Public Review DRAFT Initial Study/Mitigated Negative Declaration

VTSM USE23-0112: Tully Road Subdivision

prepared by
City of Hughson
Community Development Department
7018 Pine Street
Hughson, California 95326

Prepared with the assistance of
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October 2024

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NEGATIVE DECLARATION

Lead Agency:
City of Hughson
7018 Pine Street
Hughson, California 95326

PROJECT NAME:

Vesting Tentative Subdivision Map No. USE23-0112 – Tully Road Subdivision

PROJECT PROPONENT AND LEAD AGENCY:

Project Proponent: Mr. W. David Hendley
6413 E. Keyes Road
Hughson, CA 95326

Lead Agency: City of Hughson
7018 Pine Street
Hughson, CA 95326

PROJECT LOCATION:

The Proposed Project is located on three parcels equaling approximately 46.44 acres and is bounded by existing industrial development to the north, the future extension of Roeding Road and agricultural lands to the south, Santa Fe Avenue and the Burlington Northern Santa Fe Railroad to the east, and Tully Road to the west.

The Stanislaus County Assessor's Office has assigned the Proposed Project parcels as APN No.'s 018-052-043, 018-048-009, and 040.

PROJECT DESCRIPTION:

The Proposed Project consists of the Vesting Tentative Subdivision Map to allow for the subdivision of approximately 46.44 acres into thirty-four (34) industrial lots, and a parcel set aside for a future storm drain basin. Physical development of the individual lots is not proposed at this time, but it can be assumed that future development within the Project site will conform to the City's Zoning Ordinance, including Section 17.02.032 (Uses allowed in each district) and Section 17.02.061 (I-Industrial Zone). Ultimately, the Proposed Project will consist of uses consistent with the City's Zoning Ordinance, and specifically, permitted uses within the I-Industrial Zone district.

New parcels created as part of the Proposed Project are approximately one (1) acre in size. Primary access to the Project site will be provided via access to Tully Road and Roeding Road. The Project Proponent will be required to install frontage improvements to Tully Road, including curb, gutter, and sidewalk, and

Roeding Road, including curb, gutter, sidewalk, roadway improvements allowing for two (2) travel lanes. Roeding Road improvements will be installed along the Proposed Project's frontage extending east to Street D.

The Proposed Project will be served domestic utilities by the City of Hughson. Connections to existing water, sewer, and storm drain lines located in Tully Road will be installed, along with the extension of said lines within Streets A, B, C, and D. Wet utility lines will also be installed in the Roeding Road extension and looped through Street D. Stormwater will be routed through the Proposed Project into the storm drain basin, which will be developed with a French drain system.

Lot 9 of the Proposed Project also consists of an existing communications tower. Access to this tower for maintenance, etc. will be provided via an existing easement which is located on the eastern perimeter of the Proposed Project.

The proposed VTSM can be found in this Initial Study as Figure 4.

ENVIRONMENTAL DETERMINATION:

The Lead Agency has prepared an Initial Study, the following, which considers the potential environmental effects of the Proposed Project. The Initial Study shows that there is no substantial evidence, in light of the whole record before the Lead Agency, that the Proposed Project may have a potentially significant effect on the environment, provided that the following mitigation measures are included in the Proposed Project.

MITIGATION MEASURES:

Mitigation Measure Air-1: Prior to the commencement of construction activities for each phase of construction, the Project Proponent shall prepare and submit a Dust Control Plan that meets all of the applicable requirements of APCD Rule 8021, Section 6.3.

Mitigation Measure Air-2: During all construction activities, the project proponent shall implement the following dust control practices identified in Tables 6-2 and 6-3 of the GAMAQI (San Joaquin Valley APCD, 2002):

1. All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover.
2. All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.
3. All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall control fugitive dust emissions by application of water or by presoaking.
4. When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, or at least six inches of freeboard space from the top of the container shall be maintained.

5. All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.
6. Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
7. Limit traffic speeds on unpaved roads to 5 mph.
8. Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.

Mitigation Measure Noise-1: Implementation of the following multi-part mitigation measure is required to reduce potential construction-period noise impacts:

Prior to issuance of construction permits, the following language shall be included, verbatim, in the general notes section of all the civil plan construction documents.

