} and S_{D1} reported as "null-See Section 11.4.8" (of ASCE 7-16). As noted in ASCE 7-16, Section 11.4.8, a site-specific ground motion procedure is recommended for Site Class D when the value S_1 exceeds 0.2. The value S_1 for the subject site exceeds 0.2.

For a site Class D, an exception to performing a site-specific ground motion analysis is allowed in ASCE 7-16 where S_1 exceeds 0.2 provided the value of the seismic response coefficient, Cs, is conservatively calculated by Eq 12.8-2 of ASCE 7-16 for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for $T_L \geq T > 1.5T_s$ or Eq. 12.8-4 for $T > T_L$.

The results, based on the 2015 NEHRP and the 2019 CBC, are presented in the following table assuming that the exception as allowed in ASCE 7-16 is applicable. If the exception is deemed not appropriate, a site-specific ground motion analysis will be required.

SITE SEISMIC PARAMETERS	
Mapped 0.2 sec Period Spectral Acceleration, S_s	1.097g
Mapped 1.0 sec Period Spectral Acceleration, S_1	0.42g
Site Coefficient for Site Class "D", F_a	1.061
Site Coefficient for Site Class "D", F_v	1.88
Maximum Considered Earthquake Spectral Response Acceleration for 0.2 Second, S_{MS}	1.164g
Maximum Considered Earthquake Spectral Response Acceleration for 1.0 Second, S_{M1}	0.79g
5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, S_{DS}	0.776g
5% Damped Design Spectral Response Acceleration Parameter at 1 second, S_{D1}	0.527g
Peak Ground Acceleration (PGA_M)	0.531g
Seismic Design Category	D

Final selection of the appropriate seismic design coefficients should be made by the project structural engineer based upon the local practices and ordinances, expected building response and desired level of conservatism.

4.5 LIQUEFACTION

Liquefaction describes a phenomenon in which cyclic stresses, produced by earthquake-induced ground motion, create excess pore pressures in relatively cohesionless and some low-plastic silt and clay soils. These soils may thereby acquire a high degree of mobility, which can lead to lateral movement, sliding, settlement of loose sediments, sand boils and other damaging deformations. This phenomenon occurs only below the water table, but, after liquefaction occurs, the liquefied soil/water matrix can propagate upward into overlying non-saturated soil as excess pore water dissipates.

The factors known to influence liquefaction potential include soil type and grain size, relative density, plasticity, groundwater level, confining pressures, and both intensity and duration of ground shaking. In general, materials that are susceptible to liquefaction are loose, saturated granular soils having low fines content under low confining pressures and some low plastic silts and clays.

Based on the current lack of shallow groundwater, it is GeoTek's opinion that the site is not susceptible to liquefaction during a seismic event. Due to the dense nature of the underlying alluvium, seismic induced ("dry sand") settlements are estimated to be minimal.

Since groundwater is relatively deep and no liquefaction will occur below the groundwater elevation, lateral spread should not be a consideration in the design of the structures.

4.6 OTHER SEISMIC HAZARDS

Due to the general flat terrain, the potential for seismic induced landslides or lateral spreading is considered nil. The potential for secondary seismic hazards such as a seiche and tsunami is considered negligible due to site elevation and distance from an open body of water.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 GENERAL

Development of the site appears feasible from a geotechnical engineering viewpoint. The following recommendations should be incorporated into the design and construction phases of development.

5.2 EARTHWORK CONSIDERATIONS

5.2.1 General

Earthwork and grading should be performed in accordance with the applicable grading ordinances of the County of Riverside, the 2019 California Building Code (CBC), Town of Apple Valley and recommendations contained in this report. The Grading Guidelines included in Appendix D outline general procedures and do not anticipate all site-specific situations. In the event of conflict, the recommendations presented in the text of this report should supersede those contained in Appendix D.

5.2.2 Site Clearing

Initial site preparation should commence with removal of any existing improvements, debris, slabs, pavements, deleterious materials and vegetation within the limits of the planned improvements. These materials should be properly disposed of off-site. Voids resulting from removing any materials should be replaced with engineered fill materials with expansion characteristics similar to the onsite materials.

5.2.3 Site Preparation

Due to the presence of undocumented fill, the loose and non-uniform nature of the upper alluvial soils, and the necessary demolition of existing structures and utilities in the northwest portion of the site, it is recommended that the upper site soils be removed beneath the planned building footprints to a depth of at least four (4) feet below existing grade, or to a depth of two (2) foot below the base of the new foundations, whichever is greater. The lateral extent of this recommended over-excavation should extend at least five (5) feet beyond the building or foundation limits. Removal bottoms should expose relatively uniform native soils that are not adversely porous and have a minimum in-place relative compaction of at least 85 percent. All removal bottoms should be observed by a representative of GeoTek.

Following site clearing operations, over-excavation and lowering of site grades, where necessary, it is recommended that the exposed subgrade soils beneath all surface improvements be proof rolled with a heavy rubber-tired piece of construction equipment approved by and in the presence of the geotechnical engineering representative. The proof rolling equipment should include at least 4 passes, two in each perpendicular direction. All soil that ruts or excessively deflects during proof rolling should be removed as recommended by the GeoTek representative. All proof rolling operations should be observed by a representative of GeoTek.

Following proof rolling and removal of any unsuitable bearing soil, the exposed subgrade should be scarified to a depth of about 12 inches, be moisture conditioned to slightly above the soil's optimum moisture content and then be compacted to at least 90 percent of the soil's maximum dry density as determined by ASTM D-1557 test procedures.

5.2.4 Engineered Fill

The on-site soils are generally considered suitable for reuse as engineered fill provided they are free from vegetation, debris, oversized materials (~6 inches) and other deleterious material. All areas should be brought to final subgrade elevations with fill materials that are placed and compacted in general accordance with minimum project standards. Engineered fill should be placed in 6-to-8-inch loose lifts, moisture conditioned to about two percent above the optimum moisture content and compacted to a minimum relative compaction of 90 percent as determined by ASTM D-1557 test procedures.

If wet soils are encountered during remedial grading, methods for drying soils such as stockpiling or mixing with dry soils may be required to bring the soils to the required moisture content for placement as engineered fill. Placement of engineered fill should be observed and tested on a full-time basis by a GeoTek representative during grading activities.

5.2.5 Transition Lot Condition

Building pads graded with a cut/fill transition should be undercut to reduce the potential for differential settlement. The cut portion of the cut/fill transition should be undercut to a depth of at least 3 feet from proposed finish pad grade, or 2 feet below the bottom of any new foundation, and be backfilled with a properly compacted engineered fill. The bottom of the undercut should be sloped at a minimum of 1 percent toward the adjacent street/parking lot area.

5.2.6 Oversized Rock Disposal

Although unlikely, oversized cobbles, boulders, rock fragments and concrete debris may be encountered during rough grading and utility trench operations. If encountered, on-site

disposal of oversized materials is possible, provided the oversized materials are placed as recommended on Plate 4 within Appendix C. Alternatively, over-sized materials can be exported from the site.

5.2.7 Excavation Characteristics

Excavations in the on-site younger alluvium should be readily accomplished with heavy-duty earthmoving or excavating equipment in good operating condition. All excavations should be performed in accordance with current Cal-OSHA requirements.

5.2.8 Trench Excavations and Backfill

Temporary trench excavations within the on-site materials should be stable at a 1:1 inclination for short durations during construction and where cuts do not exceed 15 feet in height. Deeper temporary excavations should be reviewed by GeoTek prior to their planned excavation to determine if supplemental recommendations or analysis are warranted. It is anticipated that temporary cuts to a maximum height of 4 feet can be excavated vertically.

Trench excavations should conform to Cal-OSHA regulations. The contractor should have a competent person, per OSHA requirements, on site during construction to observe conditions and to make the appropriate recommendations.

Utility trench backfill should be compacted to at least 90 percent relative compaction (as determined by ASTM D-1557 test procedures). Under-slab trenches should also be compacted to project specifications. Where applicable, based on jurisdictional requirements, the top 12 inches of backfill below subgrade for road pavements should be compacted to at least 95 percent relative compaction. On-site materials may not be suitable for use as bedding material but should be suitable as backfill provided particles larger than 6 inches are removed.

Compaction should be achieved with a mechanical compaction device. Ponding or jetting of trench backfill is not recommended. If backfill soils have dried out, they should be properly moisture conditioned prior to placement in trenches.

5.2.9 Shrinkage and Bulking

For planning purposes, a shrinkage loss of about 10 to 15 percent is anticipated for excavations within the alluvium at the site. Several factors will impact earthwork balancing on the site, including shrinkage, trench spoil from utilities and footing excavations, as well as the accuracy of topography. Shrinkage and bulking are primarily dependent upon the degree of compactive effort achieved during construction, depth of fill and underlying site conditions. Site balance areas should be available in order to adjust project grades, depending on actual field conditions at the conclusion of earthwork construction.

A subsidence loss of up to about 0.2 foot is estimated for the site.

5.2.10 Grading Plan Review

Upon completion of the site grading plans, it is recommended that those plans be provided to GeoTek for review. Based on that review, some modifications to the recommendations provided in this report may be necessary.

5.3 DESIGN RECOMMENDATIONS

5.3.1 Foundation Design Criteria

Foundation design criteria for a conventional foundation system, in general conformance with the 2019 CBC, are presented herein. These are typical design criteria and are not intended to supersede the design by the structural engineer.

Based on the expansion index testing performed for this report and visual examination of the site soils, site soils possess a "very low" (0-20) expansion potential (ASTM D4829). Therefore, it is GeoTek's opinion that conventional foundations supported by engineered fill may be used for this site.

A summary of GeoTek's preliminary foundation design recommendations is presented in the table below:

Design Parameter	"Very Low" Expansion Potential (0≤EI≤20)
Foundation Depth or Minimum Perimeter Beam Depth (inches below lowest adjacent grade)	12-One Story
Minimum Foundation Width (Inches)*	12-1 Story
Minimum Slab Thickness (actual)	4 inches
Minimum Slab Reinforcing	6" x 6" – W1.4 / W1.4 welded wire fabric or No. 3 bars at 24-inch centers, placed in the middle of the slab
Minimum Footing Reinforcement	Two No. 4 Reinforcing Bars, one top and one bottom
Presaturation of Subgrade Soil (Percent of Optimum)	Minimum 100% to a depth of 12 inches

*Code minimums per Table 1809.7 of the 2019 CBC need to be complied with.

It should be noted that the criteria provided are based on soil support characteristics only. The structural engineer should design the slab and beam reinforcement based on actual loading conditions.

The following criteria for design of foundations are preliminary and should be re-evaluated based on the results additional laboratory testing of samples obtained at/near finish pad grade.

5.3.1.1 An allowable bearing capacity of 2,500 pounds per square foot (psf) may be used for design of continuous and perimeter footings 12 inches deep and 12 inches wide, and pad footings 24 inches square and 12 inches deep. This allowable soil bearing capacity may be increased by 600 psf for each additional foot of footing depth and 400 psf for each additional foot of footing width to a maximum value of 3,500 psf. An increase of one-third may be applied when considering short-term live loads (e.g., seismic and wind loads).

5.3.1.2 Structural foundations should be designed in accordance with the 2019 CBC, and to withstand a total static settlement of 1 inch and maximum differential static settlement of one-half of the total settlement over a horizontal distance of 40 feet.

5.3.1.3 The passive earth pressure may be computed as an equivalent fluid having a density of 375 psf per foot of depth, to a maximum earth pressure of 3,750 psf for footings founded on engineered fill or competent native soil. A coefficient of friction between soil and concrete of 0.40 may be used with dead load forces. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third. The upper one foot of soil should be ignored in the passive pressure calculations unless the surface is covered with pavements.

5.3.1.4 A grade beam, a minimum of 12 inches wide and 12 inches deep, should be utilized across large entrances. The base of the grade beam should be at the same elevation as the bottom of the adjoining footings.

5.3.1.5 A moisture and vapor retarding system should be placed below slabs-on-grade where moisture migration through the slab is undesirable. Guidelines for these are provided in the 2019 California Green Building Standards Code (CALGreen) Section 4.505.2, the 2019 CBC Section 1907.1 and ACI 360R-10. The vapor retarder design and construction should also meet the requirements of ASTM E 1643. A portion of the vapor retarder design should be the implementation of a moisture vapor retardant membrane.

It should be realized that the effectiveness of the vapor retarding membrane can be adversely impacted as a result of construction related punctures (e.g., stake penetrations, tears, punctures from walking on the vapor retarder placed atop the underlying aggregate layer, etc.). These occurrences should be limited as much as possible during construction. Thicker membranes are generally more resistant to accidental puncture than thinner ones. Products specifically designed for use as moisture/vapor retarders may also be more puncture resistant. Although the CBC specifies a 6-mil vapor retarder membrane, it is GeoTek's opinion that a minimum 10 mil thick membrane with joints properly overlapped and sealed should be considered, unless otherwise specified by the slab design professional. The membrane should consist of Stego wrap or the equivalent.

Moisture and vapor retarding systems are intended to provide a certain level of resistance to vapor and moisture transmission through the concrete, but do not eliminate it. The acceptable level of moisture transmission through the slab is to a large extent based on the type of flooring used and environmental conditions. Ultimately, the vapor retarding system should be comprised of suitable elements to limited migration of water and reduce transmission of water vapor through the slab to acceptable levels. The selected elements should have suitable properties (i.e., thickness, composition, strength, and permeability) to achieve the desired performance level.

Moisture retarders can reduce, but not eliminate, moisture vapor rise from the underlying soils up through the slab. Moisture retarder systems should be designed and constructed in accordance with applicable American Concrete Institute, Portland Cement Association, Post-Tensioning Concrete Institute, ASTM and California Building Code requirements and guidelines.

GeoTek recommends that a qualified person, such as the flooring contractor, structural engineer, architect, and/or other experts specializing in moisture control within the building be consulted to evaluate the general and specific moisture and

vapor transmission paths and associated potential impact on the proposed construction. That person (or persons) should provide recommendations relative to the slab moisture and vapor retarder systems and for migration of potential adverse impact of moisture vapor transmission on various components of the structures, as deemed appropriate.

In addition, the recommendations in this report and GeoTek's services in general are not intended to address mold prevention; since GeoTek, along with geotechnical consultants in general, do not practice in the area of mold prevention. If specific recommendations addressing potential mold issues are desired, then a professional mold prevention consultant should be contacted.

5.3.1.6 It is recommended that control joints be placed in two directions spaced approximately 30 to 36 times the thickness of the slab in inches. These joints are a widely accepted means to control cracks and should be reviewed by the project structural engineer.

5.3.2 Miscellaneous Foundation Recommendations

5.3.2.1 To reduce moisture penetration beneath the slab on grade areas, utility trench excavations should be backfilled with engineered fill, lean concrete or concrete slurry where they intercept the perimeter footing or thickened slab edge.

5.3.2.2 Soils from the footing excavations should not be placed in the slab-on-grade areas unless properly compacted and tested. The excavations should be free of loose/sloughed materials and be neatly trimmed at the time of concrete placement.

5.3.3 Foundation Setbacks

Minimum setbacks for all foundations should comply with the 2019 CBC or Town of Apple Valley requirements, whichever is more stringent. Improvements not conforming to these setbacks are subject to the increased likelihood of excessive lateral movements and/or differential settlements. If large enough, these movements can compromise the integrity of the improvements. The top outside edge of all footings should be set back a minimum of H/3 (where H is the slope height) from the face of any descending slope. The setback should be at least five feet and need not exceed 40 feet.

5.3.4 Soil Corrosivity

The soil resistivity at this site was tested in the laboratory on a sample collected during the field investigation. The results of the testing indicate that the on-site soils are considered "extremely corrosive" (737 ohm-cm) (Roberge, 2000) to buried ferrous metal in accordance with current standards used by corrosion engineers. It is recommended that a corrosion engineer be consulted to provide recommendations for the protection of buried ferrous metal at this site.

5.3.5 Soil Sulfate Content

The sulfate content was determined in the laboratory on a sample collected during the field investigation. The results indicate that the water-soluble sulfate result is less than 0.1 percent by weight, which is considered "negligible" as per Table 4.2.1 of ACI 318. Based on the test results and Table 4.3.1 of ACI 318. Based upon the test results, no special recommendations for concrete are required for this project due to soil sulfate exposure.

5.4 RETAINING AND GARDEN WALL DESIGN AND CONSTRUCTION

5.4.1.1 General Design Criteria

Recommendations presented in this report apply to typical masonry or concrete vertical retaining walls to a maximum height of up to six (6) feet. Additional review and recommendations should be requested for higher walls. These are typical design criteria and are not intended to supersede the design by the structural engineer.

Retaining wall foundations should be embedded a minimum of 18 inches into engineered fill and/or competent native soil/bedrock. Retaining wall foundations should be designed in accordance with Section 5.3 of this report. Structural needs may govern and should be evaluated by the project structural engineer.

All earth retention structure plans, as applicable, should be reviewed by this office prior to finalization.

Earthwork considerations, site clearing and remedial earthwork for all earth retention structures should meet the requirements of this report, unless specifically provided otherwise, or more stringent requirements or recommendations are made by the designer. The backfill material placement for all earth retention structures should meet the requirement of Section 5.2.4 in this report.

In general, cantilever earth retention structures, which are designed to yield at least 0.001H, where H is equal to the height of the earth retention structure, may be designed using the "active" condition. Rigid earth retention structures (including but not limited to rigid walls, and walls braced at top, such as typical basement walls) should be designed using the "at-rest" condition.

In addition to the design lateral forces due to retained earth, surcharges due to improvements, such as an adjacent building or traffic loading, should be considered in the design of the earth retention structures. Loads applied within a 1:1 (horizontal:vertical) projection from the surcharge on the stem of the earth retention structure should be considered in the design.

Final selection of the appropriate design parameters should be made by the designer of the earth retention structures.

5.4.1.2 Cantilevered Walls

The recommendations presented below are for cantilevered retaining walls up to six (6) feet high. Active earth pressure may be used for retaining wall design, provided the top of the wall is not restrained from minor deflections. An equivalent fluid pressure approach may be used to compute the horizontal pressure against the wall. Appropriate fluid unit weights are given below for specific slope gradients of the retained material. These do not include other superimposed loading conditions such as traffic, structures, seismic events, or adverse geologic conditions.

ACTIVE EARTH PRESSURES	
Surface Slope of Retained Materials (horizontal : vertical)	Equivalent Fluid Pressure (pcf) Select Backfill* and Native Soils
Level	40
2:1	60

*The design pressures assume the backfill material has an expansion index less than or equal to 20. Backfill zone includes area between back of the wall to a plane (1:1 horizontal : vertical) up from bottom of the wall foundation (on the backside of the wall) to the ground surface.

For walls with a retained height greater than 6 feet, an incremental seismic pressure should be included into the wall design. Where needed, it is recommended that an equivalent fluid

pressure of 16 pcf be included into the wall design to account for seismic loading conditions. This pressure may be applied as a triangular distribution.

5.4.1.3 Retaining Wall Backfill and Drainage

The wall backfill should also include a minimum one (1) foot wide section of ¾- to 1-inch clean crushed rock (or an approved equivalent). The rock should be placed immediately adjacent to the back of the wall and extend up from a back drain to within approximately 30 inches of the finish grade. The upper 30 inches should consist of compacted on-site materials. The rock should be separated from the earth with filter fabric. The presence of other materials might necessitate revision to the parameters provided and modification of the wall designs. The backfill materials should be placed in lifts no greater than eight (8) inches in thickness and compacted to a minimum of 90% relative compaction as determined by ASTM D 1557 test procedures. Proper surface drainage needs to be provided and maintained.

As an alternative to the drain, rock and fabric, a pre-manufactured wall drainage product (example: Mira Drain 6000 or approved equivalent) may be used behind the retaining wall. The wall drainage product should extend from the base of the wall to within two (2) feet of the ground surface. The subdrain should be placed in direct contact with the wall drainage product.

Retaining walls should be provided with an adequate pipe and gravel back drain system to help prevent buildup of hydrostatic pressures. Backdrains should consist of a four (4)-inch diameter perforated collector pipe (Schedule 40, SDR 35, or approved equivalent) embedded in a minimum of one (1) cubic foot per linear foot of ¾- to 1-inch clean crushed rock or an approved equivalent, wrapped in filter fabric (Mirafi 140N or an approved equivalent). The drain system should be connected to a suitable outlet. Waterproofing of site walls should be performed where moisture migration through the walls is undesirable.

5.4.1.4 Restrained Retaining Walls

Retaining walls that will be restrained at the top that support level backfill or that have reentrant or male corners, should be designed for an equivalent at-rest fluid pressure of 60 pcf, plus any applicable surcharge loading. For areas of male or reentrant corners, the restrained wall design should extend a minimum distance of twice the height of the wall laterally from the corner, or a distance otherwise determined by the project structural engineer.

5.4.1.5 Other Design Considerations

- Wall design should consider the additional surcharge loads from superjacent slopes and/or footings, where appropriate.
- No backfill should be placed against concrete until minimum design strengths are evident by compression tests of cylinders.
- The retaining wall footing excavations, backcuts, and backfill materials should be approved by the project geotechnical engineer or their authorized representative.
- Positive separations should be provided in garden walls at horizontal distances not exceeding 20 feet.

5.5 PRELIMINARY PAVEMENT DESIGN RECOMMENDATIONS

5.5.1 Asphaltic Concrete Pavement

Although planned final grades beneath the proposed parking, access roads and adjacent street improvements within the site are not yet known, the following preliminary pavement design recommendations are based on assumed Traffic Indexes of 5.0 for car parking areas, 6.0 for access drives and 8.0 for Rancherias Road. The Traffic Index for California Highway 18 needs to be provided by Caltrans. Preliminary pavement thickness design is based on the CalTrans Highway Design Manual (2018). An R-value of 50 was assumed for the determination of preliminary pavement sections for this report. Once the traffic loading information becomes more defined, revision to the pavement design recommendations may be warranted. It is recommended that the final pavement design be based on R-value testing of the as-graded subgrade soils within the pavement areas.

Based on the assumptions noted above, the following preliminary pavement recommendations are provided for the site:

PRELIMINARY MINIMUM PAVEMENT SECTION		
Traffic Index	Thickness of Asphalt Concrete (inches)	Thickness of Aggregate Base (inches)
5.0 (Car Parking Areas)	3	4
6.0 (Automobile Access Lanes)	4	4
8.0 (Rancherias Road)	4	7

Traffic Indices (TIs) used in the pavement design should provide a pavement life of approximately 20 years with a normal amount of flexible pavement maintenance. Irrigation adjacent to pavements, without a deep curb or other cutoff to separate landscaping from the paving may result in premature pavement failure. Traffic parameters used for design were selected based upon engineering judgment and not upon information furnished to us such as an equivalent wheel load analysis or a traffic study.

All base material and the upper 12 inches of subgrade should be compacted to at least 95 percent of the material's maximum dry density as determined by ASTM D 1557 test procedures. All materials and methods of construction should conform to the requirements of the Town of Apple Valley.

5.5.2 Permeable Interlocking Concrete Pavers

Interlocking concrete pavers can be used for this project. The pavers are assumed to be approximately 3.2 inches (80 millimeters) in thickness. Concrete pavers should be underlain by 1.0 inch to 1.5 inches of bedding sand overlying four inches of aggregate base founded on compacted subgrade soils. The aggregate base should be compacted to at least 95 percent of maximum dry density as determined by ASTM D 1557 test procedures.

Where possible, the aggregate base should extend beyond the perimeter of the pavers a minimum distance of four inches.

The bedding sand should be placed and lightly moistened and compacted. Since this compaction cannot be tested it should be observed by a representative of this firm.

Historically, paver systems have experienced failures in areas where water has degraded the support characteristics of the underlying base and/or subgrade soils. Since paver systems are permeable and allow transmission of water into the underlying materials, it may be prudent to discuss with the paver designer/manufacturer what methods may be employed to address the issue of potential water introduction into the underlying materials. Underdrain systems, local subgrade reinforcement, or additional structural elements such as geotextiles can be considered, particularly in high traffic areas and/or low areas where water will tend to collect. The recommendations of the designer/manufacturer should then be implemented into the design and construction of the paver system.

5.5.3 Portland Cement Concrete (PCC) Pavement

For the proposed vehicle parking and access lanes, it is recommended that a minimum of 4 inches of PCC pavement over 4 inches of aggregate base over 12 inches subgrade compacted to at least 95 percent of maximum dry density as determined by ASTM D 1557 test procedures be utilized. For vehicle service lanes, it is recommended that a minimum of 6 inches of PCC pavement over 4 inches of aggregate base over 12 inches subgrade compacted to at least 95 percent of maximum dry density be utilized. This section should also be used in heavy truck traffic areas such as loading docks, fire lanes, and trash dumpster pads and approaches.

Requirements of Section 90 of Caltrans Standard Specifications, and various ACI and ASTM standards regarding mixing and placing concrete should be followed. The PCC pavement should have a minimum modulus of rupture of 500 pounds per square inch, and a minimum 28-day compressive strength of 4,000 pounds per square inch. Concrete should incorporate 1-inch maximum size aggregate and should be proportioned to achieve a maximum slump of four inches. Instead of increasing the water content, a plasticizing admixture may be utilized to increase the workability of the concrete. The concrete should be properly cured after placement. Concrete should not be placed during hot and windy weather.

Crack control joints should be provided in the transverse direction spaced at horizontal intervals ranging from 24 to 36 times the thickness of the concrete.

5.5.4 Pavement Construction

All pavement installation, including preparation and compaction of subgrade, compaction of base material, placement and rolling of asphaltic concrete should be done in accordance with the Town of Apple Valley specifications, and under the observation and testing of GeoTek and a Town Inspector where required. Jurisdictional minimum compaction requirements in excess of the aforementioned minimums may govern.

Deleterious material, excessive wet or dry pockets, oversized rock fragments, and other unsuitable yielding materials encountered during grading should be removed. Once existing compacted fill are brought to the proposed pavement subgrade elevations, the subgrade should be proof rolled in order to check for a uniform and unyielding surface. The upper 12 inches of pavement subgrade soils should be scarified, moisture conditioned at or near optimum moisture content, and recompacted to at least 95 percent of the maximum dry density as determined by ASTM D1557 test procedures. If loose or yielding materials are encountered during construction, additional evaluation of these areas should be carried out by GeoTek. All pavement section changes should be properly transitioned.

All base material and the upper 12 inches of subgrade should be compacted to at least 95 percent of the material's maximum dry density as determined by ASTM D 1557 test procedures. All materials and methods of construction should conform to the requirements of the Town of Apple Valley.

5.6 CONCRETE CONSTRUCTION

5.6.1 General

Concrete construction should follow the 2019 CBC and ACI guidelines regarding design, mix placement and curing of the concrete. If desired, GeoTek could provide quality control testing of the concrete during construction.

5.6.2 Concrete Mix Design

As discussed in Section 5.3.5, no special recommendations for concrete are required for this project due to soil sulfate exposure. Additional testing should be performed during grading so that specific recommendations can be formulated based on the as-graded conditions.

5.6.3 Concrete Flatwork

Exterior concrete flatwork is often one of the most visible aspects of site development. They are typically given the least level of quality control, being considered "non-structural" components. Cracking of these features is common due to various factors. While cracking usually does not affect the structural performance of the concrete, it is unsightly. It is recommended that the same standards of care be applied to these features as to the structure itself.

Flatwork should consist of a minimum four-inch (actual) thick concrete and the use of temperature and shrinkage control reinforcement is suggested. The project structural engineer should provide final design recommendations.

5.6.4 Concrete Performance

Concrete cracks should be expected. These cracks can vary from sizes that are hairline to more than 1/8 inch in width. Most cracks in concrete while unsightly do not significantly impact long-term performance. While it is possible to take measures (proper concrete mix, placement, curing, control joints, etc.) to reduce the extent and size of cracks that occur, some cracking will occur despite the best efforts to minimize it. Concrete undergoes chemical processes that are dependent on a wide range of variables, which are difficult, at best, to control. Concrete, while seemingly a stable material, is subject to internal expansion and contraction due to external changes over time.

One of the simplest means to control cracking is to provide weakened control joints for cracking to occur along. These do not prevent cracks from developing; they simply provide a relief point for the stresses that develop. These joints are a widely accepted means to control cracks but are not always effective. Control joints are more effective the more closely spaced they are. GeoTek suggests that control joints be placed in two orthogonal directions and located a distance apart approximately equal to 30 to 36 times the slab thickness.

5.7 PLAN REVIEW AND CONSTRUCTION OBSERVATIONS

It is recommended that site grading, specifications, and foundation plans be reviewed by this office prior to construction to check for conformance with the recommendations of this report. It is also recommended that GeoTek representatives be present during site grading and foundation construction to observe and document for proper implementation of the geotechnical recommendations. The owner/developer should have GeoTek perform at least the following duties:

- Observe site clearing and grubbing operations for proper removal of all unsuitable materials.
- Observe and test bottom of removals prior to fill placement.
- Evaluate the suitability of on-site and import materials for fill placement and collect soil samples for laboratory testing where necessary.
- Observe the fill for uniformity during placement, including utility trench excavation backfill. Also, test the fill for density, relative compaction and moisture content.
- Observe and probe foundation excavations to confirm suitability of bearing materials with respect to density.

If requested, a construction observation and compaction report can be provided by GeoTek which can comply with the requirements of the governmental agencies having jurisdiction over the project. It is recommended that these agencies be notified prior to commencement of construction so that necessary grading permits can be obtained.

6. INTENT

It is the intent of this report to aid in the design and construction of the proposed development. Implementation of the advice presented in this report is intended to reduce risk

associated with construction projects. The professional opinions and geotechnical advice contained in this report are not intended to imply total performance of the project or guarantee that unusual or variable conditions will not be discovered during or after construction.

The scope of this evaluation is limited to the area explored that is shown on the Boring and Infiltration Test Location Map (Figure 2). This evaluation does not and should in no way be construed to encompass any areas beyond the specific area of the proposed construction as indicated to GeoTek by the client. Further, no evaluation of any existing site improvements is included. The scope is based on GeoTek's understanding of the project and the client's needs, GeoTek's proposal (Proposal No. P-0602122-CR) dated June 6, 2022 and geotechnical engineering standards normally used on similar projects in this region.

7. LIMITATIONS

GeoTek's findings are based on site conditions observed and the stated sources. Thus, GeoTek's comments are professional opinions that are limited to the extent of the available data.

GeoTek has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering at this time and location and science professions currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report.

Since GeoTek's recommendations are based on the site conditions observed and encountered at the stated times and laboratory testing. Thus, GeoTek's conclusions and recommendations are professional opinions that are limited to the extent of the available data. Observations during construction are important to allow for any change in recommendations found to be warranted. These opinions have been derived in accordance with current standards of practice and no warranty of any kind is expressed or implied. Standards of care/practice are subject to change with time.

8. SELECTED REFERENCES

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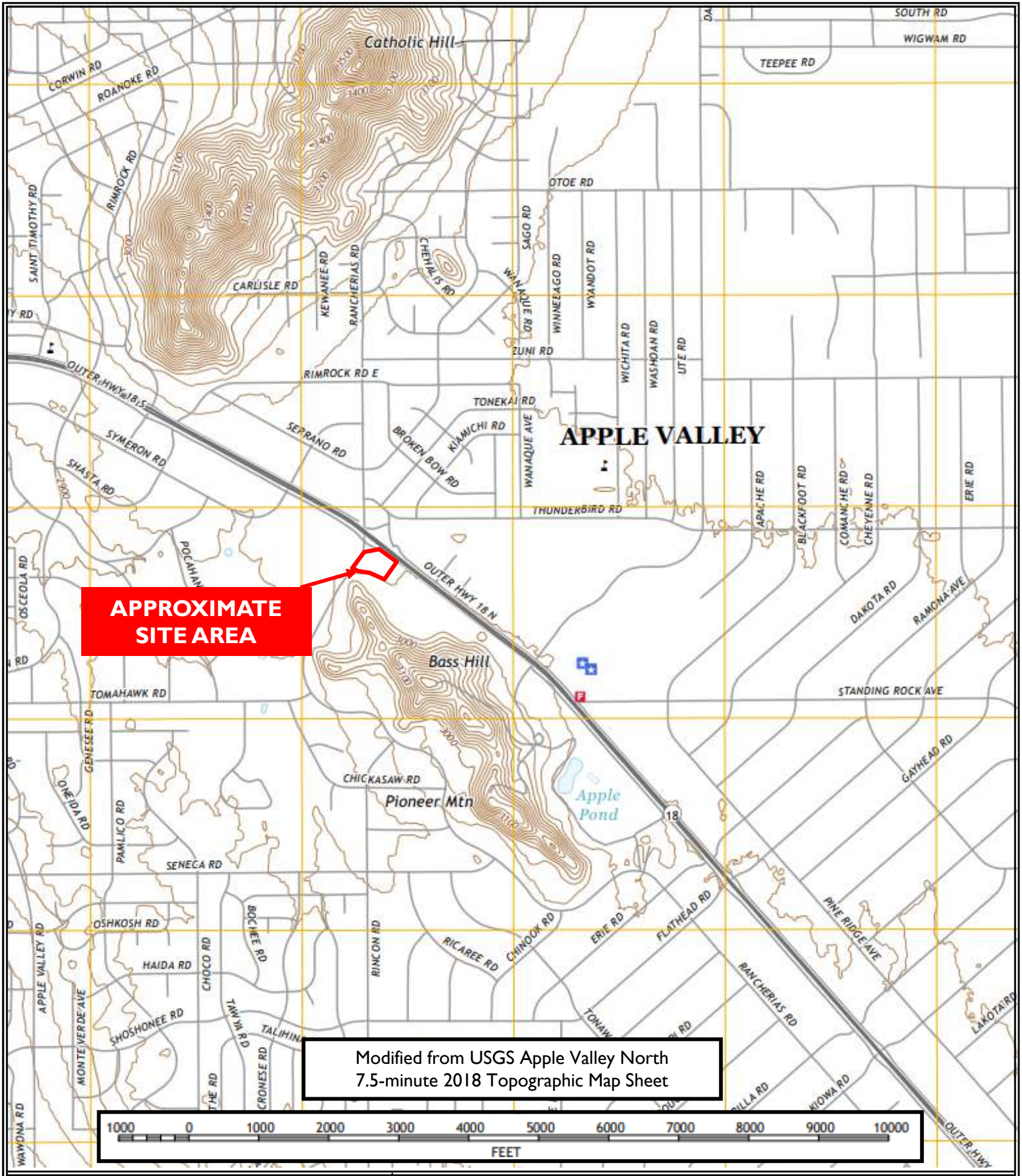
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Avant Real Estate
Apple Valley Retail/Commercial Center
Apple Valley, San Bernardino County, California

GeoTek Project No. 3275-CR

Figure 1

Site Location and Topography Map

GEOTEK



Avant Real Estate
Apple Valley Retail/Commercial Center
Apple Valley, San Bernardino County, California

GeoTek Project No. **3275-CR**

Scale As Shown

NORTH

Figure 2

Boring and Infiltration Test Location Map

GEOTEK

APPENDIX A

LOG OF EXPLORATORY BORINGS

Proposed Retail/Commercial Development
California State Highway 18 and Rancherias Road
Apple Valley, San Bernardino County, California
Project No. 3275-CR

GEOTEK

A - FIELD TESTING AND SAMPLING PROCEDURES

The Modified Split-Barrel Sampler (Ring)

The Ring sampler is driven into the ground at various depths in accordance with ASTM D 3550 test procedures. The sampler, with an external diameter of 3.0 inches, is lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sampler is typically driven into the ground 12 or 18 inches with a 140-pound hammer free falling from a height of 30 inches. Blow counts are recorded for every 6 inches of penetration as indicated on the log of boring. The samples are removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Sampler

Standard penetration tests (SPT) were performed with a 2.0-inch outside diameter, 1.5-inch inside diameter, split-barrel sampler. The sampler was 18 inches long. The inside diameter of the sampler shoe was 1.4 inches. The sampler was unlined. The sampler conformed to the requirements of ASTM D 1586. A 140-pound automatic trip hammer was utilized, dropping 30 inches for each blow. Blow counts are recorded for every 6 inches of penetration as indicated on the log of boring. Disturbed samples are removed from the sample barrel, sealed in a plastic bag, and transported to the laboratory for testing.

Bulk Samples (Large)

These samples are normally large bags of earth materials over 20 pounds in weight collected from the field by means of hand digging or exploratory cuttings.

Bulk Samples (Small)

These are plastic bag samples which are normally airtight and contain less than 5 pounds in weight of earth materials collected from the field by means of hand digging or exploratory cuttings. These samples are primarily used for determining natural moisture content and classification indices.

B - BORING LOG LEGEND

The following abbreviations and symbols often appear in the classification and description of soil and rock on the log of borings:

SOILS

USCS	Unified Soil Classification System
f-c	Fine to coarse
f-m	Fine to medium

GEOLOGIC

B: Attitudes	Bedding: strike/dip
J: Attitudes	Joint: strike/dip
C: Contact line	
……..	Dashed line denotes USCS material change
———	Solid Line denotes unit / formational change
———	Thick solid line denotes end of boring

(Additional denotations and symbols are provided on the boring log)

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Avant Real Estate	**DRILLER:**	2R Drilling	**LOGGED BY:**	CBT
PROJECT NAME:	Apple Valley Retail/Commercial Center	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jaime
PROJECT NO.:	3275-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Apple Valley, CA			**DATE:**	8/8/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	Boring No.: B-1 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
0					**Undocumented Fill:**			
				SM	Silty f-c SAND, light brown, slightly moist, trace organics, some gravel			
		7	R1		**Alluvium:**			
		23		SM	Silty f-c SAND, brown, slightly moist, dense, few gravel	7.9	110.8	Collapse
		30						MD, EI, SH
								Expansion Index = 7
		18	R2		Silty f-c SAND, light brown, slightly moist, dense, few gravel			
		23				10.9	125.6	
5		39						
		12	R3		Silty f-m SAND, gray brown, slightly moist, dense, trace gravel			
		21						
		39						
10		18	R4		Silty f-c SAND, brown, slightly moist, dense, few gravel, trace clay			
		31				11.2	117.3	
		40						
15		35	R5		Silty f-c SAND, gray brown, slightly moist, very dense, trace gravel	3.7	126.6	
		50/5"						
					BORING TERMINATED AT 16 FEET			
					No groundwater encountered			
					Boring backfilled with soil cuttings			
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Avant Real Estate	**DRILLER:**	2R Drilling	**LOGGED BY:**	CBT
PROJECT NAME:	Apple Valley Retail/Commercial Center	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jaime
PROJECT NO.:	3275-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Apple Valley, CA			**DATE:**	8/8/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	**Boring No.: B-2** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
0				SM	**Undocumented Fill:** Silty f-c SAND, light brown, slightly moist, trace organics, some gravel			
		29 50/3"	R1	SM	**Alluvium:** Silty f-m SAND, light brown, slightly moist, very dense, trace gravel	7.2	112.4	
5		14 32 50/2"	R2	SM/ML	Silty f-m SAND to sandy SILT, light brown, slightly moist, very dense to hard, trace gravel	13.8	113.9	
10		30 50/2"	R3	SM	Silty f-c SAND, gray brown, slightly moist, very dense, few gravel			
15		15 36 50/4"	R4		Silty f-c SAND, brown, slightly moist, very dense, few gravel	5.3	118.1	
					BORING TERMINATED AT 16.5 FEET No groundwater encountered Boring backfilled with soil cuttings			
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Avant Real Estate	**DRILLER:**	2R Drilling	**LOGGED BY:**	CBT
PROJECT NAME:	Apple Valley Retail/Commercial Center	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jaime
PROJECT NO.:	3275-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Apple Valley, CA			**DATE:**	8/8/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	Boring No.: B-3 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
0				SM	**Udocumented Fill:** Silty f-c SAND, light brown, slightly moist, trace organics, some gravel			
		12 18 31	R1	SM	**Alluvium:** Silty f SAND, brown, slightly moist, dense, little gravel	5.7	114.2	Collapse
5		14	R2	SM/ML	@6' Silty f SAND to sandy SILT, light brown, slightly moist, dense, trace gravel			
		50/5"		SM	@6.5' Silty f-c SAND, light brown, slightly moist, dense, trace gravel	114.2	7.8	Corrosion Tests
		29 29 50/5"	R3		Silty f-c SAND, light brown, slightly moist, dense, trace gravel	109.3	8.6	
10		24 45 50/3"	R4		Silty f-c SAND, brown, slightly moist, very dense, few gravel			
15		17 28 37	R5		Silty f-c SAND, brown, slightly moist, very dense, few gravel, trace clay	113.5	9.6	
					BORING TERMINATED AT 16.5 FEET No groundwater encountered Boring backfilled with soil cuttings			
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Avant Real Estate	**DRILLER:**	2R Drilling	**LOGGED BY:**	CBT
PROJECT NAME:	Apple Valley Retail/Commercial Center	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jaime
PROJECT NO.:	3275-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Apple Valley, CA			**DATE:**	8/8/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	Boring No.: B-4 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
0				SM	**Undocumented Fill** Silty f-c SAND, light brown, slightly moist, trace organics, some gravel			
		9 33 45	R1	SM	**Alluvium:** Silty f-c SAND, brown, slightly moist, very dense, little gravel	9.5	111.9	
5		44 44 50/4"	R2		Silty f SAND, light brown, slightly moist, very dense, trace gravel	5.0	114.3	
10		50 50/3"	R3		@9' Silty f SAND, light brown, slightly moist, very dense, trace gravel @9.5' Silty f-c SAND, brown, slightly moist, very dense, few gravel			
		18 44 42	R4		Silty f-c SAND, light brown, slightly moist, very dense, trace gravel	10.6	113.8	
15		23 50/2"	R5		Silty f-c SAND, light brown, slightly moist, very dense, trace gravel			
					BORING TERMINATED AT 16 FEET No groundwater encountered Boring backfilled with soil cuttings			
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Avant Real Estate	**DRILLER:**	2R Drilling	**LOGGED BY:**	CBT
PROJECT NAME:	Apple Valley Retail/Commercial Center	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jaime
PROJECT NO.:	3275-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Apple Valley, CA			**DATE:**	8/8/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	**Boring No.: B-5** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
0				SM	**Undocumented FIll:** Silty f-c SAND, light brown, slightly moist, trace organics, some gravel			
		14 33 33	R1	SM	**Alluvium:** Silty f-c SAND, brown, slightly moist, dense	8.0	125.6	
5		16 50/3"	R2		@5' Silty f-c SAND, brown, slightly moist, very dense @5.5' Silty f-m SAND, gray brown, slightly moist, very dense	10.1	113.2	
		34 40 42	R3		Silty f-m SAND, gray brown, slightly moist, very dense			
10		15 26 35	R4		Silty f-m SAND, gray brown, slightly moist, dense, trace gravel	7.5	113.4	
15		16 30 47	R5		Silty f-c SAND, gray brown, slightly moist, very dense, trace gravel, trace clay			
20		32 39 50	R6		Silty f-c SAND, light brown, slightly moist, very dense, trace gravel	6.7	117.4	
					BORING TERMINATED AT 21.5 FEET No groundwater encountered Boring backfilled with soil cuttings			
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Avant Real Estate	**DRILLER:**	2R Drilling	**LOGGED BY:**	CBT
PROJECT NAME:	Apple Valley Retail/Commercial Center	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jaime
PROJECT NO.:	3275-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Apple Valley, CA			**DATE:**	8/8/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	**Boring No.: B-6** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
0					**Undocumented Fill:**			
				SM	Silty f-c SAND, light brown, slightly moist, trace organics, some gravel			
		33	R1		**Alluvium:**			
		30		SM	Silty f-c SAND, dark brown, slightly moist, dense, some gravel	6.1		
		29						
		16	R2		Silty f-c SAND, dark brown, slightly moist, dense, trace gravel			
		28				9.6	126.1	
		38						
5								
		31	R3		@6' Silty f-c SAND, brown, slightly moist, very dense, trace gravel			
		50/4"			@6.5' Silty f-c SAND, light brown, slightly moist, very dense, trace gravel			
10		15	R4		Silty f-c SAND, light brown, slightly moist, dense, few gravel			
		25				13.3	110.7	Collapse
		35						
15		43	R5		Silty f-c SAND, light brown, slightly moist, very dense, few gravel			
		50/3"						
20		24	R6		Silty f-m SAND, gray brown, slightly moist, very dense, trace gravel			
		46				5.5	119.7	
		50/3"						
					BORING TERMINATED AT 21.5 FEET			
					No groundwater encountered			
					Boring backfilled with soil cuttings			
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Avant Real Estate	**DRILLER:**	2R Drilling	**LOGGED BY:**	CBT
PROJECT NAME:	Apple Valley Retail/Commercial Center	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jaime
PROJECT NO.:	3275-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Apple Valley, CA			**DATE:**	8/8/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	**Boring No.: B-7** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
0				SM	**Top Soil:** Silty f-c SAND, light brown, slightly moist, trace organics, some gravel			
		10 25 35	R1	SM	**Alluvium:** Silty f-c SAND, brown, slightly moist, dense, trace gravel	9.5	120.6	
5		29 50/3"	R2		Silty f-c SAND, brown, slightly moist, very dense, trace gravel	9.8	118.8	
		29 34 38	R3	SM/ML	Silty f SAND to sandy SILT, light brown, slightly moist, dense to hard, trace gravel	8.2	109.1	Collapse
10		14 32 50	R4		@10' Silty f SAND to sandy SILT, light brown, slightly moist, very dense to to hard, trace gravel @11' Silty f SAND to sandy SILT, brown, slightly moist, very dense to hard, trace trace gravel, trace clay	9.6	100.1	
15		40 50/2"	R5	SM	Silty f-c SAND, gray brown, slightly moist, very dense, little gravel			
20		13 17 50/5"	R6	SM/ML	@15' Silty f SAND to sandy SILT, light brown, slightly moist, dense to hard, trace gravel @21' Silty f SAND to sandy SILT, light brown, slightly moist, dense to hard, few gravel	8.5	114.8	
25		8 15 21	S1	SM	Silty f SAND, light brown, slightly moist, dense, trace gravel	4.5		
30		6 14 19	S2	SM/ML	Silty f SAND to sandy SILT, light brown, slightly moist, dense to hard, trace gravel, trace clay			

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits EI = Expansion Index SA = Sieve Analysis RV = R-Value Test

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Avant Real Estate	**DRILLER:**	2R Drilling	**LOGGED BY:**	CBT
PROJECT NAME:	Apple Valley Retail/Commercial Center	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jaime
PROJECT NO.:	3275-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Apple Valley, CA			**DATE:**	8/8/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	**Boring No.: B-7 (continued)** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
				SM/ML	Silty f SAND to sandy SILT, light brown, slightly moist, dense to hard, trace gravel, trace clay			
35		19 28 31	S3	SP	F-c SAND, light brown, slightly moist, dense, trace gravel	11.0		
40		18 21 20	S4	SM	Silty f SAND, light brown, slightly moist, dense, trace gravel			
45		22 24 30	S5		@45' Silty f-c SAND, reddish brown, slightly moist, very dense, trace gravel @45.5' Silty f-c SAND, gray brown, slightly moist, very dense, trace gravel	7.3		
50		13 38 50/4"	S6		@50' Silty f-c SAND, gray brown, slightly moist, very dense, trace gravel @50.5' Silty f-c SAND, brown, slightly moist, very dense, few gravel			
					BORING TERMINATED AT 51.5 FEET No groundwater encountered Boring backfilled with soil cuttings			

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Avant Real Estate	**DRILLER:**	2R Drilling	**LOGGED BY:**	CBT
PROJECT NAME:	Apple Valley Retail/Commercial Center	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jaime
PROJECT NO.:	3275-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Apple Valley, CA			**DATE:**	8/8/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	**Boring No.: I-1** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
0					**Undocumented Fill:**			
				SM	Silty f-c SAND, light brown, slightly moist, trace organics, some gravel			
					Alluvium:			
				SM	Silty f-c SAND, brown, slightly moist, some gravel			
					Silty f-c SAND, brown, slightly moist, few gravel			
5					**BORING TERMINATED AT 5 FEET**			
					No groundwater encountered Boring set with pipe, sock, and gravel			
10								
15								
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Avant Real Estate	**DRILLER:**	2R Drilling	**LOGGED BY:**	CBT
PROJECT NAME:	Apple Valley Retail/Commercial Center	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jaime
PROJECT NO.:	3275-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Apple Valley, CA			**DATE:**	8/8/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	**Boring No.: I-2** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
0					**Undocumented Fill:**			
				SM	Silty f-c SAND, light brown, slightly moist, trace organics, some gravel			
					Alluvium:			
				SM	Silty f-c SAND, brown, slightly moist, some gravel			
					Silty f-c SAND, brown, slightly moist, few gravel			
5					**BORING TERMINATED AT 5 FEET**			
					No groundwater encountered Boring set with pipe, sock, and gravel			
10								
15								
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

APPENDIX B

RESULTS OF LABORATORY TESTING

Proposed Retail/Commercial Development
California State Highway 18 and Rancherias Road
Apple Valley, San Bernardino County, California
Project No. 3275-CR

GEOTEK

SUMMARY OF LABORATORY TESTING

Classification

Soils were classified visually in general accordance with the Unified Soil Classification System (ASTM Test Method D 3087). The soil classifications are shown on the logs of borings in Appendix A.

Collapse Tests

Consolidation/collapse tests were performed on selected samples of the site soils in general accordance with ASTM D 4546 test procedures. The results of this test are presented graphically in Appendix B.

Direct Shear

Shear testing was performed in a direct shear machine of the strain-control type in general accordance with ASTM D 3080 test procedures. The rate of deformation was approximately 0.035 inch per minute. The samples were sheared under varying confining loads in order to determine the coulomb shear strength parameters, angle of internal friction and cohesion. The tests were performed on soil samples remolded to approximately 90 percent of maximum dry density as determined by ASTM D 1557 test procedures. The shear test results are presented graphically in Appendix B.

Expansion Index

Expansion Index testing was performed on one sample obtained during the site exploration. Testing was performed in general accordance with ASTM Test Method D 4829. The results of the testing are provided below and in Appendix B.

Boring No.	Depth (ft.)	Description	Expansion Index	Classification
B-1	0-5	Silty Sand	7	Very Low

In-Situ Moisture and Density

The natural water content of sampled soils was determined in general accordance with ASTM D 2216 test procedures on samples of the materials recovered from the subsurface exploration. In addition, in-place dry density of the sampled soils was determined in general accordance with ASTM D 2937 test procedures on relatively undisturbed samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths in Appendix A.

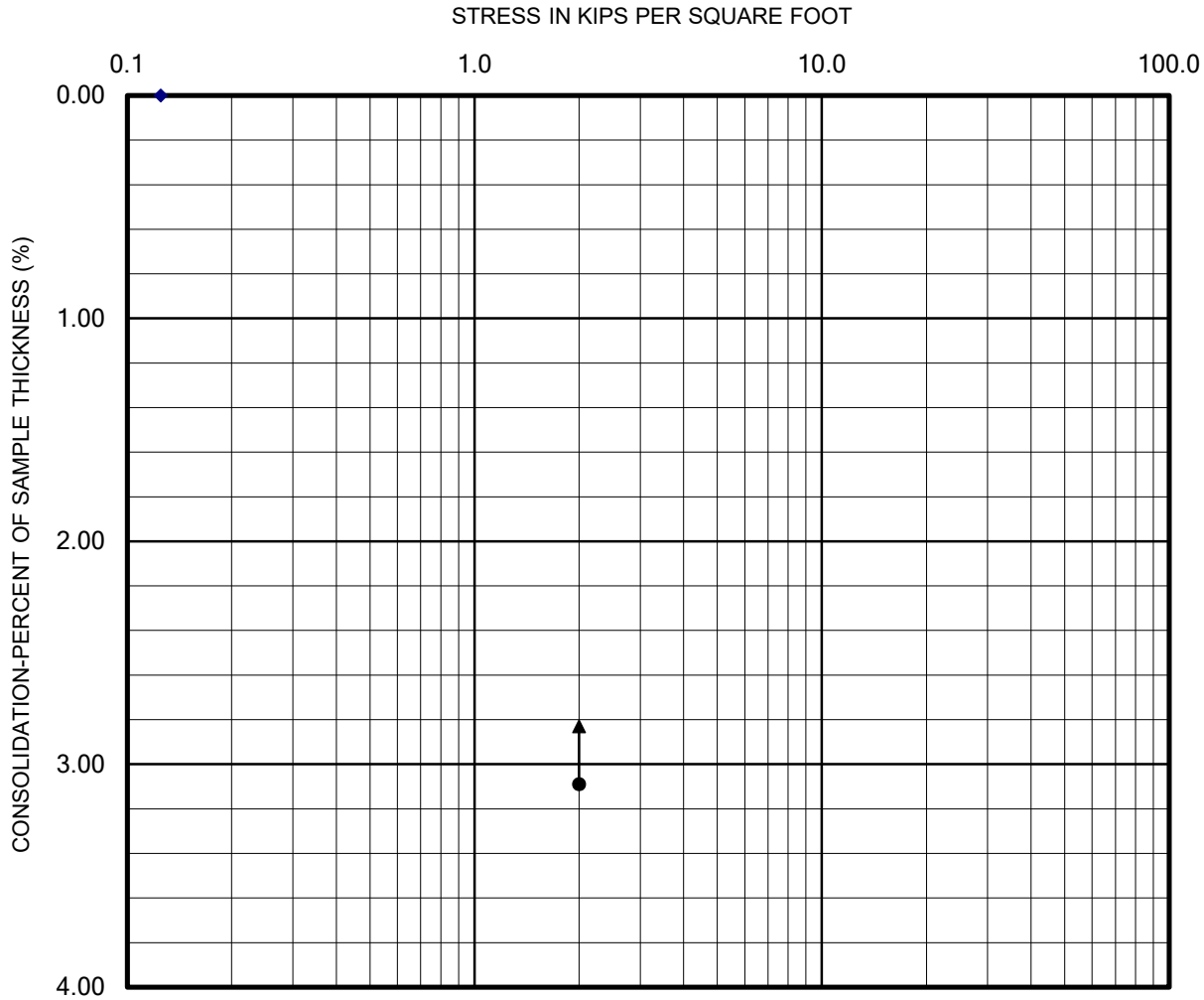
Moisture-Density Relationship

Laboratory testing was performed on one sample collected during the subsurface exploration. The laboratory maximum dry density and optimum moisture content for the soil type was determined in general accordance with test method ASTM Test Procedure D 1557. The results of the testing are presented graphically in Appendix B.

Sulfate Content, Resistivity and Chloride Content

Testing to determine the water-soluble sulfate content was performed by others in general accordance with ASTM D4327 test procedures. Resistivity testing was completed by others in general accordance with ASTM G187 test procedures. Testing to determine the chloride content was performed by others in general accordance with ASTM D4327 test procedures. The results of the testing are provided below and in Appendix B.

Boring No.	Depth (ft.)	pH ASTM D4972	Chloride ASTM D4327 (mg/kg)	Sulfate ASTM D4327 (% by weight)	Resistivity ASTM G187 (ohm-cm)
B-3	5-10	8.8	390.5	0.0245	737



Seating Cycle
Loading Prior to Inundation
Loading After Inundation
Rebound Cycle

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

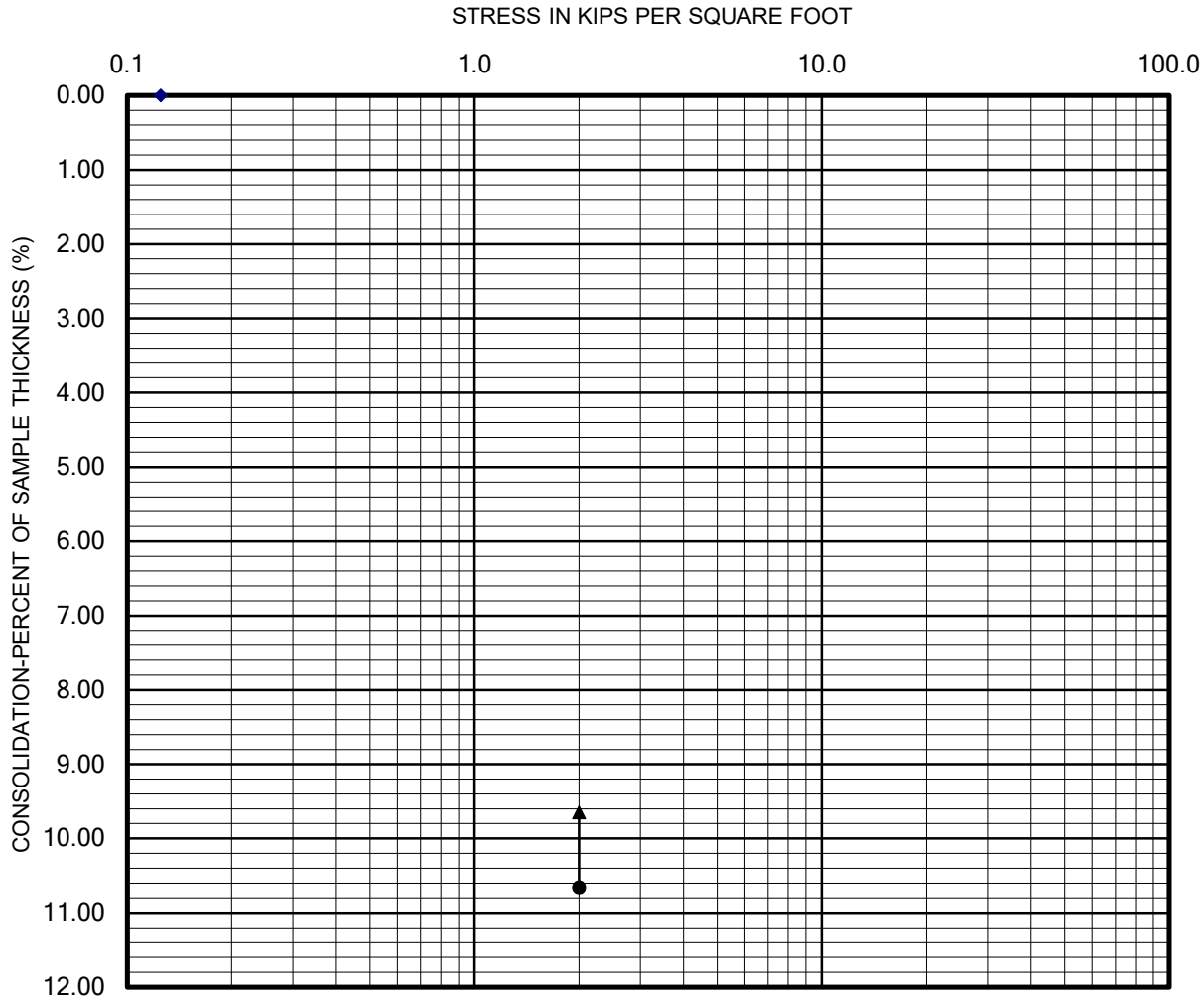
GEOTEK

CHECKED BY: DA	Lab: Corona
PROJECT NO.: 3275-CR	Date: 8/17/2022

COLLAPSE REPORT

Sample: B-1 @ 1 feet

Plate B-1



Seating Cycle
Loading Prior to Inundation
Loading After Inundation
Rebound Cycle

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

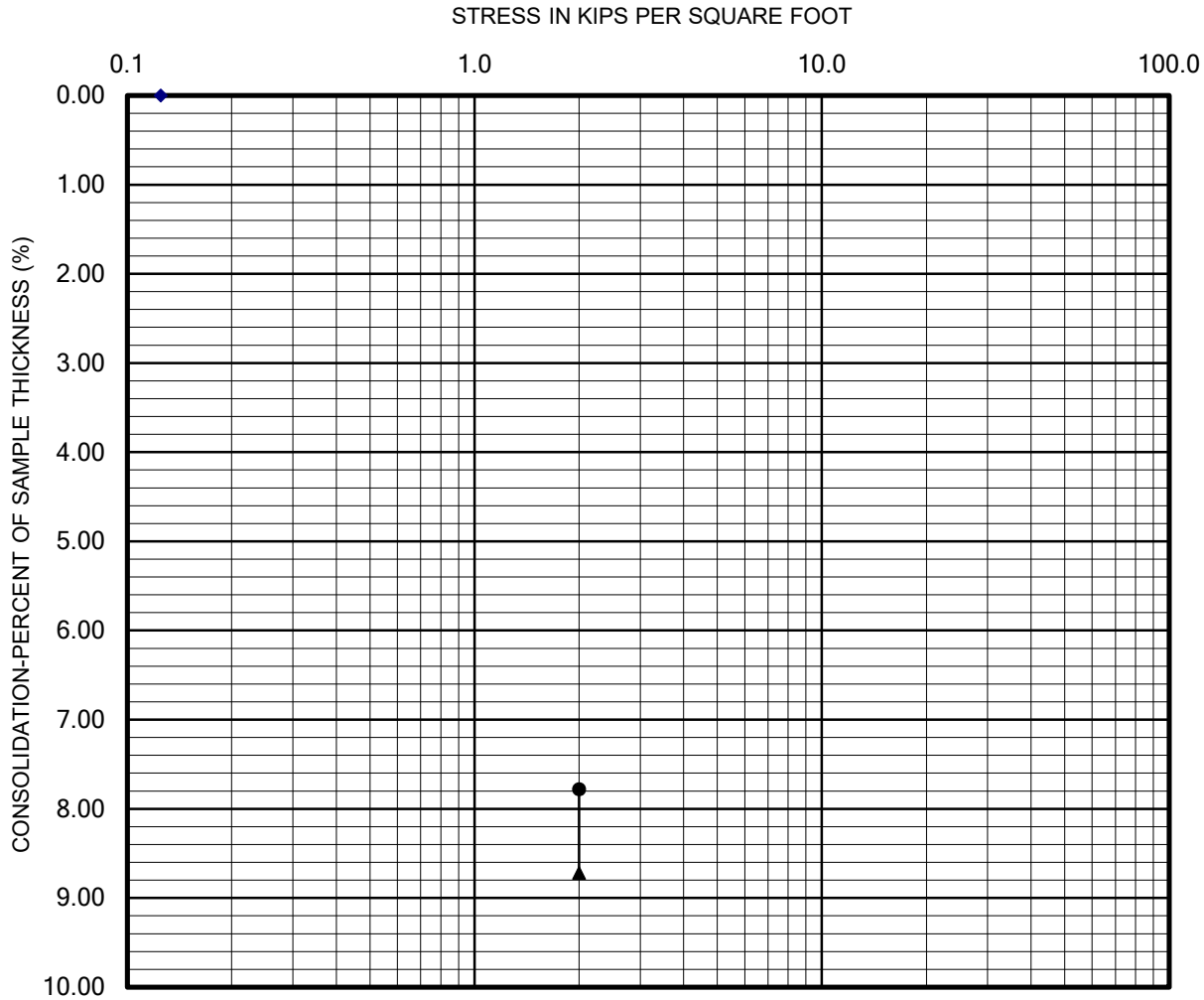
GEOTEK

CHECKED BY: DA	Lab: Corona
PROJECT NO.: 3275-CR	Date: 8/17/2022

COLLAPSE REPORT

Sample: B-3 @ 3 feet

Plate B-2



Seating Cycle
Loading Prior to Inundation
Loading After Inundation
Rebound Cycle

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

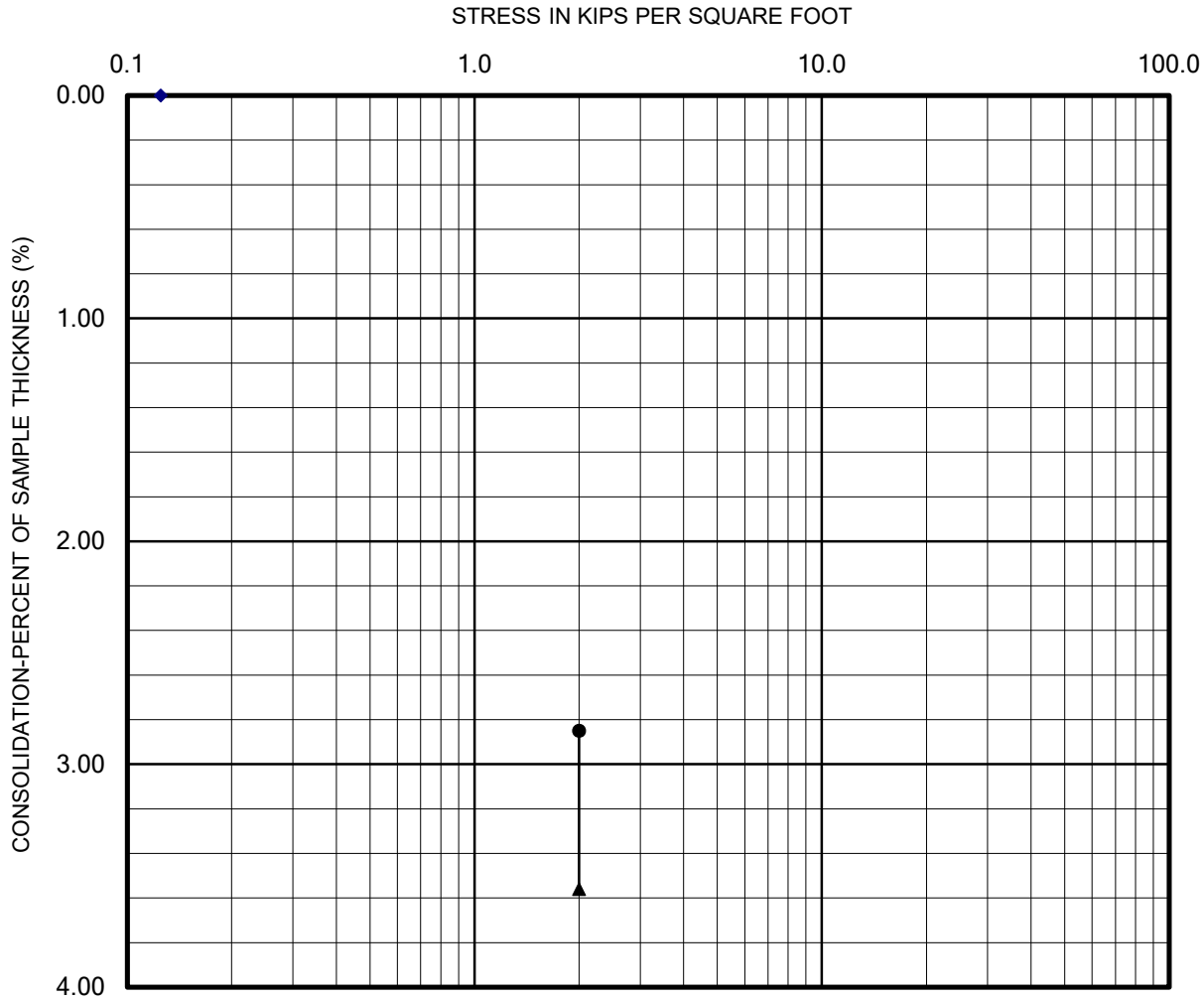
GEOTEK

CHECKED BY: DA	Lab: Corona
PROJECT NO.: 3275-CR	Date: 8/17/2022

COLLAPSE REPORT

Sample: B-6 @ 10 feet

Plate B-3



Seating Cycle
Loading Prior to Inundation
Loading After Inundation
Rebound Cycle

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

GEOTEK

CHECKED BY: DA	Lab: Corona
PROJECT NO.: 3275-CR	Date: 8/17/2022

COLLAPSE REPORT

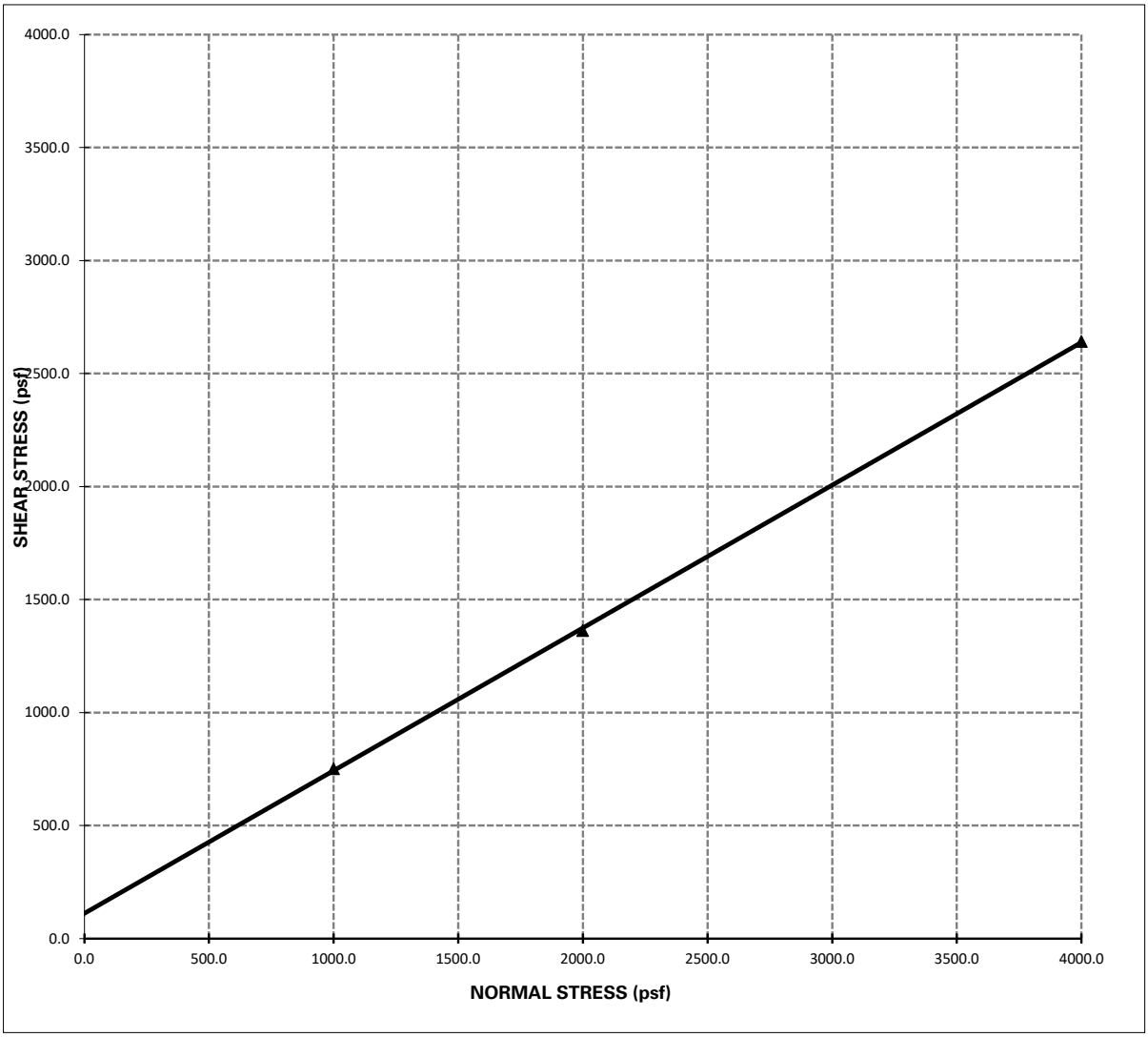
Sample: B-7 @ 7 feet

Plate B-4

GEOTEK

DIRECT SHEAR TEST

Project Name:	Commercial Center Apple Valley	***Sample Location:***	B-1 @ 0-5 feet
Project Number:	3275-CR	***Date Tested:***	8/29/2022



Shear Strength: Φ = **32°** , **C = 112 psf**

Notes: 1 - The soil specimen used in the shear box was a ring sample remolded to approximately 90% relative compaction from a bulk sample collected during the field investigation.

2 - The above reflect direct shear strength at saturated conditions.

3 - The tests were run at a shear rate of 0.01 in/min.

GeoTek - Corona
1548 N. Maple St.
Corona, CA 92880
Phone: (951) 710-1160
Fax: (951) 710-1167

Proctor Report

Report No: PTR:22-00009-S01

Client: Avant Real Estate
ATTN: Michelle Sanchez
Vernon CA 90058

CC:

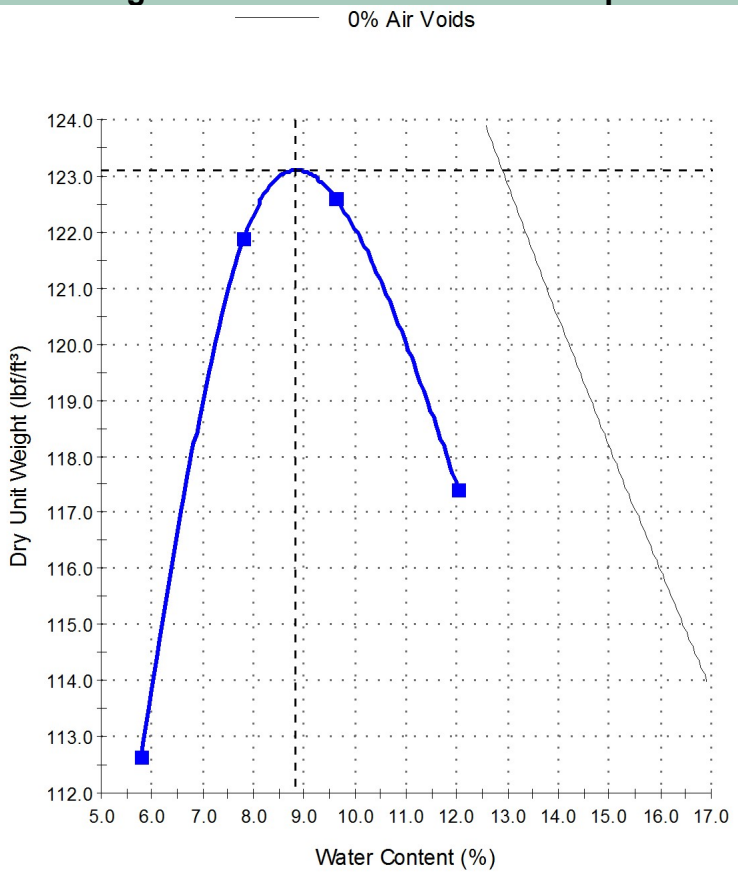
Project: 3275-CR
Apple Valley Retail/Commercial Center,
Apple Valley

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample ID: 22-00009-S01 **Date Sampled:** 8/22/2022
Sampled By:
Location: B-1 @ 0-5 feet

Dry Unit Weight - Water Content Relationship



Test Results

ASTM D 1557

Maximum Dry Unit Weight (lbf/ft³):	**123.1**
Optimum Water Content (%):	**8.8**
Method:	A
Preparation Method:	Moist
Specific Gravity (Fines):	2.65
Retained Sieve No 4 (4.75mm) (%):	2
Passing Sieve No 4 (4.75mm) (%):	98
Tested By:	Diego Alvarez-Victorica
Date Tested:	8/15/2022
Visual Description:	Silty fine to medium sand

Comments

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GEOTEK

EXPANSION INDEX TEST

(ASTM D4829)

Client:	Avant Real Estate	***Tested/ Checked By:***	KG Lab No Corona
Project Number:	3275-CR	***Date Tested:***	8/30/2022
Project Location:	Retail-Commercial Center, Apple Valley	***Sample Source:***	B-1 @ 0-5 feet
		Sample Description:	

Ring #: _____ Ring Dia. : 4.01" Ring Ht. 1"

DENSITY DETERMINATION

Weight of compacted sample & ring (gm)	751.1
Weight of ring (gm)	363.2
Net weight of sample (gm)	**387.9**
Wet Density, lb / ft3 (C*0.3016)	**117.0**
Dry Density, lb / ft3 (D/1.F)	**104.9**

SATURATION DETERMINATION

Moisture Content, %	11.5
Specific Gravity, assumed	**2.70**
Unit Wt. of Water @ 20 °C, (pcf)	**62.4**
% Saturation	**51.3**

READINGS

DATE	TIME	READING	
8/30/2022		0.5720	Initial
8/30/2022		0.5720	10 min/Dry
8/31/2022		0.5790	Final

FINAL MOISTURE

Final Weight of wet sample & tare	% Moisture
790.0	**21.5**

EXPANSION INDEX = 7

Results Only Soil Testing for Apple Valley Retail /Commercial Center

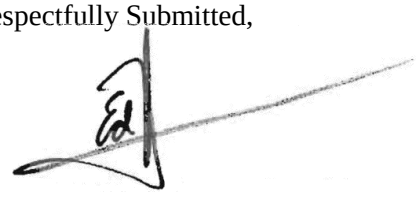
August 17, 2022

Prepared for:

Bruce Hick
Geotek USA
1548 North Maple Street
Corona, CA 92280
bhick@geotekusa.com

Project X Job#: S220816B
Client Job or PO#: 3275-CR Avant Real Estate

Respectfully Submitted,





Eduardo Hernandez, M.Sc., P.E.
Sr. Corrosion Consultant
NACE Corrosion Technologist #16592
Professional Engineer
California No. M37102
ehernandez@projectxcorrosion.com

Soil Analysis Lab Results

Client: Geotek USA
Job Name: Apple Valley Retail /Commercial Center
Client Job Number: 3275-CR Avant Real Estate
Project X Job Number: S220816B
August 17, 2022

	Method	ASTM D4327		ASTM D4327		ASTM G187		ASTM G51	ASTM G200	SM 4500-D	ASTM D4327	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D4327	ASTM D4327
Bore# / Description	**Depth**	**Sulfates** SO_4^{2-}		**Chlorides** Cl^-		**Resistivity** As Rec'd | Minimum		**pH**	**Redox**	**Sulfide** S^{2-}	**Nitrate** NO_3^-	**Ammonium** NH_4^+	**Lithium** Li^+	**Sodium** Na^+	**Potassium** K^+	**Magnesium** Mg^{2+}	**Calcium** Ca^{2+}	**Fluoride** F_2^{--}	**Phosphate** PO_4^{3-}
	(ft)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(Ohm-cm)	(Ohm-cm)		(mV)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
B3	5 - 10	245.0	0.0245	390.5	0.0391	15,410	737	8.8	175	<0.01	3.3	112.1	0.01	380.6	3.5	32.4	59.0	4.0	2.4

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
Chemical Analysis performed on 1:3 Soil-To-Water extract
PPM = mg/kg (soil) = mg/L (Liquid)

Project X
Corrosion Engineering
Corrosion Control - Soil, Water, and Metallurgy Lab

Lab Request Sheet Chain of Custody
Phone: (213) 928-7213 · Fax (951) 226-1720 · www.projectxcorrosion.com

Ship Samples To: 29990 Technology Dr, Suite 13, Murrieta, CA 92563

Project X Job Number S220816B Geotek 3275-CR Apple Valley 1 Full

IMPORTANT: Please complete Project and Sample Identification Data as you would like it to appear in report & include this form with samples.

Company Name:	Geotek USA	**Contact Name:**	Bruce Hick
Phone No:	661-233-5229		
Mailing Address:	1548 N. Maple Ave. Corona, CA	**Contact Email:**	bhick@geotekusa.com
Accounting Contact:		**Invoice Email:**	bhick@geotekusa.com
Client Project No:	3275-CR Avant Real Estate	**Project Name:**	Apple Valley Retail/Commercial Center
P.O. #:			

(Business Days) Turn Around Time: 3-5 Day Standard [X] · 3 Day Guarantee 50% mark-up [ ] · 2 Day RUSH 100% mark-up [ ]

Results By: ☐ Phone ☐ Fax ☒ Email

Date & Received by : KASE GEBBIE 8/16/22 **Default Method**

Special Instructions:

ANALYSIS REQUESTED (Please circle)

	SAMPLE ID - BORE #	DEPTH (ft)	DATE COLLECTED
326	1 B3 @	5'-10'	
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		

	Soil Resistivity	pH	Sulfate	Chloride	Redox Potential	Sulfide	Ammonia	Nitrate	Flouride	Phosphate	Lithium	Sodium	Potassium	Magnesium	Calcium	BiCarbonate	Full Corrosion Series	Soil Corrosivity Evaluation Report	Water Corrosivity Mini Report	Moisture Content	Total Alkalinity	Thermal Resistivity	(ANC) Alk Neutr Cap	(SRB) Sulfate Reducing	Puckorius Index	XRF Elemental Analysis	Water Hardness
Method	ASTM G187	ASTM G 51	ASTM D4327	ASTM D4327	ASTM G200	SM 4500-S2	ASTM D4327	ASTM D4327	SM 2320B	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	SM 2320B				ASTM D2216	SM 2320B	IEEE 442	ASTM D3334	HACH BART		ASTM E1621	ASTM E322	ASTM A751
1																	X										

Full Corrosion Series: AASHTO T288 (Caltrans CTM643) · AASHTO T 289 (Caltrans CTM643) · AASHTO T 290 (Caltrans CTM417) · AASHTO T 291 (Caltrans CTM422) · SM 2580B · SM 4500-NH3 · SM 4500-NO3

Geo Quad

Reports

*Req: Min. 3 Samples, site map, and groundwater info

APPENDIX C

PERCOLATION DATA SHEETS
AND
PORCHET CALCULATIONS

Proposed Retail/Commercial Development
California State Highway 18 and Rancherias Road
Apple Valley, San Bernardino County, California
Project No. 3275-CR

GEOTEK

Client:	**Avant Real Estate**
Project:	**Apple Valley Retail/Commercial**
Project No:	**3275-CR**
Date:	**8/9/2022**

Boring No. **I-1**

Percolation to Infiltration Rate (Porchet Method)

Time Interval, Δt =	30
Final Depth to Water, D_F =	45.75
Test Hole Radius, r =	3
Initial Depth to Water, D_O =	40
Total Test Hole Depth, D_T =	60.5

Equation - $I_t = \dfrac{\Delta H\ (60r)}{\Delta t\ (r+2H_{avg})}$

$H_O = D_T - D_O$ =	20.5
$H_F = D_T - D_F$ =	14.75
$\Delta H = \Delta D = H_O - H_F$ =	5.75
$Havg = (H_O+H_F)/2$ =	17.625

I_t = 0.90 **Inches pe**

GEOTEK

Client:	**Avant Real Estate**
Project:	**Apple Valley Retail/Commercial**
Project No:	**3275-CR**
Date:	**8/9/2022**

Boring No. **I-2**

Percolation to Infiltration Rate (Porchet Method)

Time Interval, Δt =	30
Final Depth to Water, D_F =	46.75
Test Hole Radius, r =	3
Initial Depth to Water, D_O =	40
Total Test Hole Depth, D_T =	61

Equation - $I_t = \dfrac{\Delta H\,(60r)}{\Delta t\,(r+2H_{avg})}$

$H_O = D_T - D_O$ =	21
$H_F = D_T - D_F$ =	14.25
$\Delta H = \Delta D = H_O - H_F$ =	6.75
$H_{avg} = (H_O+H_F)/2$ =	17.625

I_t = 1.06 **Inches pe**

GEOTEK

PERCOLATION DATA SHEET

Project: Apple Valley Retail/commercial Center Job No.: 3275-CR

Test Hole No.: I-1 Tested By: CBT Date: 8/9/22

Depth of Hole As Drilled: 60.5" Before Test: 60.5" After Test: 60.5"

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ In Water Level (Inches)	Rate (minutes per inch)	Comments
1	615 640	25	60 1/2	20	14.5	5 1/2		presoak 8/8/22
2	641 706	25	60 1/2	20	14 1/4	5 3/4		
1	707 737	30	60 1/2	20	14	6		Test 8/9/22
2	738 808	30	60 1/2	20	14 1/2	5 1/2		
3	810 840	30	60 1/2	20	14 1/4	5 3/4		
4	841 911	30	60 1/2	20	14 1/2	5 1/2		
5	912 942	30	60 1/2	20	13 3/4	6 1/4		
6	945 1015	30	60 1/2	20	14 1/4	5 3/4		
7	1016 1046	30	60 1/2	20	14 1/2	5 1/2		
8	1047 1117	30	60 1/2	20	14 1/4	5 3/4		

PERCOLATION DATA SHEET

Project: Apple Valley Retail/Commercial Center Job No.: 3275-CR

Test Hole No.: I-1 Tested By: CBT Date: 8/9/22

Depth of Hole As Drilled: 60.5" Before Test: 60.5" After Test: 60.5"

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ In Water Level (Inches)	Rate (minutes per inch)	Comments
9	1118 1148	30	60 1/2	20	14 1/4	5 3/4		
10	1150 1220	30	60 1/2	20	14 1/4	5 3/4		
11	1221 1251	30	60 1/2	20	14 1/2	5 1/2		
12	1252 122	30	60 1/2	20	14 1/4	5 3/4		end test.

PERCOLATION DATA SHEET

Project: Apple Valley Retail / Commercial Center Job No.: 3275-CR

Test Hole No.: I-2 Tested By: CBT Date: 8/9/22

Depth of Hole As Drilled: 61" Before Test: 61" After Test: 61"

San Bernardino County

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Rate (minutes per inch)	Comments
1	610 635	25	~~20~~ 61	20	13	7		Presoak 8/8/22
2	638 703	25	~~20~~ 61	20	13 3/4	6 1/4		
1	705 735	30	61	20	13 1/4	6 3/4		test 8/9/22
2	736 806	30	61	20	13	7		
3	807 837	30	61	20	11 1/2	8 1/2		
4	839 909	30	61	20	14	6		
5	910 940	30	61	20	13 1/4	6 3/4		
6	941 1011	30	61	20	14	6		
7	1012 1042	30	61	20	13 3/4	6 1/4		
8	1043 1113	30	61	20	13	7		

PERCOLATION DATA SHEET

Project: Apple Valley Retail / Commercial Center Job No.: 3275-CR

Test Hole No.: I-2 Tested By: CBT Date: 8/9/22

Depth of Hole As Drilled: 61" Before Test: 61" After Test: 61"

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ In Water Level (Inches)	Rate (minutes per inch)	Comments
9	1115 1145	30	61	20	13 1/4	6 3/4		
10	1146 1216	30	61	20	13 3/4	6 1/4		
11	1218 1248	30	61	20	12 3/4	7 1/4		
12	1250 120	30	61	20	13 1/4	6 3/4		end test

APPENDIX D

GENERAL GRADING GUIDELINES

Proposed Retail/Commercial Development
California State Highway 18 and Rancherias Road
Apple Valley, San Bernardino County, California
Project No. 3275-CR

GEOTEK

GENERAL GRADING GUIDELINES

Guidelines presented herein are intended to address general construction procedures for earthwork construction. Specific situations and conditions often arise which cannot reasonably be discussed in general guidelines, when anticipated these are discussed in the text of the report. Often unanticipated conditions are encountered which may necessitate modification or changes to these guidelines. It is our hope that these will assist the contractor to more efficiently complete the project by providing a reasonable understanding of the procedures that would be expected during earthwork and the testing and observation used to evaluate those procedures.

General

Grading should be performed to at least the minimum requirements of governing agencies, Chapters 18 and 33 of the Uniform Building Code, CBC (2019) and the guidelines presented below.

Preconstruction Meeting

A preconstruction meeting should be held prior to site earthwork. Any questions the contractor has regarding our recommendations, general site conditions, apparent discrepancies between reported and actual conditions and/or differences in procedures the contractor intends to use should be brought up at that meeting. The contractor (including the main onsite representative) should review our report and these guidelines in advance of the meeting. Any comments the contractor may have regarding these guidelines should be brought up at that meeting.

Grading Observation and Testing

1. Observation of the fill placement should be provided by our representative during grading. Verbal communication during the course of each day will be used to inform the contractor of test results. The contractor should receive a copy of the "Daily Field Report" indicating results of field density tests that day. If our representative does not provide the contractor with these reports, our office should be notified.
2. Testing and observation procedures are, by their nature, specific to the work or area observed and location of the tests taken, variability may occur in other locations. The contractor is responsible for the uniformity of the grading operations; our observations and test results are intended to evaluate the contractor's overall level of efforts during grading. The contractor's personnel are the only individuals participating in all aspect of site work. Compaction testing and observation should not be considered as relieving the contractor's responsibility to properly compact the fill.
3. Cleanouts, processed ground to receive fill, key excavations, and subdrains should be observed by our representative prior to placing any fill. It will be the contractor's responsibility to notify our representative or office when such areas are ready for observation.
4. Density tests may be made on the surface material to receive fill, as considered warranted by this firm.
5. In general, density tests would be made at maximum intervals of two feet of fill height or every 1,000 cubic yards of fill placed. Criteria will vary depending on soil conditions and size of the fill. More frequent testing may be performed. In any case, an adequate number of field density tests should be made to evaluate the required compaction and moisture content is generally being obtained.

6. Laboratory testing to support field test procedures will be performed, as considered warranted, based on conditions encountered (e.g. change of material sources, types, etc.) Every effort will be made to process samples in the laboratory as quickly as possible and in progress construction projects are our first priority. However, laboratory workloads may cause in delays and some soils may require a **minimum of 48 to 72 hours to complete test procedures**. Whenever possible, our representative(s) should be informed in advance of operational changes that might result in different source areas for materials.
7. Procedures for testing of fill slopes are as follows:
   a) Density tests should be taken periodically during grading on the flat surface of the fill, three to five feet horizontally from the face of the slope.
   b) If a method other than over building and cutting back to the compacted core is to be employed, slope compaction testing during construction should include testing the outer six inches to three feet in the slope face to determine if the required compaction is being achieved.
8. Finish grade testing of slopes and pad surfaces should be performed after construction is complete.

Site Clearing

1. All vegetation, and other deleterious materials, should be removed from the site. If material is not immediately removed from the site it should be stockpiled in a designated area(s) well outside of all current work areas and delineated with flagging or other means. Site clearing should be performed in advance of any grading in a specific area.
2. Efforts should be made by the contractor to remove all organic or other deleterious material from the fill, as even the most diligent efforts may result in the incorporation of some materials. This is especially important when grading is occurring near the natural grade. All equipment operators should be aware of these efforts. Laborers may be required as root pickers.
3. Nonorganic debris or concrete may be placed in deeper fill areas provided the procedures used are observed and found acceptable by our representative. Typical procedures are similar to those indicated on Plate G-4.

Treatment of Existing Ground

1. Following site clearing, all surficial deposits of alluvium and colluvium as well as weathered or creep effected bedrock, should be removed (see Plates G-1, G-2 and G-3) unless otherwise specifically indicated in the text of this report.
2. In some cases, removal may be recommended to a specified depth (e.g. flat sites where partial alluvial removals may be sufficient). The contractor should not exceed these depths unless directed otherwise by our representative.
3. Groundwater existing in alluvial areas may make excavation difficult. Deeper removals than indicated in the text of the report may be necessary due to saturation during winter months.
4. Subsequent to removals, the natural ground should be processed to a depth of six inches, moistened to near optimum moisture conditions and compacted to fill standards.
5. Exploratory back hoe or dozer trenches still remaining after site removal should be excavated and filled with compacted fill if they can be located.

Subdrainage

1. Subdrainage systems should be provided in canyon bottoms prior to placing fill, and behind buttress and stabilization fills and in other areas indicated in the report. Subdrains should conform to schematic diagrams G-1 and G-5, and be acceptable to our representative.
2. For canyon subdrains, runs less than 500 feet may use six-inch pipe. Typically, runs in excess of 500 feet should have the lower end as eight-inch minimum.
3. Filter material should be clean, 1/2 to 1-inch gravel wrapped in a suitable filter fabric. Class 2 permeable filter material per California Department of Transportation Standards tested by this office to verify its suitability, may be used without filter fabric. A sample of the material should be provided to the Soils Engineer by the contractor at least two working days before it is delivered to the site. The filter should be clean with a wide range of sizes.
4. Approximate delineation of anticipated subdrain locations may be offered at 40-scale plan review stage. During grading, this office would evaluate the necessity of placing additional drains.
5. All subdrainage systems should be observed by our representative during construction and prior to covering with compacted fill.
6. Subdrains should outlet into storm drains where possible. Outlets should be located and protected. The need for backflow preventers should be assessed during construction.
7. Consideration should be given to having subdrains located by the project surveyors.

Fill Placement

1. Unless otherwise indicated, all site soil and bedrock may be reused for compacted fill; however, some special processing or handling may be required (see text of report).
2. Material used in the compacting process should be evenly spread, moisture conditioned, processed, and compacted in thin lifts six (6) to eight (8) inches in compacted thickness to obtain a uniformly dense layer. The fill should be placed and compacted on a nearly horizontal plane, unless otherwise found acceptable by our representative.
3. If the moisture content or relative density varies from that recommended by this firm, the contractor should rework the fill until it is in accordance with the following:
    a) Moisture content of the fill should be at or above optimum moisture. Moisture should be evenly distributed without wet and dry pockets. Pre-watering of cut or removal areas should be considered in addition to watering during fill placement, particularly in clay or dry surficial soils. The ability of the contractor to obtain the proper moisture content will control production rates.
    b) Each six-inch layer should be compacted to at least 90 percent of the maximum dry density in compliance with the testing method specified by the controlling governmental agency. In most cases, the testing method is ASTM Test Designation D 1557.
4. Rock fragments less than eight inches in diameter may be utilized in the fill, provided:
    a) They are not placed in concentrated pockets;
    b) There is a sufficient percentage of fine-grained material to surround the rocks;
    c) The distribution of the rocks is observed by, and acceptable to, our representative.
5. Rocks exceeding eight (8) inches in diameter should be taken off site, broken into smaller fragments, or placed in accordance with recommendations of this firm in areas designated suitable for rock disposal (see Plate G-4). On projects where significant large quantities of oversized materials are anticipated, alternate guidelines for placement may be included. If

significant oversize materials are encountered during construction, these guidelines should be requested.

6. In clay soil, dry or large chunks or blocks are common. If in excess of eight (8) inches minimum dimension, then they are considered as oversized. Sheepsfoot compactors or other suitable methods should be used to break up blocks. When dry, they should be moisture conditioned to provide a uniform condition with the surrounding fill.

Slope Construction

1. The contractor should obtain a minimum relative compaction of 90 percent out to the finished slope face of fill slopes. This may be achieved by either overbuilding the slope and cutting back to the compacted core, or by direct compaction of the slope face with suitable equipment.
2. Slopes trimmed to the compacted core should be overbuilt by at least three (3) feet with compaction efforts out to the edge of the false slope. Failure to properly compact the outer edge results in trimming not exposing the compacted core and additional compaction after trimming may be necessary.
3. If fill slopes are built "at grade" using direct compaction methods, then the slope construction should be performed so that a constant gradient is maintained throughout construction. Soil should not be "spilled" over the slope face nor should slopes be "pushed out" to obtain grades. Compaction equipment should compact each lift along the immediate top of slope. Slopes should be back rolled or otherwise compacted at approximately every 4 feet vertically as the slope is built.
4. Corners and bends in slopes should have special attention during construction as these are the most difficult areas to obtain proper compaction.
5. Cut slopes should be cut to the finished surface. Excessive undercutting and smoothing of the face with fill may necessitate stabilization.

Keyways, Buttress and Stabilization Fills

Keyways are needed to provide support for fill slope and various corrective procedures.

1. Side-hill fills should have an equipment-width key at their toe excavated through all surficial soil and into competent material and tilted back into the hill (Plates G-2, G-3). As the fill is elevated, it should be benched through surficial soil and slopewash, and into competent bedrock or other material deemed suitable by our representatives (See Plates G-1, G-2, and G-3).
2. Fill over cut slopes should be constructed in the following manner:
   a) All surficial soils and weathered rock materials should be removed at the cut-fill interface.
   b) A key at least one and one-half (1.5) equipment width wide (or as needed for compaction), and tipped at least one (1) foot into slope, should be excavated into competent materials and observed by our representative.
   c) The cut portion of the slope should be excavated prior to fill placement to evaluate if stabilization is necessary. The contractor should be responsible for any additional earthwork created by placing fill prior to cut excavation. (see Plate G-3 for schematic details.)
3. Daylight cut lots above descending natural slopes may require removal and replacement of the outer portion of the lot. A schematic diagram for this condition is presented on Plate G-2.
4. A basal key is needed for fill slopes extending over natural slopes. A schematic diagram for this condition is presented on Plate G-2.

5. All fill slopes should be provided with a key unless within the body of a larger overall fill mass. Please refer to Plate G-3 for specific guidelines.

Anticipated buttress and stabilization fills are discussed in the text of the report. The need to stabilize other proposed cut slopes will be evaluated during construction. Plate G-5 shows a schematic of buttress construction.

1. All backcuts should be excavated at gradients of 1:1 or flatter. The backcut configuration should be determined based on the design, exposed conditions, and need to maintain a minimum fill width and provide working room for the equipment.
2. On longer slopes, backcuts and keyways should be excavated in maximum 250 feet long segments. The specific configurations will be determined during construction.
3. All keys should be a minimum of two (2) feet deep at the toe and slope toward the heel at least one foot or two (2%) percent, whichever is greater.
4. Subdrains are to be placed for all stabilization slopes exceeding 10 feet in height. Lower slopes are subject to review. Drains may be required. Guidelines for subdrains are presented on Plate G-5.
5. Benching of backcuts during fill placement is required.

Lot Capping

1. When practical, the upper three (3) feet of material placed below finish grade should be comprised of the least expansive material available. Preferably, highly and very highly expansive materials should not be used. We will attempt to offer advice based on visual evaluations of the materials during grading, but it must be realized that laboratory testing is needed to evaluate the expansive potential of soil. Minimally, this testing takes two (2) to four (4) days to complete.
2. Transition lots (cut and fill) both per plan and those created by remedial grading (e.g. lots above stabilization fills, along daylight lines, above natural slopes, etc.) should be capped with a minimum three foot thick compacted fill blanket.
3. Cut pads should be observed by our representative(s) to evaluate the need for overexcavation and replacement with fill. This may be necessary to reduce water infiltration into highly fractured bedrock or other permeable zones, and/or due to differing expansive potential of materials beneath a structure. The overexcavation should be at least three feet. Deeper overexcavation may be recommended in some cases.

ROCK PLACEMENT AND ROCK FILL GUIDELINES

It is anticipated that large quantities of oversize material would be generated during grading. It's likely that such materials may require special handling for burial. Although alternatives may be developed in the field, the following methods of rock disposal are recommended on a preliminary basis.

Limited Larger Rock

When materials encountered are principally soil with limited quantities of larger rock fragments or boulders, placement in windrows is recommended. The following procedures should be applied:

1. Oversize rock (greater than 8 inches) should be placed in windrows.
    a) Windrows are rows of single file rocks placed to avoid nesting or clusters of rock.
    b) Each adjacent rock should be approximately the same size (within ~one foot in diameter).

c) The maximum rock size allowed in windrows is four feet

2. A minimum vertical distance of three feet between lifts should be maintained. Also, the windrows should be offset from lift to lift. Rock windrows should not be closer than 15 feet to the face of fill slopes and sufficient space must be maintained for proper slope construction (see Plate G-4).
3. Rocks greater than eight inches in diameter should not be placed within seven feet of the finished subgrade for a roadway or pads and should be held below the depth of the lowest utility. This will allow easier trenching for utility lines.
4. Rocks greater than four feet in diameter should be broken down, if possible, or they may be placed in a dozer trench. Each trench should be excavated into the compacted fill a minimum of one foot deeper than the largest diameter of rock.
   a) The rock should be placed in the trench and granular fill materials (SE>30) should be flooded into the trench to fill voids around the rock.
   b) The over size rock trenches should be no closer together than 15 feet from any slope face.
   c) Trenches at higher elevation should be staggered and there should be a minimum of four feet of compacted fill between the top of the one trench and the bottom of the next higher trench.
   d) It would be necessary to verify 90 percent relative compaction in these pits. A 24 to 72 hour delay to allow for water dissipation should be anticipated prior to additional fill placement.

Structural Rock Fills

If the materials generated for placement in structural fills contains a significant percentage of material more than six (6) inches in one dimension, then placement using conventional soil fill methods with isolated windrows would not be feasible. In such cases the following could be considered:

1. Mixes of large rock or boulders may be placed as rock fill. They should be below the depth of all utilities both on pads and in roadways and below any proposed swimming pools or other excavations. If these fills are placed within seven (7) feet of finished grade, they may affect foundation design.
2. Rock fills are required to be placed in horizontal layers that should **not exceed two feet in thickness, or the maximum rock size present, which ever is less**. All rocks exceeding two feet should be broken down to a smaller size, windrowed (see above), or disposed of in non-structural fill areas. Localized larger rock up to 3 feet in largest dimension may be placed in rock fill as follows:
   a) individual rocks are placed in a given lift so as to be roughly 50% exposed above the typical surface of the fill ,
   b) loaded rock trucks or alternate compactors are worked around the rock on all sides to the satisfaction of the soil engineer,
   c) the portion of the rock above grade is covered with a second lift.
3. Material placed in each lift should be well graded. No unfilled spaces (voids) should be permitted in the rock fill.

Compaction Procedures

Compaction of rock fills is largely procedural. The following procedures have been found to generally produce satisfactory compaction.

1. Provisions for routing of construction traffic over the fill should be implemented.
   a) Placement should be by rock trucks crossing the lift being placed and dumping at its edge.
   b) The trucks should be routed so that each pass across the fill is via a different path and that all areas are uniformly traversed.
   c) The dumped piles should be knocked down and spread by a large dozer (D-8 or larger suggested). (Water should be applied before and during spreading.)

2. Rock fill should be generously watered (sluiced)
   a) Water should be applied by water trucks to the:
      i) dump piles,
      ii) front face of the lift being placed and,
      iii) surface of the fill prior to compaction.
   b) No material should be placed without adequate water.
   c) The number of water trucks and water supply should be sufficient to provide constant water.
   d) Rock fill placement should be suspended when water trucks are unavailable:
      i) for more than 5 minutes straight, or,
      ii) for more than 10 minutes/hour.

3. In addition to the truck pattern and at the discretion of the soil engineer, large, rubber tired compactors may be required.
   a) The need for this equipment will depend largely on the ability of the operators to provide complete and uniform coverage by wheel rolling with the trucks.
   b) Other large compactors will also be considered by the soil engineer provided that required compaction is achieved.

4. Placement and compaction of the rock fill is largely procedural. Observation by trenching should be made to check:
   a) the general segregation of rock size,
   b) for any unfilled spaces between the large blocks, and
   c) the matrix compaction and moisture content.

5. Test fills may be required to evaluate relative compaction of finer grained zones or as deemed appropriate by the soil engineer.
   a) A lift should be constructed by the methods proposed, as proposed

6. Frequency of the test trenching is to be at the discretion of the soil engineer. Control areas may be used to evaluate the contractor's procedures.

7. A minimum horizontal distance of 15 feet should be maintained from the face of the rock fill and any finish slope face. At least the outer 15 feet should be built of conventional fill materials.

Piping Potential and Filter Blankets

Where conventional fill is placed over rock fill, the potential for piping (migration) of the fine grained material from the conventional fill into rock fills will need to be addressed.

The potential for particle migration is related to the grain size comparisons of the materials present and in contact with each other. Provided that 15 percent of the finer soil is larger than the effective pore size of the coarse soil, then particle migration is substantially mitigated. This can be accomplished with a well-graded matrix material for the rock fill and a zone of fill similar to the matrix above it. The specific gradation of the fill materials placed during grading must be known to evaluate the need for any type of filter that may be necessary to cap the rock fills. This, unfortunately, can only be accurately determined during construction.

In the event that poorly graded matrix is used in the rock fills, properly graded filter blankets 2 to 3 feet thick separating rock fills and conventional fill may be needed. As an alternative, use of two layers of filter fabric (Mirafi 700 x or equivalent) could be employed on top of the rock fill. In order to mitigate excess puncturing, the surface of the rock fill should be well broken down and smoothed prior to placing the filter fabric. The first layer of the fabric may then be placed and covered with relatively permeable fill material (with respect to overlying material) 1 to 2 feet thick. The relative permeable material should be compacted to fill standards. The second layer of fabric should be placed and conventional fill placement continued.

Subdrainage

Rock fill areas should be tied to a subdrainage system. If conventional fill is placed that separates the rock from the main canyon subdrain, then a secondary system should be installed. A system consisting of an adequately graded base (3 to 4 percent to the lower side) with a collector system and outlets may suffice.

Additionally, at approximately every 25 foot vertical interval, a collector system with outlets should be placed at the interface of the rock fill and the conventional fill blanketing a fill slope

Monitoring

Depending upon the depth of the rock fill and other factors, monitoring for settlement of the fill areas may be needed following completion of grading. Typically, if rock fill depths exceed 40 feet, monitoring would be recommend prior to construction of any settlement sensitive improvements. Delays of 3 to 6 months or longer can be expected prior to the start of construction.

UTILITY TRENCH CONSTRUCTION AND BACKFILL

Utility trench excavation and backfill is the contractor's responsibility. The geotechnical consultant typically provides periodic observation and testing of these operations. While efforts are made to make sufficient observations and tests to verify that the contractors' methods and procedures are adequate to achieve proper compaction, it is typically impractical to observe all backfill procedures. As such, it is critical that the contractor use consistent backfill procedures.

Compaction methods vary for trench compaction and experience indicates many methods can be successful. However, procedures that "worked" on previous projects may or may not prove effective on a given site. The contractor(s) should outline the procedures proposed, so that we may discuss them **prior** to construction. We will offer comments based on our knowledge of site conditions and experience.