1. The construction contractor shall ensure that all equipment driven by internal combustion engines shall be equipped with mufflers which are in good condition and appropriate for the equipment.
2. The construction contractor shall ensure that unnecessary idling of internal combustion engines (i.e., idling in excess of five (5) minutes) is prohibited.
3. The construction contractor shall utilize “quiet” models of air compressors and other stationary noise sources where technology exists.
4. At all times during project grading construction, the construction contractor shall ensure that stationary noise-generating equipment shall be located as far as practicable from sensitive receptors and placed so that emitted noise is directed away from adjacent residences.
5. The construction contractor shall ensure that the construction staging areas shall be located to create the greatest feasible distance between the staging area and noise-sensitive receptors nearest the project site.
6. The construction contractor shall ensure that all on-site construction activities, including the operation of any tools or equipment used in construction, drilling, repair, alteration, grading, or demolition work, are limited to between the hours of 7:00 a.m. and 10:00 p.m. Monday through Friday and between the hours of 8:00 a.m. and 10:00 p.m. on Saturdays, Sundays, and holidays.

Mitigation Measure Transportation-1: A southbound left-turn lane should be installed on Tully Road at the proposed project intersection with Street A. Based on Caltrans guidelines and projected left-turn volumes, the left-turn lane should be designed to provide the maximum storage (to the extent possible) given project frontage and available ROW (100-125 feet) of storage (4 vehicles and/or combination of heavy vehicles.

Mitigation Measure Transportation-2: Install a signal at the intersection of East Whitmore Avenue/Tully Road to improve vehicle delays and reduce overall vehicle queuing during the AM and PM peak hours. In addition, widen and/or re-stripe the eastbound E. Whitmore Avenue approach to include a separate left-

turn lane and shared through/right-turn lane. Under Cumulative Year 2043 plus Project conditions, the intersection meets the peak hour signal warrant (Warrant #3). Based on Cumulative Year 2043 plus Project conditions, it is recommended that the proposed project contribute a "proportional share" of the costs to improve the intersection based on Caltrans "pro-rata" fair share calculations; or construction of a single/multi-lane modern roundabout could be given consideration.

Mitigation Measure Transportation-3: Install a signal at the intersection of E. Whitmore Avenue/Santa Fe Avenue to improve vehicle delays and reduce overall vehicle queuing during the AM and PM peak hours. The signal should be coordinated with existing automated railroad crossing gates located approximately 75-feet west of Santa Fe Avenue. Since unacceptable intersection LOS and vehicle delay is an existing deficient condition, it is recommended that the proposed project contribute a "proportional share" of the costs to improve the intersection based on Caltrans "pro-rata" fair share calculations. Please refer to Cumulative Year 2043 Plus Project Conditions for a discussion of Caltrans "pro-rata" fair share methodology and proposed project fair share contribution.

Mitigation Measure Utility and Service Systems-1: Prior to the approval of any specific development projects within the Proposed Project, the City Engineer shall review the respective development project and determine, in writing, that the specific development project complies with the maximum water demand of 3,600 gallons per day per acre.

Ms. Carla Jauregui, Community Development Director

10/10/24
Date

INITIAL STUDY

1. PROJECT TITLE

Vesting Tentative Subdivision Map No. USE23-0112 – Tully Road Subdivision

2. LEAD AGENCY NAME AND ADDRESS

City of Hughson
7018 Pine Street
Hughson, CA 95326

3. CONTACT PERSON AND PHONE NUMBER

Ms. Carla Jauregui, Community Development Director
(209) 883-4054

4. PROJECT LOCATION

The Project site is located on Tully Road, and includes Assessor Parcel Numbers 018-048-009 and 040, and 018-052-043. Figure 1 provides an illustration of the Project site's location.

5. PROJECT SPONSOR'S NAME AND ADDRESS

Mr. W. David Hendley
6413 E. Keyes Road
Hughson, CA 95326

6. EXISTING SETTING

The Tully Road Subdivision Project site is comprised of three (3) parcels equaling 46.44 acres located at the northeastern corner of the Tully Road and Roeding Road intersection in the City of Hughson, Stanislaus County. The Project site has previously been used for agricultural uses and is presently being utilized as an Almond orchard. The Project site sits at the southern end of the City of Hughson's city limits. Surrounding uses are made up of a mixture of light-industrial and commercial uses to the north including California Trus (sic) Company, Santa Fe Avenue and BNSF Railroad to the east, Grossi Fabrication Inc. and the future extension of Roeding Road to the south, Tully Road and Almond orchards to the west. See Figure 1 below for an aerial view of the Project site and surrounding area.