1. Utility trench backfill in slopes, structural areas, in streets and beneath flat work or hardscape should be brought to at least optimum moisture and compacted to at least 90 percent of the laboratory standard. Soil should be moisture conditioned prior to placing in the trench.
2. Flooding and jetting are not typically recommended or acceptable for native soils. Flooding or jetting may be used with select sand having a Sand Equivalent (SE) of 30 or higher. This is typically limited to the following uses:
   a) shallow (12 + inches) under slab interior trenches and,
   b) as bedding in pipe zone.

   The water should be allowed to dissipate prior to pouring slabs or completing trench compaction.

3. Care should be taken not to place soils at high moisture content within the upper three feet of the trench backfill in street areas, as overly wet soils may impact subgrade preparation. Moisture may be reduced to 2% below optimum moisture in areas to be paved within the upper three feet below sub grade.
4. Sand backfill should not be allowed in exterior trenches adjacent to and within an area extending below a 1:1 projection from the outside bottom edge of a footing, unless it is similar to the surrounding soil.
5. Trench compaction testing is generally at the discretion of the geotechnical consultant. Testing frequency will be based on trench depth and the contractor's procedures. A probing rod would be used to assess the consistency of compaction between tested areas and untested areas. If zones are found that are considered less compact than other areas, this would be brought to the contractor's attention.

JOB SAFETY

General

Personnel safety is a primary concern on all job sites. The following summaries are safety considerations for use by all our employees on multi-employer construction sites. On ground personnel are at highest risk of injury and possible fatality on grading construction projects. The company recognizes that construction activities will vary on each site and that job site safety is the contractor's responsibility. However, it is, imperative that all personnel be safety conscious to avoid accidents and potential injury.

In an effort to minimize risks associated with geotechnical testing and observation, the following precautions are to be implemented for the safety of our field personnel on grading and construction projects.

1. Safety Meetings: Our field personnel are directed to attend the contractor's regularly scheduled safety meetings.
2. Safety Vests: Safety vests are provided for and are to be worn by our personnel while on the job site.
3. Safety Flags: Safety flags are provided to our field technicians; one is to be affixed to the vehicle when on site, the other is to be placed atop the spoil pile on all test pits.

In the event that the contractor's representative observes any of our personnel not following the above, we request that it be brought to the attention of our office.

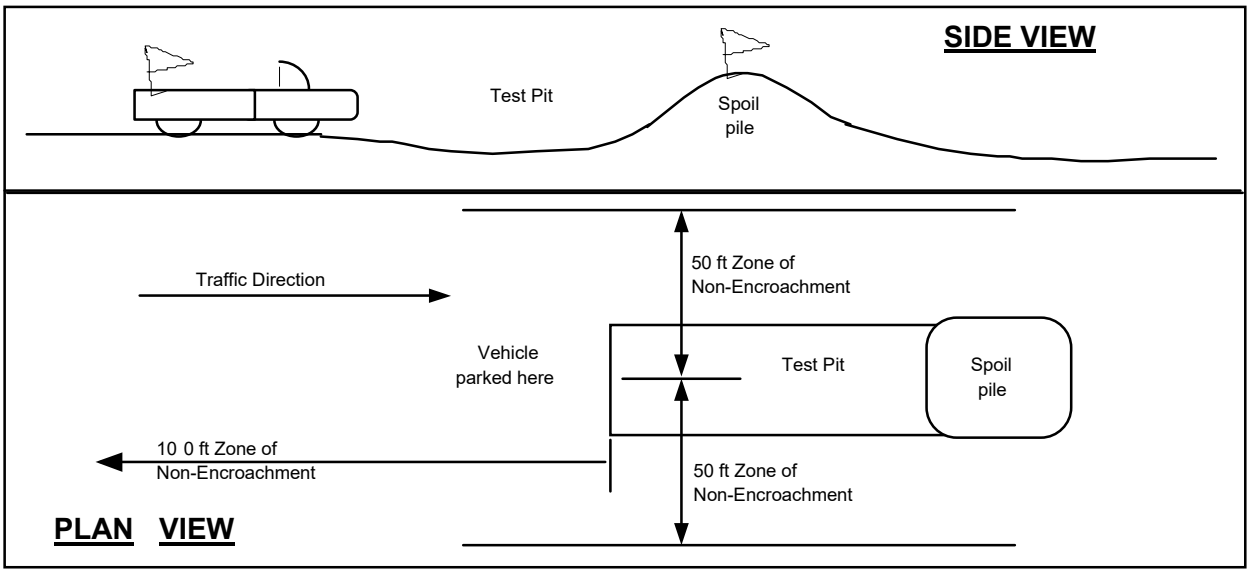
Test Pits Location, Orientation and Clearance

The technician is responsible for selecting test pit locations. The primary concern is the technician's safety. However, it is necessary to take sufficient tests at various locations to obtain a representative sampling of the fill. As such, efforts will be made to coordinate locations with the grading contractors authorized representatives (e.g. dump man, operator, supervisor, grade checker, etc.), and to select locations following or behind the established traffic pattern, preferably outside of current traffic. The contractors authorized representative should direct excavation of the pit and safety during the test period. Again, safety is the paramount concern.

Test pits should be excavated so that the spoil pile is placed away from oncoming traffic. The technician's vehicle is to be placed next to the test pit, opposite the spoil pile. This necessitates that the fill be maintained in a drivable condition. Alternatively, the contractor may opt to park a piece of equipment in front of test pits, particularly in small fill areas or those with limited access.

A zone of non-encroachment should be established for all test pits (see diagram below). No grading equipment should enter this zone during the test procedure. The zone should extend outward to the sides approximately 50 feet from the center of the test pit and 100 feet in the direction of traffic flow. This zone is established both for safety and to avoid excessive ground vibration, which typically decreases test results.

TEST PIT SAFETY PLAN



Slope Tests

When taking slope tests, the technician should park their vehicle directly above or below the test location on the slope. The contractor's representative should effectively keep all equipment at a safe operation distance (e.g. 50 feet) away from the slope during testing.

The technician is directed to withdraw from the active portion of the fill as soon as possible following testing. The technician's vehicle should be parked at the perimeter of the fill in a highly visible location.

Trench Safety

It is the contractor's responsibility to provide safe access into trenches where compaction testing is needed. Trenches for all utilities should be excavated in accordance with CAL-OSHA and any other applicable safety standards. Safe conditions will be required to enable compaction testing of the trench backfill.

All utility trench excavations in excess of 5 feet deep, which a person enters, are to be shored or laid back. Trench access should be provided in accordance with OSHA standards. Our personnel are directed not to enter any trench by being lowered or "riding down" on the equipment.

Our personnel are directed not to enter any excavation which;

1. is 5 feet or deeper unless shored or laid back,
2. exit points or ladders are not provided,
3. displays any evidence of instability, has any loose rock or other debris which could fall into the trench, or
4. displays any other evidence of any unsafe conditions regardless of depth.

If the contractor fails to provide safe access to trenches for compaction testing, our company policy requires that the soil technician withdraws and notifies their supervisor. The contractor's representative will then be contacted in an effort to affect a solution. All backfill not tested due to safety concerns or other reasons is subject to reprocessing and/or removal.

Procedures

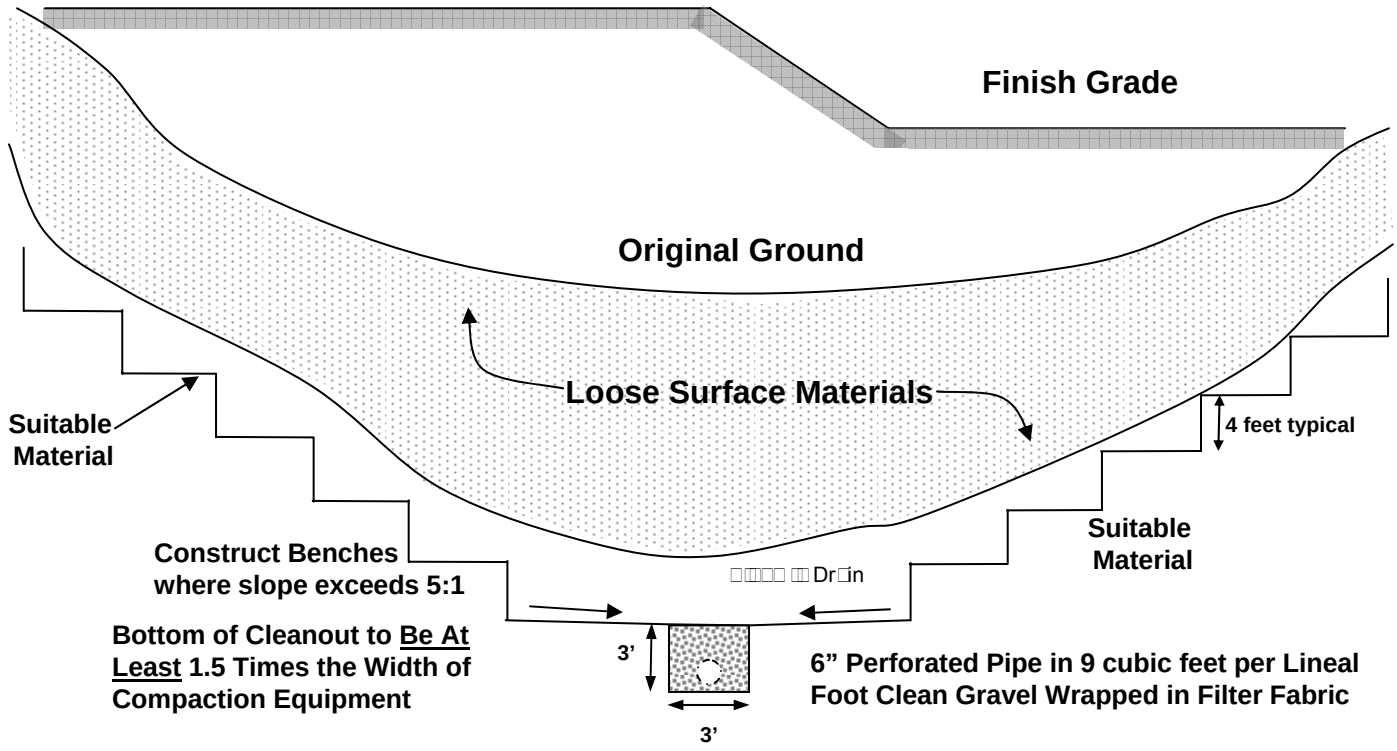
In the event that the technician's safety is jeopardized or compromised as a result of the contractor's failure to comply with any of the above, the technician is directed to inform both the developer's and contractor's representatives. If the condition is not rectified, the technician is required, by company policy, to immediately withdraw and notify their supervisor. The contractor's representative will then be contacted in an effort to affect a solution. No further testing will be performed until the situation is rectified. Any fill placed in the interim can be considered unacceptable and subject to reprocessing, recompaction or removal.

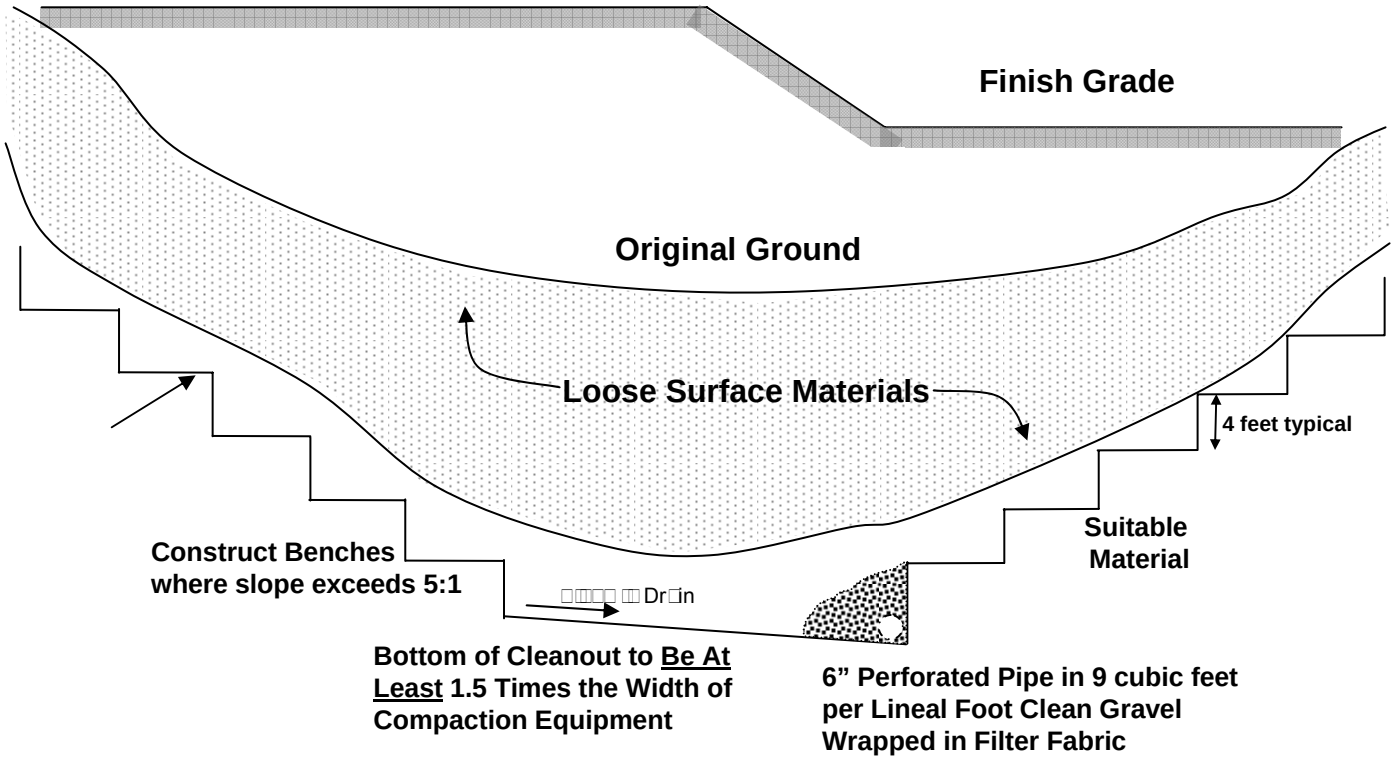
In the event that the soil technician does not comply with the above or other established safety guidelines, we request that the contractor bring this to technician's attention and notify our project manager or office. Effective communication and coordination between the contractors' representative and the field technician(s) is strongly encouraged in order to implement the above safety program and safety in general.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

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ALTERNATES





GEOTEK

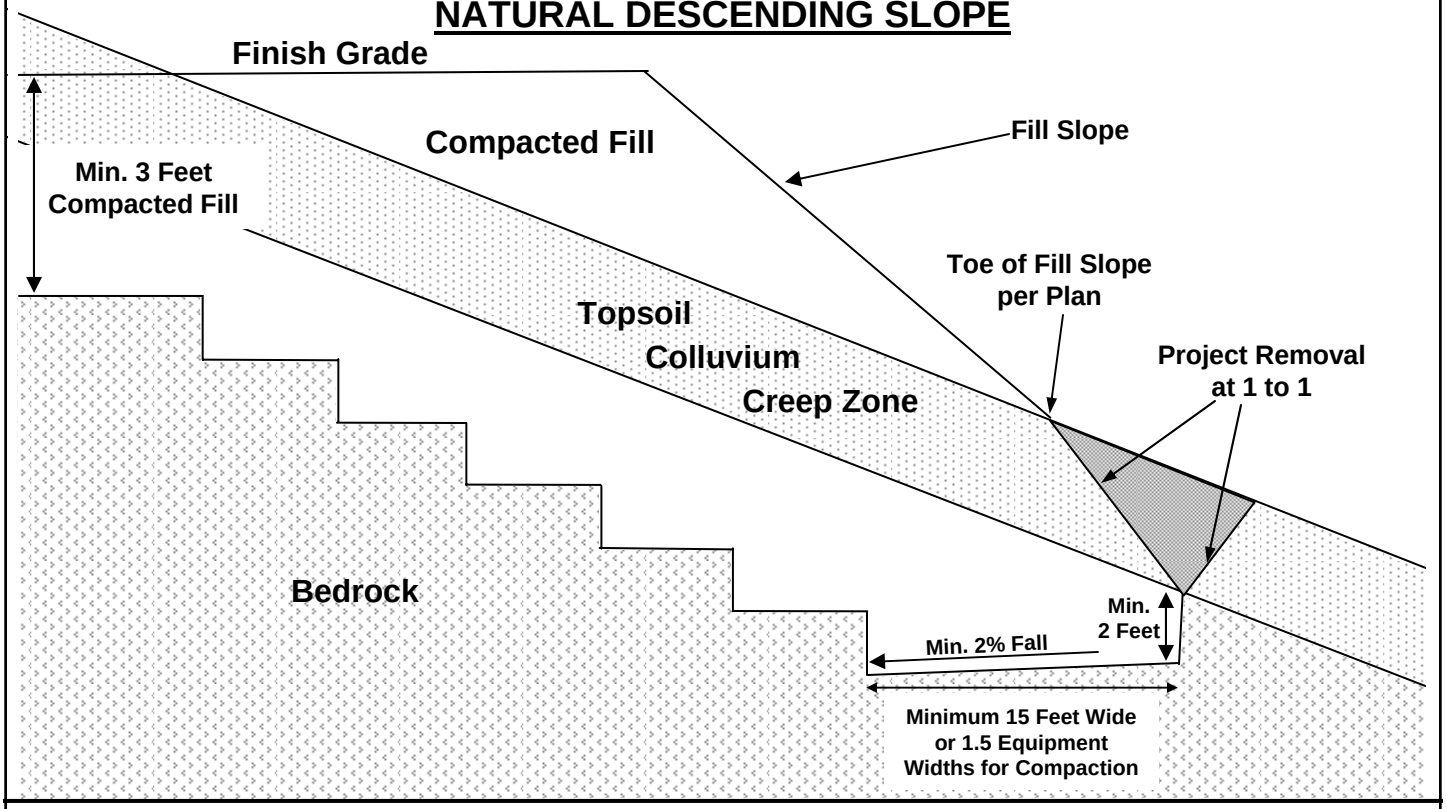
154 North Main Street
Pleasanton, California 94566

TYPICAL CANYON CLEANOUT

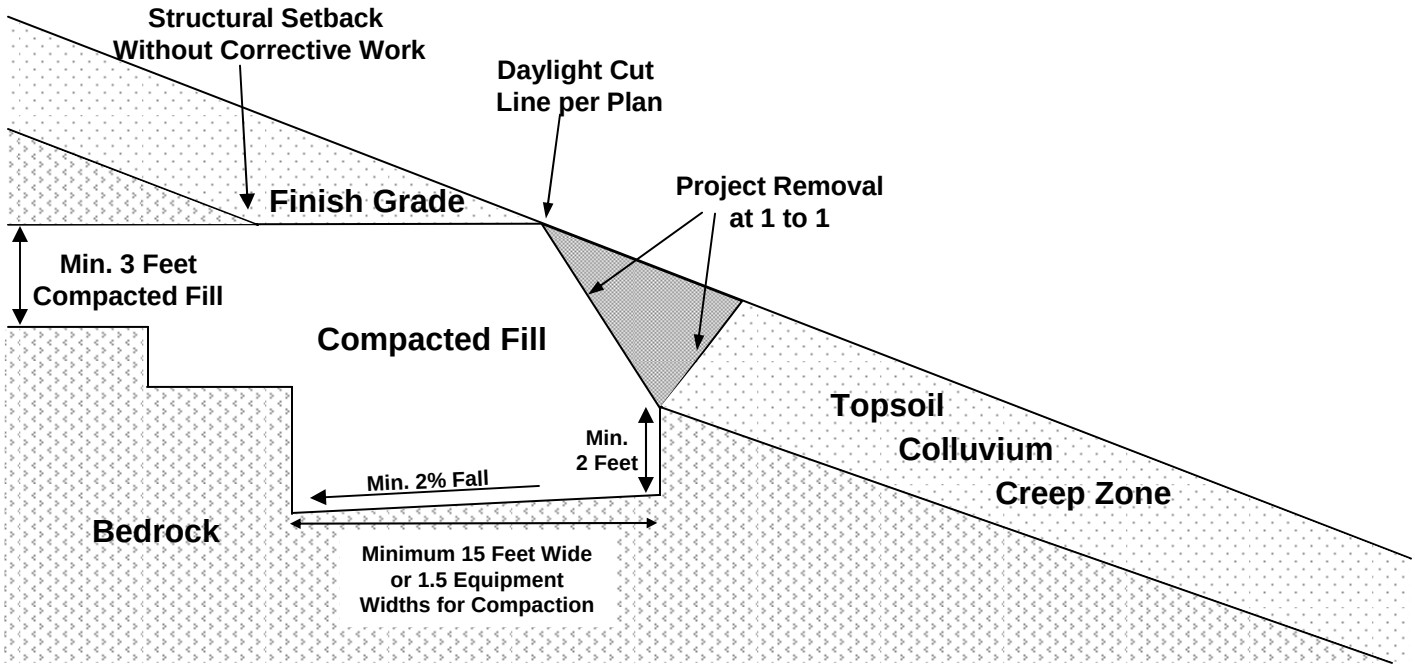
STANDARD GRADING GUIDELINES

PLATE D-1

TYPICAL FILL SLOPE OVER NATURAL DESCENDING SLOPE



DAYLIGHT CUT AREA OVER NATURAL DESCENDING SLOPE



GEOTEK

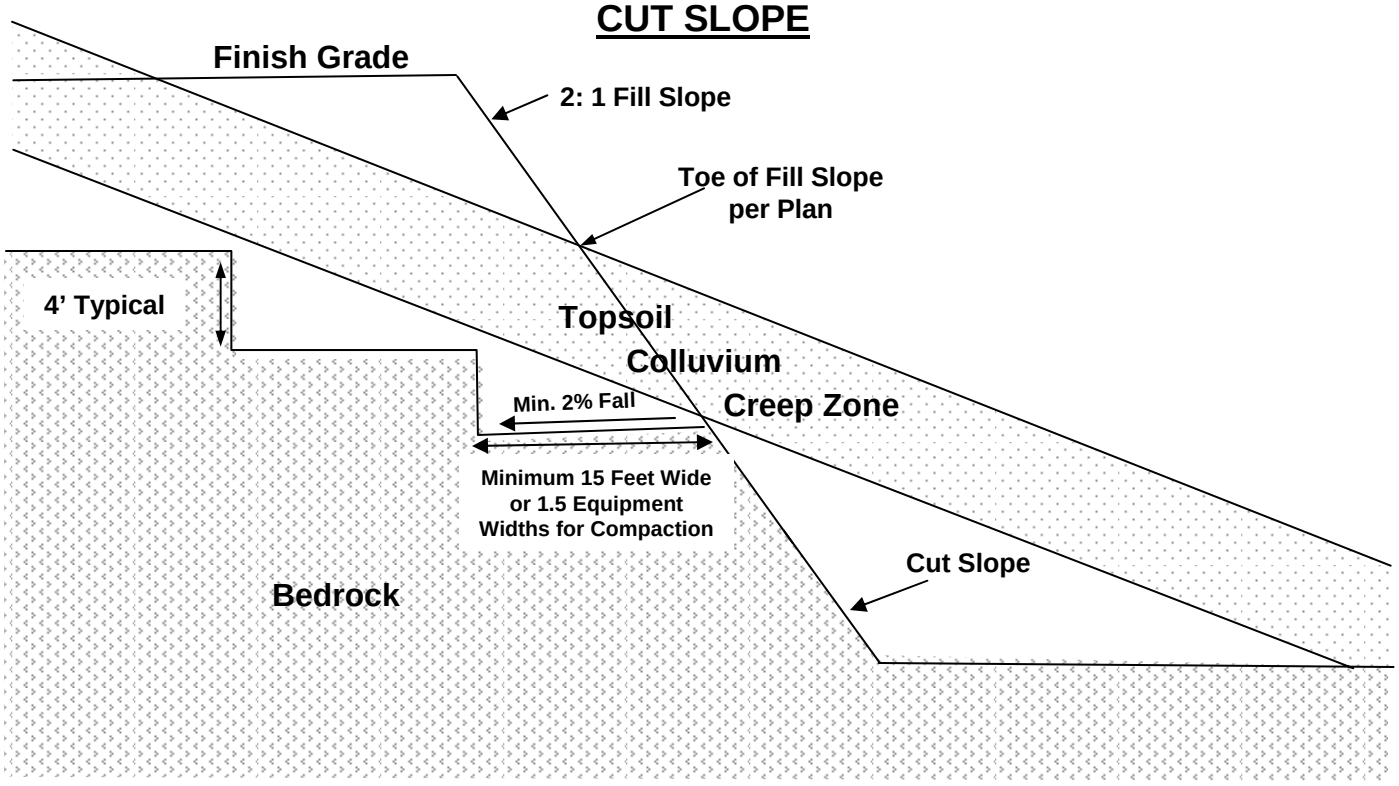
154 North Main Street
Corona, California 92882

TREATMENT ABOVE NATURAL SLOPES

STANDARD GRADING GUIDELINES

PLATE D-2

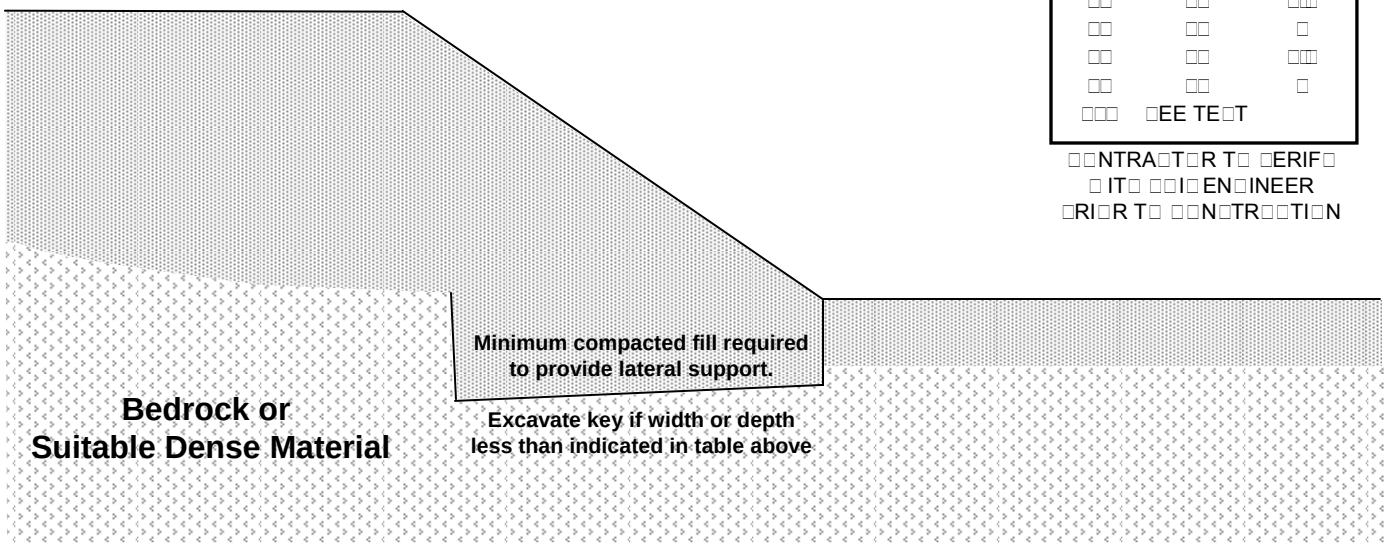
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TYPICAL FILL SLOPE

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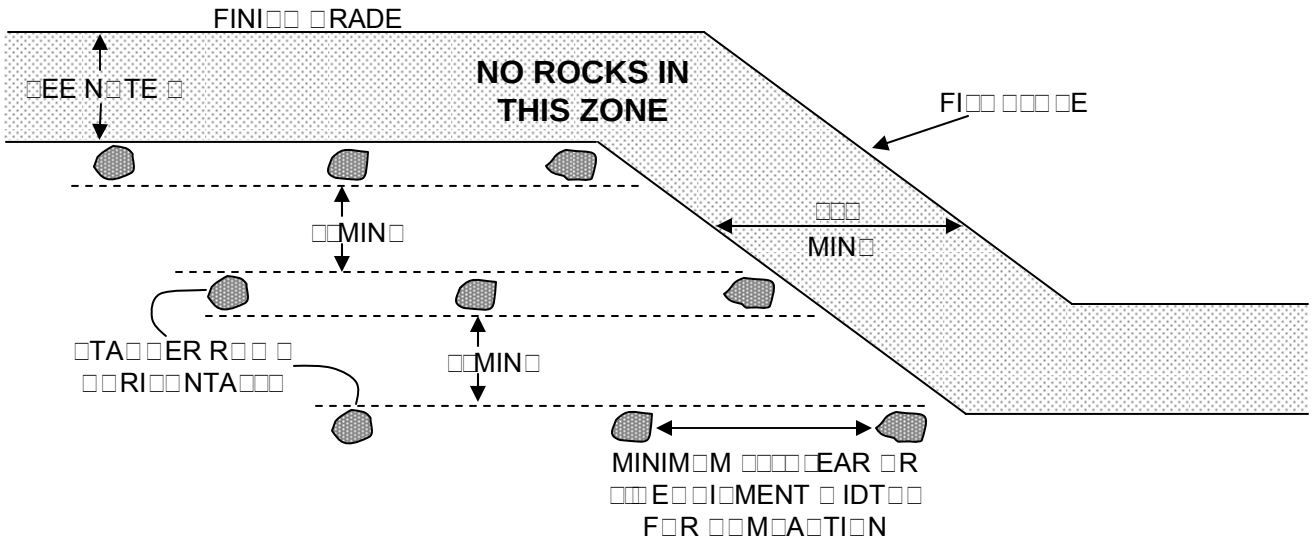
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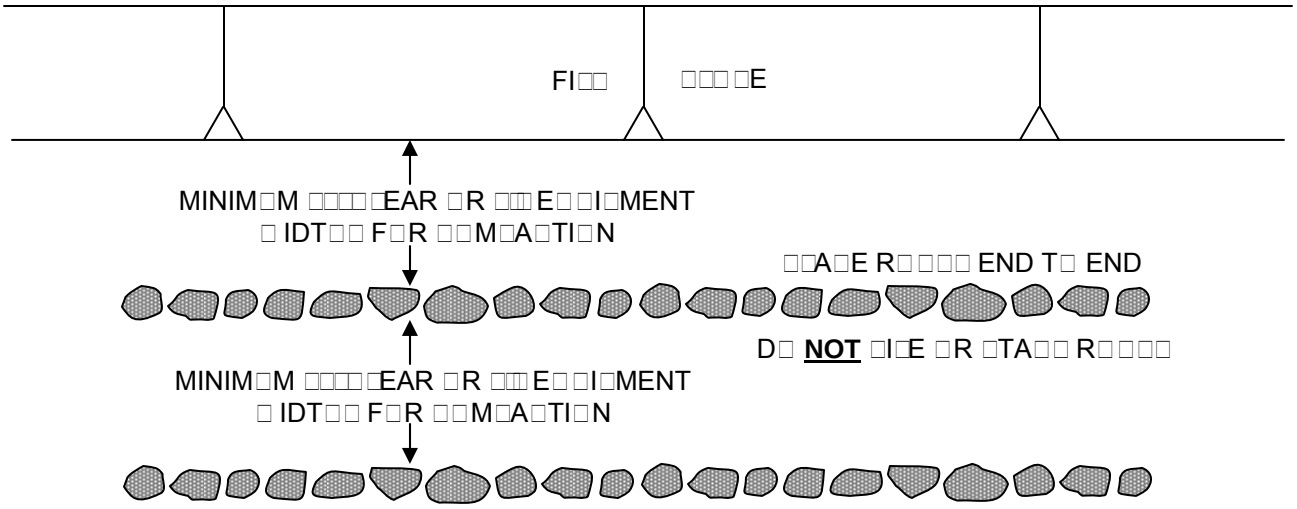
STANDARD GRADING GUIDELINES

PLATE D-3

CROSS SECTIONAL VIEW



PLAN VIEW



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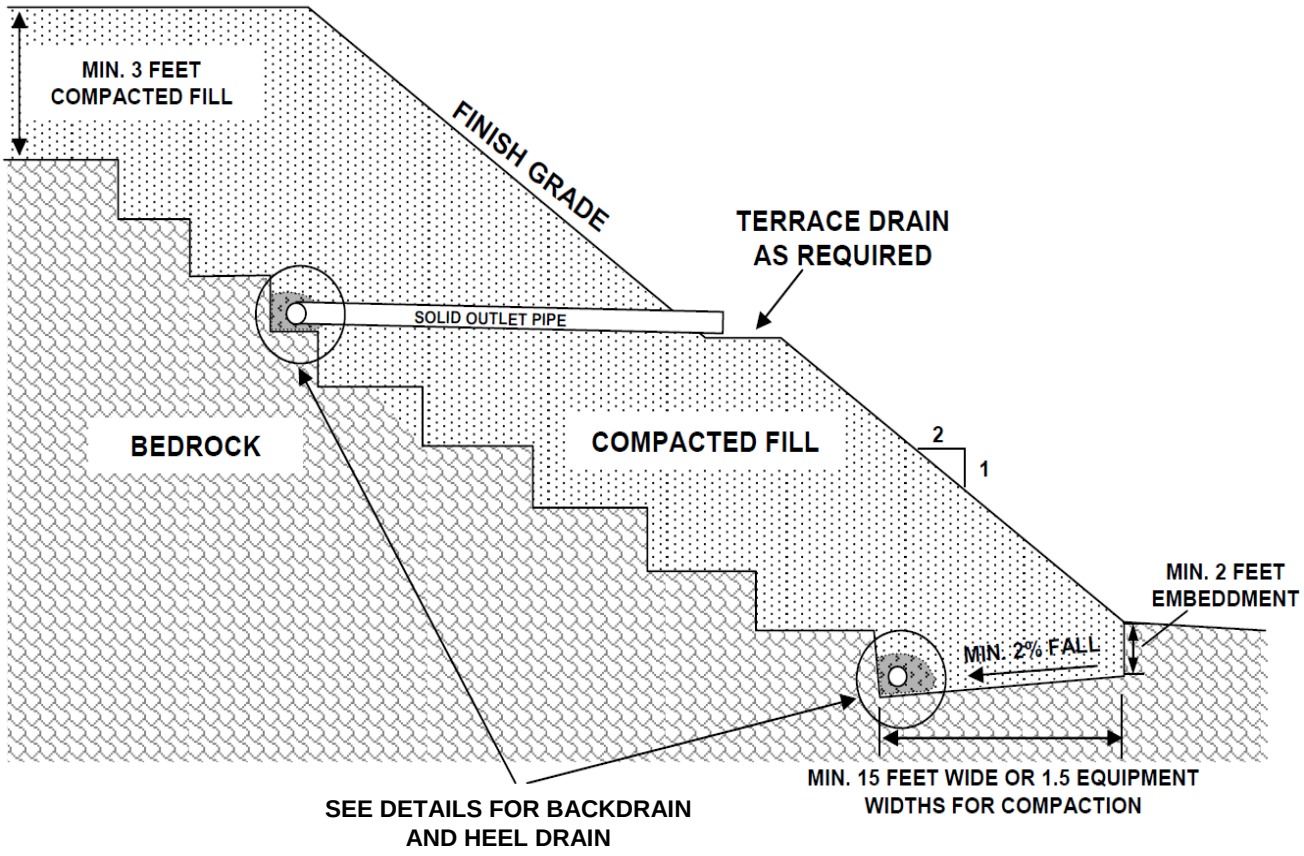
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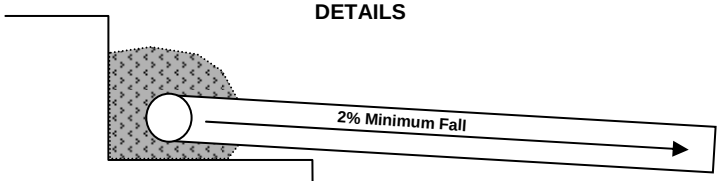
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BACKDRAIN DETAILS



4" diameter perforated drain pipe (Schedule 40 PVC or equivalent) in 6 cubic feet per lineal foot clean gravel wrapped in filter fabric

4" diameter solid outlet pipe (Schedule 40 PVC or equivalent) laterals to slope face or storm drain system at maximum 100 foot maximum intervals

Note: Additional backdrains may be recommended

HEEL DRAIN DETAILS



6" diameter perforated drain pipe in 6 cubic feet per lineal foot clean gravel wrapped in filter fabric, outlet pipe to gravity flow with 2% minimum fall

GEOTEK

154 North Main Street
Corona, California 92882

TYPICAL BUTTRESS AND STABILIZATION FILL

STANDARD GRADING GUIDELINES

PLATE D-5

Appendix EF
Traffic Impact Analysis Report

LINSCOTT LAW & GREENSPAN engineers

TRAFFIC IMPACT ANALYSIS REPORT
BUFFALO TRADING POST PLAZA

Apple Valley, California

December 12, 2022

(Update of June 16, 2022 Report)

Prepared for:

66 LLC
4490 Ayers Avenue
Vernon, CA 90058

LLG Ref. 2-19-4173-1



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EXECUTIVE SUMMARY

Project Description

- The proposed Project is located on the southeast quadrant of US Highway 18 (Happy Trails Highway) and Rancherias Road in the Town of Apple Valley, San Bernardino County, California. The proposed Project includes construction of a mixed-use commercial center with a total floor area of 79,969 square-feet (SF) that will consist of a 20,559 SF supermarket, 5,700 SF tire store, 2,305 SF fast-food restaurant with drive-through window, 950 SF coffee shop with drive-through window, a 5,265 SF express car wash with 140 feet of tunnel, 12-fueling position gasoline station with 2,500 SF convenience store, a 7,650 SF fast casual restaurant building, and a future development of 35,000 SF retail. Parking for the Project will be provided via a surface parking lot with 247 parking spaces. Main access to the Project site will be provided via one (1) full-access driveway on Rancherias Road, one (1) right-in/right-out driveway on Rancherias Road, and one (1) right-in/right-out driveway on US Highway 18. The Project is anticipated to be completed and fully occupied by Year 2025.

- The proposed Project is expected to generate 8,750 daily "net" trips (one half arriving, one half departing), with 339 "net" trips (189 inbound, 150 outbound) produced in the AM peak hour and 563 "net" trips (284 inbound, 279 outbound) produced in the PM peak hour.

Study Area

- Thirteen (13) existing key study intersections were designated for evaluation based on Town of Apple Valley Traffic Impact Analysis (TIA) criteria and coordination with Caltrans and Town staff. The key intersections selected for evaluation in this report provide access to the study area and are listed as follows:

1. Apple Valley Road at US Highway 18 (Apple Valley/Caltrans)
2. Kasota Road at US Highway 18 (Apple Valley/Caltrans)
3. Corwin Road at US Highway 18 (Apple Valley/Caltrans)
4. Tao Road at US Highway 18 (Apple Valley/Caltrans)
5. Rimrock Road/Piute Road at US Highway 18 (Apple Valley/Caltrans)
6. Rancherias Road at Thunderbird Road (Apple Valley)
7. Rancherias Road at US Highway 18 (Apple Valley/Caltrans)
8. Rancherias Road at Tomahawk Road (Apple Valley)
9. Bass Hill Road at US Highway 18 (Apple Valley/Caltrans)
10. Dale Evans Parkway at US Highway 18 (Apple Valley/Caltrans)
11. Flathead Road at US Highway 18 (Apple Valley/Caltrans)
12. Kiowa Road at US Highway 18 (Apple Valley/Caltrans)
13. Navajo Road at US Highway 18 (Apple Valley/Caltrans)

Cumulative Projects Description

- The ten (10) cumulative projects are expected to generate 10,777 daily trips (one half arriving, one half departing) on a "typical" weekday, with 656 trips forecast during the AM peak hour and 781 trips forecast during the PM peak hour.

Traffic Impact Analysis

Existing Traffic Conditions

- For the Existing traffic conditions, one (1) of the thirteen (13) key study intersections currently operates at unacceptable levels of service during the AM peak hour when compared to the LOS standards defined in this report. The remaining twelve (12) key study intersections currently operate at acceptable levels of service during the AM and PM peak hours. The intersection operating at adverse levels of service is:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
12. Kiowa Road at US Highway 18	143.0	F	--	--

Existing With Project Traffic Conditions

- For the Existing With Project traffic conditions, one (1) of the thirteen (13) key study intersection is forecast to continue to operate at unacceptable levels of service during the AM peak hour when compared to the LOS standards defined in this report. The remaining twelve (12) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersection forecast to operate at adverse levels of service is:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
12. Kiowa Road at US Highway 18	135.3	F	--	--

One (1) of the thirteen (13) key study intersections will have a significant impact under the Existing With Project traffic conditions when compared to the LOS criteria defined in this report. However, the implementation of recommended mitigation measures at the impacted intersection mitigates the impacts of the proposed Project. After implementation of the recommended mitigation measures, the impacted intersection is forecast to operate at an acceptable LOS based on the LOS standards outlined in this report.

Year 2025 With Project Traffic Conditions

- For the Year 2025 With Project traffic conditions, one (1) of the thirteen (13) key study intersections are forecast to continue to operate at unacceptable levels of service during the AM peak hour when compared to the LOS standards defined in this report. The remaining twelve (12) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersection operating at adverse levels of service is:

Key Intersection	AM Peak Hour Delay (s/v)	AM Peak Hour LOS	PM Peak Hour Delay (s/v)	PM Peak Hour LOS
12. Kiowa Road at US Highway 18	123.9	F	--	--

One (1) of the thirteen (13) key study intersections will have a cumulative significant impact under the Year 2025 With Project traffic conditions when compared to the LOS criteria defined in this report. However, the implementation of recommended mitigation measures at the impacted intersection mitigates the impacts of the proposed Project. After implementation of the recommended mitigation measures, the impacted intersection is forecast to operate at better service levels than pre-Project conditions and improve or maintain existing service levels.

Project-Specific Improvements

- The following Project design features are to be implemented in conjunction with development of the proposed Project to ensure adequate access and egress to the site is provided:
  - Intersection 7. Rancherias Road at US Highway 18: Widen and restripe the northbound approach to provide a second northbound through lane and a free northbound right-turn lane. Modify the existing traffic signal phasing to protected/permissive on Rancherias Road (north-south directions).

Recommended Improvements

Existing With Project Traffic Conditions

- The results of the Existing With Project traffic conditions level of service analyses indicate that the proposed Project will significantly impact one (1) of the thirteen (13) key study intersections. The remaining twelve (12) key study intersections are forecast to operate at acceptable levels of service under the Existing With Project traffic conditions. The improvements listed below have been identified to address the traffic impacts at the intersection significantly impacted by the Existing With Project traffic:
  - Intersection 12. Kiowa Road at US Highway 18: Modify the existing traffic signal to an eight-phase signal to provide Kiowa Road with protected left-turn phasing (north-south directions).

Year 2025 With Project Traffic Conditions

- The results of the Year 2025 With Project traffic conditions level of service analyses indicate that the proposed Project will significantly impact one (1) of the thirteen (13) key study intersections. The remaining twelve (12) key study intersections are forecast to operate at acceptable levels of service under the Year 2025 With Project traffic conditions. The

improvements listed below have been identified to address the traffic impacts at the intersection significantly impacted by the Year 2025 With Project traffic:

- Intersection 12. Kiowa Road at US Highway 18: Modify the existing traffic signal to an eight-phase signal to provide Kiowa Road with protected left-turn phasing (north-south directions).

Project Fair Share Analysis

Year 2025 With Project Traffic Conditions

- The Project fair share percentage (worse time period impacted) for the one (1) cumulatively impacted intersection for the Year 2025 With Project traffic conditions is shown below:
  - 12. Kiowa Road at US Highway 18 33.22%

Site Access and Internal Circulation Evaluation

- The Project driveways are forecast to operate at acceptable levels of service during the AM and PM peak hours under the Year 2025 With Project traffic conditions.

- The on-site circulation was evaluated in terms of vehicle-pedestrian conflicts. Based on our review of the preliminary site plan, the overall layout does not create significant vehicle-pedestrian conflict points such that access for the Project are not impacted by internal vehicle queuing/stacking. Project traffic is not anticipated to cause significant internal queuing/stacking at the Project driveways. The alignment and spacing of the Project driveways are also deemed adequate. Turning movements into and out of the Project site at the Project driveways are anticipated to operate at acceptable service levels. As such, motorists entering and exiting the Project site from this driveway will be able to do so comfortably, safely, and without undue congestion.

- Based on the proposed storage at the intersections of Rancherias Road at US Highway 18 and Rancherias Road at Project Driveway 1, adequate storage is provided. Therefore, no modifications to the proposed pockets are required.

Multi-Modal Circulation

- The multi-modal circulation plan (vehicular, pedestrian, bicycle, public transit) associated with the Project site, includes connections between sidewalks, signalized crosswalks, bicycle connections/access to the site, and access to nearby public transit stops. Pedestrian circulation is provided via proposed new public sidewalks along both the Highway 18 and Rancherias Road Project frontages as well as crosswalk connect across Rancherias Road to the west and Highway 18 to the north. The existing pedestrian network to the east of the Project site provides direct connectivity to the existing Victor Valley Transit Bus Stop 2010 along eastbound Highway 18 at Bass Hill Road for both pedestrians and bicycles.

SB 743 VMT Assessment

- For the VMT screening analysis, the project was analyzed using the project screening criteria identified in the *San Bernardino County Transportation Impact Study Guidelines (July 9, 2019)*. Projects which serve the local community and have the potential to reduce VMT should not be required to complete a VMT assessment, which includes local-serving retail less than 50,000 SF. Therefore, since the proposed Buffalo Trading Post Plaza Project consists of 79,969 SF of local-serving retail land uses with no building greater than 50,000 SF, this project could be screened from a VMT analysis and could be presumed a less than significant impact on VMT, per the *San Bernardino County Transportation Impact Study Guidelines (July 9, 2019)*.

TRAFFIC IMPACT ANALYSIS REPORT

BUFFALO TRADING POST PLAZA

Apple Valley, California

December 12, 2022

(Update of June 16, 2022 Report)

1.0 INTRODUCTION

This focused traffic impact analysis evaluates the potential traffic impacts of the proposed Buffalo Trading Post Plaza project (hereinafter referred to as Project), on the area traffic circulation. The proposed Project is located on the southeast quadrant of US Highway 18 (Happy Trails Highway) and Rancherias Road in the Town of Apple Valley, San Bernardino County, California. The proposed Project includes construction of a mixed-use commercial center with a total floor area of 79,969 square-feet (SF) that will consist of a 20,599 SF supermarket, 5,700 SF tire store, 2,305 SF fast-food restaurant with drive-through window, 950 SF coffee shop with drive-through window, a 5,265 SF express car wash with 140 feet of tunnel, 12-fueling position gasoline station with 2,500 SF convenience store, a 7,650 SF fast casual restaurant building, and a future development of 35,000 SF retail. Parking for the Project will be provided via a surface parking lot with 247 parking spaces. Main access to the Project site will be provided via one (1) full-access driveway on Rancherias Road, one (1) right-in/right-out driveway on Rancherias Road, and one (1) right-in/right-out driveway on US Highway 18. The Project is anticipated to be completed and fully occupied by Year 2025.

This report documents the findings and recommendations of a traffic impact analysis conducted by Linscott, Law & Greenspan, Engineers (LLG) to determine the potential impacts the Project may have on the local network in the vicinity of the Project site. The traffic impact analysis evaluates the operating conditions at thirteen (13) existing key study intersections within the Project vicinity, estimates the trip generation potential of the Project and forecasts future (near-term) operating conditions without and with the Project.

The Project site has been visited and an inventory of adjacent area roadways and intersections was performed. Existing (i.e. baseline) peak hour traffic information has been collected at the thirteen (13) key study intersections on a "typical" weekday for use in the preparation of intersection level of service calculations. This traffic report analyzes existing (i.e. baseline) and future (near-term) weekday AM and PM peak hour traffic conditions for Existing (i.e. baseline) and Year 2025 traffic conditions without and with the proposed Project. Peak hour traffic forecasts for the Year 2025 traffic conditions have been projected by increasing existing traffic volumes by an annual growth rate of two percent (2%) per year and adding the traffic from ten (10) cumulative projects.

The work program for this traffic study was developed in conjunction with the Town of Apple Valley Public Works Department staff and Caltrans staff. ***Appendix A*** contains a copy of the Town of Apple Valley Traffic Impact Study Scoping Agreement.

1.1 Study Area

The thirteen (13) existing key study intersections were designated for evaluation based on Town of Apple Valley Traffic Impact Analysis (TIA) criteria and coordination with Caltrans and Town staff. The key intersections selected for evaluation in this report provide access to the study area and are listed as follows:

1. Apple Valley Road at US Highway 18 (Apple Valley/Caltrans)
2. Kasota Road at US Highway 18 (Apple Valley/Caltrans)
3. Corwin Road at US Highway 18 (Apple Valley/Caltrans)
4. Tao Road at US Highway 18 (Apple Valley/Caltrans)
5. Rimrock Road/Piute Road at US Highway 18 (Apple Valley/Caltrans)
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7. Rancherias Road at US Highway 18 (Apple Valley/Caltrans)
8. Rancherias Road at Tomahawk Road (Apple Valley)
9. Bass Hill Road at US Highway 18 (Apple Valley/Caltrans)
10. Dale Evans Parkway at US Highway 18 (Apple Valley/Caltrans)
11. Flathead Road at US Highway 18 (Apple Valley/Caltrans)
12. Kiowa Road at US Highway 18 (Apple Valley/Caltrans)
13. Navajo Road at US Highway 18 (Apple Valley/Caltrans)

1.2 Traffic Impact Analysis Components

The Highway Capacity Manual (HCM) and corresponding Level of Service (LOS) calculations at the key study locations were used to evaluate the potential traffic-related impacts associated with area growth, cumulative projects, and the Project. When necessary, this report recommends intersection improvements that may be required to accommodate future traffic volumes and restore/maintain an acceptable Level of Service and/or addresses the impact of the Project.

Included in this Traffic Impact Analysis are:

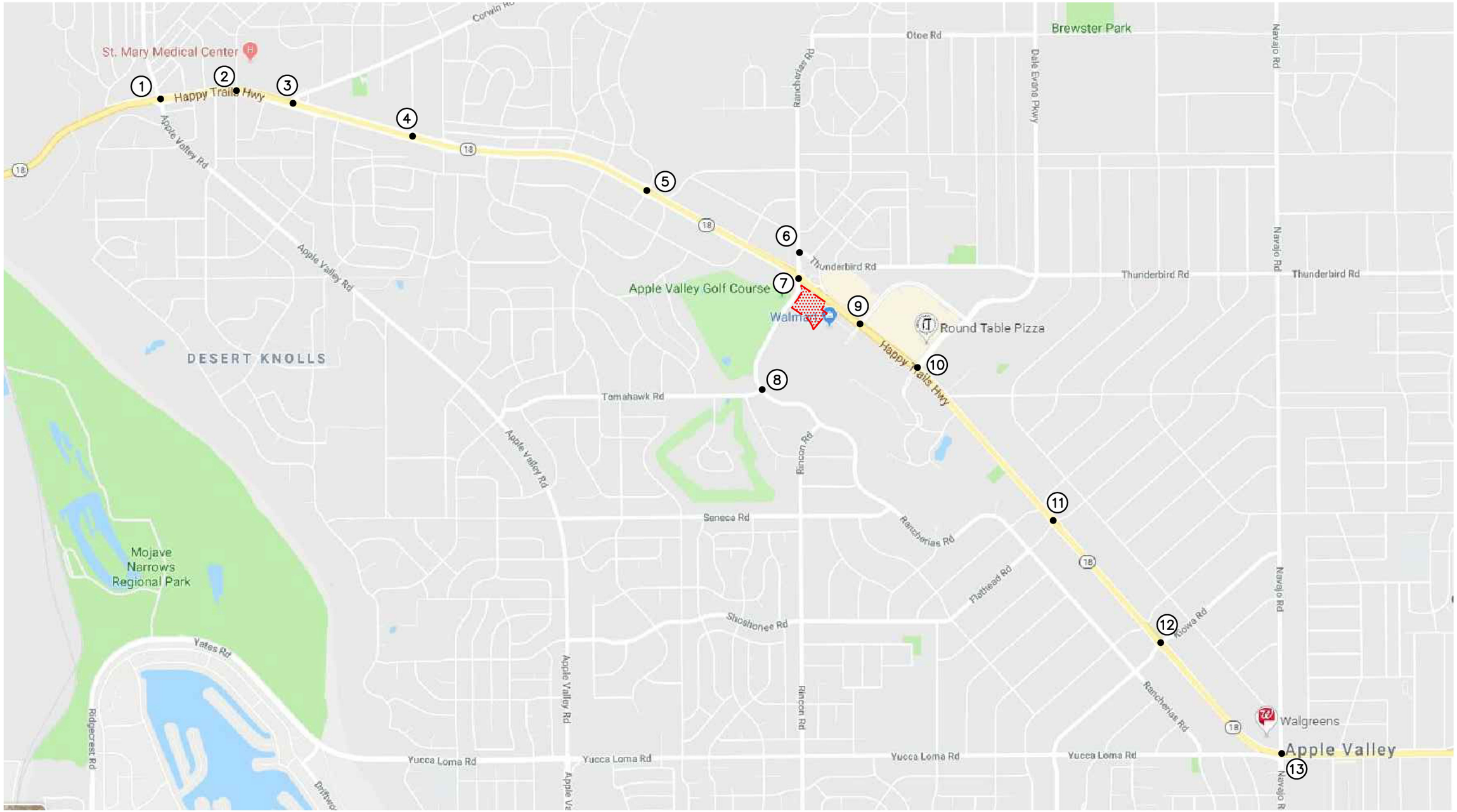
- Existing Traffic Counts,
- Estimated Project traffic generation/distribution/assignment,
- AM and PM peak hour LOS analyses for Existing (i.e. Baseline) Conditions,
- AM and PM peak hour LOS analyses for Existing (i.e. Baseline) Conditions with Project traffic,
- AM and PM peak hour LOS analyses for Near-Term (Year 2025) Conditions without and with Project traffic,
- Project-Specific Traffic Improvements, if any,
- Site Access and Internal Circulation Evaluation,
- Multi-Modal Assessment, and
- VMT Analysis.

Figure 1-1 presents a Vicinity Map, which illustrates the general location of the Project and depicts the study locations and surrounding street system.

1.3 Traffic Impact Analysis Scenarios

The following scenarios are those for which Delay and corresponding LOS calculations have been performed at the key intersections for existing and near-term (Year 2025) traffic conditions:

A. Existing (i.e. Baseline) Traffic Conditions,
B. Existing (i.e. Baseline) With Project Traffic Conditions,
C. Scenario (B) with Recommended Improvements, if any,
D. Year 2025 Without Project Traffic Conditions,
E. Year 2025 With Project Traffic Conditions, and
F. Scenario (E) With Recommended Improvements, if any.



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: GOOGLE

KEY

(#) = STUDY INTERSECTION

= PROJECT SITE

FIGURE 1-1

VICINITY MAP

BUFFALO TRADING POST PLAZA, APPLE VALLEY

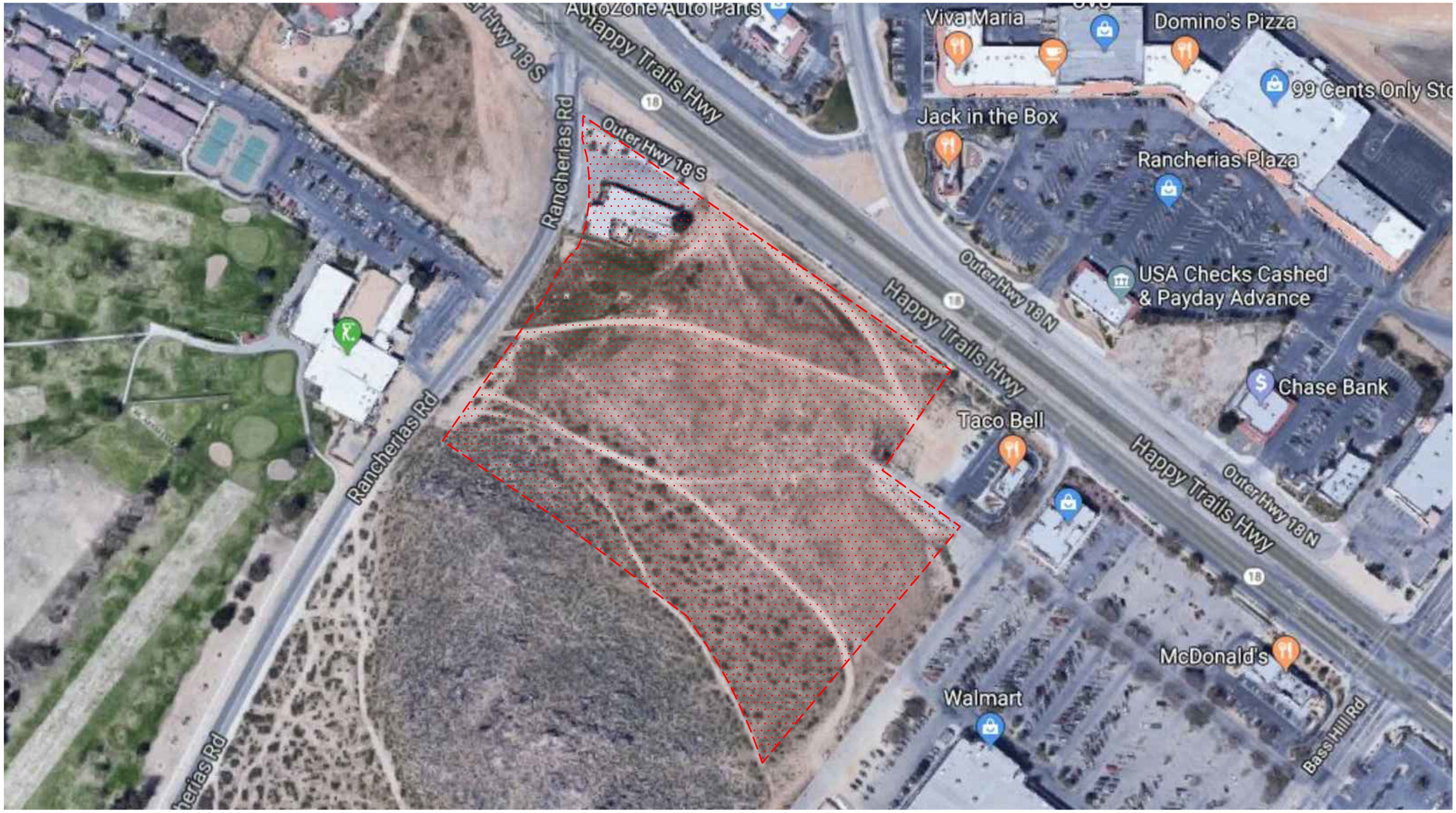
2.0 PROJECT DESCRIPTION AND LOCATION

The proposed Project is located on the southeast quadrant of US Highway 18 (Happy Trails Highway) and Rancherias Road in the Town of Apple Valley, San Bernardino County, California. The proposed Project includes construction of a mixed-use commercial center with a total floor area of 79,969 square-feet (SF) that will consist of a 20,599 SF supermarket, 5,700 SF tire store, 2,305 SF fast-food restaurant with drive-through window, 950 SF coffee shop with drive-through window, a 5,265 SF express car wash with 140 feet of tunnel, 12-fueling position gasoline station with 2,500 SF convenience store, a 7,650 SF fast casual restaurant building, and a future development of 35,000 SF retail. Parking for the Project will be provided via a surface parking lot with 247 parking spaces. The Project is anticipated to be completed and fully occupied by Year 2025.

Figure 2-1 presents an aerial depiction of the existing site for the proposed Project. ***Figure 2-2*** presents the proposed site plan, prepared by McKently Malak Architects.

2.1 Site Access

As shown in *Figure 2-2*, main access to the Project site will be provided via one (1) full-access driveway on Rancherias Road, one (1) right-in/right-out driveway on Rancherias Road, and one (1) right-in/right-out driveway on US Highway 18.



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LINSCOTT LAW & GREENSPAN engineers

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SOURCE: GOOGLE

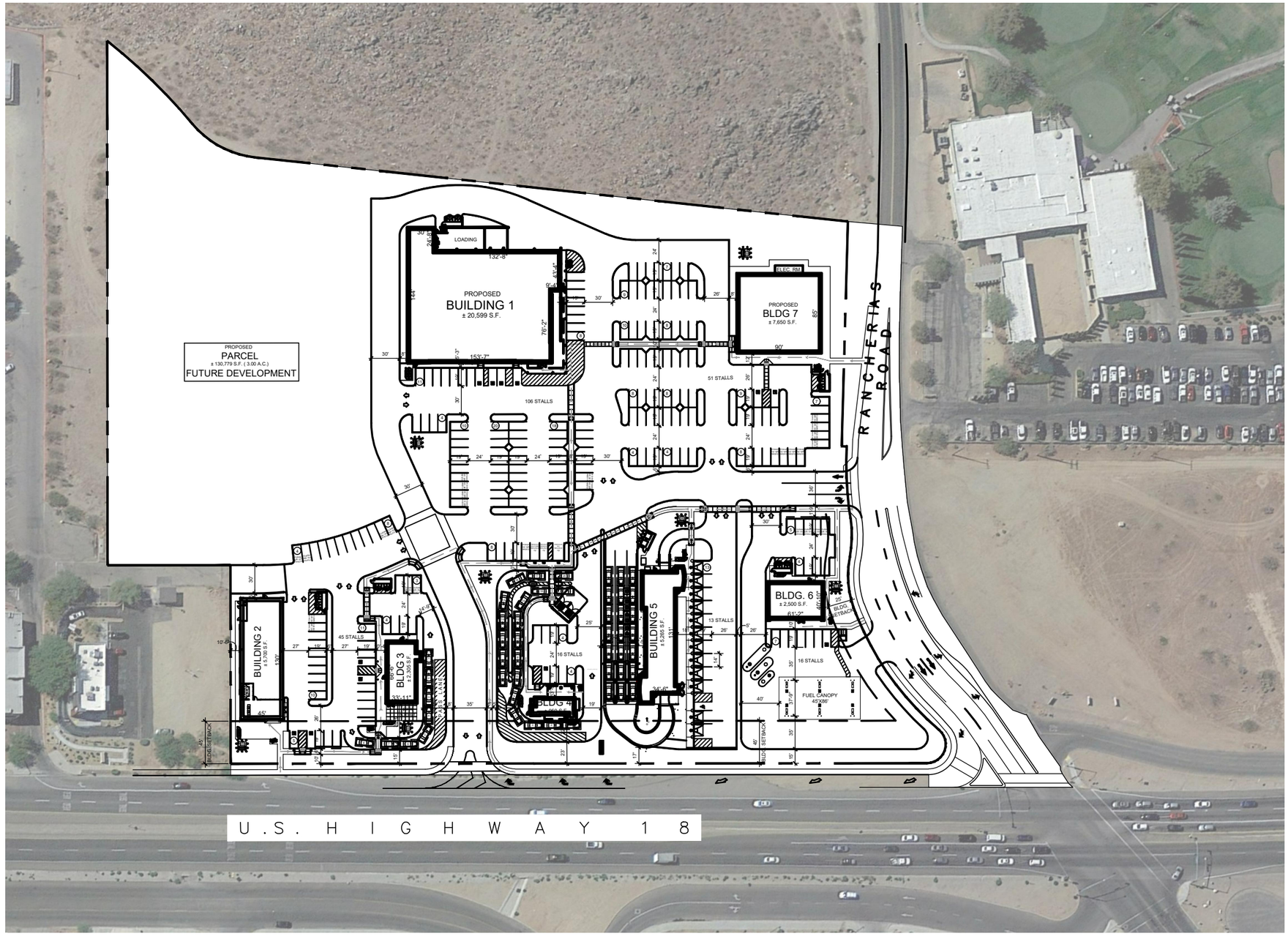
KEY

= PROJECT SITE

FIGURE 2-1

EXISTING SITE AERIAL

BUFFALO TRADING POST PLAZA, APPLE VALLEY



SOURCE: McKENTLY MALAK ARCHITECTS

LINSCOTT LAW & GREENSPAN engineers

NO SCALE

FIGURE 2-2

PROPOSED SITE PLAN

66 LLC COMMERCIAL CENTER, APPLE VALLEY

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3.0 ANALYSIS CONDITIONS AND METHODOLOGY

The principal local network of streets serving the site consists of US Highway 18, Rancherias Road, and Apple Valley Road. The following discussion provides a brief synopsis of the key area streets.

3.1 Existing Street Network

US Highway 18 is a four-lane divided roadway. It borders the northern frontage of the Project and provides right-in/right-out access to the site. Parking is restricted on both sides of the roadway within the vicinity of the Project. US Highway 18 has a posted speed limit of 45 miles per hour (mph). The intersections of US Highway 18 at Apple Valley Road, Corwin Road, Tao Road, Rancherias Road, Bass Hill Road, Dale Evans Parkway, Flathead Road, Kiowa Road, and Navajo Road are controlled by a traffic signal. The intersection of US Highway 18 at Rimrock Road/Piute Road is stop controlled.

Rancherias Road is a two-lane undivided roadway. It borders the eastern frontage of the Project and provides full access to the site. Parking is restricted on both sides of the roadway within the vicinity of the Project. Rancherias Road has a posted speed limit of 35 mph north of US Highway 18, 45 mph between US Highway 18 and Tomahawk Road, and 35 mph south of Tomahawk Road. The intersection of Rancherias Road at US Highway 18 is controlled by a traffic signal. The intersections of Rancherias Road at Thunderbird Road and Tomahawk Road are stop controlled.

Apple Valley Road is a two-lane divided roadway. Parking is not permitted on either side of the roadway. The posted speed limit on Apple Valley Road is 55 mph. The intersection of Apple Valley Road is controlled by a traffic signal.

Figure 3-1 presents an inventory of the existing roadway conditions within the study area evaluated in this report. The number of travel lanes and intersection controls for the key area study intersections are identified.

3.1.1 *Public Transit*

Public transit bus services are provided in the project area by the Victor Valley Transportation Authority (VVTA). Two (2) VVTA bus route operates within the vicinity of the Project site on US Highway 18, which consists of the following:

- VVTA Route 40: Route 40 runs from Apple Valley Post Office to Walmart. The major routes of travel are Thunderbird Road and Central Road. Route 40 currently operates on approximately 120-minute headways on the weekdays and weekends.

- VVTA Route 41: Route 41 runs from Apple Valley Post Office to Victor Valley Transit Center. The major route of travel is US Highway 18. Route 41 operates on approximately 90-minute headways on the weekdays and weekends.

It should be noted that it is our understanding that due to the current COVID-19 environment, VVTA routes have implemented temporary service reductions.

3.2 Existing Area Traffic Volumes

Existing AM and PM peak hour traffic volumes for the thirteen (13) key study intersections evaluated in this report, were collected by *Counts Unlimited, Inc.* in April 2022. ***Appendix B*** contains the existing intersection turning movement traffic count data.

Figures 3-2 and ***3-3*** present the existing AM and PM peak hour traffic volumes, respectively, for the thirteen (13) existing key study intersections.

3.3 Level Of Service (LOS) Analysis Methodologies

AM and PM peak hour operating conditions for the key study intersections were evaluated using the methodology outlined in *Chapter 19 of the Highway Capacity Manual 6 (HCM 6)* for signalized intersections and the methodology outlined in *Chapter 20 of the HCM 6* for two-way stop-controlled intersections. Daily operating conditions the key study roadway segments were evaluated using the Volume to Capacity methodology.

3.3.1 *Highway Capacity Manual (HCM) Method of Analysis (Signalized Intersections)*

In conformance with Town of Apple Valley requirements, AM and PM peak hour operating conditions for the key study intersections were evaluated using the HCM operations method of analysis. Based on the HCM operations method of analysis, level of service for signalized intersections and approaches is defined in terms of control delay, which is a measure of the increase in travel time due to traffic signal control, driver discomfort, and fuel consumption. Control delay includes the delay associated with vehicles slowing in advance of an intersection, the time spent stopped on an intersection approach, the time spent as vehicles move up in the queue, and the time needed for vehicles to accelerate to their desired speed. LOS criteria for traffic signals are stated in terms of the control delay in seconds per vehicle. The LOS thresholds established for the automobile mode at a signalized intersection are shown in ***Table 3-1***.

3.3.2 *Highway Capacity Manual (HCM) Method of Analysis (Unsignalized Intersections)*

The HCM unsignalized methodology for stop-controlled intersections was utilized for the analysis of the unsignalized intersections. LOS criteria for unsignalized intersections differ from LOS criteria for signalized intersections as signalized intersections are designed for heavier traffic and therefore a greater delay. Unsignalized intersections are also associated with more uncertainty for users, as delays are less predictable, which can reduce users' delay tolerance.

3.3.2.1 Two-Way Stop-Controlled Intersections

Two-way stop-controlled intersections are comprised of a major street, which is uncontrolled, and a minor street, which is controlled by stop signs. Level of service for a two-way stop-controlled intersection is determined by the computed or measured control delay. The control delay by movement, by approach, and for the intersection as a whole is estimated by the computed capacity for each movement. LOS is determined for each minor-street movement (or shared movement) as well as major-street left turns. The worst side street approach delay is reported. LOS is not defined for the intersection as a whole or for major-street approaches, as it is assumed that major-street

through vehicles experience zero delay. The HCM control delay value range for two-way stop-controlled intersections are shown in ***Table 3-2***.

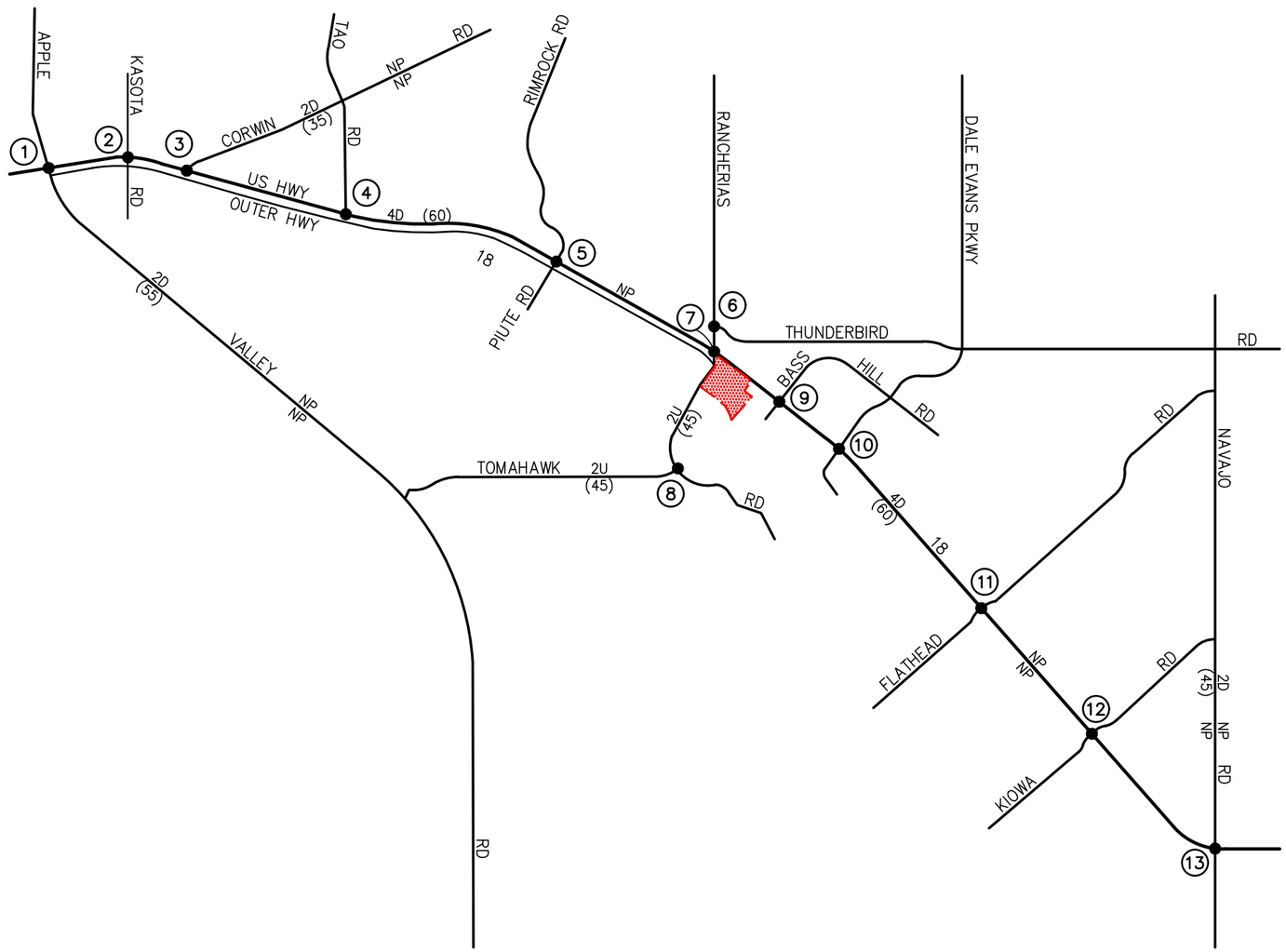
3.3.2.2 All-Way Stop-Controlled Intersections

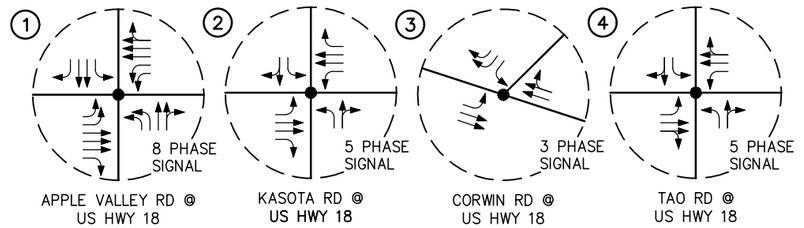
All-way stop-controlled intersections require every vehicle to stop at the intersection before proceeding. Because each driver must stop, the decision to proceed into the intersection is a function of traffic conditions on the other approaches. The time between subsequent vehicle departures depends on the degree of conflict that results between the vehicles and vehicles on the other approaches. This methodology determines the control delay for each lane on the approach, computes a weighted average for the whole approach, and computes a weighted average for the intersection as a whole. Level of service (LOS) at the approach and intersection levels is based solely on control delay. The HCM control delay value range for all-way stop-controlled intersections are shown in *Table 3-2*.

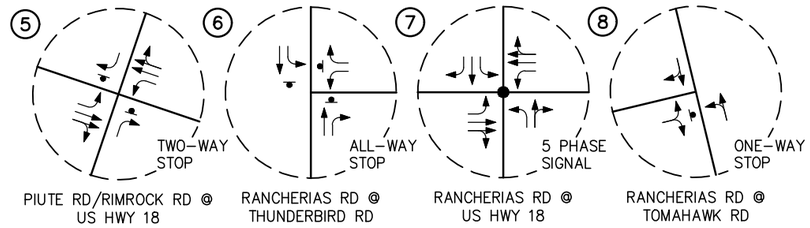
3.4 Impact Criteria and Thresholds

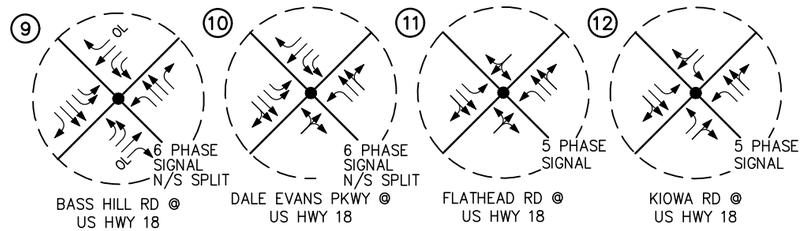
The *Congestion Management Program (CMP) for San Bernardino County* indicates that Level of Service (LOS) E shall be maintained at intersections and roadways. However, in order to provide a conservative analysis, LOS D shall be maintained at all intersections. Therefore, any intersections operating at LOS E or F shall be considered deficient.

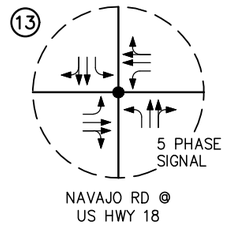
Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities. However, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. Caltrans has established that LOS D is the operating standard for all Caltrans facilities. Caltrans has determined that all state-owned facilities that operate below LOS D should be identified and improved to an acceptable LOS. The *SBCTA Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment (February 2020)* states that if an existing State-owned facility operates at less than the target LOS (i.e. LOS D); the existing service level should be maintained.











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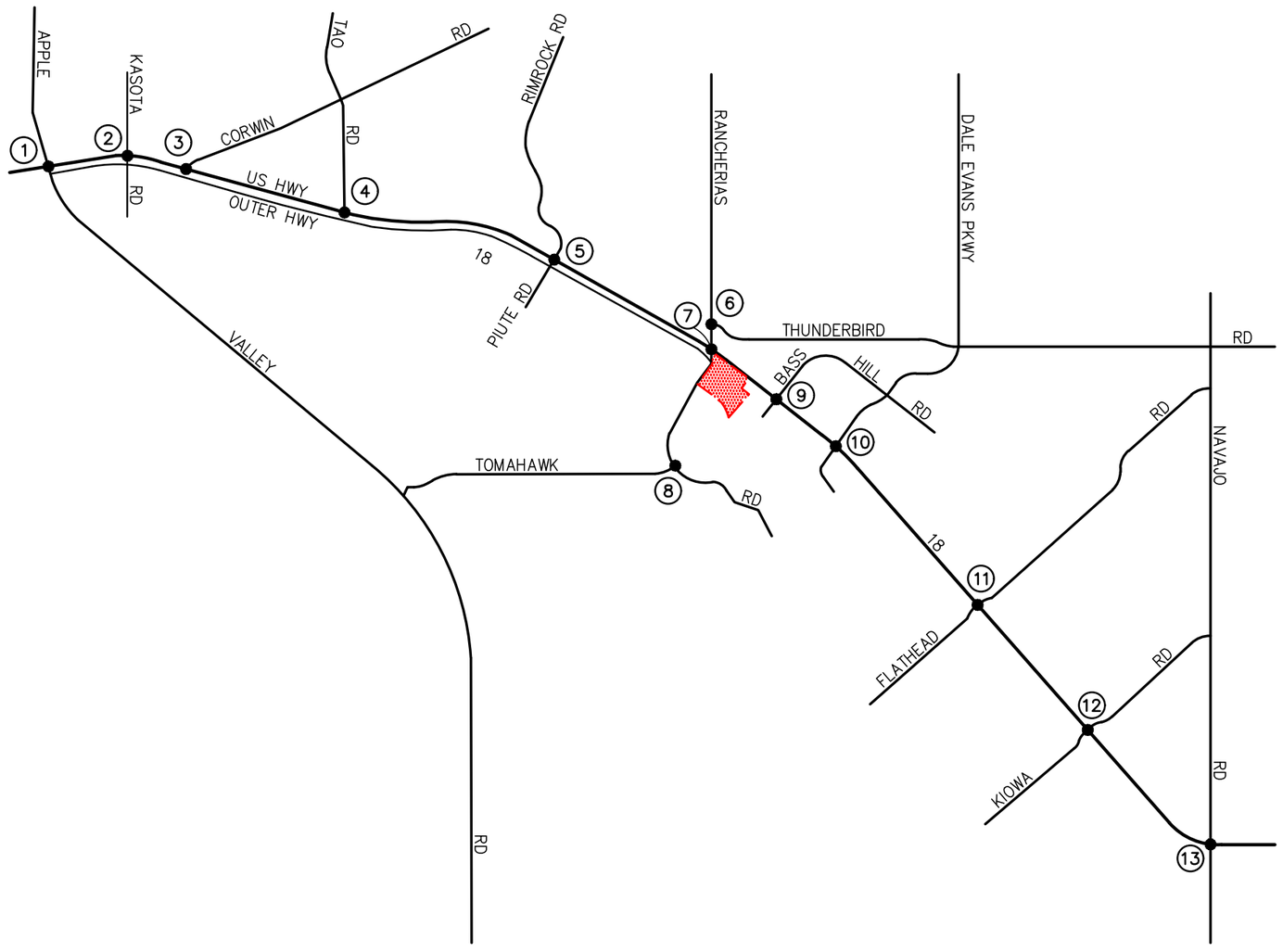
(#) = STUDY INTERSECTION
= APPROACH LANE ASSIGNMENT
● = TRAFFIC SIGNAL, ☛ = STOP SIGN
P = PARKING, NP = NO PARKING
U = UNDIVIDED, D = DIVIDED

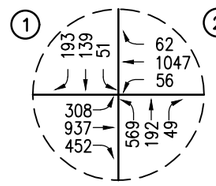
2 = NUMBER OF TRAVEL LANES
(XX)= POSTED SPEED LIMIT (MPH)
F = FREE-RIGHT, OL = OVERLAP
= PROJECT SITE

FIGURE 3-1

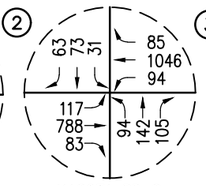
PROJECT TRIP DISTRIBUTION PATTERN

BUFFALO TRADING POST PLAZA, APPLE VALLEY

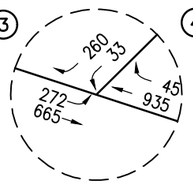




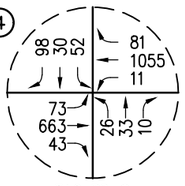
APPLE VALLEY RD @
US HWY 18



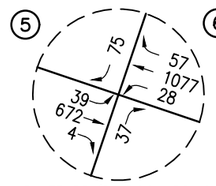
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US HWY 18



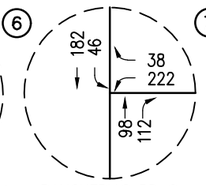
CORWIN RD @
US HWY 18



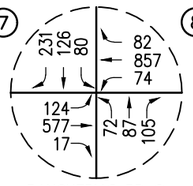
TAO RD @
US HWY 18



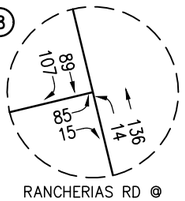
PIUTE RD/RIMROCK RD @
US HWY 18



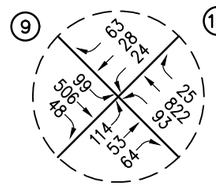
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THUNDERBIRD RD



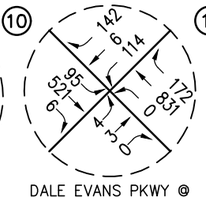
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US HWY 18



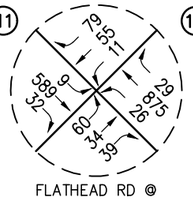
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TOMAHAWK RD



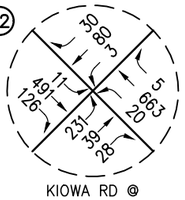
BASS HILL RD @
US HWY 18



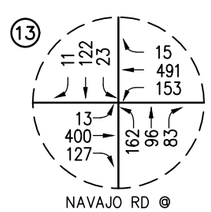
DALE EVANS PKWY @
US HWY 18



FLATHEAD RD @
US HWY 18



KIOWA RD @
US HWY 18



NAVAJO RD @
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LINSCOTT LAW & GREENSPAN engineers

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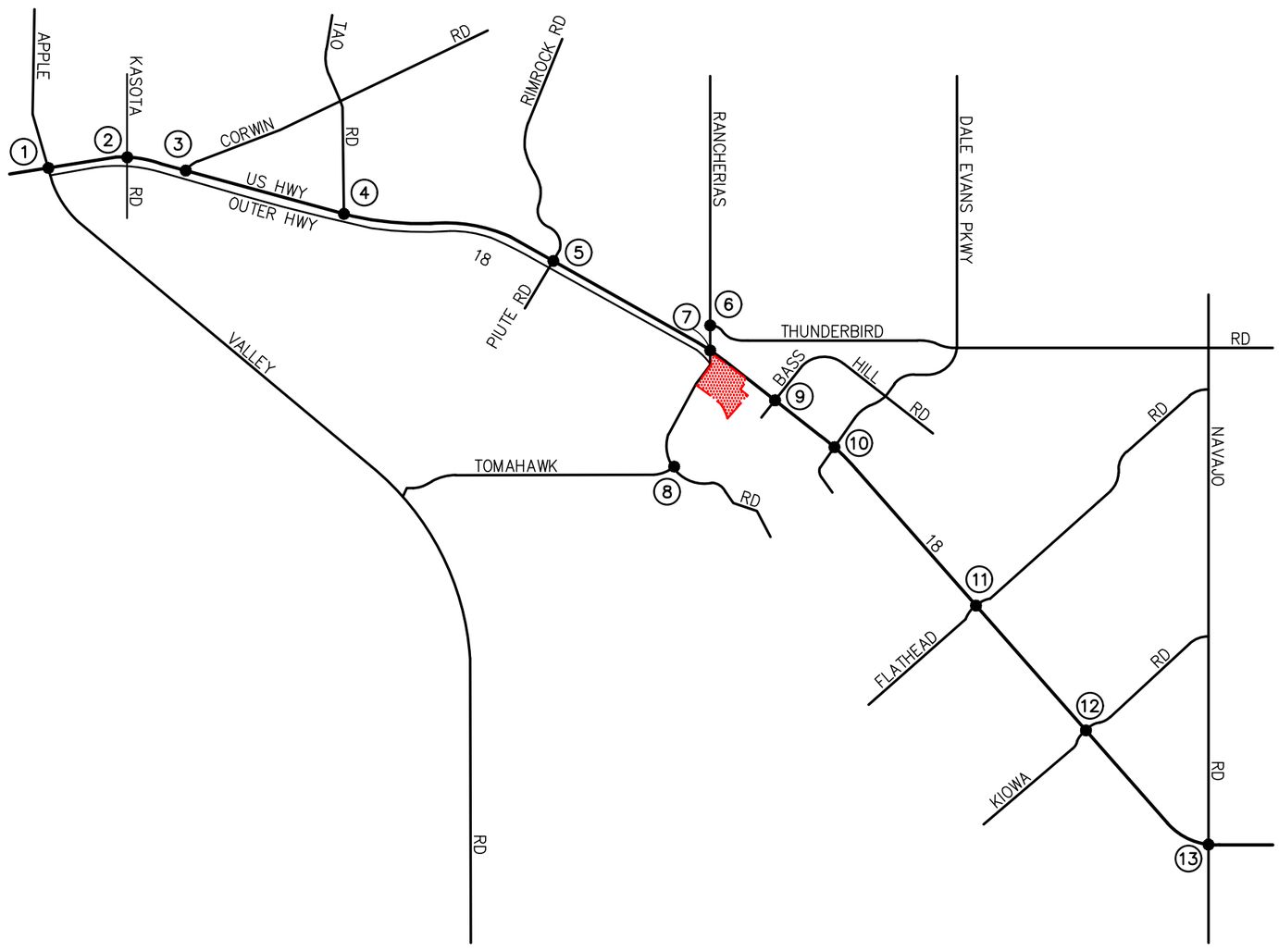
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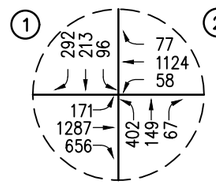
= PROJECT SITE

FIGURE 3-2

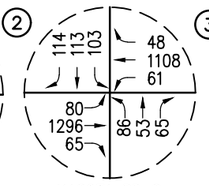
EXISTING AM PEAK HOUR TRAFFIC VOLUMES

BUFFALO TRADING POST PLAZA, APPLE VALLEY

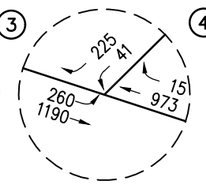




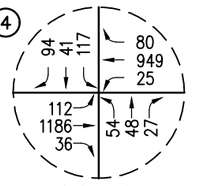
APPLE VALLEY RD @
US HWY 18



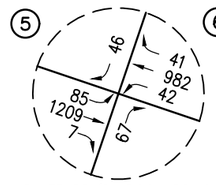
KASOTA RD @
US HWY 18



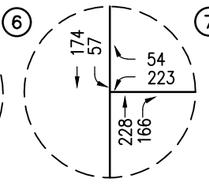
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US HWY 18



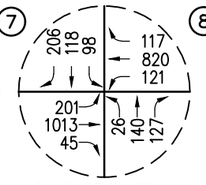
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US HWY 18



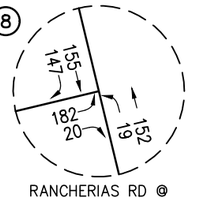
PIUTE RD/RIMROCK RD @
US HWY 18



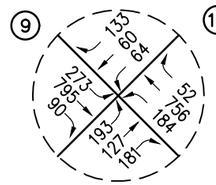
RANCHERIAS RD @
THUNDERBIRD RD



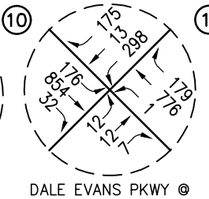
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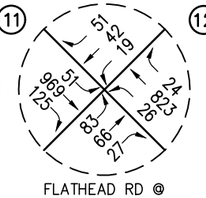
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TOMAHAWK RD



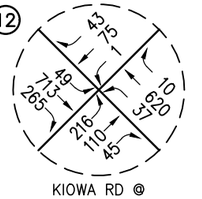
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US HWY 18



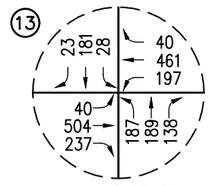
DALE EVANS PKWY @
US HWY 18



FLATHEAD RD @
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KIOWA RD @
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LINSCOTT LAW & GREENSPAN
engineers

N
NO SCALE

KEY
(#) = STUDY INTERSECTION
= PROJECT SITE

FIGURE 3-3

EXISTING PM PEAK HOUR TRAFFIC VOLUMES

BUFFALO TRADING POST PLAZA, APPLE VALLEY

TABLE 3-1

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS (HCM METHODOLOGY)[1]

Level of Service (LOS)	Control Delay Per Vehicle (seconds/vehicle)	Level of Service Description
A	$\leq$ 10.0	This level of service 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.
B	> 10.0 and $\leq$ 20.0	This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.
C	> 20.0 and $\leq$ 35.0	Average traffic delays. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
D	> 35.0 and $\leq$ 55.0	Long traffic delays At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high *v/c* ratios. Many vehicles stop and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	> 55.0 and $\leq$ 80.0	Very long traffic delays This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths and high *v/c* ratios. Individual cycle failures are frequent occurrences.
F	$\geq$ 80.0	Severe congestion This level, considered to be unacceptable to most drivers, often occurs with over saturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high *v/c* ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such delay levels.

[1] Source: *Highway Capacity Manual 6*, Chapter 19: Signalized Intersections.

TABLE 3-2

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM METHODOLOGY)[2,3]

Level of Service (LOS)	Highway Capacity Manual (HCM) Delay Per Vehicle (seconds/vehicle)	Level of Service Description
A	≤ 10.0	Little or no delay
B	> 10.0 and ≤ 15.0	Short traffic delays
C	> 15.0 and ≤ 25.0	Average traffic delays
D	> 25.0 and ≤ 35.0	Long traffic delays
E	> 35.0 and ≤ 50.0	Very long traffic delays
F	> 50.0	Severe congestion

[2] Source: *Highway Capacity Manual 6*, Chapter 20: Two-Way Stop-Controlled Intersections. The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.

[3] Source: *Highway Capacity Manual 6*, Chapter 21: All-Way Stop-Controlled Intersections. For approaches and intersection-wide assessment, LOS is defined solely by control delay.

4.0 TRAFFIC FORECASTING METHODOLOGY

In order to estimate the traffic impact characteristics of the Project, a multi-step process has been utilized. The first step is traffic generation, which estimates the total arriving and departing traffic on a peak hour and daily basis. The traffic generation potential is forecast by applying the appropriate vehicle trip generation equations and/or rates to the Project development tabulation.

The second step of the forecasting process is traffic distribution, which identifies the origins and destinations of inbound and outbound Project traffic. These origins and destinations are typically based on demographics and existing/expected future travel patterns in the study area.

The third step is traffic assignment, which involves the allocation of Project traffic to study area streets and intersections. Traffic assignment is typically based on minimization of travel time, which may or may not involve the shortest route, depending on prevailing operating conditions and travel speeds.

Traffic distribution patterns are indicated by general percentage orientation, while traffic assignment allocates specific volume forecasts to individual roadway segments and intersection turning movements throughout the study area.

With the forecasting process complete and Project traffic assignments developed, the impact of the Project is isolated by comparing operational (LOS) conditions at selected key intersections using expected future traffic volumes with and without forecast Project traffic. If necessary, the need for site-specific and/or cumulative local area traffic improvements can then be evaluated.

5.0 PROJECT TRAFFIC CHARACTERISTICS

5.1 Project Trip Generation Forecast

Traffic generation is expressed in vehicle trip ends, defined as one-way vehicular movements, either entering or exiting the generating land use. Generation equations and/or rates used in the traffic forecasting procedure are found in the *11th Edition of Trip Generation, published by the Institute of Transportation Engineers (ITE) [Washington D.C., 2021]*.

Based on the land use for the proposed Project, the average trip rates for ITE Land Use 822: Strip Retail Plaza Less Than 40k, ITE Land Use 848: Tire Store, ITE Land Use 850: Supermarket, ITE Land Use 930: Fast Casual Restaurant, ITE Land Use 934: Fast Food Restaurant With Drive Through Window and ITE Land Use 945: Gasoline Service Station with Convenience Market rates. Trip generation rates used for the express wash land use in the traffic forecasting procedure are based on the empirical trip generation estimates at Victorville Speedwash collected on February 7, 2014. The upper half of ***Table 5-1*** summarizes the trip generation rates used in forecasting the vehicular trips generated by the Project.

Review of the lower half of *Table 5-1* shows that the proposed Project is forecast to generate 8,750 daily "net" trips (one half arriving, one half departing), with 339 "net" trips (189 inbound, 150 outbound) produced in the AM peak hour and 563 "net" trips (284 inbound, 279 outbound) produced in the PM peak hour.

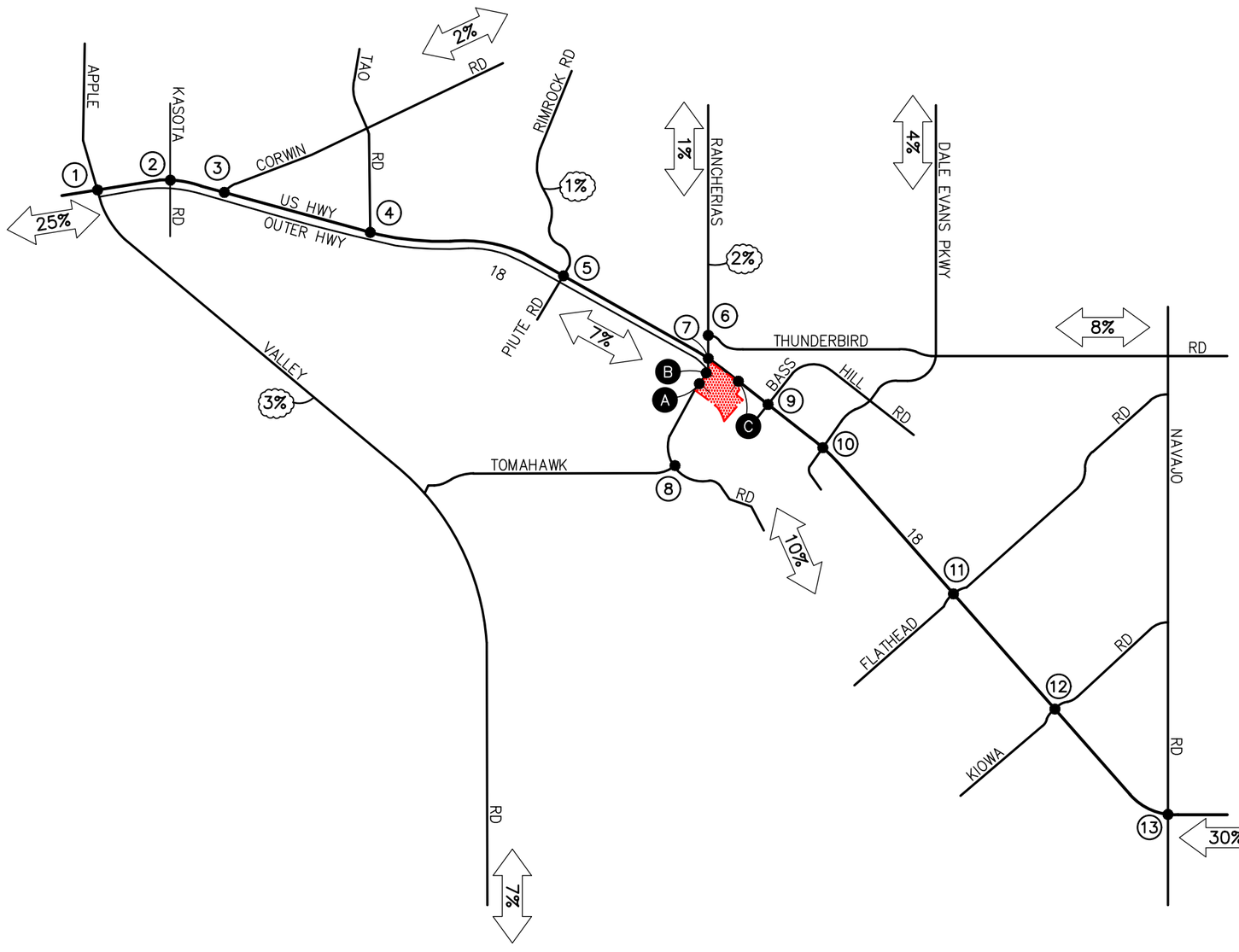
5.2 Project Trip Distribution and Assignment

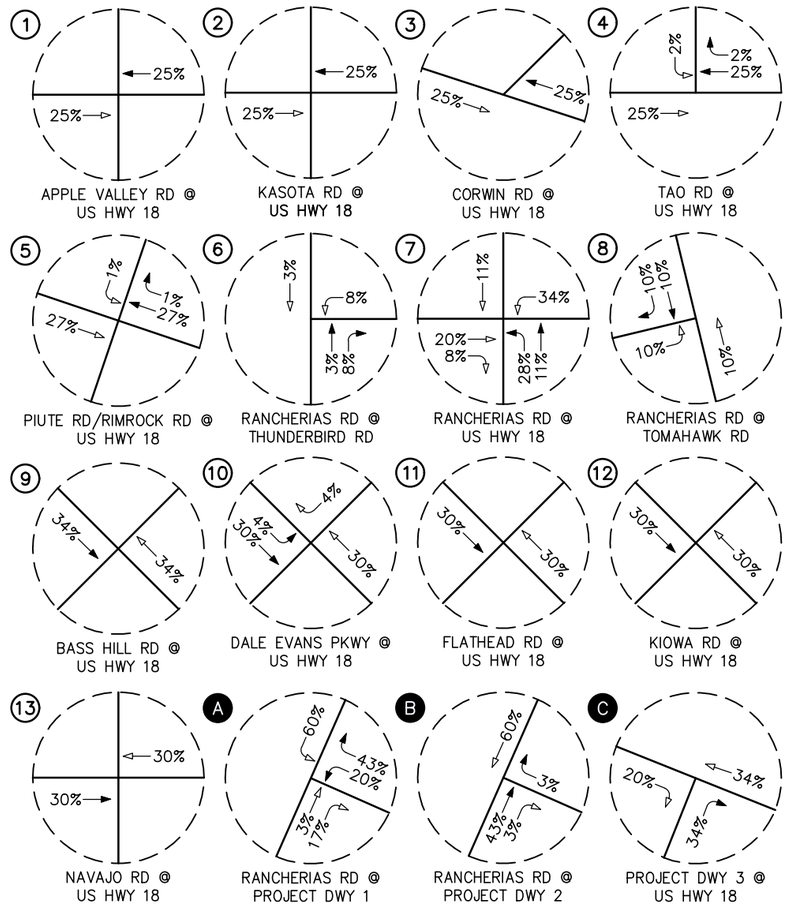
The directional trip distribution pattern for the Project is presented in ***Figure 5-1***. Project traffic volumes, both entering and exiting the site, have been distributed and assigned to the adjacent street system based on the following considerations:

- expected localized traffic flow patterns based on adjacent street channelization and presence of traffic signals;
- ingress/egress availability at the Project site; and
- the traffic-carrying capacity and travel speed available on roadways serving the Project site.

The Project trip distribution pattern was submitted to the Town staff for their review and approval prior to proceeding with further analyses.

The anticipated AM and PM peak hour Project traffic volumes at the thirteen (13) key study intersections and three (3) Project driveways are presented in ***Figures 5-2*** and ***5-3***, respectively. The traffic volume assignment presented in the above-mentioned figures reflect the traffic distribution characteristics shown in *Figure 5-1* and the traffic generation forecast presented in the lower portion of *Table 5-1*.





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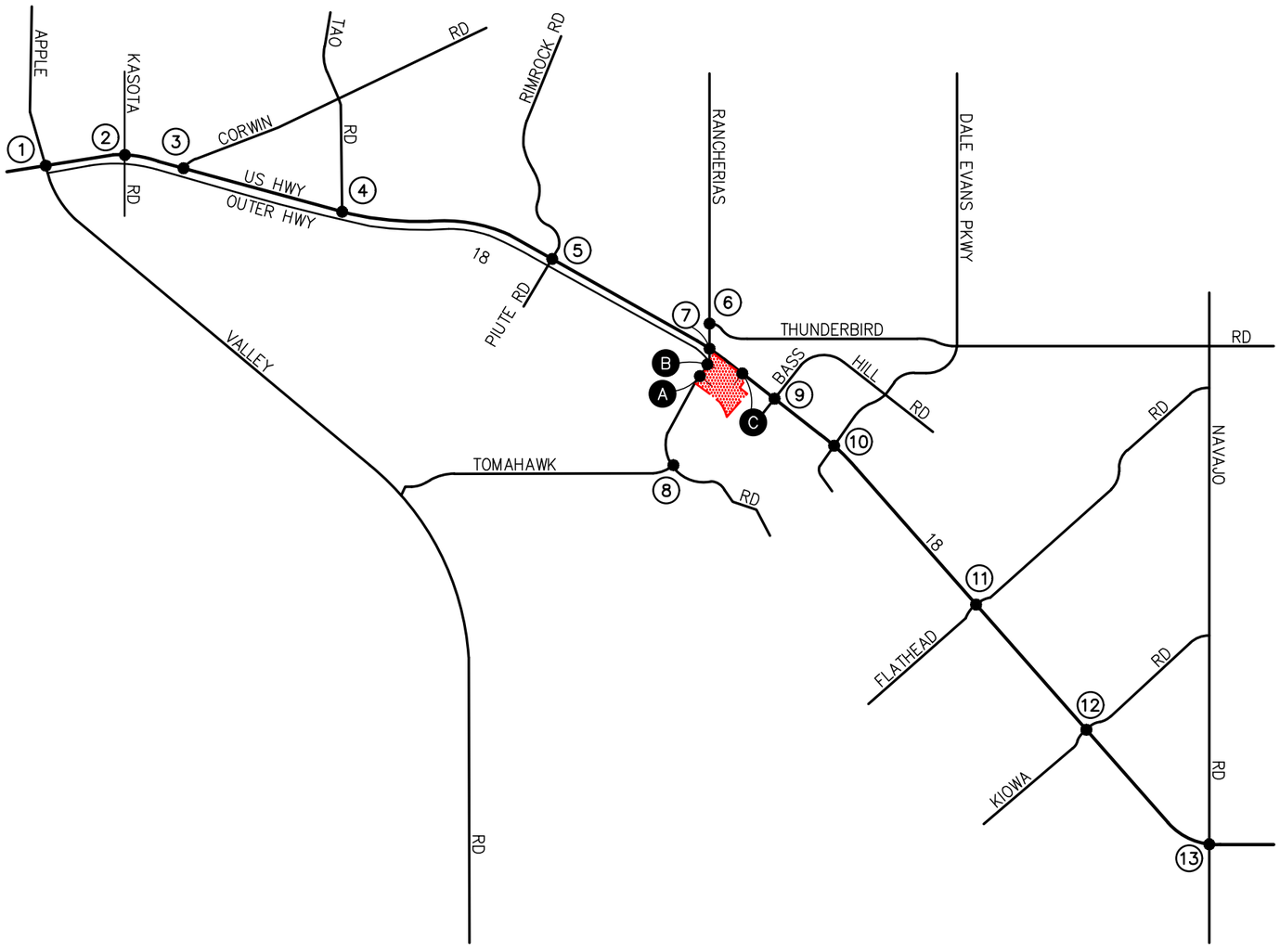
N NO SCALE

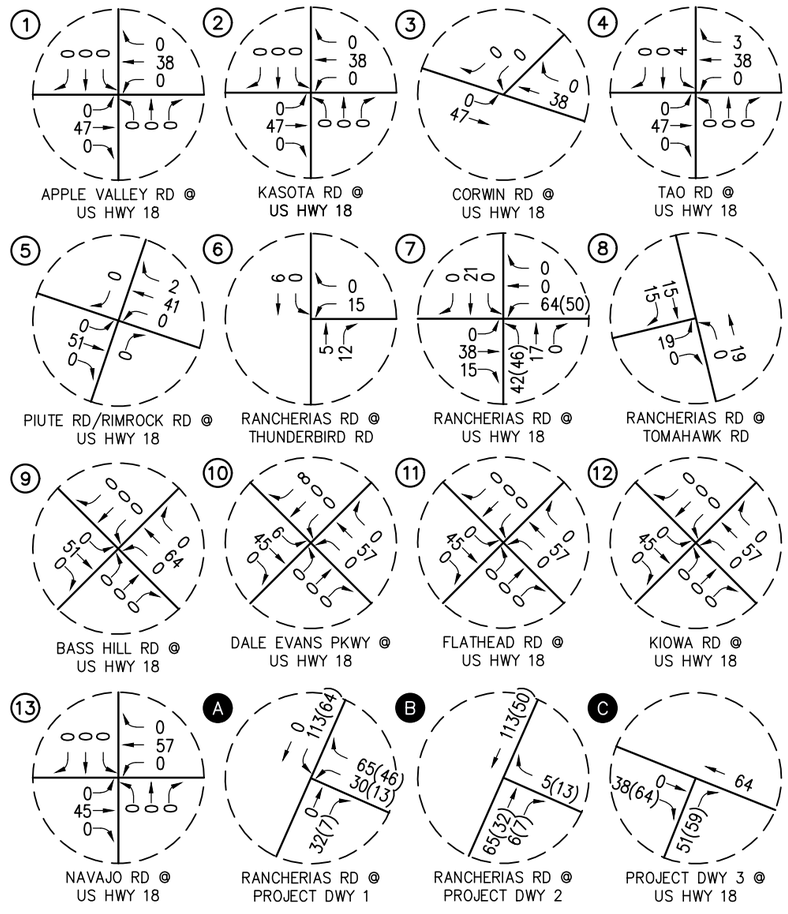
KEY
- (#) = STUDY INTERSECTION
- ◁— = INBOUND PERCENTAGE
- —▶ = OUTBOUND PERCENTAGE
- = PROJECT SITE

FIGURE 5–1

PROJECT TRIP DISTRIBUTION PATTERN

BUFFALO TRADING POST PLAZA, APPLE VALLEY





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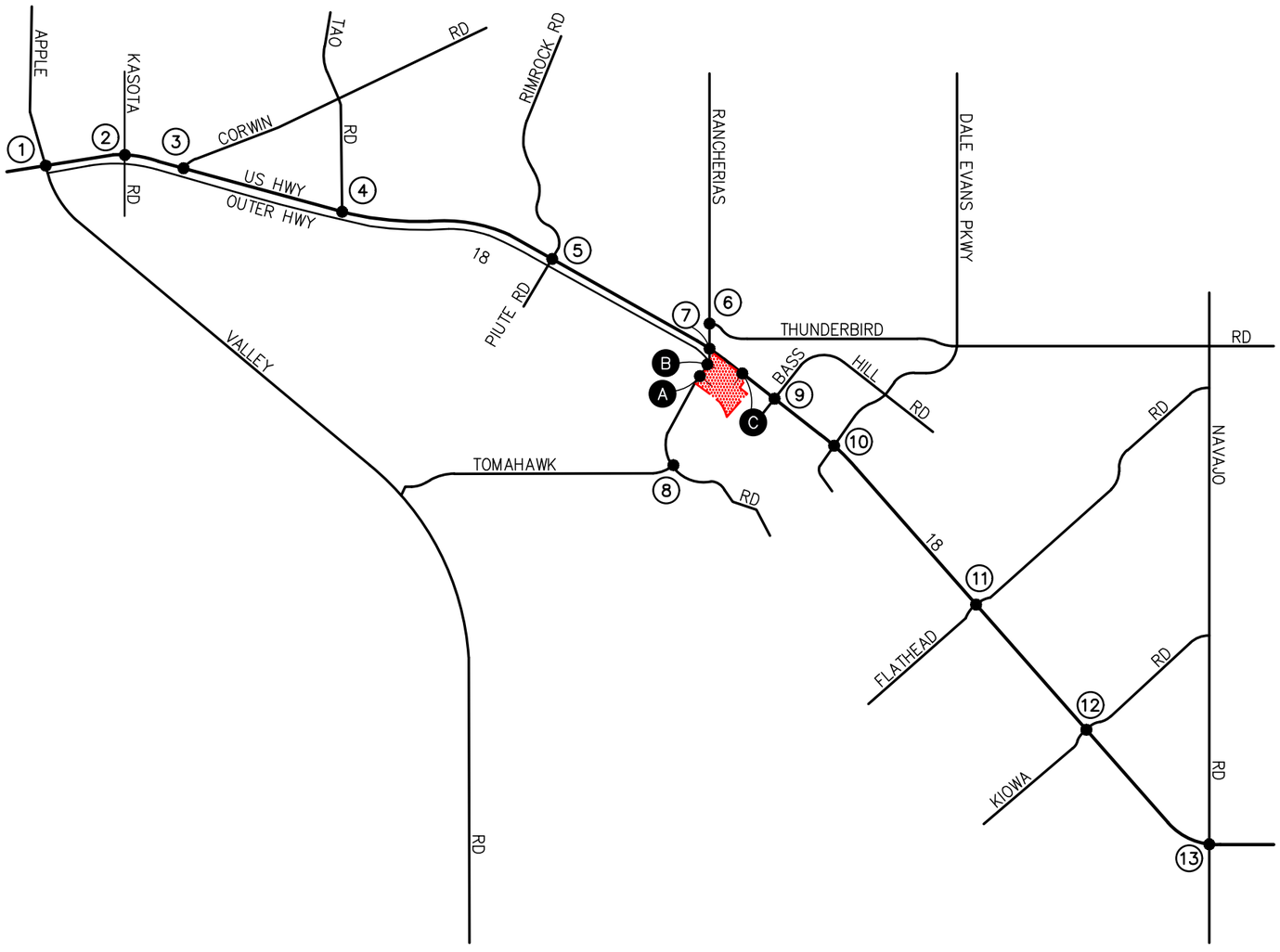
(XX) = PASS-BY TRIPS

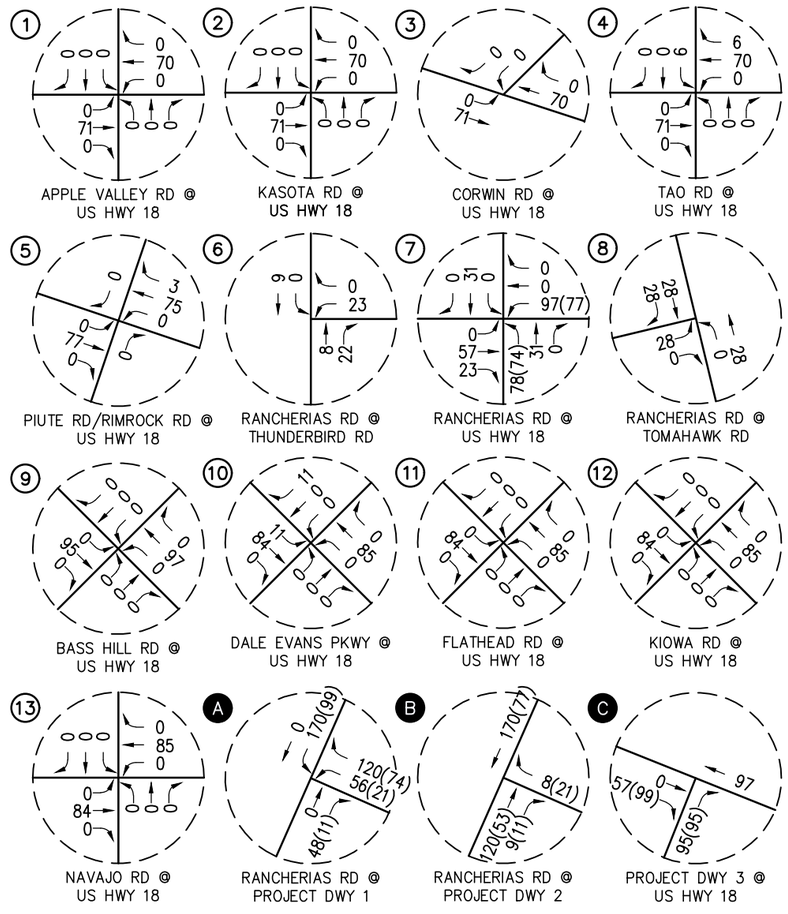
= PROJECT SITE

FIGURE 5-2

AM PEAK HOUR PROJECT TRAFFIC VOLUMES

BUFFALO TRADING POST PLAZA, APPLE VALLEY





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N NO SCALE

KEY

(#) = STUDY INTERSECTION
(XX) = PASS-BY TRIPS
= PROJECT SITE

FIGURE 5-3

PM PEAK HOUR PROJECT TRAFFIC VOLUMES

BUFFALO TRADING POST PLAZA, APPLE VALLEY

TABLE 5-1
PROJECT TRIP GENERATION RATES AND FORECAST[4]

ITE Land Use Code / Project Description	Daily 2-Way	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Trip Generation Rates:							
▪ 822: Strip Retail Plaza less than 40k (TE/TSF)	54.45	60%	40%	2.36	50%	50%	6.59
▪ 848: Tire Store (TE/TSF)	27.69	64%	36%	2.61	43%	57%	3.75
▪ 850: Supermarket (TE/TSF)	93.84	59%	41%	2.86	50%	50%	8.95
▪ 930: Fast Casual Restaurant (TE/TSF)	97.14	50%	50%	1.43	55%	45%	12.55
▪ 934: Fast Food Restaurant With Drive Through Window (TE/TSF)	467.48	51%	49%	44.61	52%	48%	33.03
▪ 937: Coffee/Donut Shop with Drive Through Window (TE/TSF)	533.57	51%	49%	85.88	50%	50%	38.99
▪ 945: Gasoline Service Station with Convenience Market – GFA (2-4k)[5] (TE/VFP)	265.12	50%	50%	16.06	50%	50%	18.42
▪ Empirical Trip Generation Estimates for Speedwash (TE/LFWT)[6]	8.663	0.275	0.204	0.479	0.450	0.463	0.913
Trip Generation Forecast:							
▪ Building 1: Supermarket (20,599 SF)	1,933	35	24	59	92	92	184
Pass-by (10% Daily, 10% AM, 24% PM)	-193	-4	-2	-6	-22	-22	-44
Supermarket Subtotal	*1,740*	*31*	*22*	*53*	*70*	*70*	*140*
▪ Building 2: Tire Store (5,700 SF)	158	10	5	15	9	12	21
Pass-by (10% Daily, 10% AM, 25% PM)	-16	-1	-1	-2	-2	-3	-5
Tire Store Subtotal	*142*	*9*	*4*	*13*	*7*	*9*	*16*
▪ Building 3: Fast Food With Drive Through (2,305 SF)	1,078	53	50	103	40	36	76
Pass-by (25% Daily, 50% AM, 55% PM)	-270	-27	-25	-52	-22	-20	-42
Fast Food With Drive Through Subtotal	*808*	*26*	*25*	*51*	*18*	*16*	*34*
▪ Building 4: Coffee/Donut Shop with Drive Through Window (950 SF)	507	42	40	82	19	18	37
Pass-by (25% Daily, 50% AM, 25% PM)	-127	-21	-20	-41	-5	-4	-9
Coffee Shop Subtotal	*380*	*21*	*20*	*41*	*14*	*14*	*28*
▪ Building 5: Express Wash (140 Feet of Tunnel)	1,213	39	28	67	63	65	128
Pass-by (25% Daily, 25% AM, 25% PM)	-303	-10	-7	-17	-16	-16	-32
Express Wash Subtotal	*910*	*29*	*21*	*50*	*47*	*49*	*96*
▪ Building 6: Gasoline Service Station (12 VFP)	3,181	97	96	193	111	110	221
Pass-by (25% Daily, 76% AM, 75% PM)	-795	-74	-73	-147	-83	-83	-166
Gasoline Service Station Subtotal	*2,386*	*23*	*23*	*46*	*28*	*27*	*55*
▪ Building 7: Fast Casual Restaurant (7,650 SF)	743	6	5	11	53	43	96
Pass-by (10% Daily, 10% AM, 43% PM)	-74	-1	0	-1	-23	-18	-41
Fast Casual Restaurant Subtotal	*669*	*5*	*5*	*10*	*30*	*25*	*55*
▪ Future Development: Strip Retail Plaza less than 40k (35,000 SF)	1,906	50	33	83	116	115	231
Pass-by (10% Daily, 10% AM, 40% PM)	-191	-5	-3	-8	-46	-46	-92
Strip Retail Plaza Subtotal	*1,715*	*45*	*30*	*75*	*70*	*69*	*139*
Project Total Trip Generation	**8,750**	**189**	**150**	**339**	**284**	**279**	**563**

Notes:

- TE/TSF = Trip Ends per Thousand Square Feet
- TE/VFP = Trip Ends per Vehicle Fueling Position
- TE/LFWT = Trip Ends per Linear Feet of Wash Tunnel
- SF = Square Feet
- VFP = Vehicle Fueling Position

[4] Source: *Trip Generation*, 11th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2021).
[5] Source*:* Driveway traffic counts conducted on Friday (2/7/2014) at Victorville Speedwash (12147 Industrial Boulevard, Victorville).
[6] Proposed convenience store is 3,360 SF.

6.0 FUTURE TRAFFIC CONDITIONS

6.1 Existing With Project Traffic Volumes

The estimates of Project-generated traffic volumes were added to the Existing traffic conditions to develop traffic projections for the Existing With Project traffic conditions. ***Figures 6-1*** and ***6-2*** present the anticipated AM and PM peak hour Existing With Project traffic volumes, respectively, at the thirteen (13) key study intersections and three (3) additional Project driveways.

6.2 Year 2025 Without Project Traffic Volumes

6.2.1 *Ambient Growth Traffic*

For future traffic conditions, background traffic growth estimates have been calculated using an ambient growth factor. The ambient growth factor is intended to include unknown and future cumulative projects in the study area, as well as account for regular growth in traffic volumes due to the development of projects outside the study area. The application of the two percent (2%) annual growth rate to baseline Year 2022 traffic volumes results in a six percent (6%) growth in existing baseline volumes at the thirteen (13) key study intersections to horizon Year 2025.

6.2.2 *Cumulative Projects Traffic*

In order to make a realistic estimate of future on-street conditions prior to implementation of the Project, the status of other known development projects (cumulative projects) has been researched at the Town of Apple Valley. The Town of Apple Valley identified ten (10) cumulative projects within the Project study area. The Traffic Impact Analysis assumes that these cumulative projects will be developed and operational when the proposed Project is operational, which is the most conservative approach, since the exact timing of each cumulative project is uncertain. In addition, impacts for these cumulative projects would likely be, or have been, subject to mitigation measures, which could reduce potential impacts. Under this analysis, however, those mitigation measures are not considered. The locations of these cumulative projects are presented in ***Figure 6-3***.

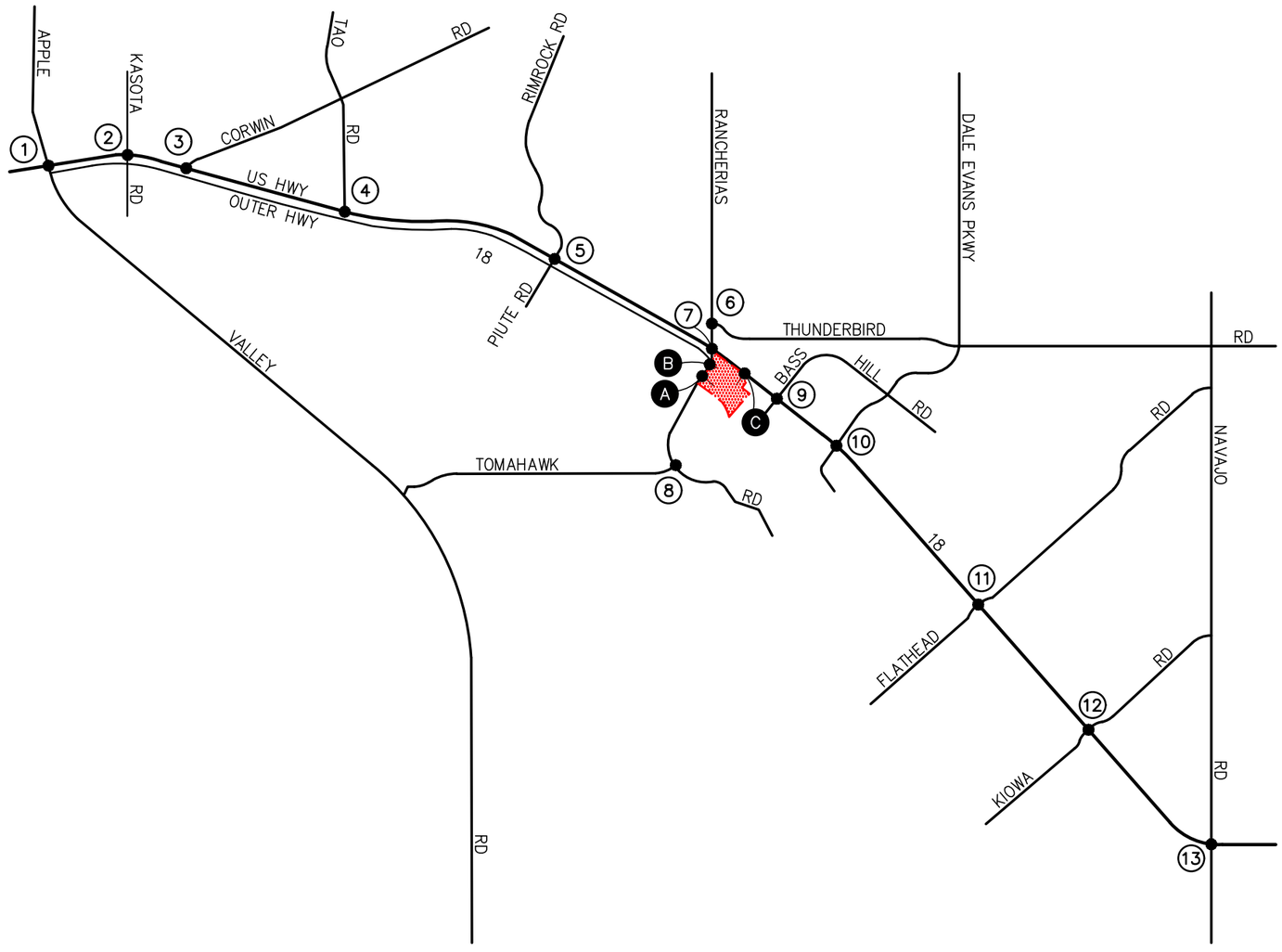
Table 6-1 presents the location, description, and development totals of the cumulative projects. ***Table 6-2*** presents the resultant trip generation for cumulative projects. As shown in *Table 6-2*, the ten (10) cumulative projects are expected to generate 10,777 daily trips (one half arriving, one half departing) on a "typical" weekday, with 656 trips forecast during the AM peak hour and 781 trips forecast during the PM peak hour.

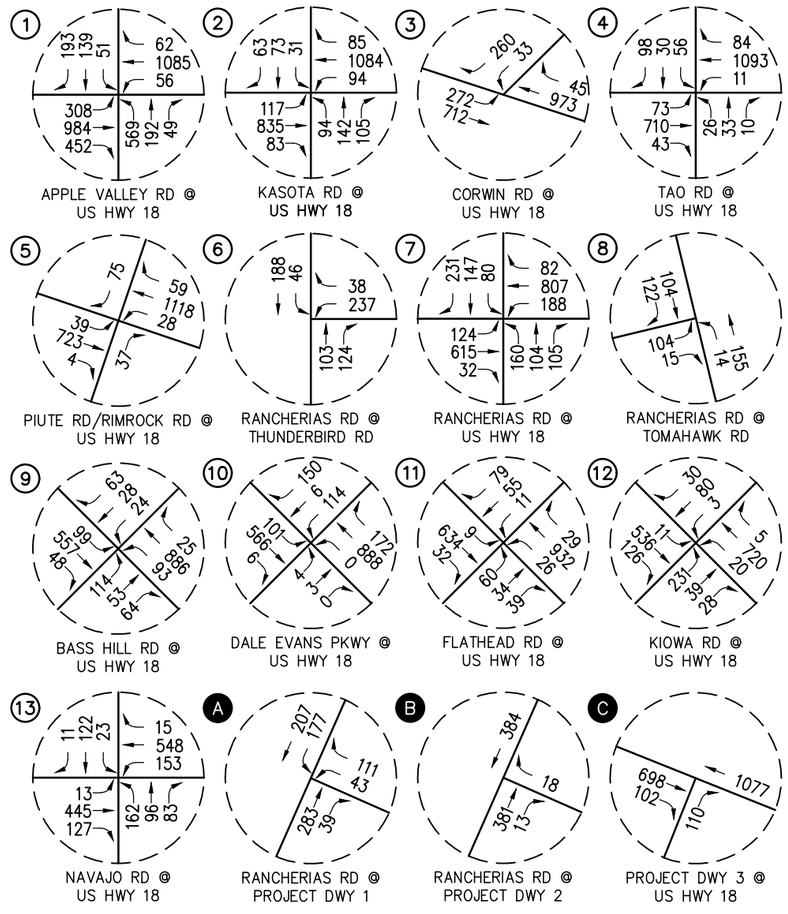
The anticipated AM and PM peak hour cumulative projects traffic volumes at the thirteen (13) key study intersections are presented in ***Figures 6-4*** and ***6-5***, respectively. ***Figures 6-6*** and ***6-7*** present Year 2025 Without Project AM and PM peak hour traffic volumes at the thirteen (13) key study intersections, respectively. It should be noted that Year 2025 Without Project traffic volumes include ambient traffic growth as well as the traffic from the ten (10) cumulative projects.

It should be emphasized that because this traffic impact analysis utilizes both an ambient growth factor along with a list of cumulative projects approach to analyze cumulative impacts, this traffic impact analysis is conservative and would tend to overstate cumulative traffic impacts.

6.3 Year 2025 With Project Traffic Volumes

The estimates of Project-generated traffic volumes were added to the Year 2025 Without Project traffic conditions to develop traffic projections for the Year 2025 With Project traffic conditions. ***Figures 6-8*** and ***6-9*** present the anticipated AM and PM peak hour Year 2025 With Project traffic volumes, respectively, at the thirteen (13) key study intersections and three (3) Project driveways.





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N NO SCALE

KEY

(#) = STUDY INTERSECTION

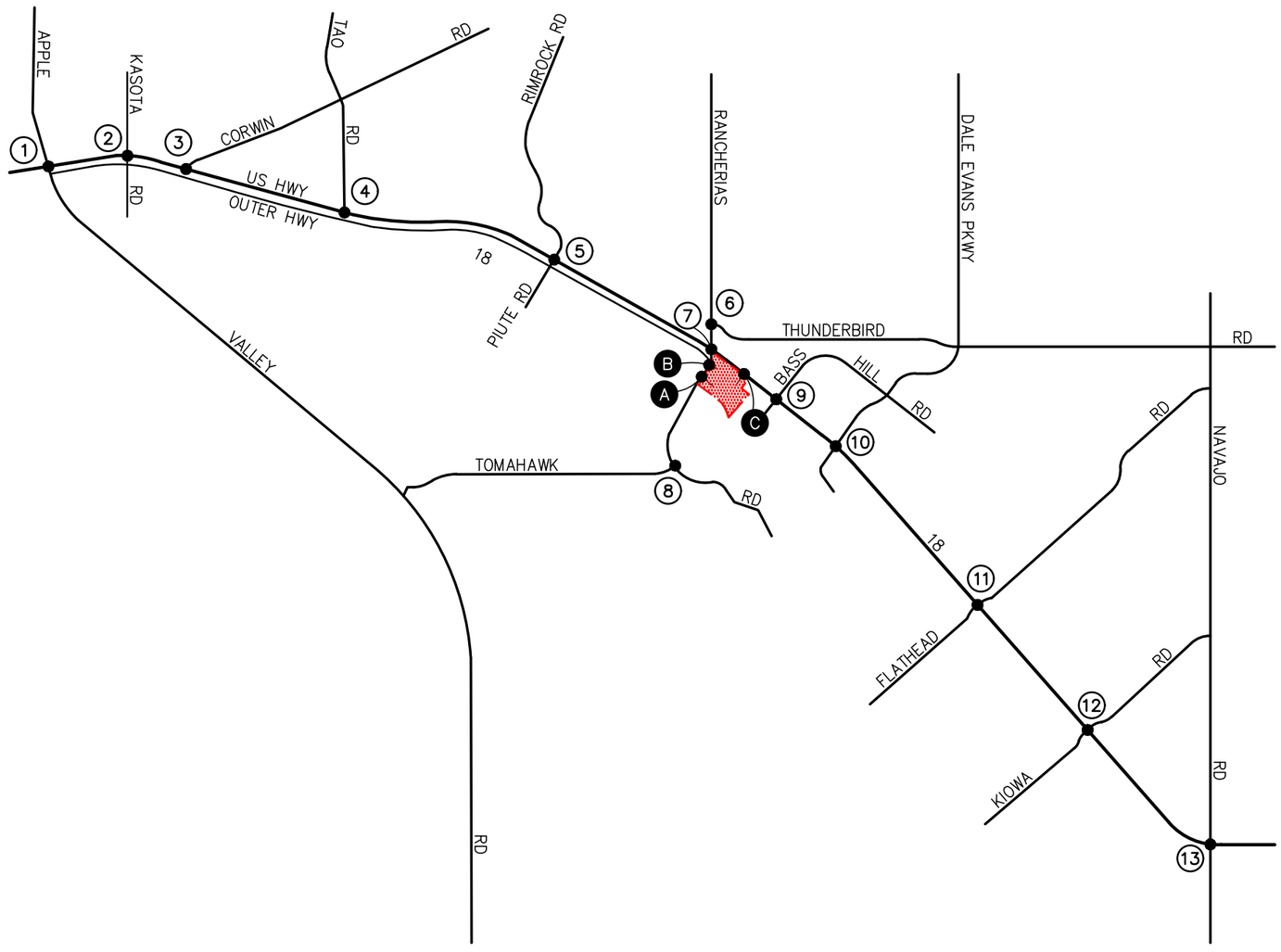
= PROJECT SITE

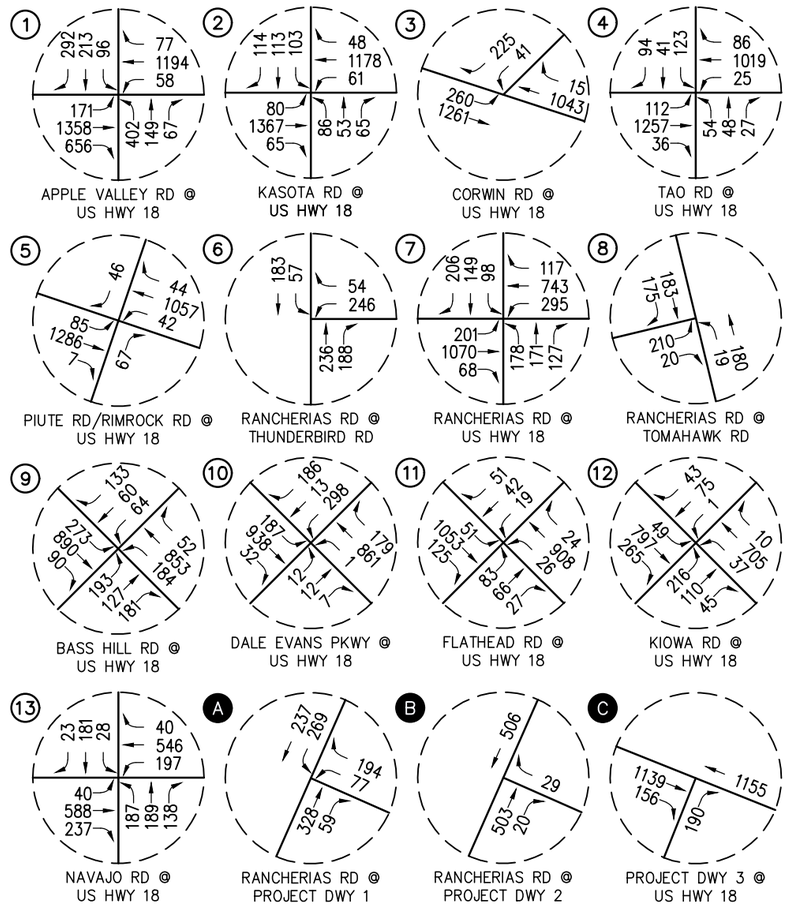
FIGURE 6–1

EXISTING WITH PROJECT AM PEAK HOUR TRAFFIC VOLUMES

BUFFALO TRADING POST PLAZA, APPLE VALLEY

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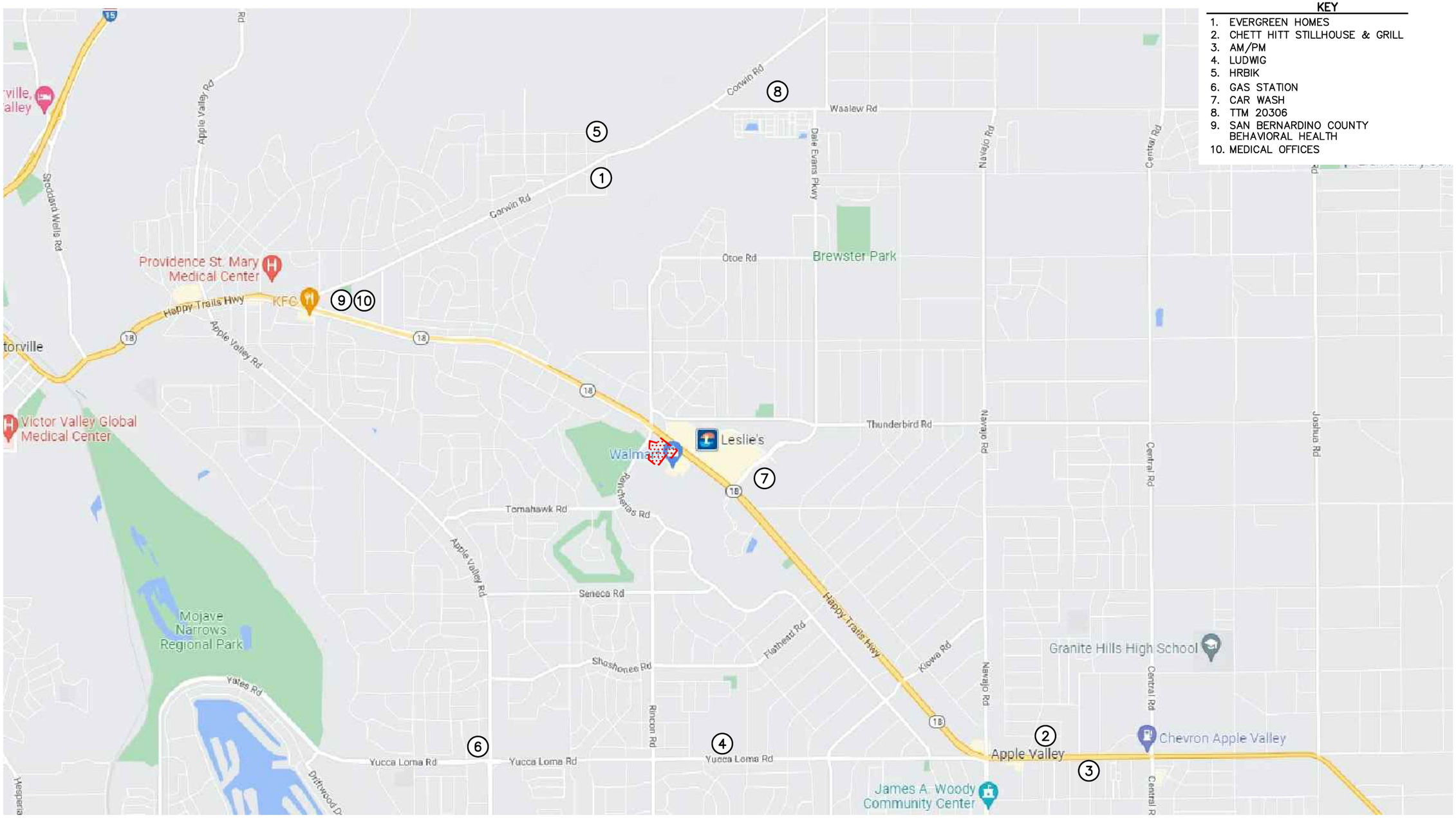
(#) = STUDY INTERSECTION

= PROJECT SITE

FIGURE 6-2

EXISTING WITH PROJECT PM PEAK HOUR TRAFFIC VOLUMES

BUFFALO TRADING POST PLAZA, APPLE VALLEY



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SOURCE: GOOGLE

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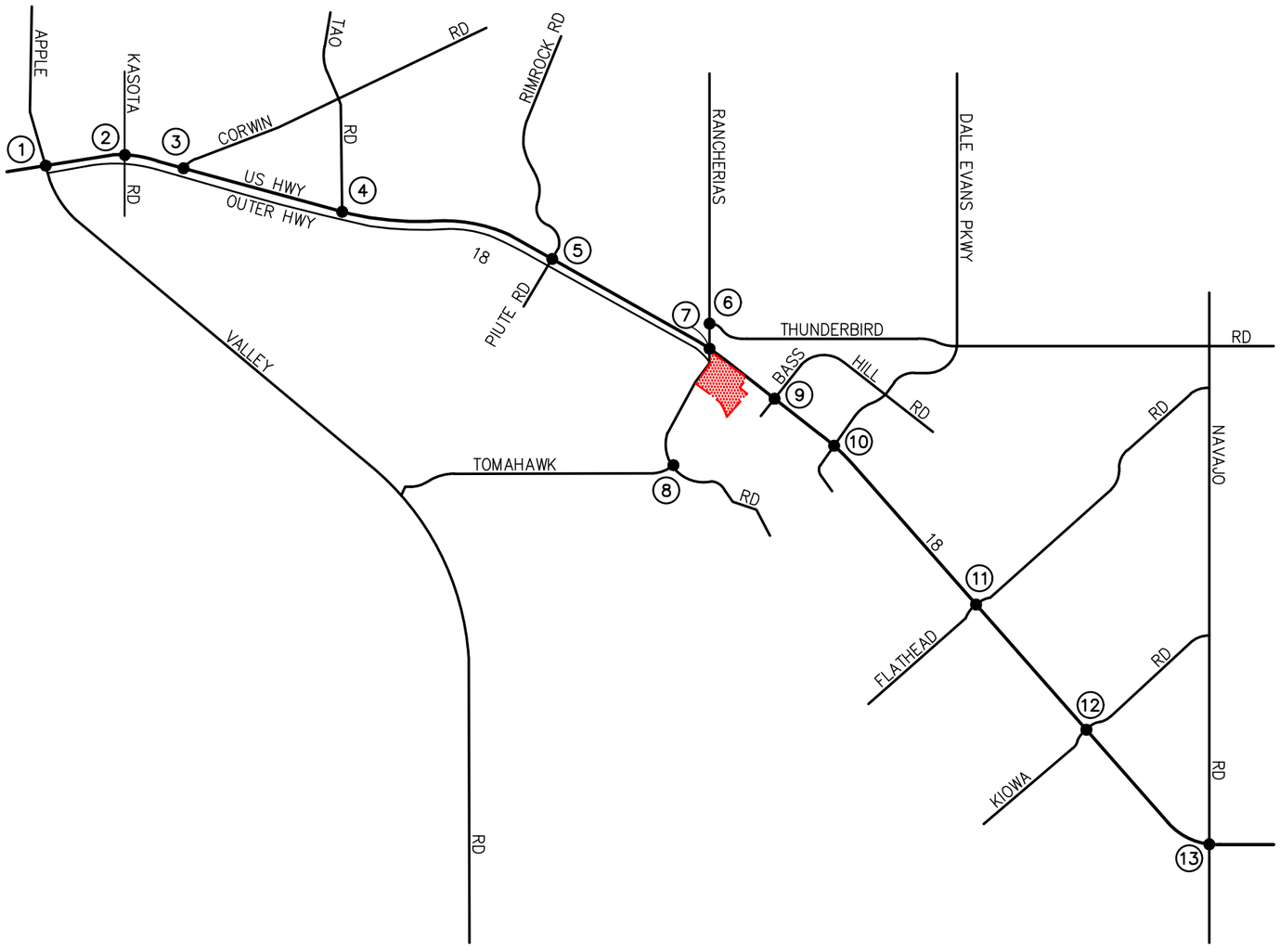
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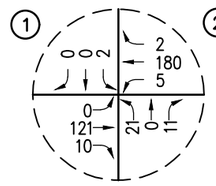
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FIGURE 6–3

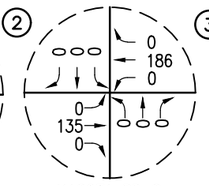
LOCATION OF CUMULATIVE PROJECTS

BUFFALO TRADING POST PLAZA, APPLE VALLEY

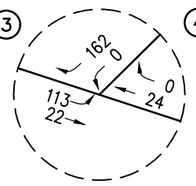




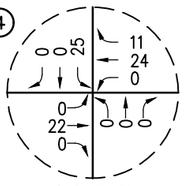
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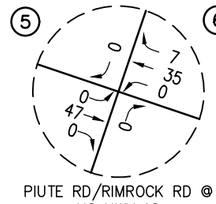
2 KASOTA RD @ US HWY 18



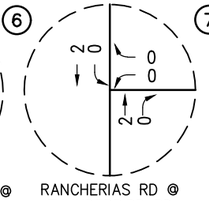
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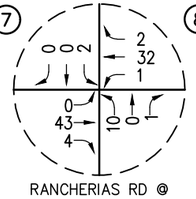
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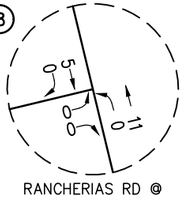
5 PIUTE RD/RIMROCK RD @ US HWY 18



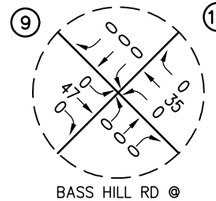
6 RANCHERIAS RD @ THUNDERBIRD RD



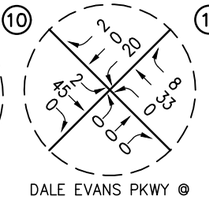
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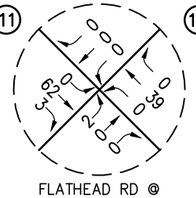
8 RANCHERIAS RD @ TOMAHAWK RD



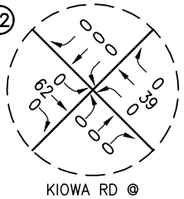
9 BASS HILL RD @ US HWY 18



10 DALE EVANS PKWY @ US HWY 18



11 FLATHEAD RD @ US HWY 18



12 KIOWA RD @ US HWY 18

13 NAVAJO RD @ US HWY 18

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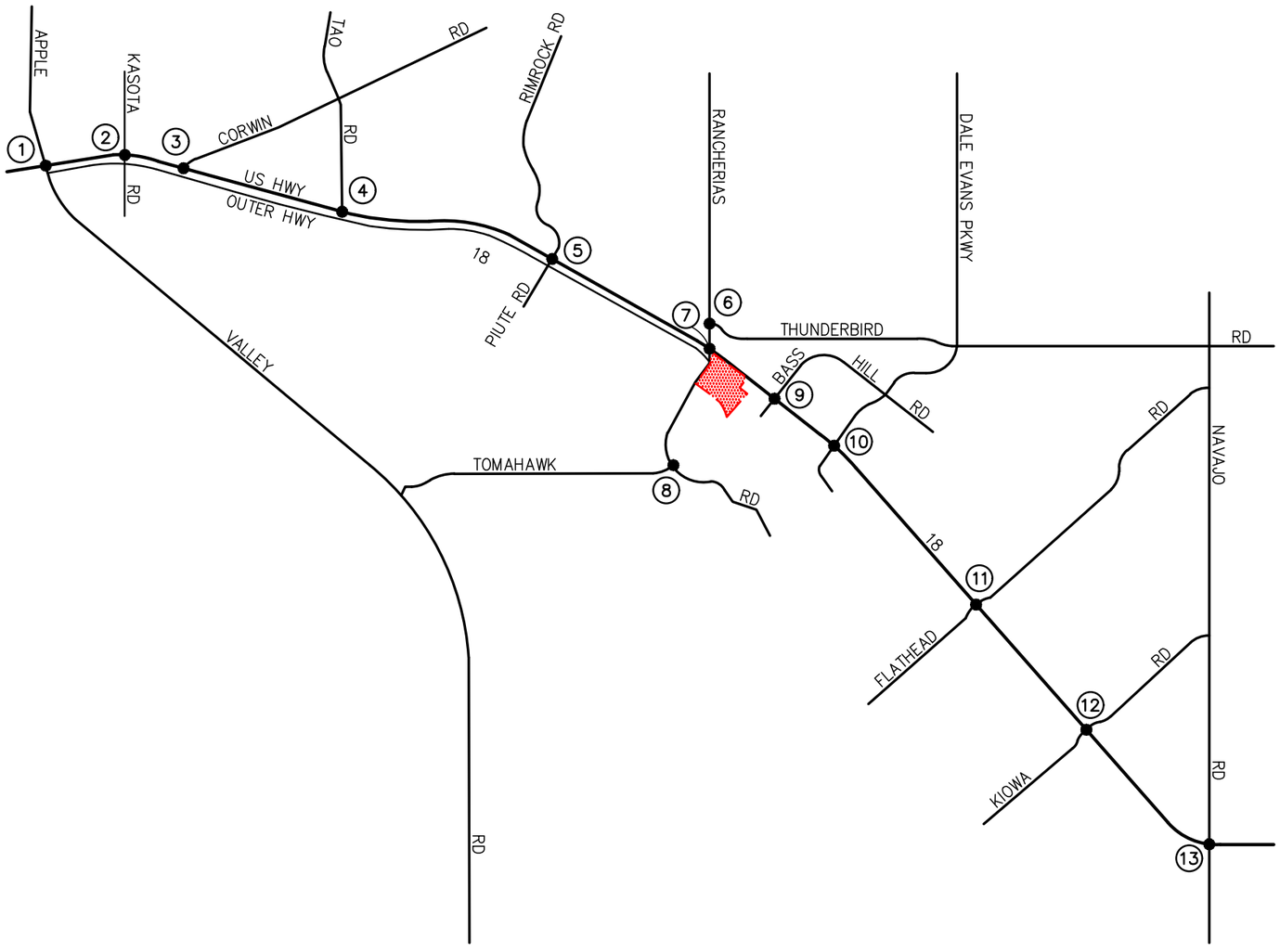
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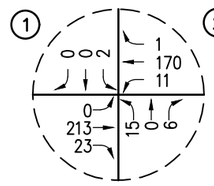
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FIGURE 6-4

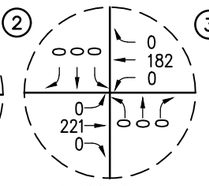
CUMULATIVE PROJECTS AM PEAK HOUR TRAFFIC VOLUMES

BUFFALO TRADING POST PLAZA, APPLE VALLEY

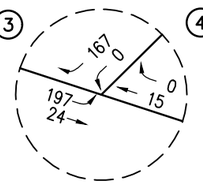




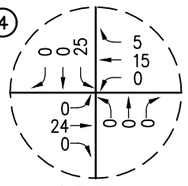
APPLE VALLEY RD @
US HWY 18



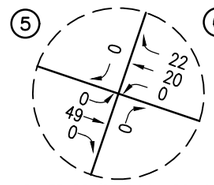
KASOTA RD @
US HWY 18



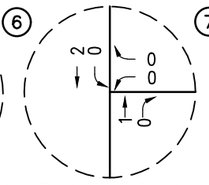
CORWIN RD @
US HWY 18



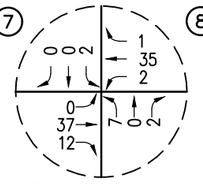
TAO RD @
US HWY 18



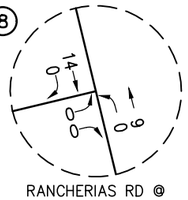
PIUTE RD/RIMROCK RD @
US HWY 18



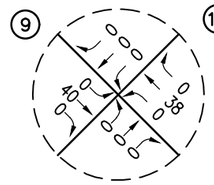
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THUNDERBIRD RD



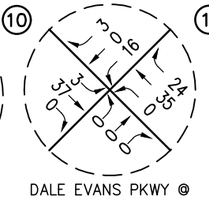
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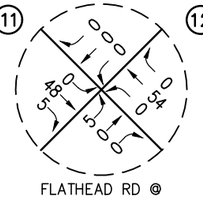
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TOMAHAWK RD



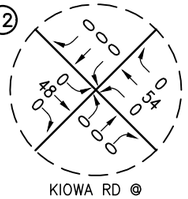
BASS HILL RD @
US HWY 18



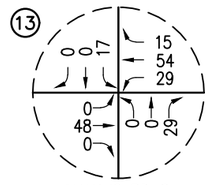
DALE EVANS PKWY @
US HWY 18



FLATHEAD RD @
US HWY 18



KIOWA RD @
US HWY 18



NAVAJO RD @
US HWY 18

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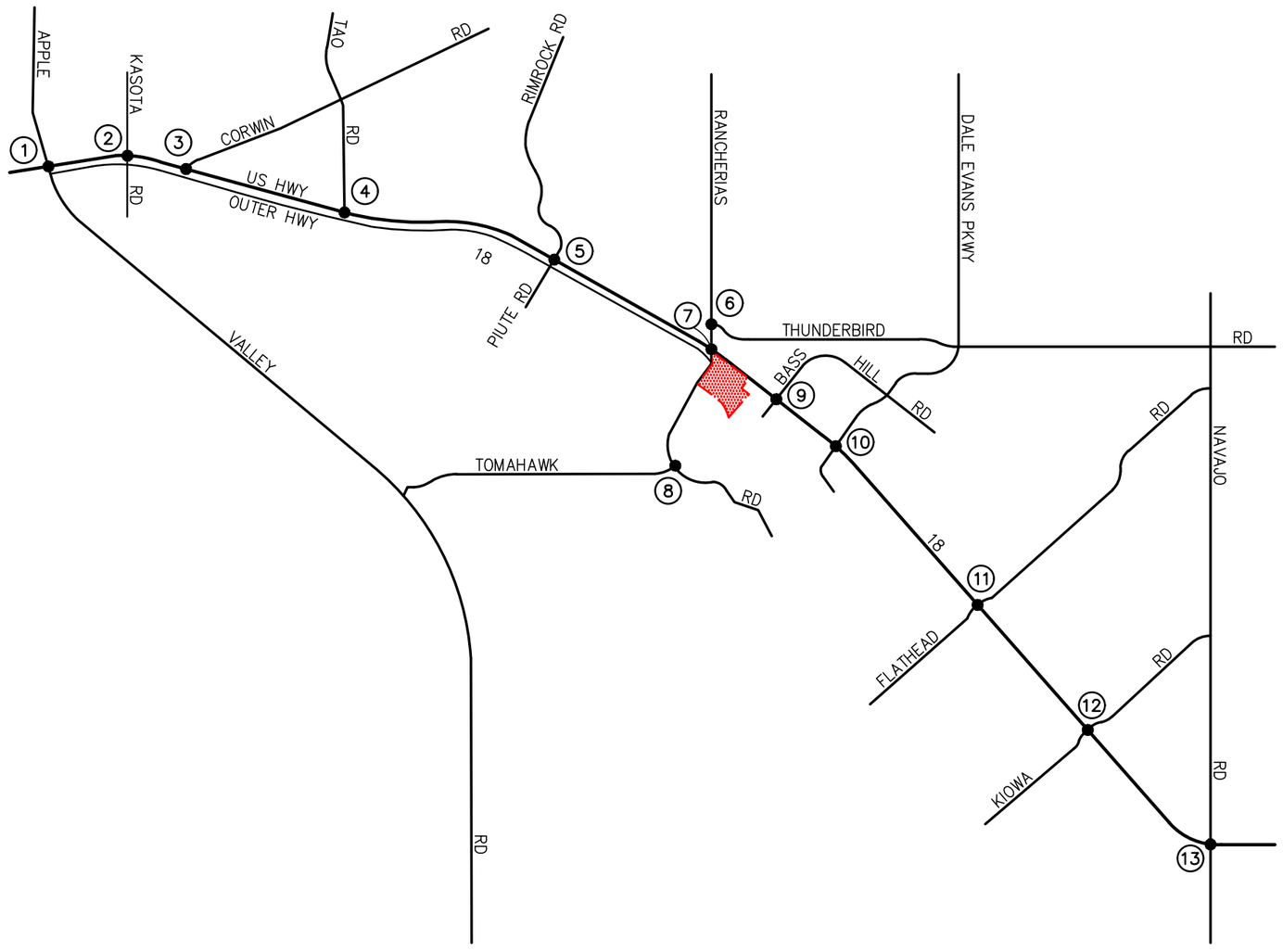
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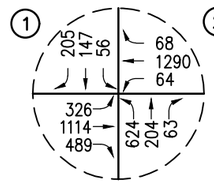
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= PROJECT SITE

FIGURE 6-5

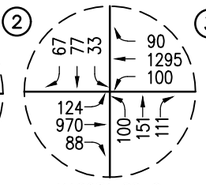
CUMULATIVE PROJECTS PM PEAK HOUR TRAFFIC VOLUMES

BUFFALO TRADING POST PLAZA, APPLE VALLEY

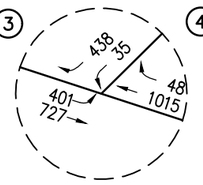




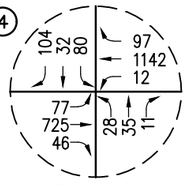
APPLE VALLEY RD @
US HWY 18



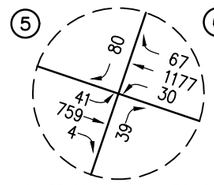
KASOTA RD @
US HWY 18



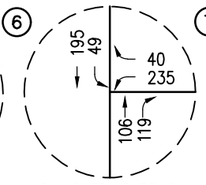
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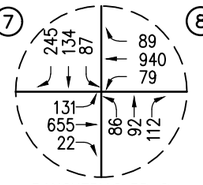
TAO RD @
US HWY 18



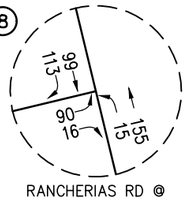
PIUTE RD/RIMROCK RD @
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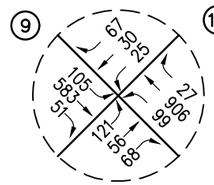
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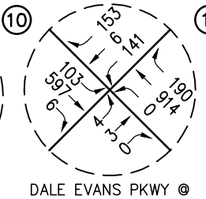
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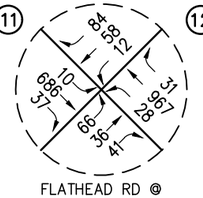
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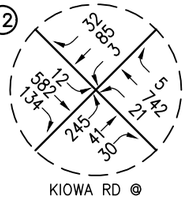
BASS HILL RD @
US HWY 18



DALE EVANS PKWY @
US HWY 18



FLATHEAD RD @
US HWY 18



KIOWA RD @
US HWY 18

NAVAJO RD @
US HWY 18

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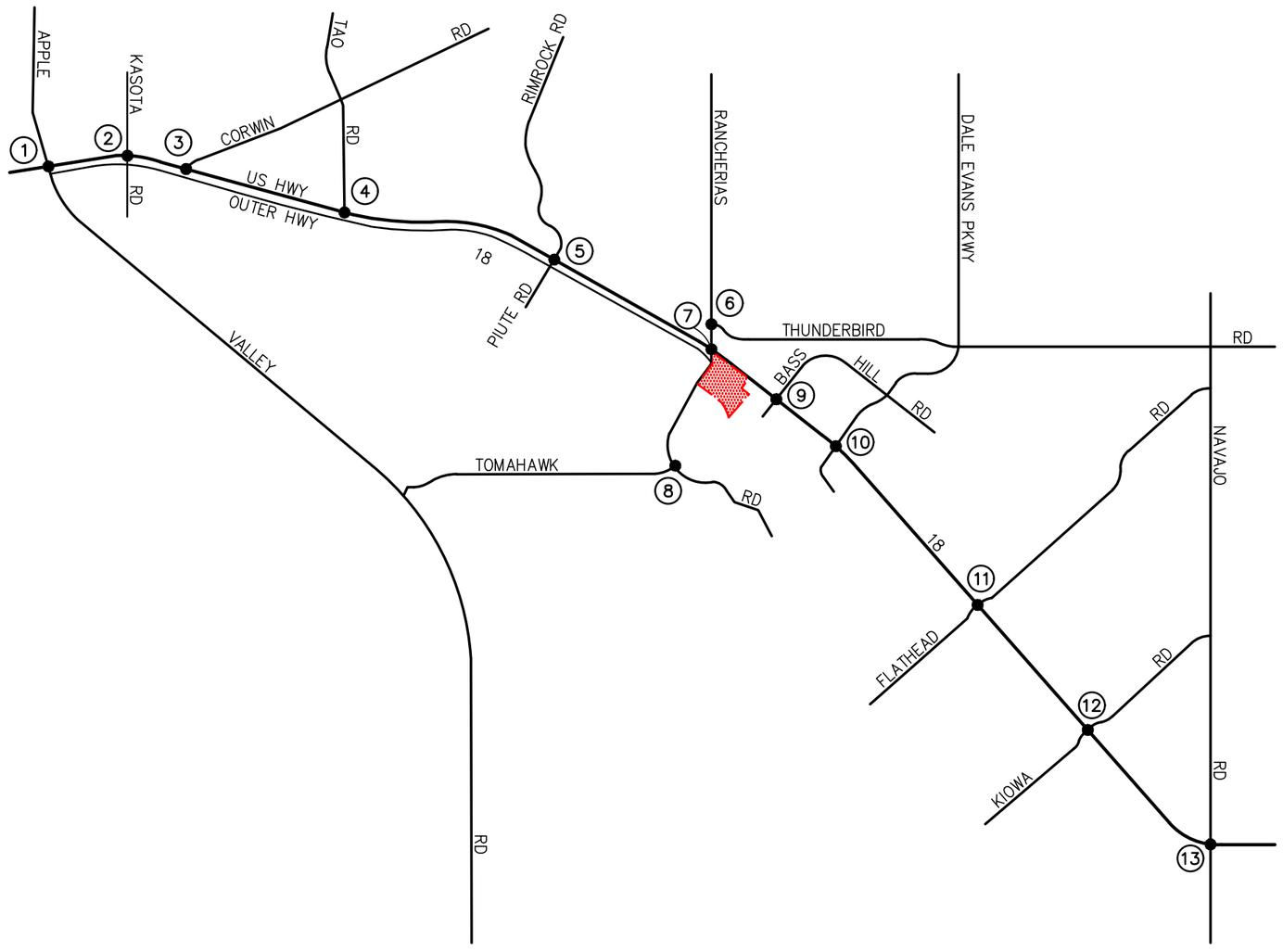
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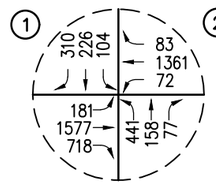
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FIGURE 6-6

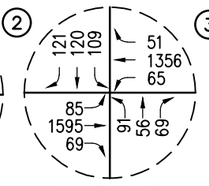
YEAR 2025 WITHOUT PROJECT AM PEAK HOUR TRAFFIC VOLUMES

BUFFALO TRADING POST PLAZA, APPLE VALLEY

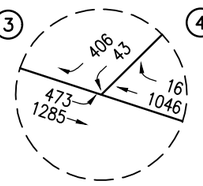




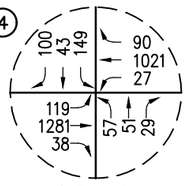
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US HWY 18



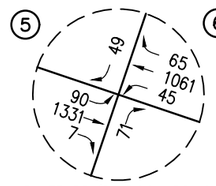
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US HWY 18



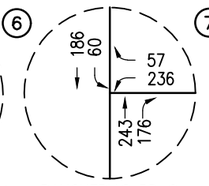
CORWIN RD @
US HWY 18



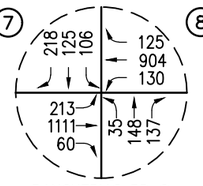
TAO RD @
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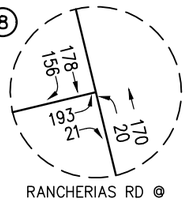
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US HWY 18



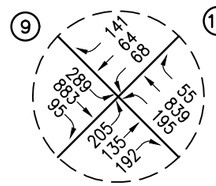
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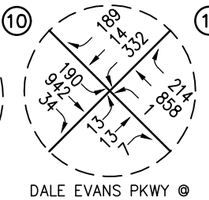
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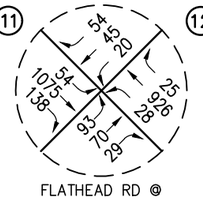
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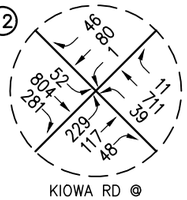
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US HWY 18



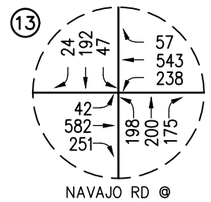
DALE EVANS PKWY @
US HWY 18



FLATHEAD RD @
US HWY 18



KIOWA RD @
US HWY 18



NAVAJO RD @
US HWY 18

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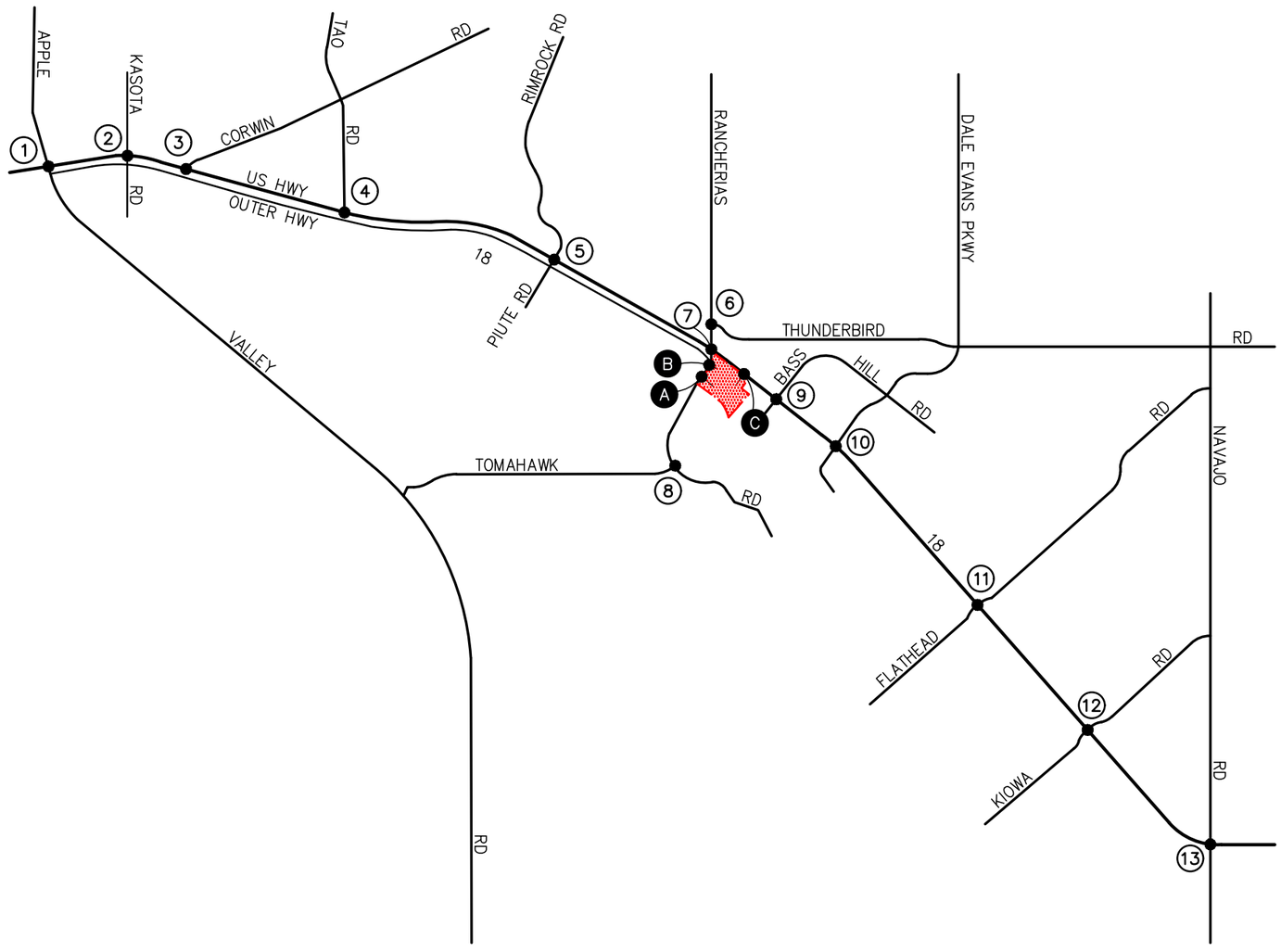
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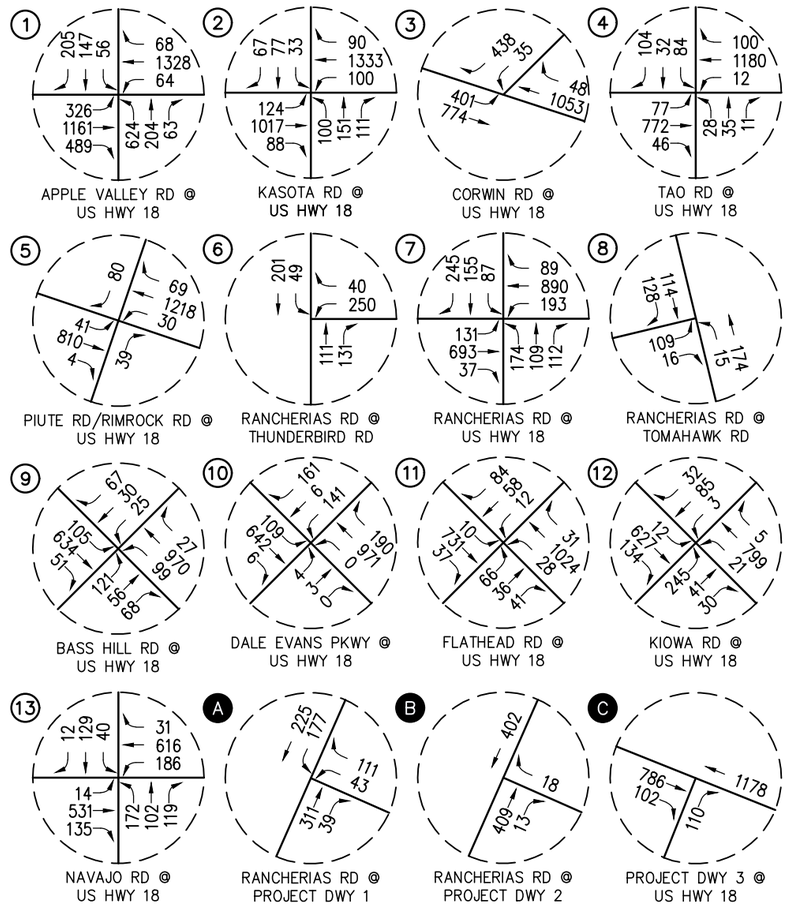
= PROJECT SITE

FIGURE 6-7

YEAR 2025 WITHOUT PROJECT PM PEAK HOUR TRAFFIC VOLUMES

BUFFALO TRADING POST PLAZA, APPLE VALLEY





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(#) = STUDY INTERSECTION

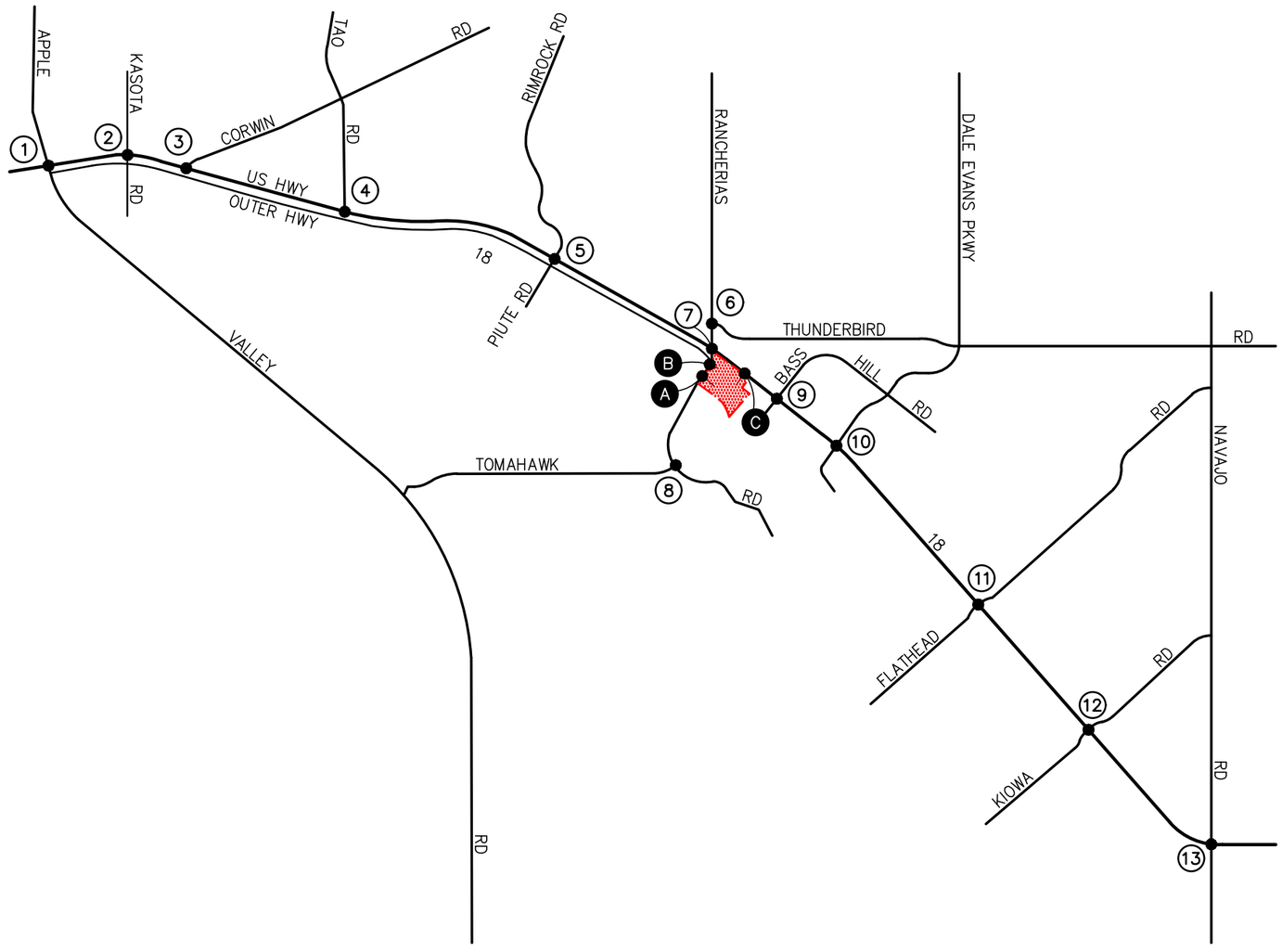
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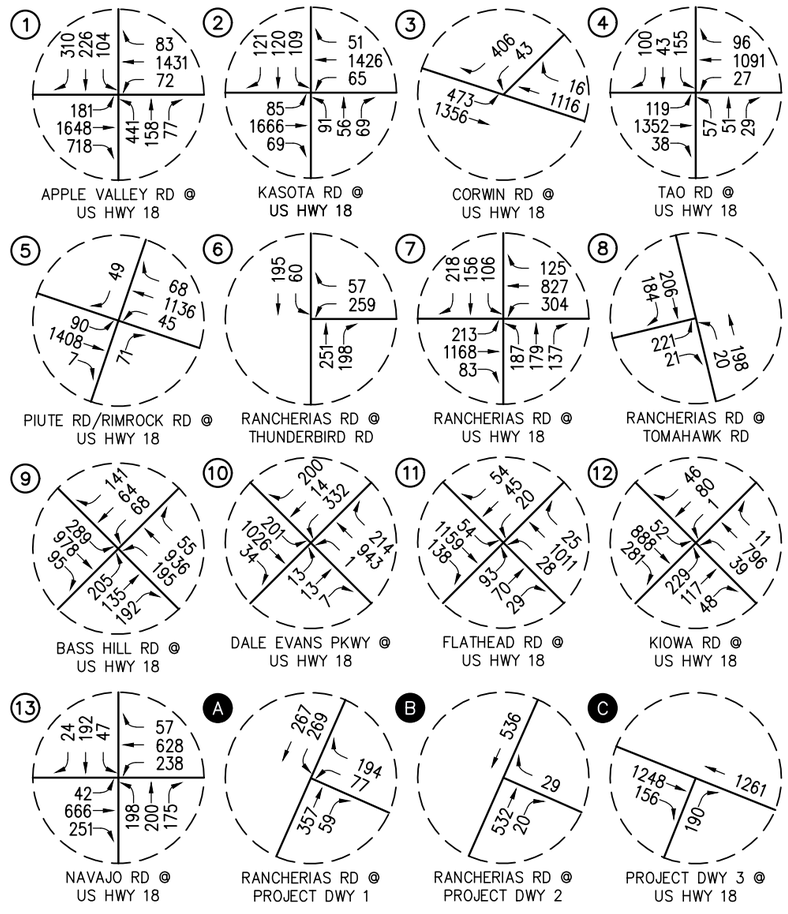
FIGURE 6-8

YEAR 2025 WITH PROJECT AM PEAK HOUR TRAFFIC VOLUMES

BUFFALO TRADING POST PLAZA, APPLE VALLEY

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N NO SCALE

KEY

(#) = STUDY INTERSECTION

= PROJECT SITE

FIGURE 6-9

YEAR 2025 WITH PROJECT PM PEAK HOUR TRAFFIC VOLUMES

BUFFALO TRADING POST PLAZA, APPLE VALLEY

TABLE 6-1
LOCATION AND DESCRIPTION OF CUMULATIVE PROJECTS

No.	Cumulative Project	Location/Address	Description
1.	Evergreen Homes	Corwin Road at Choco Road	96 Single Family DU
2.	Chett Hitt Stillhouse & Grill	22020 US Highway 18	10,040 SF High-Turnover Sit Down Restaurant
3.	AM/PM	22499 US Highway 18	3,800 SF Convenience Store With Gas Station
4.	Ludwig	Yucca Loma Road at Cree Road	66 Single Family DU
5.	Hrbik	Hausna Road at Choco Road	93 Single Family DU
6.	Gas Station	Yucca Loma at Apple Valley Road	12 VFP Gas Station With Convenience Store
7.	Car Wash	20440 Outer Highway 18	4,400 SF Car Wash
8.	TTM 20306	Corwin Road at Waalew Road	160 Single Family DU
9.	San Bernardino County Behavioral Health	18818 US Highway 18	27,019 SF Medical Office Building
10.	Medical Office	18856 US Highway 18	10,032 SF Medical Office Building

TABLE 6-2

CUMULATIVE PROJECTS TRAFFIC GENERATION FORECAST[7]

Cumulative Project Description		Daily 2-Way	AM Peak Hour			PM Peak Hour		
			Enter	Exit	Total	Enter	Exit	Total
1.	Evergreen Homes	905	17	50	67	57	33	90
2.	Chett Hitt Stillhouse & Grill	968	48	38	86	32	20	52
3.	AM/PM	1,779	31	31	62	40	41	81
4.	Ludwig	622	12	34	46	39	23	62
5.	Hrbik	877	17	48	65	55	32	87
6.	Gas Station	2,314	39	39	78	34	34	68
7.	Car Wash	469	12	13	25	23	23	46
8.	TTM 20306	1,509	29	83	112	95	55	150
9.	San Bernardino County Behavioral Health	973	66	18	84	32	74	106
10.	Medical Office	361	24	7	31	12	27	39
Cumulative Projects Total Trip Generation Potential		**10,777**	**295**	**361**	**656**	**419**	**362**	**781**

[7] Source*: Trip Generation, 11th Edition*, Institute of Transportation Engineers, (ITE) [Washington, D.C. (2021)]. Average rates used.

7.0 EXISTING CONDITIONS TRAFFIC IMPACT ANALYSIS

The existing conditions analysis establishes the basis for the future forecasts for the Project. The existing conditions analysis reflects the existing traffic counts and existing lane configurations for all analyzed intersections.

7.1 Existing Conditions Intersection Capacity Analysis

Table 7-1 summarizes the peak hour Level of Service results at the key study intersections for existing traffic conditions, with and without the Project. The first column (1) of Delay/LOS values in *Table 7-1* presents a summary of Existing AM and PM peak hour traffic conditions. The second column (2) in *Table 7-1* presents forecast Existing With Project traffic conditions. The third column (3) of *Table 7-1* shows whether the traffic associated with the Project will have a significant impact based on the LOS standards and the significance impact criteria defined in this report. The fourth column (4) of *Table 7-1* presents the Level of Service with the implementation of traffic mitigation improvements, if necessary.

7.1.1 *Existing Traffic Conditions*

Review of column (1) of *Table 7-1* indicates that for the Existing traffic conditions, one (1) of the thirteen (13) key study intersections currently operates at unacceptable levels of service during the AM peak hour when compared to the LOS standards defined in this report. The remaining twelve (12) key study intersections currently operate at acceptable levels of service during the AM and PM peak hours. The intersection operating at adverse levels of service is:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
12. Kiowa Road at US Highway 18	143.0	F	--	--

7.1.2 *Existing With Project Traffic Conditions*

Review of column (2) of *Table 7-1* indicates that for the Existing With Project traffic conditions, one (1) of the thirteen (13) key study intersection is forecast to continue to operate at unacceptable levels of service during the AM peak hour when compared to the LOS standards defined in this report. The remaining twelve (12) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersection forecast to operate at adverse levels of service is:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
12. Kiowa Road at US Highway 18	135.3	F	--	--

Review of column (3) of *Table 7-1* indicates that one (1) of the thirteen (13) key study intersections will have a significant impact under the Existing With Project traffic conditions when compared to the LOS criteria defined in this report. However, as shown in column (4) of *Table 7-1*, the implementation of recommended mitigation measures at the impacted intersection mitigates the

impacts of the proposed Project. After implementation of the recommended mitigation measures, the impacted intersection is forecast to operate at an acceptable LOS based on the LOS standards outlined in this report.

Appendix C contains the Delay/LOS calculation worksheets for the Existing Traffic Conditions.

TABLE 7-1

EXISTING WITH PROJECT CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY[8]

Key Intersection	Control Type	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Existing With Project Traffic Conditions		(3) Significant Impact	(4) Existing With Project With Mitigation	
				Delay (s/v)	LOS	Delay (s/v)	LOS	Yes/No	Delay (s/v)	LOS
1. Apple Valley Road at US Highway 18	6 Phase Signal	D	AM	32.4	C	32.5	C	No	--	--
			PM	30.8	C	30.6	C	No	--	--
2. Kasota Road at US Highway 18	5 Phase Signal	D	AM	20.0	B	20.6	B	No	--	--
			PM	17.2	B	17.3	B	No	--	--
3. Corwin Road at US Highway 18	3 Phase Signal	D	AM	17.7	B	17.5	B	No	--	--
			PM	13.8	B	13.7	B	No	--	--
4. Tao Road at US Highway 18	5 Phase Signal	D	AM	12.0	B	12.0	B	No	--	--
			PM	14.3	B	14.4	B	No	--	--
5. Rimrock Road/Piute Road at US Highway 18	Two-Way Stop	D	AM	15.8	C	16.3	C	No	--	--
			PM	14.9	B	15.6	C	No	--	--
6. Rancherias Road at Thunderbird Road	All-Way Stop	D	AM	12.1	B	12.8	B	No	--	--
			PM	11.6	B	12.3	B	No	--	--
7. Rancherias Road at US Highway 18	5 Phase Signal	D	AM	21.7	C	26.6	C	No	--	--
			PM	24.4	C	31.8	C	No	--	--

Notes:

- s/v = seconds per vehicle (delay)
- LOS = Level of Service, please refer to *Tables 3-1* and *3-2* for the LOS definitions
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

[8] *Appendix C* contains the Delay/LOS calculation worksheets for all study intersections.

TABLE 7-1 (CONTINUED)
EXISTING WITH PROJECT CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY[9]

Key Intersection	Control Type	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Existing With Project Traffic Conditions		(3) Significant Impact	(4) Existing With Project With Mitigation	
				Delay (s/v)	LOS	Delay (s/v)	LOS	Yes/No	Delay (s/v)	LOS
8. Rancherias Road at Tomahawk Road	One-Way Stop	D	AM	11.3	B	12.2	B	No	--	--
			PM	15.5	C	19.0	C	No	--	--
9. Bass Hill Road at US Highway 18	6 Phase Signal	D	AM	18.8	B	18.4	B	No	--	--
			PM	26.6	C	28.0	C	No	--	--
10. Dale Evans Parkway at US Highway 18	6 Phase Signal	D	AM	15.3	B	15.6	B	No	--	--
			PM	20.0	C	20.3	C	No	--	--
11. Flathead Road at US Highway 18	5 Phase Signal	D	AM	11.8	B	11.6	B	No	--	--
			PM	12.3	B	12.2	B	No	--	--
12. Kiowa Road at US Highway 18	5 Phase Signal	D	AM	**143.0**	**F**	**135.3**	**F**	**Yes**	21.6	C
			PM	43.9	D	41.4	D	No	22.3	C
13. Navajo Road at US Highway 18	5 Phase Signal	D	AM	20.5	C	20.0	B	No	--	--
			PM	24.5	C	23.6	C	No	--	--

Notes:

- s/v = seconds per vehicle (delay)
- LOS = Level of Service, please refer to *Tables 3-1* and *3-2* for the LOS definitions
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

[9] *Appendix C* contains the Delay/LOS calculation worksheets for all study intersections.

8.0 YEAR 2025 CONDITIONS TRAFFIC IMPACT ANALYSIS

The relative impacts of the added Project traffic volumes generated by proposed Project during the AM and PM peak hour conditions was evaluated based on analysis of future Year 2025 operating conditions at the thirteen (13) key study intersections, with and without the proposed Project. The previously discussed capacity analysis procedures were utilized to investigate the future Delay relationships and service level characteristics at each study intersection. The significance of the potential impacts of the Project at each key intersection was then evaluated using the traffic impact criteria mentioned in this report.

8.1 Year 2025 Conditions Intersection Capacity Analysis

Table 8-1 summarizes the AM and PM peak hour Level of Service results at the key study intersections for the Year 2025 traffic conditions. The first column (1) of Delay/LOS values in *Table 8-1* presents a summary of existing AM and PM peak hour traffic conditions (which were also presented in *Table 7-1*). The second column (2) presents forecast Year 2025 Without Project traffic conditions and the third column (3) identifies forecast Year 2025 With Project traffic conditions. The fourth column (4) indicates whether the traffic associated with the Project will have a significant impact based on the significant impact criteria mentioned in this report. The fifth column (5) presents the resultant level of service with the inclusion of recommended traffic improvements, where needed, to achieve an acceptable level of service.

8.1.1 *Year 2025 Without Project Traffic Conditions*

Review of column (2) of *Table 8-1* indicates that for the Year 2025 Without Project traffic conditions, one (1) of the thirteen (13) key study intersections are forecast to operate at unacceptable levels of service during the AM peak hour when compared to the LOS standards defined in this report. The remaining twelve (12) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersection forecast to operate at adverse levels of service is:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
12. Kiowa Road at US Highway 18	130.1	F	--	--

8.1.2 *Year 2025 With Project Traffic Conditions*

Review of column (3) of *Table 8-1* indicates that for the Year 2025 With Project traffic conditions, one (1) of the thirteen (13) key study intersections are forecast to continue to operate at unacceptable levels of service during the AM peak hour when compared to the LOS standards defined in this report. The remaining twelve (12) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersection operating at adverse levels of service is:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
12. Kiowa Road at US Highway 18	123.9	F	--	--

Review of column (4) of *Table 8-1* indicates that one (1) of the thirteen (13) key study intersections will have a cumulative significant impact under the Year 2025 With Project traffic conditions when compared to the LOS criteria defined in this report. However, as shown in column (5) of *Table 8-1*, the implementation of recommended mitigation measures at the impacted intersection mitigates the impacts of the proposed Project. After implementation of the recommended mitigation measures, the impacted intersection is forecast to operate at better service levels than pre-Project conditions and improve or maintain existing service levels.

Appendix D contains the Delay/LOS calculation worksheets for the Year 2025 Traffic Conditions.

TABLE 8-1

YEAR 2025 CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY[10]

Key Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2025 Without Project Traffic Conditions		(3) Year 2025 With Project Traffic Conditions		(4) Significant Impact	(5) Year 2025 With Project With Mitigation	
			Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Yes/No	Delay (s/v)	LOS
1. Apple Valley Road at	D	AM	32.4	C	34.3	C	34.6	C	No	--	--
US Highway 18		PM	30.8	C	37.9	D	38.1	D	No	--	--
2. Kasota Road at	D	AM	20.0	B	20.7	C	20.8	C	No	--	--
US Highway 18		PM	17.2	B	20.1	C	20.8	C	No	--	--
3. Corwin Road at	D	AM	17.7	B	24.4	C	24.9	C	No	--	--
US Highway 18		PM	13.8	B	23.3	C	24.2	C	No	--	--
4. Tao Road at	D	AM	12.0	B	12.6	B	12.5	B	No	--	--
US Highway 18		PM	14.3	B	15.6	B	15.8	B	No	--	--
5. Rimrock Road/Piute Road at	D	AM	15.8	C	16.1	C	16.6	C	No	--	--
US Highway 18		PM	14.9	B	16.8	C	17.8	C	No	--	--
6. Rancherias Road at	D	AM	12.1	B	11.1	B	11.6	B	No	--	--
Thunderbird Road		PM	11.6	B	12.3	B	13.2	B	No	--	--
7. Rancherias Road at	D	AM	21.7	C	21.5	C	26.4	C	No	--	--
US Highway 18		PM	24.4	C	28.0	C	30.2	C	No	--	--

Notes:

- s/v = seconds per vehicle (delay)
- LOS = Level of Service, please refer to *Tables 3-1* and *3-2* for the LOS definitions
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

[10] *Appendix D* contains the Delay/LOS calculation worksheets for all study intersections.

TABLE 8-1 (CONTINUED)
YEAR 2025 CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY[11]

Key Intersection	Minimum Acceptable LOS	Time Period	(1) Existing Traffic Conditions		(2) Year 2025 Without Project Traffic Conditions		(3) Year 2025 With Project Traffic Conditions		(4) Significant Impact	(5) Year 2025 With Project With Mitigation	
			Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Yes/No	Delay (s/v)	LOS
8. Rancherias Road at	D	AM	11.3	B	11.6	B	12.4	B	No	--	--
Tomahawk Road		PM	15.5	C	16.2	C	20.0	C	No	--	--
9. Bass Hill Road at	D	AM	18.8	B	18.2	B	17.8	B	No	--	--
US Highway 18		PM	26.6	C	29.1	C	27.1	C	No	--	--
10. Dale Evans Parkway at	D	AM	15.3	B	15.3	B	15.6	B	No	--	--
US Highway 18		PM	20.0	C	21.0	C	21.6	C	No	--	--
11. Flathead Road at	D	AM	11.8	B	11.4	B	11.2	B	No	--	--
US Highway 18		PM	12.3	B	13.1	B	13.2	B	No	--	--
12. Kiowa Road at	D	AM	**143.0**	**F**	**130.1**	**F**	**123.9**	**F**	**Yes**	20.6	C
US Highway 18		PM	43.9	D	43.3	D	41.2	D	No	23.5	C
13. Navajo Road at	D	AM	20.5	C	20.7	C	20.2	C	No	--	--
US Highway 18		PM	24.5	C	25.3	C	24.6	C	No	--	--

Notes:

- s/v = seconds per vehicle (delay)
- LOS = Level of Service, please refer to *Tables 3-1* and *3-2* for the LOS definitions
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

[11] *Appendix D* contains the Delay/LOS calculation worksheets for all study intersections.

9.0 RECOMMENDED IMPROVEMENTS

For those intersections where projected traffic volumes are expected to result in unacceptable operating conditions, this report recommends improvement measures that change the intersection geometry to increase capacity. These capacity improvements may involve roadway widening and/or re-striping to reconfigure specific approaches of a key intersection. The identified improvements are expected to:

- mitigate the impact of existing traffic, Project traffic and future non-Project (ambient traffic growth and cumulative projects) traffic and
- improve Levels of Service to an acceptable range and/or to pre-Project conditions.

Figure 9-1 presents the recommended improvements and intersection controls at the key study intersections. These are discussed in more detail in the sections below.

9.1 Project-Specific Improvements

The following Project design features are to be implemented in conjunction with development of the proposed Project to ensure adequate access and egress to the site is provided:

- Intersection 7. Rancherias Road at US Highway 18: Widen and restripe the northbound approach to provide a second northbound through lane and a free northbound right-turn lane. Modify the existing traffic signal phasing to protected/permissive on Rancherias Road (north-south directions).

9.2 Recommended Improvements

9.2.1 *Existing With Project Traffic Conditions*

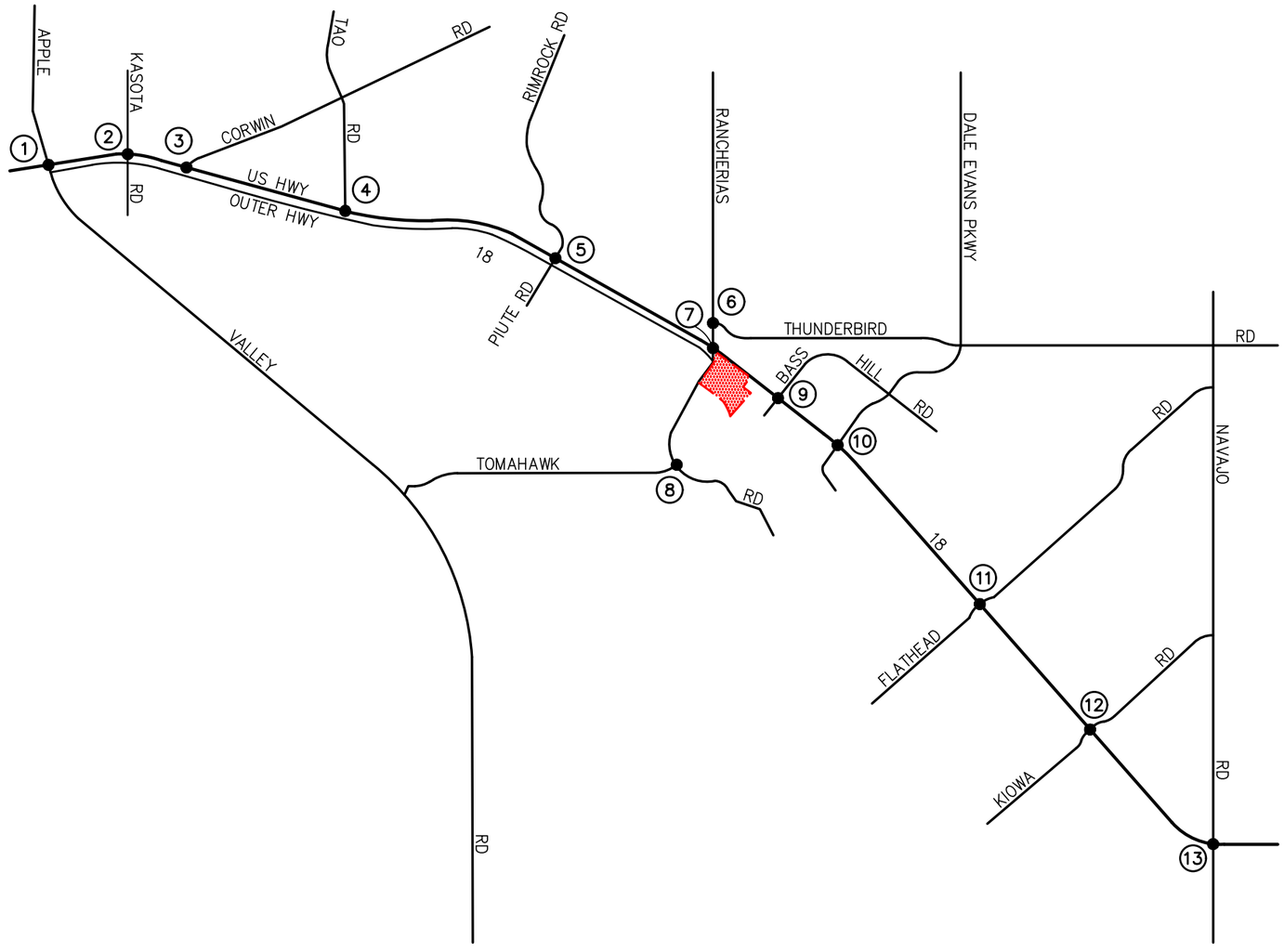
The results of the Existing With Project traffic conditions level of service analyses indicate that the proposed Project will significantly impact one (1) of the thirteen (13) key study intersections. The remaining twelve (12) key study intersections are forecast to operate at acceptable levels of service under the Existing With Project traffic conditions. The improvements listed below have been identified to address the traffic impacts at the intersection significantly impacted by the Existing With Project traffic:

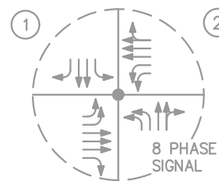
- Intersection 12. Kiowa Road at US Highway 18: Modify the existing traffic signal to an eight-phase signal to provide Kiowa Road with protected left-turn phasing (north-south directions).

9.2.2 *Year 2025 With Project Traffic Conditions*

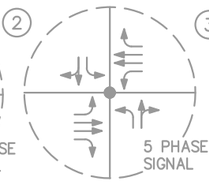
The results of the Year 2025 With Project traffic conditions level of service analyses indicate that the proposed Project will significantly impact one (1) of the thirteen (13) key study intersections. The remaining twelve (12) key study intersections are forecast to operate at acceptable levels of service under the Year 2025 With Project traffic conditions. The improvements listed below have been identified to address the traffic impacts at the intersection significantly impacted by the Year 2025 With Project traffic:

- Intersection 12. Kiowa Road at US Highway 18: Modify the existing traffic signal to an eight-phase signal to provide Kiowa Road with protected left-turn phasing (north-south directions).

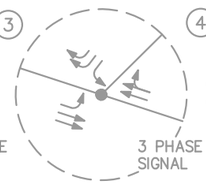




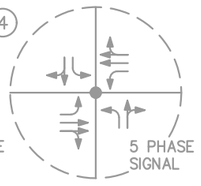
APPLE VALLEY RD @ US HWY 18



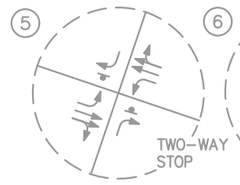
KASOTA RD @ US HWY 18



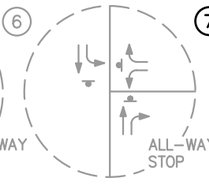
CORWIN RD @ US HWY 18



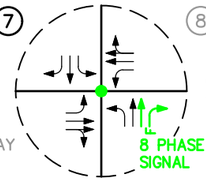
TAO RD @ US HWY 18



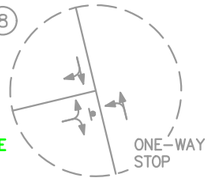
PIUTE RD/RIMROCK RD @ US HWY 18



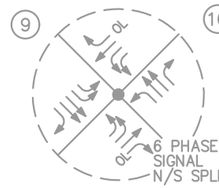
RANCHERIAS RD @ THUNDERBIRD RD



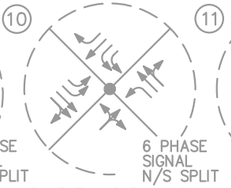
RANCHERIAS RD @ US HWY 18



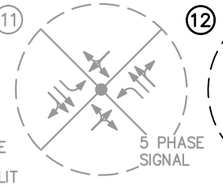
RANCHERIAS RD @ TOMAHAWK RD



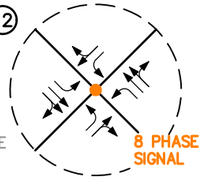
BASS HILL RD @ US HWY 18



DALE EVANS PKWY @ US HWY 18



FLATHEAD RD @ US HWY 18



KIOWA RD @ US HWY 18



NAVAJO RD @ US HWY 18

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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

= APPROACH LANE ASSIGNMENT
= EXISTING WITH PROJECT RECOMMENDED IMPROVEMENTS
= PROJECT SPECIFIC IMPROVEMENTS
= TRAFFIC SIGNAL, = STOP SIGN
F = FREE RIGHT
= PROJECT SITE

FIGURE 9-1

RECOMMENDED IMPROVEMENTS

BUFFALO TRADING POST PLAZA, APPLE VALLEY

10.0 PROJECT FAIR SHARE ANALYSIS

The transportation impacts associated with the development of the proposed Project were determined based on the future conditions analysis with and without the proposed Project. The key study locations forecast to operate at adverse levels of service are discussed below. As such, the proposed Project's "fair-share" of the recommended traffic improvements has been calculated for the key study locations that are forecast to operate at adverse levels of service in the Year 2025.

10.1 Year 2025 With Project Traffic Conditions

Table 10-1 presents the AM and PM peak hour Project fair share percentage at the key study intersections that are forecast to operate at adverse levels of service in the Year 2025 With Project traffic conditions. As presented in *Table 10-1*, the first column (1) presents a total of all intersection peak hour movements for existing conditions. The second column (2) presents Project traffic. The third column (3) presents future Year 2025 traffic conditions with Project traffic. The fourth column (4) represents the Project's fair share based on the following formula:

- Project Fair Share (4) = Column (2)/[Column (3) – Column (1)]*100

The Project fair share percentage (worse time period impacted) for the one (1) cumulatively impacted intersection for the Year 2025 With Project traffic conditions is shown below:

- 11. Kiowa Road at US Highway 18 33.22%

TABLE 10-1

YEAR 2025 WITH PROJECT TRAFFIC CONDITIONS INTERSECTION FAIR SHARE CONTRIBUTION

Key Intersection		Impacted Time Period	(1) Existing Traffic	(2) Project Traffic	(3) Year 2025 With Project Traffic	(4) Project Fair Share Responsibility
12.	Kiowa Road at	AM	1,727	102	2,034	**33.22%**
	US Highway 18	PM	--	--	--	--

Notes:

- Net Project Percent Increase (4) = Column (2) / [Column (3) – Column (1)]
- **Bold Project Fair Share Responsibility** is based on worse case

11.0 SITE ACCESS, INTERNAL CIRCULATION, AND QUEUING EVALUATION

11.1 Site Access

As previously detailed, main access to the Project site will be provided via one (1) full-access driveway on Rancherias Road, one (1) right-in/right-out driveway on Rancherias Road, and one (1) right-in/right-out driveway on US Highway 18.

11.1.1 *Year 2025 With Project Traffic Conditions*

Table 11-1 summarizes the levels of service at the Project driveways for Year 2025 With Project traffic conditions. The operations analysis for the Project access is based on the *Highway Capacity Manual 6* (HCM 6) Method of Analysis for unsignalized intersections. As shown in column (1) of *Table 11-1*, the Project access is forecast to operate at acceptable levels of service during the AM and PM peak hours under the Year 2025 With Project traffic conditions. ***Appendix E*** contains the Delay/LOS calculation worksheets for the Year 2025 With Project Traffic Conditions.

11.2 Internal Circulation

The on-site circulation was evaluated in terms of vehicle-pedestrian conflicts. Based on our review of the preliminary site plan, the overall layout does not create significant vehicle-pedestrian conflict points such that access for the Project are not impacted by internal vehicle queuing/stacking. Project traffic is not anticipated to cause significant internal queuing/stacking at the Project driveways. The alignment and spacing of the Project driveways is also deemed adequate. Turning movements into and out of the Project site at the Project driveways are anticipated to operate at acceptable service levels. As such, motorists entering and exiting the Project site from this driveway will be able to do so comfortably, safely, and without undue congestion.

TABLE 11-1

PROJECT DRIVEWAY PEAK HOUR CAPACITY ANALYSIS SUMMARY[12]

Project Driveway		Time Period	(1) Year 2025 With Project Traffic Conditions	
			Delay (s/v)	LOS
A.	Rancherias Road at Project Driveway 1	AM	14.6	B
		PM	26.4	D
B.	Rancherias Road at Project Driveway 2	AM	10.6	B
		PM	11.3	B
C.	Project Driveway 3 at US Highway 18	AM	12.6	B
		PM	22.1	C

Notes:

- s/v = seconds per vehicle (delay).
- LOS = Level of Service, please refer to *Table 3-2* for the LOS definitions.
- **Bold Delay/LOS values** indicate unacceptable service levels.

[12] *Appendix E* contains the Delay/LOS calculation worksheets for the Project driveway.

11.3 Intersection Queueing Evaluation

A "turn pocket" queuing evaluation has been conducted for the intersections of Rancherias Road at US Highway 18 and Rancherias Road at Project Driveway 1 to determine the minimum required stacking/storage lengths for the proposed Project-specific improvement approaches. The stacking/storage requirements are required at a minimum to ensure that vehicles do not queue beyond the striped lane, causing interruptions to traffic on Rancherias Road or access to the Project site.

Table 11-2 identifies the minimum required stacking/storage lengths based off of the 95th percentile for Year 2025 With Project traffic conditions. Based on the proposed storage at the intersections, adequate storage is provided. Therefore, no modifications to the proposed pockets are required.

TABLE 11-2
YEAR 2025 WITH PROJECT PEAK HOUR QUEUING ANALYSIS

Key Caltrans Intersection	(1) Year 2025 With Project Traffic Conditions				
		AM Peak Hour		PM Peak Hour	
	Proposed Storage Provided[13] (feet)	Max. Queue/ Min. Storage Required[14]	Adequate Storage (Yes / No)	Max. Queue/ Min. Storage Required[14]	Adequate Storage (Yes / No)
7. Rancherias Road at US Highway 18					
Northbound Left-Turn	270’	144’	Yes	178’	Yes
A. Rancherias Road at Project Driveway 1					
Southbound Left-Turn	100’	25’	Yes	25’	Yes

[13] Source: *Google Earth*.

[14] Maximum queue in feet (ft) is the 95th percentile.

12.0 MULTI-MODAL CIRCULATION

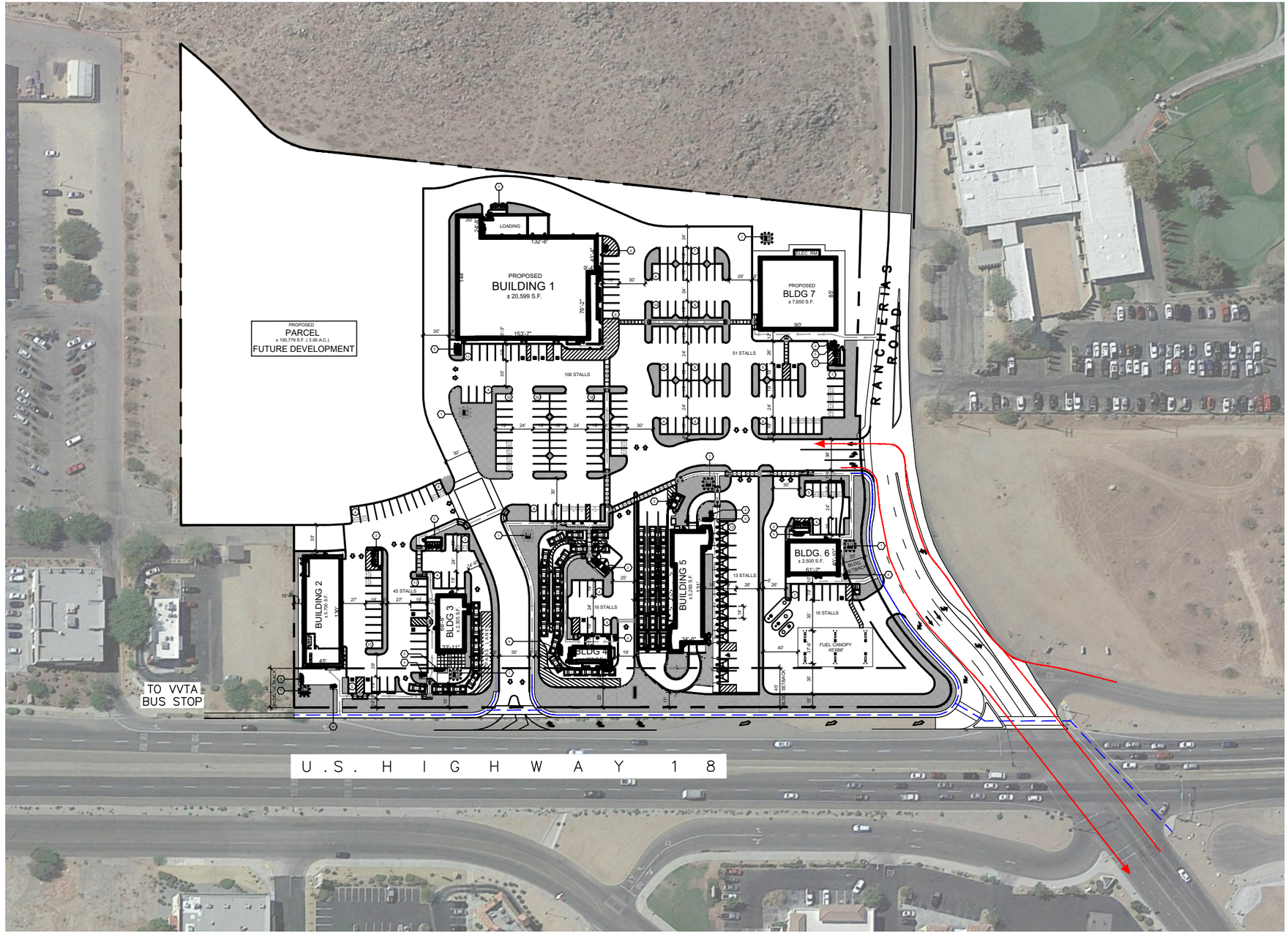
Figure 12-1 illustrates the multi-modal circulation plan (vehicular, pedestrian, bicycle, public transit) associated with the Project site, including connections between sidewalks, signalized crosswalks, bicycle connections/access to the site, and access to nearby public transit stops. As shown in *Figure 12-1*, Pedestrian circulation is provided via proposed new public sidewalks along both the Highway 18 and Rancherias Road Project frontages as well as crosswalk connect across Rancherias Road to the west and Highway 18 to the north. The existing pedestrian network to the east of the Project site provides direct connectivity to the existing Victor Valley Transit Bus Stop 2010 along eastbound Highway 18 at Bass Hill Road for both pedestrians and bicycles.

The Town of Apple Valley promotes bicycling as a means of mobility and a way in which to improve the quality of life within its community. The existing bikeway in the vicinity of the Project site consists of a Class III bikeway along Rancherias Road. In addition, as shown in *Figure 12-1*, bicycle circulation for the Project site is provided via Rancherias Road and the proposed internal Project drive aisles.

This multi-modal circulation assessment is in compliance with the Caltrans *Interim Land Development and Intergovernmental Review (LDIGR) Safety Review Practitioners Guidance,* dated July 2020, which indicates that District safety staff should consider each location and the proposed project's or plan's potential influence on safety, including but not limited to the following factors:

- Increased presence of pedestrians and bicyclists.
- Degradation of the walking and bicycling environment and experience.
- New pedestrian and bicyclist connection desires.
- Multimodal conflict points, especially at intersections and project access locations.
- Change in traffic mix such as an increase in bicyclists or pedestrians where features such as shoulders or sidewalks may not exist or are inconsistent with facility design (sidewalks, bike and multi-user paths, multimodal roadways, etc.).

The proposed Project will widen the roadway along both the Highway 18 and Rancherias Road Project frontages to accommodate bicycle traffic and construct new sidewalk along both Project frontages to improve pedestrian and bicycle circulation, thus satisfying Caltrans desire and directive to improve multi-modal operation along their facilities.



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NO SCALE

SOURCE: McKENTLY MALAK ARCHITECTS

KEY
= BIKE PATH
= PEDESTRIAN

FIGURE 12-1

MULTI-MODEL CIRCULATION PLAN

BUFFALO TRADING POST PLAZA, APPLE VALLEY

13.0 STATE BILL (SB) 743 COMPLIANCE

The Department of Transportation (Caltrans) has also formally adopted VMT as the metric for reviewing the transportation impacts of a land use development project. Caltrans has released the Vehicle Miles Traveled-Focused Transportation Impact Study Guide (TISG), dated May 20, 2020, and the Caltrans Interim Land Development and Intergovernmental Review (LDIGR) Safety Review Practitioners Guidance, dated July 2020, in order to provide guidance on Caltrans' review of land use projects.