7. EXISTING GENERAL PLAN DESIGNATION

The Project site is designed for Industrial land uses per the City's General Plan, dated December 12, 2005.

8. EXISTING ZONING

The Project site is located within the I-Industrial zone district.

9. SURROUNDING LAND USES AND SETTING

The Project is bounded by existing industrial development to the north, agricultural lands and the future extension of Roeding Road to the south, Santa Fe Avenue and the Burlington Northern Santa Fe Railroad to the east, and Tully Road to the west. Table 1, below, provides the Project site's surrounding uses, General Plan land use designations, and zoning districts. In addition, Figures 1 and 2 provide illustrations of the Project site and surrounding area's General Plan and Zoning designations.

Table 1 Surrounding Land Uses and Setting

	Existing Use	General Plan Land Use Designation	Zoning Classification
North	Industrial – California Trus (sic) Company	Industrial (I)	Industrial (I)
South	Orchard w/ Single-Family Dwelling	Industrial (I)	Industrial (I)
East	Santa Fe Ave. w/ abutting SFDs	Industrial (I)	Industrial (I)
West	Tully Rd. w/ abutting orchards	Industrial (I)	Industrial (I)

10. DESCRIPTION OF THE PROJECT

The Proposed Project consists of the Vesting Tentative Subdivision Map to allow for the subdivision of approximately 46.44 acres into thirty-four (34) industrial lots, and a parcel set aside for a future storm drain basin. Physical development of the individual lots is not proposed at this time, but it can be assumed that future development within the Project site will conform to the City's Zoning Ordinance, including Section 17.02.032 (Uses allowed in each district) and Section 17.02.061 (I-Industrial Zone). Ultimately, the Proposed Project will consist of uses consistent with the City's Zoning Ordinance, and specifically, permitted uses within the I-Industrial Zone district.

New parcels created as part of the Proposed Project are approximately one (1) acre in size. Primary access to the Project site will be provided via access to Tully Road and Roeding Road. The Project Proponent will be required to install frontage improvements to Tully Road, including curb, gutter, and sidewalk, and Roeding Road, including curb, gutter, sidewalk, roadway improvements allowing for two (2) travel lanes. Roeding Road improvements will be installed along the Proposed Project's frontage extending east to Street D.

The Proposed Project will be served domestic utilities by the City of Hughson. Connections to existing water, sewer, and storm drain lines located in Tully Road will be installed, along with the extension of said lines within Streets A, B, C, and D. Wet utility lines will also be installed in the Roeding Road extension and looped through Street D. Stormwater will be routed through the Proposed Project into the storm drain basin, which will be developed with a French drain system.

Lot 9 of the Proposed Project also consists of an existing communications tower. Access to this tower for maintenance, etc. will be provided via an existing easement which is located on the eastern perimeter of the Proposed Project.

11. OTHER PUBLIC AGENCIES WHOSE APPROVAL IS REQUIRED

There are no other public agencies whose approval is required for the Proposed Project.

12. HAVE CALIFORNIA NATIVE AMERICAN TRIBES TRADITIONALLY AND CULTURALLY AFFILIATED WITH THE PROJECT AREA REQUESTED CONSULTATION PURSUANT TO PUBLIC RESOURCES CODE SECTION 21080.3.1?

Under Assembly Bill (AB) 52, when a California Native American Tribe requests notification from a CEQA lead agency on projects within its traditionally and culturally affiliated geographical area, the lead agency must provide the tribe with notice of a Proposed Project within 14 days of a project application being deemed complete or when the lead agency decides to undertake the project if it is the agency's own project. The tribe has up to 30 days to respond to the notice and request formal consultation; if consultation is requested, then the local agency has up to 30 days to initiate consultation. Matters which may be subjects of AB 52 consultation include the type of CEQA environmental review necessary, the significance of tribal cultural resources, and project alternatives or appropriate measures for preservation or mitigation of the tribal cultural resource that the tribe may recommend to the lead agency.