Caltrans' TISG references the Technical Advisory on Evaluating Transportation Impacts In California Environmental Quality Act (CEQA), dated December 2018, prepared by the State of California Governor's Office of Planning and Research (OPR) as the basis for its guidance on VMT assessment.

On December 28, 2018, the California Natural Resources Agency adopted revised CEQA Guidelines. Among the changes to the guidelines was the removal of vehicle delay and LOS from consideration for transportation impacts under CEQA. With the adopted guidelines, transportation impacts are to be evaluated based on a project's effect on vehicle miles traveled. Lead agencies are allowed to continue using their current impact criteria, or to opt into the revised transportation guidelines. However, the new guidelines must be used starting July 1, 2020, as required in CEQA section 15064.3. As we understand it, the Town of Apple Valley extended the adoption of the VMT thresholds and guidelines to May of 2021. As a result, the VMT assessment is based on the *San Bernardino County Transportation Impact Study Guidelines (July 9, 2019).*

In late 2019, State courts stated that under section 21099, subdivision (b)(2), existing law is that "automobile delay, as described solely by level of service or similar measures of vehicular capacity or traffic congestion shall not be considered a significant impact on the environment" under CEQA, except for roadway capacity projects. While this project does not create a significant impact through LOS or delay, for the purposes of this recent court decision, this project was also screened for VMT analysis.

For the VMT screening analysis, the proposed Project was analyzed using the list of projects which serve the local community, have the potential to reduce VMT, and should not be required to complete a VMT assessment. The project list includes:

- K-12 schools
- ***Local-serving retail less than 50,000 sq.ft.***
- Local parks
- Day care centers
- Local serving gas stations
- Local serving banks
- Student housing projects

- Local serving community colleges that are consistent with the assumptions noted in the RTP/SCS

Therefore, since the proposed Buffalo Trading Post Plaza Project consists of local-serving retail land uses with no building greater than 50,000 SF, this project could be screened from a VMT analysis and could be presumed a less than significant impact on VMT, per the *San Bernardino County Transportation Impact Study Guidelines (July 9, 2019)*.

APPENDIX A

TRAFFIC IMPACT STUDY SCOPE OF WORK

LINSCOTT LAW & GREENSPAN
engineers

Engineers & Planners
Traffic
Transportation
Parking

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2 Executive Circle
Suite 250
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Pasadena
Irvine
San Diego
Woodland Hills

To:	Mr. Richard Pedersen Town of Apple Valley	Date:	April 19, 2022
From:	Keil D. Maberry, P.E., Principal Linscott, Law & Greenspan, Engineers	LLG Ref:	2.19.4173.1
Subject:	*Updated* Traffic Impact Analysis Scope of Work for the proposed 66 LLC Commercial Center, Apple Valley, California		

Linscott, Law & Greenspan, Engineers (LLG) is pleased to submit the following Scope of Work (SOW) Memorandum for the preparation of an *Updated* Traffic Impact Analysis (TIA) report for proposed 66 LLC Commercial Center (hereinafter referred to as Project) in the Town of Apple Valley. The work scope details summarized below are based on the Town's traffic study requirements, Congestion Management Program (CMP) for San Bernardino County requirement, Caltrans requirements, and our experience within the area.

The traffic impact analysis report for the proposed Project will satisfy the traffic impact requirements of the Town of Apple Valley and be consistent with the requirements and procedures outlined in the current *Congestion Management Program (CMP) for San Bernardino County, SBCTA Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment (February 2020), and Caltrans Interim Land Development and Intergovernmental Review (LDIGR) Safety Review Practitioners Guidance (July 2020).*

Traffic Impact Analysis (TIA) Scope of Work

1. ***Project Description and Location***: The proposed Project is located on the southeast quadrant of US Highway 18 (Happy Trails Highway) and Rancherias Road in the Town of Apple Valley, San Bernardino County, California. ***Figure 1*** presents a Vicinity Map, which illustrates the general location of the Project and depicts the study locations and surrounding street system. ***Figure 2*** presents the existing aerial photograph of the Project site.

   The proposed Project includes construction of a mixed-use commercial center with a total floor area of 45,576 square-feet (SF) that will consist of a 20,442 SF supermarket, 5,700 SF tire store, two (2) fast-food restaurants with drive-through windows totaling 4,624 SF, 7,650 SF fast casual restaurant use building, 12-fueling position gasoline station with 3,360 SF convenience store, and a 3,800 SF express car wash with 140 feet of tunnel. Access to the Project site will be provided via one (1) right-in/right-out driveway on US Highway 18, one (1) full-access driveway and one (1) right-in/right-out driveway on Rancherias Road. Parking for the Project will be provided via a surface parking lot with 273 parking

Philip M. Linscott, PE (1924-2000)
William A. Law, PE (1921-2018)
Jack M. Greenspan, PE (Ret.)
Paul W. Wilkinson, PE (Ret.)
John P. Keating, PE
David S. Shender, PE
John A. Boarman, PE
Clare M. Look-Jaeger, PE
Richard E. Barretto, PE
Keil D. Maberry, PE
Walter B. Musial, PE
An LG2WB Company Founded 1966

spaces. ***Figure 3*** presents the proposed Project site plan prepared by *McKently Malak Architects*.

2. **Traffic Study Locations:** The following twelve (12) study intersections with their corresponding jurisdiction represent the list of study intersections that are to be evaluated in the Traffic Impact Analysis report:

    1. Apple Valley Road at US Highway 18 (Apple Valley/Caltrans)
    2. Kasota Road at US Highway 18 (Apple Valley/Caltrans)
    3. Corwin Road at US Highway 18 (Apple Valley/Caltrans)
    4. Tao Road at US Highway 18 (Apple Valley/Caltrans)
    5. Rimrock Road/Piute Road at US Highway 18 (Apple Valley/Caltrans)
    6. Rancherias Road at Thunderbird Road (Apple Valley)
    7. Rancherias Road at US Highway 18 (Apple Valley/Caltrans)
    8. Rancherias Road at Tomahawk Road (Apple Valley)
    9. Bass Hill Road at US Highway 18 (Apple Valley/Caltrans)
    10. Dale Evans Parkway at US Highway 18 (Apple Valley/Caltrans)
    11. Flathead Road at US Highway 18 (Apple Valley/Caltrans)
    12. Kiowa Road at US Highway 18 (Apple Valley/Caltrans)
    13. Navajo Road at US Highway 18 (Apple Valley/Caltrans)

3. **Level of Service and Impact Criteria:** The *Congestion Management Program (CMP) for San Bernardino County* indicates that Level of Service (LOS) E shall be maintained at intersections and roadways.

    Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities. However, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. Caltrans has established that LOS D is the operating standard for all Caltrans facilities. Caltrans has determined that all state-owned facilities that operate below LOS D should be identified and improved to an acceptable LOS. The *SBCTA Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment (February 2020)* states that if an existing State-owned facility operates at less than the target LOS (i.e. LOS D); the existing service level should be maintained.

    In order to provide a conservative analysis, LOS D shall be maintained at all intersections. Therefore, any intersections operating at LOS E or F shall be considered deficient.

Consistent with the Town of Apple Valley, Caltrans and as presented in *Appendix B of the San Bernardino County CMP*, the parameters to be used in the analysis are listed in ***Table 1***.

4. **Project Trip Generation Forecast**: The trip generation potential of the proposed Project will be estimated using trip rates contained in the 11th Edition of *Trip Generation,* published by the Institute of Transportation Engineers (ITE), [Washington, D.C., 2021]. Specifically, the trip generation potential of the Project will be estimated using ITE Land Use 848: Tire Store, ITE Land Use 850: Supermarket, ITE Land Use 930: Fast Casual Restaurant, ITE Land Use 934: Fast Food Restaurant With Drive Through Window and ITE Land Use 945: Gasoline Service Station with Convenience Market rates. Trip generation rates used for the express wash land use in the traffic forecasting procedure are based on the empirical trip generation estimates at Victorville Speedwash collected on February 7, 2014. The upper half of ***Table 2*** summarizes the trip generation rates used in forecasting the vehicular trips generated by the Project.

   A review of the lower half of *Table 1* shows that the proposed Project is forecast to generate 7,454 daily "net" trips (one half arriving, one half departing), with 273 "net" trips (149 inbound, 124 outbound) produced in the AM peak hour and 430 "net" trips (218 inbound, 212 outbound) produced in the PM peak hour.

5. **Project Trip Distribution Pattern**: The directional trip distribution pattern for the Project is presented in ***Figure 4***. Project traffic volumes, both entering and exiting the site, have been distributed and assigned to the adjacent street system based on the following considerations:

   - expected localized traffic flow patterns based on adjacent street channelization and presence of traffic signals,
   - the traffic-carrying capacity and travel speed available on roadways serving the Project site, and
   - ingress/egress availability at the Project site.

6. **Year 2025 Cumulative Traffic**:

   - Ambient Growth Rate: 2.0% per year.
   - Cumulative Projects: Obtain information regarding cumulative projects within the vicinity of the proposed Project from the Town of Apple Valley.

7. **Traffic Impact Analysis Scenarios:** The LOS calculations will be based on the *Highway Capacity Manual 6th Edition (HCM 6)* for methodology for signalized and unsignalized intersections consistent with the Town of Apple Valley, San

Bernardino County CMP and Caltrans requirements. The Project's potential impact will be based on the Town of Apple Valley LOS standards. The following scenarios are those for which LOS calculations will be performed:

1. Existing Traffic Conditions,
2. Existing With Project Traffic Conditions,
3. Scenario (2) with Recommended Improvements, if any,
4. Year 2025 Without Project Traffic Conditions,
5. Year 2025 With Project Traffic Conditions, and
6. Scenario (5) With Recommended Improvements, if any.

8. **Mitigation and Fair-Share Contribution Percentage**: Conduct mitigation and calculate fair-share contribution percentage at the significantly impacted intersections (if any) for the scenarios listed in ***Task 6*** above.

9. **VMT Assessment:** Conduct VMT assessment analysis for the proposed Project.

10. **Other Issues:**
    - Evaluate site access and internal circulation.
    - Evaluate pedestrian and bicycle circulation.

* * * * * * * * * * *

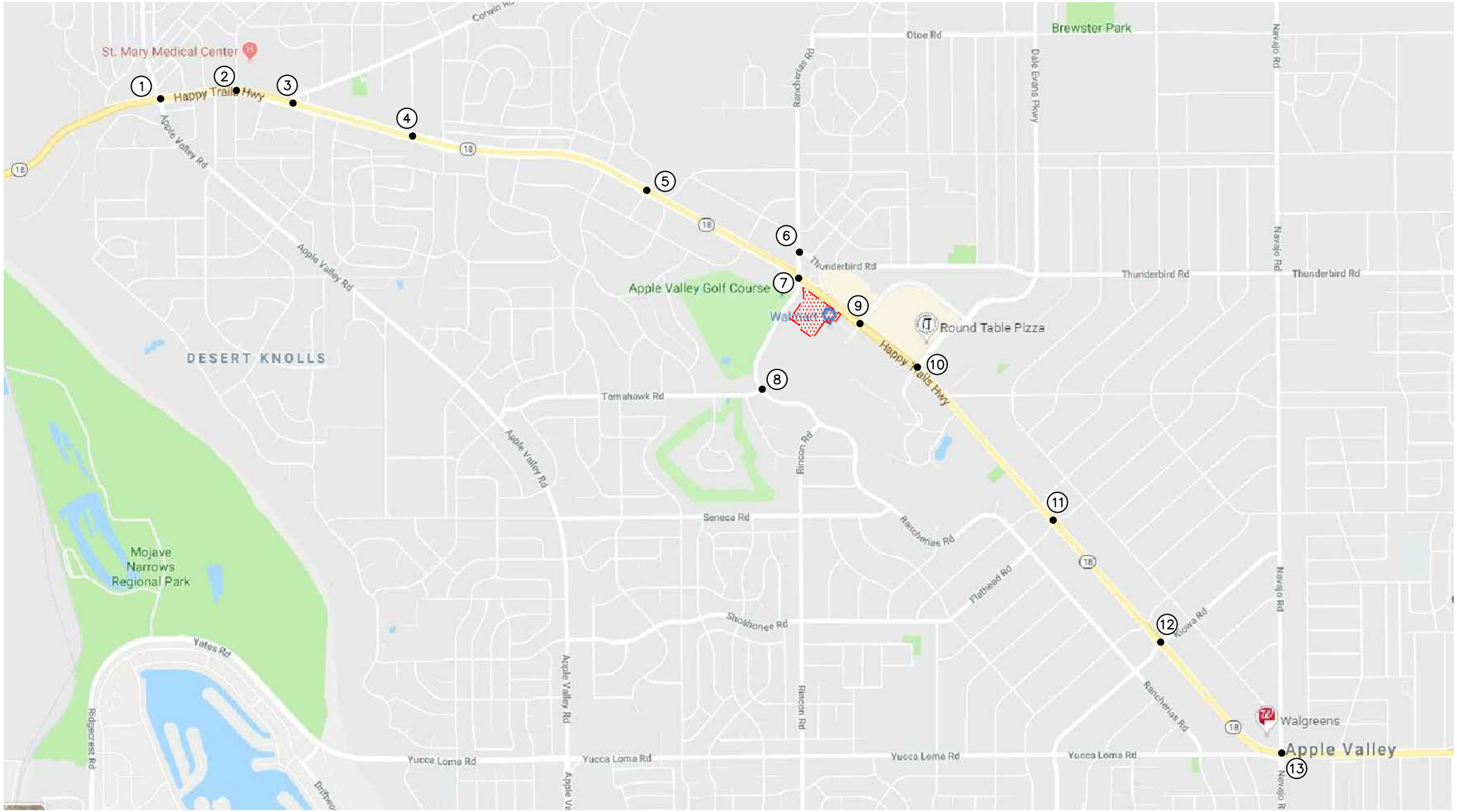
We appreciate the opportunity to provide this scope of work for your review and approval. Should you have any questions or comments, please call me at (949) 825-6175.

Approved by:

_____ _____

Town of Apple Valley Date

cc: File



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: GOOGLE

KEY

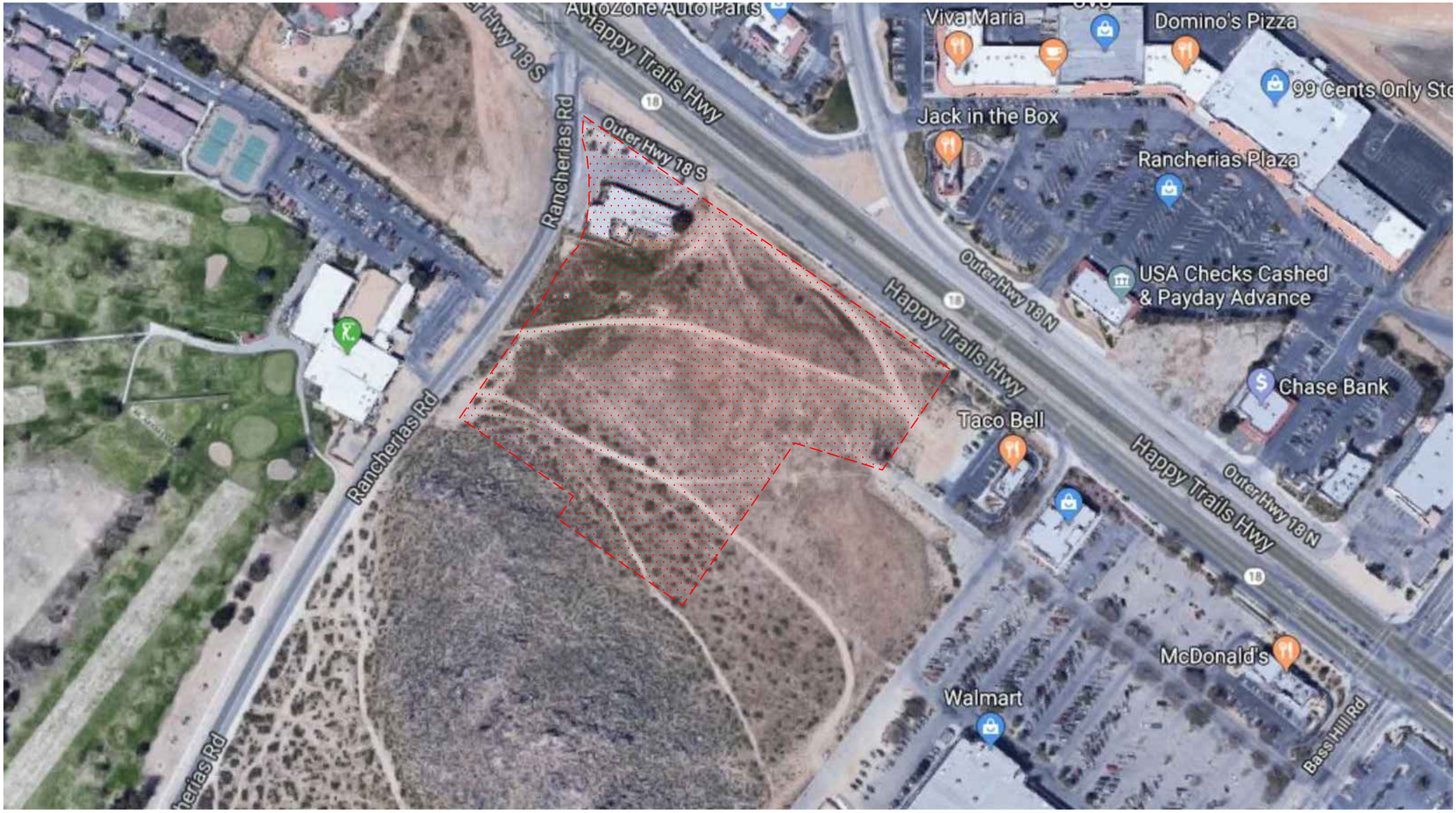
(#) = STUDY INTERSECTION

= PROJECT SITE

FIGURE 1

VICINITY MAP

66 LLC COMMERCIAL CENTER, APPLE VALLEY



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LINSCOTT LAW & GREENSPAN engineers

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SOURCE: GOOGLE

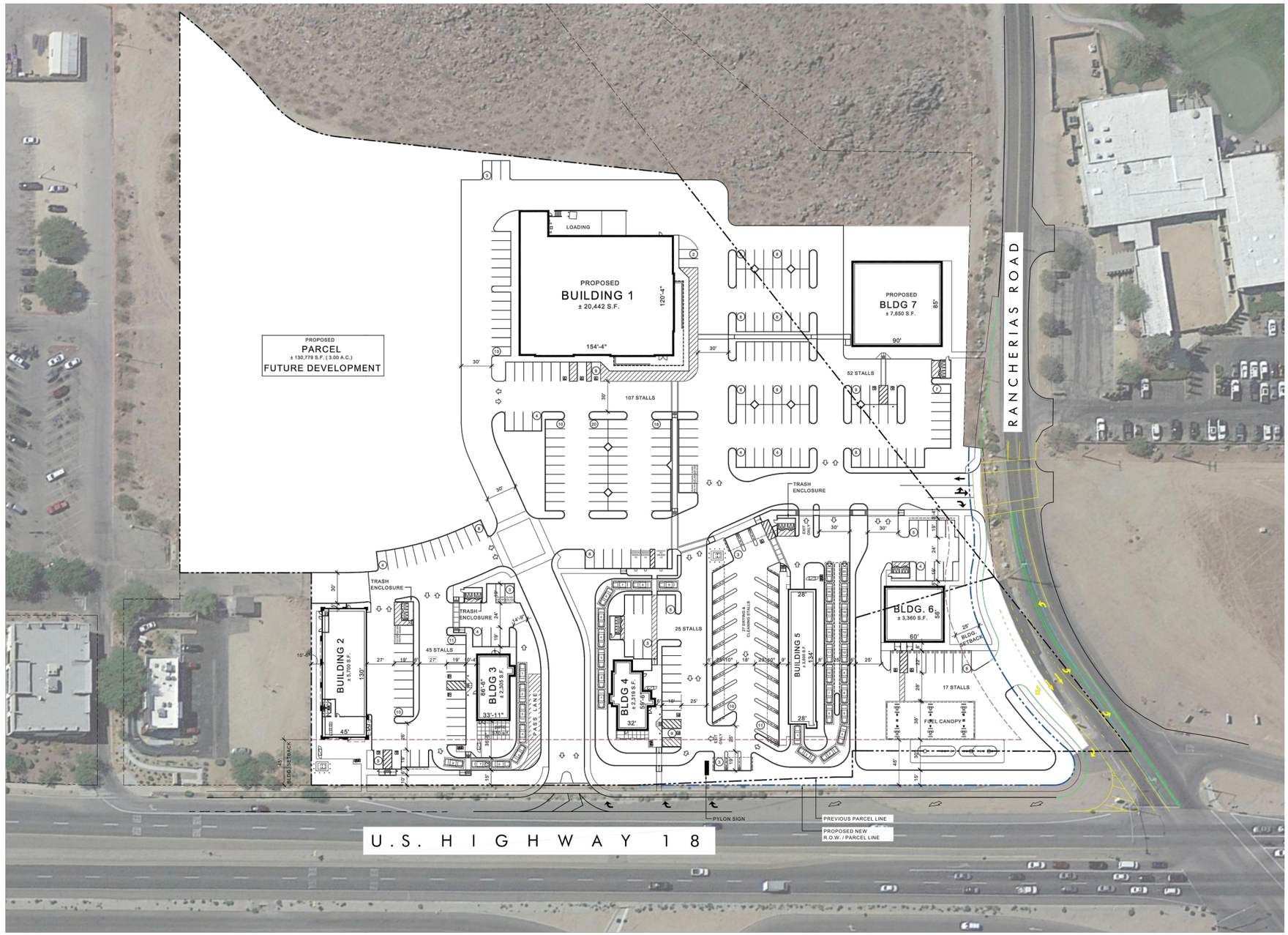
KEY

= PROJECT SITE

FIGURE 2

EXISTING SITE AERIAL

66 LLC COMMERCIAL CENTER, APPLE VALLEY



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LINSCOTT LAW & GREENSPAN engineers

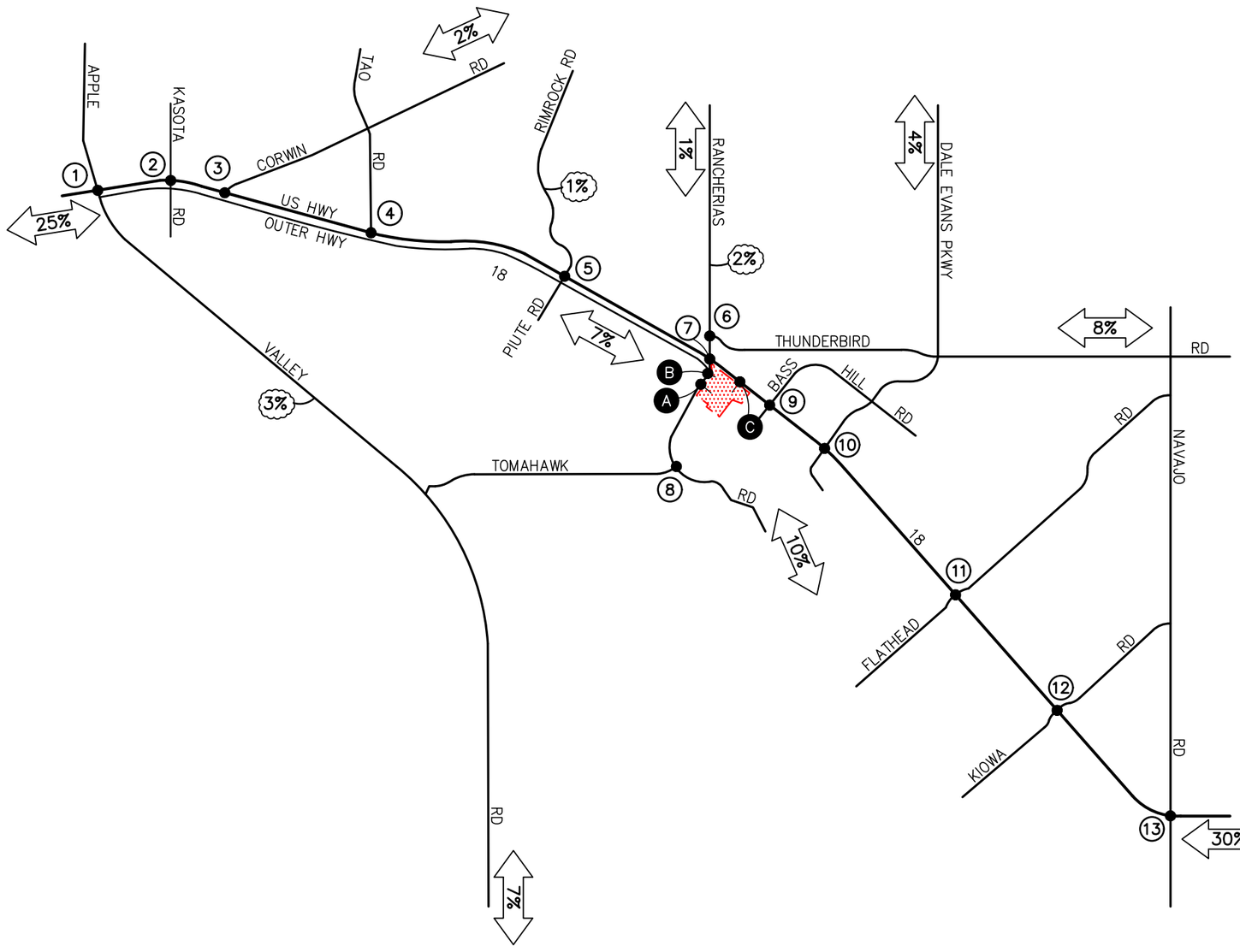
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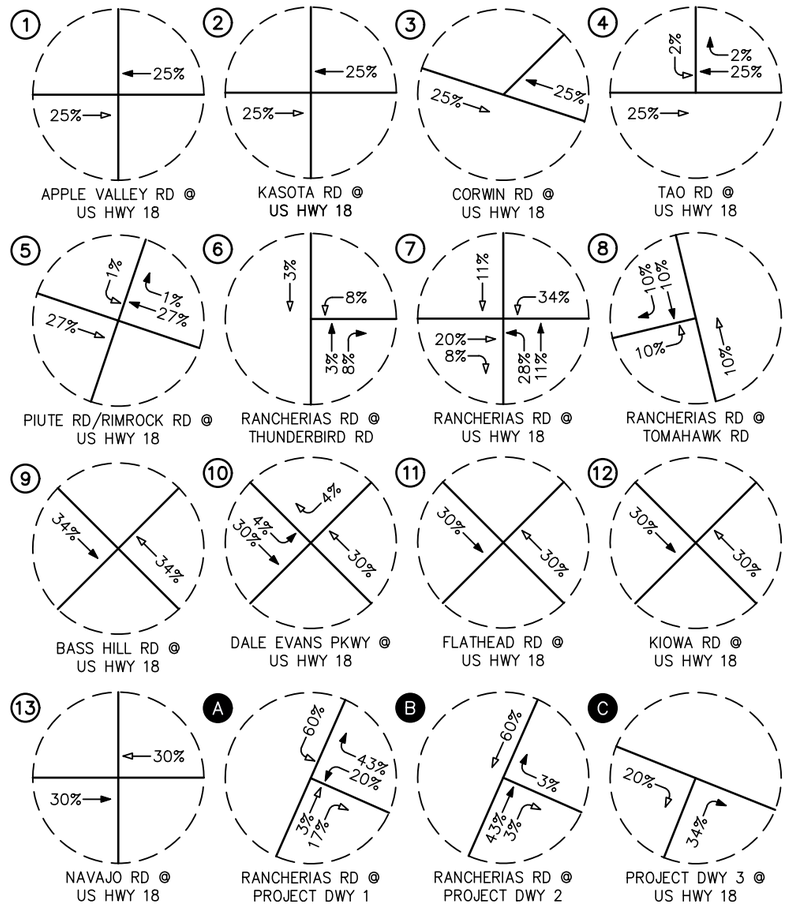
SOURCE: McKENTLY MALAK ARCHITECTS

FIGURE 3

PROPOSED SITE PLAN

66 LLC COMMERCIAL CENTER, APPLE VALLEY





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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

(#) = STUDY INTERSECTION
⇦ = INBOUND PERCENTAGE
⇦ = OUTBOUND PERCENTAGE
▭ = PROJECT SITE

FIGURE 4

PROJECT TRIP DISTRIBUTION PATTERN

66 LLC COMMERCIAL CENTER, APPLE VALLEY

TABLE 1

TOWN OF APPLE VALLEY & CALTRANS TRAFFIC IMPACT ANALYSIS PARAMETERS [1]

Intersection Methodology	HCM 6th Edition • *Chapter 19: Signalized Intersections* • *Chapter 20: Two-Way Stop-Controlled Intersections*		
PHF	Existing Field Observed	Near-Term 0.95	Long-Term 0.95
Saturation	*San Bernardino County CMP, 2016 Update, Appendix B*		
	<u>Existing and Opening Day</u> • Exclusive thru: 1,800 vphgpl • Exclusive left: 1,700 vphgpl • Exclusive right: 1,800 vphgpl • Exclusive double left: 1,600 vphgpl • Exclusive triple left: 1,500 vphgpl		
Coordinate Type/Actuation Type	Time of Day Pattern Coordinated/Fully Actuated		
Cycle Length	90-130 seconds		
Minimum Green	6 seconds		
Lost Time	2 second lost time/phase		
Pedestrian Clearance	[(# lanes x 12) / 3.5] + 7 seconds		

<u>Notes:</u>

- vphgpl = Vehicles Per Hour of Green Per Lane

[1] Source*: Appendix B of the San Bernardino County CMP, 2016 Update.*

TABLE 2
PROJECT TRIP GENERATION RATES AND FORECAST[1]
66 LLC COMMERCIAL CENTER, APPLE VALLEY

ITE Land Use Code / Project Description	Daily 2-Way	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Trip Generation Rates:							
▪ 848: Tire Store (TE/TSF)	27.69	64%	36%	2.61	43%	57%	3.75
▪ 850: Supermarket (TE/TSF)	93.84	59%	41%	2.86	50%	50%	8.95
▪ 930: Fast Casual Restaurant (TE/TSF)	97.14	50%	50%	1.43	55%	45%	12.55
▪ 934: Fast Food Restaurant With Drive Through Window (TE/TSF)	467.48	51%	49%	44.61	52%	48%	33.03
▪ 945: Gasoline Service Station with Convenience Market – GFA (2-4k)[2] (TE/TSF)	265.12	50%	50%	16.06	50%	50%	18.42
▪ Empirical Trip Generation Estimates for Speedwash (TE/LFWT)[3]	8.663	0.275	0.204	0.479	0.450	0.463	0.913
Trip Generation Forecast:							
▪ Building 1: Supermarket (20,442 SF)	1,918	34	24	58	92	91	183
Pass-by (10% Daily, 10% AM, 24% PM)	-192	-3	-3	-6	-22	-22	-44
Supermarket Subtotal	*1,726*	*31*	*21*	*52*	*70*	*69*	*139*
▪ Building 2: Tire Store (5,700 SF)	158	10	5	15	9	12	21
Pass-by (10% Daily, 10% AM, 25% PM)	-16	-1	-1	-2	-2	-3	-5
Tire Store Subtotal	*142*	*9*	*4*	*13*	*7*	*9*	*16*
▪ Building 3: Fast Food With Drive Through (2,305 SF)	1,078	53	50	103	40	36	76
Pass-by (25% Daily, 50% AM, 55% PM)	-270	-27	-25	-52	-22	-20	-42
Fast Food With Drive Through Subtotal	*808*	*26*	*25*	*51*	*18*	*16*	*34*
▪ Building 4: Fast Food With Drive Through (3,319 SF)	1,084	53	50	103	40	37	77
Pass-by (25% Daily, 50% AM, 55% PM)	-271	-27	-25	-52	-22	-20	-42
Fast Food With Drive Through Subtotal	*813*	*26*	*25*	*51*	*18*	*17*	*35*
▪ Building 5: Express Wash (140 Feet of Tunnel)	1,213	39	28	67	63	65	128
Pass-by (25% Daily, 25% AM, 25% PM)	-303	-10	-7	-17	-16	-16	-32
Express Wash Subtotal	*910*	*29*	*21*	*50*	*47*	*49*	*96*
▪ Building 6: Gasoline Service Station (12 VFP)	3,181	97	96	193	111	110	221
Pass-by (25% Daily, 76% AM, 75% PM)	-795	-74	-73	-147	-83	-83	-166
Gasoline Service Station Subtotal	*2,386*	*23*	*23*	*46*	*28*	*27*	*55*
▪ Building 7: Fast Casual Restaurant (7,650 SF)	743	6	5	11	53	43	96
Pass-by (10% Daily, 10% AM, 43% PM)	-74	-1	0	-1	-23	-18	-41
Fast Casual Restaurant Subtotal	*669*	*5*	*5*	*10*	*30*	*25*	*55*
Project Total Trip Generation	**7,454**	**149**	**124**	**273**	**218**	**212**	**430**

Notes:
- TE/TSF = Trip Ends per Thousand Square Feet
- TE/VFP = Trip Ends per Vehicle Fueling Position
- TE/LFWT = Trip Ends per Linear Feet of Wash Tunnel
- SF = Square Feet
- VFP = Vehicle Fueling Position

1 Source: *Trip Generation*, 10th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2017).
2 Source*:* Driveway traffic counts conducted on Friday (2/7/2014) at Victorville Speedwash (12147 Industrial Boulevard, Victorville).
3 Proposed convenience store is 3,360 SF.

APPENDIX B

EXISTING TRAFFIC COUNT DATA

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Apple Valley
N/S: Apple Valley Road
E/W: SR-18
Weather: Clear

File Name : 01_APV_AV_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

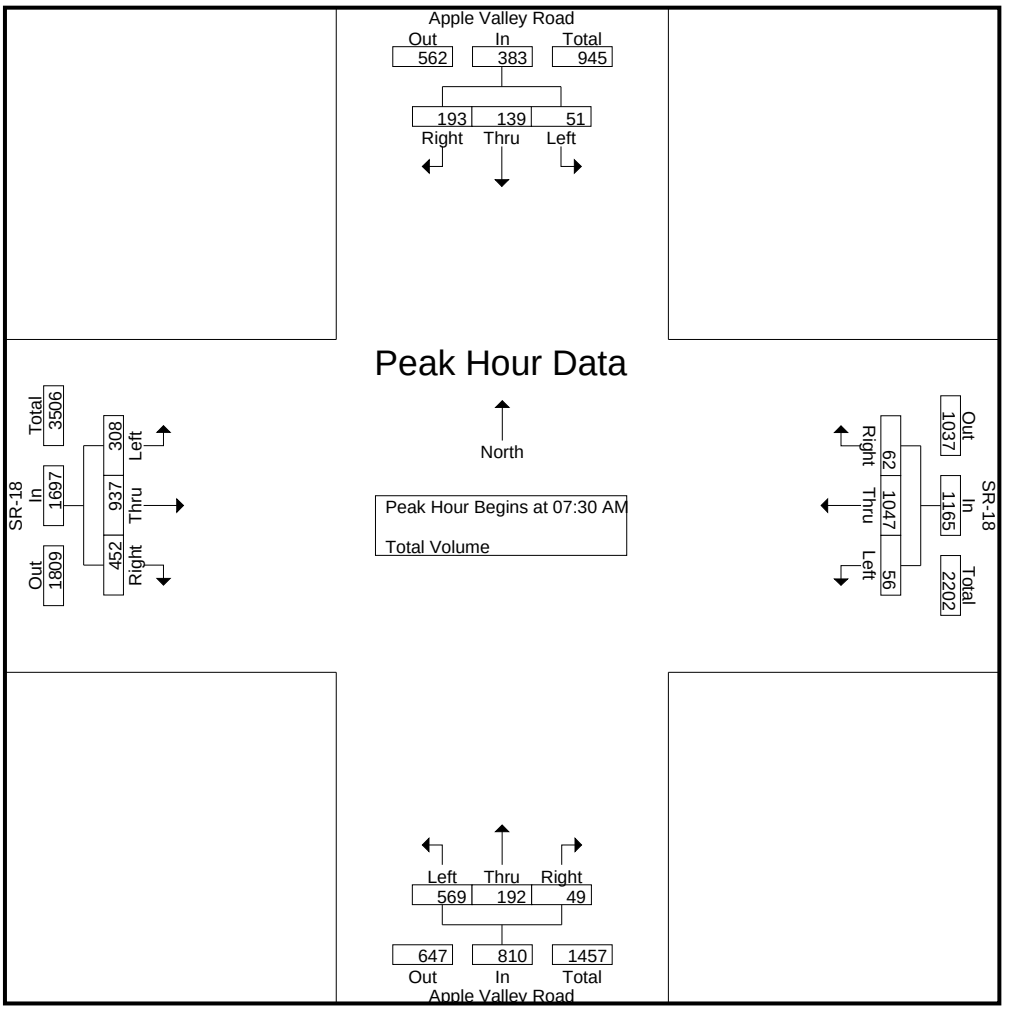
	Apple Valley Road Southbound				SR-18 Westbound				Apple Valley Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	10	23	36	69	5	253	15	273	86	27	6	119	28	158	52	238	699
07:15 AM	5	24	47	76	6	235	12	253	139	42	9	190	39	165	74	278	797
07:30 AM	14	27	44	85	13	288	11	312	152	36	10	198	69	213	105	387	982
07:45 AM	12	35	53	100	10	272	18	300	146	63	11	220	88	290	120	498	1118
Total	41	109	180	330	34	1048	56	1138	523	168	36	727	224	826	351	1401	3596
08:00 AM	13	42	56	111	17	291	18	326	132	35	10	177	64	223	133	420	1034
08:15 AM	12	35	40	87	16	196	15	227	139	58	18	215	87	211	94	392	921
08:30 AM	13	32	45	90	9	263	10	282	134	37	12	183	66	230	74	370	925
08:45 AM	21	41	44	106	11	272	18	301	143	48	12	203	74	198	75	347	957
Total	59	150	185	394	53	1022	61	1136	548	178	52	778	291	862	376	1529	3837
Grand Total	100	259	365	724	87	2070	117	2274	1071	346	88	1505	515	1688	727	2930	7433
Apprch %	13.8	35.8	50.4		3.8	91	5.1		71.2	23	5.8		17.6	57.6	24.8		
Total %	1.3	3.5	4.9	9.7	1.2	27.8	1.6	30.6	14.4	4.7	1.2	20.2	6.9	22.7	9.8	39.4	

	Apple Valley Road Southbound				SR-18 Westbound				Apple Valley Road Northbound				SR-18 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	**14**	27	44	85	13	288	11	312	**152**	36	10	198	69	213	105	387	982
07:45 AM	12	35	53	100	10	272	**18**	300	146	**63**	11	**220**	**88**	**290**	120	**498**	**1118**
08:00 AM	13	**42**	**56**	**111**	**17**	**291**	18	**326**	132	35	10	177	64	223	**133**	420	1034
08:15 AM	12	35	40	87	16	196	15	227	139	58	**18**	215	87	211	94	392	921
Total Volume	51	139	193	383	56	1047	62	1165	569	192	49	810	308	937	452	1697	4055
% App. Total	13.3	36.3	50.4		4.8	89.9	5.3		70.2	23.7	6		18.1	55.2	26.6		
PHF	.911	.827	.862	.863	.824	.899	.861	.893	.936	.762	.681	.920	.875	.808	.850	.852	.907

Counts Unlimited, Inc.
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City of Apple Valley
N/S: Apple Valley Road
E/W: SR-18
Weather: Clear

File Name : 01_APV_AV_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
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:

	08:00 AM				07:15 AM				07:30 AM				07:30 AM			
+0 mins.	13	**42**	**56**	**111**	6	235	12	253	**152**	36	10	198	69	213	105	387
+15 mins.	12	35	40	87	13	288	11	312	146	**63**	11	**220**	**88**	**290**	120	**498**
+30 mins.	13	32	45	90	10	272	**18**	300	132	35	10	177	64	223	**133**	420
+45 mins.	**21**	41	44	106	**17**	**291**	18	**326**	139	58	**18**	215	87	211	94	392
Total Volume	59	150	185	394	46	1086	59	1191	569	192	49	810	308	937	452	1697
% App. Total	15	38.1	47		3.9	91.2	5		70.2	23.7	6		18.1	55.2	26.6	
PHF	.702	.893	.826	.887	.676	.933	.819	.913	.936	.762	.681	.920	.875	.808	.850	.852

Counts Unlimited, Inc.
PO Box 1178
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City of Apple Valley
N/S: Apple Valley Road
E/W: SR-18
Weather: Clear

File Name : 01_APV_AV_SR-18 PM
Site Code : 05722315
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Page No : 1

Groups Printed- Total Volume

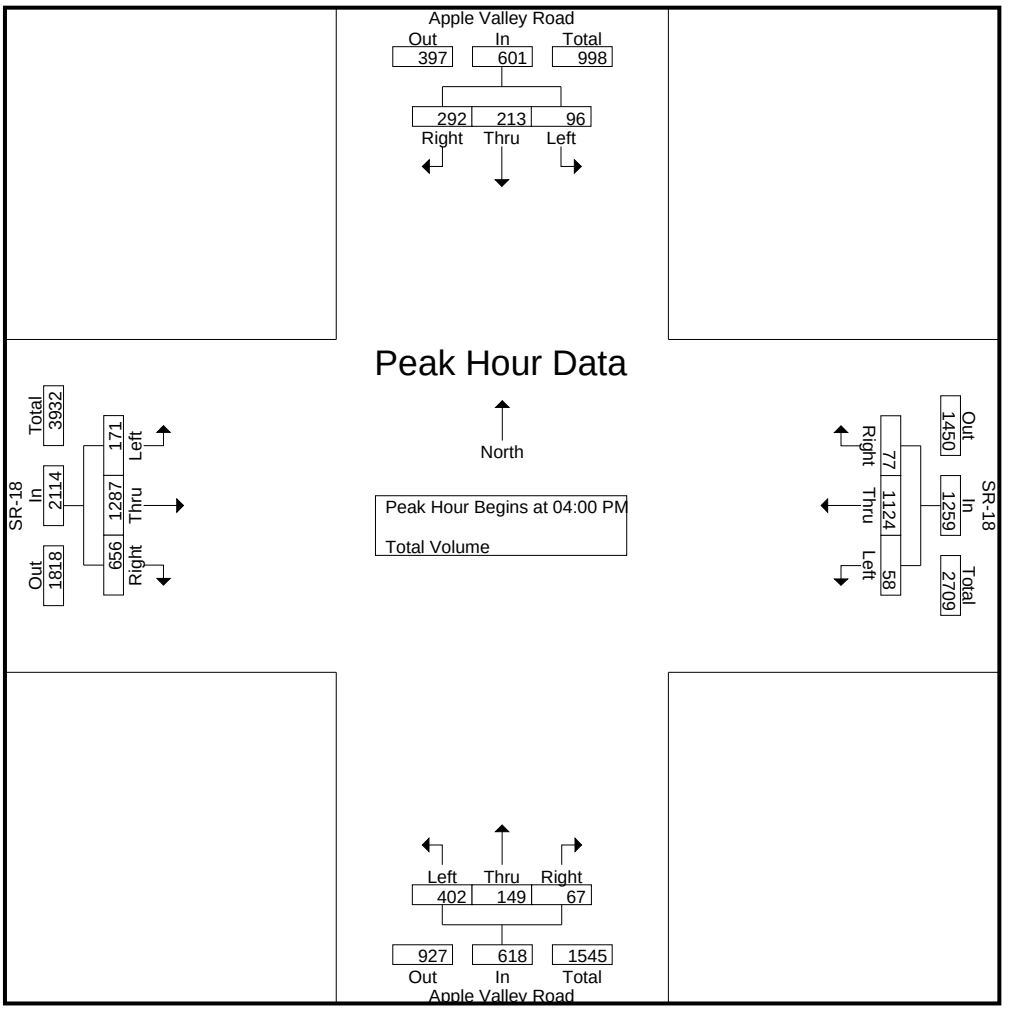
	Apple Valley Road Southbound				SR-18 Westbound				Apple Valley Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	23	72	91	186	14	273	13	300	134	55	23	212	38	282	171	491	1189
04:15 PM	18	41	55	114	14	285	20	319	80	38	14	132	52	349	179	580	1145
04:30 PM	30	59	88	177	11	277	23	311	102	32	19	153	37	299	137	473	1114
04:45 PM	25	41	58	124	19	289	21	329	86	24	11	121	44	357	169	570	1144
Total	96	213	292	601	58	1124	77	1259	402	149	67	618	171	1287	656	2114	4592
05:00 PM	22	35	73	130	12	324	16	352	95	21	16	132	29	313	172	514	1128
05:15 PM	18	48	58	124	17	267	25	309	73	33	11	117	49	332	165	546	1096
05:30 PM	17	35	58	110	13	246	15	274	92	17	16	125	30	311	157	498	1007
05:45 PM	20	35	37	92	11	225	16	252	66	20	14	100	33	346	132	511	955
Total	77	153	226	456	53	1062	72	1187	326	91	57	474	141	1302	626	2069	4186
Grand Total	173	366	518	1057	111	2186	149	2446	728	240	124	1092	312	2589	1282	4183	8778
Apprch %	16.4	34.6	49		4.5	89.4	6.1		66.7	22	11.4		7.5	61.9	30.6		
Total %	2	4.2	5.9	12	1.3	24.9	1.7	27.9	8.3	2.7	1.4	12.4	3.6	29.5	14.6	47.7	

	Apple Valley Road Southbound				SR-18 Westbound				Apple Valley Road Northbound				SR-18 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 04:00 PM																	
04:00 PM	23	**72**	**91**	**186**	14	273	13	300	**134**	**55**	**23**	**212**	38	282	171	491	**1189**
04:15 PM	18	41	55	114	14	285	20	319	80	38	14	132	**52**	349	**179**	**580**	1145
04:30 PM	**30**	59	88	177	11	277	**23**	311	102	32	19	153	37	299	137	473	1114
04:45 PM	25	41	58	124	**19**	**289**	21	**329**	86	24	11	121	44	**357**	169	570	1144
Total Volume	96	213	292	601	58	1124	77	1259	402	149	67	618	171	1287	656	2114	4592
% App. Total	16	35.4	48.6		4.6	89.3	6.1		65	24.1	10.8		8.1	60.9	31		
PHF	.800	.740	.802	.808	.763	.972	.837	.957	.750	.677	.728	.729	.822	.901	.916	.911	.966

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City of Apple Valley
N/S: Apple Valley Road
E/W: SR-18
Weather: Clear

File Name : 01_APV_AV_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
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:

	04:00 PM				04:15 PM				04:00 PM				04:15 PM			
+0 mins.	23	**72**	**91**	**186**	14	285	20	319	**134**	**55**	**23**	**212**	**52**	349	**179**	**580**
+15 mins.	18	41	55	114	11	277	**23**	311	80	38	14	132	37	299	137	473
+30 mins.	**30**	59	88	177	**19**	289	21	329	102	32	19	153	44	**357**	169	570
+45 mins.	25	41	58	124	12	**324**	16	**352**	86	24	11	121	29	313	172	514
Total Volume	96	213	292	601	56	1175	80	1311	402	149	67	618	162	1318	657	2137
% App. Total	16	35.4	48.6		4.3	89.6	6.1		65	24.1	10.8		7.6	61.7	30.7	
PHF	.800	.740	.802	.808	.737	.907	.870	.931	.750	.677	.728	.729	.779	.923	.918	.921

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City of Apple Valley
N/S: Kasota Road
E/W: SR-18
Weather: Clear

File Name : 02_APV_Kasota_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

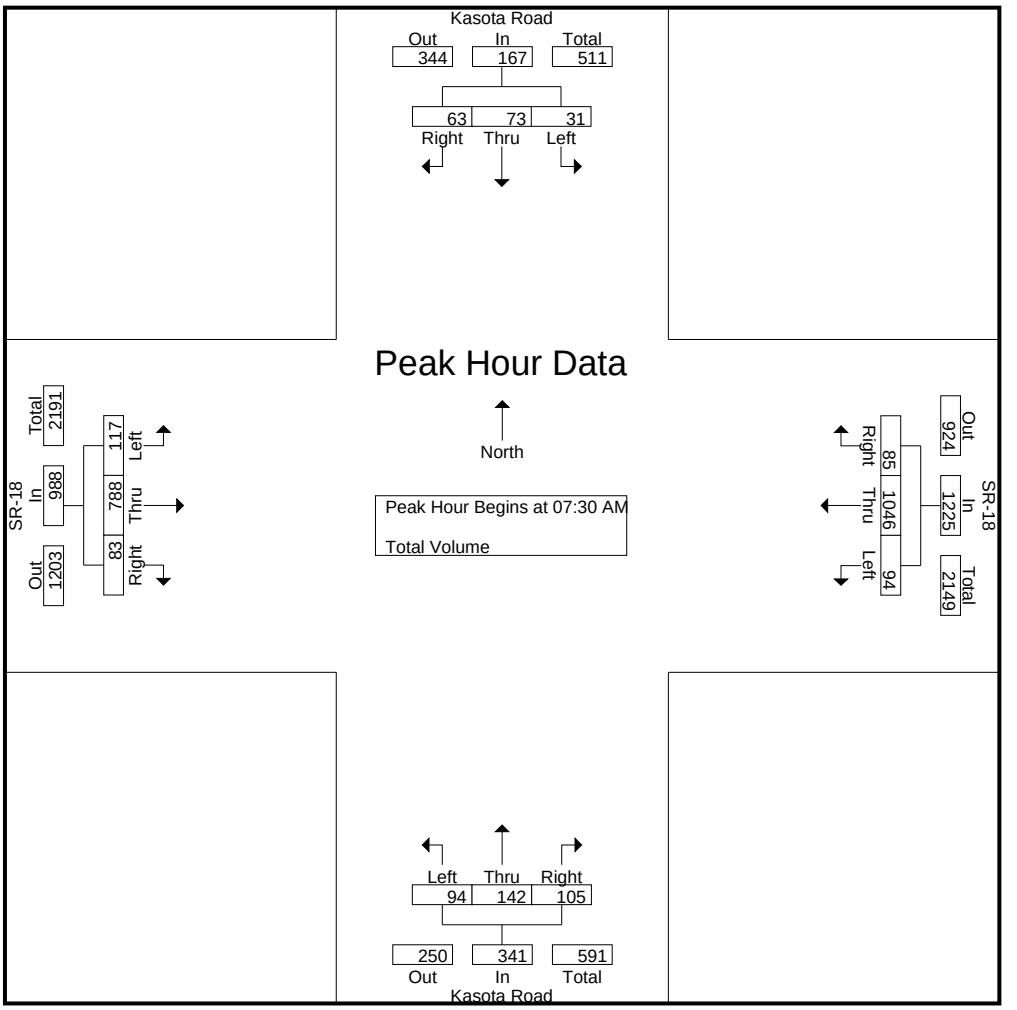
	Kasota Road Southbound				SR-18 Westbound				Kasota Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	8	6	12	26	15	255	11	281	15	16	10	41	18	133	8	159	507
07:15 AM	10	15	14	39	16	239	18	273	17	27	13	57	25	153	16	194	563
07:30 AM	14	18	25	57	22	273	13	308	17	29	17	63	28	179	26	233	661
07:45 AM	7	21	17	45	28	273	30	331	26	38	28	92	35	226	19	280	748
Total	39	60	68	167	81	1040	72	1193	75	110	68	253	106	691	69	866	2479
08:00 AM	6	18	14	38	19	261	25	305	24	32	31	87	29	166	21	216	646
08:15 AM	4	16	7	27	25	239	17	281	27	43	29	99	25	217	17	259	666
08:30 AM	13	13	4	30	16	217	14	247	21	26	23	70	33	201	24	258	605
08:45 AM	12	6	20	38	15	259	27	301	18	21	20	59	28	182	30	240	638
Total	35	53	45	133	75	976	83	1134	90	122	103	315	115	766	92	973	2555
Grand Total	74	113	113	300	156	2016	155	2327	165	232	171	568	221	1457	161	1839	5034
Apprch %	24.7	37.7	37.7		6.7	86.6	6.7		29	40.8	30.1		12	79.2	8.8		
Total %	1.5	2.2	2.2	6	3.1	40	3.1	46.2	3.3	4.6	3.4	11.3	4.4	28.9	3.2	36.5	

	Kasota Road Southbound				SR-18 Westbound				Kasota Road Northbound				SR-18 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	**14**	18	**25**	**57**	22	**273**	13	308	17	29	17	63	28	179	**26**	233	661
07:45 AM	7	**21**	17	45	**28**	273	**30**	**331**	26	38	28	92	**35**	**226**	19	**280**	**748**
08:00 AM	6	18	14	38	19	261	25	305	24	32	**31**	87	29	166	21	216	646
08:15 AM	4	16	7	27	25	239	17	281	**27**	**43**	29	**99**	25	217	17	259	666
Total Volume	31	73	63	167	94	1046	85	1225	94	142	105	341	117	788	83	988	2721
% App. Total	18.6	43.7	37.7		7.7	85.4	6.9		27.6	41.6	30.8		11.8	79.8	8.4		
PHF	.554	.869	.630	.732	.839	.958	.708	.925	.870	.826	.847	.861	.836	.872	.798	.882	.909

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City of Apple Valley
N/S: Kasota Road
E/W: SR-18
Weather: Clear

File Name : 02_APV_Kasota_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
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:

	07:15 AM				07:30 AM				07:45 AM				07:45 AM			
+0 mins.	10	15	14	39	22	**273**	13	308	26	38	28	92	**35**	**226**	19	**280**
+15 mins.	**14**	18	**25**	**57**	**28**	273	**30**	**331**	24	32	**31**	87	29	166	21	216
+30 mins.	7	**21**	17	45	19	261	25	305	**27**	**43**	29	**99**	25	217	17	259
+45 mins.	6	18	14	38	25	239	17	281	21	26	23	70	33	201	**24**	258
Total Volume	37	72	70	179	94	1046	85	1225	98	139	111	348	122	810	81	1013
% App. Total	20.7	40.2	39.1		7.7	85.4	6.9		28.2	39.9	31.9		12	80	8	
PHF	.661	.857	.700	.785	.839	.958	.708	.925	.907	.808	.895	.879	.871	.896	.844	.904

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City of Apple Valley
N/S: Kasota Road
E/W: SR-18
Weather: Clear

File Name : 02_APV_Kasota_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

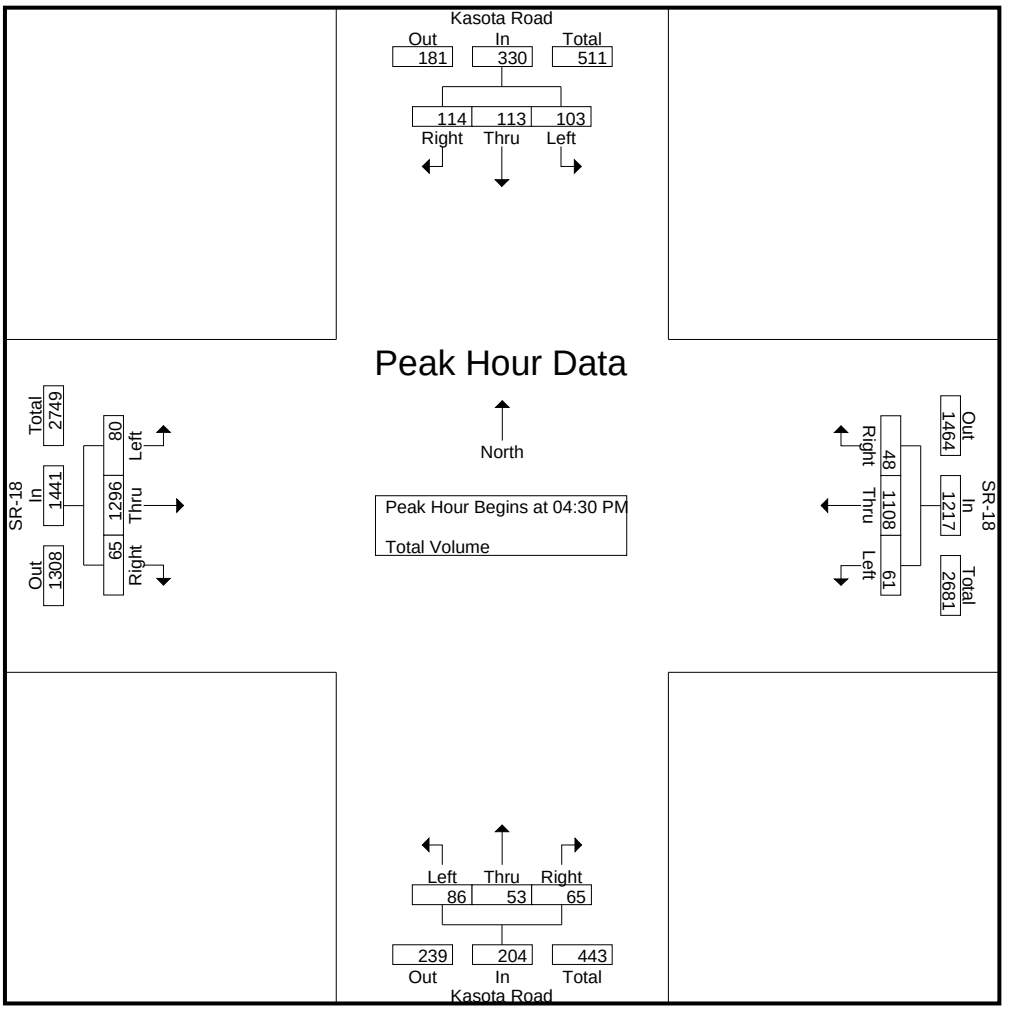
	Kasota Road Southbound				SR-18 Westbound				Kasota Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	22	19	37	78	21	270	13	304	17	21	23	61	18	312	20	350	793
04:15 PM	19	23	18	60	18	274	18	310	27	18	14	59	19	316	19	354	783
04:30 PM	29	33	24	86	16	277	14	307	23	17	24	64	15	324	17	356	813
04:45 PM	25	21	31	77	12	259	10	281	23	20	12	55	20	348	18	386	799
Total	95	96	110	301	67	1080	55	1202	90	76	73	239	72	1300	74	1446	3188
05:00 PM	30	28	30	88	25	289	13	327	28	8	14	50	22	283	13	318	783
05:15 PM	19	31	29	79	8	283	11	302	12	8	15	35	23	341	17	381	797
05:30 PM	11	22	27	60	21	204	11	236	25	18	7	50	17	318	20	355	701
05:45 PM	17	7	24	48	15	228	9	252	14	21	13	48	24	332	14	370	718
Total	77	88	110	275	69	1004	44	1117	79	55	49	183	86	1274	64	1424	2999
Grand Total	172	184	220	576	136	2084	99	2319	169	131	122	422	158	2574	138	2870	6187
Apprch %	29.9	31.9	38.2		5.9	89.9	4.3		40	31	28.9		5.5	89.7	4.8		
Total %	2.8	3	3.6	9.3	2.2	33.7	1.6	37.5	2.7	2.1	2	6.8	2.6	41.6	2.2	46.4	

	Kasota Road Southbound				SR-18 Westbound				Kasota Road Northbound				SR-18 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	29	**33**	24	86	16	277	**14**	307	23	17	**24**	**64**	15	324	17	356	**813**
04:45 PM	25	21	**31**	77	12	259	10	281	23	**20**	12	55	20	**348**	**18**	**386**	799
05:00 PM	**30**	28	30	**88**	**25**	**289**	13	**327**	**28**	8	14	50	22	283	13	318	783
05:15 PM	19	31	29	79	8	283	11	302	12	8	15	35	**23**	341	17	381	797
Total Volume	103	113	114	330	61	1108	48	1217	86	53	65	204	80	1296	65	1441	3192
% App. Total	31.2	34.2	34.5		5	91	3.9		42.2	26	31.9		5.6	89.9	4.5		
PHF	.858	.856	.919	.938	.610	.958	.857	.930	.768	.663	.677	.797	.870	.931	.903	.933	.982

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City of Apple Valley
N/S: Kasota Road
E/W: SR-18
Weather: Clear

File Name : 02_APV_Kasota_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
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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				04:15 PM				04:00 PM				04:00 PM			
+0 mins.	29	**33**	24	86	18	274	**18**	310	17	**21**	23	61	18	312	**20**	350
+15 mins.	25	21	**31**	77	16	277	14	307	**27**	18	14	59	19	316	19	354
+30 mins.	**30**	28	30	**88**	12	259	10	281	23	17	**24**	**64**	15	324	17	356
+45 mins.	19	31	29	79	**25**	**289**	13	**327**	23	20	12	55	**20**	**348**	18	**386**
Total Volume	103	113	114	330	71	1099	55	1225	90	76	73	239	72	1300	74	1446
% App. Total	31.2	34.2	34.5		5.8	89.7	4.5		37.7	31.8	30.5		5	89.9	5.1	
PHF	.858	.856	.919	.938	.710	.951	.764	.937	.833	.905	.760	.934	.900	.934	.925	.937

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City of Apple Valley
N/S: Corwin Road
E/W: SR-18
Weather: Clear

File Name : 03_APV_Corwin_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

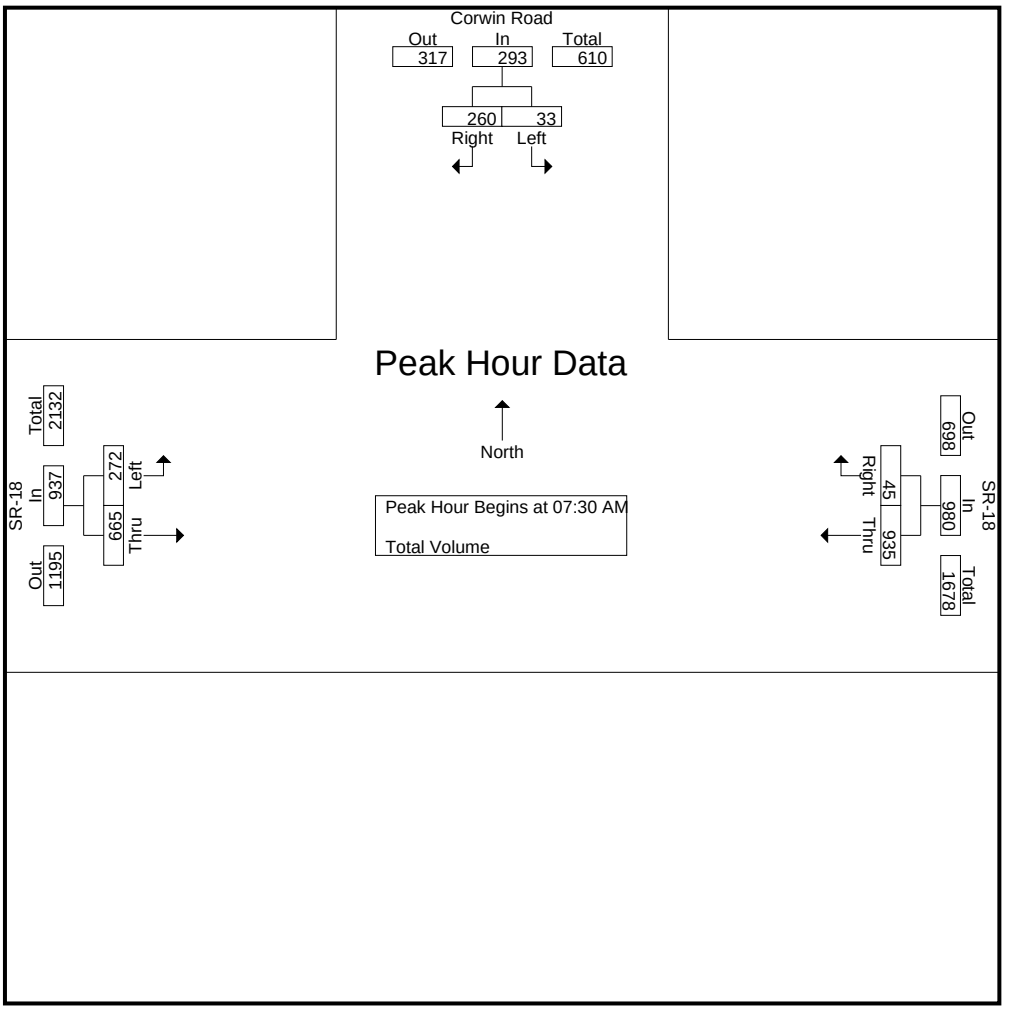
	Corwin Road Southbound			SR-18 Westbound			SR-18 Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
07:00 AM	7	51	58	212	7	219	38	124	162	439
07:15 AM	9	50	59	243	7	250	38	137	175	484
07:30 AM	7	78	85	228	5	233	52	156	208	526
07:45 AM	7	61	68	249	14	263	78	193	271	602
Total	30	240	270	932	33	965	206	610	816	2051
08:00 AM	5	65	70	252	12	264	60	143	203	537
08:15 AM	14	56	70	206	14	220	82	173	255	545
08:30 AM	19	72	91	182	3	185	54	174	228	504
08:45 AM	8	58	66	234	7	241	63	153	216	523
Total	46	251	297	874	36	910	259	643	902	2109
Grand Total	76	491	567	1806	69	1875	465	1253	1718	4160
Apprch %	13.4	86.6		96.3	3.7		27.1	72.9		
Total %	1.8	11.8	13.6	43.4	1.7	45.1	11.2	30.1	41.3	

	Corwin Road Southbound			SR-18 Westbound			SR-18 Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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	**78**	**85**	228	5	233	52	156	208	526
07:45 AM	7	61	68	249	**14**	263	78	**193**	**271**	**602**
08:00 AM	5	65	70	**252**	12	**264**	60	143	203	537
08:15 AM	**14**	56	70	206	14	220	**82**	173	255	545
Total Volume	33	260	293	935	45	980	272	665	937	2210
% App. Total	11.3	88.7		95.4	4.6		29	71		
PHF	.589	.833	.862	.928	.804	.928	.829	.861	.864	.918

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City of Apple Valley
N/S: Corwin Road
E/W: SR-18
Weather: Clear

File Name : 03_APV_Corwin_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022



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			07:15 AM			07:45 AM		
+0 mins.	7	61	68	243	7	250	78	**193**	**271**
+15 mins.	5	65	70	228	5	233	60	143	203
+30 mins.	14	56	70	249	**14**	263	**82**	173	255
+45 mins.	**19**	**72**	**91**	**252**	12	**264**	54	174	228
Total Volume	45	254	299	972	38	1010	274	683	957
% App. Total	15.1	84.9		96.2	3.8		28.6	71.4	
PHF	.592	.882	.821	.964	.679	.956	.835	.885	.883

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City of Apple Valley
N/S: Corwin Road
E/W: SR-18
Weather: Clear

File Name : 03_APV_Corwin_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

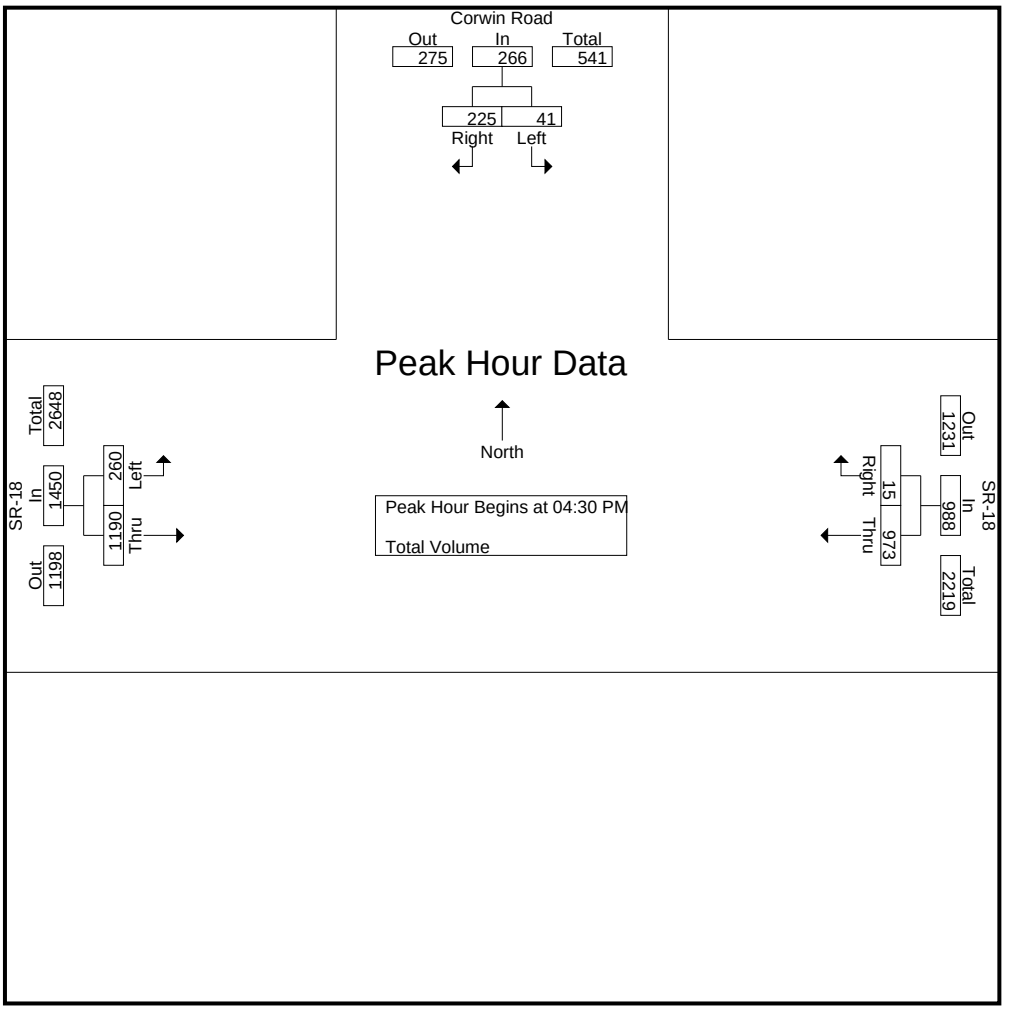
	Corwin Road Southbound			SR-18 Westbound			SR-18 Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
04:00 PM	18	53	71	245	5	250	63	288	351	672
04:15 PM	8	50	58	251	4	255	67	295	362	675
04:30 PM	13	59	72	226	4	230	58	285	343	645
04:45 PM	6	50	56	232	5	237	78	330	408	701
Total	45	212	257	954	18	972	266	1198	1464	2693
05:00 PM	9	65	74	278	4	282	59	262	321	677
05:15 PM	13	51	64	237	2	239	65	313	378	681
05:30 PM	10	53	63	195	3	198	72	273	345	606
05:45 PM	8	36	44	189	3	192	56	301	357	593
Total	40	205	245	899	12	911	252	1149	1401	2557
Grand Total	85	417	502	1853	30	1883	518	2347	2865	5250
Apprch %	16.9	83.1		98.4	1.6		18.1	81.9		
Total %	1.6	7.9	9.6	35.3	0.6	35.9	9.9	44.7	54.6	

	Corwin Road Southbound			SR-18 Westbound			SR-18 Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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	**13**	59	72	226	4	230	58	285	343	645
04:45 PM	6	50	56	232	**5**	237	**78**	**330**	**408**	**701**
05:00 PM	9	**65**	**74**	**278**	4	**282**	59	262	321	677
05:15 PM	13	51	64	237	2	239	65	313	378	681
Total Volume	41	225	266	973	15	988	260	1190	1450	2704
% App. Total	15.4	84.6		98.5	1.5		17.9	82.1		
PHF	.788	.865	.899	.875	.750	.876	.833	.902	.888	.964

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City of Apple Valley
N/S: Corwin Road
E/W: SR-18
Weather: Clear

File Name : 03_APV_Corwin_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022



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			04:15 PM			04:00 PM		
+0 mins.	**13**	59	72	251	4	255	63	288	351
+15 mins.	6	50	56	226	4	230	67	295	362
+30 mins.	9	**65**	**74**	232	**5**	237	58	285	343
+45 mins.	13	51	64	**278**	4	**282**	**78**	**330**	**408**
Total Volume	41	225	266	987	17	1004	266	1198	1464
% App. Total	15.4	84.6		98.3	1.7		18.2	81.8	
PHF	.788	.865	.899	.888	.850	.890	.853	.908	.897

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City of Apple Valley
N/S: Tao Road
E/W: SR-18
Weather: Clear

File Name : 04_APV_Tao_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

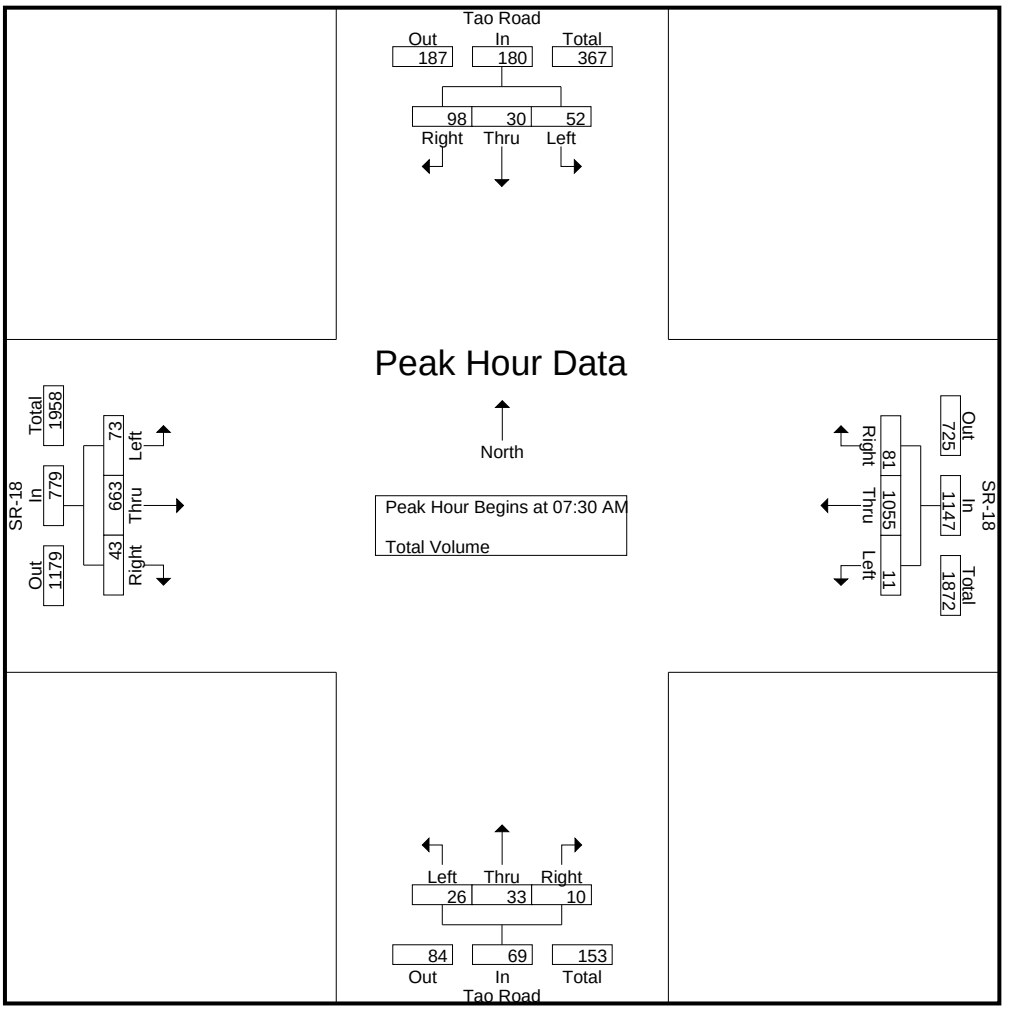
	Tao Road Southbound				SR-18 Westbound				Tao Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	14	1	22	37	2	223	17	242	10	2	1	13	13	143	5	161	453
07:15 AM	10	4	24	38	1	215	5	221	12	5	2	19	8	144	2	154	432
07:30 AM	16	5	26	47	1	251	16	268	8	8	1	17	10	163	4	177	509
07:45 AM	11	7	25	43	4	287	25	316	5	11	4	20	23	174	12	209	588
Total	51	17	97	165	8	976	63	1047	35	26	8	69	54	624	23	701	1982
08:00 AM	12	17	29	58	3	286	22	311	5	3	1	9	17	153	12	182	560
08:15 AM	13	1	18	32	3	231	18	252	8	11	4	23	23	173	15	211	518
08:30 AM	17	10	21	48	4	198	26	228	10	8	2	20	25	165	11	201	497
08:45 AM	18	9	19	46	2	262	17	281	11	12	3	26	29	154	9	192	545
Total	60	37	87	184	12	977	83	1072	34	34	10	78	94	645	47	786	2120
Grand Total	111	54	184	349	20	1953	146	2119	69	60	18	147	148	1269	70	1487	4102
Apprch %	31.8	15.5	52.7		0.9	92.2	6.9		46.9	40.8	12.2		10	85.3	4.7		
Total %	2.7	1.3	4.5	8.5	0.5	47.6	3.6	51.7	1.7	1.5	0.4	3.6	3.6	30.9	1.7	36.3	

	Tao Road Southbound				SR-18 Westbound				Tao Road Northbound				SR-18 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	**16**	5	26	47	1	251	16	268	**8**	8	1	17	10	163	4	177	509
07:45 AM	11	7	25	43	**4**	**287**	**25**	**316**	5	**11**	**4**	20	**23**	**174**	12	209	**588**
08:00 AM	12	**17**	**29**	**58**	3	286	22	311	5	3	1	9	17	153	12	182	560
08:15 AM	13	1	18	32	3	231	18	252	8	11	4	**23**	23	173	**15**	**211**	518
Total Volume	52	30	98	180	11	1055	81	1147	26	33	10	69	73	663	43	779	2175
% App. Total	28.9	16.7	54.4		1	92	7.1		37.7	47.8	14.5		9.4	85.1	5.5		
PHF	.813	.441	.845	.776	.688	.919	.810	.907	.813	.750	.625	.750	.793	.953	.717	.923	.925

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City of Apple Valley
N/S: Tao Road
E/W: SR-18
Weather: Clear

File Name : 04_APV_Tao_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
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:

	07:15 AM				07:30 AM				08:00 AM				07:45 AM			
+0 mins.	10	4	24	38	1	251	16	268	5	3	1	9	23	**174**	12	209
+15 mins.	**16**	5	26	47	**4**	**287**	**25**	**316**	8	11	**4**	23	17	153	12	182
+30 mins.	11	7	25	43	3	286	22	311	10	8	2	20	23	173	**15**	**211**
+45 mins.	12	**17**	**29**	**58**	3	231	18	252	**11**	**12**	3	**26**	**25**	165	11	201
Total Volume	49	33	104	186	11	1055	81	1147	34	34	10	78	88	665	50	803
% App. Total	26.3	17.7	55.9		1	92	7.1		43.6	43.6	12.8		11	82.8	6.2	
PHF	.766	.485	.897	.802	.688	.919	.810	.907	.773	.708	.625	.750	.880	.955	.833	.951

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City of Apple Valley
N/S: Tao Road
E/W: SR-18
Weather: Clear

File Name : 04_APV_Tao_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

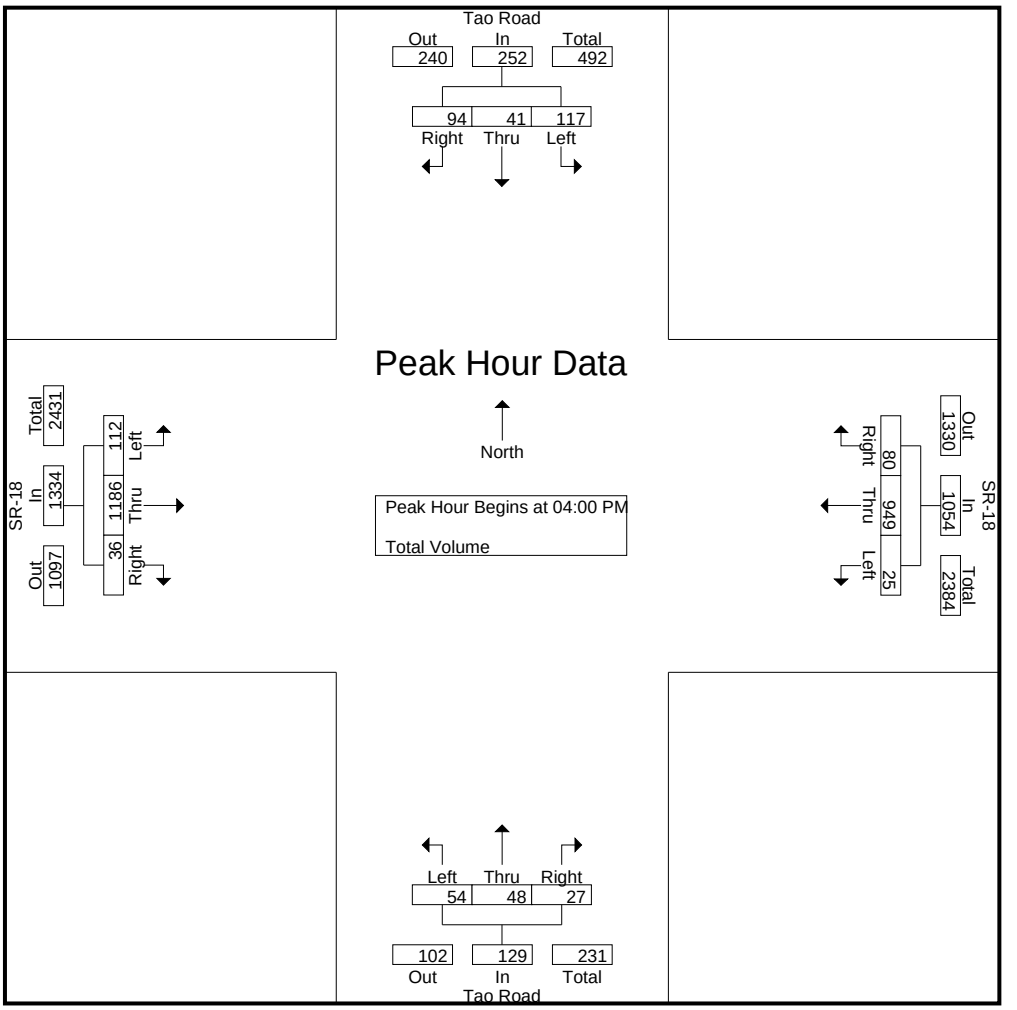
	Tao Road Southbound				SR-18 Westbound				Tao Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	32	13	25	70	6	251	21	278	13	11	10	34	31	293	14	338	720
04:15 PM	25	10	18	53	6	268	22	296	9	8	7	24	29	285	8	322	695
04:30 PM	26	13	29	68	4	222	21	247	12	18	7	37	26	296	8	330	682
04:45 PM	34	5	22	61	9	208	16	233	20	11	3	34	26	312	6	344	672
Total	117	41	94	252	25	949	80	1054	54	48	27	129	112	1186	36	1334	2769
05:00 PM	38	13	19	70	8	234	19	261	20	10	4	34	22	261	8	291	656
05:15 PM	18	5	17	40	3	239	22	264	13	7	6	26	21	326	4	351	681
05:30 PM	23	9	23	55	6	205	10	221	7	11	6	24	19	291	5	315	615
05:45 PM	17	7	7	31	3	218	11	232	10	7	7	24	20	267	11	298	585
Total	96	34	66	196	20	896	62	978	50	35	23	108	82	1145	28	1255	2537
Grand Total	213	75	160	448	45	1845	142	2032	104	83	50	237	194	2331	64	2589	5306
Apprch %	47.5	16.7	35.7		2.2	90.8	7		43.9	35	21.1		7.5	90	2.5		
Total %	4	1.4	3	8.4	0.8	34.8	2.7	38.3	2	1.6	0.9	4.5	3.7	43.9	1.2	48.8	

	Tao Road Southbound				SR-18 Westbound				Tao Road Northbound				SR-18 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 04:00 PM																	
04:00 PM	32	**13**	25	**70**	6	251	21	278	13	11	**10**	34	**31**	293	**14**	338	**720**
04:15 PM	25	10	18	53	6	**268**	**22**	**296**	9	8	7	24	29	285	8	322	695
04:30 PM	26	13	**29**	68	4	222	21	247	12	**18**	7	**37**	26	296	8	330	682
04:45 PM	**34**	5	22	61	**9**	208	16	233	**20**	11	3	34	26	**312**	6	**344**	672
Total Volume	117	41	94	252	25	949	80	1054	54	48	27	129	112	1186	36	1334	2769
% App. Total	46.4	16.3	37.3		2.4	90	7.6		41.9	37.2	20.9		8.4	88.9	2.7		
PHF	.860	.788	.810	.900	.694	.885	.909	.890	.675	.667	.675	.872	.903	.950	.643	.969	.961

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City of Apple Valley
N/S: Tao Road
E/W: SR-18
Weather: Clear

File Name : 04_APV_Tao_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
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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				04:00 PM				04:30 PM				04:00 PM			
+0 mins.	32	**13**	25	**70**	6	251	21	278	12	**18**	**7**	**37**	**31**	293	**14**	338
+15 mins.	25	10	18	53	6	**268**	**22**	**296**	**20**	11	3	34	29	285	8	322
+30 mins.	26	13	**29**	68	4	222	21	247	20	10	4	34	26	296	8	330
+45 mins.	**34**	5	22	61	**9**	208	16	233	13	7	6	26	26	**312**	6	**344**
Total Volume	117	41	94	252	25	949	80	1054	65	46	20	131	112	1186	36	1334
% App. Total	46.4	16.3	37.3		2.4	90	7.6		49.6	35.1	15.3		8.4	88.9	2.7	
PHF	.860	.788	.810	.900	.694	.885	.909	.890	.813	.639	.714	.885	.903	.950	.643	.969

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City of Apple Valley
N/S: Rimrock Road/Piute Road
E/W: SR-18
Weather: Clear

File Name : 05_APV_Rimrock_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

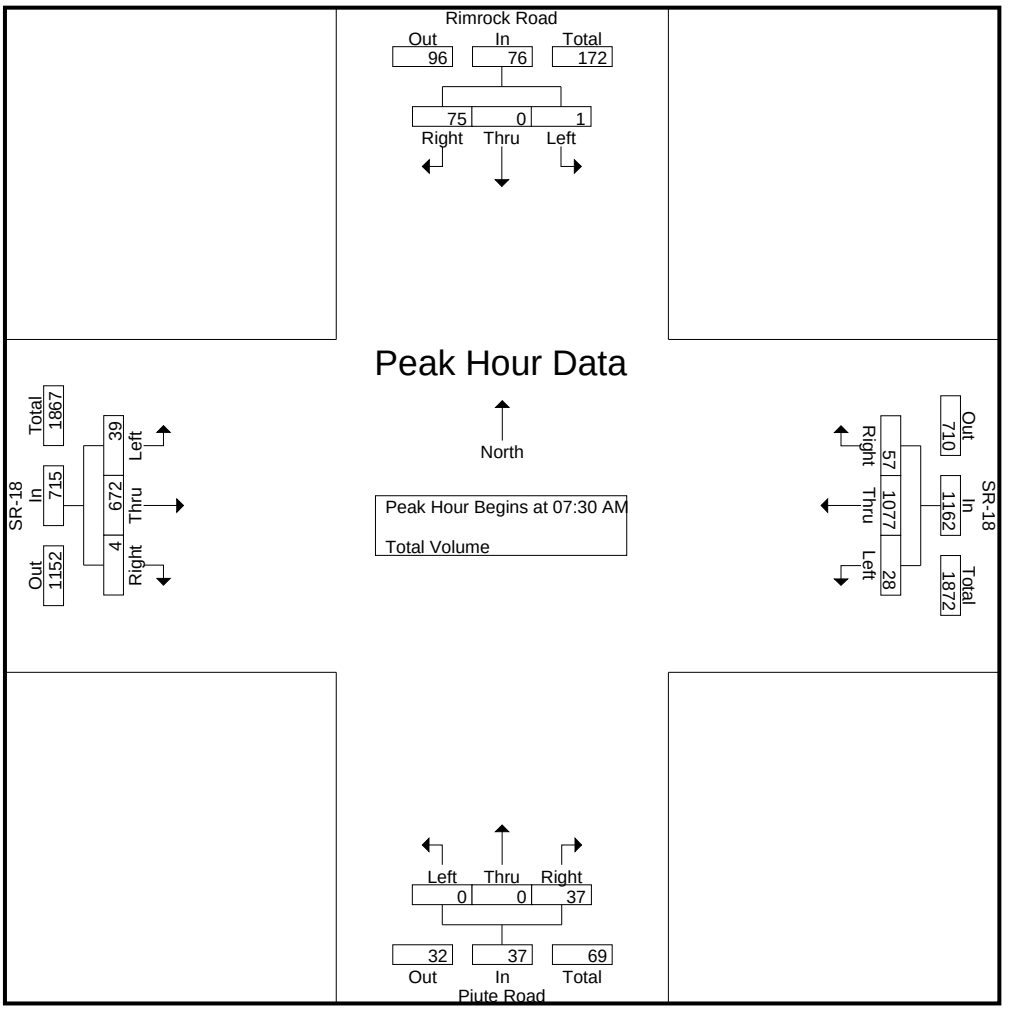
	Rimrock Road Southbound				SR-18 Westbound				Piute Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	15	15	7	221	7	235	0	0	5	5	5	127	1	133	388
07:15 AM	0	0	17	17	5	209	7	221	1	0	14	15	13	163	1	177	430
07:30 AM	0	0	21	21	4	267	11	282	0	0	14	14	4	167	0	171	488
07:45 AM	0	0	19	19	9	294	30	333	0	0	9	9	14	187	1	202	563
Total	0	0	72	72	25	991	55	1071	1	0	42	43	36	644	3	683	1869
08:00 AM	0	0	24	24	11	285	8	304	0	0	6	6	9	144	1	154	488
08:15 AM	1	0	11	12	4	231	8	243	0	0	8	8	12	174	2	188	451
08:30 AM	0	0	9	9	3	208	11	222	0	0	6	6	6	193	2	201	438
08:45 AM	0	0	18	18	10	249	9	268	0	0	7	7	8	162	0	170	463
Total	1	0	62	63	28	973	36	1037	0	0	27	27	35	673	5	713	1840
Grand Total	1	0	134	135	53	1964	91	2108	1	0	69	70	71	1317	8	1396	3709
Apprch %	0.7	0	99.3		2.5	93.2	4.3		1.4	0	98.6		5.1	94.3	0.6		
Total %	0	0	3.6	3.6	1.4	53	2.5	56.8	0	0	1.9	1.9	1.9	35.5	0.2	37.6	

	Rimrock Road Southbound				SR-18 Westbound				Piute Road Northbound				SR-18 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	21	21	4	267	11	282	0	0	**14**	**14**	4	167	0	171	488
07:45 AM	0	0	19	19	9	**294**	**30**	**333**	0	0	9	9	**14**	**187**	1	**202**	**563**
08:00 AM	0	0	**24**	**24**	**11**	285	8	304	0	0	6	6	9	144	1	154	488
08:15 AM	**1**	0	11	12	4	231	8	243	0	0	8	8	12	174	**2**	188	451
Total Volume	1	0	75	76	28	1077	57	1162	0	0	37	37	39	672	4	715	1990
% App. Total	1.3	0	98.7		2.4	92.7	4.9		0	0	100		5.5	94	0.6		
PHF	.250	.000	.781	.792	.636	.916	.475	.872	.000	.000	.661	.661	.696	.898	.500	.885	.884

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City of Apple Valley
N/S: Rimrock Road/Piute Road
E/W: SR-18
Weather: Clear

File Name : 05_APV_Rimrock_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
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:

	07:15 AM				07:30 AM				07:15 AM				07:45 AM			
+0 mins.	0	0	17	17	4	267	11	282	**1**	0	**14**	**15**	**14**	187	1	**202**
+15 mins.	0	0	21	21	9	**294**	**30**	**333**	0	0	14	14	9	144	1	154
+30 mins.	0	0	19	19	**11**	285	8	304	0	0	9	9	12	174	**2**	188
+45 mins.	0	0	**24**	**24**	4	231	8	243	0	0	6	6	6	**193**	2	201
Total Volume	0	0	81	81	28	1077	57	1162	1	0	43	44	41	698	6	745
% App. Total	0	0	100		2.4	92.7	4.9		2.3	0	97.7		5.5	93.7	0.8	
PHF	.000	.000	.844	.844	.636	.916	.475	.872	.250	.000	.768	.733	.732	.904	.750	.922

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City of Apple Valley
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Weather: Clear

File Name : 05_APV_Rimrock_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

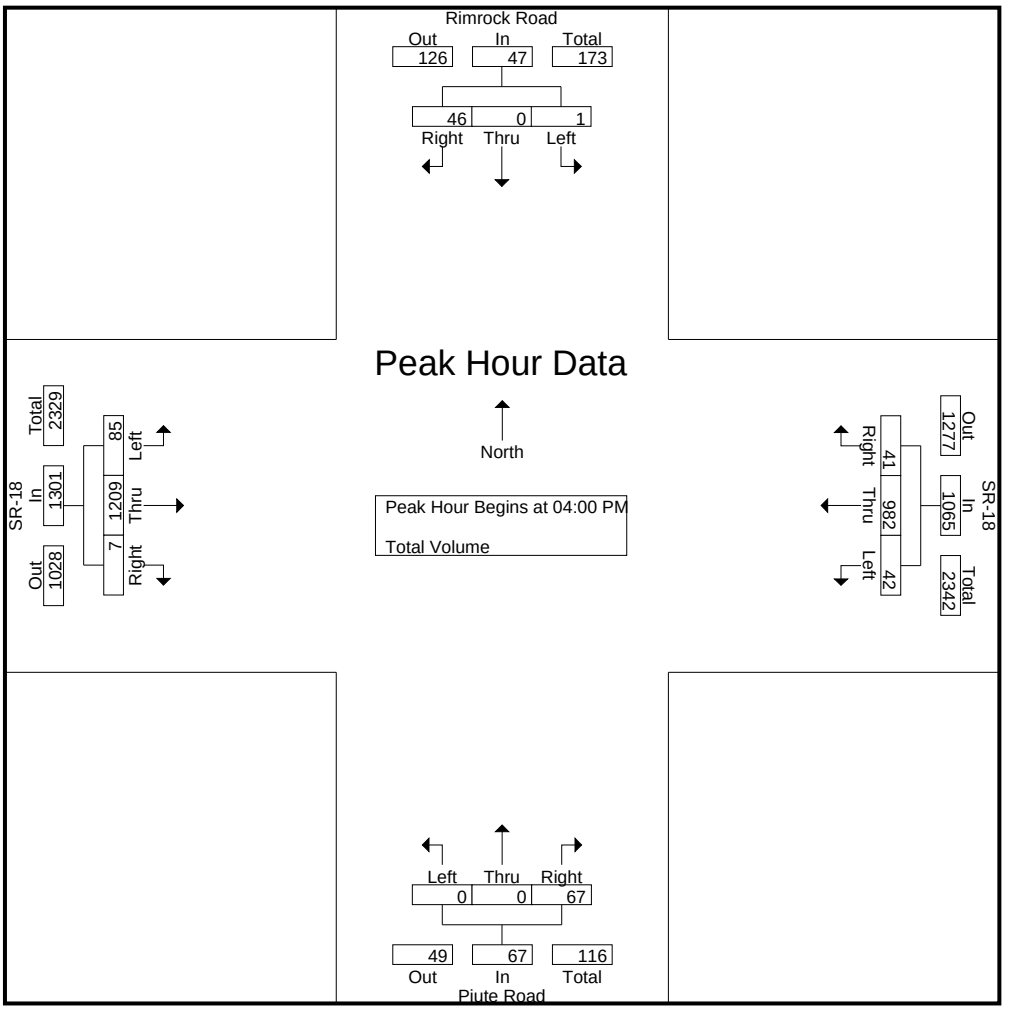
	Rimrock Road Southbound				SR-18 Westbound				Piute Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	13	13	9	239	11	259	0	0	14	14	21	315	4	340	626
04:15 PM	1	0	14	15	11	275	6	292	0	0	21	21	19	283	0	302	630
04:30 PM	0	0	10	10	10	253	14	277	0	0	14	14	20	308	2	330	631
04:45 PM	0	0	9	9	12	215	10	237	0	0	18	18	25	303	1	329	593
Total	1	0	46	47	42	982	41	1065	0	0	67	67	85	1209	7	1301	2480
05:00 PM	0	1	10	11	16	246	5	267	0	0	23	23	21	284	5	310	611
05:15 PM	0	0	5	5	15	231	12	258	0	1	17	18	20	330	0	350	631
05:30 PM	0	0	9	9	6	198	9	213	0	0	8	8	29	285	3	317	547
05:45 PM	0	0	12	12	9	199	13	221	0	0	14	14	17	272	4	293	540
Total	0	1	36	37	46	874	39	959	0	1	62	63	87	1171	12	1270	2329
Grand Total	1	1	82	84	88	1856	80	2024	0	1	129	130	172	2380	19	2571	4809
Apprch %	1.2	1.2	97.6		4.3	91.7	4		0	0.8	99.2		6.7	92.6	0.7		
Total %	0	0	1.7	1.7	1.8	38.6	1.7	42.1	0	0	2.7	2.7	3.6	49.5	0.4	53.5	

	Rimrock Road Southbound				SR-18 Westbound				Piute Road Northbound				SR-18 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 04:00 PM																	
04:00 PM	0	0	13	13	9	239	11	259	0	0	14	14	21	**315**	**4**	**340**	626
04:15 PM	**1**	0	**14**	**15**	11	**275**	6	**292**	0	0	**21**	**21**	19	283	0	302	630
04:30 PM	0	0	10	10	10	253	**14**	277	0	0	14	14	20	308	2	330	**631**
04:45 PM	0	0	9	9	**12**	215	10	237	0	0	18	18	**25**	303	1	329	593
Total Volume	1	0	46	47	42	982	41	1065	0	0	67	67	85	1209	7	1301	2480
% App. Total	2.1	0	97.9		3.9	92.2	3.8		0	0	100		6.5	92.9	0.5		
PHF	.250	.000	.821	.783	.875	.893	.732	.912	.000	.000	.798	.798	.850	.960	.438	.957	.983

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City of Apple Valley
N/S: Rimrock Road/Piute Road
E/W: SR-18
Weather: Clear

File Name : 05_APV_Rimrock_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
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:

	04:00 PM				04:15 PM				04:15 PM				04:30 PM			
+0 mins.	0	0	13	13	11	**275**	6	**292**	0	0	21	21	20	308	2	330
+15 mins.	**1**	0	**14**	**15**	10	253	**14**	277	0	0	14	14	**25**	303	1	329
+30 mins.	0	0	10	10	12	215	10	237	0	0	18	18	21	284	**5**	310
+45 mins.	0	0	9	9	**16**	246	5	267	0	0	**23**	**23**	20	**330**	0	**350**
Total Volume	1	0	46	47	49	989	35	1073	0	0	76	76	86	1225	8	1319
% App. Total	2.1	0	97.9		4.6	92.2	3.3		0	0	100		6.5	92.9	0.6	
PHF	.250	.000	.821	.783	.766	.899	.625	.919	.000	.000	.826	.826	.860	.928	.400	.942

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City of Apple Valley
N/S: Rancherias Road
E/W: Thunderbird Road
Weather: Clear

File Name : 06_APV_Ranch_Thun AM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

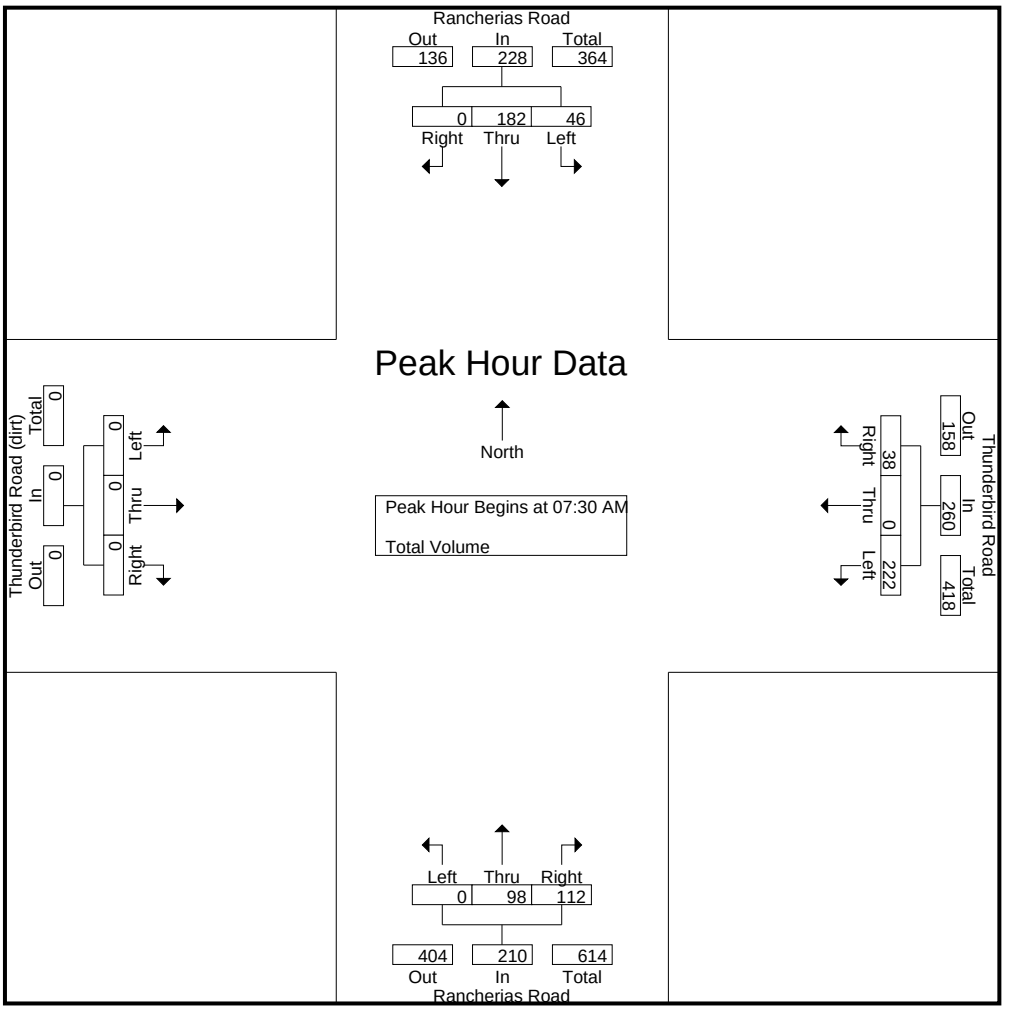
	Rancherias Road Southbound				Thunderbird Road Westbound				Rancherias Road Northbound				Thunderbird Road (dirt) Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	7	26	0	33	41	0	8	49	0	14	13	27	0	0	1	1	110
07:15 AM	2	41	0	43	39	0	2	41	0	15	21	36	0	0	0	0	120
07:30 AM	6	50	0	56	55	0	7	62	0	12	28	40	0	0	0	0	158
07:45 AM	20	56	0	76	62	0	10	72	0	31	39	70	0	0	0	0	218
Total	35	173	0	208	197	0	27	224	0	72	101	173	0	0	1	1	606
08:00 AM	13	44	0	57	62	0	12	74	0	29	27	56	0	0	0	0	187
08:15 AM	7	32	0	39	43	0	9	52	0	26	18	44	0	0	0	0	135
08:30 AM	4	35	0	39	51	0	5	56	0	21	19	40	0	0	0	0	135
08:45 AM	8	38	0	46	41	0	8	49	0	18	15	33	0	0	0	0	128
Total	32	149	0	181	197	0	34	231	0	94	79	173	0	0	0	0	585
Grand Total	67	322	0	389	394	0	61	455	0	166	180	346	0	0	1	1	1191
Apprch %	17.2	82.8	0		86.6	0	13.4		0	48	52		0	0	100		
Total %	5.6	27	0	32.7	33.1	0	5.1	38.2	0	13.9	15.1	29.1	0	0	0.1	0.1	

	Rancherias Road Southbound				Thunderbird Road Westbound				Rancherias Road Northbound				Thunderbird Road (dirt) 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	6	50	0	56	55	0	7	62	0	12	28	40	0	0	0	0	158
07:45 AM	**20**	**56**	0	**76**	**62**	0	10	72	0	**31**	**39**	**70**	0	0	0	0	**218**
08:00 AM	13	44	0	57	62	0	**12**	**74**	0	29	27	56	0	0	0	0	187
08:15 AM	7	32	0	39	43	0	9	52	0	26	18	44	0	0	0	0	135
Total Volume	46	182	0	228	222	0	38	260	0	98	112	210	0	0	0	0	698
% App. Total	20.2	79.8	0		85.4	0	14.6		0	46.7	53.3		0	0	0		
PHF	.575	.813	.000	.750	.895	.000	.792	.878	.000	.790	.718	.750	.000	.000	.000	.000	.800

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City of Apple Valley
N/S: Rancherias Road
E/W: Thunderbird Road
Weather: Clear

File Name : 06_APV_Ranch_Thun AM
Site Code : 05722315
Start Date : 4/14/2022



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				07:30 AM				07:30 AM				07:00 AM			
+0 mins.	2	41	0	43	55	0	7	62	0	12	28	40	0	0	**1**	**1**
+15 mins.	6	50	0	56	**62**	0	10	72	0	**31**	**39**	**70**	0	0	0	0
+30 mins.	**20**	**56**	0	**76**	62	0	**12**	**74**	0	29	27	56	0	0	0	0
+45 mins.	13	44	0	57	43	0	9	52	0	26	18	44	0	0	0	0
Total Volume	41	191	0	232	222	0	38	260	0	98	112	210	0	0	1	1
% App. Total	17.7	82.3	0		85.4	0	14.6		0	46.7	53.3		0	0	100	
PHF	.513	.853	.000	.763	.895	.000	.792	.878	.000	.790	.718	.750	.000	.000	.250	.250

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City of Apple Valley
N/S: Rancherias Road
E/W: Thunderbird Road
Weather: Clear

File Name : 06_APV_Ranch_Thun PM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

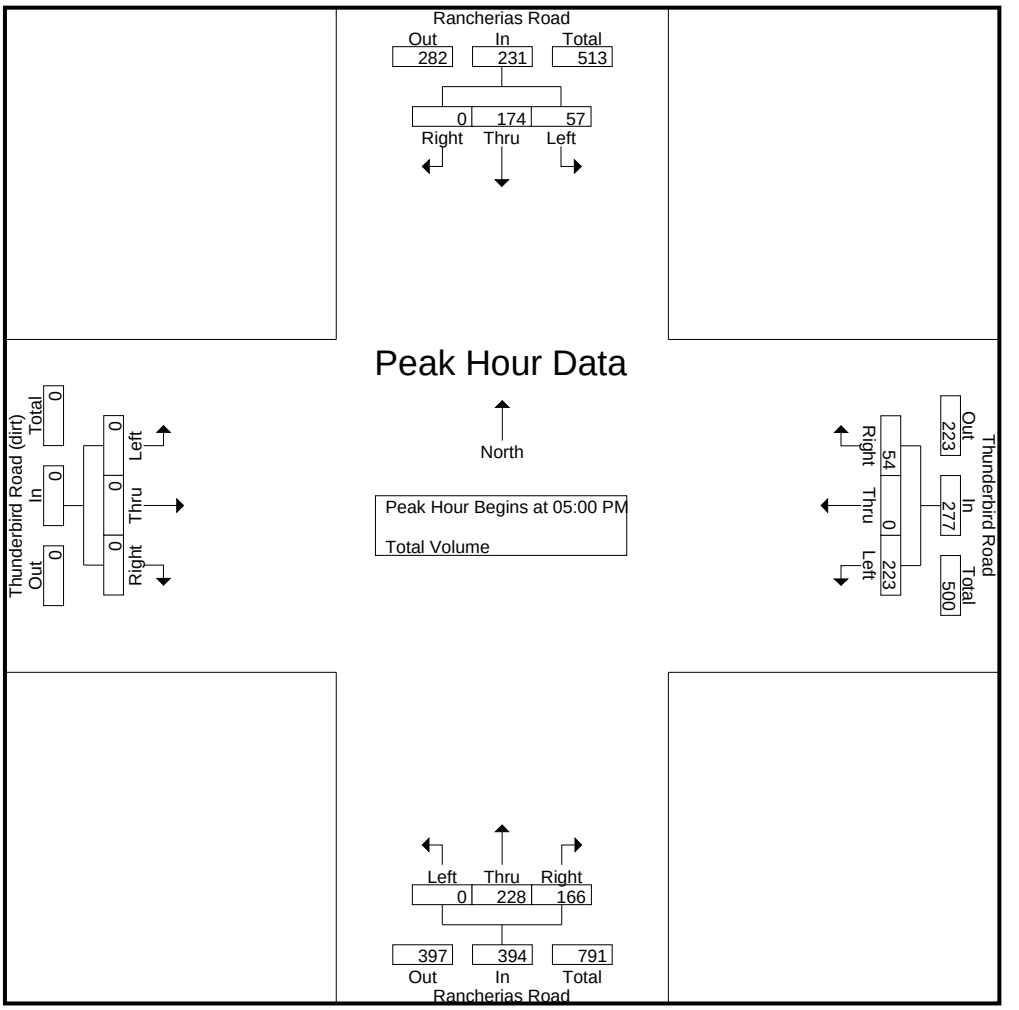
	Rancherias Road Southbound				Thunderbird Road Westbound				Rancherias Road Northbound				Thunderbird Road (dirt) Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	17	43	0	60	60	0	19	79	0	46	33	79	0	0	0	0	218
04:15 PM	10	45	0	55	68	0	14	82	0	48	36	84	0	0	0	0	221
04:30 PM	12	47	0	59	55	0	11	66	0	48	35	83	0	0	0	0	208
04:45 PM	15	35	0	50	47	0	7	54	0	63	46	109	0	0	0	0	213
Total	54	170	0	224	230	0	51	281	0	205	150	355	0	0	0	0	860
05:00 PM	13	42	0	55	65	0	11	76	0	60	34	94	0	0	0	0	225
05:15 PM	9	48	0	57	57	0	14	71	0	51	39	90	0	0	0	0	218
05:30 PM	16	41	0	57	51	0	9	60	0	59	49	108	0	0	0	0	225
05:45 PM	19	43	0	62	50	0	20	70	0	58	44	102	0	0	0	0	234
Total	57	174	0	231	223	0	54	277	0	228	166	394	0	0	0	0	902
Grand Total	111	344	0	455	453	0	105	558	0	433	316	749	0	0	0	0	1762
Apprch %	24.4	75.6	0		81.2	0	18.8		0	57.8	42.2		0	0	0		
Total %	6.3	19.5	0	25.8	25.7	0	6	31.7	0	24.6	17.9	42.5	0	0	0	0	

	Rancherias Road Southbound				Thunderbird Road Westbound				Rancherias Road Northbound				Thunderbird Road (dirt) 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 05:00 PM																	
05:00 PM	13	42	0	55	**65**	0	11	**76**	0	**60**	34	94	0	0	0	0	225
05:15 PM	9	**48**	0	57	57	0	14	71	0	51	39	90	0	0	0	0	218
05:30 PM	16	41	0	57	51	0	9	60	0	59	**49**	**108**	0	0	0	0	225
05:45 PM	**19**	43	0	**62**	50	0	**20**	70	0	58	44	102	0	0	0	0	**234**
Total Volume	57	174	0	231	223	0	54	277	0	228	166	394	0	0	0	0	902
% App. Total	24.7	75.3	0		80.5	0	19.5		0	57.9	42.1		0	0	0		
PHF	.750	.906	.000	.931	.858	.000	.675	.911	.000	.950	.847	.912	.000	.000	.000	.000	.964

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City of Apple Valley
N/S: Rancherias Road
E/W: Thunderbird Road
Weather: Clear

File Name : 06_APV_Ranch_Thun PM
Site Code : 05722315
Start Date : 4/14/2022



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				04:00 PM				04:45 PM				04:00 PM			
+0 mins.	13	42	0	55	60	0	**19**	79	0	**63**	46	**109**	0	0	0	0
+15 mins.	9	**48**	0	57	**68**	0	14	**82**	0	60	34	94	0	0	0	0
+30 mins.	16	41	0	57	55	0	11	66	0	51	39	90	0	0	0	0
+45 mins.	**19**	43	0	**62**	47	0	7	54	0	59	**49**	108	0	0	0	0
Total Volume	57	174	0	231	230	0	51	281	0	233	168	401	0	0	0	0
% App. Total	24.7	75.3	0		81.9	0	18.1		0	58.1	41.9		0	0	0	
PHF	.750	.906	.000	.931	.846	.000	.671	.857	.000	.925	.857	.920	.000	.000	.000	.000

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City of Apple Valley
N/S: Rancherias Road
E/W: SR-18
Weather: Clear

File Name : 07_APV_Ranch_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

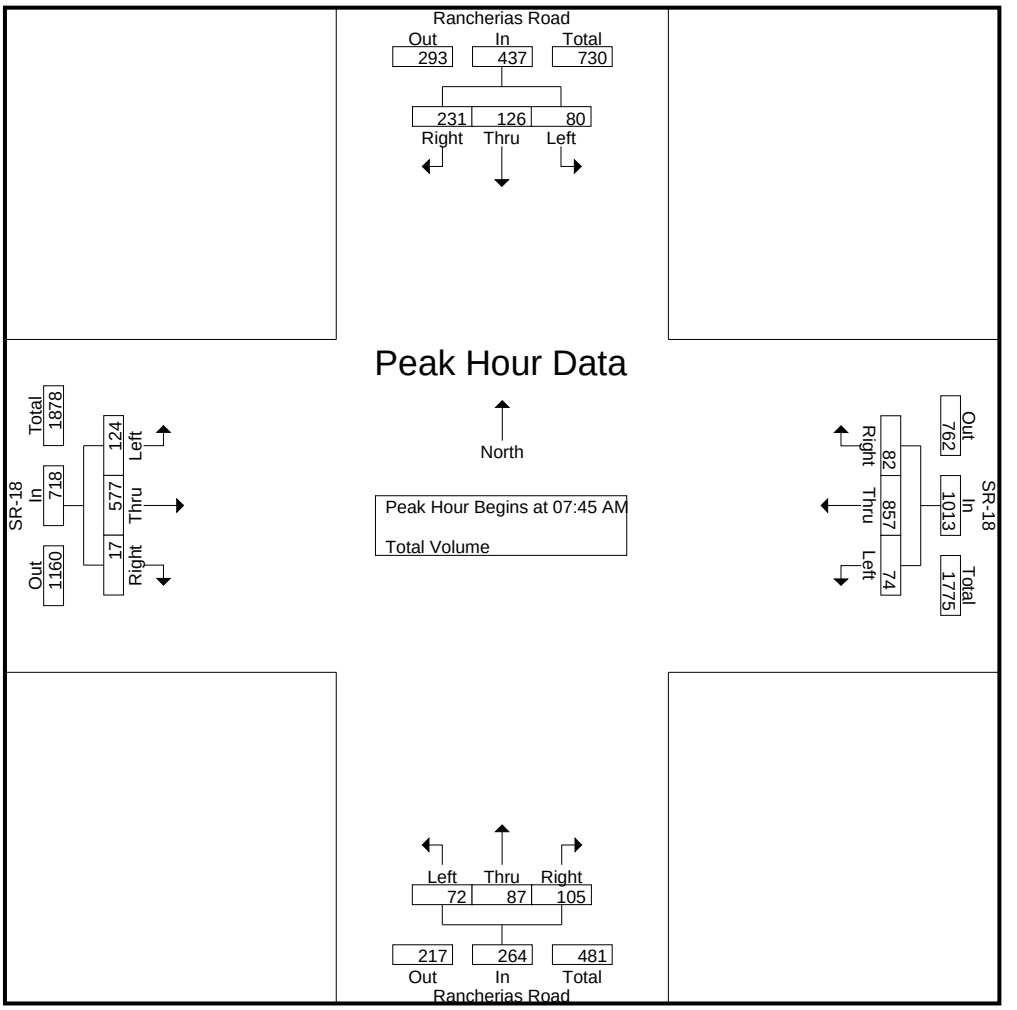
	Rancherias Road Southbound				SR-18 Westbound				Rancherias Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	12	14	44	70	17	195	10	222	5	8	14	27	19	107	4	130	449
07:15 AM	11	24	49	84	12	146	7	165	8	11	19	38	25	141	3	169	456
07:30 AM	16	35	57	108	14	213	10	237	14	17	18	49	26	148	9	183	577
07:45 AM	30	27	60	117	21	283	21	325	16	28	15	59	32	155	1	188	689
Total	69	100	210	379	64	837	48	949	43	64	66	173	102	551	17	670	2171
08:00 AM	30	32	65	127	16	205	23	244	17	21	30	68	31	128	7	166	605
08:15 AM	9	35	50	94	21	187	20	228	17	20	31	68	31	125	7	163	553
08:30 AM	11	32	56	99	16	182	18	216	22	18	29	69	30	169	2	201	585
08:45 AM	12	24	51	87	25	177	15	217	20	17	26	63	22	153	2	177	544
Total	62	123	222	407	78	751	76	905	76	76	116	268	114	575	18	707	2287
Grand Total	131	223	432	786	142	1588	124	1854	119	140	182	441	216	1126	35	1377	4458
Apprch %	16.7	28.4	55		7.7	85.7	6.7		27	31.7	41.3		15.7	81.8	2.5		
Total %	2.9	5	9.7	17.6	3.2	35.6	2.8	41.6	2.7	3.1	4.1	9.9	4.8	25.3	0.8	30.9	

	Rancherias Road Southbound				SR-18 Westbound				Rancherias Road Northbound				SR-18 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	**30**	27	60	117	**21**	**283**	21	**325**	16	**28**	15	59	**32**	155	1	188	**689**
08:00 AM	30	32	**65**	**127**	16	205	**23**	244	17	21	30	68	31	128	**7**	166	605
08:15 AM	9	**35**	50	94	21	187	20	228	17	20	**31**	68	31	125	7	163	553
08:30 AM	11	32	56	99	16	182	18	216	**22**	18	29	**69**	30	**169**	2	**201**	585
Total Volume	80	126	231	437	74	857	82	1013	72	87	105	264	124	577	17	718	2432
% App. Total	18.3	28.8	52.9		7.3	84.6	8.1		27.3	33	39.8		17.3	80.4	2.4		
PHF	.667	.900	.888	.860	.881	.757	.891	.779	.818	.777	.847	.957	.969	.854	.607	.893	.882

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City of Apple Valley
N/S: Rancherias Road
E/W: SR-18
Weather: Clear

File Name : 07_APV_Ranch_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022



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				07:30 AM				08:00 AM				07:45 AM			
+0 mins.	16	**35**	57	108	14	213	10	237	17	**21**	30	68	**32**	155	1	188
+15 mins.	**30**	27	60	117	**21**	**283**	21	**325**	17	20	**31**	68	31	128	**7**	166
+30 mins.	30	32	**65**	**127**	16	205	**23**	244	**22**	18	29	**69**	31	125	7	163
+45 mins.	9	35	50	94	21	187	20	228	20	17	26	63	30	**169**	2	**201**
Total Volume	85	129	232	446	72	888	74	1034	76	76	116	268	124	577	17	718
% App. Total	19.1	28.9	52		7	85.9	7.2		28.4	28.4	43.3		17.3	80.4	2.4	
PHF	.708	.921	.892	.878	.857	.784	.804	.795	.864	.905	.935	.971	.969	.854	.607	.893

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City of Apple Valley
N/S: Rancherias Road
E/W: SR-18
Weather: Clear

File Name : 07_APV_Ranch_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

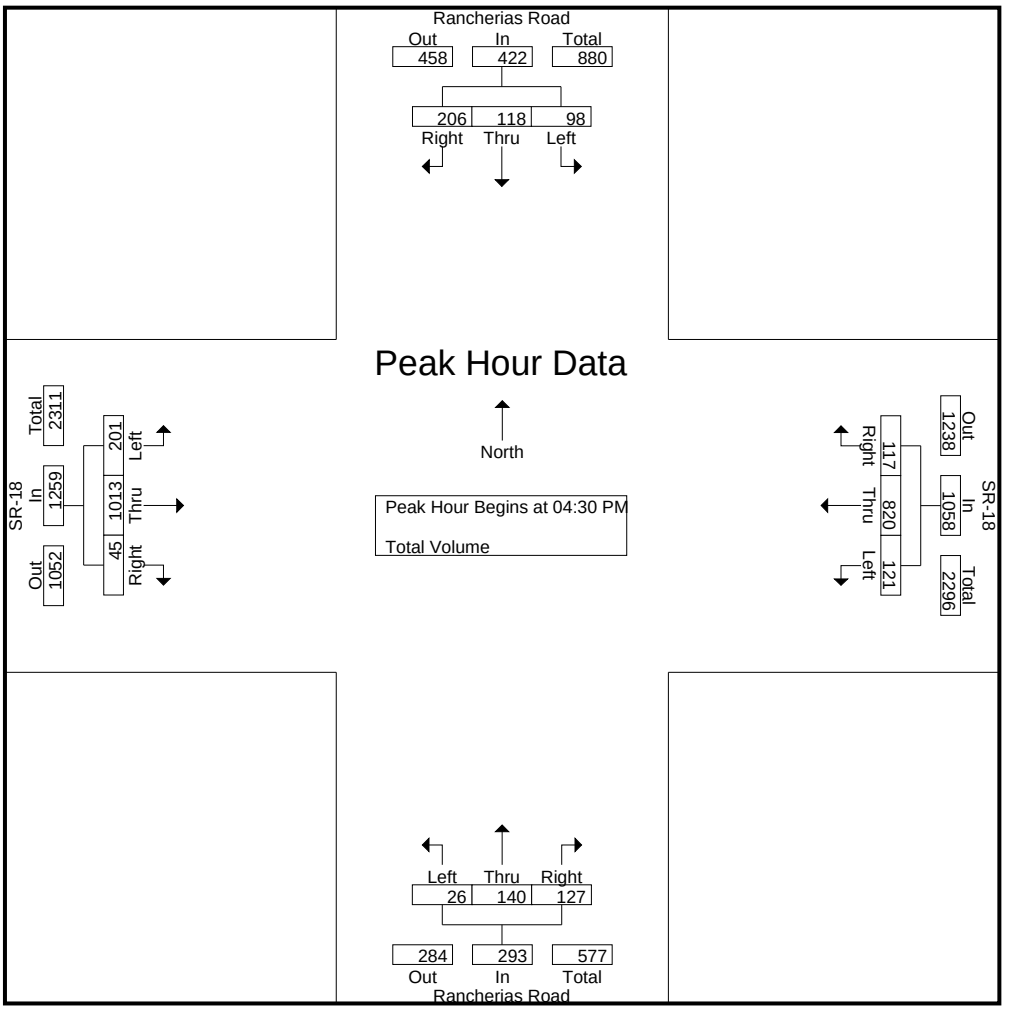
	Rancherias Road Southbound				SR-18 Westbound				Rancherias Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	26	24	57	107	27	220	29	276	5	31	38	74	45	267	15	327	784
04:15 PM	28	26	61	115	33	210	20	263	2	31	38	71	44	277	7	328	777
04:30 PM	20	24	59	103	26	214	28	268	4	32	31	67	41	239	15	295	733
04:45 PM	18	29	44	91	32	180	28	240	7	39	27	73	58	259	12	329	733
Total	92	103	221	416	118	824	105	1047	18	133	134	285	188	1042	49	1279	3027
05:00 PM	29	37	53	119	26	207	35	268	8	39	35	82	49	239	11	299	768
05:15 PM	31	28	50	109	37	219	26	282	7	30	34	71	53	276	7	336	798
05:30 PM	27	19	55	101	27	151	31	209	7	42	39	88	57	222	10	289	687
05:45 PM	12	22	51	85	32	178	20	230	2	46	26	74	56	233	2	291	680
Total	99	106	209	414	122	755	112	989	24	157	134	315	215	970	30	1215	2933
Grand Total	191	209	430	830	240	1579	217	2036	42	290	268	600	403	2012	79	2494	5960
Apprch %	23	25.2	51.8		11.8	77.6	10.7		7	48.3	44.7		16.2	80.7	3.2		
Total %	3.2	3.5	7.2	13.9	4	26.5	3.6	34.2	0.7	4.9	4.5	10.1	6.8	33.8	1.3	41.8	

	Rancherias Road Southbound				SR-18 Westbound				Rancherias Road Northbound				SR-18 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	20	24	**59**	103	26	214	28	268	4	32	31	67	41	239	**15**	295	733
04:45 PM	18	29	44	91	32	180	28	240	7	**39**	27	73	**58**	259	12	329	733
05:00 PM	29	**37**	53	**119**	26	207	**35**	268	**8**	39	**35**	**82**	49	239	11	299	768
05:15 PM	**31**	28	50	109	**37**	**219**	26	**282**	7	30	34	71	53	**276**	7	**336**	**798**
Total Volume	98	118	206	422	121	820	117	1058	26	140	127	293	201	1013	45	1259	3032
% App. Total	23.2	28	48.8		11.4	77.5	11.1		8.9	47.8	43.3		16	80.5	3.6		
PHF	.790	.797	.873	.887	.818	.936	.836	.938	.813	.897	.907	.893	.866	.918	.750	.937	.950

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City of Apple Valley
N/S: Rancherias Road
E/W: SR-18
Weather: Clear

File Name : 07_APV_Ranch_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
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:

	04:15 PM				04:30 PM				05:00 PM				04:00 PM			
+0 mins.	28	26	**61**	115	26	214	28	268	**8**	39	35	82	45	267	**15**	327
+15 mins.	20	24	59	103	32	180	28	240	7	30	34	71	44	**277**	7	328
+30 mins.	18	29	44	91	26	207	**35**	268	7	42	**39**	**88**	41	239	15	295
+45 mins.	**29**	**37**	53	**119**	**37**	**219**	26	**282**	2	**46**	26	74	**58**	259	12	**329**
Total Volume	95	116	217	428	121	820	117	1058	24	157	134	315	188	1042	49	1279
% App. Total	22.2	27.1	50.7		11.4	77.5	11.1		7.6	49.8	42.5		14.7	81.5	3.8	
PHF	.819	.784	.889	.899	.818	.936	.836	.938	.750	.853	.859	.895	.810	.940	.817	.972

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City of Apple Valley
N/S: Rancherias Road
E/W: Tomahawk Road
Weather: Clear

File Name : 08_APV_Ranch_Toma AM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

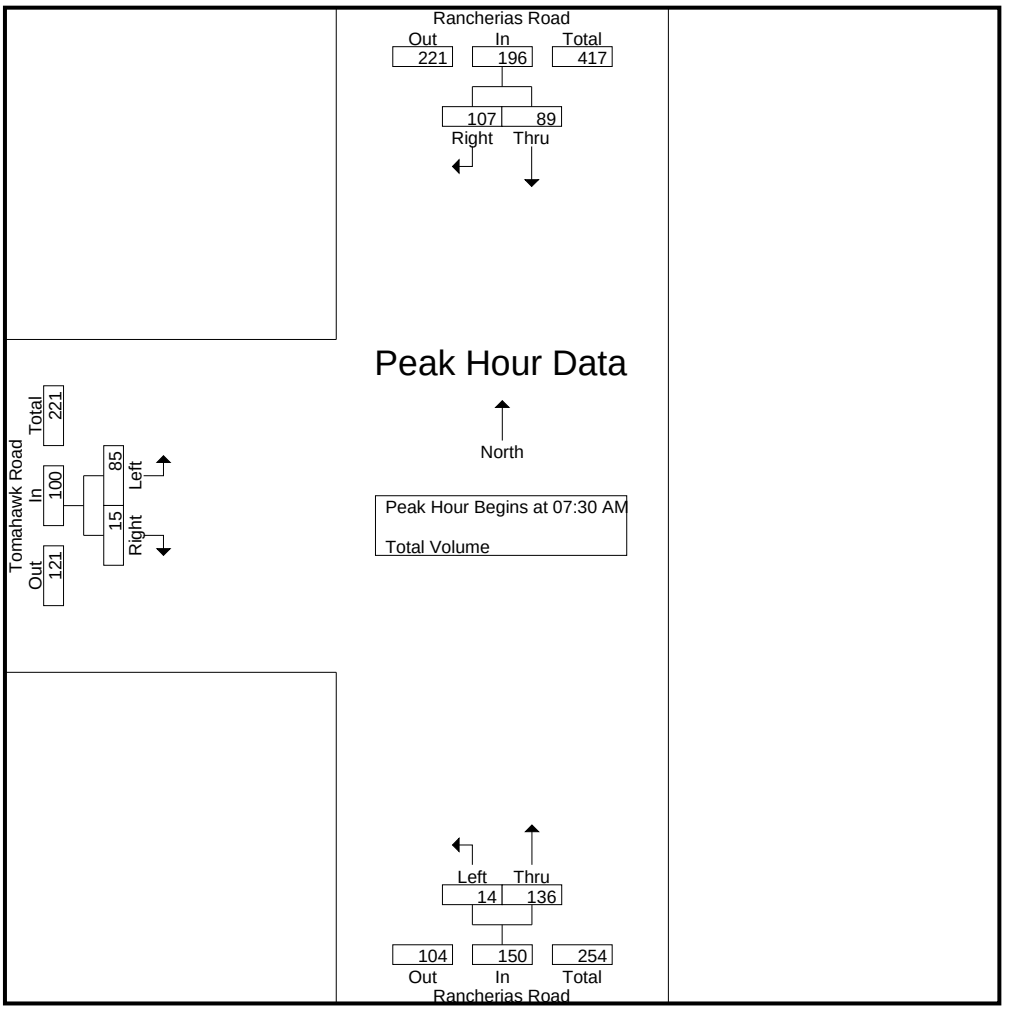
	Rancherias Road Southbound			Rancherias Road Northbound			Tomahawk Road Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
07:00 AM	12	22	34	5	20	25	14	0	14	73
07:15 AM	16	16	32	2	20	22	10	3	13	67
07:30 AM	28	29	57	5	38	43	18	5	23	123
07:45 AM	21	27	48	4	36	40	25	1	26	114
Total	77	94	171	16	114	130	67	9	76	377
08:00 AM	16	29	45	3	39	42	17	5	22	109
08:15 AM	24	22	46	2	23	25	25	4	29	100
08:30 AM	19	19	38	5	27	32	30	2	32	102
08:45 AM	15	28	43	3	30	33	19	2	21	97
Total	74	98	172	13	119	132	91	13	104	408
Grand Total	151	192	343	29	233	262	158	22	180	785
Apprch %	44	56		11.1	88.9		87.8	12.2		
Total %	19.2	24.5	43.7	3.7	29.7	33.4	20.1	2.8	22.9	

	Rancherias Road Southbound			Rancherias Road Northbound			Tomahawk Road Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	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	**28**	**29**	**57**	**5**	38	**43**	18	**5**	23	**123**
07:45 AM	21	27	48	4	36	40	**25**	1	26	114
08:00 AM	16	29	45	3	**39**	42	17	5	22	109
08:15 AM	24	22	46	2	23	25	25	4	**29**	100
Total Volume	89	107	196	14	136	150	85	15	100	446
% App. Total	45.4	54.6		9.3	90.7		85	15		
PHF	.795	.922	.860	.700	.872	.872	.850	.750	.862	.907

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City of Apple Valley
N/S: Rancherias Road
E/W: Tomahawk Road
Weather: Clear

File Name : 08_APV_Ranch_Toma AM
Site Code : 05722315
Start Date : 4/14/2022
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			07:30 AM			07:45 AM		
+0 mins.	**28**	**29**	**57**	**5**	38	**43**	25	1	26
+15 mins.	21	27	48	4	36	40	17	**5**	22
+30 mins.	16	29	45	3	**39**	42	25	4	29
+45 mins.	24	22	46	2	23	25	**30**	2	**32**
Total Volume	89	107	196	14	136	150	97	12	109
% App. Total	45.4	54.6		9.3	90.7		89	11	
PHF	.795	.922	.860	.700	.872	.872	.808	.600	.852

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City of Apple Valley
N/S: Rancherias Road
E/W: Tomahawk Road
Weather: Clear

File Name : 08_APV_Ranch_Toma PM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

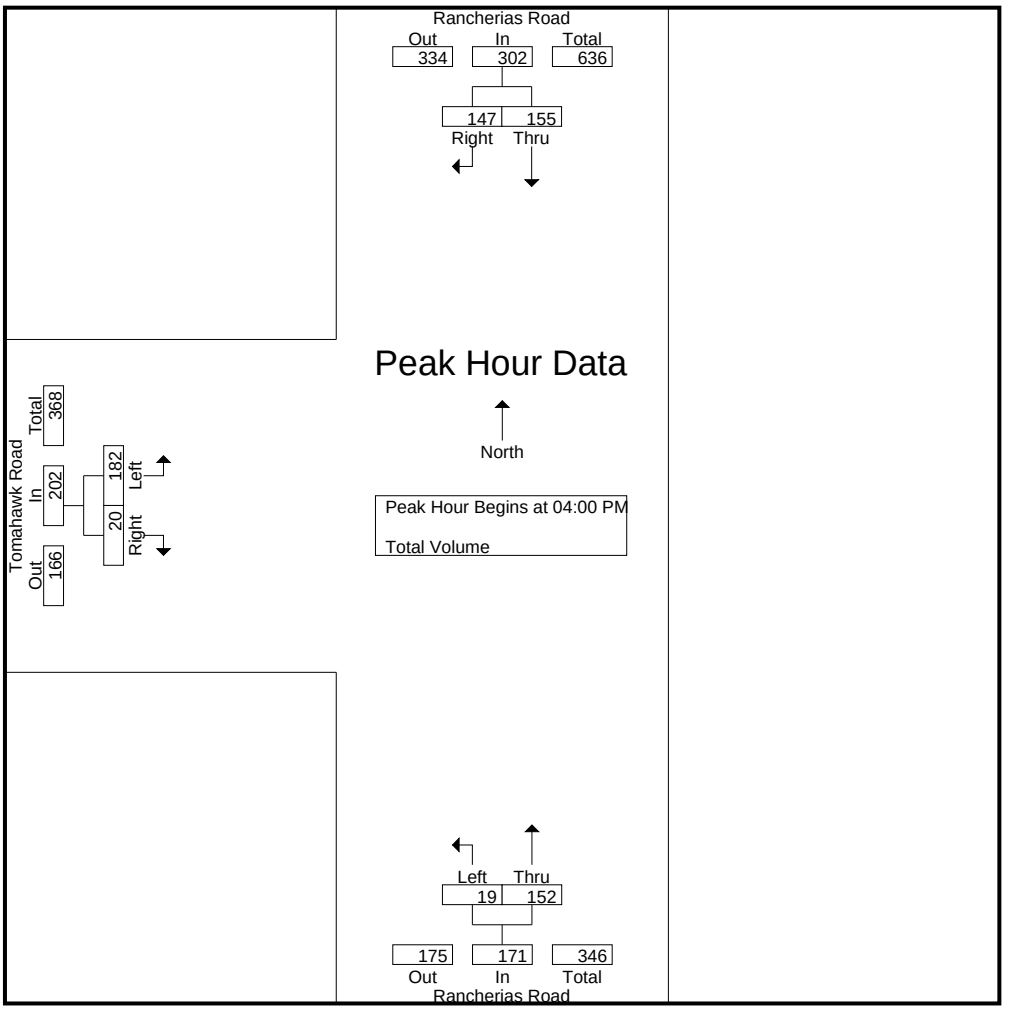
	Rancherias Road Southbound			Rancherias Road Northbound			Tomahawk Road Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
04:00 PM	38	35	73	4	35	39	52	5	57	169
04:15 PM	40	39	79	4	41	45	36	6	42	166
04:30 PM	45	36	81	6	40	46	53	6	59	186
04:45 PM	32	37	69	5	36	41	41	3	44	154
Total	155	147	302	19	152	171	182	20	202	675
05:00 PM	37	32	69	2	35	37	46	4	50	156
05:15 PM	33	42	75	4	36	40	33	4	37	152
05:30 PM	29	29	58	7	44	51	32	3	35	144
05:45 PM	27	28	55	2	42	44	37	5	42	141
Total	126	131	257	15	157	172	148	16	164	593
Grand Total	281	278	559	34	309	343	330	36	366	1268
Apprch %	50.3	49.7		9.9	90.1		90.2	9.8		
Total %	22.2	21.9	44.1	2.7	24.4	27.1	26	2.8	28.9	

	Rancherias Road Southbound			Rancherias Road Northbound			Tomahawk Road Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	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 04:00 PM										
04:00 PM	38	35	73	4	35	39	52	5	57	169
04:15 PM	40	**39**	79	4	**41**	45	36	**6**	42	166
04:30 PM	**45**	36	**81**	**6**	40	**46**	**53**	6	**59**	**186**
04:45 PM	32	37	69	5	36	41	41	3	44	154
Total Volume	155	147	302	19	152	171	182	20	202	675
% App. Total	51.3	48.7		11.1	88.9		90.1	9.9		
PHF	.861	.942	.932	.792	.927	.929	.858	.833	.856	.907

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City of Apple Valley
N/S: Rancherias Road
E/W: Tomahawk Road
Weather: Clear

File Name : 08_APV_Ranch_Toma PM
Site Code : 05722315
Start Date : 4/14/2022
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:

	04:00 PM			05:00 PM			04:00 PM		
+0 mins.	38	35	73	2	35	37	52	5	57
+15 mins.	40	**39**	79	4	36	40	36	**6**	42
+30 mins.	**45**	36	**81**	**7**	**44**	**51**	**53**	6	**59**
+45 mins.	32	37	69	2	42	44	41	3	44
Total Volume	155	147	302	15	157	172	182	20	202
% App. Total	51.3	48.7		8.7	91.3		90.1	9.9	
PHF	.861	.942	.932	.536	.892	.843	.858	.833	.856

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City of Apple Valley
N/S: Bass Hill Road
E/W: SR-18
Weather: Clear

File Name : 09_APV_Bass_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

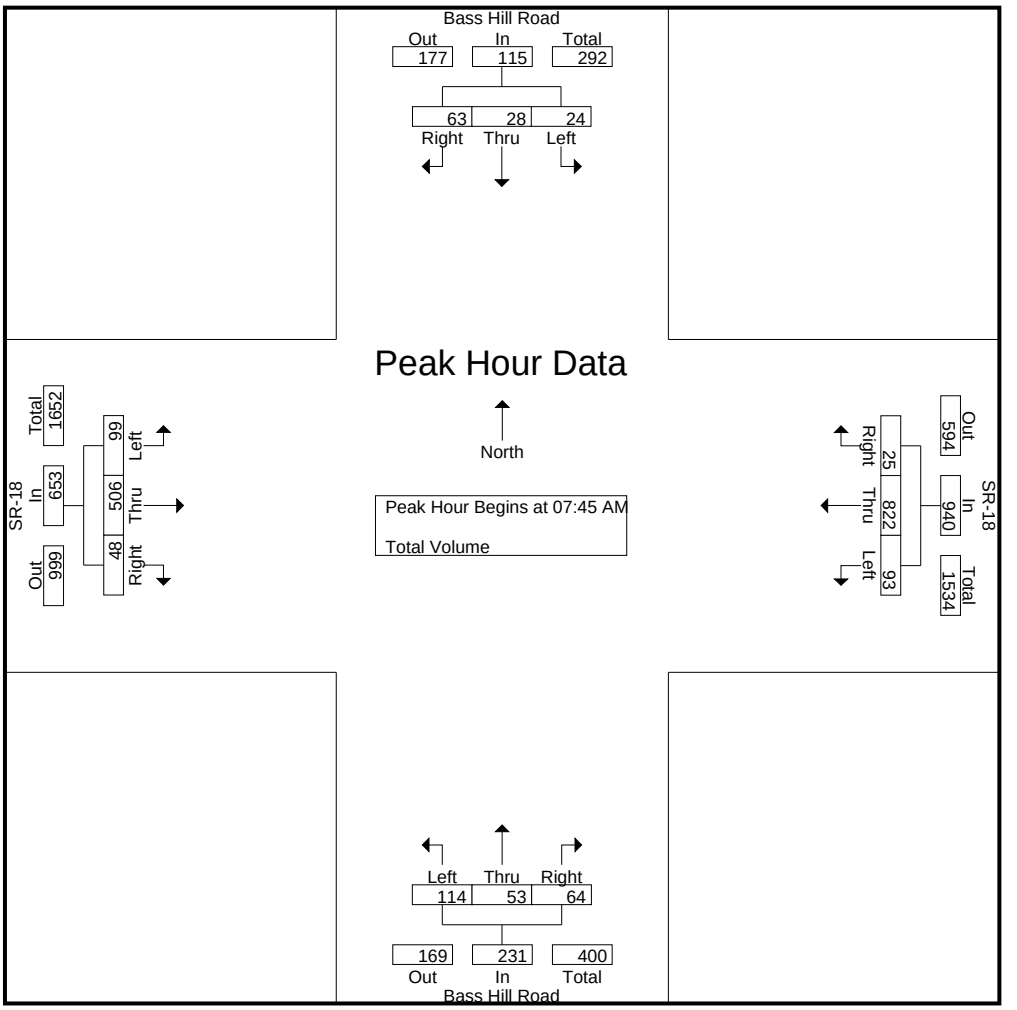
	Bass Hill Road Southbound				SR-18 Westbound				Bass Hill Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	2	7	6	15	25	180	6	211	22	5	15	42	14	91	6	111	379
07:15 AM	5	6	2	13	18	156	4	178	17	6	16	39	14	152	9	175	405
07:30 AM	8	9	12	29	21	209	5	235	18	13	12	43	13	130	13	156	463
07:45 AM	8	5	21	34	23	284	5	312	25	16	14	55	19	155	9	183	584
Total	23	27	41	91	87	829	20	936	82	40	57	179	60	528	37	625	1831
08:00 AM	8	6	15	29	26	190	11	227	32	7	16	55	31	121	8	160	471
08:15 AM	2	12	11	25	27	155	6	188	32	17	14	63	24	107	12	143	419
08:30 AM	6	5	16	27	17	193	3	213	25	13	20	58	25	123	19	167	465
08:45 AM	1	7	8	16	38	185	8	231	17	20	26	63	45	130	15	190	500
Total	17	30	50	97	108	723	28	859	106	57	76	239	125	481	54	660	1855
Grand Total	40	57	91	188	195	1552	48	1795	188	97	133	418	185	1009	91	1285	3686
Apprch %	21.3	30.3	48.4		10.9	86.5	2.7		45	23.2	31.8		14.4	78.5	7.1		
Total %	1.1	1.5	2.5	5.1	5.3	42.1	1.3	48.7	5.1	2.6	3.6	11.3	5	27.4	2.5	34.9	

	Bass Hill Road Southbound				SR-18 Westbound				Bass Hill Road Northbound				SR-18 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	**8**	5	**21**	**34**	23	**284**	5	**312**	25	16	14	55	19	**155**	9	**183**	**584**
08:00 AM	8	6	15	29	26	190	**11**	227	**32**	7	16	55	**31**	121	8	160	471
08:15 AM	2	**12**	11	25	**27**	155	6	188	32	**17**	14	**63**	24	107	12	143	419
08:30 AM	6	5	16	27	17	193	3	213	25	13	**20**	58	25	123	**19**	167	465
Total Volume	24	28	63	115	93	822	25	940	114	53	64	231	99	506	48	653	1939
% App. Total	20.9	24.3	54.8		9.9	87.4	2.7		49.4	22.9	27.7		15.2	77.5	7.4		
PHF	.750	.583	.750	.846	.861	.724	.568	.753	.891	.779	.800	.917	.798	.816	.632	.892	.830

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City of Apple Valley
N/S: Bass Hill Road
E/W: SR-18
Weather: Clear

File Name : 09_APV_Bass_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
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				07:30 AM				08:00 AM				07:15 AM			
+0 mins.	**8**	9	12	29	21	209	5	235	**32**	7	16	55	14	152	9	175
+15 mins.	8	5	**21**	**34**	23	**284**	5	**312**	32	17	14	**63**	13	130	**13**	156
+30 mins.	8	6	15	29	26	190	**11**	227	25	13	20	58	19	**155**	9	**183**
+45 mins.	2	**12**	11	25	**27**	155	6	188	17	**20**	**26**	63	**31**	121	8	160
Total Volume	26	32	59	117	97	838	27	962	106	57	76	239	77	558	39	674
% App. Total	22.2	27.4	50.4		10.1	87.1	2.8		44.4	23.8	31.8		11.4	82.8	5.8	
PHF	.813	.667	.702	.860	.898	.738	.614	.771	.828	.713	.731	.948	.621	.900	.750	.921

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City of Apple Valley
N/S: Bass Hill Road
E/W: SR-18
Weather: Clear

File Name : 09_APV_Bass_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

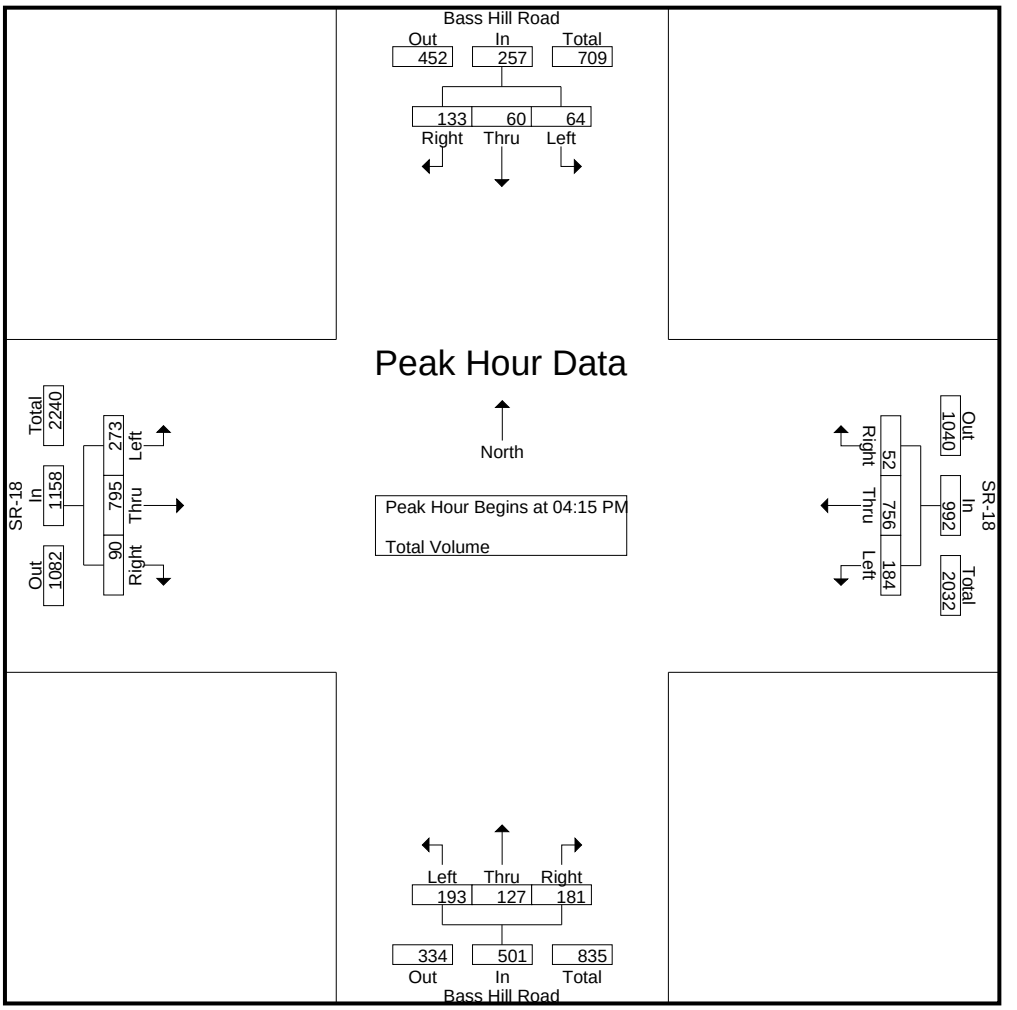
	Bass Hill Road Southbound				SR-18 Westbound				Bass Hill Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	10	10	25	45	46	193	10	249	64	20	50	134	52	222	25	299	727
04:15 PM	11	18	32	61	46	203	11	260	47	28	43	118	78	196	20	294	733
04:30 PM	13	19	28	60	40	186	10	236	48	40	46	134	52	199	23	274	704
04:45 PM	21	13	33	67	57	155	16	228	52	25	49	126	69	213	23	305	726
Total	55	60	118	233	189	737	47	973	211	113	188	512	251	830	91	1172	2890
05:00 PM	19	10	40	69	41	212	15	268	46	34	43	123	74	187	24	285	745
05:15 PM	15	18	39	72	34	174	7	215	39	28	51	118	66	201	24	291	696
05:30 PM	9	12	25	46	65	162	8	235	39	35	46	120	47	231	16	294	695
05:45 PM	18	10	23	51	43	152	11	206	58	30	48	136	64	176	26	266	659
Total	61	50	127	238	183	700	41	924	182	127	188	497	251	795	90	1136	2795
Grand Total	116	110	245	471	372	1437	88	1897	393	240	376	1009	502	1625	181	2308	5685
Apprch %	24.6	23.4	52		19.6	75.8	4.6		38.9	23.8	37.3		21.8	70.4	7.8		
Total %	2	1.9	4.3	8.3	6.5	25.3	1.5	33.4	6.9	4.2	6.6	17.7	8.8	28.6	3.2	40.6	

	Bass Hill Road Southbound				SR-18 Westbound				Bass Hill Road Northbound				SR-18 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 04:15 PM																	
04:15 PM	11	18	32	61	46	203	11	260	47	28	43	118	**78**	196	20	294	733
04:30 PM	13	**19**	28	60	40	186	10	236	48	**40**	46	**134**	52	199	23	274	704
04:45 PM	**21**	13	33	67	**57**	155	**16**	228	**52**	25	**49**	126	69	**213**	23	**305**	726
05:00 PM	19	10	**40**	**69**	41	**212**	15	**268**	46	34	43	123	74	187	**24**	285	**745**
Total Volume	64	60	133	257	184	756	52	992	193	127	181	501	273	795	90	1158	2908
% App. Total	24.9	23.3	51.8		18.5	76.2	5.2		38.5	25.3	36.1		23.6	68.7	7.8		
PHF	.762	.789	.831	.931	.807	.892	.813	.925	.928	.794	.923	.935	.875	.933	.938	.949	.976

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City of Apple Valley
N/S: Bass Hill Road
E/W: SR-18
Weather: Clear

File Name : 09_APV_Bass_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
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				04:15 PM				04:00 PM				04:45 PM			
+0 mins.	13	**19**	28	60	46	203	11	260	**64**	20	**50**	**134**	69	213	23	**305**
+15 mins.	**21**	13	33	67	40	186	10	236	47	28	43	118	**74**	187	**24**	285
+30 mins.	19	10	**40**	69	**57**	155	**16**	228	48	**40**	46	134	66	201	24	291
+45 mins.	15	18	39	**72**	41	**212**	15	**268**	52	25	49	126	47	**231**	16	294
Total Volume	68	60	140	268	184	756	52	992	211	113	188	512	256	832	87	1175
% App. Total	25.4	22.4	52.2		18.5	76.2	5.2		41.2	22.1	36.7		21.8	70.8	7.4	
PHF	.810	.789	.875	.931	.807	.892	.813	.925	.824	.706	.940	.955	.865	.900	.906	.963

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City of Apple Valley
N/S: Dale Evans Pkwy/Apple Valley Inn Rd
E/W: SR-18
Weather: Clear

File Name : 10_APV_Dale_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

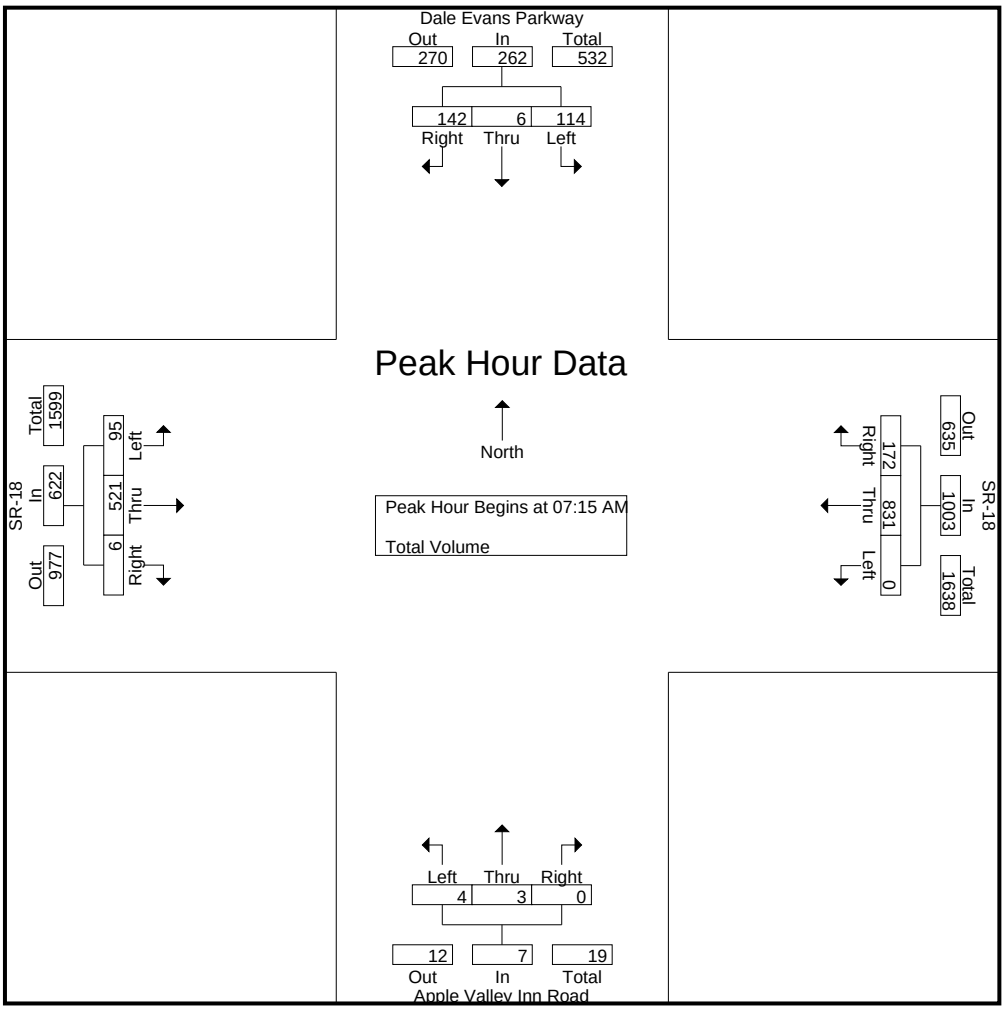
	Dale Evans Parkway Southbound				SR-18 Westbound				Apple Valley Inn Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	17	0	22	39	0	203	28	231	1	0	0	1	18	95	6	119	390
07:15 AM	21	0	34	55	0	149	35	184	2	0	0	2	27	142	0	169	410
07:30 AM	34	0	45	79	0	211	45	256	0	0	0	0	23	122	3	148	483
07:45 AM	23	4	36	63	0	264	50	314	1	1	0	2	16	144	0	160	539
Total	95	4	137	236	0	827	158	985	4	1	0	5	84	503	9	596	1822
08:00 AM	36	2	27	65	0	207	42	249	1	2	0	3	29	113	3	145	462
08:15 AM	29	1	30	60	1	167	31	199	2	0	0	2	19	112	0	131	392
08:30 AM	26	2	28	56	2	178	27	207	0	2	1	3	18	115	6	139	405
08:45 AM	27	5	32	64	1	199	35	235	5	1	0	6	31	115	2	148	453
Total	118	10	117	245	4	751	135	890	8	5	1	14	97	455	11	563	1712
Grand Total	213	14	254	481	4	1578	293	1875	12	6	1	19	181	958	20	1159	3534
Apprch %	44.3	2.9	52.8		0.2	84.2	15.6		63.2	31.6	5.3		15.6	82.7	1.7		
Total %	6	0.4	7.2	13.6	0.1	44.7	8.3	53.1	0.3	0.2	0	0.5	5.1	27.1	0.6	32.8	

	Dale Evans Parkway Southbound				SR-18 Westbound				Apple Valley Inn Road Northbound				SR-18 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 07:15 AM																	
07:15 AM	21	0	34	55	0	149	35	184	**2**	0	0	2	27	142	0	**169**	410
07:30 AM	34	0	**45**	**79**	0	211	45	256	0	0	0	0	23	122	**3**	148	483
07:45 AM	23	**4**	36	63	0	**264**	**50**	**314**	1	1	0	2	16	**144**	0	160	**539**
08:00 AM	**36**	2	27	65	0	207	42	249	1	**2**	0	**3**	**29**	113	3	145	462
Total Volume	114	6	142	262	0	831	172	1003	4	3	0	7	95	521	6	622	1894
% App. Total	43.5	2.3	54.2		0	82.9	17.1		57.1	42.9	0		15.3	83.8	1		
PHF	.792	.375	.789	.829	.000	.787	.860	.799	.500	.375	.000	.583	.819	.905	.500	.920	.878

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City of Apple Valley
N/S: Dale Evans Pkwy/Apple Valley Inn Rd
E/W: SR-18
Weather: Clear

File Name : 10_APV_Dale_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022



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				07:30 AM				08:00 AM				07:15 AM			
+0 mins.	34	0	**45**	**79**	0	211	45	256	1	**2**	0	3	27	142	0	**169**
+15 mins.	23	**4**	36	63	0	**264**	**50**	**314**	2	0	0	2	23	122	**3**	148
+30 mins.	**36**	2	27	65	0	207	42	249	0	2	**1**	3	16	**144**	0	160
+45 mins.	29	1	30	60	**1**	167	31	199	**5**	1	0	**6**	**29**	113	3	145
Total Volume	122	7	138	267	1	849	168	1018	8	5	1	14	95	521	6	622
% App. Total	45.7	2.6	51.7		0.1	83.4	16.5		57.1	35.7	7.1		15.3	83.8	1	
PHF	.847	.438	.767	.845	.250	.804	.840	.811	.400	.625	.250	.583	.819	.905	.500	.920

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City of Apple Valley
N/S: Dale Evans Pkwy/Apple Valley Inn Rd
E/W: SR-18
Weather: Clear

File Name : 10_APV_Dale_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

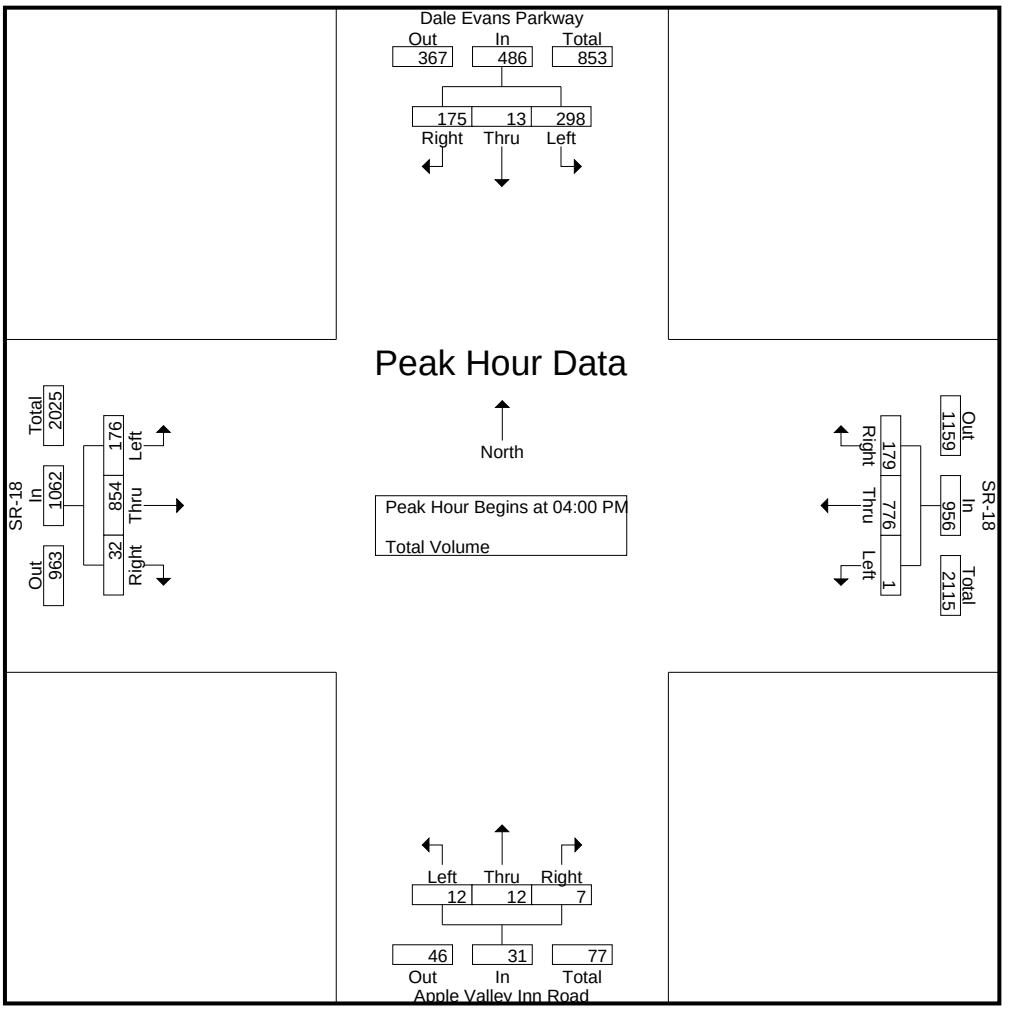
	Dale Evans Parkway Southbound				SR-18 Westbound				Apple Valley Inn Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	75	3	43	121	0	207	37	244	2	2	3	7	61	221	8	290	662
04:15 PM	65	2	45	112	0	217	45	262	2	3	3	8	32	199	7	238	620
04:30 PM	78	2	44	124	0	181	48	229	5	3	0	8	40	211	4	255	616
04:45 PM	80	6	43	129	1	171	49	221	3	4	1	8	43	223	13	279	637
Total	298	13	175	486	1	776	179	956	12	12	7	31	176	854	32	1062	2535
05:00 PM	56	0	43	99	0	205	43	248	2	2	2	6	39	185	8	232	585
05:15 PM	66	3	37	106	0	187	54	241	4	1	1	6	48	209	4	261	614
05:30 PM	81	1	45	127	0	160	37	197	3	1	2	6	50	194	12	256	586
05:45 PM	65	5	44	114	0	152	41	193	3	2	1	6	44	184	15	243	556
Total	268	9	169	446	0	704	175	879	12	6	6	24	181	772	39	992	2341
Grand Total	566	22	344	932	1	1480	354	1835	24	18	13	55	357	1626	71	2054	4876
Apprch %	60.7	2.4	36.9		0.1	80.7	19.3		43.6	32.7	23.6		17.4	79.2	3.5		
Total %	11.6	0.5	7.1	19.1	0	30.4	7.3	37.6	0.5	0.4	0.3	1.1	7.3	33.3	1.5	42.1	

	Dale Evans Parkway Southbound				SR-18 Westbound				Apple Valley Inn Road Northbound				SR-18 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 04:00 PM																	
04:00 PM	75	3	43	121	0	207	37	244	2	2	**3**	7	**61**	221	8	**290**	**662**
04:15 PM	65	2	**45**	112	0	**217**	45	**262**	2	3	3	**8**	32	199	7	238	620
04:30 PM	78	2	44	124	0	181	48	229	**5**	3	0	8	40	211	4	255	616
04:45 PM	**80**	**6**	43	**129**	**1**	171	**49**	221	3	**4**	1	8	43	**223**	**13**	279	637
Total Volume	298	13	175	486	1	776	179	956	12	12	7	31	176	854	32	1062	2535
% App. Total	61.3	2.7	36		0.1	81.2	18.7		38.7	38.7	22.6		16.6	80.4	3		
PHF	.931	.542	.972	.942	.250	.894	.913	.912	.600	.750	.583	.969	.721	.957	.615	.916	.957

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City of Apple Valley
N/S: Dale Evans Pkwy/Apple Valley Inn Rd
E/W: SR-18
Weather: Clear

File Name : 10_APV_Dale_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
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:

	04:00 PM				04:15 PM				04:00 PM				04:00 PM			
+0 mins.	75	3	43	121	0	**217**	45	**262**	2	2	**3**	7	**61**	221	8	**290**
+15 mins.	65	2	**45**	112	0	181	48	229	2	3	3	**8**	32	199	7	238
+30 mins.	78	2	44	124	**1**	171	**49**	221	**5**	3	0	8	40	211	4	255
+45 mins.	**80**	**6**	43	**129**	0	205	43	248	3	**4**	1	8	43	**223**	**13**	279
Total Volume	298	13	175	486	1	774	185	960	12	12	7	31	176	854	32	1062
% App. Total	61.3	2.7	36		0.1	80.6	19.3		38.7	38.7	22.6		16.6	80.4	3	
PHF	.931	.542	.972	.942	.250	.892	.944	.916	.600	.750	.583	.969	.721	.957	.615	.916

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City of Apple Valley
N/S: Flathead Road
E/W: SR-18
Weather: Clear

File Name : 11_APV_Flat_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

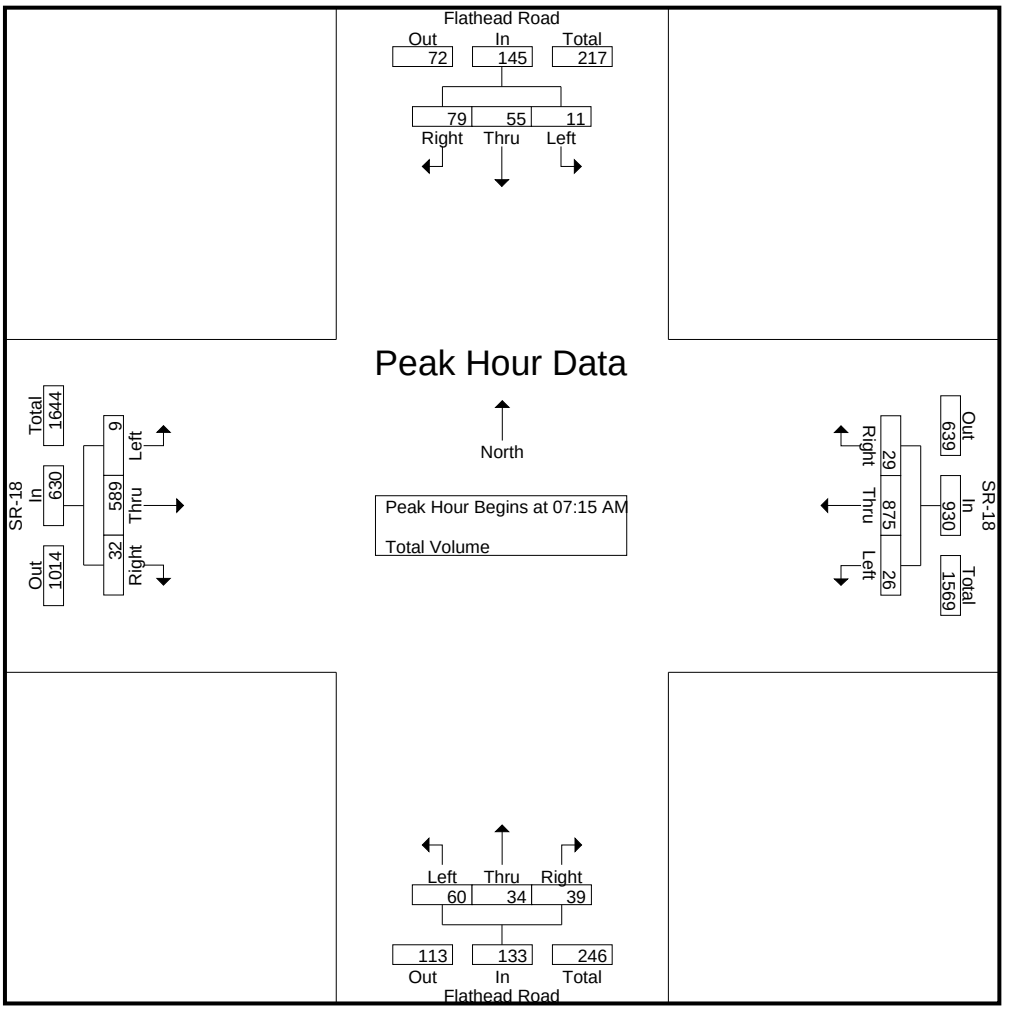
	Flathead Road Southbound				SR-18 Westbound				Flathead Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	3	9	21	33	17	197	2	216	16	8	9	33	3	96	9	108	390
07:15 AM	4	12	10	26	5	162	6	173	19	8	7	34	3	137	7	147	380
07:30 AM	2	11	32	45	6	217	9	232	13	11	14	38	1	158	12	171	486
07:45 AM	4	17	16	37	9	278	10	297	16	10	12	38	4	155	8	167	539
Total	13	49	79	141	37	854	27	918	64	37	42	143	11	546	36	593	1795
08:00 AM	1	15	21	37	6	218	4	228	12	5	6	23	1	139	5	145	433
08:15 AM	2	13	14	29	1	169	8	178	18	10	5	33	4	112	12	128	368
08:30 AM	4	9	14	27	2	181	6	189	9	10	7	26	7	129	13	149	391
08:45 AM	3	14	15	32	6	204	5	215	23	11	12	46	6	118	13	137	430
Total	10	51	64	125	15	772	23	810	62	36	30	128	18	498	43	559	1622
Grand Total	23	100	143	266	52	1626	50	1728	126	73	72	271	29	1044	79	1152	3417
Apprch %	8.6	37.6	53.8		3	94.1	2.9		46.5	26.9	26.6		2.5	90.6	6.9		
Total %	0.7	2.9	4.2	7.8	1.5	47.6	1.5	50.6	3.7	2.1	2.1	7.9	0.8	30.6	2.3	33.7	

	Flathead Road Southbound				SR-18 Westbound				Flathead Road Northbound				SR-18 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 07:15 AM																	
07:15 AM	**4**	12	10	26	5	162	6	173	**19**	8	7	34	3	137	7	147	380
07:30 AM	2	11	**32**	**45**	6	217	9	232	13	**11**	**14**	**38**	1	**158**	**12**	**171**	486
07:45 AM	4	**17**	16	37	**9**	**278**	**10**	**297**	16	10	12	38	**4**	155	8	167	**539**
08:00 AM	1	15	21	37	6	218	4	228	12	5	6	23	1	139	5	145	433
Total Volume	11	55	79	145	26	875	29	930	60	34	39	133	9	589	32	630	1838
% App. Total	7.6	37.9	54.5		2.8	94.1	3.1		45.1	25.6	29.3		1.4	93.5	5.1		
PHF	.688	.809	.617	.806	.722	.787	.725	.783	.789	.773	.696	.875	.563	.932	.667	.921	.853

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City of Apple Valley
N/S: Flathead Road
E/W: SR-18
Weather: Clear

File Name : 11_APV_Flat_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
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				07:30 AM				07:00 AM				07:15 AM			
+0 mins.	2	11	**32**	**45**	6	217	9	232	16	8	9	33	3	137	7	147
+15 mins.	**4**	**17**	16	37	**9**	**278**	**10**	**297**	**19**	8	7	34	1	**158**	**12**	**171**
+30 mins.	1	15	21	37	6	218	4	228	13	**11**	**14**	**38**	**4**	155	8	167
+45 mins.	2	13	14	29	1	169	8	178	16	10	12	38	1	139	5	145
Total Volume	9	56	83	148	22	882	31	935	64	37	42	143	9	589	32	630
% App. Total	6.1	37.8	56.1		2.4	94.3	3.3		44.8	25.9	29.4		1.4	93.5	5.1	
PHF	.563	.824	.648	.822	.611	.793	.775	.787	.842	.841	.750	.941	.563	.932	.667	.921

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City of Apple Valley
N/S: Flathead Road
E/W: SR-18
Weather: Clear

File Name : 11_APV_Flat_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

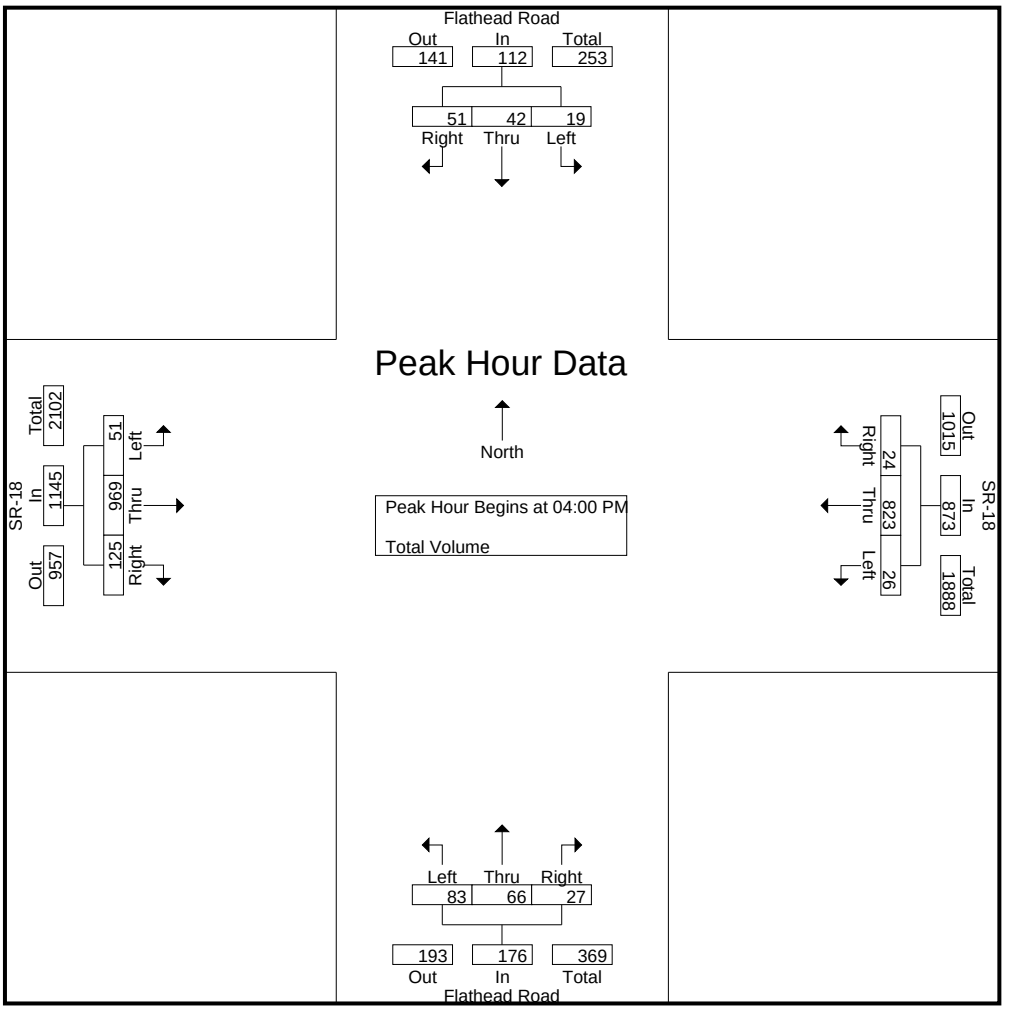
	Flathead Road Southbound				SR-18 Westbound				Flathead Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	5	10	11	26	6	211	7	224	16	20	5	41	11	247	26	284	575
04:15 PM	4	8	20	32	6	217	6	229	23	13	10	46	15	225	34	274	581
04:30 PM	1	14	10	25	10	207	6	223	16	21	7	44	12	223	31	266	558
04:45 PM	9	10	10	29	4	188	5	197	28	12	5	45	13	274	34	321	592
Total	19	42	51	112	26	823	24	873	83	66	27	176	51	969	125	1145	2306
05:00 PM	8	12	13	33	10	208	2	220	17	22	6	45	13	193	29	235	533
05:15 PM	3	6	13	22	4	210	3	217	16	13	5	34	17	249	30	296	569
05:30 PM	3	13	14	30	10	171	4	185	15	19	6	40	14	216	30	260	515
05:45 PM	3	12	10	25	8	159	4	171	15	12	6	33	12	215	27	254	483
Total	17	43	50	110	32	748	13	793	63	66	23	152	56	873	116	1045	2100
Grand Total	36	85	101	222	58	1571	37	1666	146	132	50	328	107	1842	241	2190	4406
Apprch %	16.2	38.3	45.5		3.5	94.3	2.2		44.5	40.2	15.2		4.9	84.1	11		
Total %	0.8	1.9	2.3	5	1.3	35.7	0.8	37.8	3.3	3	1.1	7.4	2.4	41.8	5.5	49.7	

	Flathead Road Southbound				SR-18 Westbound				Flathead Road Northbound				SR-18 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 04:00 PM																	
04:00 PM	5	10	11	26	6	211	**7**	224	16	20	5	41	11	247	26	284	575
04:15 PM	4	8	**20**	**32**	6	**217**	6	**229**	23	13	**10**	**46**	**15**	225	**34**	274	581
04:30 PM	1	**14**	10	25	**10**	207	6	223	16	**21**	7	44	12	223	31	266	558
04:45 PM	**9**	10	10	29	4	188	5	197	**28**	12	5	45	13	**274**	34	**321**	**592**
Total Volume	19	42	51	112	26	823	24	873	83	66	27	176	51	969	125	1145	2306
% App. Total	17	37.5	45.5		3	94.3	2.7		47.2	37.5	15.3		4.5	84.6	10.9		
PHF	.528	.750	.638	.875	.650	.948	.857	.953	.741	.786	.675	.957	.850	.884	.919	.892	.974

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City of Apple Valley
N/S: Flathead Road
E/W: SR-18
Weather: Clear

File Name : 11_APV_Flat_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
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:

	04:15 PM				04:00 PM				04:15 PM				04:00 PM			
+0 mins.	4	8	**20**	32	6	211	**7**	224	23	13	**10**	**46**	11	247	26	284
+15 mins.	1	**14**	10	25	6	**217**	6	**229**	16	21	7	44	**15**	225	**34**	274
+30 mins.	**9**	10	10	29	**10**	207	6	223	**28**	12	5	45	12	223	31	266
+45 mins.	8	12	13	**33**	4	188	5	197	17	**22**	6	45	13	**274**	34	**321**
Total Volume	22	44	53	119	26	823	24	873	84	68	28	180	51	969	125	1145
% App. Total	18.5	37	44.5		3	94.3	2.7		46.7	37.8	15.6		4.5	84.6	10.9	
PHF	.611	.786	.663	.902	.650	.948	.857	.953	.750	.773	.700	.978	.850	.884	.919	.892

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City of Apple Valley
N/S: Kiowa Road
E/W: SR-18
Weather: Clear

File Name : 12_APV_Kiowa_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

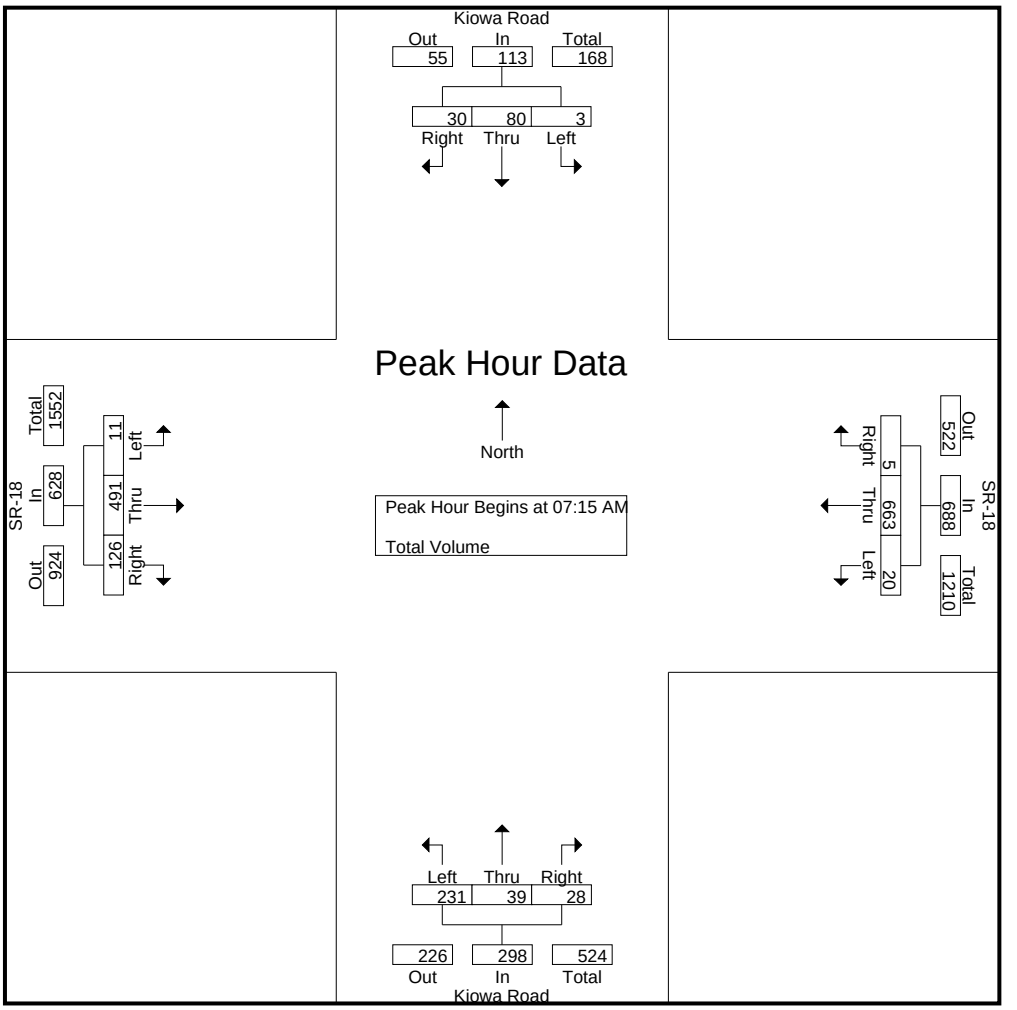
	Kiowa Road Southbound				SR-18 Westbound				Kiowa Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	17	7	25	12	158	1	171	38	10	10	58	3	96	12	111	365
07:15 AM	1	15	6	22	2	122	0	124	45	9	5	59	0	114	29	143	348
07:30 AM	1	21	10	32	3	174	1	178	54	3	8	65	4	137	25	166	441
07:45 AM	1	23	9	33	8	204	4	216	78	13	9	100	2	124	37	163	512
Total	4	76	32	112	25	658	6	689	215	35	32	282	9	471	103	583	1666
08:00 AM	0	21	5	26	7	163	0	170	54	14	6	74	5	116	35	156	426
08:15 AM	1	16	3	20	0	125	0	125	53	12	8	73	5	86	23	114	332
08:30 AM	0	15	5	20	7	146	0	153	51	8	5	64	7	115	24	146	383
08:45 AM	1	19	4	24	4	151	0	155	56	26	9	91	5	104	22	131	401
Total	2	71	17	90	18	585	0	603	214	60	28	302	22	421	104	547	1542
Grand Total	6	147	49	202	43	1243	6	1292	429	95	60	584	31	892	207	1130	3208
Apprch %	3	72.8	24.3		3.3	96.2	0.5		73.5	16.3	10.3		2.7	78.9	18.3		
Total %	0.2	4.6	1.5	6.3	1.3	38.7	0.2	40.3	13.4	3	1.9	18.2	1	27.8	6.5	35.2	

	Kiowa Road Southbound				SR-18 Westbound				Kiowa Road Northbound				SR-18 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 07:15 AM																	
07:15 AM	**1**	15	6	22	2	122	0	124	45	9	5	59	0	114	29	143	348
07:30 AM	1	21	**10**	32	3	174	1	178	54	3	8	65	4	**137**	25	**166**	441
07:45 AM	1	**23**	9	**33**	**8**	**204**	**4**	**216**	**78**	13	**9**	**100**	2	124	**37**	163	**512**
08:00 AM	0	21	5	26	7	163	0	170	54	**14**	6	74	**5**	116	35	156	426
Total Volume	3	80	30	113	20	663	5	688	231	39	28	298	11	491	126	628	1727
% App. Total	2.7	70.8	26.5		2.9	96.4	0.7		77.5	13.1	9.4		1.8	78.2	20.1		
PHF	.750	.870	.750	.856	.625	.813	.313	.796	.740	.696	.778	.745	.550	.896	.851	.946	.843

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City of Apple Valley
N/S: Kiowa Road
E/W: SR-18
Weather: Clear

File Name : 12_APV_Kiowa_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
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:

	07:15 AM				07:00 AM				07:30 AM				07:15 AM			
+0 mins.	**1**	15	6	22	**12**	158	1	171	54	3	8	65	0	114	29	143
+15 mins.	1	21	**10**	32	2	122	0	124	**78**	13	**9**	**100**	4	**137**	25	**166**
+30 mins.	1	**23**	9	**33**	3	174	1	178	54	**14**	6	74	2	124	**37**	163
+45 mins.	0	21	5	26	8	**204**	**4**	**216**	53	12	8	73	**5**	116	35	156
Total Volume	3	80	30	113	25	658	6	689	239	42	31	312	11	491	126	628
% App. Total	2.7	70.8	26.5		3.6	95.5	0.9		76.6	13.5	9.9		1.8	78.2	20.1	
PHF	.750	.870	.750	.856	.521	.806	.375	.797	.766	.750	.861	.780	.550	.896	.851	.946

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City of Apple Valley
N/S: Kiowa Road
E/W: SR-18
Weather: Clear

File Name : 12_APV_Kiowa_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

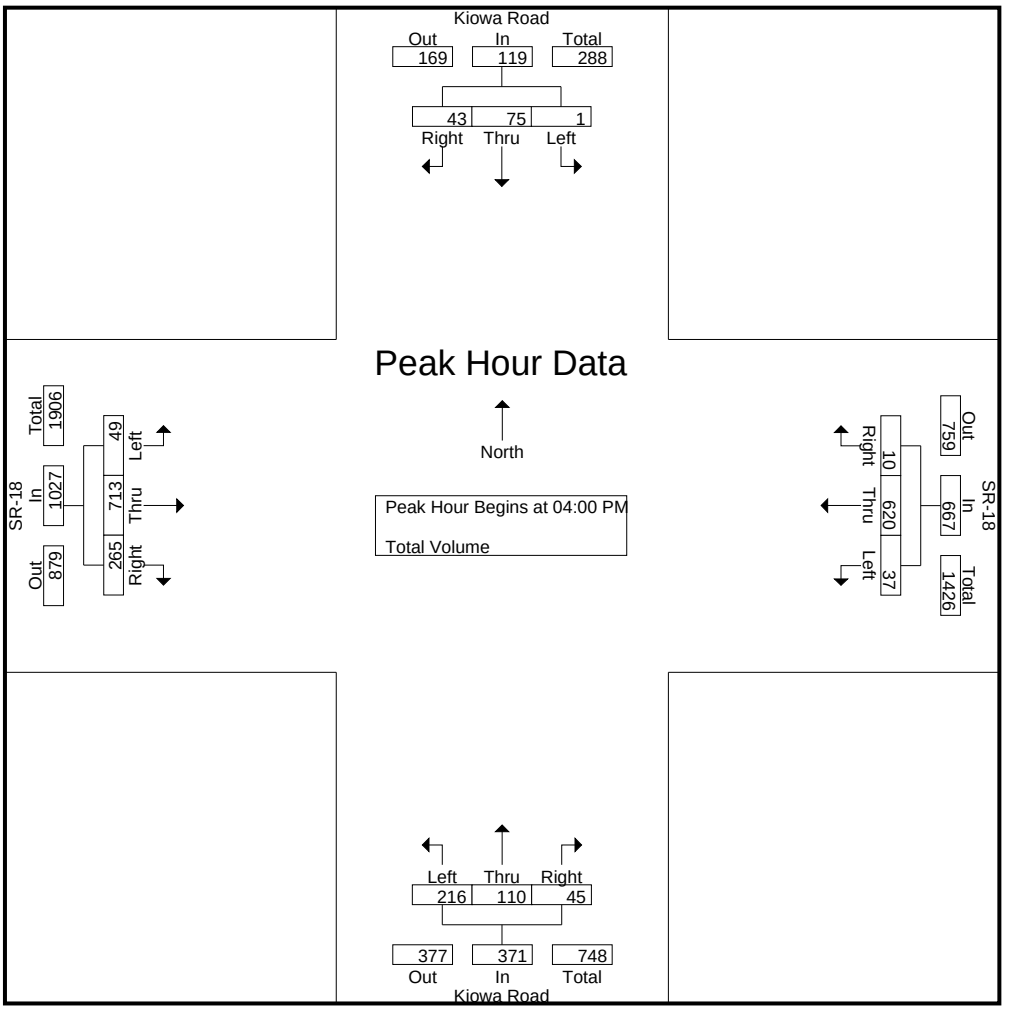
	Kiowa Road Southbound				SR-18 Westbound				Kiowa Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	22	7	29	16	152	2	170	51	27	13	91	14	162	83	259	549
04:15 PM	0	13	8	21	6	175	0	181	56	29	12	97	9	197	48	254	553
04:30 PM	1	18	11	30	7	156	2	165	52	28	10	90	9	144	63	216	501
04:45 PM	0	22	17	39	8	137	6	151	57	26	10	93	17	210	71	298	581
Total	1	75	43	119	37	620	10	667	216	110	45	371	49	713	265	1027	2184
05:00 PM	0	26	13	39	3	135	3	141	53	37	14	104	12	137	49	198	482
05:15 PM	0	11	6	17	3	152	0	155	56	30	7	93	9	181	75	265	530
05:30 PM	0	13	6	19	3	136	3	142	50	24	8	82	6	174	60	240	483
05:45 PM	0	12	8	20	7	103	0	110	50	22	5	77	7	141	49	197	404
Total	0	62	33	95	16	526	6	548	209	113	34	356	34	633	233	900	1899
Grand Total	1	137	76	214	53	1146	16	1215	425	223	79	727	83	1346	498	1927	4083
Apprch %	0.5	64	35.5		4.4	94.3	1.3		58.5	30.7	10.9		4.3	69.8	25.8		
Total %	0	3.4	1.9	5.2	1.3	28.1	0.4	29.8	10.4	5.5	1.9	17.8	2	33	12.2	47.2	

	Kiowa Road Southbound				SR-18 Westbound				Kiowa Road Northbound				SR-18 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 04:00 PM																	
04:00 PM	0	**22**	7	29	**16**	152	2	170	51	27	**13**	91	14	162	**83**	259	549
04:15 PM	0	13	8	21	6	**175**	0	**181**	56	**29**	12	**97**	9	197	48	254	553
04:30 PM	**1**	18	11	30	7	156	2	165	52	28	10	90	9	144	63	216	501
04:45 PM	0	22	**17**	**39**	8	137	**6**	151	**57**	26	10	93	**17**	**210**	71	**298**	**581**
Total Volume	1	75	43	119	37	620	10	667	216	110	45	371	49	713	265	1027	2184
% App. Total	0.8	63	36.1		5.5	93	1.5		58.2	29.6	12.1		4.8	69.4	25.8		
PHF	.250	.852	.632	.763	.578	.886	.417	.921	.947	.948	.865	.956	.721	.849	.798	.862	.940

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City of Apple Valley
N/S: Kiowa Road
E/W: SR-18
Weather: Clear

File Name : 12_APV_Kiowa_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
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:

	04:15 PM				04:00 PM				04:15 PM				04:00 PM			
+0 mins.	0	13	8	21	**16**	152	2	170	56	29	12	97	14	162	**83**	259
+15 mins.	**1**	18	11	30	6	**175**	0	**181**	52	28	10	90	9	197	48	254
+30 mins.	0	22	**17**	**39**	7	156	2	165	**57**	26	10	93	9	144	63	216
+45 mins.	0	**26**	13	39	8	137	**6**	151	53	**37**	**14**	**104**	**17**	**210**	71	**298**
Total Volume	1	79	49	129	37	620	10	667	218	120	46	384	49	713	265	1027
% App. Total	0.8	61.2	38		5.5	93	1.5		56.8	31.2	12		4.8	69.4	25.8	
PHF	.250	.760	.721	.827	.578	.886	.417	.921	.956	.811	.821	.923	.721	.849	.798	.862

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City of Apple Valley
N/S: Navajo Road
E/W: SR-18
Weather: Clear

File Name : 13_APV_Navajo_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

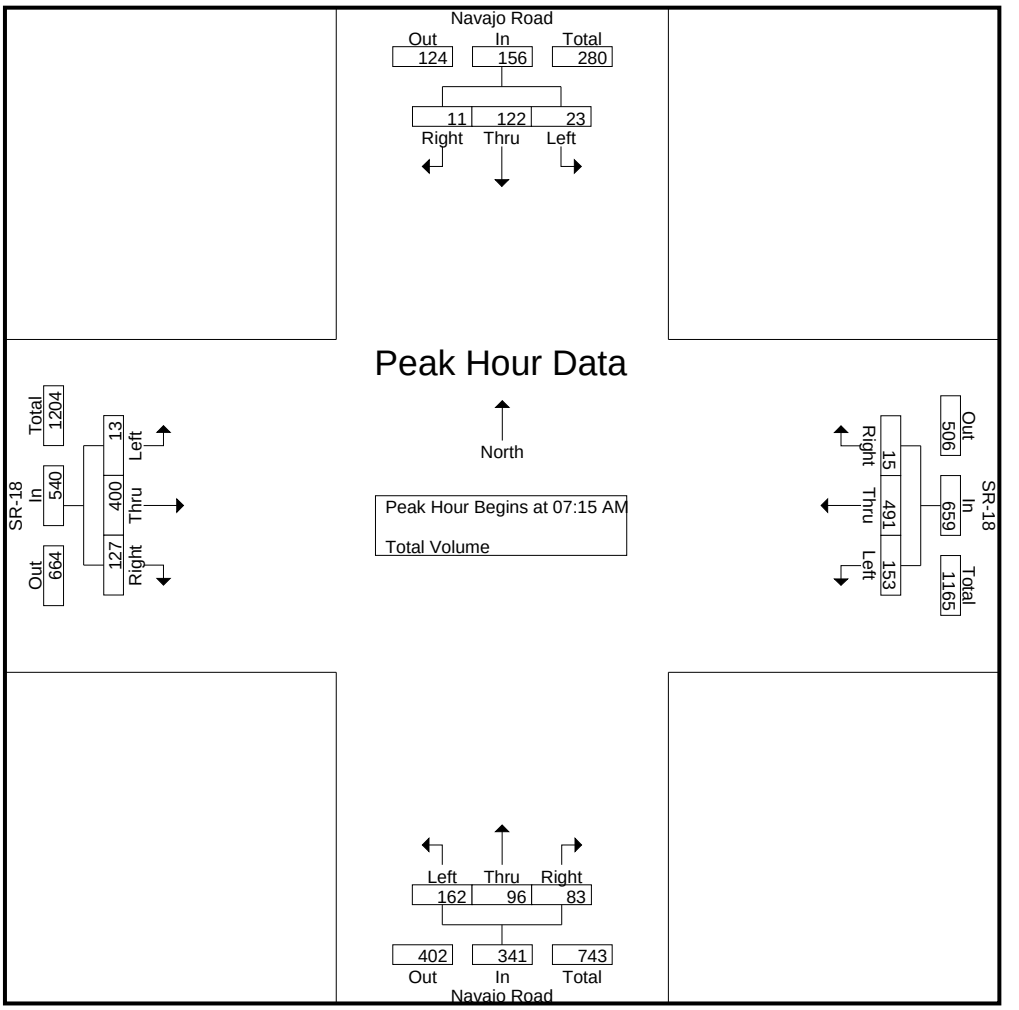
	Navajo Road Southbound				SR-18 Westbound				Navajo Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	4	23	4	31	48	129	6	183	41	21	22	84	0	84	20	104	402
07:15 AM	2	34	3	39	47	83	1	131	36	20	22	78	3	91	27	121	369
07:30 AM	4	36	2	42	32	137	3	172	43	23	9	75	3	114	29	146	435
07:45 AM	10	20	4	34	44	157	11	212	38	28	23	89	4	113	32	149	484
Total	20	113	13	146	171	506	21	698	158	92	76	326	10	402	108	520	1690
08:00 AM	7	32	2	41	30	114	0	144	45	25	29	99	3	82	39	124	408
08:15 AM	4	21	5	30	29	88	5	122	36	31	28	95	4	63	32	99	346
08:30 AM	4	22	2	28	46	111	4	161	29	24	23	76	2	77	38	117	382
08:45 AM	6	26	2	34	49	113	7	169	35	17	26	78	9	81	29	119	400
Total	21	101	11	133	154	426	16	596	145	97	106	348	18	303	138	459	1536
Grand Total	41	214	24	279	325	932	37	1294	303	189	182	674	28	705	246	979	3226
Apprch %	14.7	76.7	8.6		25.1	72	2.9		45	28	27		2.9	72	25.1		
Total %	1.3	6.6	0.7	8.6	10.1	28.9	1.1	40.1	9.4	5.9	5.6	20.9	0.9	21.9	7.6	30.3	

	Navajo Road Southbound				SR-18 Westbound				Navajo Road Northbound				SR-18 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 07:15 AM																	
07:15 AM	2	34	3	39	**47**	83	1	131	36	20	22	78	3	91	27	121	369
07:30 AM	4	**36**	2	**42**	32	137	3	172	43	23	9	75	3	**114**	29	146	435
07:45 AM	**10**	20	**4**	34	44	**157**	**11**	**212**	38	**28**	23	89	**4**	113	32	**149**	**484**
08:00 AM	7	32	2	41	30	114	0	144	**45**	25	**29**	**99**	3	82	**39**	124	408
Total Volume	23	122	11	156	153	491	15	659	162	96	83	341	13	400	127	540	1696
% App. Total	14.7	78.2	7.1		23.2	74.5	2.3		47.5	28.2	24.3		2.4	74.1	23.5		
PHF	.575	.847	.688	.929	.814	.782	.341	.777	.900	.857	.716	.861	.813	.877	.814	.906	.876

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File Name : 13_APV_Navajo_SR-18 AM
Site Code : 05722315
Start Date : 4/14/2022



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				07:00 AM				07:45 AM				07:15 AM			
+0 mins.	2	34	3	39	**48**	129	6	183	38	28	23	89	3	91	27	121
+15 mins.	4	**36**	2	**42**	47	83	1	131	**45**	25	**29**	**99**	3	**114**	29	146
+30 mins.	**10**	20	**4**	34	32	137	3	172	36	**31**	28	95	**4**	113	32	**149**
+45 mins.	7	32	2	41	44	**157**	**11**	**212**	29	24	23	76	3	82	**39**	124
Total Volume	23	122	11	156	171	506	21	698	148	108	103	359	13	400	127	540
% App. Total	14.7	78.2	7.1		24.5	72.5	3		41.2	30.1	28.7		2.4	74.1	23.5	
PHF	.575	.847	.688	.929	.891	.806	.477	.823	.822	.871	.888	.907	.813	.877	.814	.906

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City of Apple Valley
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File Name : 13_APV_Navajo_SR-18 PM
Site Code : 05722315
Start Date : 4/14/2022
Page No : 1

Groups Printed- Total Volume

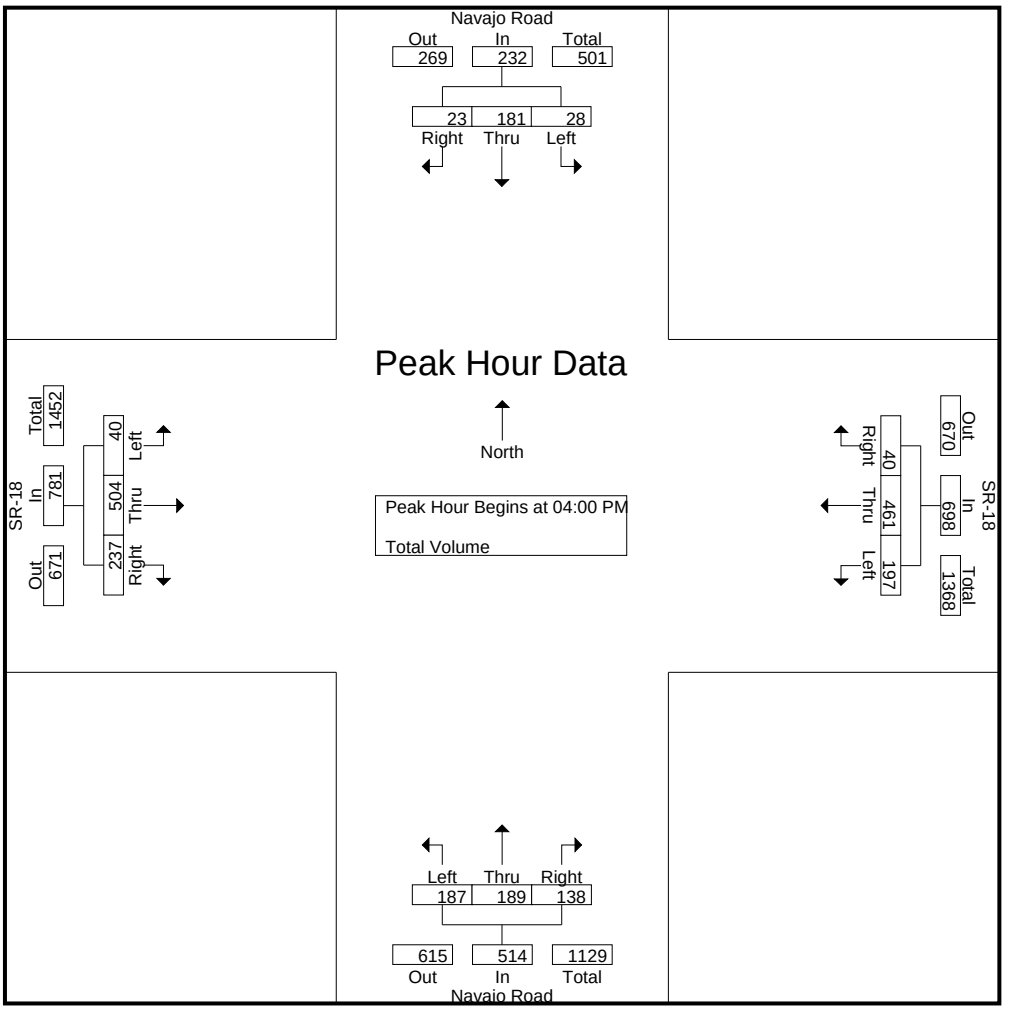
	Navajo Road Southbound				SR-18 Westbound				Navajo Road Northbound				SR-18 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	4	51	3	58	61	134	13	208	48	52	27	127	12	130	55	197	590
04:15 PM	10	53	9	72	46	113	13	172	51	50	36	137	17	121	64	202	583
04:30 PM	9	34	2	45	50	106	9	165	53	38	31	122	6	108	55	169	501
04:45 PM	5	43	9	57	40	108	5	153	35	49	44	128	5	145	63	213	551
Total	28	181	23	232	197	461	40	698	187	189	138	514	40	504	237	781	2225
05:00 PM	8	56	7	71	40	97	13	150	50	38	31	119	7	98	50	155	495
05:15 PM	8	37	5	50	38	123	14	175	30	30	32	92	8	143	56	207	524
05:30 PM	7	48	4	59	56	92	2	150	39	47	28	114	12	115	46	173	496
05:45 PM	6	44	6	56	48	70	7	125	42	43	36	121	7	100	55	162	464
Total	29	185	22	236	182	382	36	600	161	158	127	446	34	456	207	697	1979
Grand Total	57	366	45	468	379	843	76	1298	348	347	265	960	74	960	444	1478	4204
Apprch %	12.2	78.2	9.6		29.2	64.9	5.9		36.2	36.1	27.6		5	65	30		
Total %	1.4	8.7	1.1	11.1	9	20.1	1.8	30.9	8.3	8.3	6.3	22.8	1.8	22.8	10.6	35.2	

	Navajo Road Southbound				SR-18 Westbound				Navajo Road Northbound				SR-18 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 04:00 PM																	
04:00 PM	4	51	3	58	**61**	**134**	**13**	**208**	48	**52**	27	127	12	130	55	197	**590**
04:15 PM	**10**	**53**	**9**	**72**	46	113	13	172	51	50	36	**137**	**17**	121	**64**	202	583
04:30 PM	9	34	2	45	50	106	9	165	**53**	38	31	122	6	108	55	169	501
04:45 PM	5	43	9	57	40	108	5	153	35	49	**44**	128	5	**145**	63	**213**	551
Total Volume	28	181	23	232	197	461	40	698	187	189	138	514	40	504	237	781	2225
% App. Total	12.1	78	9.9		28.2	66	5.7		36.4	36.8	26.8		5.1	64.5	30.3		
PHF	.700	.854	.639	.806	.807	.860	.769	.839	.882	.909	.784	.938	.588	.869	.926	.917	.943

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Site Code : 05722315
Start Date : 4/14/2022
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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				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	**10**	53	**9**	**72**	**61**	**134**	**13**	**208**	48	**52**	27	127	12	130	55	197
+15 mins.	9	34	2	45	46	113	13	172	51	50	36	**137**	**17**	121	**64**	202
+30 mins.	5	43	9	57	50	106	9	165	**53**	38	31	122	6	108	55	169
+45 mins.	8	**56**	7	71	40	108	5	153	35	49	**44**	128	5	**145**	63	**213**
Total Volume	32	186	27	245	197	461	40	698	187	189	138	514	40	504	237	781
% App. Total	13.1	75.9	11		28.2	66	5.7		36.4	36.8	26.8		5.1	64.5	30.3	
PHF	.800	.830	.750	.851	.807	.860	.769	.839	.882	.909	.784	.938	.588	.869	.926	.917

APPENDIX C

EXISTING TRAFFIC CONDITIONS INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS

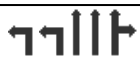
APPENDIX C-I

EXISTING TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 1: Apple Valley Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	32.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.774

Intersection Setup

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	569	192	49	51	139	193	308	937	452	56	1047	62
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	569	192	49	51	139	193	308	937	452	56	1047	62
Peak Hour Factor	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070
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]	157	53	14	14	38	53	85	258	125	15	289	17
Total Analysis Volume [veh/h]	627	212	54	56	153	213	340	1033	498	62	1154	68
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]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	38	39	0	9	10	0	17	42	0	10	35	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	0	0	24	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	R	L	C	R	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
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	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	32	32	4	14	14	13	43	43	5	35	35
g / C, Green / Cycle	0.23	0.32	0.32	0.04	0.14	0.14	0.13	0.42	0.42	0.05	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.20	0.08	0.07	0.03	0.04	0.12	0.11	0.19	0.28	0.02	0.22	0.23
s, saturation flow rate [veh/h]	3200	1800	1800	1700	3600	1800	3200	5400	1800	3200	3600	1800
c, Capacity [veh/h]	724	582	582	73	503	251	402	2289	763	161	1255	627
d1, Uniform Delay [s]	37.27	24.82	24.68	47.45	38.70	42.03	42.83	20.56	22.98	46.05	27.41	27.58
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	3.28	0.21	0.19	15.68	0.34	7.70	4.95	0.65	4.32	1.50	2.56	5.34
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	0.87	0.24	0.22	0.77	0.30	0.85	0.85	0.45	0.65	0.38	0.64	0.66
d, Delay for Lane Group [s/veh]	40.55	25.03	24.87	63.13	39.04	49.74	47.78	21.20	27.30	47.55	29.97	32.92
Lane Group LOS	D	C	C	E	D	D	D	C	C	D	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	7.59	2.41	2.23	1.69	1.70	5.62	4.35	5.72	9.94	0.78	8.38	9.08
50th-Percentile Queue Length [ft/ln]	189.87	60.22	55.76	42.28	42.61	140.51	108.82	142.89	248.39	19.43	209.39	226.95
95th-Percentile Queue Length [veh/ln]	12.11	4.34	4.01	3.04	3.07	9.51	7.77	9.64	15.10	1.40	13.12	14.02
95th-Percentile Queue Length [ft/ln]	302.86	108.40	100.36	76.10	76.69	237.71	194.36	240.91	377.62	34.98	328.04	350.49

Movement, Approach, & Intersection Results

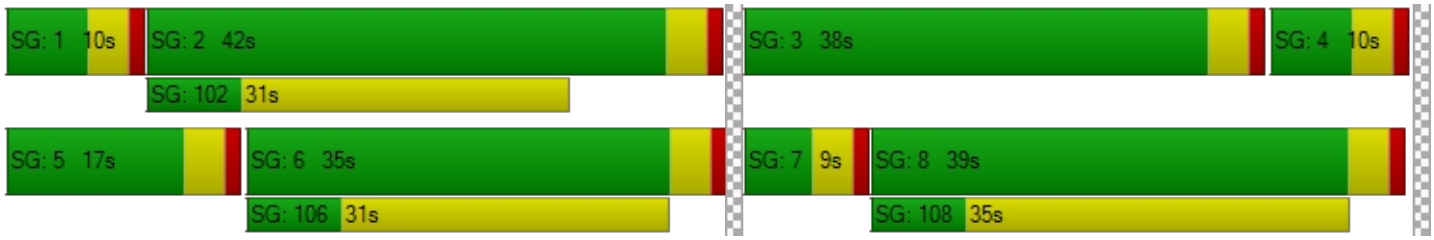
d_M, Delay for Movement [s/veh]	40.55	24.98	24.87	63.13	39.04	49.74	47.78	21.20	27.30	47.55	30.85	32.92
Movement LOS	D	C	C	E	D	D	D	C	C	D	C	C
d_A, Approach Delay [s/veh]	35.91			47.64			27.65			31.77		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	32.37											
Intersection LOS	C											
Intersection V/C	0.774											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	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]	39.64	39.64	0.00	39.64
l_p,int, Pedestrian LOS Score for Intersection	2.719	2.627	0.000	3.026
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	120	759	620
d_b, Bicycle Delay [s]	21.16	44.22	19.25	23.84
l_b,int, Bicycle LOS Score for Intersection	2.296	1.908	2.589	2.266
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Kasota Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	20.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.665

Intersection Setup

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	94	142	105	31	73	63	117	788	83	94	1046	85
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	94	142	105	31	73	63	117	788	83	94	1046	85
Peak Hour Factor	0.9090	0.9090	0.9090	0.9090	0.9090	0.9090	0.9090	0.9090	0.9090	0.9090	0.9090	0.9090
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]	26	39	29	9	20	17	32	217	23	26	288	23
Total Analysis Volume [veh/h]	103	156	116	34	80	69	129	867	91	103	1151	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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	5	6	0	5	6	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	38	0	0	38	0	12	30	0	22	40	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	16	16	16	16	8	55	55	7	54	54
g / C, Green / Cycle	0.18	0.18	0.18	0.18	0.09	0.61	0.61	0.08	0.60	0.60
(v / s)_i Volume / Saturation Flow Rate	0.06	0.15	0.02	0.08	0.08	0.27	0.26	0.06	0.35	0.34
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	226	321	104	321	154	1098	1098	133	1076	1076
d1, Uniform Delay [s]	32.39	35.85	31.05	33.18	40.30	9.38	9.27	40.72	11.20	11.06
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	1.43	6.22	1.80	1.05	11.21	1.30	1.22	9.06	2.33	2.21
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	0.46	0.85	0.33	0.46	0.84	0.44	0.43	0.77	0.58	0.57
d, Delay for Lane Group [s/veh]	33.82	42.07	32.85	34.23	51.51	10.68	10.50	49.77	13.52	13.27
Lane Group LOS	C	D	C	C	D	B	B	D	B	B
Critical Lane Group	No	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.03	6.22	0.67	2.97	3.26	4.96	4.74	2.55	7.61	7.34
50th-Percentile Queue Length [ft/ln]	50.72	155.52	16.64	74.15	81.39	123.98	118.39	63.73	190.21	183.43
95th-Percentile Queue Length [veh/ln]	3.65	10.31	1.20	5.34	5.86	8.61	8.30	4.59	12.13	11.78
95th-Percentile Queue Length [ft/ln]	91.29	257.78	29.95	133.48	146.49	215.28	207.61	114.71	303.31	294.48

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	33.82	42.07	42.07	32.85	34.23	34.23	51.51	10.60	10.50	49.77	13.41	13.27
Movement LOS	C	D	D	C	C	C	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	39.81			33.97			15.45			16.18		
Approach LOS	D			C			B			B		
d_I, Intersection Delay [s/veh]	19.96											
Intersection LOS	B											
Intersection V/C	0.665											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.70	34.70
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.916	2.809
Crosswalk LOS	F	F	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	755	755	577	800
d_b, Bicycle Delay [s]	17.44	17.44	22.78	16.22
l_b,int, Bicycle LOS Score for Intersection	2.178	1.862	2.456	2.672
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Corwin Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	17.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.634

Intersection Setup

Name	Corwin Road		US Highway 18		US Highway 18	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	1	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Corwin Road		US Highway 18		US Highway 18	
Base Volume Input [veh/h]	33	260	272	665	935	45
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	260	272	665	935	45
Peak Hour Factor	0.9180	0.9180	0.9180	0.9180	0.9180	0.9180
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	71	74	181	255	12
Total Analysis Volume [veh/h]	36	283	296	724	1019	49
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Protected	Permissive	Permissive	Permissive
Signal Group	7	0	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	6	0	6	6	6	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	13	0	48	77	29	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	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
Detector Length [ft]	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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	C
C, Cycle Length [s]	90	90	90	90	90	90
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]	9	9	18	73	51	51
g / C, Green / Cycle	0.10	0.10	0.20	0.81	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.02	0.08	0.17	0.20	0.30	0.30
s, saturation flow rate [veh/h]	1700	3600	1700	3600	1800	1800
c, Capacity [veh/h]	170	359	338	2921	1022	1022
d1, Uniform Delay [s]	37.27	39.59	34.97	2.01	11.96	11.96
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.62	3.85	7.12	0.20	1.91	1.91
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	0.21	0.79	0.87	0.25	0.52	0.52
d, Delay for Lane Group [s/veh]	37.89	43.45	42.09	2.21	13.87	13.87
Lane Group LOS	D	D	D	A	B	B
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.75	3.21	6.82	0.91	6.55	6.55
50th-Percentile Queue Length [ft/ln]	18.78	80.19	170.38	22.74	163.71	163.71
95th-Percentile Queue Length [veh/ln]	1.35	5.77	11.10	1.64	10.74	10.74
95th-Percentile Queue Length [ft/ln]	33.80	144.34	277.42	40.93	268.62	268.62

Movement, Approach, & Intersection Results

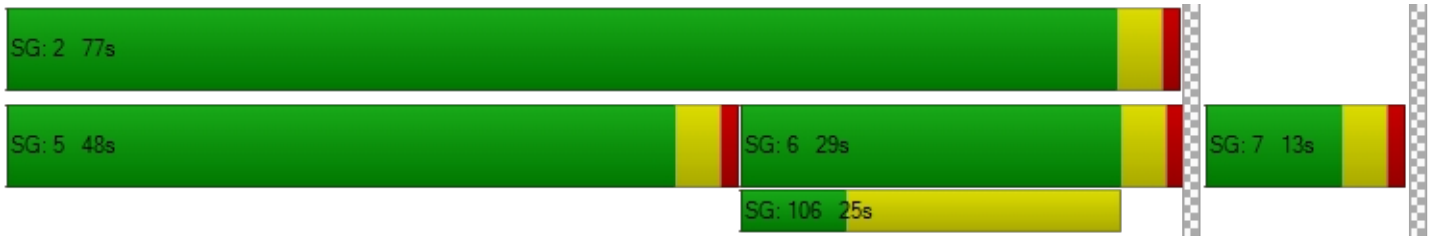
d_M, Delay for Movement [s/veh]	37.89	43.45	42.09	2.21	13.87	13.87
Movement LOS	D	D	D	A	B	B
d_A, Approach Delay [s/veh]	42.82		13.78		13.87	
Approach LOS	D		B		B	
d_I, Intersection Delay [s/veh]	17.67					
Intersection LOS	B					
Intersection V/C	0.634					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.292	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	200	1622	555
d_b, Bicycle Delay [s]	36.46	1.61	23.48
l_b,int, Bicycle LOS Score for Intersection	1.560	2.401	2.441
Bicycle LOS	A	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Tao Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	12.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.541

Intersection Setup

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	26	33	10	52	30	98	73	663	43	11	1055	81
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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	33	10	52	30	98	73	663	43	11	1055	81
Peak Hour Factor	0.9250	0.9250	0.9250	0.9250	0.9250	0.9250	0.9250	0.9250	0.9250	0.9250	0.9250	0.9250
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	9	3	14	8	26	20	179	12	3	285	22
Total Analysis Volume [veh/h]	28	36	11	56	32	106	79	717	46	12	1141	88
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	29	0	0	29	0	51	51	0	10	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	9	9	9	9	5	67	67	2	64	64
g / C, Green / Cycle	0.10	0.10	0.10	0.10	0.06	0.75	0.75	0.02	0.71	0.71
(v / s)_i Volume / Saturation Flow Rate	0.02	0.03	0.03	0.08	0.05	0.21	0.21	0.01	0.35	0.34
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	92	181	178	181	104	1345	1345	32	1269	1269
d1, Uniform Delay [s]	37.01	37.38	37.64	39.43	41.62	3.66	3.64	43.68	5.99	5.92
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	1.82	0.75	1.00	6.43	10.81	0.54	0.52	7.37	1.36	1.30
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	0.30	0.26	0.31	0.76	0.76	0.29	0.28	0.38	0.49	0.48
d, Delay for Lane Group [s/veh]	38.83	38.13	38.64	45.85	52.43	4.19	4.16	51.05	7.35	7.22
Lane Group LOS	D	D	D	D	D	A	A	D	A	A
Critical Lane Group	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.60	0.98	1.19	3.25	2.02	1.87	1.82	0.33	4.73	4.56
50th-Percentile Queue Length [ft/ln]	15.12	24.60	29.63	81.37	50.48	46.82	45.59	8.16	118.24	114.01
95th-Percentile Queue Length [veh/ln]	1.09	1.77	2.13	5.86	3.63	3.37	3.28	0.59	8.30	8.06
95th-Percentile Queue Length [ft/ln]	27.22	44.28	53.33	146.46	90.86	84.28	82.06	14.69	207.41	201.57

Movement, Approach, & Intersection Results

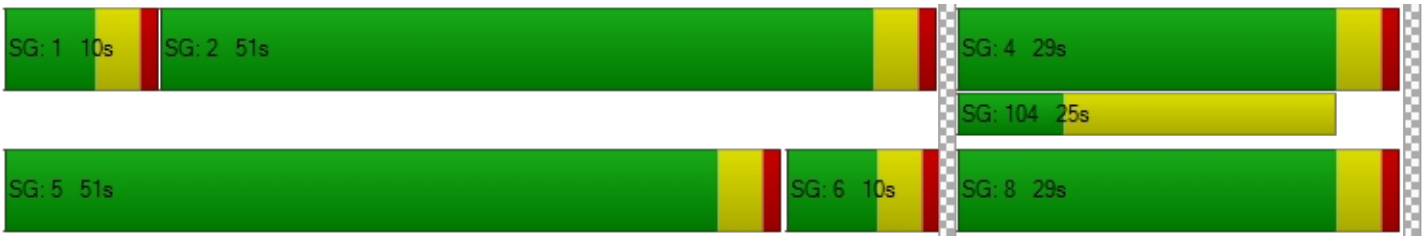
d_M, Delay for Movement [s/veh]	38.83	38.13	38.13	38.64	45.85	45.85	52.43	4.18	4.16	51.05	7.29	7.22
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	38.39			43.77			8.70			7.71		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	12.02											
Intersection LOS	B											
Intersection V/C	0.541											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.752	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	555	555	1044	133
d_b, Bicycle Delay [s]	23.48	23.48	10.28	39.21
l_b,int, Bicycle LOS Score for Intersection	1.683	1.880	2.254	2.583
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Rimrock Road/Piute Road at US Highway 18

Control Type:	Two-way stop	Delay (sec / veh):	15.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.204

Intersection Setup

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			60.00			60.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	0	0	37	0	0	75	39	672	4	28	1077	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	0	0	37	0	0	75	39	672	4	28	1077	57
Peak Hour Factor	0.9500	0.9500	0.8840	0.9500	0.9500	0.8840	0.8840	0.8840	0.8840	0.8840	0.8840	0.8840
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]	0	0	10	0	0	21	11	190	1	8	305	16
Total Analysis Volume [veh/h]	0	0	42	0	0	85	44	760	5	32	1218	64
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.07	0.00	0.00	0.20	0.08	0.01	0.00	0.04	0.01	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	11.28	0.00	0.00	15.82	12.30	0.00	0.00	9.43	0.00	0.00
Movement LOS			B			C	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.22	0.00	0.00	0.75	0.27	0.00	0.00	0.12	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	5.48	0.00	0.00	18.84	6.66	0.00	0.00	2.95	0.00	0.00
d_A, Approach Delay [s/veh]	11.28			15.82			0.67			0.23		
Approach LOS	B			C			A			A		
d_I, Intersection Delay [s/veh]	1.18											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 6: Rancherias Road at Thunderbird Road

Control Type:	All-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):	0.498

Intersection Setup

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Base Volume Input [veh/h]	98	112	46	182	222	38
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	98	112	46	182	222	38
Peak Hour Factor	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	35	14	57	69	12
Total Analysis Volume [veh/h]	123	140	58	228	278	48
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	599	678	557	605	558	685
Degree of Utilization, x	0.21	0.21	0.10	0.38	0.50	0.07

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.77	0.77	0.35	1.75	2.76	0.23
95th-Percentile Queue Length [ft]	19.15	19.27	8.66	43.74	69.07	5.64
Approach Delay [s/veh]	9.79		11.74		14.36	
Approach LOS	A		B		B	
Intersection Delay [s/veh]	12.13					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 7: Rancherias Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	21.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.610

Intersection Setup

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	72	87	105	80	126	231	124	577	17	74	857	82
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	72	87	105	80	126	231	124	577	17	74	857	82
Peak Hour Factor	0.8820	0.8820	0.8820	0.8820	0.8820	0.8820	0.8820	0.8820	0.8820	0.8820	0.8820	0.8820
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]	20	25	30	23	36	65	35	164	5	21	243	23
Total Analysis Volume [veh/h]	82	99	119	91	143	262	141	654	19	84	972	93
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	44	0	0	44	0	17	20	0	26	29	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	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	21	0	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
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
l1_p, Permitted Start-Up Lost Time [s]	2.00	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
g_i, Effective Green Time [s]	16	16	16	16	16	9	56	56	6	53	53
g / C, Green / Cycle	0.18	0.18	0.18	0.18	0.18	0.10	0.63	0.63	0.06	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.05	0.12	0.05	0.08	0.15	0.08	0.19	0.19	0.05	0.30	0.29
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	228	318	157	318	318	175	1125	1125	111	1058	1058
d1, Uniform Delay [s]	32.10	34.77	32.28	33.19	35.76	39.54	7.79	7.78	41.41	10.95	10.81
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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
d2, Incremental Delay [s]	0.95	2.63	3.34	1.00	5.41	8.46	0.69	0.68	10.02	1.76	1.66
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
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
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

Lane Group Results

X, volume / capacity	0.36	0.69	0.58	0.45	0.83	0.81	0.30	0.30	0.76	0.51	0.50
d, Delay for Lane Group [s/veh]	33.06	37.40	35.62	34.19	41.17	47.99	8.48	8.45	51.43	12.71	12.48
Lane Group LOS	C	D	D	C	D	D	A	A	D	B	B
Critical Lane Group	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.59	4.63	1.85	2.84	5.91	3.42	2.90	2.87	2.12	6.24	5.97
50th-Percentile Queue Length [ft/ln]	39.69	115.73	46.25	71.05	147.81	85.51	72.60	71.73	53.05	155.94	149.27
95th-Percentile Queue Length [veh/ln]	2.86	8.16	3.33	5.12	9.90	6.16	5.23	5.16	3.82	10.33	9.98
95th-Percentile Queue Length [ft/ln]	71.44	203.94	83.26	127.88	247.51	153.91	130.68	129.11	95.49	258.34	249.45

Movement, Approach, & Intersection Results

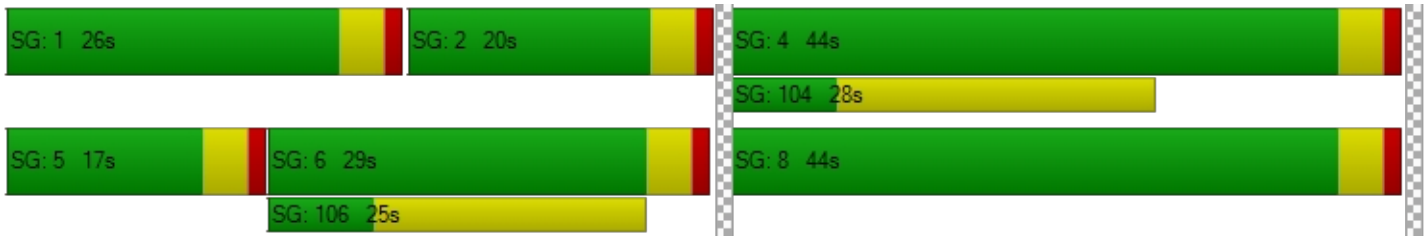
d_M, Delay for Movement [s/veh]	33.06	37.40	37.40	35.62	34.19	41.17	47.99	8.47	8.45	51.43	12.61	12.48
Movement LOS	C	D	D	D	C	D	D	A	A	D	B	B
d_A, Approach Delay [s/veh]	36.21			38.14			15.31			15.44		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	21.74											
Intersection LOS	C											
Intersection V/C	0.610											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	34.70	34.70	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.333	2.831	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	888	888	355	555
d_b, Bicycle Delay [s]	13.91	13.91	30.44	23.49
l_b,int, Bicycle LOS Score for Intersection	2.055	2.378	2.231	2.508
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Rancherias Road at Tomahawk Road

Control Type:	Two-way stop	Delay (sec / veh):	11.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.144

Intersection Setup

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
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 Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
Base Volume Input [veh/h]	14	136	89	107	85	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	14	136	89	107	85	15
Peak Hour Factor	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	37	25	29	23	4
Total Analysis Volume [veh/h]	15	150	98	118	94	17
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			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	0.14	0.02
d_M, Delay for Movement [s/veh]	7.69	0.00	0.00	0.00	11.57	10.09
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.00	0.00	0.58	0.58
95th-Percentile Queue Length [ft/ln]	0.84	0.84	0.00	0.00	14.55	14.55
d_A, Approach Delay [s/veh]	0.70		0.00		11.34	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.79					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 9: Bass Hill Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	18.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.469

Intersection Setup

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	114	53	64	24	28	63	99	506	48	93	822	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	114	53	64	24	28	63	99	506	48	93	822	25
Peak Hour Factor	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
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]	34	16	19	7	8	19	30	152	14	28	248	8
Total Analysis Volume [veh/h]	137	64	77	29	34	76	119	610	58	112	990	30
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]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Overlap	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	8	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups			1,8			4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	6	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	30	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	10	0	35	35	10	32	0	23	45	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	24	0	21	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No	No		No	No	No	No		No	No	
Maximum Recall		No	No		No	No	No	No		No	No	
Pedestrian Recall		No	No		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	R	L	C	R	L	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
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	0.00	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	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]	7	7	19	6	6	26	6	63	63	8	66	66
g / C, Green / Cycle	0.07	0.07	0.19	0.06	0.06	0.26	0.06	0.63	0.63	0.08	0.66	0.66
(v / s)_i Volume / Saturation Flow Rate	0.04	0.04	0.04	0.01	0.02	0.04	0.04	0.17	0.03	0.07	0.28	0.02
s, saturation flow rate [veh/h]	3200	1800	1800	3200	1800	1800	3200	3600	1800	1700	3600	1800
c, Capacity [veh/h]	231	120	345	191	107	477	188	2264	1132	144	2358	1179
d1, Uniform Delay [s]	45.56	45.21	34.19	44.68	45.13	28.24	46.08	8.30	7.12	44.90	8.22	6.06
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	2.43	3.62	0.32	0.36	1.67	0.15	3.50	0.29	0.09	8.67	0.55	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	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	0.59	0.53	0.22	0.15	0.32	0.16	0.63	0.27	0.05	0.78	0.42	0.03
d, Delay for Lane Group [s/veh]	47.99	48.83	34.52	45.05	46.80	28.39	49.57	8.59	7.21	53.57	8.77	6.10
Lane Group LOS	D	D	C	D	D	C	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.73	1.65	1.61	0.35	0.86	1.42	1.53	2.81	0.47	3.05	4.73	0.22
50th-Percentile Queue Length [ft/ln]	43.22	41.29	40.22	8.75	21.40	35.39	38.27	70.17	11.75	76.33	118.35	5.41
95th-Percentile Queue Length [veh/ln]	3.11	2.97	2.90	0.63	1.54	2.55	2.76	5.05	0.85	5.50	8.30	0.39
95th-Percentile Queue Length [ft/ln]	77.80	74.33	72.40	15.76	38.53	63.70	68.89	126.30	21.15	137.39	207.56	9.74

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	47.99	48.83	34.52	45.05	46.80	28.39	49.57	8.59	7.21	53.57	8.77	6.10
Movement LOS	D	D	C	D	D	C	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	44.45			36.37			14.68			13.13		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	18.76											
Intersection LOS	B											
Intersection V/C	0.469											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
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]	39.64	39.64	39.64	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.536	2.515	3.071	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	120	620	560	819
d_b, Bicycle Delay [s]	44.22	23.84	25.95	17.43
l_b,int, Bicycle LOS Score for Intersection	2.018	1.789	2.209	2.494
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: Dale Evans Parkway at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	15.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.553

Intersection Setup

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	4	3	0	114	6	142	95	521	6	0	831	172
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	4	3	0	114	6	142	95	521	6	0	831	172
Peak Hour Factor	0.8780	0.8780	0.8780	0.8780	0.8780	0.8780	0.8780	0.8780	0.8780	0.8780	0.8780	0.8780
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	1	0	32	2	40	27	148	2	0	237	49
Total Analysis Volume [veh/h]	5	3	0	130	7	162	108	593	7	0	946	196
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	10	0	0	35	0	10	21	0	24	35	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	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	0	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	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
g_i, Effective Green Time [s]	1	11	11	11	6	62	62	0	57	57
g / C, Green / Cycle	0.01	0.12	0.12	0.12	0.06	0.69	0.69	0.00	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.00	0.04	0.00	0.09	0.03	0.17	0.17	0.00	0.33	0.31
s, saturation flow rate [veh/h]	1700	3200	1800	1800	3200	1800	1800	1700	1800	1800
c, Capacity [veh/h]	23	381	214	214	202	1240	1240	2	1128	1128
d1, Uniform Delay [s]	44.09	36.47	35.13	38.45	40.95	5.24	5.24	0.00	9.33	9.08
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	8.86	0.53	0.06	5.35	2.17	0.46	0.46	0.00	1.72	1.53
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	0.35	0.34	0.03	0.76	0.53	0.24	0.24	0.00	0.52	0.49
d, Delay for Lane Group [s/veh]	52.95	37.00	35.19	43.80	43.12	5.71	5.70	0.00	11.05	10.61
Lane Group LOS	D	D	D	D	D	A	A	A	B	B
Critical Lane Group	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.23	1.33	0.14	3.73	1.21	1.91	1.91	0.00	6.14	5.62
50th-Percentile Queue Length [ft/ln]	5.79	33.18	3.46	93.30	30.27	47.86	47.64	0.00	153.50	140.46
95th-Percentile Queue Length [veh/ln]	0.42	2.39	0.25	6.72	2.18	3.45	3.43	0.00	10.20	9.51
95th-Percentile Queue Length [ft/ln]	10.43	59.72	6.23	167.94	54.48	86.15	85.76	0.00	255.10	237.64

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.95	52.95	52.95	37.00	35.19	43.80	43.12	5.71	5.70	0.00	10.88	10.61
Movement LOS	D	D	D	D	D	D	D	A	A	A	B	B
d_A, Approach Delay [s/veh]	52.95			40.64			11.41			10.84		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	15.31											
Intersection LOS	B											
Intersection V/C	0.553											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	34.72	34.72	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.551	2.847	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	133	688	377	688
d_b, Bicycle Delay [s]	39.24	19.38	29.65	19.38
l_b,int, Bicycle LOS Score for Intersection	1.573	2.053	2.144	2.502
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: Flathead Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	11.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.464

Intersection Setup

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	60	34	39	11	55	79	9	589	32	26	875	29
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	60	34	39	11	55	79	9	589	32	26	875	29
Peak Hour Factor	0.8530	0.8530	0.8530	0.8530	0.8530	0.8530	0.8530	0.8530	0.8530	0.8530	0.8530	0.8530
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]	18	10	11	3	16	23	3	173	9	8	256	8
Total Analysis Volume [veh/h]	70	40	46	13	64	93	11	691	38	30	1026	34
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	70	0	0	70	0	10	10	0	10	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	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	2.00	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
g_i, Effective Green Time [s]	11	11	2	64	64	3	65	65
g / C, Green / Cycle	0.12	0.12	0.02	0.71	0.71	0.04	0.73	0.73
(v / s)_i Volume / Saturation Flow Rate	0.09	0.10	0.01	0.20	0.20	0.02	0.30	0.29
s, saturation flow rate [veh/h]	1700	1700	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	267	252	29	1273	1273	62	1308	1308
d1, Uniform Delay [s]	38.13	38.48	43.76	4.85	4.83	42.56	4.79	4.77
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.02	3.12	7.68	0.57	0.56	5.77	0.94	0.93
d3, Initial Queue Delay [s]	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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.58	0.67	0.37	0.29	0.28	0.48	0.41	0.40
d, Delay for Lane Group [s/veh]	40.15	41.60	51.44	5.42	5.38	48.32	5.73	5.69
Lane Group LOS	D	D	D	A	A	D	A	A
Critical Lane Group	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	3.42	3.82	0.30	2.24	2.19	0.75	3.32	3.27
50th-Percentile Queue Length [ft/ln]	85.57	95.44	7.58	56.05	54.83	18.69	83.07	81.74
95th-Percentile Queue Length [veh/ln]	6.16	6.87	0.55	4.04	3.95	1.35	5.98	5.89
95th-Percentile Queue Length [ft/ln]	154.02	171.80	13.64	100.89	98.70	33.63	149.52	147.14

Movement, Approach, & Intersection Results

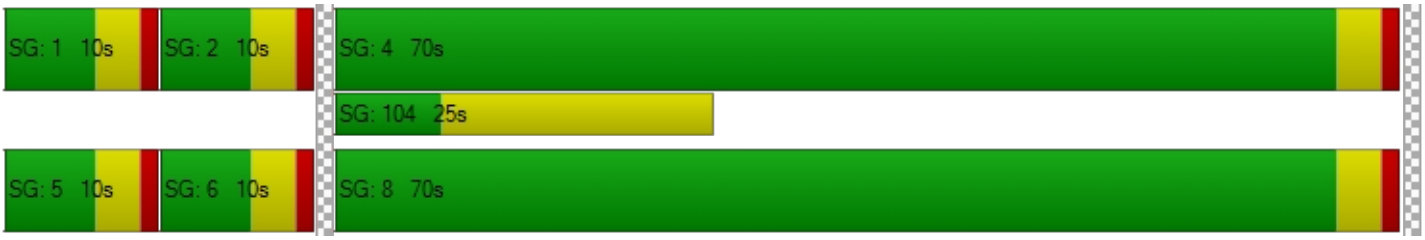
d_M, Delay for Movement [s/veh]	40.15	40.15	40.15	41.60	41.60	41.60	51.44	5.40	5.38	48.32	5.71	5.69
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	40.15			41.60			6.09			6.88		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	11.76											
Intersection LOS	B											
Intersection V/C	0.464											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.775	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1466	1466	133	133
d_b, Bicycle Delay [s]	3.21	3.21	39.21	39.21
I_b,int, Bicycle LOS Score for Intersection	1.817	1.840	2.170	2.459
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: Kiowa Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	143.0
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.449

Intersection Setup

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	231	39	28	3	80	30	11	491	126	20	663	5
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	231	39	28	3	80	30	11	491	126	20	663	5
Peak Hour Factor	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430
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]	69	12	8	1	24	9	3	146	37	6	197	1
Total Analysis Volume [veh/h]	274	46	33	4	95	36	13	582	149	24	786	6
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	44	0	0	44	0	10	32	0	14	36	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	8	8	8	8	2	67	67	3	68	68
g / C, Green / Cycle	0.09	0.09	0.09	0.09	0.02	0.74	0.74	0.03	0.75	0.75
(v / s)_i Volume / Saturation Flow Rate	0.16	0.04	0.00	0.07	0.01	0.21	0.20	0.01	0.22	0.22
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	88	170	137	170	31	1336	1336	51	1357	1357
d1, Uniform Delay [s]	38.91	38.60	36.99	39.80	43.68	3.79	3.72	42.94	3.50	3.50
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	965.38	1.97	0.08	7.20	8.45	0.53	0.48	6.55	0.55	0.54
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	3.13	0.46	0.03	0.77	0.41	0.28	0.26	0.47	0.29	0.29
d, Delay for Lane Group [s/veh]	1004.29	40.57	37.08	47.00	52.13	4.32	4.20	49.49	4.05	4.04
Lane Group LOS	F	D	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	25.29	1.73	0.08	3.13	0.36	1.89	1.74	0.61	1.86	1.86
50th-Percentile Queue Length [ft/ln]	632.31	43.17	2.06	78.33	8.94	47.33	43.42	15.33	46.55	46.39
95th-Percentile Queue Length [veh/ln]	41.26	3.11	0.15	5.64	0.64	3.41	3.13	1.10	3.35	3.34
95th-Percentile Queue Length [ft/ln]	1031.38	77.70	3.71	140.99	16.08	85.19	78.16	27.59	83.79	83.51

Movement, Approach, & Intersection Results

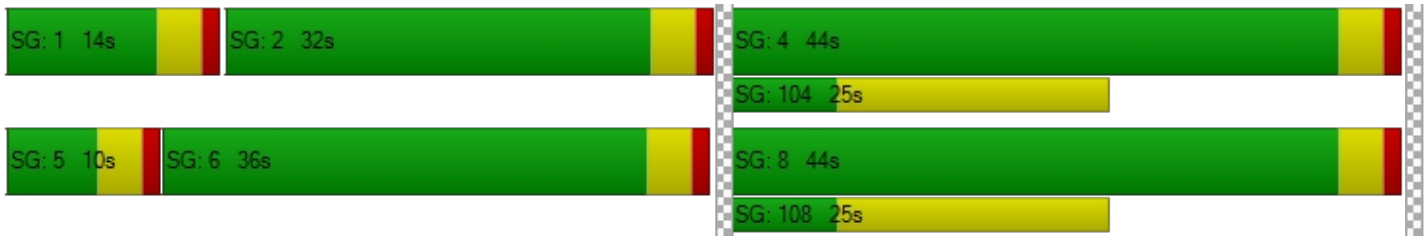
d_M, Delay for Movement [s/veh]	1004.29	40.57	40.57	37.08	47.00	47.00	52.13	4.28	4.20	49.49	4.04	4.04
Movement LOS	F	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	788.61			46.71			5.10			5.38		
Approach LOS	F			D			A			A		
d_I, Intersection Delay [s/veh]	143.00											
Intersection LOS	F											
Intersection V/C	0.449											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.67	34.67
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	3.048	2.585
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	889	889	622	711
d_b, Bicycle Delay [s]	13.89	13.89	21.36	18.69
l_b,int, Bicycle LOS Score for Intersection	2.142	1.782	2.173	2.233
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Navajo Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	20.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.444

Intersection Setup

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	162	96	83	23	122	11	13	400	127	153	491	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	162	96	83	23	122	11	13	400	127	153	491	15
Peak Hour Factor	0.8760	0.8760	0.8760	0.8760	0.8760	0.8760	0.8760	0.8760	0.8760	0.8760	0.8760	0.8760
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]	46	27	24	7	35	3	4	114	36	44	140	4
Total Analysis Volume [veh/h]	185	110	95	26	139	13	15	457	145	175	561	17
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	44	0	0	44	0	10	10	0	36	36	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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]	90	90	90	90	90	90	90	90	90	90	90	90
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]	12	12	12	12	12	12	2	54	54	11	64	64
g / C, Green / Cycle	0.14	0.14	0.14	0.14	0.14	0.14	0.02	0.60	0.60	0.13	0.71	0.71
(v / s)_i Volume / Saturation Flow Rate	0.11	0.06	0.05	0.02	0.04	0.04	0.01	0.17	0.16	0.10	0.16	0.16
s, saturation flow rate [veh/h]	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	214	246	246	186	246	246	38	1088	1088	213	1274	1274
d1, Uniform Delay [s]	37.65	35.69	35.47	34.07	35.04	35.02	43.44	8.52	8.40	38.38	4.58	4.57
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	9.96	1.23	1.03	0.34	0.71	0.70	6.70	0.66	0.60	7.59	0.42	0.41
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	0.86	0.44	0.39	0.14	0.31	0.31	0.40	0.29	0.27	0.82	0.23	0.23
d, Delay for Lane Group [s/veh]	47.61	36.92	36.49	34.41	35.75	35.72	50.14	9.19	9.00	45.97	5.00	4.98
Lane Group LOS	D	D	D	C	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.48	2.23	1.99	0.51	1.54	1.52	0.40	2.84	2.60	4.15	1.67	1.65
50th-Percentile Queue Length [ft/ln]	111.89	55.77	49.77	12.79	38.52	38.12	9.92	71.03	64.96	103.86	41.77	41.28
95th-Percentile Queue Length [veh/ln]	7.95	4.02	3.58	0.92	2.77	2.74	0.71	5.11	4.68	7.48	3.01	2.97
95th-Percentile Queue Length [ft/ln]	198.63	100.38	89.59	23.02	69.34	68.61	17.85	127.86	116.93	186.95	75.19	74.31

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	47.61	36.91	36.49	34.41	35.74	35.72	50.14	9.13	9.00	45.97	4.99	4.98
Movement LOS	D	D	D	C	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	41.88			35.54			10.09			14.51		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	20.55											
Intersection LOS	C											
Intersection V/C	0.444											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.831	2.596
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	889	889	133	711
d_b, Bicycle Delay [s]	13.90	13.90	39.21	18.70
l_b,int, Bicycle LOS Score for Intersection	1.881	1.706	2.069	2.181
Bicycle LOS	A	A	B	B

Sequence

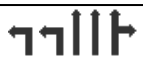
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: Apple Valley Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	30.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.826

Intersection Setup

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	402	149	67	96	213	292	171	1287	656	58	1124	77
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	402	149	67	96	213	292	171	1287	656	58	1124	77
Peak Hour Factor	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660
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]	104	39	17	25	55	76	44	333	170	15	291	20
Total Analysis Volume [veh/h]	416	154	69	99	220	302	177	1332	679	60	1164	80
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]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	21	39	0	15	33	0	11	36	0	10	35	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	0	0	24	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	R	L	C	R	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
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	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]	15	27	27	7	19	19	7	45	45	5	43	43
g / C, Green / Cycle	0.15	0.27	0.27	0.07	0.19	0.19	0.07	0.45	0.45	0.05	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.13	0.06	0.06	0.06	0.06	0.17	0.06	0.25	0.38	0.02	0.23	0.23
s, saturation flow rate [veh/h]	3200	1800	1800	1700	3600	1800	3200	5400	1800	3200	3600	1800
c, Capacity [veh/h]	484	489	489	126	700	350	227	2402	801	159	1526	763
d1, Uniform Delay [s]	41.47	28.40	28.22	45.60	34.60	39.04	45.76	20.49	24.78	46.08	21.57	21.67
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.12	0.11	0.50	0.50	0.11	0.50	0.50
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]	4.60	0.25	0.22	10.39	0.25	6.86	5.79	0.93	10.83	1.47	1.38	2.84
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	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	0.86	0.24	0.22	0.79	0.31	0.86	0.78	0.55	0.85	0.38	0.54	0.55
d, Delay for Lane Group [s/veh]	46.07	28.65	28.44	55.99	34.86	45.90	51.55	21.42	35.61	47.54	22.95	24.51
Lane Group LOS	D	C	C	E	C	D	D	C	D	D	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.26	2.20	1.99	2.77	2.31	7.75	2.33	7.58	16.05	0.75	7.30	7.76
50th-Percentile Queue Length [ft/ln]	131.59	55.11	49.71	69.17	57.78	193.74	58.32	189.57	401.35	18.81	182.55	194.08
95th-Percentile Queue Length [veh/ln]	9.03	3.97	3.58	4.98	4.16	12.31	4.20	12.10	22.63	1.35	11.73	12.33
95th-Percentile Queue Length [ft/ln]	225.66	99.20	89.48	124.51	104.01	307.87	104.98	302.47	565.63	33.85	293.35	308.31

Movement, Approach, & Intersection Results

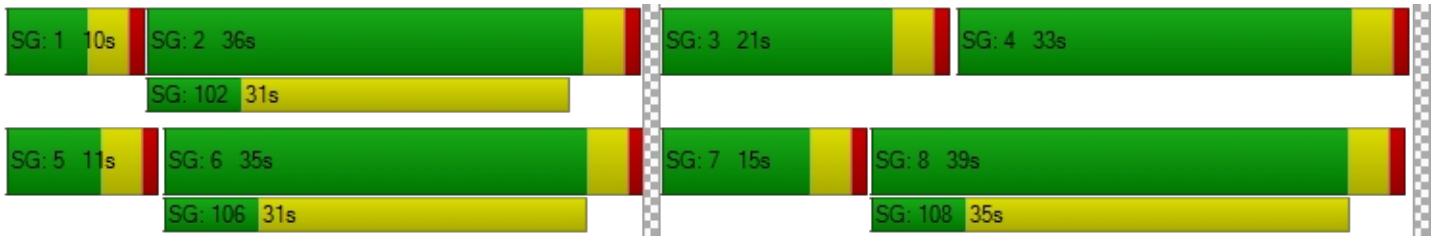
d_M, Delay for Movement [s/veh]	46.07	28.60	28.44	55.99	34.86	45.90	51.55	21.42	35.61	47.54	23.40	24.51
Movement LOS	D	C	C	E	C	D	D	C	D	D	C	C
d_A, Approach Delay [s/veh]	39.96			43.59			28.26			24.58		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	30.83											
Intersection LOS	C											
Intersection V/C	0.826											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	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]	39.64	39.64	0.00	39.64
l_p,int, Pedestrian LOS Score for Intersection	2.717	2.625	0.000	3.072
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	580	640	620
d_b, Bicycle Delay [s]	21.16	25.24	23.15	23.84
l_b,int, Bicycle LOS Score for Intersection	2.087	2.072	2.763	2.277
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Kasota Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	17.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.637

Intersection Setup

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	86	53	65	103	113	114	80	1296	65	61	1108	48
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	86	53	65	103	113	114	80	1296	65	61	1108	48
Peak Hour Factor	0.9820	0.9820	0.9820	0.9820	0.9820	0.9820	0.9820	0.9820	0.9820	0.9820	0.9820	0.9820
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]	22	13	17	26	29	29	20	330	17	16	282	12
Total Analysis Volume [veh/h]	88	54	66	105	115	116	81	1320	66	62	1128	49
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	5	6	0	5	6	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	42	0	0	42	0	12	39	0	9	36	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	14	14	14	14	6	60	60	4	59	59
g / C, Green / Cycle	0.16	0.16	0.16	0.16	0.06	0.66	0.66	0.05	0.65	0.65
(v / s)_i Volume / Saturation Flow Rate	0.05	0.07	0.06	0.13	0.05	0.39	0.38	0.04	0.33	0.32
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	105	280	212	280	106	1194	1194	82	1168	1168
d1, Uniform Delay [s]	33.88	34.42	34.24	36.86	41.60	8.34	8.27	42.37	8.27	8.21
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	16.15	1.04	1.80	6.10	10.92	2.09	2.03	13.35	1.57	1.53
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	0.84	0.43	0.50	0.83	0.77	0.58	0.58	0.76	0.51	0.50
d, Delay for Lane Group [s/veh]	50.03	35.46	36.04	42.96	52.52	10.43	10.31	55.71	9.84	9.74
Lane Group LOS	D	D	D	D	D	B	B	E	A	A
Critical Lane Group	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.16	2.43	2.15	5.31	2.07	6.96	6.81	1.65	5.68	5.57
50th-Percentile Queue Length [ft/ln]	54.07	60.69	53.70	132.78	51.81	173.93	170.29	41.28	142.11	139.19
95th-Percentile Queue Length [veh/ln]	3.89	4.37	3.87	9.09	3.73	11.28	11.09	2.97	9.59	9.44
95th-Percentile Queue Length [ft/ln]	97.32	109.23	96.67	227.27	93.26	282.07	277.29	74.30	239.87	235.93

Movement, Approach, & Intersection Results

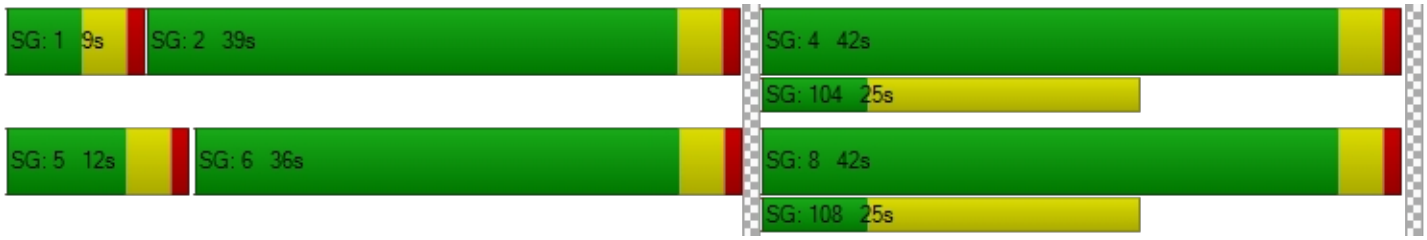
d_M, Delay for Movement [s/veh]	50.03	35.46	35.46	36.04	42.96	42.96	52.52	10.37	10.31	55.71	9.79	9.74
Movement LOS	D	D	D	D	D	D	D	B	B	E	A	A
d_A, Approach Delay [s/veh]	41.63			40.80			12.70			12.09		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	17.22											
Intersection LOS	B											
Intersection V/C	0.637											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.70	34.70
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.970	2.981
Crosswalk LOS	F	F	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	844	844	777	711
d_b, Bicycle Delay [s]	15.04	15.04	16.83	18.71
l_b,int, Bicycle LOS Score for Intersection	1.903	2.114	2.770	2.582
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Corwin Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	13.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.586

Intersection Setup

Name	Corwin Road		US Highway 18		US Highway 18	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	1	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Corwin Road		US Highway 18		US Highway 18	
Base Volume Input [veh/h]	41	225	260	1190	973	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	41	225	260	1190	973	15
Peak Hour Factor	0.9640	0.9640	0.9640	0.9640	0.9640	0.9640
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	58	67	309	252	4
Total Analysis Volume [veh/h]	43	233	270	1234	1009	16
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Protected	Permissive	Permissive	Permissive
Signal Group	7	0	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	6	0	6	6	6	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	12	0	49	78	29	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	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
Detector Length [ft]	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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	C
C, Cycle Length [s]	90	90	90	90	90	90
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]	8	8	17	74	54	54
g / C, Green / Cycle	0.09	0.09	0.18	0.83	0.60	0.60
(v / s)_i Volume / Saturation Flow Rate	0.03	0.06	0.16	0.34	0.28	0.28
s, saturation flow rate [veh/h]	1700	3600	1700	3600	1800	1800
c, Capacity [veh/h]	147	311	312	2969	1074	1074
d1, Uniform Delay [s]	38.55	40.18	35.68	2.10	10.24	10.24
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.09	3.61	7.15	0.43	1.52	1.52
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	0.29	0.75	0.87	0.42	0.48	0.48
d, Delay for Lane Group [s/veh]	39.64	43.78	42.83	2.54	11.76	11.76
Lane Group LOS	D	D	D	A	B	B
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.93	2.64	6.25	1.58	5.60	5.60
50th-Percentile Queue Length [ft/ln]	23.14	66.09	156.22	39.41	140.08	140.08
95th-Percentile Queue Length [veh/ln]	1.67	4.76	10.35	2.84	9.49	9.49
95th-Percentile Queue Length [ft/ln]	41.65	118.96	258.70	70.94	237.13	237.13

Movement, Approach, & Intersection Results

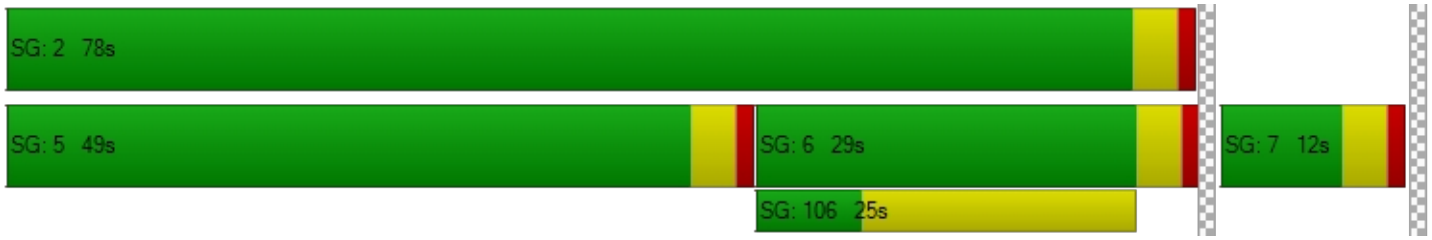
d_M, Delay for Movement [s/veh]	39.64	43.78	42.83	2.54	11.76	11.76
Movement LOS	D	D	D	A	B	B
d_A, Approach Delay [s/veh]	43.14		9.77		11.76	
Approach LOS	D		A		B	
d_I, Intersection Delay [s/veh]	13.78					
Intersection LOS	B					
Intersection V/C	0.586					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.268	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	178	1644	555
d_b, Bicycle Delay [s]	37.37	1.43	23.48
l_b,int, Bicycle LOS Score for Intersection	1.560	2.800	2.405
Bicycle LOS	A	C	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Tao Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	14.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.518

Intersection Setup

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	54	48	27	117	41	94	112	1186	36	25	949	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	54	48	27	117	41	94	112	1186	36	25	949	80
Peak Hour Factor	0.9610	0.9610	0.9610	0.9610	0.9610	0.9610	0.9610	0.9610	0.9610	0.9610	0.9610	0.9610
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	12	7	30	11	24	29	309	9	7	247	21
Total Analysis Volume [veh/h]	56	50	28	122	43	98	117	1234	37	26	988	83
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	33	0	0	33	0	47	12	0	45	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	9	9	9	9	8	66	66	3	61	61
g / C, Green / Cycle	0.10	0.10	0.10	0.10	0.09	0.73	0.73	0.03	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.03	0.04	0.07	0.08	0.07	0.35	0.35	0.02	0.30	0.29
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	96	188	156	188	150	1313	1313	56	1213	1213
d1, Uniform Delay [s]	37.34	37.75	38.90	39.18	40.20	5.12	5.09	42.75	6.85	6.77
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	5.46	1.46	8.16	5.90	8.48	1.29	1.27	5.79	1.19	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	0.58	0.41	0.78	0.75	0.78	0.49	0.48	0.46	0.45	0.44
d, Delay for Lane Group [s/veh]	42.80	39.21	47.06	45.08	48.68	6.41	6.36	48.54	8.04	7.91
Lane Group LOS	D	D	D	D	D	A	A	D	A	A
Critical Lane Group	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.28	1.67	2.92	3.29	2.86	4.29	4.24	0.65	4.48	4.31
50th-Percentile Queue Length [ft/ln]	31.91	41.69	72.99	82.35	71.42	107.30	105.88	16.33	112.03	107.73
95th-Percentile Queue Length [veh/ln]	2.30	3.00	5.26	5.93	5.14	7.69	7.61	1.18	7.95	7.71
95th-Percentile Queue Length [ft/ln]	57.43	75.04	131.39	148.23	128.56	192.24	190.25	29.40	198.82	192.83

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	42.80	39.21	39.21	47.06	45.08	45.08	48.68	6.38	6.36	48.54	7.98	7.91
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	40.71			46.00			9.95			8.94		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	14.28											
Intersection LOS	B											
Intersection V/C	0.518											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.872	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	644	644	178	133
d_b, Bicycle Delay [s]	20.68	20.68	37.37	39.21
l_b,int, Bicycle LOS Score for Intersection	1.781	1.994	2.705	2.465
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Rimrock Road/Piute Road at US Highway 18

Control Type:	Two-way stop	Delay (sec / veh):	14.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.157

Intersection Setup

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			60.00			60.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	0	0	67	0	0	46	85	1209	7	42	982	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	0	0	67	0	0	46	85	1209	7	42	982	41
Peak Hour Factor	0.9500	0.9500	0.9830	0.9500	0.9500	0.9830	0.9830	0.9830	0.9830	0.9830	0.9830	0.9830
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]	0	0	17	0	0	12	22	307	2	11	250	10
Total Analysis Volume [veh/h]	0	0	68	0	0	47	86	1230	7	43	999	42
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.16	0.00	0.00	0.09	0.13	0.01	0.00	0.08	0.01	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	14.89	0.00	0.00	12.94	11.23	0.00	0.00	11.98	0.00	0.00
Movement LOS			B			B	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.55	0.00	0.00	0.31	0.44	0.00	0.00	0.25	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	13.85	0.00	0.00	7.73	11.10	0.00	0.00	6.23	0.00	0.00
d_A, Approach Delay [s/veh]	14.89			12.94			0.73			0.48		
Approach LOS	B			B			A			A		
d_I, Intersection Delay [s/veh]	1.23											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 6: Rancherias Road at Thunderbird Road

Control Type:	All-way stop	Delay (sec / veh):	11.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.426

Intersection Setup

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Base Volume Input [veh/h]	228	166	57	174	223	54
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	228	166	57	174	223	54
Peak Hour Factor	0.9640	0.9640	0.9640	0.9640	0.9640	0.9640
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	59	43	15	45	58	14
Total Analysis Volume [veh/h]	237	172	59	180	231	56
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	619	705	554	600	543	662
Degree of Utilization, x	0.38	0.24	0.11	0.30	0.43	0.08

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.80	0.96	0.36	1.26	2.11	0.28
95th-Percentile Queue Length [ft]	44.89	23.89	8.90	31.39	52.78	6.91
Approach Delay [s/veh]	10.98		10.94		13.09	
Approach LOS	B		B		B	
Intersection Delay [s/veh]	11.62					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 7: Rancherias Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	24.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.647

Intersection Setup

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	26	140	127	98	118	206	201	1013	45	121	820	117
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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	140	127	98	118	206	201	1013	45	121	820	117
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]	7	37	33	26	31	54	53	267	12	32	216	31
Total Analysis Volume [veh/h]	27	147	134	103	124	217	212	1066	47	127	863	123
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	45	0	0	45	0	16	32	0	13	29	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	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	21	0	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
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
l1_p, Permitted Start-Up Lost Time [s]	2.00	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
g_i, Effective Green Time [s]	16	16	16	16	16	12	53	53	8	50	50
g / C, Green / Cycle	0.18	0.18	0.18	0.18	0.18	0.13	0.59	0.59	0.09	0.55	0.55
(v / s)_i Volume / Saturation Flow Rate	0.02	0.16	0.06	0.07	0.12	0.12	0.31	0.31	0.07	0.28	0.27
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	256	328	104	328	328	229	1064	1064	158	990	990
d1, Uniform Delay [s]	30.60	35.69	32.06	32.35	34.25	38.53	10.92	10.86	40.03	12.68	12.48
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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
d2, Incremental Delay [s]	0.18	6.42	39.59	0.72	2.28	14.66	1.86	1.81	9.01	1.87	1.72
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
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
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

Lane Group Results

X, volume / capacity	0.11	0.86	0.99	0.38	0.66	0.93	0.53	0.52	0.80	0.51	0.49
d, Delay for Lane Group [s/veh]	30.78	42.11	71.65	33.06	36.53	53.19	12.79	12.67	49.04	14.55	14.19
Lane Group LOS	C	D	E	C	D	D	B	B	D	B	B
Critical Lane Group	No	Yes	No	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.50	6.44	3.07	2.41	4.55	5.48	6.50	6.37	3.12	6.35	5.98
50th-Percentile Queue Length [ft/ln]	12.38	160.97	76.68	60.16	113.63	137.01	162.39	159.27	77.91	158.87	149.40
95th-Percentile Queue Length [veh/ln]	0.89	10.60	5.52	4.33	8.04	9.32	10.68	10.51	5.61	10.49	9.99
95th-Percentile Queue Length [ft/ln]	22.28	265.00	138.02	108.29	201.04	233.00	266.89	262.75	140.24	262.23	249.63

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	30.78	42.11	42.11	71.65	33.06	36.53	53.19	12.73	12.67	49.04	14.40	14.19
Movement LOS	C	D	D	E	C	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	41.12			43.71			19.20			18.33		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	24.43											
Intersection LOS	C											
Intersection V/C	0.647											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	34.70	34.70	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.356	2.812	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	911	911	622	555
d_b, Bicycle Delay [s]	13.36	13.36	21.38	23.49
l_b,int, Bicycle LOS Score for Intersection	2.068	2.292	2.653	2.478
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Rancherias Road at Tomahawk Road

Control Type:	Two-way stop	Delay (sec / veh):	15.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.367

Intersection Setup

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
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 Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
Base Volume Input [veh/h]	19	152	155	147	182	20
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	19	152	155	147	182	20
Peak Hour Factor	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	42	43	41	50	6
Total Analysis Volume [veh/h]	21	168	171	162	201	22
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.37	0.03
d_M, Delay for Movement [s/veh]	7.99	0.00	0.00	0.00	15.68	13.68
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.05	0.05	0.00	0.00	1.88	1.88
95th-Percentile Queue Length [ft/ln]	1.31	1.31	0.00	0.00	46.94	46.94
d_A, Approach Delay [s/veh]	0.89		0.00		15.49	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	4.86					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 9: Bass Hill Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	26.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.578

Intersection Setup

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	193	127	181	64	60	133	273	795	90	184	756	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	193	127	181	64	60	133	273	795	90	184	756	52
Peak Hour Factor	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760
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]	49	33	46	16	15	34	70	204	23	47	194	13
Total Analysis Volume [veh/h]	198	130	185	66	61	136	280	815	92	189	775	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]	105
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Overlap	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	8	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups			1,8			4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	6	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	30	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	10	0	35	35	28	32	0	28	32	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	24	0	21	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No	No		No	No	No	No		No	No	
Maximum Recall		No	No		No	No	No	No		No	No	
Pedestrian Recall		No	No		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	R	L	C	R	L	C	R
C, Cycle Length [s]	105	105	105	105	105	105	105	105	105	105	105	105
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	0.00	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	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]	10	10	28	8	8	38	12	57	57	14	59	59
g / C, Green / Cycle	0.10	0.10	0.27	0.08	0.08	0.37	0.11	0.54	0.54	0.13	0.56	0.56
(v / s)_i Volume / Saturation Flow Rate	0.06	0.07	0.10	0.02	0.03	0.08	0.09	0.23	0.05	0.11	0.22	0.03
s, saturation flow rate [veh/h]	3200	1800	1800	3200	1800	1800	3200	3600	1800	1700	3600	1800
c, Capacity [veh/h]	334	178	490	248	140	661	368	1930	965	230	2003	1002
d1, Uniform Delay [s]	45.54	46.05	31.06	45.72	46.35	22.77	45.17	14.63	11.93	44.27	13.19	10.66
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	1.68	5.63	0.48	0.57	2.14	0.15	3.27	0.68	0.20	7.16	0.57	0.10
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	0.59	0.73	0.38	0.27	0.44	0.21	0.76	0.42	0.10	0.82	0.39	0.05
d, Delay for Lane Group [s/veh]	47.22	51.68	31.54	46.29	48.49	22.93	48.44	15.31	12.13	51.43	13.75	10.76
Lane Group LOS	D	D	C	D	D	C	D	B	B	D	B	B
Critical Lane Group	No	No	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.55	3.56	3.86	0.83	1.60	2.33	3.69	5.77	1.08	5.22	5.11	0.58
50th-Percentile Queue Length [ft/ln]	63.80	89.10	96.51	20.76	40.06	58.19	92.32	144.36	27.05	130.45	127.66	14.38
95th-Percentile Queue Length [veh/ln]	4.59	6.42	6.95	1.49	2.88	4.19	6.65	9.72	1.95	8.96	8.81	1.04
95th-Percentile Queue Length [ft/ln]	114.85	160.38	173.71	37.36	72.10	104.74	166.18	242.88	48.69	224.10	220.31	25.89

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	47.22	51.68	31.54	46.29	48.49	22.93	48.44	15.31	12.13	51.43	13.75	10.76
Movement LOS	D	D	C	D	D	C	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	42.70			34.72			22.88			20.60		
Approach LOS	D			C			C			C		
d_I, Intersection Delay [s/veh]	26.56											
Intersection LOS	C											
Intersection V/C	0.578											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
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]	42.14	42.14	42.14	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.599	2.578	3.203	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	114	590	533	533
d_b, Bicycle Delay [s]	46.73	26.13	28.29	28.29
l_b,int, Bicycle LOS Score for Intersection	2.406	1.994	2.539	2.399
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: Dale Evans Parkway at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	20.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.559

Intersection Setup

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	12	12	7	298	13	175	176	854	32	1	776	179
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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	12	7	298	13	175	176	854	32	1	776	179
Peak Hour Factor	0.9570	0.9570	0.9570	0.9570	0.9570	0.9570	0.9570	0.9570	0.9570	0.9570	0.9570	0.9570
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	3	2	78	3	46	46	223	8	0	203	47
Total Analysis Volume [veh/h]	13	13	7	311	14	183	184	892	33	1	811	187
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 Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	10	0	0	35	0	12	36	0	14	38	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	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	0	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	95	95	95	95	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	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	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
g_i, Effective Green Time [s]	4	13	13	13	7	63	63	0	55	55
g / C, Green / Cycle	0.04	0.13	0.13	0.13	0.08	0.66	0.66	0.00	0.58	0.58
(v / s)_i Volume / Saturation Flow Rate	0.02	0.10	0.01	0.10	0.06	0.26	0.26	0.00	0.29	0.27
s, saturation flow rate [veh/h]	1700	3200	1800	1800	3200	1800	1800	1700	1800	1800
c, Capacity [veh/h]	65	431	242	242	250	1181	1181	5	1046	1046
d1, Uniform Delay [s]	44.90	39.47	35.91	39.67	42.90	7.58	7.54	47.33	11.70	11.41
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	6.11	2.30	0.10	4.75	4.18	0.99	0.97	19.25	1.66	1.46
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
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	0.51	0.72	0.06	0.76	0.74	0.39	0.39	0.20	0.49	0.46
d, Delay for Lane Group [s/veh]	51.02	41.77	36.01	44.42	47.08	8.56	8.51	66.59	13.36	12.87
Lane Group LOS	D	D	D	D	D	A	A	E	B	B
Critical Lane Group	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.87	3.58	0.29	4.39	2.24	4.18	4.11	0.05	6.36	5.79
50th-Percentile Queue Length [ft/ln]	21.71	89.50	7.22	109.77	56.04	104.59	102.83	1.24	159.07	144.80
95th-Percentile Queue Length [veh/ln]	1.56	6.44	0.52	7.83	4.03	7.53	7.40	0.09	10.50	9.74
95th-Percentile Queue Length [ft/ln]	39.07	161.10	12.99	195.68	100.87	188.25	185.10	2.24	262.49	243.48

Movement, Approach, & Intersection Results

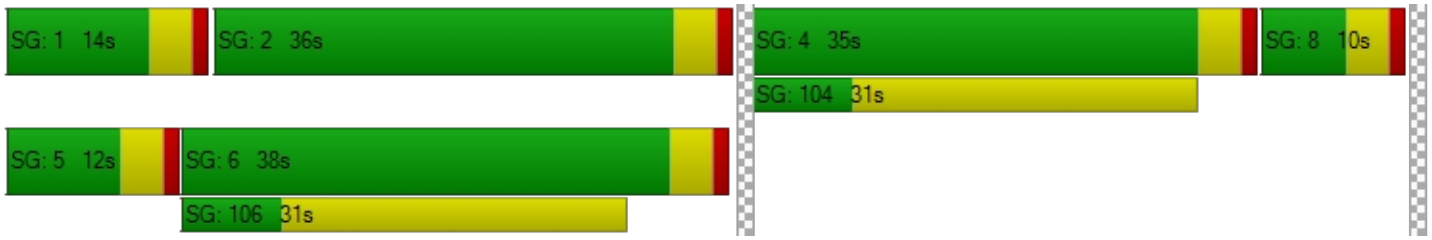
d_M, Delay for Movement [s/veh]	51.02	51.02	51.02	41.77	36.01	44.42	47.08	8.54	8.51	66.59	13.18	12.87
Movement LOS	D	D	D	D	D	D	D	A	A	E	B	B
d_A, Approach Delay [s/veh]	51.02			42.57			14.93			13.18		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	20.02											
Intersection LOS	C											
Intersection V/C	0.559											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	37.18	37.18	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.600	2.891	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	126	652	673	715
d_b, Bicycle Delay [s]	41.73	21.59	20.92	19.62
l_b,int, Bicycle LOS Score for Intersection	1.614	2.398	2.475	2.384
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: Flathead Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	12.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.508

Intersection Setup

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	83	66	27	19	42	51	51	969	125	26	823	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	83	66	27	19	42	51	51	969	125	26	823	24
Peak Hour Factor	0.9740	0.9740	0.9740	0.9740	0.9740	0.9740	0.9740	0.9740	0.9740	0.9740	0.9740	0.9740
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]	21	17	7	5	11	13	13	249	32	7	211	6
Total Analysis Volume [veh/h]	85	68	28	20	43	52	52	995	128	27	845	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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	70	0	0	70	0	10	10	0	10	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	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	2.00	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
g_i, Effective Green Time [s]	12	12	4	63	63	3	62	62
g / C, Green / Cycle	0.13	0.13	0.05	0.70	0.70	0.03	0.69	0.69
(v / s)_i Volume / Saturation Flow Rate	0.11	0.07	0.03	0.32	0.31	0.02	0.24	0.24
s, saturation flow rate [veh/h]	1700	1700	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	278	266	84	1267	1267	58	1238	1238
d1, Uniform Delay [s]	38.22	36.63	41.94	5.80	5.70	42.70	5.79	5.77
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.56	1.10	7.09	1.17	1.09	5.78	0.79	0.78
d3, Initial Queue Delay [s]	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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.65	0.43	0.62	0.45	0.43	0.47	0.35	0.35
d, Delay for Lane Group [s/veh]	40.78	37.73	49.04	6.96	6.78	48.47	6.58	6.55
Lane Group LOS	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.03	2.41	1.29	4.19	3.96	0.68	3.10	3.06
50th-Percentile Queue Length [ft/ln]	100.66	60.32	32.18	104.76	98.93	16.92	77.52	76.48
95th-Percentile Queue Length [veh/ln]	7.25	4.34	2.32	7.54	7.12	1.22	5.58	5.51
95th-Percentile Queue Length [ft/ln]	181.20	108.58	57.92	188.56	178.08	30.45	139.53	137.67

Movement, Approach, & Intersection Results

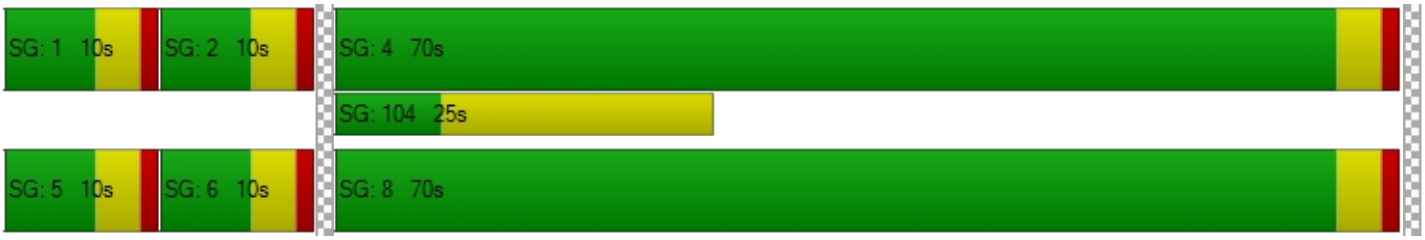
d_M, Delay for Movement [s/veh]	40.78	40.78	40.78	37.73	37.73	37.73	49.04	6.89	6.78	48.47	6.57	6.55
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	40.78			37.73			8.74			7.83		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	12.25											
Intersection LOS	B											
Intersection V/C	0.508											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.841	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1466	1466	133	133
d_b, Bicycle Delay [s]	3.21	3.21	39.21	39.21
l_b,int, Bicycle LOS Score for Intersection	1.858	1.749	2.529	2.300
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: Kiowa Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	43.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.532

Intersection Setup

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	216	110	45	1	75	43	49	713	265	37	620	10
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	216	110	45	1	75	43	49	713	265	37	620	10
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
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]	57	29	12	0	20	11	13	190	70	10	165	3
Total Analysis Volume [veh/h]	230	117	48	1	80	46	52	759	282	39	660	11
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	46	0	0	46	0	10	34	0	10	34	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	11	11	11	11	4	63	63	4	63	63
g / C, Green / Cycle	0.12	0.12	0.12	0.12	0.05	0.71	0.71	0.04	0.70	0.70
(v / s)_i Volume / Saturation Flow Rate	0.14	0.09	0.00	0.07	0.03	0.30	0.28	0.02	0.19	0.19
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	142	218	104	218	82	1267	1267	71	1255	1255
d1, Uniform Delay [s]	37.93	38.27	34.79	37.38	42.03	5.65	5.44	42.31	5.08	5.07
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	286.72	5.31	0.04	2.42	7.70	1.07	0.91	6.59	0.52	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
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	1.62	0.76	0.01	0.58	0.63	0.43	0.39	0.55	0.27	0.27
d, Delay for Lane Group [s/veh]	324.65	43.58	34.82	39.80	49.72	6.72	6.35	48.90	5.60	5.59
Lane Group LOS	F	D	C	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	14.25	3.79	0.02	2.74	1.30	3.89	3.40	0.97	2.11	2.10
50th-Percentile Queue Length [ft/ln]	356.34	94.83	0.50	68.39	32.44	97.15	84.88	24.26	52.82	52.47
95th-Percentile Queue Length [veh/ln]	23.85	6.83	0.04	4.92	2.34	6.99	6.11	1.75	3.80	3.78
95th-Percentile Queue Length [ft/ln]	596.26	170.69	0.91	123.11	58.39	174.87	152.78	43.67	95.08	94.45

Movement, Approach, & Intersection Results

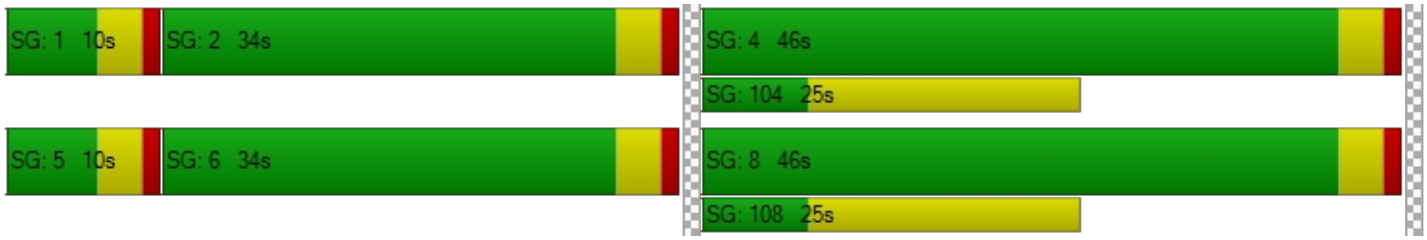
d_M, Delay for Movement [s/veh]	324.65	43.58	43.58	34.82	39.80	39.80	49.72	6.61	6.35	48.90	5.60	5.59
Movement LOS	F	D	D	C	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	207.24			39.76			8.60			7.98		
Approach LOS	F			D			A			A		
d_I, Intersection Delay [s/veh]	43.86											
Intersection LOS	D											
Intersection V/C	0.532											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.67	34.67
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	3.022	2.597
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	933	933	667	667
d_b, Bicycle Delay [s]	12.80	12.80	20.00	20.00
l_b,int, Bicycle LOS Score for Intersection	2.211	1.769	2.461	2.145
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Navajo Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	24.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.542

Intersection Setup

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	187	189	138	28	181	23	40	504	237	197	461	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	187	189	138	28	181	23	40	504	237	197	461	40
Peak Hour Factor	0.9430	0.9430	0.9430	0.9430	0.9430	0.9430	0.9430	0.9430	0.9430	0.9430	0.9430	0.9430
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]	50	50	37	7	48	6	11	134	63	52	122	11
Total Analysis Volume [veh/h]	198	200	146	30	192	24	42	534	251	209	489	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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	44	0	0	44	0	10	10	0	36	36	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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]	90	90	90	90	90	90	90	90	90	90	90	90
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]	13	13	13	13	13	13	4	52	52	13	61	61
g / C, Green / Cycle	0.15	0.15	0.15	0.15	0.15	0.15	0.04	0.57	0.57	0.15	0.68	0.68
(v / s)_i Volume / Saturation Flow Rate	0.12	0.10	0.09	0.02	0.06	0.06	0.02	0.23	0.21	0.12	0.15	0.15
s, saturation flow rate [veh/h]	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	204	266	266	134	266	266	76	1031	1031	249	1214	1214
d1, Uniform Delay [s]	37.01	36.41	35.95	33.29	34.81	34.77	42.14	10.68	10.36	37.40	5.61	5.59
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	22.53	3.17	2.27	0.83	1.01	0.98	6.21	1.17	0.98	7.42	0.42	0.41
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	0.97	0.69	0.61	0.22	0.41	0.40	0.55	0.40	0.36	0.84	0.22	0.22
d, Delay for Lane Group [s/veh]	59.54	39.58	38.22	34.12	35.82	35.75	48.35	11.85	11.34	44.83	6.03	5.99
Lane Group LOS	E	D	D	C	D	D	D	B	B	D	A	A
Critical Lane Group	Yes	No	No	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.41	4.00	3.46	0.59	2.21	2.17	1.04	4.53	3.92	4.91	1.80	1.74
50th-Percentile Queue Length [ft/ln]	135.26	99.95	86.58	14.85	55.30	54.27	25.90	113.17	98.01	122.85	44.96	43.59
95th-Percentile Queue Length [veh/ln]	9.22	7.20	6.23	1.07	3.98	3.91	1.86	8.02	7.06	8.55	3.24	3.14
95th-Percentile Queue Length [ft/ln]	230.62	179.91	155.84	26.73	99.54	97.69	46.62	200.40	176.42	213.73	80.93	78.46

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.54	39.47	38.22	34.12	35.79	35.75	48.35	11.74	11.34	44.83	6.01	5.99
Movement LOS	E	D	D	C	D	D	D	B	B	D	A	A
d_A, Approach Delay [s/veh]	46.44			35.58			13.48			16.97		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	24.49											
Intersection LOS	C											
Intersection V/C	0.542											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.881	2.625
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	889	889	133	711
d_b, Bicycle Delay [s]	13.90	13.90	39.21	18.70
l_b,int, Bicycle LOS Score for Intersection	2.008	1.763	2.242	2.170
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



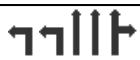
APPENDIX C-II

EXISTING WITH PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 1: Apple Valley Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	32.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.783

Intersection Setup

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	569	192	49	51	139	193	308	984	452	56	1085	62
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	569	192	49	51	139	193	308	984	452	56	1085	62
Peak Hour Factor	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070
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]	157	53	14	14	38	53	85	271	125	15	299	17
Total Analysis Volume [veh/h]	627	212	54	56	153	213	340	1085	498	62	1196	68
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]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	38	39	0	9	10	0	17	41	0	11	35	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	0	0	24	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	R	L	C	R	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
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	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	32	32	4	14	14	13	43	43	5	35	35
g / C, Green / Cycle	0.23	0.32	0.32	0.04	0.14	0.14	0.13	0.42	0.42	0.05	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.20	0.08	0.07	0.03	0.04	0.12	0.11	0.20	0.28	0.02	0.23	0.24
s, saturation flow rate [veh/h]	3200	1800	1800	1700	3600	1800	3200	5400	1800	3200	3600	1800
c, Capacity [veh/h]	724	582	582	73	503	251	402	2289	763	161	1255	627
d1, Uniform Delay [s]	37.27	24.82	24.68	47.45	38.70	42.03	42.83	20.80	22.98	46.05	27.68	27.87
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	3.28	0.21	0.19	15.68	0.34	7.70	4.95	0.71	4.32	1.50	2.82	5.89
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	0.87	0.24	0.22	0.77	0.30	0.85	0.85	0.47	0.65	0.38	0.67	0.68
d, Delay for Lane Group [s/veh]	40.55	25.03	24.87	63.13	39.04	49.74	47.78	21.51	27.30	47.55	30.50	33.76
Lane Group LOS	D	C	C	E	D	D	D	C	C	D	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	7.59	2.41	2.23	1.69	1.70	5.62	4.35	6.08	9.94	0.78	8.77	9.55
50th-Percentile Queue Length [ft/ln]	189.87	60.22	55.76	42.28	42.61	140.51	108.82	152.00	248.39	19.43	219.30	238.67
95th-Percentile Queue Length [veh/ln]	12.11	4.34	4.01	3.04	3.07	9.51	7.77	10.12	15.10	1.40	13.63	14.61
95th-Percentile Queue Length [ft/ln]	302.86	108.40	100.36	76.10	76.69	237.71	194.36	253.10	377.62	34.98	340.73	365.35

Movement, Approach, & Intersection Results

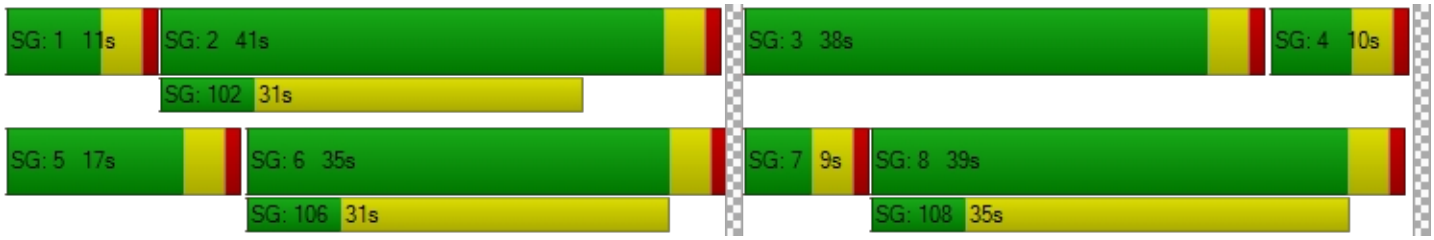
d_M, Delay for Movement [s/veh]	40.55	24.98	24.87	63.13	39.04	49.74	47.78	21.51	27.30	47.55	31.48	33.76
Movement LOS	D	C	C	E	D	D	D	C	C	D	C	C
d_A, Approach Delay [s/veh]	35.91			47.64			27.65			32.35		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	32.48											
Intersection LOS	C											
Intersection V/C	0.783											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	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]	39.64	39.64	0.00	39.64
l_p,int, Pedestrian LOS Score for Intersection	2.719	2.627	0.000	3.038
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	120	739	620
d_b, Bicycle Delay [s]	21.16	44.22	19.88	23.84
l_b,int, Bicycle LOS Score for Intersection	2.296	1.908	2.617	2.289
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Kasota Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	20.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.673

Intersection Setup

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	94	142	105	31	73	63	117	835	83	94	1084	85
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	94	142	105	31	73	63	117	835	83	94	1084	85
Peak Hour Factor	0.9090	0.9090	0.9090	0.9090	0.9090	0.9090	0.9090	0.9090	0.9090	0.9090	0.9090	0.9090
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]	26	39	29	9	20	17	32	230	23	26	298	23
Total Analysis Volume [veh/h]	103	156	116	34	80	69	129	919	91	103	1193	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]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	5	6	0	5	6	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	40	0	0	40	0	13	34	0	21	42	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	95	95	95	95	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	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	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
g_i, Effective Green Time [s]	17	17	17	17	9	59	59	7	57	57
g / C, Green / Cycle	0.18	0.18	0.18	0.18	0.09	0.62	0.62	0.08	0.60	0.60
(v / s)_i Volume / Saturation Flow Rate	0.06	0.15	0.02	0.08	0.08	0.28	0.28	0.06	0.36	0.35
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	220	318	98	318	159	1115	1115	132	1086	1086
d1, Uniform Delay [s]	34.31	37.97	32.89	35.14	42.25	9.63	9.51	43.02	11.69	11.56
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	1.54	6.60	2.08	1.08	9.39	1.37	1.29	9.41	2.44	2.32
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	0.47	0.86	0.35	0.47	0.81	0.46	0.45	0.78	0.60	0.59
d, Delay for Lane Group [s/veh]	35.85	44.57	34.96	36.21	51.64	11.00	10.81	52.43	14.13	13.88
Lane Group LOS	D	D	C	D	D	B	B	D	B	B
Critical Lane Group	No	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.16	6.63	0.71	3.16	3.35	5.54	5.30	2.70	8.43	8.14
50th-Percentile Queue Length [ft/ln]	54.05	165.65	17.78	78.97	83.87	138.54	132.59	67.52	210.72	203.61
95th-Percentile Queue Length [veh/ln]	3.89	10.85	1.28	5.69	6.04	9.40	9.08	4.86	13.19	12.82
95th-Percentile Queue Length [ft/ln]	97.30	271.18	32.00	142.14	150.96	235.06	227.01	121.54	329.75	320.62

Movement, Approach, & Intersection Results

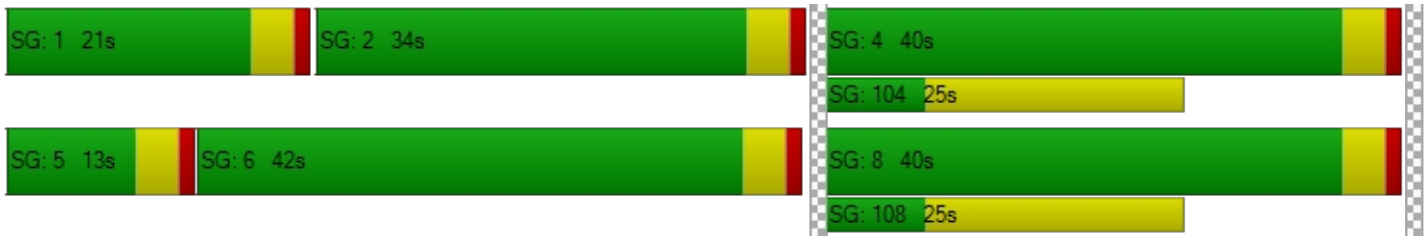
d_M, Delay for Movement [s/veh]	35.85	44.57	44.57	34.96	36.21	36.21	51.64	10.91	10.81	52.43	14.02	13.88
Movement LOS	D	D	D	C	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	42.17			35.98			15.52			16.85		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	20.57											
Intersection LOS	C											
Intersection V/C	0.673											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	37.15	37.15
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.937	2.830
Crosswalk LOS	F	F	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	758	758	631	800
d_b, Bicycle Delay [s]	18.33	18.33	22.25	17.11
I_b,int, Bicycle LOS Score for Intersection	2.178	1.862	2.499	2.706
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Corwin Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	17.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.647

Intersection Setup

Name	Corwin Road		US Highway 18		US Highway 18	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	1	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Corwin Road		US Highway 18		US Highway 18	
Base Volume Input [veh/h]	33	260	272	712	973	45
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	260	272	712	973	45
Peak Hour Factor	0.9180	0.9180	0.9180	0.9180	0.9180	0.9180
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	71	74	194	265	12
Total Analysis Volume [veh/h]	36	283	296	776	1060	49
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Protected	Permissive	Permissive	Permissive
Signal Group	7	0	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	6	0	6	6	6	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	13	0	48	77	29	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	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
Detector Length [ft]	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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	C
C, Cycle Length [s]	90	90	90	90	90	90
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]	9	9	18	73	51	51
g / C, Green / Cycle	0.10	0.10	0.20	0.81	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.02	0.08	0.17	0.22	0.31	0.31
s, saturation flow rate [veh/h]	1700	3600	1700	3600	1800	1800
c, Capacity [veh/h]	170	359	338	2921	1022	1022
d1, Uniform Delay [s]	37.27	39.59	34.97	2.04	12.15	12.15
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.62	3.85	7.12	0.22	2.07	2.07
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	0.21	0.79	0.87	0.27	0.54	0.54
d, Delay for Lane Group [s/veh]	37.89	43.45	42.09	2.27	14.22	14.22
Lane Group LOS	D	D	D	A	B	B
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.75	3.21	6.82	0.99	6.93	6.93
50th-Percentile Queue Length [ft/ln]	18.78	80.19	170.38	24.84	173.16	173.16
95th-Percentile Queue Length [veh/ln]	1.35	5.77	11.10	1.79	11.24	11.24
95th-Percentile Queue Length [ft/ln]	33.80	144.34	277.42	44.70	281.06	281.06

Movement, Approach, & Intersection Results

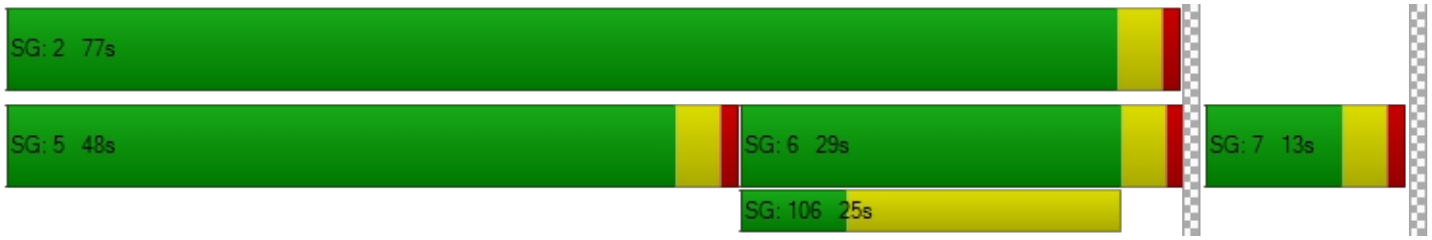
d_M, Delay for Movement [s/veh]	37.89	43.45	42.09	2.27	14.22	14.22
Movement LOS	D	D	D	A	B	B
d_A, Approach Delay [s/veh]	42.82		13.26		14.22	
Approach LOS	D		B		B	
d_I, Intersection Delay [s/veh]	17.46					
Intersection LOS	B					
Intersection V/C	0.647					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	2.292	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	200	1622	555
d_b, Bicycle Delay [s]	36.46	1.61	23.48
I_b,int, Bicycle LOS Score for Intersection	1.560	2.444	2.475
Bicycle LOS	A	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Tao Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	12.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.555

Intersection Setup

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	26	33	10	56	30	98	73	710	43	11	1093	84
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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	33	10	56	30	98	73	710	43	11	1093	84
Peak Hour Factor	0.9250	0.9250	0.9250	0.9250	0.9250	0.9250	0.9250	0.9250	0.9250	0.9250	0.9250	0.9250
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	9	3	15	8	26	20	192	12	3	295	23
Total Analysis Volume [veh/h]	28	36	11	61	32	106	79	768	46	12	1182	91
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	29	0	0	29	0	51	51	0	10	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	9	9	9	9	5	67	67	2	64	64
g / C, Green / Cycle	0.10	0.10	0.10	0.10	0.06	0.75	0.75	0.02	0.71	0.71
(v / s)_i Volume / Saturation Flow Rate	0.02	0.03	0.04	0.08	0.05	0.23	0.22	0.01	0.36	0.35
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	93	182	178	182	104	1345	1345	32	1268	1268
d1, Uniform Delay [s]	37.00	37.37	37.74	39.41	41.62	3.73	3.71	43.68	6.11	6.04
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	1.81	0.74	1.13	6.38	10.81	0.59	0.57	7.37	1.45	1.39
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	0.30	0.26	0.34	0.76	0.76	0.31	0.30	0.38	0.51	0.50
d, Delay for Lane Group [s/veh]	38.81	38.11	38.88	45.79	52.43	4.32	4.28	51.05	7.57	7.43
Lane Group LOS	D	D	D	D	D	A	A	D	A	A
Critical Lane Group	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.60	0.98	1.30	3.25	2.02	2.04	1.99	0.33	5.00	4.83
50th-Percentile Queue Length [ft/ln]	15.12	24.59	32.41	81.30	50.48	50.95	49.65	8.16	125.07	120.64
95th-Percentile Queue Length [veh/ln]	1.09	1.77	2.33	5.85	3.63	3.67	3.57	0.59	8.67	8.43
95th-Percentile Queue Length [ft/ln]	27.21	44.27	58.34	146.35	90.86	91.71	89.37	14.69	216.77	210.71

Movement, Approach, & Intersection Results

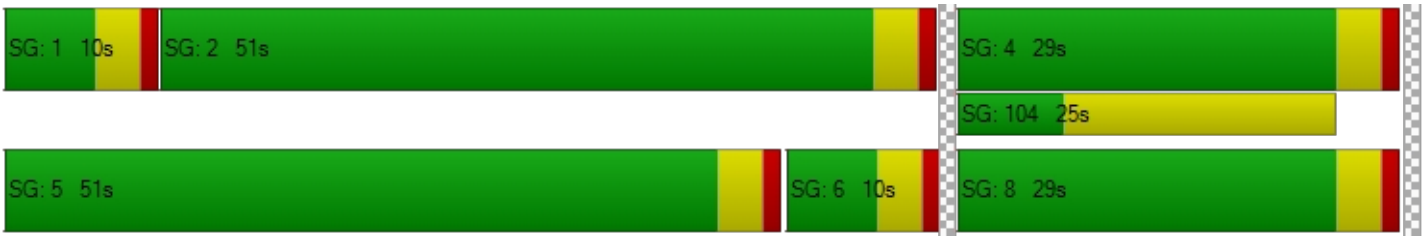
d_M, Delay for Movement [s/veh]	38.81	38.11	38.11	38.88	45.79	45.79	52.43	4.30	4.28	51.05	7.50	7.43
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	38.37			43.67			8.56			7.90		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	11.98											
Intersection LOS	B											
Intersection V/C	0.555											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.770	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	555	555	1044	133
d_b, Bicycle Delay [s]	23.48	23.48	10.28	39.21
l_b,int, Bicycle LOS Score for Intersection	1.683	1.888	2.296	2.620
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Rimrock Road/Piute Road at US Highway 18

Control Type:	Two-way stop	Delay (sec / veh):	16.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.211

Intersection Setup

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			60.00			60.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	0	0	37	0	0	75	39	723	4	28	1118	59
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	0	0	37	0	0	75	39	723	4	28	1118	59
Peak Hour Factor	0.9500	0.9500	0.8840	0.9500	0.9500	0.8840	0.8840	0.8840	0.8840	0.8840	0.8840	0.8840
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]	0	0	10	0	0	21	11	204	1	8	316	17
Total Analysis Volume [veh/h]	0	0	42	0	0	85	44	818	5	32	1265	67
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.07	0.00	0.00	0.21	0.09	0.01	0.00	0.04	0.01	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	11.58	0.00	0.00	16.34	12.66	0.00	0.00	9.67	0.00	0.00
Movement LOS			B			C	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.23	0.00	0.00	0.79	0.28	0.00	0.00	0.12	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	5.73	0.00	0.00	19.72	6.99	0.00	0.00	3.11	0.00	0.00
d_A, Approach Delay [s/veh]	11.58			16.34			0.64			0.23		
Approach LOS	B			C			A			A		
d_I, Intersection Delay [s/veh]	1.16											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 6: Rancherias Road at Thunderbird Road

Control Type:	All-way stop	Delay (sec / veh):	12.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.538

Intersection Setup

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Base Volume Input [veh/h]	103	124	46	188	237	38
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	103	124	46	188	237	38
Peak Hour Factor	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	32	39	14	59	74	12
Total Analysis Volume [veh/h]	129	155	58	235	296	48
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	589	666	548	594	551	674
Degree of Utilization, x	0.22	0.23	0.11	0.40	0.54	0.07

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.83	0.90	0.35	1.89	3.17	0.23
95th-Percentile Queue Length [ft]	20.75	22.43	8.83	47.19	79.29	5.73
Approach Delay [s/veh]	10.09		12.17		15.45	
Approach LOS	B		B		C	
Intersection Delay [s/veh]	12.75					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 7: Rancherias Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	26.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.690

Intersection Setup

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	160	104	105	80	147	231	124	615	32	188	807	82
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	160	104	105	80	147	231	124	615	32	188	807	82
Peak Hour Factor	0.8820	0.8820	0.8820	0.8820	0.8820	0.8820	0.8820	0.8820	0.8820	0.8820	0.8820	0.8820
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]	45	29	30	23	42	65	35	174	9	53	229	23
Total Analysis Volume [veh/h]	181	118	119	91	167	262	141	697	36	213	915	93
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	ProtPer	Permiss	Unsigna	ProtPer	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	32	0	9	32	0	13	10	0	39	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	21	0	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
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
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	25	16	25	16	16	9	40	40	13	44	44
g / C, Green / Cycle	0.28	0.18	0.28	0.18	0.18	0.10	0.44	0.44	0.15	0.49	0.49
(v / s)_i Volume / Saturation Flow Rate	0.11	0.03	0.05	0.09	0.15	0.08	0.21	0.20	0.13	0.28	0.28
s, saturation flow rate [veh/h]	1700	3600	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	447	635	543	317	317	171	792	792	255	880	880
d1, Uniform Delay [s]	26.37	31.63	24.89	33.73	35.81	39.76	17.79	17.71	37.26	16.44	16.25
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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
d2, Incremental Delay [s]	0.59	0.14	0.14	1.35	5.44	9.47	1.97	1.91	7.13	2.80	2.61
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
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
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

Lane Group Results

X, volume / capacity	0.40	0.19	0.17	0.53	0.83	0.82	0.47	0.46	0.84	0.58	0.56
d, Delay for Lane Group [s/veh]	26.96	31.77	25.04	35.08	41.25	49.24	19.76	19.63	44.39	19.24	18.86
Lane Group LOS	C	C	C	D	D	D	B	B	D	B	B
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	3.16	1.09	1.49	3.38	5.92	3.47	5.60	5.47	4.99	7.74	7.41
50th-Percentile Queue Length [ft/ln]	78.94	27.36	37.14	84.62	147.96	86.71	139.90	136.81	124.67	193.59	185.13
95th-Percentile Queue Length [veh/ln]	5.68	1.97	2.67	6.09	9.91	6.24	9.48	9.31	8.65	12.31	11.87
95th-Percentile Queue Length [ft/ln]	142.09	49.25	66.85	152.31	247.71	156.09	236.89	232.73	216.22	307.68	296.70

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	26.96	31.77	0.00	25.04	35.08	41.25	49.24	19.70	19.63	44.39	19.07	18.86
Movement LOS	C	C		C	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	28.86			36.43			24.46			23.47		
Approach LOS	C			D			C			C		
d_I, Intersection Delay [s/veh]	26.63											
Intersection LOS	C											
Intersection V/C	0.690											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	34.72	34.72	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.469	2.786	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	622	622	133	710
d_b, Bicycle Delay [s]	21.40	21.40	39.24	18.73
l_b,int, Bicycle LOS Score for Intersection	1.806	2.418	2.281	2.567
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Rancherias Road at Tomahawk Road

Control Type:	Two-way stop	Delay (sec / veh):	12.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.188

Intersection Setup

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
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 Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
Base Volume Input [veh/h]	14	155	104	122	104	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	14	155	104	122	104	15
Peak Hour Factor	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	43	29	34	29	4
Total Analysis Volume [veh/h]	15	171	115	135	115	17
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			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	0.19	0.02
d_M, Delay for Movement [s/veh]	7.77	0.00	0.00	0.00	12.37	10.67
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.00	0.00	0.78	0.78
95th-Percentile Queue Length [ft/ln]	0.86	0.86	0.00	0.00	19.44	19.44
d_A, Approach Delay [s/veh]	0.63		0.00		12.15	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	3.03					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 9: Bass Hill Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	18.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.494

Intersection Setup

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	114	53	64	24	28	63	99	557	48	93	886	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	114	53	64	24	28	63	99	557	48	93	886	25
Peak Hour Factor	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
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]	34	16	19	7	8	19	30	168	14	28	267	8
Total Analysis Volume [veh/h]	137	64	77	29	34	76	119	671	58	112	1067	30
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]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Overlap	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	8	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups			1,8			4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	6	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	30	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	10	0	35	35	10	32	0	23	45	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	24	0	21	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No	No		No	No	No	No		No	No	
Maximum Recall		No	No		No	No	No	No		No	No	
Pedestrian Recall		No	No		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	R	L	C	R	L	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
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	0.00	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	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]	7	7	19	6	6	26	6	63	63	8	66	66
g / C, Green / Cycle	0.07	0.07	0.19	0.06	0.06	0.26	0.06	0.63	0.63	0.08	0.66	0.66
(v / s)_i Volume / Saturation Flow Rate	0.04	0.04	0.04	0.01	0.02	0.04	0.04	0.19	0.03	0.07	0.30	0.02
s, saturation flow rate [veh/h]	3200	1800	1800	3200	1800	1800	3200	3600	1800	1700	3600	1800
c, Capacity [veh/h]	231	120	345	191	107	477	188	2264	1132	144	2358	1179
d1, Uniform Delay [s]	45.56	45.21	34.19	44.68	45.13	28.24	46.08	8.47	7.12	44.90	8.47	6.06
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	2.43	3.62	0.32	0.36	1.67	0.15	3.50	0.33	0.09	8.67	0.63	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	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	0.59	0.53	0.22	0.15	0.32	0.16	0.63	0.30	0.05	0.78	0.45	0.03
d, Delay for Lane Group [s/veh]	47.99	48.83	34.52	45.05	46.80	28.39	49.57	8.80	7.21	53.57	9.10	6.10
Lane Group LOS	D	D	C	D	D	C	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.73	1.65	1.61	0.35	0.86	1.42	1.53	3.15	0.47	3.05	5.26	0.22
50th-Percentile Queue Length [ft/ln]	43.22	41.29	40.22	8.75	21.40	35.39	38.27	78.84	11.75	76.33	131.57	5.41
95th-Percentile Queue Length [veh/ln]	3.11	2.97	2.90	0.63	1.54	2.55	2.76	5.68	0.85	5.50	9.03	0.39
95th-Percentile Queue Length [ft/ln]	77.80	74.33	72.40	15.76	38.53	63.70	68.89	141.90	21.15	137.39	225.63	9.74

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	47.99	48.83	34.52	45.05	46.80	28.39	49.57	8.80	7.21	53.57	9.10	6.10
Movement LOS	D	D	C	D	D	C	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	44.45			36.37			14.42			13.14		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	18.40											
Intersection LOS	B											
Intersection V/C	0.494											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
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]	39.64	39.64	39.64	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.536	2.515	3.090	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	120	620	560	819
d_b, Bicycle Delay [s]	44.22	23.84	25.95	17.43
l_b,int, Bicycle LOS Score for Intersection	2.018	1.789	2.259	2.557
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: Dale Evans Parkway at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	15.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.584

Intersection Setup

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	4	3	0	114	6	150	101	566	6	0	888	172
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	4	3	0	114	6	150	101	566	6	0	888	172
Peak Hour Factor	0.8780	0.8780	0.8780	0.8780	0.8780	0.8780	0.8780	0.8780	0.8780	0.8780	0.8780	0.8780
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	1	0	32	2	43	29	161	2	0	253	49
Total Analysis Volume [veh/h]	5	3	0	130	7	171	115	645	7	0	1011	196
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	10	0	0	35	0	10	21	0	24	35	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	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	0	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	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
g_i, Effective Green Time [s]	1	11	11	11	6	62	62	0	56	56
g / C, Green / Cycle	0.01	0.12	0.12	0.12	0.06	0.69	0.69	0.00	0.62	0.62
(v / s)_i Volume / Saturation Flow Rate	0.00	0.04	0.00	0.10	0.04	0.18	0.18	0.00	0.34	0.33
s, saturation flow rate [veh/h]	1700	3200	1800	1800	3200	1800	1800	1700	1800	1800
c, Capacity [veh/h]	23	397	224	224	205	1231	1231	2	1118	1118
d1, Uniform Delay [s]	44.09	36.05	34.72	38.22	40.98	5.51	5.51	0.00	9.88	9.61
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	8.86	0.48	0.06	5.39	2.41	0.53	0.53	0.00	1.98	1.77
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	0.35	0.33	0.03	0.76	0.56	0.27	0.26	0.00	0.55	0.53
d, Delay for Lane Group [s/veh]	52.95	36.53	34.78	43.60	43.38	6.04	6.03	0.00	11.87	11.38
Lane Group LOS	D	D	C	D	D	A	A	A	B	B
Critical Lane Group	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.23	1.32	0.14	3.93	1.29	2.17	2.16	0.00	6.82	6.27
50th-Percentile Queue Length [ft/ln]	5.79	32.92	3.43	98.34	32.36	54.29	54.04	0.00	170.48	156.70
95th-Percentile Queue Length [veh/ln]	0.42	2.37	0.25	7.08	2.33	3.91	3.89	0.00	11.10	10.37
95th-Percentile Queue Length [ft/ln]	10.43	59.25	6.18	177.01	58.24	97.72	97.28	0.00	277.55	259.34

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.95	52.95	52.95	36.53	34.78	43.60	43.38	6.04	6.03	0.00	11.68	11.38
Movement LOS	D	D	D	D	C	D	D	A	A	A	B	B
d_A, Approach Delay [s/veh]	52.95			40.42			11.64			11.63		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	15.65											
Intersection LOS	B											
Intersection V/C	0.584											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	34.72	34.72	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	2.553	2.866	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	133	688	377	688
d_b, Bicycle Delay [s]	39.24	19.38	29.65	19.38
I_b,int, Bicycle LOS Score for Intersection	1.573	2.068	2.192	2.555
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: Flathead Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	11.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.486

Intersection Setup

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	60	34	39	11	55	79	9	634	32	26	932	29
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	60	34	39	11	55	79	9	634	32	26	932	29
Peak Hour Factor	0.8530	0.8530	0.8530	0.8530	0.8530	0.8530	0.8530	0.8530	0.8530	0.8530	0.8530	0.8530
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]	18	10	11	3	16	23	3	186	9	8	273	8
Total Analysis Volume [veh/h]	70	40	46	13	64	93	11	743	38	30	1093	34
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	70	0	0	70	0	10	10	0	10	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	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	2.00	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
g_i, Effective Green Time [s]	11	11	2	64	64	3	65	65
g / C, Green / Cycle	0.12	0.12	0.02	0.71	0.71	0.04	0.73	0.73
(v / s)_i Volume / Saturation Flow Rate	0.09	0.10	0.01	0.22	0.22	0.02	0.31	0.31
s, saturation flow rate [veh/h]	1700	1700	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	267	252	29	1273	1273	62	1308	1308
d1, Uniform Delay [s]	38.13	38.48	43.76	4.94	4.91	42.56	4.92	4.89
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.02	3.12	7.68	0.63	0.62	5.77	1.05	1.03
d3, Initial Queue Delay [s]	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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.58	0.67	0.37	0.31	0.30	0.48	0.43	0.43
d, Delay for Lane Group [s/veh]	40.15	41.60	51.44	5.57	5.53	48.32	5.97	5.92
Lane Group LOS	D	D	D	A	A	D	A	A
Critical Lane Group	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	3.42	3.82	0.30	2.45	2.40	0.75	3.63	3.58
50th-Percentile Queue Length [ft/ln]	85.57	95.44	7.58	61.20	59.90	18.69	90.83	89.46
95th-Percentile Queue Length [veh/ln]	6.16	6.87	0.55	4.41	4.31	1.35	6.54	6.44
95th-Percentile Queue Length [ft/ln]	154.02	171.80	13.64	110.16	107.83	33.63	163.50	161.02

Movement, Approach, & Intersection Results

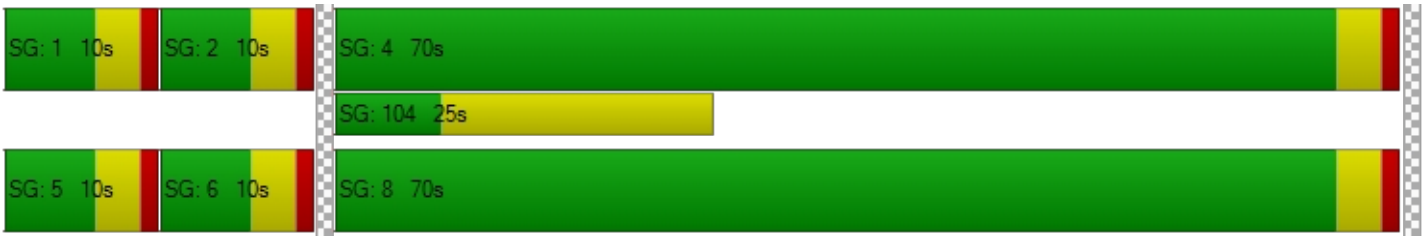
d_M, Delay for Movement [s/veh]	40.15	40.15	40.15	41.60	41.60	41.60	51.44	5.55	5.53	48.32	5.95	5.92
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	40.15			41.60			6.19			7.04		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	11.60											
Intersection LOS	B											
Intersection V/C	0.486											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.798	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1466	1466	133	133
d_b, Bicycle Delay [s]	3.21	3.21	39.21	39.21
I_b,int, Bicycle LOS Score for Intersection	1.817	1.840	2.213	2.514
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: Kiowa Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	135.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.471

Intersection Setup

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	231	39	28	3	80	30	11	536	126	20	720	5
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	231	39	28	3	80	30	11	536	126	20	720	5
Peak Hour Factor	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430
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]	69	12	8	1	24	9	3	159	37	6	214	1
Total Analysis Volume [veh/h]	274	46	33	4	95	36	13	636	149	24	854	6
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	44	0	0	44	0	10	34	0	12	36	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	8	8	8	8	2	67	67	3	68	68
g / C, Green / Cycle	0.09	0.09	0.09	0.09	0.02	0.74	0.74	0.03	0.75	0.75
(v / s)_i Volume / Saturation Flow Rate	0.16	0.04	0.00	0.07	0.01	0.23	0.21	0.01	0.24	0.24
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	88	170	137	170	31	1336	1336	51	1357	1357
d1, Uniform Delay [s]	38.91	38.60	36.99	39.80	43.68	3.86	3.79	42.94	3.59	3.58
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	965.38	1.97	0.08	7.20	8.45	0.59	0.53	6.55	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
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	3.13	0.46	0.03	0.77	0.41	0.30	0.28	0.47	0.32	0.32
d, Delay for Lane Group [s/veh]	1004.29	40.57	37.08	47.00	52.13	4.45	4.33	49.49	4.20	4.20
Lane Group LOS	F	D	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	25.29	1.73	0.08	3.13	0.36	2.07	1.90	0.61	2.07	2.07
50th-Percentile Queue Length [ft/ln]	632.31	43.17	2.06	78.33	8.94	51.79	47.62	15.33	51.86	51.70
95th-Percentile Queue Length [veh/ln]	41.26	3.11	0.15	5.64	0.64	3.73	3.43	1.10	3.73	3.72
95th-Percentile Queue Length [ft/ln]	1031.38	77.70	3.71	140.99	16.08	93.22	85.72	27.59	93.35	93.05

Movement, Approach, & Intersection Results

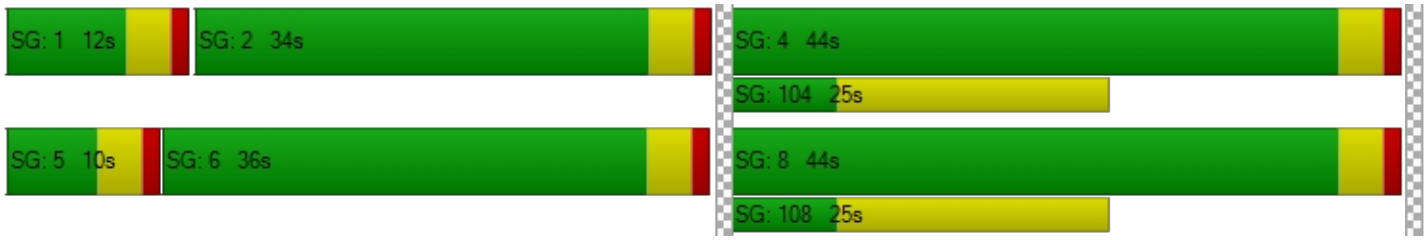
d_M, Delay for Movement [s/veh]	1004.29	40.57	40.57	37.08	47.00	47.00	52.13	4.40	4.33	49.49	4.20	4.20
Movement LOS	F	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	788.61			46.71			5.16			5.43		
Approach LOS	F			D			A			A		
d_I, Intersection Delay [s/veh]	135.30											
Intersection LOS	F											
Intersection V/C	0.471											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.67	34.67
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	3.072	2.609
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	889	889	667	711
d_b, Bicycle Delay [s]	13.89	13.89	20.00	18.69
l_b,int, Bicycle LOS Score for Intersection	2.142	1.782	2.218	2.289
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Navajo Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	20.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.461

Intersection Setup

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	162	96	83	23	122	11	13	445	127	153	548	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	162	96	83	23	122	11	13	445	127	153	548	15
Peak Hour Factor	0.8760	0.8760	0.8760	0.8760	0.8760	0.8760	0.8760	0.8760	0.8760	0.8760	0.8760	0.8760
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]	46	27	24	7	35	3	4	127	36	44	156	4
Total Analysis Volume [veh/h]	185	110	95	26	139	13	15	508	145	175	626	17
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	44	0	0	44	0	10	29	0	17	36	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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]	90	90	90	90	90	90	90	90	90	90	90	90
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]	12	12	12	12	12	12	2	55	55	11	64	64
g / C, Green / Cycle	0.14	0.14	0.14	0.14	0.14	0.14	0.02	0.61	0.61	0.12	0.71	0.71
(v / s)_i Volume / Saturation Flow Rate	0.11	0.06	0.05	0.02	0.04	0.04	0.01	0.19	0.17	0.10	0.18	0.18
s, saturation flow rate [veh/h]	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	214	246	246	186	246	246	38	1093	1093	209	1274	1274
d1, Uniform Delay [s]	37.65	35.69	35.47	34.07	35.04	35.02	43.44	8.55	8.42	38.62	4.68	4.67
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	9.96	1.23	1.03	0.34	0.71	0.70	6.70	0.74	0.67	8.64	0.48	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	0.86	0.44	0.39	0.14	0.31	0.31	0.40	0.31	0.29	0.84	0.25	0.25
d, Delay for Lane Group [s/veh]	47.61	36.92	36.49	34.41	35.75	35.72	50.14	9.29	9.08	47.26	5.16	5.15
Lane Group LOS	D	D	D	C	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.48	2.23	1.99	0.51	1.54	1.52	0.40	3.11	2.85	4.22	1.90	1.88
50th-Percentile Queue Length [ft/ln]	111.89	55.77	49.77	12.79	38.52	38.12	9.92	77.64	71.14	105.48	47.53	47.00
95th-Percentile Queue Length [veh/ln]	7.95	4.02	3.58	0.92	2.77	2.74	0.71	5.59	5.12	7.59	3.42	3.38
95th-Percentile Queue Length [ft/ln]	198.63	100.38	89.59	23.02	69.34	68.61	17.85	139.75	128.06	189.69	85.55	84.60

Movement, Approach, & Intersection Results

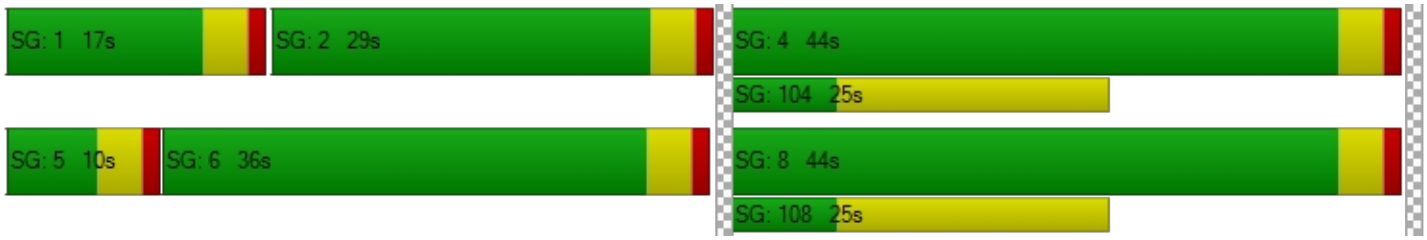
d_M, Delay for Movement [s/veh]	47.61	36.91	36.49	34.41	35.74	35.72	50.14	9.22	9.08	47.26	5.15	5.15
Movement LOS	D	D	D	C	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	41.88			35.54			10.11			14.16		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	19.96											
Intersection LOS	B											
Intersection V/C	0.461											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.853	2.619
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	889	889	555	711
d_b, Bicycle Delay [s]	13.90	13.90	23.48	18.70
l_b,int, Bicycle LOS Score for Intersection	1.881	1.706	2.111	2.234
Bicycle LOS	A	A	B	B

Sequence

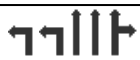
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: Apple Valley Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	30.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.826

Intersection Setup

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	402	149	67	96	213	292	171	1358	656	58	1194	77
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	402	149	67	96	213	292	171	1358	656	58	1194	77
Peak Hour Factor	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660
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]	104	39	17	25	55	76	44	351	170	15	309	20
Total Analysis Volume [veh/h]	416	154	69	99	220	302	177	1406	679	60	1236	80
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]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	18	39	0	11	32	0	12	40	0	10	38	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	0	0	24	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	R	L	C	R	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
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	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]	14	26	26	7	19	19	7	46	46	5	43	43
g / C, Green / Cycle	0.14	0.26	0.26	0.07	0.19	0.19	0.07	0.46	0.46	0.05	0.43	0.43
(v / s)_i Volume / Saturation Flow Rate	0.13	0.06	0.06	0.06	0.06	0.17	0.06	0.26	0.38	0.02	0.24	0.25
s, saturation flow rate [veh/h]	3200	1800	1800	1700	3600	1800	3200	5400	1800	3200	3600	1800
c, Capacity [veh/h]	449	474	474	120	697	348	240	2465	822	159	1553	776
d1, Uniform Delay [s]	42.52	29.07	28.89	45.90	34.69	39.13	45.36	19.99	23.75	46.08	21.36	21.49
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.13	0.11	0.50	0.50	0.11	0.50	0.50
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]	8.58	0.27	0.24	12.90	0.26	7.63	4.41	0.96	9.31	1.47	1.47	3.05
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	0.93	0.25	0.22	0.82	0.32	0.87	0.74	0.57	0.83	0.38	0.56	0.57
d, Delay for Lane Group [s/veh]	51.11	29.34	29.13	58.80	34.94	46.76	49.77	20.96	33.06	47.54	22.84	24.54
Lane Group LOS	D	C	C	E	C	D	D	C	C	D	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.56	2.24	2.02	2.84	2.31	7.83	2.29	7.95	15.42	0.75	7.74	8.26
50th-Percentile Queue Length [ft/ln]	139.00	55.88	50.41	71.11	57.86	195.75	57.17	198.71	385.57	18.81	193.48	206.43
95th-Percentile Queue Length [veh/ln]	9.43	4.02	3.63	5.12	4.17	12.42	4.12	12.57	21.86	1.35	12.30	12.97
95th-Percentile Queue Length [ft/ln]	235.68	100.59	90.73	127.99	104.15	310.48	102.91	314.30	546.58	33.85	307.54	324.25

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	51.11	29.29	29.13	58.80	34.94	46.76	49.77	20.96	33.06	47.54	23.34	24.54
Movement LOS	D	C	C	E	C	D	D	C	C	D	C	C
d_A, Approach Delay [s/veh]	43.48			44.50			26.84			24.46		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	30.58											
Intersection LOS	C											
Intersection V/C	0.826											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	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]	39.64	39.64	0.00	39.64
l_p,int, Pedestrian LOS Score for Intersection	2.717	2.625	0.000	3.090
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	560	719	680
d_b, Bicycle Delay [s]	21.16	25.95	20.51	21.81
l_b,int, Bicycle LOS Score for Intersection	2.087	2.072	2.804	2.316
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Kasota Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	17.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.660

Intersection Setup

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	86	53	65	103	113	114	80	1367	65	61	1178	48
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	86	53	65	103	113	114	80	1367	65	61	1178	48
Peak Hour Factor	0.9820	0.9820	0.9820	0.9820	0.9820	0.9820	0.9820	0.9820	0.9820	0.9820	0.9820	0.9820
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]	22	13	17	26	29	29	20	348	17	16	300	12
Total Analysis Volume [veh/h]	88	54	66	105	115	116	81	1392	66	62	1200	49
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	5	6	0	5	6	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	42	0	0	42	0	12	39	0	9	36	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	14	14	14	14	6	60	60	4	59	59
g / C, Green / Cycle	0.16	0.16	0.16	0.16	0.06	0.66	0.66	0.05	0.65	0.65
(v / s)_i Volume / Saturation Flow Rate	0.05	0.07	0.06	0.13	0.05	0.41	0.40	0.04	0.35	0.34
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	105	280	212	280	106	1194	1194	82	1168	1168
d1, Uniform Delay [s]	33.88	34.42	34.24	36.86	41.60	8.61	8.55	42.37	8.52	8.46
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	16.15	1.04	1.80	6.10	10.92	2.36	2.30	13.35	1.78	1.73
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	0.84	0.43	0.50	0.83	0.77	0.61	0.61	0.76	0.54	0.53
d, Delay for Lane Group [s/veh]	50.03	35.46	36.04	42.96	52.52	10.98	10.85	55.71	10.29	10.19
Lane Group LOS	D	D	D	D	D	B	B	E	B	B
Critical Lane Group	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.16	2.43	2.15	5.31	2.07	7.59	7.44	1.65	6.23	6.11
50th-Percentile Queue Length [ft/ln]	54.07	60.69	53.70	132.78	51.81	189.63	186.12	41.28	155.77	152.79
95th-Percentile Queue Length [veh/ln]	3.89	4.37	3.87	9.09	3.73	12.10	11.92	2.97	10.32	10.17
95th-Percentile Queue Length [ft/ln]	97.32	109.23	96.67	227.27	93.26	302.55	297.99	74.30	258.11	254.15

Movement, Approach, & Intersection Results

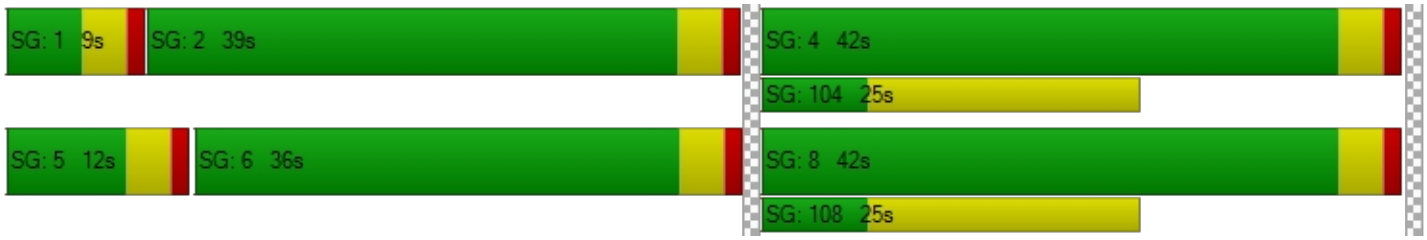
d_M, Delay for Movement [s/veh]	50.03	35.46	35.46	36.04	42.96	42.96	52.52	10.92	10.85	55.71	10.25	10.19
Movement LOS	D	D	D	D	D	D	D	B	B	E	B	B
d_A, Approach Delay [s/veh]	41.63			40.80			13.11			12.40		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	17.32											
Intersection LOS	B											
Intersection V/C	0.660											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.70	34.70
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.998	3.009
Crosswalk LOS	F	F	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	844	844	777	711
d_b, Bicycle Delay [s]	15.04	15.04	16.83	18.71
l_b,int, Bicycle LOS Score for Intersection	1.903	2.114	2.829	2.641
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Corwin Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	13.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.610

Intersection Setup

Name	Corwin Road		US Highway 18		US Highway 18	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	1	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Corwin Road		US Highway 18		US Highway 18	
Base Volume Input [veh/h]	41	225	260	1261	1043	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	41	225	260	1261	1043	15
Peak Hour Factor	0.9640	0.9640	0.9640	0.9640	0.9640	0.9640
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	58	67	327	270	4
Total Analysis Volume [veh/h]	43	233	270	1308	1082	16
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Protected	Permissive	Permissive	Permissive
Signal Group	7	0	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	6	0	6	6	6	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	11	0	46	79	33	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	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
Detector Length [ft]	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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	C
C, Cycle Length [s]	90	90	90	90	90	90
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]	7	7	17	75	54	54
g / C, Green / Cycle	0.08	0.08	0.18	0.83	0.61	0.61
(v / s)_i Volume / Saturation Flow Rate	0.03	0.06	0.16	0.36	0.31	0.31
s, saturation flow rate [veh/h]	1700	3600	1700	3600	1800	1800
c, Capacity [veh/h]	134	283	312	2997	1088	1088
d1, Uniform Delay [s]	39.20	40.86	35.68	1.99	10.13	10.13
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.37	5.90	7.17	0.46	1.67	1.67
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	0.32	0.82	0.87	0.44	0.50	0.50
d, Delay for Lane Group [s/veh]	40.57	46.76	42.85	2.45	11.81	11.81
Lane Group LOS	D	D	D	A	B	B
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.94	2.74	6.25	1.52	6.03	6.03
50th-Percentile Queue Length [ft/ln]	23.51	68.60	156.27	38.09	150.68	150.68
95th-Percentile Queue Length [veh/ln]	1.69	4.94	10.35	2.74	10.05	10.05
95th-Percentile Queue Length [ft/ln]	42.32	123.49	258.77	68.56	251.34	251.34

Movement, Approach, & Intersection Results

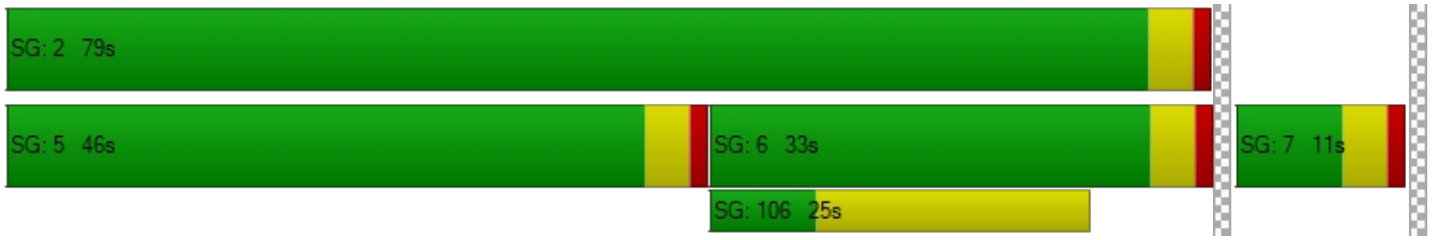
d_M, Delay for Movement [s/veh]	40.57	46.76	42.85	2.45	11.81	11.81
Movement LOS	D	D	D	A	B	B
d_A, Approach Delay [s/veh]	45.80		9.36		11.81	
Approach LOS	D		A		B	
d_I, Intersection Delay [s/veh]	13.68					
Intersection LOS	B					
Intersection V/C	0.610					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.268	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	156	1666	644
d_b, Bicycle Delay [s]	38.28	1.25	20.68
l_b,int, Bicycle LOS Score for Intersection	1.560	2.861	2.465
Bicycle LOS	A	C	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Tao Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	14.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.543

Intersection Setup

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	54	48	27	123	41	94	112	1257	36	25	1019	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	54	48	27	123	41	94	112	1257	36	25	1019	86
Peak Hour Factor	0.9610	0.9610	0.9610	0.9610	0.9610	0.9610	0.9610	0.9610	0.9610	0.9610	0.9610	0.9610
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	12	7	32	11	24	29	327	9	7	265	22
Total Analysis Volume [veh/h]	56	50	28	128	43	98	117	1308	37	26	1060	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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	39	0	0	39	0	41	12	0	39	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	9	9	9	9	8	66	66	3	61	61
g / C, Green / Cycle	0.10	0.10	0.10	0.10	0.09	0.73	0.73	0.03	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.03	0.04	0.08	0.08	0.07	0.37	0.37	0.02	0.32	0.31
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	97	189	157	189	150	1312	1312	56	1213	1213
d1, Uniform Delay [s]	37.31	37.72	39.02	39.15	40.21	5.30	5.27	42.75	7.08	6.99
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	5.33	1.45	9.84	5.81	8.53	1.44	1.42	5.79	1.36	1.30
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	0.58	0.41	0.82	0.75	0.78	0.51	0.51	0.46	0.48	0.47
d, Delay for Lane Group [s/veh]	42.64	39.16	48.86	44.96	48.73	6.74	6.70	48.54	8.44	8.29
Lane Group LOS	D	D	D	D	D	A	A	D	A	A
Critical Lane Group	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.27	1.67	3.13	3.29	2.86	4.71	4.65	0.65	4.98	4.79
50th-Percentile Queue Length [ft/ln]	31.83	41.66	78.23	82.23	71.47	117.74	116.34	16.33	124.48	119.67
95th-Percentile Queue Length [veh/ln]	2.29	3.00	5.63	5.92	5.15	8.27	8.19	1.18	8.64	8.37
95th-Percentile Queue Length [ft/ln]	57.30	74.99	140.81	148.01	128.64	206.72	204.79	29.40	215.96	209.37

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	42.64	39.16	39.16	48.86	44.96	44.96	48.73	6.72	6.70	48.54	8.37	8.29
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	40.62			46.81			10.08			9.25		
Approach LOS	D			D			B			A		
d_I, Intersection Delay [s/veh]	14.36											
Intersection LOS	B											
Intersection V/C	0.543											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.901	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	778	778	178	133
d_b, Bicycle Delay [s]	16.82	16.82	37.37	39.21
l_b,int, Bicycle LOS Score for Intersection	1.781	2.003	2.766	2.529
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Rimrock Road/Piute Road at US Highway 18

Control Type:	Two-way stop	Delay (sec / veh):	15.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.167

Intersection Setup

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			60.00			60.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	0	0	67	0	0	46	85	1286	7	42	1057	44
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	0	0	67	0	0	46	85	1286	7	42	1057	44
Peak Hour Factor	0.9500	0.9500	0.9830	0.9500	0.9500	0.9830	0.9830	0.9830	0.9830	0.9830	0.9830	0.9830
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]	0	0	17	0	0	12	22	327	2	11	269	11
Total Analysis Volume [veh/h]	0	0	68	0	0	47	86	1308	7	43	1075	45
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.17	0.00	0.00	0.10	0.14	0.01	0.00	0.08	0.01	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	15.61	0.00	0.00	13.48	11.75	0.00	0.00	12.52	0.00	0.00
Movement LOS			C			B	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.59	0.00	0.00	0.33	0.48	0.00	0.00	0.27	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	14.83	0.00	0.00	8.25	12.01	0.00	0.00	6.71	0.00	0.00
d_A, Approach Delay [s/veh]	15.61			13.48			0.72			0.46		
Approach LOS	C			B			A			A		
d_I, Intersection Delay [s/veh]	1.21											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 6: Rancherias Road at Thunderbird Road

Control Type:	All-way stop	Delay (sec / veh):	12.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.478

Intersection Setup

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Base Volume Input [veh/h]	236	188	57	183	246	54
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	236	188	57	183	246	54
Peak Hour Factor	0.9640	0.9640	0.9640	0.9640	0.9640	0.9640
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	61	49	15	47	64	14
Total Analysis Volume [veh/h]	245	195	59	190	255	56
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	605	687	540	585	533	649
Degree of Utilization, x	0.41	0.28	0.11	0.33	0.48	0.09

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.96	1.17	0.37	1.41	2.56	0.28
95th-Percentile Queue Length [ft]	48.94	29.20	9.15	35.14	64.03	7.06
Approach Delay [s/veh]	11.48		11.42		14.28	
Approach LOS	B		B		B	
Intersection Delay [s/veh]	12.33					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 7: Rancherias Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	31.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.842

Intersection Setup

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	178	171	127	98	149	206	201	1070	68	295	743	117
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	178	171	127	98	149	206	201	1070	68	295	743	117
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]	47	45	33	26	39	54	53	282	18	78	196	31
Total Analysis Volume [veh/h]	187	180	134	103	157	217	212	1126	72	311	782	123
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	ProtPer	Permiss	Unsigna	ProtPer	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	32	0	9	32	0	20	10	0	39	29	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	21	0	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
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
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	14	23	14	14	13	37	37	19	42	42
g / C, Green / Cycle	0.25	0.15	0.25	0.15	0.15	0.15	0.41	0.41	0.21	0.47	0.47
(v / s)_i Volume / Saturation Flow Rate	0.11	0.05	0.06	0.09	0.12	0.12	0.34	0.33	0.18	0.26	0.25
s, saturation flow rate [veh/h]	1700	3600	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	412	545	474	273	273	248	731	731	354	843	843
d1, Uniform Delay [s]	28.32	34.17	26.83	35.57	36.92	37.56	23.93	23.73	34.58	17.15	16.89
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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
d2, Incremental Delay [s]	0.78	0.35	0.23	1.92	5.26	8.10	10.34	9.57	6.99	2.56	2.33
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
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
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

Lane Group Results

X, volume / capacity	0.45	0.33	0.22	0.58	0.80	0.85	0.83	0.81	0.88	0.55	0.52
d, Delay for Lane Group [s/veh]	29.10	34.53	27.06	37.49	42.18	45.66	34.27	33.30	41.58	19.71	19.22
Lane Group LOS	C	C	C	D	D	D	C	C	D	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.42	1.77	1.77	3.30	4.93	5.04	12.96	12.53	7.14	7.07	6.64
50th-Percentile Queue Length [ft/ln]	85.48	44.15	44.19	82.59	123.23	125.99	323.93	313.24	178.42	176.69	165.89
95th-Percentile Queue Length [veh/ln]	6.15	3.18	3.18	5.95	8.57	8.72	18.86	18.33	11.52	11.43	10.86
95th-Percentile Queue Length [ft/ln]	153.87	79.47	79.54	148.65	214.26	218.03	471.52	458.37	287.94	285.69	271.51

Movement, Approach, & Intersection Results

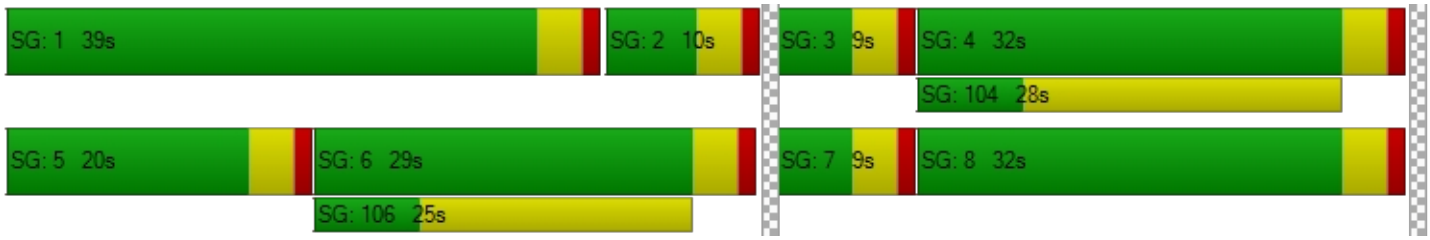
d_M, Delay for Movement [s/veh]	29.10	34.53	0.00	27.06	37.49	42.18	45.66	33.82	33.30	41.58	19.51	19.22
Movement LOS	C	C		C	D	D	D	C	C	D	B	B
d_A, Approach Delay [s/veh]	31.76			37.37			35.57			25.13		
Approach LOS	C			D			D			C		
d_I, Intersection Delay [s/veh]	31.76											
Intersection LOS	C											
Intersection V/C	0.842											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	34.72	34.72	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	2.493	2.852	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	622	622	133	555
d_b, Bicycle Delay [s]	21.40	21.40	39.24	23.51
I_b,int, Bicycle LOS Score for Intersection	1.862	2.347	2.723	2.563
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Rancherias Road at Tomahawk Road

Control Type:	Two-way stop	Delay (sec / veh):	19.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.470

Intersection Setup

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
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 Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
Base Volume Input [veh/h]	19	180	183	175	210	20
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	19	180	183	175	210	20
Peak Hour Factor	0.9070	0.9070	0.9070	0.9070	0.9070	0.9070
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	50	50	48	58	6
Total Analysis Volume [veh/h]	21	198	202	193	232	22
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.47	0.03
d_M, Delay for Movement [s/veh]	8.15	0.00	0.00	0.00	19.16	16.73
Movement LOS	A	A	A	A	C	C
95th-Percentile Queue Length [veh/ln]	0.06	0.06	0.00	0.00	2.76	2.76
95th-Percentile Queue Length [ft/ln]	1.38	1.38	0.00	0.00	68.95	68.95
d_A, Approach Delay [s/veh]	0.78		0.00		18.95	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	5.74					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 9: Bass Hill Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	28.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.602

Intersection Setup

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	193	127	181	64	60	133	273	890	90	184	853	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	193	127	181	64	60	133	273	890	90	184	853	52
Peak Hour Factor	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760
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]	49	33	46	16	15	34	70	228	23	47	218	13
Total Analysis Volume [veh/h]	198	130	185	66	61	136	280	912	92	189	874	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]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Overlap	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	8	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups			1,8			4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	6	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	30	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	10	0	35	35	19	32	0	38	51	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	24	0	21	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No	No		No	No	No	No		No	No	
Maximum Recall		No	No		No	No	No	No		No	No	
Pedestrian Recall		No	No		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	R	L	C	R	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
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	0.00	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	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]	11	11	30	9	9	40	12	64	64	15	67	67
g / C, Green / Cycle	0.10	0.10	0.26	0.08	0.08	0.35	0.11	0.56	0.56	0.13	0.58	0.58
(v / s)_i Volume / Saturation Flow Rate	0.06	0.07	0.10	0.02	0.03	0.08	0.09	0.25	0.05	0.11	0.24	0.03
s, saturation flow rate [veh/h]	3200	1800	1800	3200	1800	1800	3200	3600	1800	1700	3600	1800
c, Capacity [veh/h]	322	173	477	245	138	630	345	1994	997	228	2089	1045
d1, Uniform Delay [s]	50.13	50.68	34.65	50.14	50.82	26.30	50.23	15.34	12.07	48.56	13.39	10.45
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	1.90	6.36	0.51	0.58	2.22	0.17	4.61	0.76	0.18	7.50	0.62	0.09
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	0.61	0.75	0.39	0.27	0.44	0.22	0.81	0.46	0.09	0.83	0.42	0.05
d, Delay for Lane Group [s/veh]	52.02	57.05	35.16	50.72	53.04	26.47	54.84	16.10	12.26	56.07	14.01	10.54
Lane Group LOS	D	E	D	D	D	C	D	B	B	E	B	B
Critical Lane Group	No	No	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.83	3.95	4.32	0.92	1.77	2.67	4.16	7.13	1.15	5.75	6.23	0.60
50th-Percentile Queue Length [ft/ln]	70.77	98.81	108.07	22.94	44.18	66.68	103.93	178.37	28.75	143.77	155.86	14.99
95th-Percentile Queue Length [veh/ln]	5.10	7.11	7.73	1.65	3.18	4.80	7.48	11.52	2.07	9.68	10.33	1.08
95th-Percentile Queue Length [ft/ln]	127.39	177.86	193.31	41.29	79.53	120.03	187.07	287.89	51.76	242.09	258.23	26.98

Movement, Approach, & Intersection Results

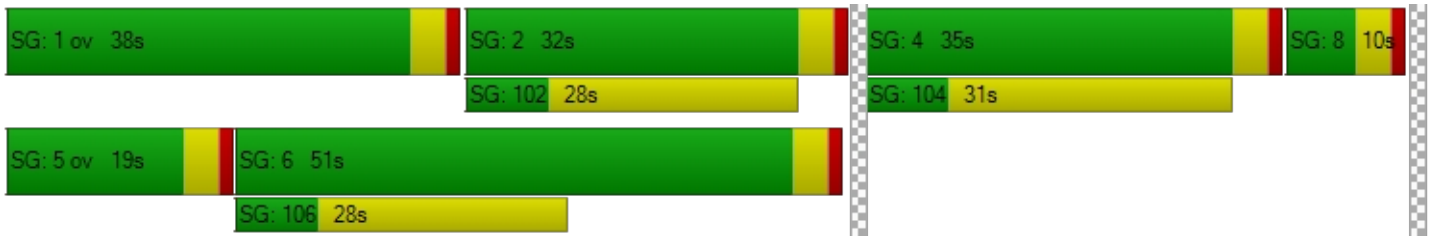
d_M, Delay for Movement [s/veh]	52.02	57.05	35.16	50.72	53.04	26.47	54.84	16.10	12.26	56.07	14.01	10.54
Movement LOS	D	E	D	D	D	C	D	B	B	E	B	B
d_A, Approach Delay [s/veh]	47.22			38.72			24.27			20.97		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	28.01											
Intersection LOS	C											
Intersection V/C	0.602											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
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]	47.07	47.07	47.07	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.604	2.583	3.234	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	104	539	487	817
d_b, Bicycle Delay [s]	51.70	30.72	32.95	20.14
l_b,int, Bicycle LOS Score for Intersection	2.406	1.994	2.619	2.480
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: Dale Evans Parkway at US Highway 18

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):	0.600

Intersection Setup

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	12	12	7	298	13	186	187	938	32	1	861	179
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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	12	7	298	13	186	187	938	32	1	861	179
Peak Hour Factor	0.9570	0.9570	0.9570	0.9570	0.9570	0.9570	0.9570	0.9570	0.9570	0.9570	0.9570	0.9570
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	3	2	78	3	49	49	245	8	0	225	47
Total Analysis Volume [veh/h]	13	13	7	311	14	194	195	980	33	1	900	187
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 Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	10	0	0	38	0	12	37	0	10	35	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	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	0	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	95	95	95	95	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	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	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
g_i, Effective Green Time [s]	4	13	13	13	8	62	62	0	54	54
g / C, Green / Cycle	0.04	0.14	0.14	0.14	0.08	0.65	0.65	0.00	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.02	0.10	0.01	0.11	0.06	0.28	0.28	0.00	0.31	0.29
s, saturation flow rate [veh/h]	1700	3200	1800	1800	3200	1800	1800	1700	1800	1800
c, Capacity [veh/h]	65	451	254	254	261	1170	1170	5	1028	1028
d1, Uniform Delay [s]	44.90	38.88	35.38	39.35	42.74	8.13	8.10	47.33	12.69	12.37
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	6.11	1.88	0.09	4.75	4.26	1.18	1.16	19.25	2.07	1.83
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	0.51	0.69	0.06	0.76	0.75	0.44	0.43	0.20	0.54	0.51
d, Delay for Lane Group [s/veh]	51.02	40.77	35.47	44.10	47.00	9.31	9.26	66.59	14.76	14.19
Lane Group LOS	D	D	D	D	D	A	A	E	B	B
Critical Lane Group	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.87	3.53	0.29	4.64	2.37	4.87	4.80	0.05	7.42	6.78
50th-Percentile Queue Length [ft/ln]	21.71	88.27	7.15	116.08	59.37	121.80	119.94	1.24	185.38	169.61
95th-Percentile Queue Length [veh/ln]	1.56	6.36	0.51	8.18	4.27	8.49	8.39	0.09	11.88	11.06
95th-Percentile Queue Length [ft/ln]	39.07	158.89	12.86	204.43	106.87	212.29	209.74	2.24	297.02	276.41

Movement, Approach, & Intersection Results

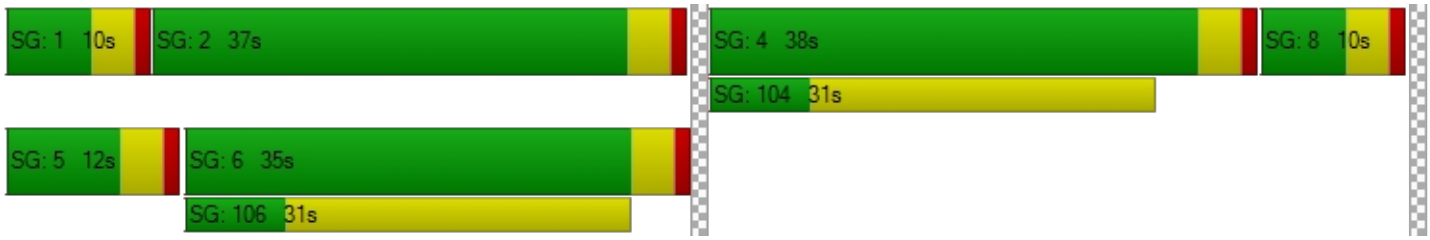
d_M, Delay for Movement [s/veh]	51.02	51.02	51.02	40.77	35.47	44.10	47.00	9.28	9.26	66.59	14.55	14.19
Movement LOS	D	D	D	D	D	D	D	A	A	E	B	B
d_A, Approach Delay [s/veh]	51.02			41.87			15.37			14.53		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	20.29											
Intersection LOS	C											
Intersection V/C	0.600											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	37.18	37.18	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.604	2.919	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	126	715	694	652
d_b, Bicycle Delay [s]	41.73	19.62	20.27	21.59
l_b,int, Bicycle LOS Score for Intersection	1.614	2.416	2.556	2.457
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: Flathead Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	12.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.535

Intersection Setup

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	83	66	27	19	42	51	51	1053	125	26	908	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	83	66	27	19	42	51	51	1053	125	26	908	24
Peak Hour Factor	0.9740	0.9740	0.9740	0.9740	0.9740	0.9740	0.9740	0.9740	0.9740	0.9740	0.9740	0.9740
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]	21	17	7	5	11	13	13	270	32	7	233	6
Total Analysis Volume [veh/h]	85	68	28	20	43	52	52	1081	128	27	932	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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	70	0	0	70	0	10	10	0	10	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	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	2.00	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
g_i, Effective Green Time [s]	12	12	4	63	63	3	62	62
g / C, Green / Cycle	0.13	0.13	0.05	0.70	0.70	0.03	0.69	0.69
(v / s)_i Volume / Saturation Flow Rate	0.11	0.07	0.03	0.34	0.33	0.02	0.27	0.26
s, saturation flow rate [veh/h]	1700	1700	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	278	266	84	1267	1267	58	1238	1238
d1, Uniform Delay [s]	38.22	36.63	41.94	6.00	5.90	42.70	5.98	5.96
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.56	1.10	7.09	1.33	1.25	5.78	0.92	0.91
d3, Initial Queue Delay [s]	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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.65	0.43	0.62	0.49	0.47	0.47	0.39	0.38
d, Delay for Lane Group [s/veh]	40.78	37.73	49.04	7.34	7.15	48.47	6.90	6.87
Lane Group LOS	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.03	2.41	1.29	4.68	4.44	0.68	3.53	3.48
50th-Percentile Queue Length [ft/ln]	100.66	60.32	32.18	116.88	110.89	16.92	88.22	87.10
95th-Percentile Queue Length [veh/ln]	7.25	4.34	2.32	8.22	7.89	1.22	6.35	6.27
95th-Percentile Queue Length [ft/ln]	181.20	108.58	57.92	205.53	197.23	30.45	158.80	156.79

Movement, Approach, & Intersection Results

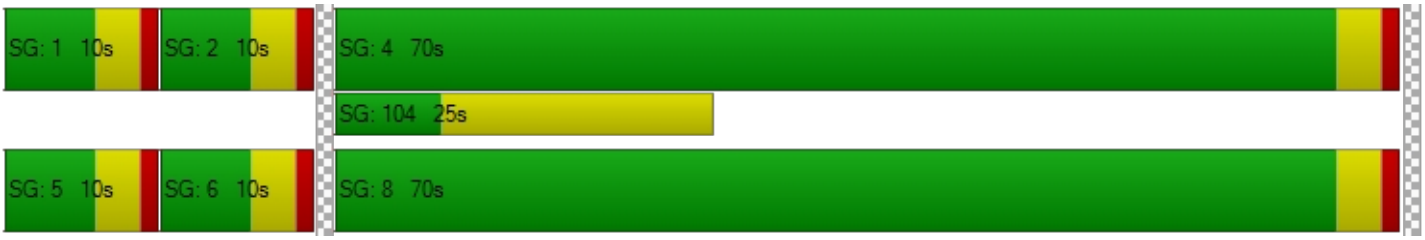
d_M, Delay for Movement [s/veh]	40.78	40.78	40.78	37.73	37.73	37.73	49.04	7.26	7.15	48.47	6.88	6.87
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	40.78			37.73			8.97			8.02		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	12.17											
Intersection LOS	B											
Intersection V/C	0.535											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.875	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1466	1466	133	133
d_b, Bicycle Delay [s]	3.21	3.21	39.21	39.21
l_b,int, Bicycle LOS Score for Intersection	1.858	1.749	2.600	2.371
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: Kiowa Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	41.4
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.560

Intersection Setup

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	216	110	45	1	75	43	49	797	265	37	705	10
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	216	110	45	1	75	43	49	797	265	37	705	10
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
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]	57	29	12	0	20	11	13	212	70	10	188	3
Total Analysis Volume [veh/h]	230	117	48	1	80	46	52	848	282	39	750	11
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	46	0	0	46	0	10	34	0	10	34	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	11	11	11	11	4	63	63	4	63	63
g / C, Green / Cycle	0.12	0.12	0.12	0.12	0.05	0.71	0.71	0.04	0.70	0.70
(v / s)_i Volume / Saturation Flow Rate	0.14	0.09	0.00	0.07	0.03	0.33	0.30	0.02	0.21	0.21
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	142	218	104	218	82	1267	1267	71	1255	1255
d1, Uniform Delay [s]	37.93	38.27	34.79	37.38	42.03	5.86	5.63	42.31	5.24	5.23
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	286.72	5.31	0.04	2.42	7.70	1.23	1.05	6.59	0.63	0.62
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	1.62	0.76	0.01	0.58	0.63	0.46	0.43	0.55	0.30	0.30
d, Delay for Lane Group [s/veh]	324.65	43.58	34.82	39.80	49.72	7.08	6.69	48.90	5.86	5.85
Lane Group LOS	F	D	C	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	14.25	3.79	0.02	2.74	1.30	4.36	3.85	0.97	2.48	2.46
50th-Percentile Queue Length [ft/ln]	356.34	94.83	0.50	68.39	32.44	109.01	96.18	24.26	61.90	61.51
95th-Percentile Queue Length [veh/ln]	23.85	6.83	0.04	4.92	2.34	7.78	6.92	1.75	4.46	4.43
95th-Percentile Queue Length [ft/ln]	596.26	170.69	0.91	123.11	58.39	194.62	173.12	43.67	111.41	110.71

Movement, Approach, & Intersection Results

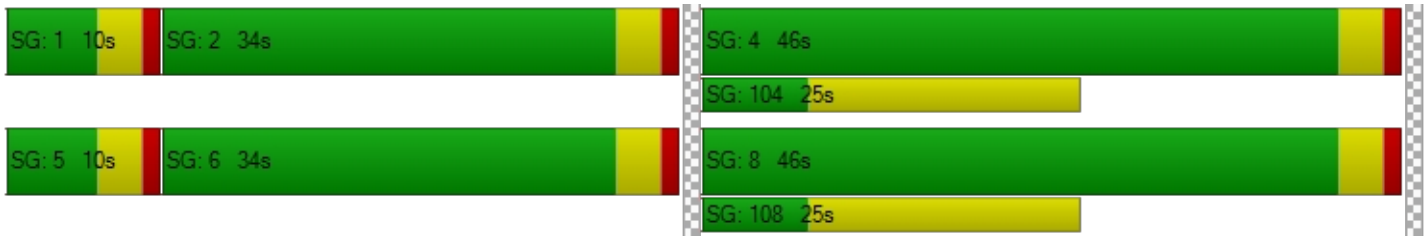
d_M, Delay for Movement [s/veh]	324.65	43.58	43.58	34.82	39.80	39.80	49.72	6.96	6.69	48.90	5.86	5.85
Movement LOS	F	D	D	C	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	207.24			39.76			8.78			7.96		
Approach LOS	F			D			A			A		
d_I, Intersection Delay [s/veh]	41.39											
Intersection LOS	D											
Intersection V/C	0.560											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.67	34.67
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	3.057	2.632
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	933	933	667	667
d_b, Bicycle Delay [s]	12.80	12.80	20.00	20.00
l_b,int, Bicycle LOS Score for Intersection	2.211	1.769	2.535	2.220
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Navajo Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	23.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.571

Intersection Setup

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	187	189	138	28	181	23	40	588	237	197	546	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	187	189	138	28	181	23	40	588	237	197	546	40
Peak Hour Factor	0.9430	0.9430	0.9430	0.9430	0.9430	0.9430	0.9430	0.9430	0.9430	0.9430	0.9430	0.9430
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]	50	50	37	7	48	6	11	156	63	52	145	11
Total Analysis Volume [veh/h]	198	200	146	30	192	24	42	624	251	209	579	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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	44	0	0	44	0	10	10	0	36	36	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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]	90	90	90	90	90	90	90	90	90	90	90	90
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]	13	13	13	13	13	13	4	52	52	13	61	61
g / C, Green / Cycle	0.15	0.15	0.15	0.15	0.15	0.15	0.04	0.57	0.57	0.15	0.68	0.68
(v / s)_i Volume / Saturation Flow Rate	0.12	0.10	0.09	0.02	0.06	0.06	0.02	0.26	0.23	0.12	0.17	0.17
s, saturation flow rate [veh/h]	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	204	266	266	134	266	266	76	1031	1031	249	1214	1214
d1, Uniform Delay [s]	37.01	36.41	35.95	33.29	34.81	34.77	42.14	11.05	10.69	37.40	5.78	5.75
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	22.53	3.17	2.27	0.83	1.01	0.98	6.21	1.40	1.17	7.42	0.52	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	0.97	0.69	0.61	0.22	0.41	0.40	0.55	0.45	0.40	0.84	0.26	0.25
d, Delay for Lane Group [s/veh]	59.54	39.58	38.22	34.12	35.82	35.75	48.35	12.44	11.87	44.83	6.30	6.25
Lane Group LOS	E	D	D	C	D	D	D	B	B	D	A	A
Critical Lane Group	Yes	No	No	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.41	4.00	3.46	0.59	2.21	2.17	1.04	5.21	4.55	4.91	2.17	2.11
50th-Percentile Queue Length [ft/ln]	135.26	99.95	86.58	14.85	55.30	54.27	25.90	130.25	113.63	122.85	54.18	52.66
95th-Percentile Queue Length [veh/ln]	9.22	7.20	6.23	1.07	3.98	3.91	1.86	8.95	8.04	8.55	3.90	3.79
95th-Percentile Queue Length [ft/ln]	230.62	179.91	155.84	26.73	99.54	97.69	46.62	223.83	201.04	213.73	97.53	94.79

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.54	39.47	38.22	34.12	35.79	35.75	48.35	12.29	11.87	44.83	6.28	6.25
Movement LOS	E	D	D	C	D	D	D	B	B	D	A	A
d_A, Approach Delay [s/veh]	46.44			35.58			13.83			15.98		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	23.63											
Intersection LOS	C											
Intersection V/C	0.571											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.916	2.660
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	889	889	133	711
d_b, Bicycle Delay [s]	13.90	13.90	39.21	18.70
l_b,int, Bicycle LOS Score for Intersection	2.008	1.763	2.316	2.244
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX C-III

EXISTING WITH PROJECT WITH MITIGATION TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 12: Kiowa Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	21.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.585

Intersection Setup

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	231	39	28	3	80	30	11	536	126	20	720	5
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	231	39	28	3	80	30	11	536	126	20	720	5
Peak Hour Factor	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430	0.8430
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]	69	12	8	1	24	9	3	159	37	6	214	1
Total Analysis Volume [veh/h]	274	46	33	4	95	36	13	636	149	24	854	6
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	41	61	0	9	29	0	10	10	0	10	10	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	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
g_i, Effective Green Time [s]	17	25	1	8	2	46	46	3	47	47
g / C, Green / Cycle	0.19	0.27	0.01	0.09	0.02	0.51	0.51	0.03	0.52	0.52
(v / s)_i Volume / Saturation Flow Rate	0.16	0.04	0.00	0.07	0.01	0.23	0.21	0.01	0.24	0.24
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	316	493	10	169	33	922	922	52	942	942
d1, Uniform Delay [s]	35.58	24.86	44.61	39.91	43.66	13.84	13.60	42.92	13.44	13.43
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	7.15	0.15	23.07	7.50	7.65	1.52	1.36	6.12	1.60	1.59
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	0.87	0.16	0.39	0.78	0.40	0.44	0.41	0.46	0.46	0.46
d, Delay for Lane Group [s/veh]	42.73	25.01	67.68	47.41	51.32	15.37	14.96	49.04	15.03	15.02
Lane Group LOS	D	C	E	D	D	B	B	D	B	B
Critical Lane Group	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	6.34	1.28	0.15	3.15	0.35	5.25	4.82	0.61	5.52	5.50
50th-Percentile Queue Length [ft/ln]	158.47	32.10	3.83	78.69	8.83	131.33	120.62	15.23	137.90	137.44
95th-Percentile Queue Length [veh/ln]	10.47	2.31	0.28	5.67	0.64	9.01	8.43	1.10	9.37	9.34
95th-Percentile Queue Length [ft/ln]	261.70	57.79	6.89	141.64	15.89	225.30	210.67	27.42	234.19	233.57

Movement, Approach, & Intersection Results

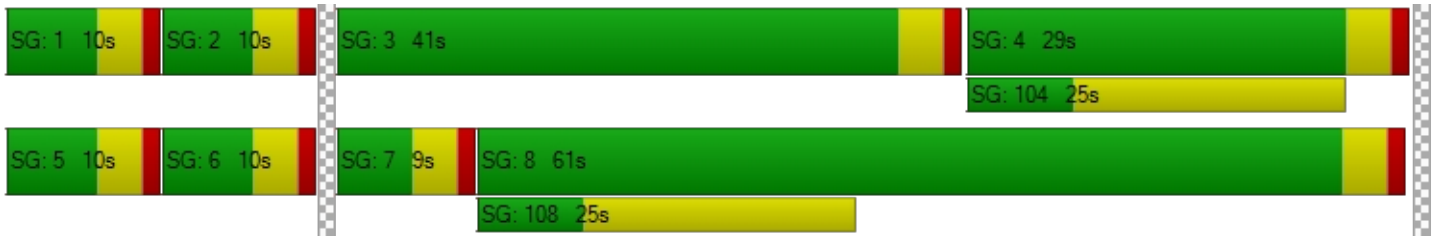
d_M, Delay for Movement [s/veh]	42.73	25.01	25.01	67.68	47.41	47.41	51.32	15.22	14.96	49.04	15.02	15.02
Movement LOS	D	C	C	E	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	38.76			48.01			15.76			15.95		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	21.58											
Intersection LOS	C											
Intersection V/C	0.585											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.69	34.69
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.682	2.603
Crosswalk LOS	F	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]	1266	555	133	133
d_b, Bicycle Delay [s]	6.06	23.49	39.22	39.22
l_b,int, Bicycle LOS Score for Intersection	2.142	1.782	2.218	2.289
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: Kiowa Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	22.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.675

Intersection Setup

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	216	110	45	1	75	43	49	796	265	37	705	10
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	216	110	45	1	75	43	49	796	265	37	705	10
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
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]	57	29	12	0	20	11	13	212	70	10	188	3
Total Analysis Volume [veh/h]	230	117	48	1	80	46	52	847	282	39	750	11
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	41	61	0	9	29	0	10	10	0	10	10	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	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
g_i, Effective Green Time [s]	14	22	0	8	4	48	48	4	47	47
g / C, Green / Cycle	0.16	0.25	0.00	0.09	0.05	0.53	0.53	0.04	0.52	0.52
(v / s)_i Volume / Saturation Flow Rate	0.14	0.09	0.00	0.07	0.03	0.33	0.30	0.02	0.21	0.21
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	271	447	3	163	84	954	954	72	942	942
d1, Uniform Delay [s]	36.79	28.04	44.89	40.06	42.01	14.78	14.22	42.29	13.00	12.98
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	7.23	0.51	40.83	7.58	7.33	2.98	2.44	6.25	1.30	1.28
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	0.85	0.37	0.29	0.77	0.62	0.62	0.57	0.54	0.41	0.40
d, Delay for Lane Group [s/veh]	44.02	28.55	85.72	47.64	49.34	17.76	16.66	48.54	14.29	14.27
Lane Group LOS	D	C	F	D	D	B	B	D	B	B
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.37	2.96	0.06	3.04	1.29	8.52	7.49	0.97	4.71	4.68
50th-Percentile Queue Length [ft/ln]	134.27	73.93	1.53	75.88	32.29	213.03	187.13	24.15	117.64	116.88
95th-Percentile Queue Length [veh/ln]	9.17	5.32	0.11	5.46	2.33	13.31	11.97	1.74	8.26	8.22
95th-Percentile Queue Length [ft/ln]	229.29	133.07	2.75	136.59	58.13	332.72	299.30	43.47	206.57	205.54

Movement, Approach, & Intersection Results

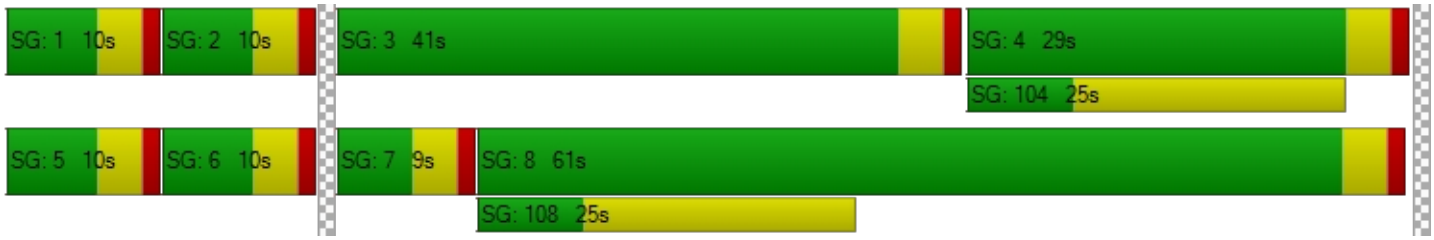
d_M, Delay for Movement [s/veh]	44.02	28.55	28.55	85.72	47.64	47.64	49.34	17.42	16.66	48.54	14.28	14.27
Movement LOS	D	C	C	F	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	37.56			47.94			18.64			15.95		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	22.25											
Intersection LOS	C											
Intersection V/C	0.675											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.69	34.69
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.730	2.630
Crosswalk LOS	F	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]	1266	555	133	133
d_b, Bicycle Delay [s]	6.06	23.49	39.22	39.22
l_b,int, Bicycle LOS Score for Intersection	2.211	1.769	2.534	2.220
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX D

YEAR 2025 TRAFFIC CONDITIONS INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS

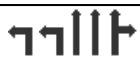
APPENDIX D-I

YEAR 2025 WITHOUT PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 1: Apple Valley Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	34.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.835

Intersection Setup

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	624	204	63	56	147	205	326	1114	489	64	1290	68
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	624	204	63	56	147	205	326	1114	489	64	1290	68
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]	164	54	17	15	39	54	86	293	129	17	339	18
Total Analysis Volume [veh/h]	657	215	66	59	155	216	343	1173	515	67	1358	72
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]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	38	39	0	9	10	0	17	38	0	14	35	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	0	0	24	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	R	L	C	R	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
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	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]	24	33	33	4	14	14	13	41	41	5	34	34
g / C, Green / Cycle	0.24	0.33	0.33	0.04	0.14	0.14	0.13	0.41	0.41	0.05	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.21	0.08	0.07	0.03	0.04	0.12	0.11	0.22	0.29	0.02	0.26	0.27
s, saturation flow rate [veh/h]	3200	1800	1800	1700	3600	1800	3200	5400	1800	3200	3600	1800
c, Capacity [veh/h]	755	596	596	76	506	253	405	2226	742	166	1215	608
d1, Uniform Delay [s]	36.80	24.37	24.20	47.31	38.66	42.04	42.79	22.10	24.23	45.99	29.81	30.06
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	3.29	0.21	0.19	14.99	0.34	8.04	4.98	0.90	5.30	1.59	4.96	10.43
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	0.87	0.25	0.23	0.77	0.31	0.85	0.85	0.53	0.69	0.40	0.78	0.80
d, Delay for Lane Group [s/veh]	40.08	24.58	24.39	62.30	39.00	50.08	47.78	22.99	29.53	47.57	34.77	40.49
Lane Group LOS	D	C	C	E	D	D	D	C	C	D	C	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	7.94	2.54	2.32	1.77	1.73	5.72	4.39	6.89	10.78	0.84	10.78	12.03
50th-Percentile Queue Length [ft/ln]	198.45	63.41	57.95	44.14	43.14	143.06	109.81	172.28	269.45	21.01	269.61	300.71
95th-Percentile Queue Length [veh/ln]	12.56	4.57	4.17	3.18	3.11	9.65	7.83	11.20	16.16	1.51	16.17	17.72
95th-Percentile Queue Length [ft/ln]	313.97	114.14	104.30	79.46	77.65	241.14	195.74	279.91	404.05	37.81	404.25	442.91

Movement, Approach, & Intersection Results

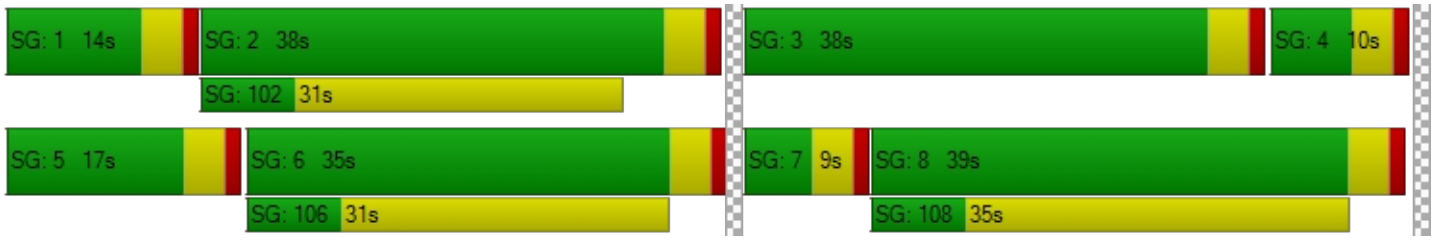
d_M, Delay for Movement [s/veh]	40.08	24.52	24.39	62.30	39.00	50.08	47.78	22.99	29.53	47.57	36.50	40.49
Movement LOS	D	C	C	E	D	D	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	35.41			47.76			28.84			37.19		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	34.31											
Intersection LOS	C											
Intersection V/C	0.835											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	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]	39.64	39.64	0.00	39.64
l_p,int, Pedestrian LOS Score for Intersection	2.730	2.630	0.000	3.071
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	120	680	620
d_b, Bicycle Delay [s]	21.16	44.22	21.81	23.84
l_b,int, Bicycle LOS Score for Intersection	2.333	1.914	2.677	2.383
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Kasota Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	20.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.736

Intersection Setup

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	100	151	111	33	77	67	124	970	88	100	1295	90
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	100	151	111	33	77	67	124	970	88	100	1295	90
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]	26	40	29	9	20	18	33	255	23	26	341	24
Total Analysis Volume [veh/h]	105	159	117	35	81	71	131	1021	93	105	1363	95
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	5	6	0	5	6	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	36	0	0	36	0	12	35	0	19	42	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	16	16	16	16	8	55	55	7	54	54
g / C, Green / Cycle	0.18	0.18	0.18	0.18	0.09	0.61	0.61	0.08	0.60	0.60
(v / s)_i Volume / Saturation Flow Rate	0.06	0.15	0.02	0.08	0.08	0.31	0.31	0.06	0.41	0.40
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	227	324	104	324	154	1093	1093	135	1073	1073
d1, Uniform Delay [s]	32.27	35.76	30.91	33.07	40.36	10.14	10.01	40.67	12.42	12.30
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	1.46	6.26	1.90	1.05	12.09	1.75	1.65	9.11	3.55	3.40
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	0.46	0.85	0.34	0.47	0.85	0.52	0.50	0.78	0.68	0.67
d, Delay for Lane Group [s/veh]	33.73	42.02	32.81	34.12	52.44	11.89	11.67	49.78	15.98	15.70
Lane Group LOS	C	D	C	C	D	B	B	D	B	B
Critical Lane Group	No	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.07	6.31	0.68	3.02	3.34	6.22	5.97	2.60	9.98	9.72
50th-Percentile Queue Length [ft/ln]	51.64	157.80	17.12	75.55	83.49	155.49	149.30	64.96	249.46	242.95
95th-Percentile Queue Length [veh/ln]	3.72	10.43	1.23	5.44	6.01	10.31	9.98	4.68	15.16	14.83
95th-Percentile Queue Length [ft/ln]	92.95	260.80	30.81	136.00	150.29	257.74	249.49	116.93	378.98	370.76

Movement, Approach, & Intersection Results

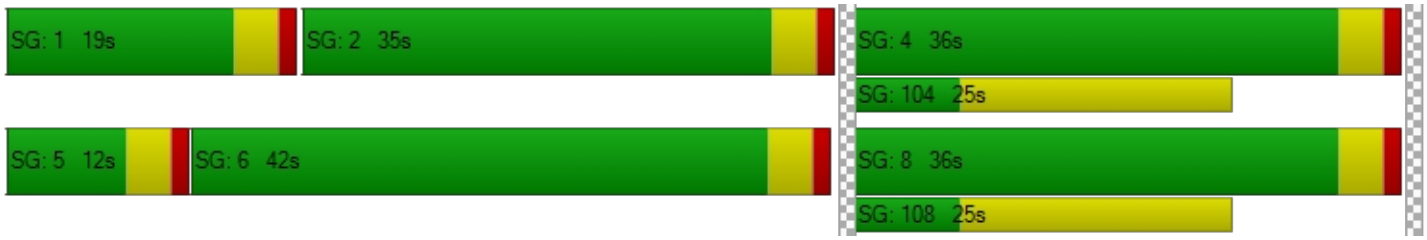
d_M, Delay for Movement [s/veh]	33.73	42.02	42.02	32.81	34.12	34.12	52.44	11.79	11.67	49.78	15.85	15.70
Movement LOS	C	D	D	C	C	C	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	39.74			33.88			16.06			18.12		
Approach LOS	D			C			B			B		
d_I, Intersection Delay [s/veh]	20.67											
Intersection LOS	C											
Intersection V/C	0.736											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.70	34.70
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.992	2.883
Crosswalk LOS	F	F	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	711	711	689	844
d_b, Bicycle Delay [s]	18.71	18.71	19.36	15.04
l_b,int, Bicycle LOS Score for Intersection	2.188	1.868	2.587	2.849
Bicycle LOS	B	A	B	C

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Corwin Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	24.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.793

Intersection Setup

Name	Corwin Road		US Highway 18		US Highway 18	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	1	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Corwin Road		US Highway 18		US Highway 18	
Base Volume Input [veh/h]	35	438	401	727	1015	48
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	35	438	401	727	1015	48
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]	9	115	106	191	267	13
Total Analysis Volume [veh/h]	37	461	422	765	1068	51
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Protected	Permissive	Permissive	Permissive
Signal Group	7	0	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	6	0	6	6	6	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	18	0	43	72	29	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	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
Detector Length [ft]	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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	C
C, Cycle Length [s]	90	90	90	90	90	90
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]	13	13	25	69	40	40
g / C, Green / Cycle	0.15	0.15	0.27	0.76	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.02	0.13	0.25	0.21	0.31	0.31
s, saturation flow rate [veh/h]	1700	3600	1700	3600	1800	1800
c, Capacity [veh/h]	254	538	464	2743	800	800
d1, Uniform Delay [s]	33.30	37.36	31.64	3.24	20.18	20.18
k, delay calibration	0.11	0.11	0.14	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.26	4.09	9.06	0.25	5.06	5.06
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	0.15	0.86	0.91	0.28	0.70	0.70
d, Delay for Lane Group [s/veh]	33.57	41.45	40.69	3.50	25.24	25.24
Lane Group LOS	C	D	D	A	C	C
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.71	5.17	9.75	1.59	10.06	10.06
50th-Percentile Queue Length [ft/ln]	17.85	129.20	243.85	39.65	251.44	251.44
95th-Percentile Queue Length [veh/ln]	1.29	8.90	14.88	2.85	15.26	15.26
95th-Percentile Queue Length [ft/ln]	32.14	222.41	371.90	71.36	381.47	381.47

Movement, Approach, & Intersection Results

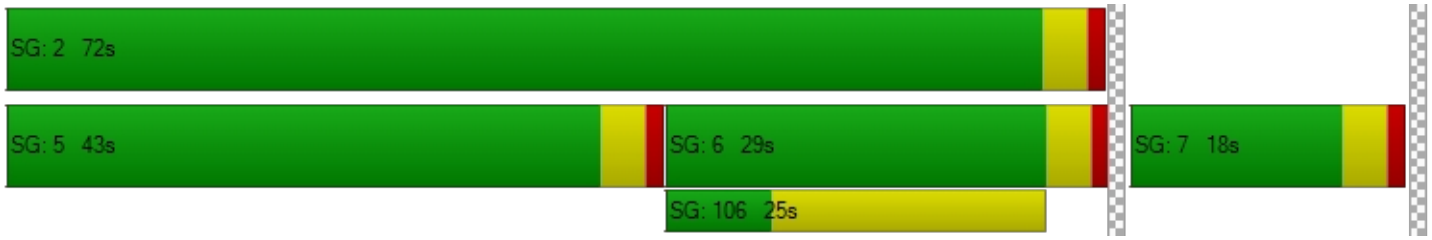
d_M, Delay for Movement [s/veh]	33.57	41.45	40.69	3.50	25.24	25.24
Movement LOS	C	D	D	A	C	C
d_A, Approach Delay [s/veh]	40.87		16.72		25.24	
Approach LOS	D		B		C	
d_I, Intersection Delay [s/veh]	24.41					
Intersection LOS	C					
Intersection V/C	0.793					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.367	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	311	1511	555
d_b, Bicycle Delay [s]	32.10	2.69	23.48
l_b,int, Bicycle LOS Score for Intersection	1.560	2.539	2.483
Bicycle LOS	A	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Tao Road at US Highway 18

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):	0.570

Intersection Setup

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	28	35	11	80	32	104	77	725	46	12	1142	97
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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	35	11	80	32	104	77	725	46	12	1142	97
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]	7	9	3	21	8	27	20	191	12	3	301	26
Total Analysis Volume [veh/h]	29	37	12	84	34	109	81	763	48	13	1202	102
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	29	0	0	29	0	51	51	0	10	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	9	9	9	9	6	67	67	2	63	63
g / C, Green / Cycle	0.10	0.10	0.10	0.10	0.06	0.74	0.74	0.02	0.70	0.70
(v / s)_i Volume / Saturation Flow Rate	0.02	0.03	0.05	0.08	0.05	0.23	0.22	0.01	0.37	0.36
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	94	188	182	188	106	1336	1336	34	1259	1259
d1, Uniform Delay [s]	36.73	37.12	37.98	39.22	41.54	3.87	3.84	43.59	6.41	6.32
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	1.83	0.73	1.80	6.21	10.60	0.59	0.58	7.11	1.56	1.49
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	0.31	0.26	0.46	0.76	0.76	0.31	0.30	0.39	0.52	0.51
d, Delay for Lane Group [s/veh]	38.57	37.85	39.79	45.43	52.14	4.46	4.42	50.71	7.97	7.81
Lane Group LOS	D	D	D	D	D	A	A	D	A	A
Critical Lane Group	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.62	1.02	1.82	3.36	2.06	2.09	2.04	0.35	5.35	5.14
50th-Percentile Queue Length [ft/ln]	15.59	25.53	45.41	83.91	51.57	52.35	50.95	8.75	133.65	128.53
95th-Percentile Queue Length [veh/ln]	1.12	1.84	3.27	6.04	3.71	3.77	3.67	0.63	9.14	8.86
95th-Percentile Queue Length [ft/ln]	28.07	45.95	81.73	151.03	92.82	94.24	91.72	15.75	228.44	221.49

Movement, Approach, & Intersection Results

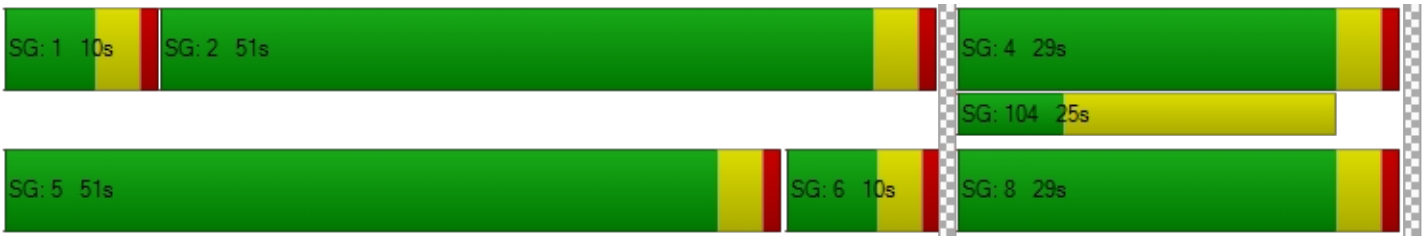
d_M, Delay for Movement [s/veh]	38.57	37.85	37.85	39.79	45.43	45.43	52.14	4.44	4.42	50.71	7.90	7.81
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	38.11			43.34			8.77			8.32		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	12.56											
Intersection LOS	B											
Intersection V/C	0.570											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.776	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	555	555	1044	133
d_b, Bicycle Delay [s]	23.48	23.48	10.28	39.21
l_b,int, Bicycle LOS Score for Intersection	1.688	1.934	2.296	2.646
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Rimrock Road/Piute Road at US Highway 18

Control Type:	Two-way stop	Delay (sec / veh):	16.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.206

Intersection Setup

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			60.00			60.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	0	0	39	0	0	80	41	759	4	30	1177	67
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	0	0	39	0	0	80	41	759	4	30	1177	67
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]	0	0	10	0	0	21	11	200	1	8	310	18
Total Analysis Volume [veh/h]	0	0	41	0	0	84	43	799	4	32	1239	71
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.07	0.00	0.00	0.21	0.08	0.01	0.00	0.04	0.01	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	11.46	0.00	0.00	16.07	12.48	0.00	0.00	9.59	0.00	0.00
Movement LOS			B			C	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.22	0.00	0.00	0.76	0.27	0.00	0.00	0.12	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	5.50	0.00	0.00	19.05	6.67	0.00	0.00	3.06	0.00	0.00
d_A, Approach Delay [s/veh]	11.46			16.07			0.63			0.23		
Approach LOS	B			C			A			A		
d_I, Intersection Delay [s/veh]	1.15											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 6: Rancherias Road at Thunderbird Road

Control Type:	All-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):	0.430

Intersection Setup

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Base Volume Input [veh/h]	106	119	49	195	235	40
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	106	119	49	195	235	40
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]	28	31	13	51	62	11
Total Analysis Volume [veh/h]	112	125	52	205	247	42
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	622	709	577	628	575	710
Degree of Utilization, x	0.18	0.18	0.09	0.33	0.43	0.06

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.65	0.64	0.30	1.42	2.15	0.19
95th-Percentile Queue Length [ft]	16.29	15.91	7.39	35.40	53.80	4.71
Approach Delay [s/veh]	9.28		10.86		12.82	
Approach LOS	A		B		B	
Intersection Delay [s/veh]	11.10					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 7: Rancherias Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	21.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.611

Intersection Setup

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	86	92	112	87	134	245	131	655	22	79	940	89
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	86	92	112	87	134	245	131	655	22	79	940	89
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]	23	24	29	23	35	64	34	172	6	21	247	23
Total Analysis Volume [veh/h]	91	97	118	92	141	258	138	689	23	83	989	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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	43	0	0	43	0	18	21	0	26	29	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	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	21	0	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
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
l1_p, Permitted Start-Up Lost Time [s]	2.00	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
g_i, Effective Green Time [s]	16	16	16	16	16	9	57	57	6	53	53
g / C, Green / Cycle	0.17	0.17	0.17	0.17	0.17	0.10	0.63	0.63	0.06	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.05	0.12	0.05	0.08	0.14	0.08	0.20	0.20	0.05	0.31	0.30
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	226	313	156	313	313	172	1131	1131	110	1065	1065
d1, Uniform Delay [s]	32.47	34.90	32.49	33.34	35.87	39.61	7.77	7.75	41.45	10.82	10.68
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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
d2, Incremental Delay [s]	1.16	2.66	3.52	1.01	5.41	8.41	0.74	0.72	10.10	1.79	1.68
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	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
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

Lane Group Results

X, volume / capacity	0.40	0.69	0.59	0.45	0.82	0.80	0.32	0.31	0.76	0.52	0.50
d, Delay for Lane Group [s/veh]	33.62	37.56	36.01	34.35	41.28	48.02	8.51	8.48	51.54	12.60	12.36
Lane Group LOS	C	D	D	C	D	D	A	A	D	B	B
Critical Lane Group	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.78	4.57	1.88	2.81	5.83	3.35	3.08	3.04	2.10	6.31	6.04
50th-Percentile Queue Length [ft/ln]	44.56	114.35	47.06	70.22	145.69	83.70	77.10	76.01	52.50	157.65	150.94
95th-Percentile Queue Length [veh/ln]	3.21	8.08	3.39	5.06	9.79	6.03	5.55	5.47	3.78	10.42	10.07
95th-Percentile Queue Length [ft/ln]	80.21	202.04	84.70	126.39	244.66	150.65	138.77	136.82	94.49	260.61	251.68

Movement, Approach, & Intersection Results

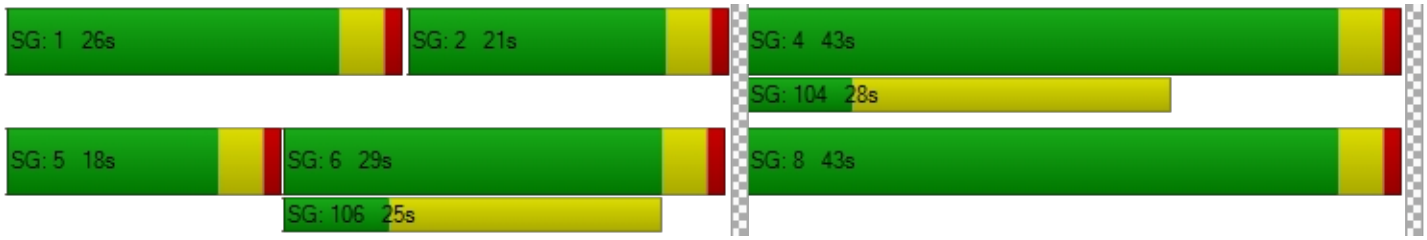
d_M, Delay for Movement [s/veh]	33.62	37.56	37.56	36.01	34.35	41.28	48.02	8.49	8.48	51.54	12.50	12.36
Movement LOS	C	D	D	D	C	D	D	A	A	D	B	B
d_A, Approach Delay [s/veh]	36.39			38.30			14.91			15.27		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	21.48											
Intersection LOS	C											
Intersection V/C	0.611											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	34.70	34.70	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.330	2.855	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	866	866	378	555
d_b, Bicycle Delay [s]	14.47	14.47	29.63	23.49
l_b,int, Bicycle LOS Score for Intersection	2.065	2.370	2.261	2.522
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Rancherias Road at Tomahawk Road

Control Type:	Two-way stop	Delay (sec / veh):	11.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.150

Intersection Setup

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
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 Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
Base Volume Input [veh/h]	15	155	99	113	90	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	15	155	99	113	90	16
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]	4	41	26	30	24	4
Total Analysis Volume [veh/h]	16	163	104	119	95	17
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			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	0.15	0.02
d_M, Delay for Movement [s/veh]	7.71	0.00	0.00	0.00	11.81	10.20
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.04	0.04	0.00	0.00	0.61	0.61
95th-Percentile Queue Length [ft/ln]	0.90	0.90	0.00	0.00	15.19	15.19
d_A, Approach Delay [s/veh]	0.69		0.00		11.57	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.76					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 9: Bass Hill Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	18.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.447

Intersection Setup

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	121	56	68	25	30	67	105	583	51	99	906	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	121	56	68	25	30	67	105	583	51	99	906	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]	32	15	18	7	8	18	28	153	13	26	238	7
Total Analysis Volume [veh/h]	127	59	72	26	32	71	111	614	54	104	954	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]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Overlap	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	8	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups			1,8			4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	6	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	30	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	10	0	35	35	10	32	0	23	45	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	24	0	21	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No	No		No	No	No	No		No	No	
Maximum Recall		No	No		No	No	No	No		No	No	
Pedestrian Recall		No	No		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	R	L	C	R	L	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
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	0.00	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	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]	6	6	18	6	6	26	6	64	64	8	66	66
g / C, Green / Cycle	0.06	0.06	0.18	0.06	0.06	0.26	0.06	0.64	0.64	0.08	0.66	0.66
(v / s)_i Volume / Saturation Flow Rate	0.04	0.03	0.04	0.01	0.02	0.04	0.03	0.17	0.03	0.06	0.27	0.02
s, saturation flow rate [veh/h]	3200	1800	1800	3200	1800	1800	3200	3600	1800	1700	3600	1800
c, Capacity [veh/h]	220	114	329	190	107	469	186	2298	1149	135	2374	1187
d1, Uniform Delay [s]	45.73	45.41	34.84	44.68	45.12	28.49	46.01	7.90	6.76	45.21	7.91	5.90
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	2.38	3.58	0.33	0.33	1.56	0.15	3.03	0.29	0.08	8.95	0.51	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	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	0.58	0.52	0.22	0.14	0.30	0.15	0.60	0.27	0.05	0.77	0.40	0.02
d, Delay for Lane Group [s/veh]	48.11	48.99	35.17	45.00	46.67	28.63	49.04	8.19	6.83	54.16	8.41	5.94
Lane Group LOS	D	D	D	D	D	C	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.60	1.53	1.52	0.31	0.80	1.33	1.42	2.73	0.42	2.85	4.42	0.20
50th-Percentile Queue Length [ft/ln]	40.11	38.16	38.00	7.84	20.11	33.19	35.46	68.31	10.55	71.31	110.46	4.96
95th-Percentile Queue Length [veh/ln]	2.89	2.75	2.74	0.56	1.45	2.39	2.55	4.92	0.76	5.13	7.87	0.36
95th-Percentile Queue Length [ft/ln]	72.20	68.69	68.39	14.12	36.20	59.74	63.83	122.95	18.99	128.36	196.64	8.93

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	48.11	48.99	35.17	45.00	46.67	28.63	49.04	8.19	6.83	54.16	8.41	5.94
Movement LOS	D	D	D	D	D	C	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	44.70			36.41			13.91			12.73		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	18.16											
Intersection LOS	B											
Intersection V/C	0.447											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
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]	39.64	39.64	39.64	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.531	2.511	3.048	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	120	620	560	819
d_b, Bicycle Delay [s]	44.22	23.84	25.95	17.43
l_b,int, Bicycle LOS Score for Intersection	1.985	1.772	2.202	2.456
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: Dale Evans Parkway at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	15.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.559

Intersection Setup

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	4	3	0	141	6	153	103	597	6	0	914	190
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	4	3	0	141	6	153	103	597	6	0	914	190
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]	1	1	0	37	2	40	27	157	2	0	241	50
Total Analysis Volume [veh/h]	4	3	0	148	6	161	108	628	6	0	962	200
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	10	0	0	35	0	10	21	0	24	35	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	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	0	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	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
g_i, Effective Green Time [s]	1	11	11	11	6	62	62	0	57	57
g / C, Green / Cycle	0.01	0.12	0.12	0.12	0.06	0.69	0.69	0.00	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.00	0.05	0.00	0.09	0.03	0.18	0.18	0.00	0.33	0.31
s, saturation flow rate [veh/h]	1700	3200	1800	1800	3200	1800	1800	1700	1800	1800
c, Capacity [veh/h]	21	381	214	214	202	1242	1242	2	1131	1131
d1, Uniform Delay [s]	44.19	36.69	35.11	38.43	40.95	5.26	5.25	0.00	9.34	9.08
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	9.50	0.65	0.05	5.24	2.17	0.50	0.49	0.00	1.77	1.57
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	0.34	0.39	0.03	0.75	0.53	0.26	0.25	0.00	0.53	0.50
d, Delay for Lane Group [s/veh]	53.69	37.34	35.16	43.66	43.12	5.75	5.75	0.00	11.11	10.65
Lane Group LOS	D	D	D	D	D	A	A	A	B	B
Critical Lane Group	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.21	1.52	0.12	3.70	1.21	2.03	2.02	0.00	6.27	5.74
50th-Percentile Queue Length [ft/ln]	5.19	38.05	2.96	92.55	30.27	50.81	50.62	0.00	156.77	143.40
95th-Percentile Queue Length [veh/ln]	0.37	2.74	0.21	6.66	2.18	3.66	3.64	0.00	10.38	9.66
95th-Percentile Queue Length [ft/ln]	9.35	68.49	5.33	166.59	54.48	91.46	91.11	0.00	259.45	241.59

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	53.69	53.69	53.69	37.34	35.16	43.66	43.12	5.75	5.75	0.00	10.94	10.65
Movement LOS	D	D	D	D	D	D	D	A	A	A	B	B
d_A, Approach Delay [s/veh]	53.69			40.53			11.19			10.89		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	15.32											
Intersection LOS	B											
Intersection V/C	0.559											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	34.72	34.72	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.554	2.854	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	133	688	377	688
d_b, Bicycle Delay [s]	39.24	19.38	29.65	19.38
l_b,int, Bicycle LOS Score for Intersection	1.571	2.079	2.172	2.518
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: Flathead Road at US Highway 18

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):	0.456

Intersection Setup

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	66	36	41	12	58	84	10	686	37	28	967	31
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	66	36	41	12	58	84	10	686	37	28	967	31
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	9	11	3	15	22	3	181	10	7	254	8
Total Analysis Volume [veh/h]	69	38	43	13	61	88	11	722	39	29	1018	33
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	70	0	0	70	0	10	10	0	10	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	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	2.00	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
g_i, Effective Green Time [s]	11	11	2	64	64	3	66	66
g / C, Green / Cycle	0.12	0.12	0.02	0.71	0.71	0.04	0.73	0.73
(v / s)_i Volume / Saturation Flow Rate	0.09	0.10	0.01	0.21	0.21	0.02	0.29	0.29
s, saturation flow rate [veh/h]	1700	1700	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	259	244	29	1284	1284	61	1317	1317
d1, Uniform Delay [s]	38.42	38.72	43.76	4.71	4.69	42.60	4.60	4.57
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.05	3.10	7.68	0.60	0.58	5.76	0.91	0.90
d3, Initial Queue Delay [s]	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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.58	0.66	0.37	0.30	0.29	0.48	0.40	0.40
d, Delay for Lane Group [s/veh]	40.46	41.82	51.44	5.31	5.27	48.37	5.51	5.47
Lane Group LOS	D	D	D	A	A	D	A	A
Critical Lane Group	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	3.30	3.64	0.30	2.29	2.24	0.72	3.18	3.13
50th-Percentile Queue Length [ft/ln]	82.56	91.10	7.58	57.36	56.10	18.10	79.57	78.33
95th-Percentile Queue Length [veh/ln]	5.94	6.56	0.55	4.13	4.04	1.30	5.73	5.64
95th-Percentile Queue Length [ft/ln]	148.61	163.99	13.64	103.25	100.99	32.57	143.23	140.99

Movement, Approach, & Intersection Results

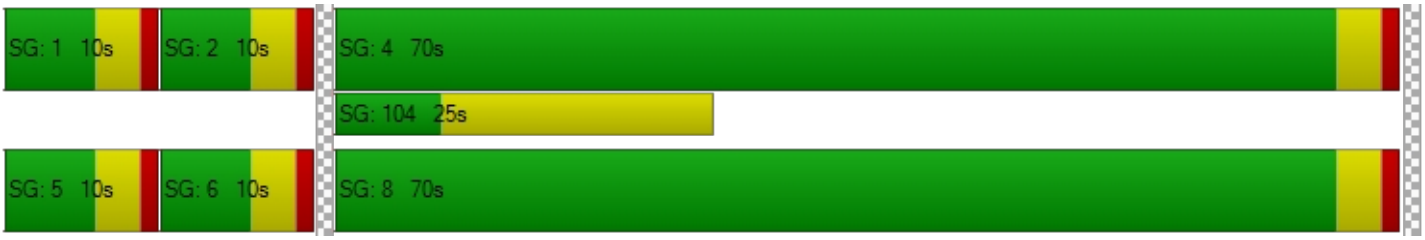
d_M, Delay for Movement [s/veh]	40.46	40.46	40.46	41.82	41.82	41.82	51.44	5.29	5.27	48.37	5.49	5.47
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	40.46			41.82			5.94			6.64		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	11.37											
Intersection LOS	B											
Intersection V/C	0.456											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.777	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1466	1466	133	133
d_b, Bicycle Delay [s]	3.21	3.21	39.21	39.21
l_b,int, Bicycle LOS Score for Intersection	1.807	1.827	2.197	2.451
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: Kiowa Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	130.1
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.439

Intersection Setup

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	245	41	30	3	85	32	12	582	134	21	742	5
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	245	41	30	3	85	32	12	582	134	21	742	5
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]	64	11	8	1	22	8	3	153	35	6	195	1
Total Analysis Volume [veh/h]	258	43	32	3	89	34	13	613	141	22	781	5
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	49	0	0	49	0	10	30	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	8	8	8	8	2	67	67	3	68	68
g / C, Green / Cycle	0.09	0.09	0.09	0.09	0.02	0.75	0.75	0.03	0.76	0.76
(v / s)_i Volume / Saturation Flow Rate	0.15	0.04	0.00	0.07	0.01	0.22	0.20	0.01	0.22	0.22
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	85	161	131	161	31	1349	1349	48	1366	1366
d1, Uniform Delay [s]	39.29	38.95	37.39	40.07	43.68	3.61	3.55	43.05	3.35	3.34
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	920.79	2.10	0.07	7.40	8.45	0.54	0.49	6.69	0.53	0.53
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	3.03	0.47	0.02	0.77	0.41	0.29	0.27	0.46	0.29	0.29
d, Delay for Lane Group [s/veh]	960.08	41.05	37.46	47.46	52.13	4.15	4.04	49.75	3.88	3.87
Lane Group LOS	F	D	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	23.55	1.65	0.06	2.96	0.36	1.87	1.73	0.57	1.78	1.77
50th-Percentile Queue Length [ft/ln]	588.84	41.28	1.56	73.93	8.94	46.86	43.23	14.16	44.42	44.30
95th-Percentile Queue Length [veh/ln]	38.54	2.97	0.11	5.32	0.64	3.37	3.11	1.02	3.20	3.19
95th-Percentile Queue Length [ft/ln]	963.58	74.30	2.80	133.07	16.08	84.35	77.82	25.49	79.96	79.74

Movement, Approach, & Intersection Results

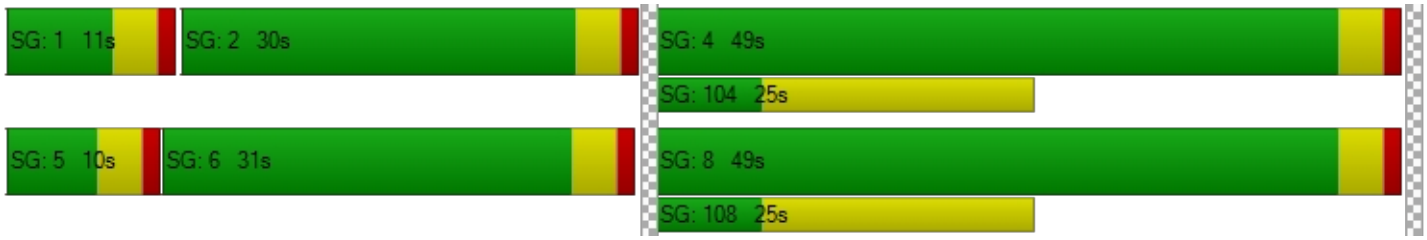
d_M, Delay for Movement [s/veh]	960.08	41.05	41.05	37.46	47.46	47.46	52.13	4.11	4.04	49.75	3.88	3.87
Movement LOS	F	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	753.09			47.23			4.91			5.13		
Approach LOS	F			D			A			A		
d_I, Intersection Delay [s/veh]	130.11											
Intersection LOS	F											
Intersection V/C	0.439											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.67	34.67
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	3.025	2.588
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1000	1000	578	600
d_b, Bicycle Delay [s]	11.25	11.25	22.76	22.05
I_b,int, Bicycle LOS Score for Intersection	2.109	1.768	2.192	2.226
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Navajo Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	20.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.473

Intersection Setup

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	172	102	119	40	129	12	14	486	135	186	559	31
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	172	102	119	40	129	12	14	486	135	186	559	31
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]	45	27	31	11	34	3	4	128	36	49	147	8
Total Analysis Volume [veh/h]	181	107	125	42	136	13	15	512	142	196	588	33
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	44	0	0	44	0	10	27	0	19	36	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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]	90	90	90	90	90	90	90	90	90	90	90	90
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]	12	12	12	12	12	12	2	54	54	12	64	64
g / C, Green / Cycle	0.13	0.13	0.13	0.13	0.13	0.13	0.02	0.60	0.60	0.14	0.71	0.71
(v / s)_i Volume / Saturation Flow Rate	0.11	0.06	0.07	0.02	0.04	0.04	0.01	0.19	0.18	0.12	0.17	0.17
s, saturation flow rate [veh/h]	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	213	243	243	167	243	243	38	1072	1072	231	1277	1277
d1, Uniform Delay [s]	37.69	35.80	36.19	34.53	35.14	35.12	43.44	9.06	8.92	38.01	4.60	4.58
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	9.22	1.25	1.68	0.78	0.71	0.70	6.70	0.77	0.70	8.44	0.46	0.45
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	0.85	0.44	0.51	0.25	0.31	0.30	0.40	0.32	0.29	0.85	0.25	0.24
d, Delay for Lane Group [s/veh]	46.90	37.05	37.87	35.31	35.85	35.82	50.14	9.83	9.62	46.45	5.06	5.03
Lane Group LOS	D	D	D	D	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.34	2.22	2.63	0.84	1.51	1.50	0.40	3.23	2.97	4.69	1.82	1.78
50th-Percentile Queue Length [ft/ln]	108.55	55.43	65.79	21.09	37.83	37.40	9.92	80.85	74.22	117.28	45.41	44.41
95th-Percentile Queue Length [veh/ln]	7.76	3.99	4.74	1.52	2.72	2.69	0.71	5.82	5.34	8.24	3.27	3.20
95th-Percentile Queue Length [ft/ln]	193.99	99.78	118.43	37.96	68.10	67.32	17.85	145.53	133.59	206.08	81.74	79.94

Movement, Approach, & Intersection Results

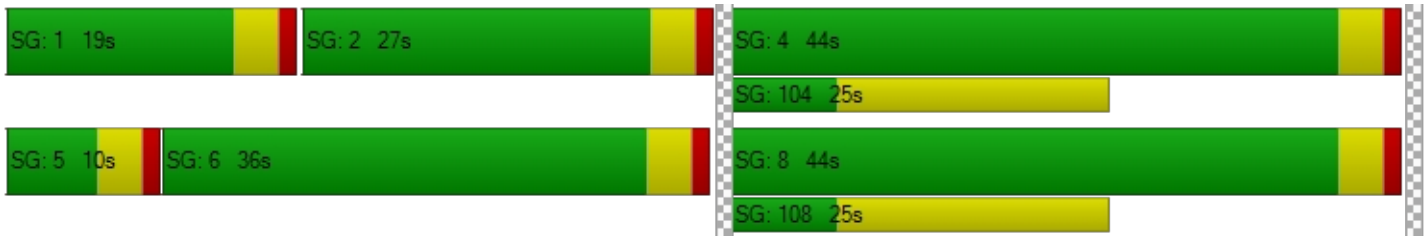
d_M, Delay for Movement [s/veh]	46.90	37.05	37.87	35.31	35.83	35.82	50.14	9.76	9.62	46.45	5.05	5.03
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	41.62			35.72			10.63			14.98		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	20.75											
Intersection LOS	C											
Intersection V/C	0.473											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.840	2.651
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	889	889	511	711
d_b, Bicycle Delay [s]	13.90	13.90	24.95	18.70
l_b,int, Bicycle LOS Score for Intersection	1.900	1.717	2.112	2.234
Bicycle LOS	A	A	B	B

Sequence

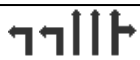
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: Apple Valley Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	37.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.888

Intersection Setup

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	441	158	77	104	226	310	181	1577	718	72	1361	83
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	441	158	77	104	226	310	181	1577	718	72	1361	83
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]	116	42	20	27	59	82	48	415	189	19	358	22
Total Analysis Volume [veh/h]	464	166	81	109	238	326	191	1660	756	76	1433	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]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	23	39	0	14	30	0	12	57	0	10	55	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	0	0	24	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	R	L	C	R	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
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	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]	19	33	33	9	24	24	8	56	56	6	53	53
g / C, Green / Cycle	0.16	0.28	0.28	0.08	0.20	0.20	0.07	0.46	0.46	0.05	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.15	0.07	0.06	0.06	0.07	0.18	0.06	0.31	0.42	0.02	0.28	0.29
s, saturation flow rate [veh/h]	3200	1800	1800	1700	3600	1800	3200	5400	1800	3200	3600	1800
c, Capacity [veh/h]	508	500	500	134	712	356	218	2497	832	152	1591	796
d1, Uniform Delay [s]	49.70	33.78	33.51	54.44	41.39	47.20	55.48	25.06	29.92	55.80	25.95	26.16
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.25	0.11	0.50	0.50	0.11	0.50	0.50
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]	6.81	0.27	0.24	11.04	0.27	18.39	10.71	1.42	15.54	2.51	1.92	4.01
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	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	0.91	0.26	0.23	0.81	0.33	0.92	0.88	0.66	0.91	0.50	0.63	0.65
d, Delay for Lane Group [s/veh]	56.51	34.05	33.75	65.48	41.66	65.59	66.19	26.47	45.46	58.31	27.88	30.17
Lane Group LOS	E	C	C	E	D	E	E	C	D	E	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	7.31	3.01	2.68	3.66	3.07	11.32	3.19	12.32	23.17	1.18	11.39	12.16
50th-Percentile Queue Length [ft/ln]	182.81	75.25	67.03	91.39	76.69	282.97	79.75	308.10	579.15	29.46	284.83	304.12
95th-Percentile Queue Length [veh/ln]	11.75	5.42	4.83	6.58	5.52	16.84	5.74	18.08	31.06	2.12	16.93	17.88
95th-Percentile Queue Length [ft/ln]	293.68	135.45	120.65	164.51	138.05	420.91	143.54	452.03	776.49	53.02	423.23	447.12

Movement, Approach, & Intersection Results

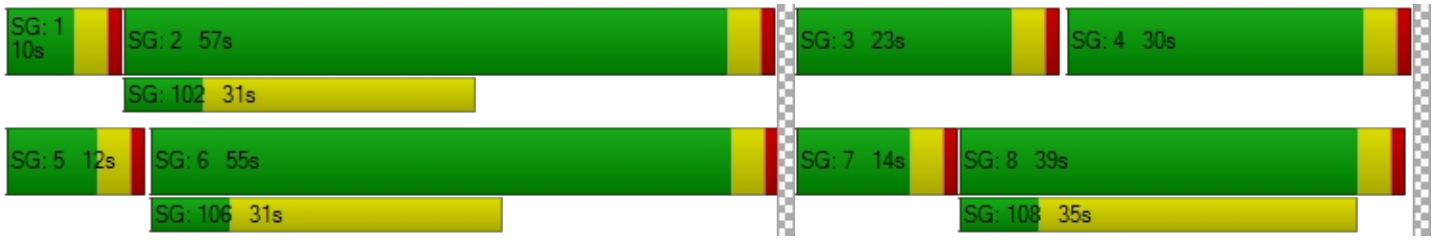
d_M, Delay for Movement [s/veh]	56.51	33.99	33.75	65.48	41.66	65.59	66.19	26.47	45.46	58.31	28.56	30.17
Movement LOS	E	C	C	E	D	E	E	C	D	E	C	C
d_A, Approach Delay [s/veh]	48.66			57.11			34.89			30.06		
Approach LOS	D			E			C			C		
d_I, Intersection Delay [s/veh]	37.94											
Intersection LOS	D											
Intersection V/C	0.888											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	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]	49.54	49.54	0.00	49.54
l_p,int, Pedestrian LOS Score for Intersection	2.756	2.648	0.000	3.159
Crosswalk LOS	C	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	433	883	850
d_b, Bicycle Delay [s]	30.13	36.85	18.73	19.86
l_b,int, Bicycle LOS Score for Intersection	2.146	2.115	2.993	2.437
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Kasota Road at US Highway 18

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):	0.771

Intersection Setup

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	91	56	69	109	120	121	85	1595	69	65	1356	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	91	56	69	109	120	121	85	1595	69	65	1356	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]	24	15	18	29	32	32	22	420	18	17	357	13
Total Analysis Volume [veh/h]	96	59	73	115	126	127	89	1679	73	68	1427	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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	5	6	0	5	6	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	43	0	0	43	0	9	38	0	9	38	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	15	15	15	15	5	58	58	5	58	58
g / C, Green / Cycle	0.17	0.17	0.17	0.17	0.06	0.65	0.65	0.05	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.06	0.07	0.07	0.14	0.05	0.49	0.49	0.04	0.41	0.41
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	106	302	223	302	98	1163	1163	89	1154	1154
d1, Uniform Delay [s]	33.05	33.65	33.45	36.28	42.21	11.00	10.96	42.12	9.88	9.83
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	23.50	0.99	1.84	6.09	24.55	4.56	4.51	12.45	2.78	2.71
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	0.91	0.44	0.52	0.84	0.91	0.75	0.75	0.76	0.64	0.64
d, Delay for Lane Group [s/veh]	56.55	34.64	35.28	42.37	66.76	15.55	15.47	54.57	12.66	12.54
Lane Group LOS	E	C	D	D	E	B	B	D	B	B
Critical Lane Group	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.51	2.64	2.33	5.79	2.61	11.62	11.54	1.79	8.56	8.44
50th-Percentile Queue Length [ft/ln]	62.85	65.96	58.16	144.79	65.35	290.52	288.62	44.63	214.10	210.90
95th-Percentile Queue Length [veh/ln]	4.53	4.75	4.19	9.74	4.70	17.21	17.12	3.21	13.36	13.20
95th-Percentile Queue Length [ft/ln]	113.13	118.73	104.69	243.45	117.62	430.28	427.93	80.33	334.09	329.98

Movement, Approach, & Intersection Results

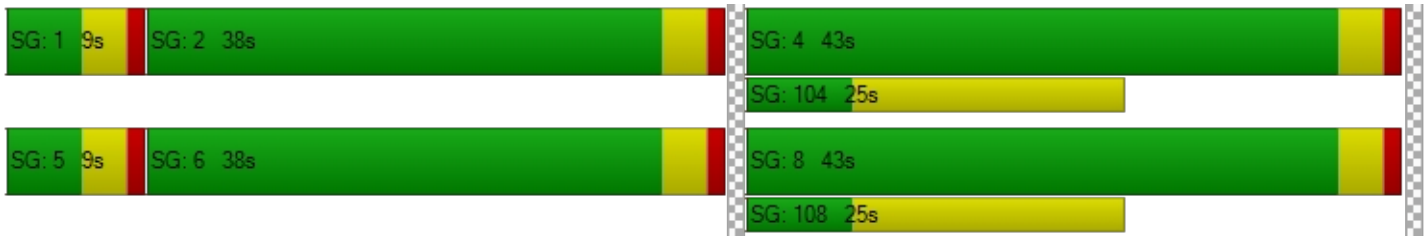
d_M, Delay for Movement [s/veh]	56.55	34.64	34.64	35.28	42.37	42.37	66.76	15.51	15.47	54.57	12.60	12.54
Movement LOS	E	C	C	D	D	D	E	B	B	D	B	B
d_A, Approach Delay [s/veh]	43.87			40.15			17.99			14.44		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	20.14											
Intersection LOS	C											
Intersection V/C	0.771											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.70	34.70
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	3.117	3.129
Crosswalk LOS	F	F	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	866	866	755	755
d_b, Bicycle Delay [s]	14.47	14.47	17.44	17.44
l_b,int, Bicycle LOS Score for Intersection	1.936	2.167	3.078	2.838
Bicycle LOS	A	B	C	C

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Corwin Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	23.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.833

Intersection Setup

Name	Corwin Road		US Highway 18		US Highway 18	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	1	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Corwin Road		US Highway 18		US Highway 18	
Base Volume Input [veh/h]	43	406	473	1285	1046	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	43	406	473	1285	1046	16
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]	11	107	124	338	275	4
Total Analysis Volume [veh/h]	45	427	498	1353	1101	17
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Protected	Permissive	Permissive	Permissive
Signal Group	7	0	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	6	0	6	6	6	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	16	0	41	74	33	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	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
Detector Length [ft]	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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	C
C, Cycle Length [s]	90	90	90	90	90	90
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]	12	12	28	70	37	37
g / C, Green / Cycle	0.13	0.13	0.32	0.78	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.03	0.12	0.29	0.38	0.31	0.31
s, saturation flow rate [veh/h]	1700	3600	1700	3600	1800	1800
c, Capacity [veh/h]	228	483	538	2798	749	749
d1, Uniform Delay [s]	34.68	38.31	29.73	3.58	22.27	22.27
k, delay calibration	0.11	0.11	0.25	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.42	5.59	14.27	0.60	6.69	6.69
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	0.20	0.88	0.92	0.48	0.75	0.75
d, Delay for Lane Group [s/veh]	35.10	43.90	44.00	4.18	28.96	28.96
Lane Group LOS	D	D	D	A	C	C
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.89	4.92	12.14	3.14	10.88	10.88
50th-Percentile Queue Length [ft/ln]	22.36	123.09	303.50	78.49	272.10	272.10
95th-Percentile Queue Length [veh/ln]	1.61	8.56	17.85	5.65	16.29	16.29
95th-Percentile Queue Length [ft/ln]	40.26	214.07	446.36	141.28	407.36	407.36

Movement, Approach, & Intersection Results

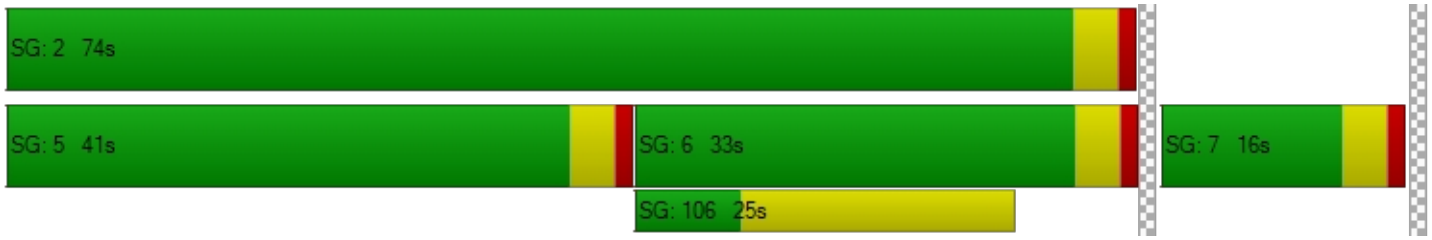
d_M, Delay for Movement [s/veh]	35.10	43.90	44.00	4.18	28.96	28.96
Movement LOS	D	D	D	A	C	C
d_A, Approach Delay [s/veh]	43.06		14.90		28.96	
Approach LOS	D		B		C	
d_I, Intersection Delay [s/veh]	23.33					
Intersection LOS	C					
Intersection V/C	0.833					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.371	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	267	1555	644
d_b, Bicycle Delay [s]	33.81	2.23	20.68
l_b,int, Bicycle LOS Score for Intersection	1.560	3.087	2.482
Bicycle LOS	A	C	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Tao Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	15.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.572

Intersection Setup

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	57	51	29	149	43	100	119	1281	38	27	1021	90
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	57	51	29	149	43	100	119	1281	38	27	1021	90
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	13	8	39	11	26	31	337	10	7	269	24
Total Analysis Volume [veh/h]	60	54	31	157	45	105	125	1348	40	28	1075	95
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	40	0	0	40	0	40	12	0	38	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	11	11	11	11	8	64	64	3	59	59
g / C, Green / Cycle	0.12	0.12	0.12	0.12	0.09	0.71	0.71	0.03	0.65	0.65
(v / s)_i Volume / Saturation Flow Rate	0.04	0.05	0.09	0.08	0.07	0.39	0.38	0.02	0.33	0.32
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	114	214	176	214	159	1283	1283	59	1177	1177
d1, Uniform Delay [s]	36.21	36.67	38.49	38.11	39.93	6.06	6.03	42.65	8.03	7.93
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	3.70	1.19	14.37	4.10	8.29	1.65	1.63	5.77	1.54	1.46
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
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	0.53	0.40	0.89	0.70	0.79	0.54	0.54	0.47	0.50	0.49
d, Delay for Lane Group [s/veh]	39.92	37.85	52.86	42.21	48.23	7.71	7.66	48.41	9.57	9.39
Lane Group LOS	D	D	D	D	D	A	A	D	A	A
Critical Lane Group	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.31	1.78	4.01	3.38	3.04	5.45	5.38	0.70	5.59	5.36
50th-Percentile Queue Length [ft/ln]	32.71	44.48	100.34	84.44	75.92	136.16	134.56	17.51	139.71	134.05
95th-Percentile Queue Length [veh/ln]	2.36	3.20	7.22	6.08	5.47	9.27	9.19	1.26	9.47	9.16
95th-Percentile Queue Length [ft/ln]	58.88	80.06	180.61	151.99	136.65	231.85	229.68	31.51	236.64	228.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	39.92	37.85	37.85	52.86	42.21	42.21	48.23	7.69	7.66	48.41	9.49	9.39
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	38.71			47.66			11.03			10.39		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	15.61											
Intersection LOS	B											
Intersection V/C	0.572											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.922	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	800	800	178	133
d_b, Bicycle Delay [s]	16.21	16.21	37.37	39.21
I_b,int, Bicycle LOS Score for Intersection	1.799	2.066	2.808	2.548
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Rimrock Road/Piute Road at US Highway 18

Control Type:	Two-way stop	Delay (sec / veh):	16.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.198

Intersection Setup

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			60.00			60.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	0	0	71	0	0	49	90	1331	7	45	1061	65
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	0	0	71	0	0	49	90	1331	7	45	1061	65
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]	0	0	19	0	0	13	24	350	2	12	279	17
Total Analysis Volume [veh/h]	0	0	75	0	0	52	95	1401	7	47	1117	68
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.20	0.00	0.00	0.12	0.16	0.01	0.00	0.10	0.01	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	16.81	0.00	0.00	14.06	12.34	0.00	0.00	13.30	0.00	0.00
Movement LOS			C			B	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.73	0.00	0.00	0.39	0.58	0.00	0.00	0.32	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	18.13	0.00	0.00	9.74	14.40	0.00	0.00	8.08	0.00	0.00
d_A, Approach Delay [s/veh]	16.81			14.06			0.78			0.51		
Approach LOS	C			B			A			A		
d_I, Intersection Delay [s/veh]	1.32											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 6: Rancherias Road at Thunderbird Road

Control Type:	All-way stop	Delay (sec / veh):	12.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.467

Intersection Setup

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Base Volume Input [veh/h]	243	176	60	186	236	57
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	243	176	60	186	236	57
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]	64	46	16	49	62	15
Total Analysis Volume [veh/h]	256	185	63	196	248	60
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	605	686	541	585	531	645
Degree of Utilization, x	0.42	0.27	0.12	0.33	0.47	0.09

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	2.10	1.09	0.39	1.47	2.46	0.31
95th-Percentile Queue Length [ft]	52.52	27.20	9.83	36.66	61.46	7.66
Approach Delay [s/veh]	11.66		11.51		14.03	
Approach LOS	B		B		B	
Intersection Delay [s/veh]	12.34					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 7: Rancherias Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	28.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.699

Intersection Setup

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	35	148	137	106	125	218	213	1111	60	130	904	125
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	35	148	137	106	125	218	213	1111	60	130	904	125
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	39	36	28	33	57	56	292	16	34	238	33
Total Analysis Volume [veh/h]	37	156	144	112	132	229	224	1169	63	137	952	132
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	46	0	0	46	0	15	31	0	13	29	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	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	21	0	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
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
l1_p, Permitted Start-Up Lost Time [s]	2.00	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
g_i, Effective Green Time [s]	17	17	17	17	17	11	52	52	9	50	50
g / C, Green / Cycle	0.19	0.19	0.19	0.19	0.19	0.12	0.58	0.58	0.10	0.55	0.55
(v / s)_i Volume / Saturation Flow Rate	0.02	0.17	0.07	0.07	0.13	0.13	0.34	0.34	0.08	0.31	0.30
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	268	348	105	348	348	210	1033	1033	169	990	990
d1, Uniform Delay [s]	29.97	35.19	31.25	31.64	33.60	39.47	12.46	12.38	39.73	13.17	12.95
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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
d2, Incremental Delay [s]	0.23	6.37	60.90	0.68	2.13	47.73	2.58	2.49	8.90	2.28	2.09
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
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
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

Lane Group Results

X, volume / capacity	0.14	0.86	1.07	0.38	0.66	1.06	0.60	0.59	0.81	0.56	0.54
d, Delay for Lane Group [s/veh]	30.21	41.56	92.14	32.33	35.72	87.20	15.04	14.87	48.63	15.45	15.03
Lane Group LOS	C	D	F	C	D	F	B	B	D	B	B
Critical Lane Group	No	Yes	No	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.67	6.85	3.70	2.53	4.75	7.36	8.06	7.89	3.35	7.29	6.86
50th-Percentile Queue Length [ft/ln]	16.80	171.13	92.52	63.28	118.65	184.08	201.62	197.27	83.69	182.20	171.58
95th-Percentile Queue Length [veh/ln]	1.21	11.14	6.66	4.56	8.32	12.12	12.72	12.50	6.03	11.72	11.16
95th-Percentile Queue Length [ft/ln]	30.23	278.40	166.54	113.90	207.97	302.91	318.05	312.44	150.64	292.88	278.99

Movement, Approach, & Intersection Results

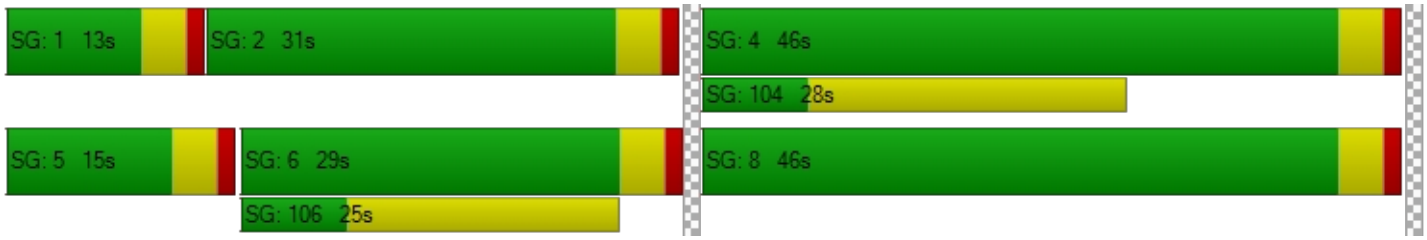
d_M, Delay for Movement [s/veh]	30.21	41.56	41.56	92.14	32.33	35.72	87.20	14.96	14.87	48.63	15.27	15.03
Movement LOS	C	D	D	F	C	D	F	B	B	D	B	B
d_A, Approach Delay [s/veh]	40.31			48.14			26.07			18.99		
Approach LOS	D			D			C			B		
d_I, Intersection Delay [s/veh]	27.96											
Intersection LOS	C											
Intersection V/C	0.699											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	34.70	34.70	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.371	2.873	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	933	933	600	555
d_b, Bicycle Delay [s]	12.82	12.82	22.07	23.49
l_b,int, Bicycle LOS Score for Intersection	2.116	2.340	2.761	2.567
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Rancherias Road at Tomahawk Road

Control Type:	Two-way stop	Delay (sec / veh):	16.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.385

Intersection Setup

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
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 Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
Base Volume Input [veh/h]	20	170	178	156	193	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	20	170	178	156	193	21
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]	5	45	47	41	51	6
Total Analysis Volume [veh/h]	21	179	187	164	203	22
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.39	0.03
d_M, Delay for Movement [s/veh]	8.03	0.00	0.00	0.00	16.42	14.27
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.05	0.05	0.00	0.00	2.02	2.02
95th-Percentile Queue Length [ft/ln]	1.33	1.33	0.00	0.00	50.38	50.38
d_A, Approach Delay [s/veh]	0.84		0.00		16.21	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	4.92					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 9: Bass Hill Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	29.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.632

Intersection Setup

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	205	135	192	68	64	141	289	883	95	195	839	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	205	135	192	68	64	141	289	883	95	195	839	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]	54	36	51	18	17	37	76	232	25	51	221	14
Total Analysis Volume [veh/h]	216	142	202	72	67	148	304	929	100	205	883	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]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Overlap	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	8	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups			1,8			4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	6	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	30	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	10	0	35	35	25	32	0	38	45	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	24	0	21	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No	No		No	No	No	No		No	No	
Maximum Recall		No	No		No	No	No	No		No	No	
Pedestrian Recall		No	No		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	R	L	C	R	L	C	R
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115	115
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	0.00	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	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]	12	12	32	9	9	43	14	62	62	17	64	64
g / C, Green / Cycle	0.10	0.10	0.28	0.08	0.08	0.37	0.12	0.53	0.53	0.14	0.56	0.56
(v / s)_i Volume / Saturation Flow Rate	0.07	0.08	0.11	0.02	0.04	0.08	0.10	0.26	0.06	0.12	0.25	0.03
s, saturation flow rate [veh/h]	3200	1800	1800	3200	1800	1800	3200	3600	1800	1700	3600	1800
c, Capacity [veh/h]	344	186	508	257	144	670	380	1920	960	245	2011	1005
d1, Uniform Delay [s]	49.64	50.26	33.42	49.83	50.59	24.75	49.40	16.90	13.27	47.97	14.87	11.59
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	1.88	6.35	0.50	0.59	2.31	0.16	3.90	0.88	0.22	7.41	0.70	0.11
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	0.63	0.76	0.40	0.28	0.46	0.22	0.80	0.48	0.10	0.84	0.44	0.06
d, Delay for Lane Group [s/veh]	51.53	56.61	33.93	50.42	52.90	24.91	53.30	17.77	13.49	55.39	15.56	11.70
Lane Group LOS	D	E	C	D	D	C	D	B	B	E	B	B
Critical Lane Group	No	No	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.08	4.30	4.64	1.00	1.94	2.81	4.46	7.75	1.33	6.21	6.74	0.70
50th-Percentile Queue Length [ft/ln]	76.93	107.62	116.07	24.95	48.46	70.23	111.39	193.65	33.22	155.34	168.56	17.53
95th-Percentile Queue Length [veh/ln]	5.54	7.71	8.18	1.80	3.49	5.06	7.92	12.31	2.39	10.30	11.00	1.26
95th-Percentile Queue Length [ft/ln]	138.48	192.68	204.41	44.90	87.23	126.41	197.93	307.75	59.79	257.55	275.02	31.56

Movement, Approach, & Intersection Results

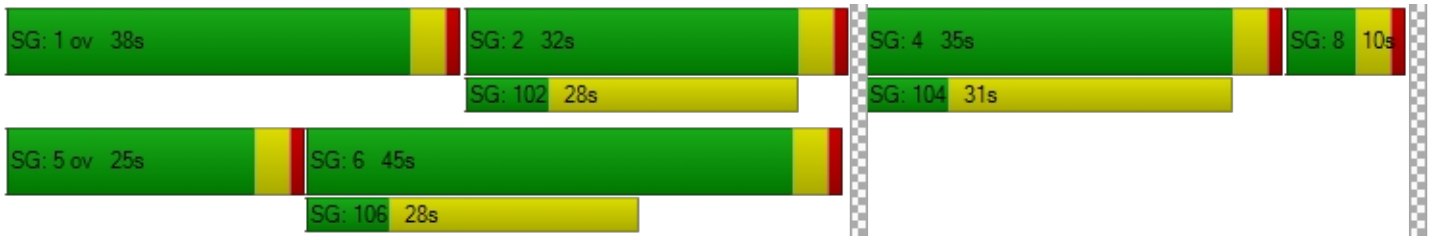
d_M, Delay for Movement [s/veh]	51.53	56.61	33.93	50.42	52.90	24.91	53.30	17.77	13.49	55.39	15.56	11.70
Movement LOS	D	E	C	D	D	C	D	B	B	E	B	B
d_A, Approach Delay [s/veh]	46.47			37.85			25.55			22.49		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	29.08											
Intersection LOS	C											
Intersection V/C	0.632											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
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]	47.07	47.07	47.07	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.616	2.593	3.272	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	104	539	487	713
d_b, Bicycle Delay [s]	51.70	30.72	32.95	23.84
l_b,int, Bicycle LOS Score for Intersection	2.484	2.033	2.659	2.505
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: Dale Evans Parkway at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	21.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.622

Intersection Setup

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	13	13	7	332	14	189	190	942	34	1	858	214
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	13	13	7	332	14	189	190	942	34	1	858	214
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	3	2	87	4	50	50	248	9	0	226	56
Total Analysis Volume [veh/h]	14	14	7	349	15	199	200	992	36	1	903	225
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 Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	10	0	0	38	0	12	33	0	14	35	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	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	0	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	95	95	95	95	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	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	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
g_i, Effective Green Time [s]	4	14	14	14	8	61	61	0	54	54
g / C, Green / Cycle	0.04	0.14	0.14	0.14	0.08	0.65	0.65	0.00	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.02	0.11	0.01	0.11	0.06	0.29	0.28	0.00	0.32	0.30
s, saturation flow rate [veh/h]	1700	3200	1800	1800	3200	1800	1800	1700	1800	1800
c, Capacity [veh/h]	67	464	261	261	266	1160	1160	5	1016	1016
d1, Uniform Delay [s]	44.83	39.04	35.08	39.11	42.68	8.43	8.39	47.33	13.35	12.94
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	6.19	2.49	0.09	4.59	4.30	1.24	1.22	19.25	2.36	2.03
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	0.52	0.75	0.06	0.76	0.75	0.45	0.44	0.20	0.57	0.54
d, Delay for Lane Group [s/veh]	51.03	41.53	35.17	43.70	46.98	9.67	9.61	66.59	15.71	14.96
Lane Group LOS	D	D	D	D	D	A	A	E	B	B
Critical Lane Group	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.92	4.02	0.30	4.74	2.44	5.08	5.00	0.05	8.07	7.27
50th-Percentile Queue Length [ft/ln]	22.98	100.52	7.62	118.56	60.89	127.12	125.05	1.24	201.74	181.80
95th-Percentile Queue Length [veh/ln]	1.65	7.24	0.55	8.31	4.38	8.78	8.67	0.09	12.73	11.69
95th-Percentile Queue Length [ft/ln]	41.37	180.94	13.71	207.85	109.61	219.58	216.75	2.24	318.21	292.36

Movement, Approach, & Intersection Results

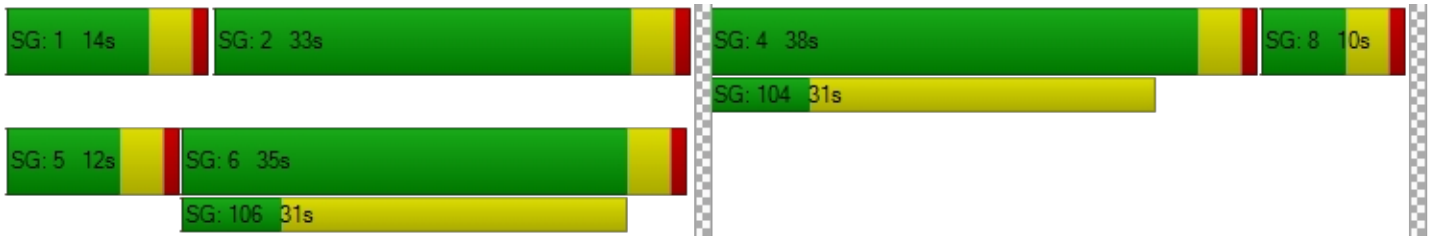
d_M, Delay for Movement [s/veh]	51.03	51.03	51.03	41.53	35.17	43.70	46.98	9.64	9.61	66.59	15.44	14.96
Movement LOS	D	D	D	D	D	D	D	A	A	E	B	B
d_A, Approach Delay [s/veh]	51.03			42.13			15.72			15.39		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	21.04											
Intersection LOS	C											
Intersection V/C	0.622											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	37.18	37.18	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.618	2.923	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	126	715	610	652
d_b, Bicycle Delay [s]	41.73	19.62	22.96	21.59
l_b,int, Bicycle LOS Score for Intersection	1.617	2.489	2.573	2.491
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: Flathead Road at US Highway 18

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):	0.574

Intersection Setup

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	93	70	29	20	45	54	54	1075	138	28	926	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	93	70	29	20	45	54	54	1075	138	28	926	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]	24	18	8	5	12	14	14	283	36	7	244	7
Total Analysis Volume [veh/h]	98	74	31	21	47	57	57	1132	145	29	975	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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	64	0	0	64	0	10	16	0	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	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	2.00	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
g_i, Effective Green Time [s]	13	13	5	62	62	3	61	61
g / C, Green / Cycle	0.14	0.14	0.05	0.69	0.69	0.04	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.12	0.07	0.03	0.36	0.35	0.02	0.28	0.28
s, saturation flow rate [veh/h]	1700	1700	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	302	289	88	1239	1239	61	1210	1210
d1, Uniform Delay [s]	37.59	35.73	41.88	6.83	6.70	42.60	6.70	6.68
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.61	1.02	7.73	1.59	1.48	5.76	1.05	1.04
d3, Initial Queue Delay [s]	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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.67	0.43	0.65	0.52	0.51	0.48	0.42	0.41
d, Delay for Lane Group [s/veh]	40.20	36.75	49.62	8.42	8.18	48.37	7.76	7.72
Lane Group LOS	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.50	2.59	1.42	5.51	5.21	0.72	4.04	3.99
50th-Percentile Queue Length [ft/ln]	112.45	64.67	35.46	137.73	130.33	18.10	101.09	99.80
95th-Percentile Queue Length [veh/ln]	7.98	4.66	2.55	9.36	8.96	1.30	7.28	7.19
95th-Percentile Queue Length [ft/ln]	199.40	116.40	63.82	233.96	223.94	32.57	181.97	179.63

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	40.20	40.20	40.20	36.75	36.75	36.75	49.62	8.32	8.18	48.37	7.74	7.72
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	40.20			36.75			10.07			8.88		
Approach LOS	D			D			B			A		
d_I, Intersection Delay [s/veh]	13.13											
Intersection LOS	B											
Intersection V/C	0.574											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.919	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1333	1333	267	267
d_b, Bicycle Delay [s]	5.01	5.01	33.81	33.81
I_b,int, Bicycle LOS Score for Intersection	1.895	1.766	2.660	2.409
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: Kiowa Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	43.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.573

Intersection Setup

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	229	117	48	1	80	46	52	804	281	39	711	11
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	229	117	48	1	80	46	52	804	281	39	711	11
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]	60	31	13	0	21	12	14	212	74	10	187	3
Total Analysis Volume [veh/h]	241	123	51	1	84	48	55	846	296	41	748	12
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	34	0	0	34	0	11	46	0	10	45	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	11	11	11	11	4	63	63	4	62	62
g / C, Green / Cycle	0.13	0.13	0.13	0.13	0.05	0.70	0.70	0.04	0.69	0.69
(v / s)_i Volume / Saturation Flow Rate	0.14	0.10	0.00	0.07	0.03	0.33	0.30	0.02	0.21	0.21
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	147	227	106	227	85	1256	1256	73	1243	1243
d1, Uniform Delay [s]	37.60	38.03	34.37	37.07	41.99	6.15	5.91	42.25	5.47	5.46
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	294.00	5.31	0.03	2.34	8.09	1.29	1.10	6.69	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
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	1.64	0.77	0.01	0.58	0.65	0.47	0.44	0.56	0.31	0.30
d, Delay for Lane Group [s/veh]	331.60	43.34	34.41	39.41	50.08	7.44	7.01	48.95	6.11	6.09
Lane Group LOS	F	D	C	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	15.07	3.99	0.02	2.85	1.38	4.59	4.03	1.02	2.55	2.53
50th-Percentile Queue Length [ft/ln]	376.70	99.81	0.50	71.30	34.41	114.70	100.72	25.49	63.82	63.37
95th-Percentile Queue Length [veh/ln]	25.13	7.19	0.04	5.13	2.48	8.10	7.25	1.83	4.59	4.56
95th-Percentile Queue Length [ft/ln]	628.32	179.66	0.90	128.35	61.95	202.52	181.30	45.87	114.87	114.07

Movement, Approach, & Intersection Results

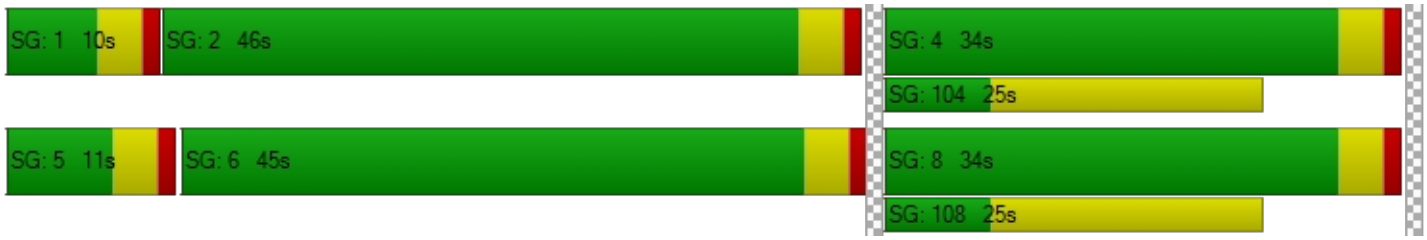
d_M, Delay for Movement [s/veh]	331.60	43.34	43.34	34.41	39.41	39.41	50.08	7.31	7.01	48.95	6.10	6.09
Movement LOS	F	D	D	C	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	210.74			39.37			9.20			8.29		
Approach LOS	F			D			A			A		
d_I, Intersection Delay [s/veh]	43.34											
Intersection LOS	D											
Intersection V/C	0.573											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.67	34.67
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	3.078	2.632
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	667	933	911
d_b, Bicycle Delay [s]	20.00	20.00	12.80	13.34
I_b,int, Bicycle LOS Score for Intersection	2.244	1.779	2.547	2.220
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Navajo Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	25.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.607

Intersection Setup

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	198	200	175	47	192	24	42	582	251	238	543	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	198	200	175	47	192	24	42	582	251	238	543	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]	52	53	46	12	51	6	11	153	66	63	143	15
Total Analysis Volume [veh/h]	208	211	184	49	202	25	44	613	264	251	572	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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	45	0	0	45	0	10	25	0	20	35	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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]	90	90	90	90	90	90	90	90	90	90	90	90
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]	14	14	14	14	14	14	4	49	49	15	60	60
g / C, Green / Cycle	0.15	0.15	0.15	0.15	0.15	0.15	0.05	0.54	0.54	0.17	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.12	0.12	0.10	0.03	0.06	0.06	0.03	0.26	0.23	0.15	0.18	0.17
s, saturation flow rate [veh/h]	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	212	279	279	120	279	279	78	980	980	285	1199	1199
d1, Uniform Delay [s]	36.63	36.42	35.81	33.11	34.34	34.29	42.09	12.57	12.15	36.62	6.11	6.07
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	24.32	4.17	2.66	2.23	0.97	0.94	6.35	1.63	1.34	8.76	0.55	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	0.98	0.76	0.66	0.41	0.41	0.40	0.57	0.47	0.42	0.88	0.27	0.26
d, Delay for Lane Group [s/veh]	60.96	40.59	38.47	35.33	35.30	35.23	48.44	14.20	13.50	45.37	6.66	6.59
Lane Group LOS	E	D	D	D	D	D	D	B	B	D	A	A
Critical Lane Group	Yes	No	No	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.76	4.69	3.95	1.00	2.31	2.26	1.09	5.72	4.95	5.98	2.31	2.22
50th-Percentile Queue Length [ft/ln]	143.99	117.15	98.67	24.88	57.71	56.54	27.13	143.02	123.85	149.39	57.81	55.50
95th-Percentile Queue Length [veh/ln]	9.70	8.24	7.10	1.79	4.16	4.07	1.95	9.64	8.60	9.98	4.16	4.00
95th-Percentile Queue Length [ft/ln]	242.39	205.90	177.60	44.78	103.88	101.77	48.83	241.09	215.11	249.62	104.05	99.90

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	60.96	40.59	38.47	35.33	35.27	35.23	48.44	14.03	13.50	45.37	6.63	6.59
Movement LOS	E	D	D	D	D	D	D	B	B	D	A	A
d_A, Approach Delay [s/veh]	46.97			35.28			15.52			17.64		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	25.32											
Intersection LOS	C											
Intersection V/C	0.607											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.932	2.706
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	911	911	467	689
d_b, Bicycle Delay [s]	13.35	13.35	26.46	19.35
l_b,int, Bicycle LOS Score for Intersection	2.057	1.787	2.319	2.288
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX D-II

YEAR 2025 WITH PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 1: Apple Valley Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	34.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.844

Intersection Setup

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	624	204	63	56	147	205	326	1161	489	64	1328	68
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	624	204	63	56	147	205	326	1161	489	64	1328	68
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]	164	54	17	15	39	54	86	306	129	17	349	18
Total Analysis Volume [veh/h]	657	215	66	59	155	216	343	1222	515	67	1398	72
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]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	38	39	0	9	10	0	17	37	0	15	35	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	0	0	24	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	R	L	C	R	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
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	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]	24	33	33	4	14	14	13	41	41	5	34	34
g / C, Green / Cycle	0.24	0.33	0.33	0.04	0.14	0.14	0.13	0.41	0.41	0.05	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.21	0.08	0.07	0.03	0.04	0.12	0.11	0.23	0.29	0.02	0.27	0.28
s, saturation flow rate [veh/h]	3200	1800	1800	1700	3600	1800	3200	5400	1800	3200	3600	1800
c, Capacity [veh/h]	755	596	596	76	506	253	405	2226	742	166	1215	608
d1, Uniform Delay [s]	36.80	24.37	24.20	47.31	38.66	42.04	42.79	22.36	24.23	45.99	30.10	30.38
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	3.29	0.21	0.19	14.99	0.34	8.04	4.98	0.98	5.30	1.59	5.58	11.75
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	0.87	0.25	0.23	0.77	0.31	0.85	0.85	0.55	0.69	0.40	0.80	0.82
d, Delay for Lane Group [s/veh]	40.08	24.58	24.39	62.30	39.00	50.08	47.78	23.34	29.53	47.57	35.69	42.13
Lane Group LOS	D	C	C	E	D	D	D	C	C	D	D	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	7.94	2.54	2.32	1.77	1.73	5.72	4.39	7.27	10.78	0.84	11.27	12.66
50th-Percentile Queue Length [ft/ln]	198.45	63.41	57.95	44.14	43.14	143.06	109.81	181.76	269.45	21.01	281.68	316.41
95th-Percentile Queue Length [veh/ln]	12.56	4.57	4.17	3.18	3.11	9.65	7.83	11.69	16.16	1.51	16.77	18.49
95th-Percentile Queue Length [ft/ln]	313.97	114.14	104.30	79.46	77.65	241.14	195.74	292.31	404.05	37.81	419.30	462.27

Movement, Approach, & Intersection Results

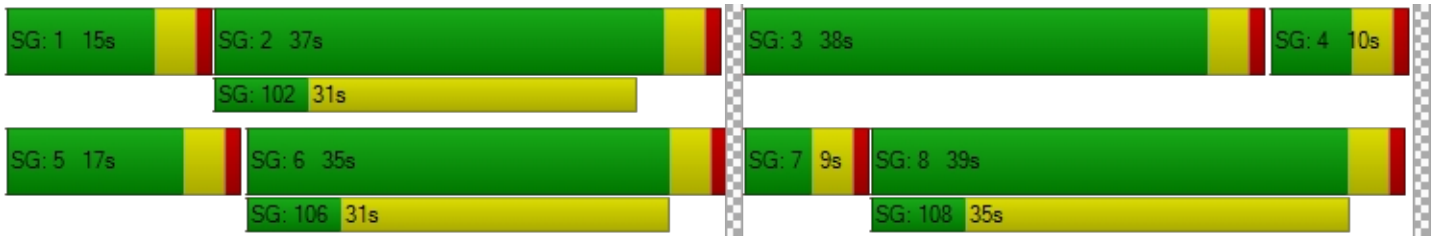
d_M, Delay for Movement [s/veh]	40.08	24.52	24.39	62.30	39.00	50.08	47.78	23.34	29.53	47.57	37.65	42.13
Movement LOS	D	C	C	E	D	D	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	35.41			47.76			28.90			38.29		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	34.65											
Intersection LOS	C											
Intersection V/C	0.844											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	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]	39.64	39.64	0.00	39.64
l_p,int, Pedestrian LOS Score for Intersection	2.730	2.630	0.000	3.082
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	120	660	620
d_b, Bicycle Delay [s]	21.16	44.22	22.48	23.84
l_b,int, Bicycle LOS Score for Intersection	2.333	1.914	2.704	2.405
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Kasota Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	20.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.749

Intersection Setup

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	100	151	111	33	77	67	124	1017	88	100	1333	90
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	100	151	111	33	77	67	124	1017	88	100	1333	90
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]	26	40	29	9	20	18	33	268	23	26	351	24
Total Analysis Volume [veh/h]	105	159	117	35	81	71	131	1071	93	105	1403	95
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	5	6	0	5	6	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	31	0	0	31	0	12	47	0	12	47	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	16	16	16	16	8	55	55	7	54	54
g / C, Green / Cycle	0.18	0.18	0.18	0.18	0.09	0.61	0.61	0.08	0.60	0.60
(v / s)_i Volume / Saturation Flow Rate	0.06	0.15	0.02	0.08	0.08	0.33	0.32	0.06	0.42	0.41
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	225	323	102	323	154	1095	1095	134	1074	1074
d1, Uniform Delay [s]	32.33	35.82	30.97	33.13	40.36	10.26	10.14	40.75	12.61	12.49
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	1.50	6.44	2.00	1.07	12.09	1.90	1.80	9.60	3.84	3.68
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	0.47	0.85	0.34	0.47	0.85	0.54	0.52	0.78	0.70	0.69
d, Delay for Lane Group [s/veh]	33.83	42.26	32.96	34.19	52.44	12.16	11.94	50.35	16.45	16.18
Lane Group LOS	C	D	C	C	D	B	B	D	B	B
Critical Lane Group	No	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.07	6.33	0.69	3.03	3.34	6.60	6.35	2.62	10.45	10.20
50th-Percentile Queue Length [ft/ln]	51.73	158.29	17.18	75.65	83.49	165.02	158.79	65.39	261.22	254.95
95th-Percentile Queue Length [veh/ln]	3.72	10.46	1.24	5.45	6.01	10.81	10.48	4.71	15.75	15.44
95th-Percentile Queue Length [ft/ln]	93.11	261.46	30.92	136.17	150.29	270.36	262.12	117.70	393.76	385.88

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	33.83	42.26	42.26	32.96	34.19	34.19	52.44	12.06	11.94	50.35	16.32	16.18
Movement LOS	C	D	D	C	C	C	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	39.94			33.96			16.13			18.54		
Approach LOS	D			C			B			B		
d_I, Intersection Delay [s/veh]	20.83											
Intersection LOS	C											
Intersection V/C	0.749											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.70	34.70
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	3.009	2.900
Crosswalk LOS	F	F	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	600	955	955
d_b, Bicycle Delay [s]	22.07	22.07	12.29	12.29
l_b,int, Bicycle LOS Score for Intersection	2.188	1.868	2.628	2.882
Bicycle LOS	B	A	B	C

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Corwin Road at US Highway 18

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):	0.806

Intersection Setup

Name	Corwin Road		US Highway 18		US Highway 18	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	1	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Corwin Road		US Highway 18		US Highway 18	
Base Volume Input [veh/h]	35	438	401	774	1053	48
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	35	438	401	774	1053	48
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]	9	115	106	204	277	13
Total Analysis Volume [veh/h]	37	461	422	815	1108	51
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Protected	Permissive	Permissive	Permissive
Signal Group	7	0	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	6	0	6	6	6	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	17	0	38	73	35	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	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
Detector Length [ft]	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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	C
C, Cycle Length [s]	90	90	90	90	90	90
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]	13	13	24	69	41	41
g / C, Green / Cycle	0.14	0.14	0.27	0.77	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	0.02	0.13	0.25	0.23	0.32	0.32
s, saturation flow rate [veh/h]	1700	3600	1700	3600	1800	1800
c, Capacity [veh/h]	247	522	463	2758	809	809
d1, Uniform Delay [s]	33.64	37.74	31.73	3.19	20.13	20.13
k, delay calibration	0.11	0.11	0.20	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.28	5.10	12.45	0.27	5.39	5.39
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	0.15	0.88	0.91	0.30	0.72	0.72
d, Delay for Lane Group [s/veh]	33.92	42.84	44.18	3.46	25.51	25.51
Lane Group LOS	C	D	D	A	C	C
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.72	5.26	10.20	1.66	10.50	10.50
50th-Percentile Queue Length [ft/ln]	17.97	131.53	255.01	41.58	262.55	262.55
95th-Percentile Queue Length [veh/ln]	1.29	9.02	15.44	2.99	15.82	15.82
95th-Percentile Queue Length [ft/ln]	32.35	225.57	385.95	74.84	395.42	395.42

Movement, Approach, & Intersection Results

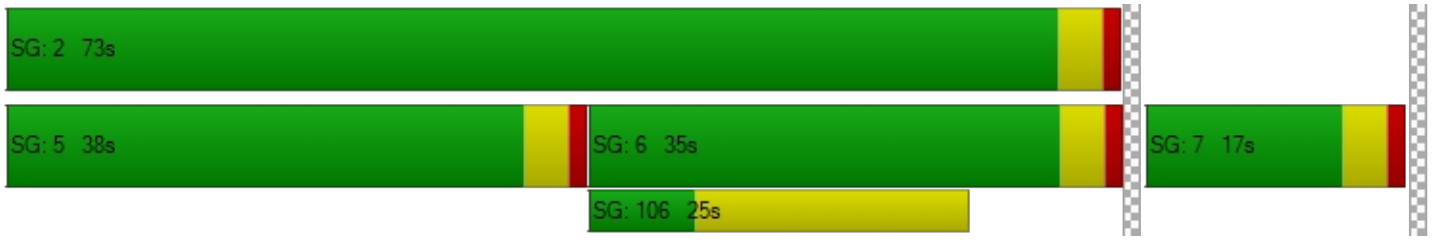
d_M, Delay for Movement [s/veh]	33.92	42.84	44.18	3.46	25.51	25.51
Movement LOS	C	D	D	A	C	C
d_A, Approach Delay [s/veh]	42.18		17.35		25.51	
Approach LOS	D		B		C	
d_I, Intersection Delay [s/veh]	24.89					
Intersection LOS	C					
Intersection V/C	0.806					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	2.367	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	289	1533	689
d_b, Bicycle Delay [s]	32.95	2.45	19.35
I_b,int, Bicycle LOS Score for Intersection	1.560	2.580	2.516
Bicycle LOS	A	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Tao Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	12.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.583

Intersection Setup

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	28	35	11	84	32	104	77	772	46	12	1180	100
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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	35	11	84	32	104	77	772	46	12	1180	100
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]	7	9	3	22	8	27	20	203	12	3	311	26
Total Analysis Volume [veh/h]	29	37	12	88	34	109	81	813	48	13	1242	105
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	29	0	0	29	0	51	51	0	10	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	9	9	9	9	6	67	67	2	63	63
g / C, Green / Cycle	0.10	0.10	0.10	0.10	0.06	0.74	0.74	0.02	0.70	0.70
(v / s)_i Volume / Saturation Flow Rate	0.02	0.03	0.05	0.08	0.05	0.24	0.24	0.01	0.38	0.37
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	94	188	183	188	106	1336	1336	34	1259	1259
d1, Uniform Delay [s]	36.73	37.11	38.07	39.22	41.54	3.94	3.91	43.59	6.54	6.45
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	1.82	0.73	1.96	6.18	10.60	0.65	0.63	7.11	1.67	1.59
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	0.31	0.26	0.48	0.76	0.76	0.33	0.32	0.39	0.54	0.53
d, Delay for Lane Group [s/veh]	38.55	37.84	40.03	45.40	52.14	4.59	4.54	50.71	8.21	8.04
Lane Group LOS	D	D	D	D	D	A	A	D	A	A
Critical Lane Group	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.62	1.02	1.91	3.35	2.06	2.27	2.21	0.35	5.64	5.43
50th-Percentile Queue Length [ft/ln]	15.59	25.52	47.77	83.87	51.57	56.66	55.20	8.75	140.94	135.65
95th-Percentile Queue Length [veh/ln]	1.12	1.84	3.44	6.04	3.71	4.08	3.97	0.63	9.53	9.25
95th-Percentile Queue Length [ft/ln]	28.06	45.94	85.98	150.96	92.82	101.99	99.35	15.75	238.29	231.15

Movement, Approach, & Intersection Results

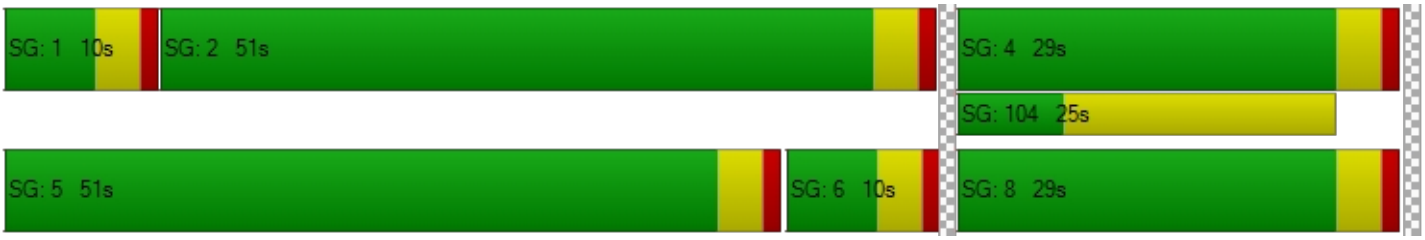
d_M, Delay for Movement [s/veh]	38.55	37.84	37.84	40.03	45.40	45.40	52.14	4.57	4.54	50.71	8.13	8.04
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	38.10			43.35			8.66			8.53		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	12.54											
Intersection LOS	B											
Intersection V/C	0.583											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.793	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	555	555	1044	133
d_b, Bicycle Delay [s]	23.48	23.48	10.28	39.21
I_b,int, Bicycle LOS Score for Intersection	1.688	1.941	2.337	2.682
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Rimrock Road/Piute Road at US Highway 18

Control Type:	Two-way stop	Delay (sec / veh):	16.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.213

Intersection Setup

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			60.00			60.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	0	0	39	0	0	80	41	810	4	30	1218	69
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	0	0	39	0	0	80	41	810	4	30	1218	69
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]	0	0	10	0	0	21	11	213	1	8	321	18
Total Analysis Volume [veh/h]	0	0	41	0	0	84	43	853	4	32	1282	73
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.07	0.00	0.00	0.21	0.09	0.01	0.00	0.04	0.01	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	11.75	0.00	0.00	16.56	12.81	0.00	0.00	9.82	0.00	0.00
Movement LOS			B			C	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.23	0.00	0.00	0.79	0.28	0.00	0.00	0.13	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	5.74	0.00	0.00	19.85	6.97	0.00	0.00	3.21	0.00	0.00
d_A, Approach Delay [s/veh]	11.75			16.56			0.61			0.23		
Approach LOS	B			C			A			A		
d_I, Intersection Delay [s/veh]	1.14											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 6: Rancherias Road at Thunderbird Road

Control Type:	All-way stop	Delay (sec / veh):	11.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.465

Intersection Setup

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Base Volume Input [veh/h]	111	131	49	201	250	40
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	111	131	49	201	250	40
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]	29	34	13	53	66	11
Total Analysis Volume [veh/h]	117	138	52	212	263	42
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	611	695	567	616	566	697
Degree of Utilization, x	0.19	0.20	0.09	0.34	0.46	0.06

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.70	0.74	0.30	1.53	2.45	0.19
95th-Percentile Queue Length [ft]	17.56	18.40	7.55	38.25	61.16	4.80
Approach Delay [s/veh]	9.54		11.22		13.60	
Approach LOS	A		B		B	
Intersection Delay [s/veh]	11.58					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 7: Rancherias Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	26.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.694

Intersection Setup

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	174	109	112	87	155	245	131	693	37	193	890	89
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	174	109	112	87	155	245	131	693	37	193	890	89
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]	46	29	29	23	41	64	34	182	10	51	234	23
Total Analysis Volume [veh/h]	183	115	118	92	163	258	138	729	39	203	937	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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	ProtPer	Permiss	Unsigna	ProtPer	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	32	0	9	32	0	13	10	0	39	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	21	0	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
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
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	25	16	25	16	16	9	41	41	13	44	44
g / C, Green / Cycle	0.27	0.17	0.27	0.17	0.17	0.10	0.45	0.45	0.14	0.49	0.49
(v / s)_i Volume / Saturation Flow Rate	0.11	0.03	0.05	0.09	0.14	0.08	0.22	0.21	0.12	0.29	0.28
s, saturation flow rate [veh/h]	1700	3600	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	447	626	541	313	313	170	807	807	244	886	886
d1, Uniform Delay [s]	26.57	31.78	25.07	33.83	35.91	39.77	17.48	17.40	37.55	16.39	16.19
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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
d2, Incremental Delay [s]	0.60	0.14	0.15	1.34	5.43	9.03	2.04	1.97	7.16	2.88	2.69
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
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
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

Lane Group Results

X, volume / capacity	0.41	0.18	0.17	0.52	0.82	0.81	0.48	0.47	0.83	0.59	0.57
d, Delay for Lane Group [s/veh]	27.17	31.92	25.21	35.17	41.35	48.80	19.52	19.37	44.71	19.27	18.88
Lane Group LOS	C	C	C	D	D	D	B	B	D	B	B
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	3.21	1.07	1.51	3.31	5.83	3.38	5.83	5.70	4.76	7.93	7.59
50th-Percentile Queue Length [ft/ln]	80.22	26.73	37.71	82.65	145.81	84.45	145.82	142.43	119.12	198.28	189.69
95th-Percentile Queue Length [veh/ln]	5.78	1.92	2.72	5.95	9.79	6.08	9.79	9.61	8.34	12.55	12.10
95th-Percentile Queue Length [ft/ln]	144.40	48.11	67.89	148.78	244.83	152.01	244.84	240.29	208.61	313.75	302.62

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	27.17	31.92	0.00	25.21	35.17	41.35	48.80	19.45	19.37	44.71	19.10	18.88
Movement LOS	C	C		C	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	29.00			36.49			23.92			23.29		
Approach LOS	C			D			C			C		
d_I, Intersection Delay [s/veh]	26.36											
Intersection LOS	C											
Intersection V/C	0.694											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	34.72	34.72	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.467	2.796	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	622	622	133	710
d_b, Bicycle Delay [s]	21.40	21.40	39.24	18.73
l_b,int, Bicycle LOS Score for Intersection	1.805	2.406	2.307	2.578
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Rancherias Road at Tomahawk Road

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):	0.193

Intersection Setup

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
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 Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
Base Volume Input [veh/h]	15	174	114	128	109	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	15	174	114	128	109	16
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]	4	46	30	34	29	4
Total Analysis Volume [veh/h]	16	183	120	135	115	17
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			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	0.19	0.02
d_M, Delay for Movement [s/veh]	7.78	0.00	0.00	0.00	12.61	10.78
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.04	0.04	0.00	0.00	0.80	0.80
95th-Percentile Queue Length [ft/ln]	0.93	0.93	0.00	0.00	20.03	20.03
d_A, Approach Delay [s/veh]	0.63		0.00		12.37	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	3.00					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 9: Bass Hill Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	17.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.469

Intersection Setup

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	121	56	68	25	30	67	105	634	51	99	970	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	121	56	68	25	30	67	105	634	51	99	970	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]	32	15	18	7	8	18	28	167	13	26	255	7
Total Analysis Volume [veh/h]	127	59	72	26	32	71	111	667	54	104	1021	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]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Overlap	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	8	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups			1,8			4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	6	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	30	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	10	0	35	35	10	32	0	23	45	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	24	0	21	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No	No		No	No	No	No		No	No	
Maximum Recall		No	No		No	No	No	No		No	No	
Pedestrian Recall		No	No		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	R	L	C	R	L	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
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	0.00	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	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]	6	6	18	6	6	26	6	64	64	8	66	66
g / C, Green / Cycle	0.06	0.06	0.18	0.06	0.06	0.26	0.06	0.64	0.64	0.08	0.66	0.66
(v / s)_i Volume / Saturation Flow Rate	0.04	0.03	0.04	0.01	0.02	0.04	0.03	0.19	0.03	0.06	0.28	0.02
s, saturation flow rate [veh/h]	3200	1800	1800	3200	1800	1800	3200	3600	1800	1700	3600	1800
c, Capacity [veh/h]	220	114	329	190	107	469	186	2298	1149	135	2374	1187
d1, Uniform Delay [s]	45.73	45.41	34.84	44.68	45.12	28.49	46.01	8.04	6.76	45.21	8.11	5.90
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	2.38	3.58	0.33	0.33	1.56	0.15	3.03	0.32	0.08	8.95	0.57	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	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	0.58	0.52	0.22	0.14	0.30	0.15	0.60	0.29	0.05	0.77	0.43	0.02
d, Delay for Lane Group [s/veh]	48.11	48.99	35.17	45.00	46.67	28.63	49.04	8.36	6.83	54.16	8.68	5.94
Lane Group LOS	D	D	D	D	D	C	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.60	1.53	1.52	0.31	0.80	1.33	1.42	3.02	0.42	2.85	4.86	0.20
50th-Percentile Queue Length [ft/ln]	40.11	38.16	38.00	7.84	20.11	33.19	35.46	75.58	10.55	71.31	121.39	4.96
95th-Percentile Queue Length [veh/ln]	2.89	2.75	2.74	0.56	1.45	2.39	2.55	5.44	0.76	5.13	8.47	0.36
95th-Percentile Queue Length [ft/ln]	72.20	68.69	68.39	14.12	36.20	59.74	63.83	136.04	18.99	128.36	211.74	8.93

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	48.11	48.99	35.17	45.00	46.67	28.63	49.04	8.36	6.83	54.16	8.68	5.94
Movement LOS	D	D	D	D	D	C	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	44.70			36.41			13.69			12.72		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	17.83											
Intersection LOS	B											
Intersection V/C	0.469											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
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]	39.64	39.64	39.64	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.531	2.511	3.065	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	120	620	560	819
d_b, Bicycle Delay [s]	44.22	23.84	25.95	17.43
l_b,int, Bicycle LOS Score for Intersection	1.985	1.772	2.246	2.511
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: Dale Evans Parkway at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	15.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.587

Intersection Setup

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	4	3	0	141	6	161	109	642	6	0	971	190
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	4	3	0	141	6	161	109	642	6	0	971	190
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]	1	1	0	37	2	42	29	169	2	0	256	50
Total Analysis Volume [veh/h]	4	3	0	148	6	169	115	676	6	0	1022	200
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	10	0	0	35	0	10	22	0	23	35	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	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	0	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	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
g_i, Effective Green Time [s]	1	11	11	11	6	62	62	0	56	56
g / C, Green / Cycle	0.01	0.12	0.12	0.12	0.06	0.69	0.69	0.00	0.62	0.62
(v / s)_i Volume / Saturation Flow Rate	0.00	0.05	0.00	0.09	0.04	0.19	0.19	0.00	0.35	0.33
s, saturation flow rate [veh/h]	1700	3200	1800	1800	3200	1800	1800	1700	1800	1800
c, Capacity [veh/h]	21	395	222	222	205	1234	1234	2	1121	1121
d1, Uniform Delay [s]	44.19	36.31	34.75	38.22	40.98	5.50	5.50	0.00	9.84	9.57
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	9.50	0.59	0.05	5.27	2.41	0.56	0.55	0.00	2.02	1.80
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	0.34	0.37	0.03	0.76	0.56	0.28	0.28	0.00	0.56	0.53
d, Delay for Lane Group [s/veh]	53.69	36.90	34.80	43.49	43.38	6.06	6.05	0.00	11.86	11.37
Lane Group LOS	D	D	C	D	D	A	A	A	B	B
Critical Lane Group	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.21	1.51	0.12	3.88	1.29	2.27	2.26	0.00	6.90	6.34
50th-Percentile Queue Length [ft/ln]	5.19	37.78	2.94	97.02	32.36	56.83	56.62	0.00	172.56	158.51
95th-Percentile Queue Length [veh/ln]	0.37	2.72	0.21	6.99	2.33	4.09	4.08	0.00	11.21	10.47
95th-Percentile Queue Length [ft/ln]	9.35	68.00	5.30	174.64	58.24	102.30	101.92	0.00	280.27	261.75

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	53.69	53.69	53.69	36.90	34.80	43.49	43.38	6.05	6.05	0.00	11.67	11.37
Movement LOS	D	D	D	D	C	D	D	A	A	A	B	B
d_A, Approach Delay [s/veh]	53.69			40.31			11.44			11.62		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	15.63											
Intersection LOS	B											
Intersection V/C	0.587											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	34.72	34.72	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.557	2.871	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	133	688	400	688
d_b, Bicycle Delay [s]	39.24	19.38	28.84	19.38
l_b,int, Bicycle LOS Score for Intersection	1.571	2.093	2.217	2.568
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: Flathead Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	11.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.475

Intersection Setup

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	66	36	41	12	58	84	10	731	37	28	1024	31
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	66	36	41	12	58	84	10	731	37	28	1024	31
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	9	11	3	15	22	3	192	10	7	269	8
Total Analysis Volume [veh/h]	69	38	43	13	61	88	11	769	39	29	1078	33
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	70	0	0	70	0	10	10	0	10	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	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	2.00	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
g_i, Effective Green Time [s]	11	11	2	64	64	3	66	66
g / C, Green / Cycle	0.12	0.12	0.02	0.71	0.71	0.04	0.73	0.73
(v / s)_i Volume / Saturation Flow Rate	0.09	0.10	0.01	0.23	0.22	0.02	0.31	0.31
s, saturation flow rate [veh/h]	1700	1700	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	259	244	29	1284	1284	61	1317	1317
d1, Uniform Delay [s]	38.42	38.72	43.76	4.79	4.76	42.60	4.71	4.69
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.05	3.10	7.68	0.65	0.63	5.76	1.00	0.99
d3, Initial Queue Delay [s]	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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.58	0.66	0.37	0.32	0.31	0.48	0.42	0.42
d, Delay for Lane Group [s/veh]	40.46	41.82	51.44	5.44	5.40	48.37	5.71	5.67
Lane Group LOS	D	D	D	A	A	D	A	A
Critical Lane Group	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	3.30	3.64	0.30	2.48	2.43	0.72	3.45	3.40
50th-Percentile Queue Length [ft/ln]	82.56	91.10	7.58	61.97	60.64	18.10	86.24	84.96
95th-Percentile Queue Length [veh/ln]	5.94	6.56	0.55	4.46	4.37	1.30	6.21	6.12
95th-Percentile Queue Length [ft/ln]	148.61	163.99	13.64	111.54	109.15	32.57	155.24	152.92

Movement, Approach, & Intersection Results

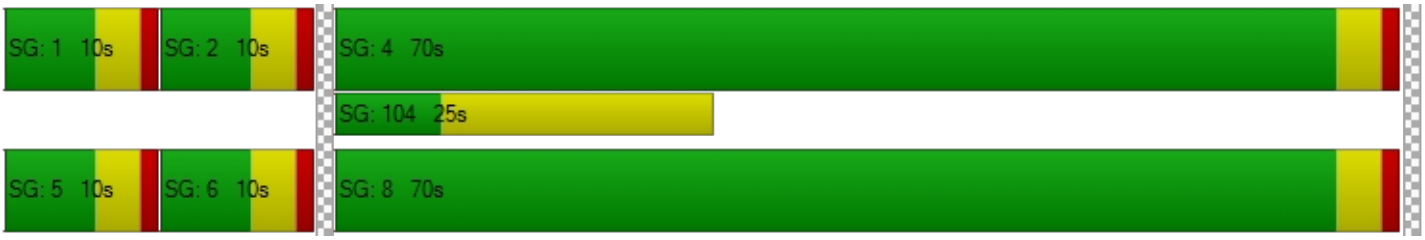
d_M, Delay for Movement [s/veh]	40.46	40.46	40.46	41.82	41.82	41.82	51.44	5.42	5.40	48.37	5.69	5.67
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	40.46			41.82			6.04			6.78		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	11.23											
Intersection LOS	B											
Intersection V/C	0.475											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.798	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1466	1466	133	133
d_b, Bicycle Delay [s]	3.21	3.21	39.21	39.21
l_b,int, Bicycle LOS Score for Intersection	1.807	1.827	2.235	2.500
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: Kiowa Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	123.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.455

Intersection Setup

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	245	41	30	3	85	32	12	627	134	21	799	5
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	245	41	30	3	85	32	12	627	134	21	799	5
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]	64	11	8	1	22	8	3	165	35	6	210	1
Total Analysis Volume [veh/h]	258	43	32	3	89	34	13	660	141	22	841	5
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	49	0	0	49	0	10	31	0	10	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	8	8	8	8	2	67	67	3	68	68
g / C, Green / Cycle	0.09	0.09	0.09	0.09	0.02	0.75	0.75	0.03	0.76	0.76
(v / s)_i Volume / Saturation Flow Rate	0.15	0.04	0.00	0.07	0.01	0.23	0.22	0.01	0.24	0.23
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	85	161	131	161	31	1349	1349	48	1366	1366
d1, Uniform Delay [s]	39.29	38.95	37.39	40.07	43.68	3.67	3.61	43.05	3.42	3.42
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	920.79	2.10	0.07	7.40	8.45	0.59	0.54	6.69	0.59	0.59
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	3.03	0.47	0.02	0.77	0.41	0.31	0.29	0.46	0.31	0.31
d, Delay for Lane Group [s/veh]	960.08	41.05	37.46	47.46	52.13	4.26	4.15	49.75	4.01	4.01
Lane Group LOS	F	D	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	23.55	1.65	0.06	2.96	0.36	2.02	1.87	0.57	1.96	1.95
50th-Percentile Queue Length [ft/ln]	588.84	41.28	1.56	73.93	8.94	50.61	46.78	14.16	48.91	48.77
95th-Percentile Queue Length [veh/ln]	38.54	2.97	0.11	5.32	0.64	3.64	3.37	1.02	3.52	3.51
95th-Percentile Queue Length [ft/ln]	963.58	74.30	2.80	133.07	16.08	91.10	84.21	25.49	88.03	87.79

Movement, Approach, & Intersection Results

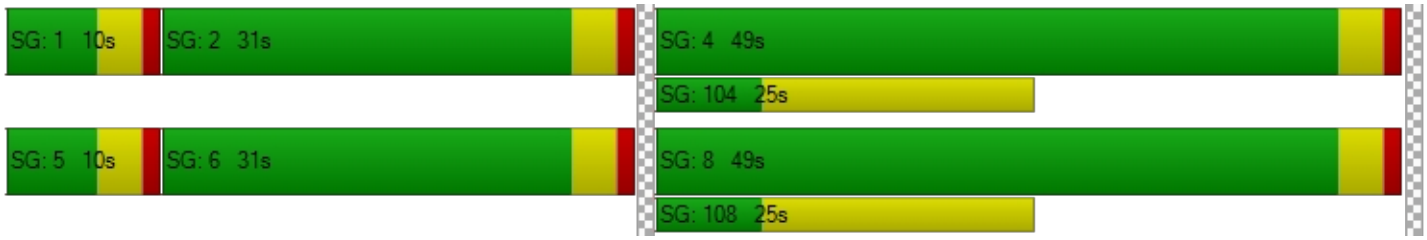
d_M, Delay for Movement [s/veh]	960.08	41.05	41.05	37.46	47.46	47.46	52.13	4.22	4.15	49.75	4.01	4.01
Movement LOS	F	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	753.09			47.23			4.97			5.17		
Approach LOS	F			D			A			A		
d_I, Intersection Delay [s/veh]	123.90											
Intersection LOS	F											
Intersection V/C	0.455											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.67	34.67
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	3.046	2.608
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1000	1000	600	600
d_b, Bicycle Delay [s]	11.25	11.25	22.05	22.05
l_b,int, Bicycle LOS Score for Intersection	2.109	1.768	2.231	2.276
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Navajo Road at US Highway 18

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):	0.488

Intersection Setup

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	172	102	119	40	129	12	14	531	135	186	616	31
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	172	102	119	40	129	12	14	531	135	186	616	31
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]	45	27	31	11	34	3	4	140	36	49	162	8
Total Analysis Volume [veh/h]	181	107	125	42	136	13	15	559	142	196	648	33
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	44	0	0	44	0	10	27	0	19	36	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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]	90	90	90	90	90	90	90	90	90	90	90	90
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]	12	12	12	12	12	12	2	54	54	12	64	64
g / C, Green / Cycle	0.13	0.13	0.13	0.13	0.13	0.13	0.02	0.60	0.60	0.14	0.71	0.71
(v / s)_i Volume / Saturation Flow Rate	0.11	0.06	0.07	0.02	0.04	0.04	0.01	0.20	0.19	0.12	0.19	0.19
s, saturation flow rate [veh/h]	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	213	243	243	167	243	243	38	1072	1072	231	1277	1277
d1, Uniform Delay [s]	37.69	35.80	36.19	34.53	35.14	35.12	43.44	9.21	9.06	38.01	4.70	4.68
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	9.22	1.25	1.68	0.78	0.71	0.70	6.70	0.85	0.77	8.44	0.52	0.51
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	0.85	0.44	0.51	0.25	0.31	0.30	0.40	0.34	0.32	0.85	0.27	0.26
d, Delay for Lane Group [s/veh]	46.90	37.05	37.87	35.31	35.85	35.82	50.14	10.06	9.83	46.45	5.21	5.18
Lane Group LOS	D	D	D	D	D	D	D	B	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.34	2.22	2.63	0.84	1.51	1.50	0.40	3.52	3.24	4.69	2.03	1.99
50th-Percentile Queue Length [ft/ln]	108.55	55.43	65.79	21.09	37.83	37.40	9.92	88.09	81.01	117.28	50.84	49.78
95th-Percentile Queue Length [veh/ln]	7.76	3.99	4.74	1.52	2.72	2.69	0.71	6.34	5.83	8.24	3.66	3.58
95th-Percentile Queue Length [ft/ln]	193.99	99.78	118.43	37.96	68.10	67.32	17.85	158.55	145.82	206.08	91.52	89.61

Movement, Approach, & Intersection Results

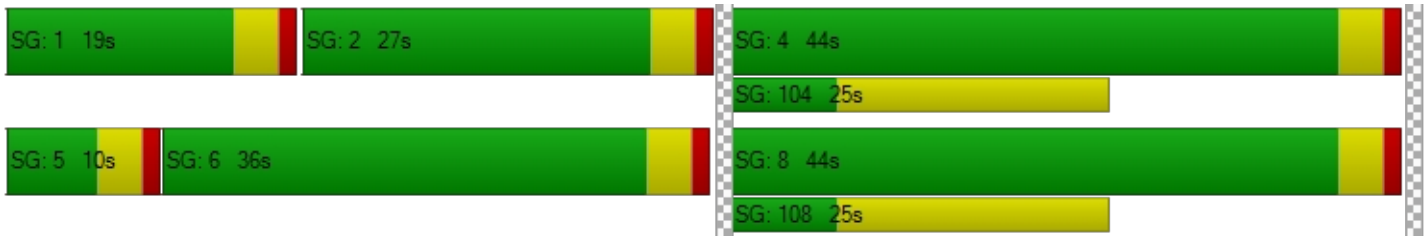
d_M, Delay for Movement [s/veh]	46.90	37.05	37.87	35.31	35.83	35.82	50.14	9.98	9.83	46.45	5.20	5.18
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	41.62			35.72			10.79			14.42		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	20.20											
Intersection LOS	C											
Intersection V/C	0.488											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.68	34.68
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.861	2.672
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	889	889	511	711
d_b, Bicycle Delay [s]	13.90	13.90	24.95	18.70
l_b,int, Bicycle LOS Score for Intersection	1.900	1.717	2.150	2.283
Bicycle LOS	A	A	B	B

Sequence

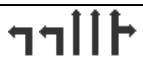
Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: Apple Valley Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	38.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.888

Intersection Setup

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Apple Valley			Apple Valley			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	441	158	77	104	226	310	181	1648	718	72	1431	83
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	441	158	77	104	226	310	181	1648	718	72	1431	83
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]	116	42	20	27	59	82	48	434	189	19	377	22
Total Analysis Volume [veh/h]	464	166	81	109	238	326	191	1735	756	76	1506	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]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	23	39	0	14	30	0	12	57	0	10	55	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	0	0	24	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	R	L	C	R	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
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	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]	19	33	33	9	24	24	8	56	56	6	53	53
g / C, Green / Cycle	0.16	0.28	0.28	0.08	0.20	0.20	0.07	0.46	0.46	0.05	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.15	0.07	0.06	0.06	0.07	0.18	0.06	0.32	0.42	0.02	0.29	0.30
s, saturation flow rate [veh/h]	3200	1800	1800	1700	3600	1800	3200	5400	1800	3200	3600	1800
c, Capacity [veh/h]	508	500	500	134	712	356	218	2497	832	152	1591	796
d1, Uniform Delay [s]	49.70	33.78	33.51	54.44	41.39	47.20	55.48	25.57	29.92	55.80	26.44	26.68
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.25	0.11	0.50	0.50	0.11	0.50	0.50
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]	6.81	0.27	0.24	11.04	0.27	18.39	10.71	1.62	15.54	2.51	2.19	4.60
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	0.91	0.26	0.23	0.81	0.33	0.92	0.88	0.69	0.91	0.50	0.66	0.68
d, Delay for Lane Group [s/veh]	56.51	34.05	33.75	65.48	41.66	65.59	66.19	27.19	45.46	58.31	28.63	31.28
Lane Group LOS	E	C	C	E	D	E	E	C	D	E	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	7.31	3.01	2.68	3.66	3.07	11.32	3.19	13.17	23.17	1.18	12.19	13.09
50th-Percentile Queue Length [ft/ln]	182.81	75.25	67.03	91.39	76.69	282.97	79.75	329.25	579.15	29.46	304.69	327.13
95th-Percentile Queue Length [veh/ln]	11.75	5.42	4.83	6.58	5.52	16.84	5.74	19.12	31.06	2.12	17.91	19.02
95th-Percentile Queue Length [ft/ln]	293.68	135.45	120.65	164.51	138.05	420.91	143.54	478.04	776.49	53.02	447.82	475.44

Movement, Approach, & Intersection Results

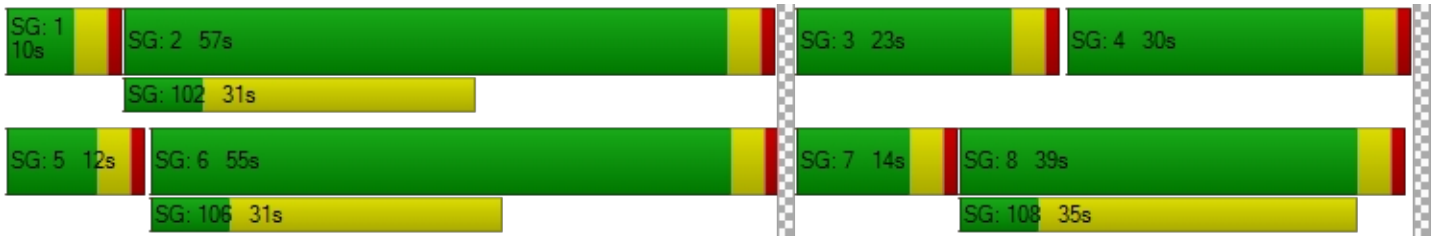
d_M, Delay for Movement [s/veh]	56.51	33.99	33.75	65.48	41.66	65.59	66.19	27.19	45.46	58.31	29.42	31.28
Movement LOS	E	C	C	E	D	E	E	C	D	E	C	C
d_A, Approach Delay [s/veh]	48.66			57.11			35.12			30.83		
Approach LOS	D			E			D			C		
d_I, Intersection Delay [s/veh]	38.13											
Intersection LOS	D											
Intersection V/C	0.888											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	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]	49.54	49.54	0.00	49.54
l_p,int, Pedestrian LOS Score for Intersection	2.756	2.648	0.000	3.177
Crosswalk LOS	C	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	433	883	850
d_b, Bicycle Delay [s]	30.13	36.85	18.73	19.86
l_b,int, Bicycle LOS Score for Intersection	2.146	2.115	3.035	2.478
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Kasota Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	20.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.794

Intersection Setup

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kasota Road			Kasota Road			US Highway 18			US HIghway 18		
Base Volume Input [veh/h]	91	56	69	109	120	121	85	1666	69	65	1426	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	91	56	69	109	120	121	85	1666	69	65	1426	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]	24	15	18	29	32	32	22	438	18	17	375	13
Total Analysis Volume [veh/h]	96	59	73	115	126	127	89	1754	73	68	1501	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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	5	6	0	5	6	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	43	0	0	43	0	9	38	0	9	38	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	15	15	15	15	5	58	58	5	58	58
g / C, Green / Cycle	0.17	0.17	0.17	0.17	0.06	0.65	0.65	0.05	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.06	0.07	0.07	0.14	0.05	0.51	0.51	0.04	0.43	0.43
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	106	302	223	302	98	1163	1163	89	1154	1154
d1, Uniform Delay [s]	33.05	33.65	33.45	36.28	42.21	11.45	11.44	42.12	10.24	10.19
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	23.50	0.99	1.84	6.09	24.55	5.37	5.35	12.45	3.18	3.12
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	0.91	0.44	0.52	0.84	0.91	0.79	0.78	0.76	0.68	0.67
d, Delay for Lane Group [s/veh]	56.55	34.64	35.28	42.37	66.76	16.82	16.79	54.57	13.42	13.31
Lane Group LOS	E	C	D	D	E	B	B	D	B	B
Critical Lane Group	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.51	2.64	2.33	5.79	2.61	12.74	12.72	1.79	9.36	9.24
50th-Percentile Queue Length [ft/ln]	62.85	65.96	58.16	144.79	65.35	318.56	317.93	44.63	234.01	231.02
95th-Percentile Queue Length [veh/ln]	4.53	4.75	4.19	9.74	4.70	18.60	18.57	3.21	14.38	14.23
95th-Percentile Queue Length [ft/ln]	113.13	118.73	104.69	243.45	117.62	464.92	464.14	80.33	359.45	355.66

Movement, Approach, & Intersection Results

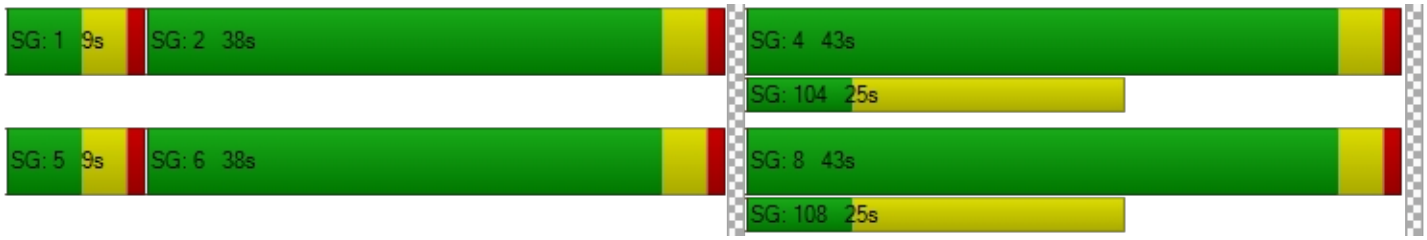
d_M, Delay for Movement [s/veh]	56.55	34.64	34.64	35.28	42.37	42.37	66.76	16.81	16.79	54.57	13.37	13.31
Movement LOS	E	C	C	D	D	D	E	B	B	D	B	B
d_A, Approach Delay [s/veh]	43.87			40.15			19.13			15.09		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	20.78											
Intersection LOS	C											
Intersection V/C	0.794											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.70	34.70
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	3.146	3.158
Crosswalk LOS	F	F	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	866	866	755	755
d_b, Bicycle Delay [s]	14.47	14.47	17.44	17.44
l_b,int, Bicycle LOS Score for Intersection	1.936	2.167	3.140	2.899
Bicycle LOS	A	B	C	C

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Corwin Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	24.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.857

Intersection Setup

Name	Corwin Road		US Highway 18		US Highway 18	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	1	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Corwin Road		US Highway 18		US Highway 18	
Base Volume Input [veh/h]	43	406	473	1356	1116	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	43	406	473	1356	1116	16
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]	11	107	124	357	294	4
Total Analysis Volume [veh/h]	45	427	498	1427	1175	17
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Protected	Permissive	Permissive	Permissive
Signal Group	7	0	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	6	0	6	6	6	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	16	0	39	74	35	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	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
Detector Length [ft]	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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	C
C, Cycle Length [s]	90	90	90	90	90	90
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]	12	12	28	70	38	38
g / C, Green / Cycle	0.13	0.13	0.32	0.78	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.03	0.12	0.29	0.40	0.33	0.33
s, saturation flow rate [veh/h]	1700	3600	1700	3600	1800	1800
c, Capacity [veh/h]	228	483	537	2798	750	750
d1, Uniform Delay [s]	34.68	38.31	29.81	3.71	22.89	22.89
k, delay calibration	0.11	0.11	0.27	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.42	5.59	15.87	0.67	8.49	8.49
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	0.20	0.88	0.93	0.51	0.79	0.79
d, Delay for Lane Group [s/veh]	35.10	43.90	45.68	4.37	31.37	31.37
Lane Group LOS	D	D	D	A	C	C
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.89	4.92	12.39	3.43	12.18	12.18
50th-Percentile Queue Length [ft/ln]	22.36	123.09	309.72	85.72	304.53	304.53
95th-Percentile Queue Length [veh/ln]	1.61	8.56	18.16	6.17	17.90	17.90
95th-Percentile Queue Length [ft/ln]	40.26	214.07	454.03	154.29	447.62	447.62

Movement, Approach, & Intersection Results

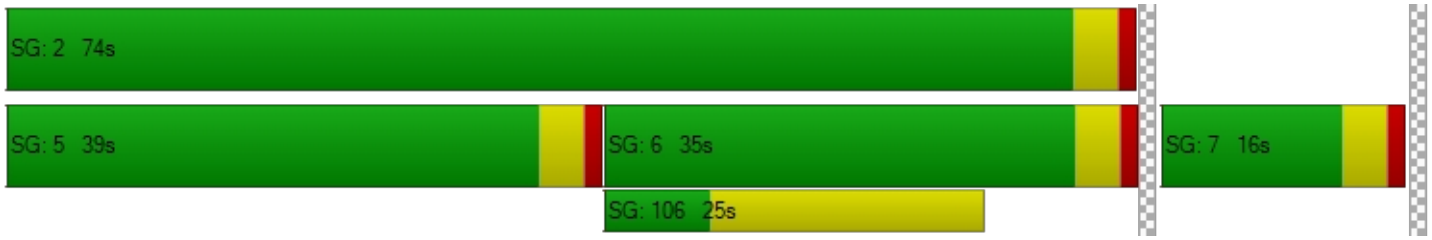
d_M, Delay for Movement [s/veh]	35.10	43.90	45.68	4.37	31.37	31.37
Movement LOS	D	D	D	A	C	C
d_A, Approach Delay [s/veh]	43.06		15.06		31.37	
Approach LOS	D		B		C	
d_I, Intersection Delay [s/veh]	24.16					
Intersection LOS	C					
Intersection V/C	0.857					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.68	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.371	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	267	1555	689
d_b, Bicycle Delay [s]	33.81	2.23	19.35
l_b,int, Bicycle LOS Score for Intersection	1.560	3.148	2.543
Bicycle LOS	A	C	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Tao Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	15.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.601

Intersection Setup

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Tao Road			Tao Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	57	51	29	155	43	100	119	1352	38	27	1091	96
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	57	51	29	155	43	100	119	1352	38	27	1091	96
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	13	8	41	11	26	31	356	10	7	287	25
Total Analysis Volume [veh/h]	60	54	31	163	45	105	125	1423	40	28	1148	101
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	39	0	0	39	0	24	31	0	20	27	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	11	11	11	11	8	64	64	3	59	59
g / C, Green / Cycle	0.12	0.12	0.12	0.12	0.09	0.71	0.71	0.03	0.65	0.65
(v / s)_i Volume / Saturation Flow Rate	0.04	0.05	0.10	0.08	0.07	0.41	0.41	0.02	0.35	0.34
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	121	221	182	221	158	1277	1277	59	1172	1172
d1, Uniform Delay [s]	35.93	36.38	38.33	37.81	40.00	6.42	6.40	42.65	8.44	8.32
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	3.15	1.10	14.24	3.64	8.65	1.89	1.86	5.77	1.78	1.69
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	0.50	0.39	0.90	0.68	0.79	0.57	0.57	0.47	0.54	0.53
d, Delay for Lane Group [s/veh]	39.07	37.47	52.58	41.45	48.65	8.31	8.26	48.41	10.22	10.01
Lane Group LOS	D	D	D	D	D	A	A	D	B	B
Critical Lane Group	No	No	Yes	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.29	1.77	4.16	3.34	3.05	6.07	6.01	0.70	6.26	6.00
50th-Percentile Queue Length [ft/ln]	32.28	44.20	103.90	83.57	76.29	151.81	150.27	17.51	156.38	150.12
95th-Percentile Queue Length [veh/ln]	2.32	3.18	7.48	6.02	5.49	10.11	10.03	1.26	10.36	10.02
95th-Percentile Queue Length [ft/ln]	58.10	79.56	187.01	150.42	137.33	252.84	250.80	31.51	258.92	250.59

Movement, Approach, & Intersection Results

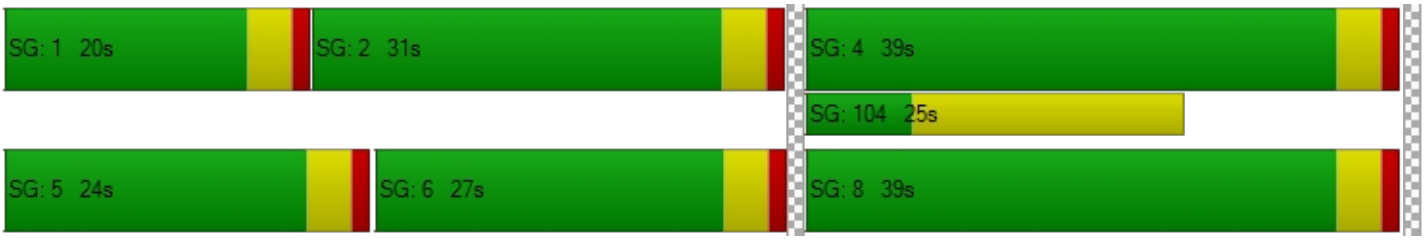
d_M, Delay for Movement [s/veh]	39.07	37.47	37.47	52.58	41.45	41.45	48.65	8.28	8.26	48.41	10.13	10.01
Movement LOS	D	D	D	D	D	D	D	A	A	D	B	B
d_A, Approach Delay [s/veh]	38.14			47.25			11.46			10.96		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	15.80											
Intersection LOS	B											
Intersection V/C	0.601											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.950	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	778	778	600	511
d_b, Bicycle Delay [s]	16.82	16.82	22.06	24.95
l_b,int, Bicycle LOS Score for Intersection	1.799	2.076	2.870	2.613
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Rimrock Road/Piute Road at US Highway 18

Control Type:	Two-way stop	Delay (sec / veh):	17.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.210

Intersection Setup

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			60.00			60.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Piute Road			Rimrock Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	0	0	71	0	0	49	90	1408	7	45	1136	68
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	0	0	71	0	0	49	90	1408	7	45	1136	68
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]	0	0	19	0	0	13	24	371	2	12	299	18
Total Analysis Volume [veh/h]	0	0	75	0	0	52	95	1482	7	47	1196	72
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.21	0.00	0.00	0.12	0.17	0.01	0.00	0.11	0.01	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	17.75	0.00	0.00	14.73	13.02	0.00	0.00	13.99	0.00	0.00
Movement LOS			C			B	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.78	0.00	0.00	0.42	0.63	0.00	0.00	0.35	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	19.53	0.00	0.00	10.45	15.70	0.00	0.00	8.75	0.00	0.00
d_A, Approach Delay [s/veh]	17.75			14.73			0.78			0.50		
Approach LOS	C			B			A			A		
d_I, Intersection Delay [s/veh]	1.32											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 6: Rancherias Road at Thunderbird Road

Control Type:	All-way stop	Delay (sec / veh):	13.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.523

Intersection Setup

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Rancherias Road		Rancherias Road		Thunderbird Road	
Base Volume Input [veh/h]	251	198	60	195	259	57
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	251	198	60	195	259	57
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]	66	52	16	51	68	15
Total Analysis Volume [veh/h]	264	208	63	205	273	60
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	591	669	527	569	522	633
Degree of Utilization, x	0.45	0.31	0.12	0.36	0.52	0.09

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	2.29	1.32	0.40	1.63	3.00	0.31
95th-Percentile Queue Length [ft]	57.36	33.10	10.11	40.74	74.94	7.83
Approach Delay [s/veh]	12.24		12.05		15.47	
Approach LOS	B		B		C	
Intersection Delay [s/veh]	13.20					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 7: Rancherias Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	30.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.842

Intersection Setup

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Rancherias Road			Rancherias Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	187	179	137	106	156	218	213	1168	83	304	827	125
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	187	179	137	106	156	218	213	1168	83	304	827	125
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]	49	47	36	28	41	57	56	307	22	80	218	33
Total Analysis Volume [veh/h]	197	188	144	112	164	229	224	1229	87	320	871	132
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	ProtPer	Permiss	Unsigna	ProtPer	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	40	0	0	40	0	21	26	0	24	29	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	21	0	0	0	0	0	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
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
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	18	14	18	14	14	14	41	41	19	46	46
g / C, Green / Cycle	0.20	0.16	0.20	0.16	0.16	0.15	0.45	0.45	0.21	0.51	0.51
(v / s)_i Volume / Saturation Flow Rate	0.12	0.05	0.07	0.09	0.13	0.13	0.37	0.36	0.19	0.28	0.27
s, saturation flow rate [veh/h]	1700	3600	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	327	574	392	287	287	261	816	816	355	915	915
d1, Uniform Delay [s]	32.22	33.61	30.49	35.04	36.49	37.22	21.35	21.16	34.78	15.23	15.00
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.13	0.50	0.50
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
d2, Incremental Delay [s]	1.78	0.33	0.40	1.79	5.06	8.03	8.70	8.13	10.04	2.47	2.26
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
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
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

Lane Group Results

X, volume / capacity	0.60	0.33	0.29	0.57	0.80	0.86	0.81	0.80	0.90	0.56	0.54
d, Delay for Lane Group [s/veh]	34.00	33.94	30.89	36.83	41.55	45.25	30.05	29.29	44.82	17.70	17.25
Lane Group LOS	C	C	C	D	D	D	C	C	D	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.96	1.83	2.09	3.42	5.17	5.31	13.27	12.87	7.66	7.33	6.91
50th-Percentile Queue Length [ft/ln]	98.94	45.69	52.14	85.49	129.21	132.69	331.75	321.73	191.62	183.32	172.86
95th-Percentile Queue Length [veh/ln]	7.12	3.29	3.75	6.16	8.90	9.09	19.24	18.75	12.20	11.77	11.23
95th-Percentile Queue Length [ft/ln]	178.08	82.24	93.85	153.88	222.42	227.14	481.10	468.81	305.12	294.34	280.67

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	34.00	33.94	0.00	30.89	36.83	41.55	45.25	29.70	29.29	44.82	17.51	17.25
Movement LOS	C	C		C	D	D	D	C	C	D	B	B
d_A, Approach Delay [s/veh]	33.97			37.65			31.94			24.09		
Approach LOS	C			D			C			C		
d_I, Intersection Delay [s/veh]	30.15											
Intersection LOS	C											
Intersection V/C	0.842											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	34.72	34.72	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.504	3.022	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	799	799	488	555
d_b, Bicycle Delay [s]	16.24	16.24	25.73	23.51
l_b,int, Bicycle LOS Score for Intersection	1.877	2.393	2.830	2.651
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Rancherias Road at Tomahawk Road

Control Type:	Two-way stop	Delay (sec / veh):	20.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.489

Intersection Setup

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
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 Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Rancherias Road		Rancherias Road		Tomahawk Road	
Base Volume Input [veh/h]	20	198	206	184	221	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	20	198	206	184	221	21
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]	5	52	54	48	58	6
Total Analysis Volume [veh/h]	21	208	217	194	233	22
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.49	0.03
d_M, Delay for Movement [s/veh]	8.19	0.00	0.00	0.00	20.19	17.59
Movement LOS	A	A	A	A	C	C
95th-Percentile Queue Length [veh/ln]	0.06	0.06	0.00	0.00	2.94	2.94
95th-Percentile Queue Length [ft/ln]	1.40	1.40	0.00	0.00	73.59	73.59
d_A, Approach Delay [s/veh]	0.75		0.00		19.96	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	5.88					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 9: Bass Hill Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	27.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.674

Intersection Setup

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	Bass Hill Road			Bass Hill Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	205	135	192	68	64	141	289	978	95	195	936	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	205	135	192	68	64	141	289	978	95	195	936	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]	54	36	51	18	17	37	76	257	25	51	246	14
Total Analysis Volume [veh/h]	216	142	202	72	67	148	304	1029	100	205	985	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]	105
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Overlap	Split	Split	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	8	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups			1,8			4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	6	0	6	6	6	6	0	6	6	0
Maximum Green [s]	0	30	30	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	10	10	0	35	35	20	32	0	28	40	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	24	0	21	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No	No		No	No	No	No		No	No	
Maximum Recall		No	No		No	No	No	No		No	No	
Pedestrian Recall		No	No		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	R	L	C	R	L	C	R
C, Cycle Length [s]	105	105	105	105	105	105	105	105	105	105	105	105
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	0.00	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	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]	11	11	30	9	9	40	12	54	54	15	57	57
g / C, Green / Cycle	0.11	0.11	0.29	0.08	0.08	0.38	0.12	0.52	0.52	0.14	0.54	0.54
(v / s)_i Volume / Saturation Flow Rate	0.07	0.08	0.11	0.02	0.04	0.08	0.10	0.29	0.06	0.12	0.27	0.03
s, saturation flow rate [veh/h]	3200	1800	1800	3200	1800	1800	3200	3600	1800	1700	3600	1800
c, Capacity [veh/h]	356	191	520	262	147	689	380	1855	927	246	1949	975
d1, Uniform Delay [s]	45.09	45.65	29.96	45.39	46.09	21.86	45.16	17.32	13.10	43.75	15.24	11.44
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	1.67	5.63	0.47	0.56	2.19	0.15	3.93	1.20	0.23	7.14	0.94	0.12
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	0.61	0.74	0.39	0.28	0.46	0.21	0.80	0.55	0.11	0.83	0.51	0.06
d, Delay for Lane Group [s/veh]	46.76	51.28	30.43	45.96	48.28	22.01	49.08	18.52	13.33	50.88	16.18	11.55
Lane Group LOS	D	D	C	D	D	C	D	B	B	D	B	B
Critical Lane Group	No	No	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.77	3.88	4.14	0.90	1.76	2.48	4.05	8.40	1.25	5.64	7.35	0.66
50th-Percentile Queue Length [ft/ln]	69.34	97.02	103.60	22.55	43.88	61.97	101.21	210.03	31.24	141.02	183.75	16.47
95th-Percentile Queue Length [veh/ln]	4.99	6.99	7.46	1.62	3.16	4.46	7.29	13.15	2.25	9.54	11.80	1.19
95th-Percentile Queue Length [ft/ln]	124.82	174.63	186.48	40.59	78.99	111.55	182.17	328.87	56.23	238.40	294.90	29.65

Movement, Approach, & Intersection Results

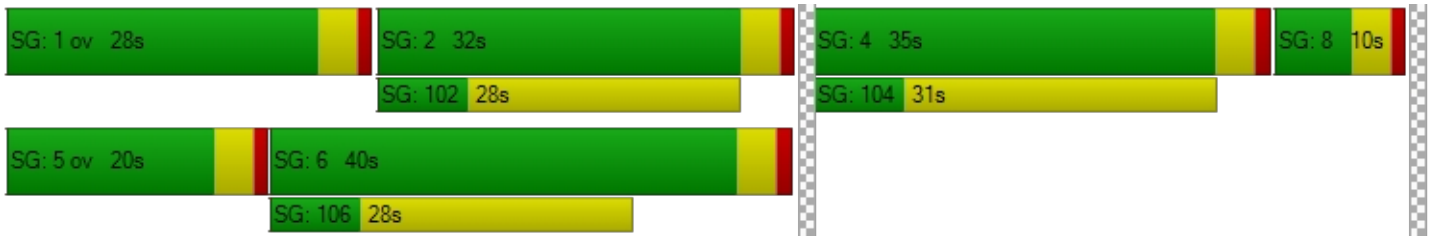
d_M, Delay for Movement [s/veh]	46.76	51.28	30.43	45.96	48.28	22.01	49.08	18.52	13.33	50.88	16.18	11.55
Movement LOS	D	D	C	D	D	C	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	42.02			34.15			24.64			21.66		
Approach LOS	D			C			C			C		
d_I, Intersection Delay [s/veh]	27.12											
Intersection LOS	C											
Intersection V/C	0.674											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
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]	42.14	42.14	42.14	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.612	2.589	3.296	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	114	590	533	685
d_b, Bicycle Delay [s]	46.73	26.13	28.29	22.72
l_b,int, Bicycle LOS Score for Intersection	2.484	2.033	2.742	2.589
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: Dale Evans Parkway at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	21.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.665

Intersection Setup

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			No		

Volumes

Name	Dale Evans Parkway			Dale Evans Parkway			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	13	13	7	332	14	200	201	1026	34	1	943	214
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	13	13	7	332	14	200	201	1026	34	1	943	214
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	3	2	87	4	53	53	270	9	0	248	56
Total Analysis Volume [veh/h]	14	14	7	349	15	211	212	1080	36	1	993	225
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 Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	10	0	0	37	0	13	33	0	15	35	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	0	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	0	0	0	24	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	95	95	95	95	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	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	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
g_i, Effective Green Time [s]	4	14	14	14	8	61	61	0	53	53
g / C, Green / Cycle	0.04	0.15	0.15	0.15	0.09	0.64	0.64	0.00	0.56	0.56
(v / s)_i Volume / Saturation Flow Rate	0.02	0.11	0.01	0.12	0.07	0.31	0.31	0.00	0.35	0.33
s, saturation flow rate [veh/h]	1700	3200	1800	1800	3200	1800	1800	1700	1800	1800
c, Capacity [veh/h]	67	485	273	273	279	1148	1148	5	997	997
d1, Uniform Delay [s]	44.83	38.44	34.54	38.80	42.46	9.05	9.01	47.33	14.55	14.10
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	6.19	2.02	0.08	4.65	4.25	1.49	1.46	19.25	3.02	2.59
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	0.52	0.72	0.05	0.77	0.76	0.49	0.48	0.20	0.63	0.59
d, Delay for Lane Group [s/veh]	51.03	40.47	34.62	43.45	46.71	10.54	10.47	66.59	17.56	16.69
Lane Group LOS	D	D	C	D	D	B	B	E	B	B
Critical Lane Group	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.92	3.96	0.30	5.02	2.58	5.88	5.79	0.05	9.37	8.50
50th-Percentile Queue Length [ft/ln]	22.98	99.07	7.54	125.55	64.39	146.94	144.80	1.24	234.37	212.59
95th-Percentile Queue Length [veh/ln]	1.65	7.13	0.54	8.70	4.64	9.85	9.74	0.09	14.40	13.29
95th-Percentile Queue Length [ft/ln]	41.37	178.32	13.58	217.43	115.90	246.34	243.47	2.24	359.90	332.15

Movement, Approach, & Intersection Results

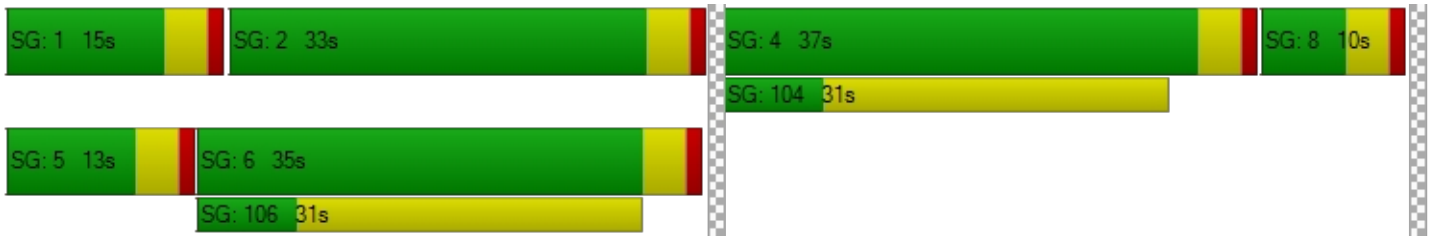
d_M, Delay for Movement [s/veh]	51.03	51.03	51.03	40.47	34.62	43.45	46.71	10.51	10.47	66.59	17.24	16.69
Movement LOS	D	D	D	D	C	D	D	B	B	E	B	B
d_A, Approach Delay [s/veh]	51.03			41.41			16.29			17.18		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	21.59											
Intersection LOS	C											
Intersection V/C	0.665											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	0.0
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	37.18	37.18	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.622	2.951	0.000
Crosswalk LOS	F	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	126	694	610	652
d_b, Bicycle Delay [s]	41.73	20.27	22.96	21.59
l_b,int, Bicycle LOS Score for Intersection	1.617	2.508	2.655	2.565
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 11: Flathead Road at US Highway 18

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):	0.601

Intersection Setup

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
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 Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			No		

Volumes

Name	Flathead Road			Flathead Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	93	70	29	20	45	54	54	1159	138	28	1011	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	93	70	29	20	45	54	54	1159	138	28	1011	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]	24	18	8	5	12	14	14	305	36	7	266	7
Total Analysis Volume [veh/h]	98	74	31	21	47	57	57	1220	145	29	1064	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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	64	0	0	64	0	10	16	0	10	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	0	0	0	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	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	2.00	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
g_i, Effective Green Time [s]	13	13	5	62	62	3	61	61
g / C, Green / Cycle	0.14	0.14	0.05	0.69	0.69	0.04	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.12	0.07	0.03	0.38	0.37	0.02	0.30	0.30
s, saturation flow rate [veh/h]	1700	1700	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	302	289	88	1239	1239	61	1210	1210
d1, Uniform Delay [s]	37.59	35.73	41.88	7.10	6.97	42.60	6.94	6.92
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.61	1.02	7.73	1.82	1.71	5.76	1.22	1.20
d3, Initial Queue Delay [s]	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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.67	0.43	0.65	0.56	0.54	0.48	0.45	0.45
d, Delay for Lane Group [s/veh]	40.20	36.75	49.62	8.92	8.68	48.37	8.16	8.12
Lane Group LOS	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.50	2.59	1.42	6.12	5.83	0.72	4.57	4.51
50th-Percentile Queue Length [ft/ln]	112.45	64.67	35.46	153.11	145.75	18.10	114.23	112.86
95th-Percentile Queue Length [veh/ln]	7.98	4.66	2.55	10.18	9.79	1.30	8.07	8.00
95th-Percentile Queue Length [ft/ln]	199.40	116.40	63.82	254.58	244.74	32.57	201.87	199.97

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	40.20	40.20	40.20	36.75	36.75	36.75	49.62	8.81	8.68	48.37	8.14	8.12
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	40.20			36.75			10.44			9.18		
Approach LOS	D			D			B			A		
d_I, Intersection Delay [s/veh]	13.20											
Intersection LOS	B											
Intersection V/C	0.601											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	0.0
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	0.00	34.68	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.954	0.000
Crosswalk LOS	F	F	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1333	1333	267	267
d_b, Bicycle Delay [s]	5.01	5.01	33.81	33.81
I_b,int, Bicycle LOS Score for Intersection	1.895	1.766	2.733	2.483
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: Kiowa Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	41.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.601

Intersection Setup

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	229	117	48	1	80	46	52	888	281	39	796	11
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	229	117	48	1	80	46	52	888	281	39	796	11
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]	60	31	13	0	21	12	14	234	74	10	209	3
Total Analysis Volume [veh/h]	241	123	51	1	84	48	55	935	296	41	838	12
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	34	0	0	34	0	10	46	0	10	46	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	2.00	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
g_i, Effective Green Time [s]	11	11	11	11	4	63	63	4	62	62
g / C, Green / Cycle	0.13	0.13	0.13	0.13	0.05	0.70	0.70	0.04	0.69	0.69
(v / s)_i Volume / Saturation Flow Rate	0.14	0.10	0.00	0.07	0.03	0.35	0.33	0.02	0.24	0.24
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	147	227	106	227	85	1256	1256	73	1243	1243
d1, Uniform Delay [s]	37.60	38.03	34.37	37.07	41.99	6.38	6.13	42.25	5.65	5.64
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	294.00	5.31	0.03	2.34	8.09	1.48	1.27	6.69	0.75	0.75
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	1.64	0.77	0.01	0.58	0.65	0.51	0.47	0.56	0.34	0.34
d, Delay for Lane Group [s/veh]	331.60	43.34	34.41	39.41	50.08	7.85	7.40	48.95	6.40	6.38
Lane Group LOS	F	D	C	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	15.07	3.99	0.02	2.85	1.38	5.12	4.54	1.02	2.95	2.93
50th-Percentile Queue Length [ft/ln]	376.70	99.81	0.50	71.30	34.41	127.96	113.62	25.49	73.83	73.35
95th-Percentile Queue Length [veh/ln]	25.13	7.19	0.04	5.13	2.48	8.83	8.04	1.83	5.32	5.28
95th-Percentile Queue Length [ft/ln]	628.32	179.66	0.90	128.35	61.95	220.72	201.03	45.87	132.89	132.02

Movement, Approach, & Intersection Results

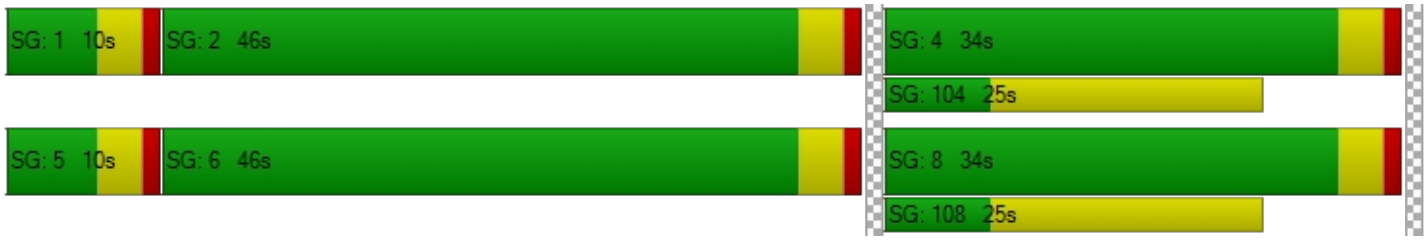
d_M, Delay for Movement [s/veh]	331.60	43.34	43.34	34.41	39.41	39.41	50.08	7.71	7.40	48.95	6.39	6.38
Movement LOS	F	D	D	C	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	210.74			39.37			9.45			8.35		
Approach LOS	F			D			A			A		
d_I, Intersection Delay [s/veh]	41.21											
Intersection LOS	D											
Intersection V/C	0.601											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.67	34.67
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	3.113	2.667
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	667	933	933
d_b, Bicycle Delay [s]	20.00	20.00	12.80	12.80
l_b,int, Bicycle LOS Score for Intersection	2.244	1.779	2.621	2.295
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Navajo Road at US Highway 18

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):	0.636

Intersection Setup

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Navajo Road			Navajo Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	198	200	175	47	192	24	42	666	251	238	628	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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	198	200	175	47	192	24	42	666	251	238	628	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]	52	53	46	12	51	6	11	175	66	63	165	15
Total Analysis Volume [veh/h]	208	211	184	49	202	25	44	701	264	251	661	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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	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	44	0	0	44	0	10	10	0	36	36	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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]	90	90	90	90	90	90	90	90	90	90	90	90
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]	14	14	14	14	14	14	4	49	49	15	60	60
g / C, Green / Cycle	0.15	0.15	0.15	0.15	0.15	0.15	0.05	0.54	0.54	0.17	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.12	0.12	0.10	0.03	0.06	0.06	0.03	0.28	0.26	0.15	0.20	0.20
s, saturation flow rate [veh/h]	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	212	279	279	120	279	279	78	972	972	292	1199	1199
d1, Uniform Delay [s]	36.63	36.42	35.81	33.11	34.34	34.29	42.09	13.24	12.78	36.25	6.30	6.25
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	24.33	4.17	2.66	2.23	0.97	0.94	6.35	1.99	1.65	7.34	0.66	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	0.98	0.76	0.66	0.41	0.41	0.40	0.57	0.52	0.47	0.86	0.31	0.30
d, Delay for Lane Group [s/veh]	60.96	40.60	38.47	35.33	35.31	35.23	48.44	15.23	14.43	43.59	6.96	6.88
Lane Group LOS	E	D	D	D	D	D	D	B	B	D	A	A
Critical Lane Group	Yes	No	No	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.76	4.69	3.95	1.00	2.31	2.26	1.09	6.59	5.75	5.85	2.72	2.62
50th-Percentile Queue Length [ft/ln]	144.00	117.16	98.67	24.88	57.71	56.54	27.13	164.75	143.74	146.19	67.97	65.50
95th-Percentile Queue Length [veh/ln]	9.70	8.24	7.10	1.79	4.16	4.07	1.95	10.80	9.68	9.81	4.89	4.72
95th-Percentile Queue Length [ft/ln]	242.40	205.91	177.61	44.78	103.89	101.77	48.83	270.00	242.05	245.33	122.35	117.89

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	60.96	40.60	38.47	35.33	35.27	35.23	48.44	15.01	14.43	43.59	6.92	6.88
Movement LOS	E	D	D	D	D	D	D	B	B	D	A	A
d_A, Approach Delay [s/veh]	46.97			35.28			16.31			16.39		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	24.63											
Intersection LOS	C											
Intersection V/C	0.636											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.68	34.68
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.966	2.741
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	889	889	133	711
d_b, Bicycle Delay [s]	13.90	13.90	39.21	18.70
I_b,int, Bicycle LOS Score for Intersection	2.057	1.787	2.392	2.362
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX D-III

YEAR 2025 WITH PROJECT WITH MITIGATION TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 12: Kiowa Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	20.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.563

Intersection Setup

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	245	41	30	3	85	32	12	627	134	21	799	5
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	245	41	30	3	85	32	12	627	134	21	799	5
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]	64	11	8	1	22	8	3	165	35	6	210	1
Total Analysis Volume [veh/h]	258	43	32	3	89	34	13	660	141	22	841	5
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	41	61	0	9	29	0	10	10	0	10	10	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	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
g_i, Effective Green Time [s]	16	23	0	8	2	48	48	3	49	49
g / C, Green / Cycle	0.18	0.26	0.00	0.09	0.02	0.53	0.53	0.03	0.54	0.54
(v / s)_i Volume / Saturation Flow Rate	0.15	0.04	0.00	0.07	0.01	0.23	0.22	0.01	0.24	0.23
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	300	468	8	159	33	951	951	49	969	969
d1, Uniform Delay [s]	36.02	25.72	44.70	40.17	43.66	12.99	12.77	43.03	12.56	12.55
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	7.17	0.16	26.94	7.68	7.65	1.44	1.30	6.24	1.43	1.43
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	0.86	0.16	0.38	0.77	0.40	0.43	0.41	0.45	0.44	0.44
d, Delay for Lane Group [s/veh]	43.19	25.88	71.65	47.85	51.32	14.43	14.07	49.27	13.99	13.98
Lane Group LOS	D	C	E	D	D	B	B	D	B	B
Critical Lane Group	Yes	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	5.99	1.24	0.13	2.97	0.35	5.14	4.74	0.56	5.17	5.16
50th-Percentile Queue Length [ft/ln]	149.70	31.09	3.14	74.25	8.83	128.44	118.60	14.06	129.28	128.93
95th-Percentile Queue Length [veh/ln]	10.00	2.24	0.23	5.35	0.64	8.85	8.32	1.01	8.90	8.88
95th-Percentile Queue Length [ft/ln]	250.03	55.96	5.66	133.66	15.89	221.37	207.90	25.31	222.52	222.04

Movement, Approach, & Intersection Results

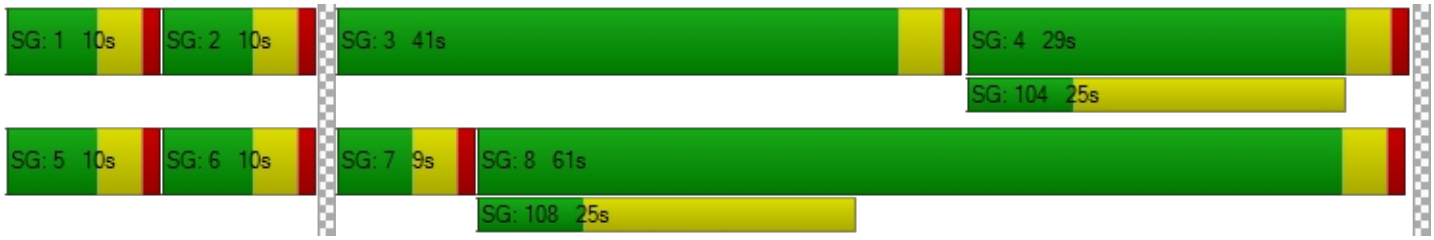
d_M, Delay for Movement [s/veh]	43.19	25.88	25.88	71.65	47.85	47.85	51.32	14.30	14.07	49.27	13.99	13.98
Movement LOS	D	C	C	E	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	39.29			48.42			14.85			14.88		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	20.64											
Intersection LOS	C											
Intersection V/C	0.563											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.69	34.69
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.679	2.604
Crosswalk LOS	F	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]	1266	555	133	133
d_b, Bicycle Delay [s]	6.06	23.49	39.22	39.22
l_b,int, Bicycle LOS Score for Intersection	2.109	1.768	2.231	2.276
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: Kiowa Road at US Highway 18

Control Type:	Signalized	Delay (sec / veh):	23.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.685

Intersection Setup

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
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 Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Kiowa Road			Kiowa Road			US Highway 18			US Highway 18		
Base Volume Input [veh/h]	229	117	48	1	80	46	52	887	281	39	796	11
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth 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
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]	229	117	48	1	80	46	52	887	281	39	796	11
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]	60	31	13	0	21	12	14	233	74	10	209	3
Total Analysis Volume [veh/h]	241	123	51	1	84	48	55	934	296	41	838	12
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]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	6	0	5	6	0	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	41	61	0	9	29	0	10	10	0	10	10	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	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	0	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		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	L	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90
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	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
g_i, Effective Green Time [s]	15	23	0	8	5	47	47	4	46	46
g / C, Green / Cycle	0.17	0.26	0.00	0.09	0.05	0.52	0.52	0.04	0.51	0.51
(v / s)_i Volume / Saturation Flow Rate	0.14	0.10	0.00	0.07	0.03	0.35	0.33	0.02	0.24	0.24
s, saturation flow rate [veh/h]	1700	1800	1700	1800	1700	1800	1800	1700	1800	1800
c, Capacity [veh/h]	283	465	3	170	86	933	933	74	920	920
d1, Uniform Delay [s]	36.49	27.42	44.89	39.87	41.97	16.19	15.56	42.23	14.09	14.07
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
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]	7.20	0.50	40.83	7.44	7.71	4.06	3.28	6.36	1.67	1.66
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	0.85	0.37	0.29	0.78	0.64	0.68	0.63	0.55	0.46	0.46
d, Delay for Lane Group [s/veh]	43.69	27.91	85.72	47.32	49.68	20.25	18.84	48.59	15.76	15.73
Lane Group LOS	D	C	F	D	D	C	B	D	B	B
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.61	3.08	0.06	3.17	1.37	10.10	8.90	1.01	5.63	5.59
50th-Percentile Queue Length [ft/ln]	140.35	77.07	1.53	79.21	34.26	252.38	222.56	25.37	140.69	139.75
95th-Percentile Queue Length [veh/ln]	9.50	5.55	0.11	5.70	2.47	15.31	13.80	1.83	9.52	9.47
95th-Percentile Queue Length [ft/ln]	237.49	138.73	2.75	142.57	61.67	382.64	344.89	45.67	237.95	236.69

Movement, Approach, & Intersection Results

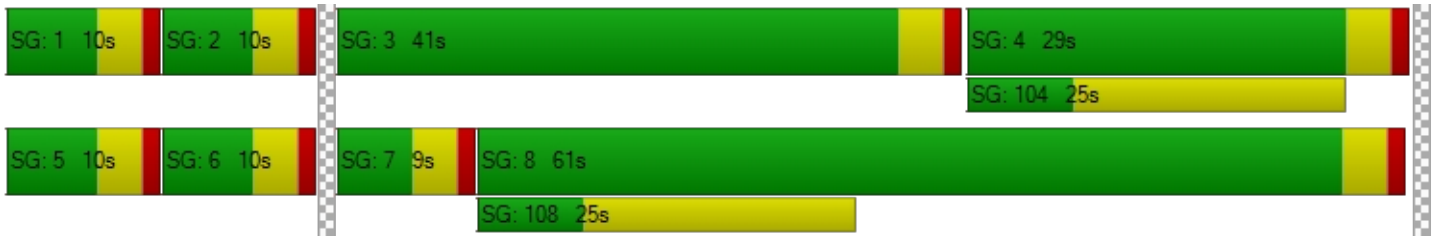
d_M, Delay for Movement [s/veh]	43.69	27.91	27.91	85.72	47.32	47.32	49.68	19.81	18.84	48.59	15.75	15.73
Movement LOS	D	C	C	F	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	37.08			47.60			20.86			17.26		
Approach LOS	D			D			C			B		
d_I, Intersection Delay [s/veh]	23.46											
Intersection LOS	C											
Intersection V/C	0.685											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	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]	0.00	0.00	34.69	34.69
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.770	2.665
Crosswalk LOS	F	F	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1266	555	133	133
d_b, Bicycle Delay [s]	6.06	23.49	39.22	39.22
l_b,int, Bicycle LOS Score for Intersection	2.244	1.779	2.620	2.295
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX E

PROJECT DRIVEWAY LEVEL OF SERVICE CALCULATION WORKSHEETS

APPENDIX E-I

YEAR 2025 WITH PROJECT TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 14: Rancherias Road at Project Driveway 1

Control Type:	Two-way stop	Delay (sec / veh):	23.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.186

Intersection Setup

Name	Rancherias Road		Rancherias Road		Project Driveway 1	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Rancherias Road		Rancherias Road		Project Driveway 1	
Base Volume Input [veh/h]	311	39	177	225	43	111
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	311	39	177	225	43	111
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]	82	10	47	59	11	29
Total Analysis Volume [veh/h]	327	41	186	237	45	117
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.16	0.00	0.19	0.17
d_M, Delay for Movement [s/veh]	0.00	0.00	8.58	0.00	23.30	11.22
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.55	0.00	0.67	0.60
95th-Percentile Queue Length [ft/ln]	0.00	0.00	13.83	0.00	16.73	15.04
d_A, Approach Delay [s/veh]	0.00		3.77		14.57	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	4.15					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 15: Rancherias Road at Project Driveway 2

Control Type:	Two-way stop	Delay (sec / veh):	10.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.029

Intersection Setup

Name	Rancherias Road		Rancherias Road		Project Driveway 2	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Rancherias Road		Rancherias Road		Project Driveway 2	
Base Volume Input [veh/h]	409	13	0	402	0	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	409	13	0	402	0	18
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]	108	3	0	106	0	5
Total Analysis Volume [veh/h]	431	14	0	423	0	19
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			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	0.03
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	0.00	0.00	10.57
Movement LOS	A	A		A		B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.09
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	2.20
d_A, Approach Delay [s/veh]	0.00		0.00		10.57	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.23					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 16: Project Driveway 3 at US Highway 18

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):	0.197

Intersection Setup

Name	Project Driveway 3		US Highway 18		US Highway 18	
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 Entry Pocket	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		60.00		60.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project Driveway 3		US Highway 18		US Highway 18	
Base Volume Input [veh/h]	0	110	786	102	0	1178
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	0	110	786	102	0	1178
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	29	207	27	0	310
Total Analysis Volume [veh/h]	0	116	827	107	0	1240
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.20	0.01	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	0.00	12.63	0.00	0.00	0.00	0.00
Movement LOS		B	A	A		A
95th-Percentile Queue Length [veh/ln]	0.00	0.73	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	18.22	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	12.63		0.00		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.64					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 14: Rancherias Road at Project Driveway 1

Control Type:	Two-way stop	Delay (sec / veh):	59.7
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.571

Intersection Setup

Name	Rancherias Road		Rancherias Road		Project Driveway 1	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Rancherias Road		Rancherias Road		Project Driveway 1	
Base Volume Input [veh/h]	357	59	269	267	77	194
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	357	59	269	267	77	194
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]	94	16	71	70	20	51
Total Analysis Volume [veh/h]	376	62	283	281	81	204
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.25	0.00	0.57	0.32
d_M, Delay for Movement [s/veh]	0.00	0.00	9.29	0.00	59.71	13.16
Movement LOS	A	A	A	A	F	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	1.00	0.00	2.89	1.36
95th-Percentile Queue Length [ft/ln]	0.00	0.00	25.06	0.00	72.33	33.93
d_A, Approach Delay [s/veh]	0.00		4.66		26.39	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	7.89					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 15: Rancherias Road at Project Driveway 2

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):	0.051

Intersection Setup

Name	Rancherias Road		Rancherias Road		Project Driveway 2	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Rancherias Road		Rancherias Road		Project Driveway 2	
Base Volume Input [veh/h]	532	20	0	536	0	29
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	532	20	0	536	0	29
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]	140	5	0	141	0	8
Total Analysis Volume [veh/h]	560	21	0	564	0	31
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			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	0.01	0.00	0.05
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	0.00	0.00	11.30
Movement LOS	A	A		A		B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.16
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	4.06
d_A, Approach Delay [s/veh]	0.00		0.00		11.30	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.30					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 16: Project Driveway 3 at US Highway 18

Control Type:	Two-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):	0.491

Intersection Setup

Name	Project Driveway 3		US Highway 18		US Highway 18	
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 Entry Pocket	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		60.00		60.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project Driveway 3		US Highway 18		US Highway 18	
Base Volume Input [veh/h]	0	190	1248	156	0	1261
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	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]	0	190	1248	156	0	1261
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	50	328	41	0	332
Total Analysis Volume [veh/h]	0	200	1314	164	0	1327
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.49	0.01	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	0.00	22.06	0.00	0.00	0.00	0.00
Movement LOS		C	A	A		A
95th-Percentile Queue Length [veh/ln]	0.00	2.63	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	65.66	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	22.06		0.00		0.00	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	1.47					
Intersection LOS	C					