The consultation process ends when either the resource in question is not considered significant, the parties agree to mitigate or avoid a significant effect on a tribal cultural resource, or a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. regardless of the outcome, a lead agency is still obligated to under CEQA to mitigate any significant environmental effects, as explicitly noted in AB 52.

For the Proposed Project, no California Native American Tribes traditionally and culturally affiliated with the Proposed Project site have requested consultation.

Figure 1 – Location Map

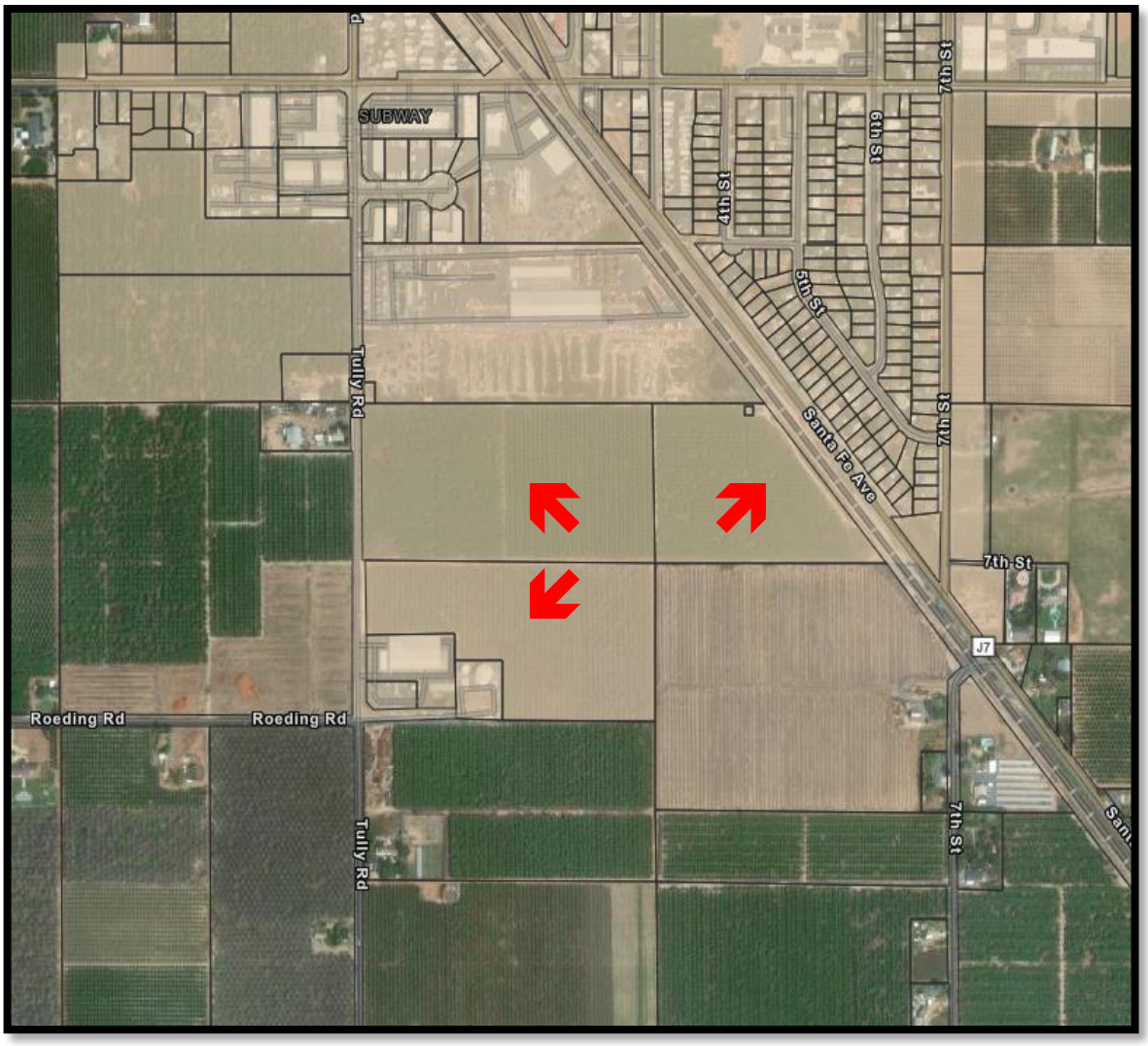


Figure 2 – Existing General Plan

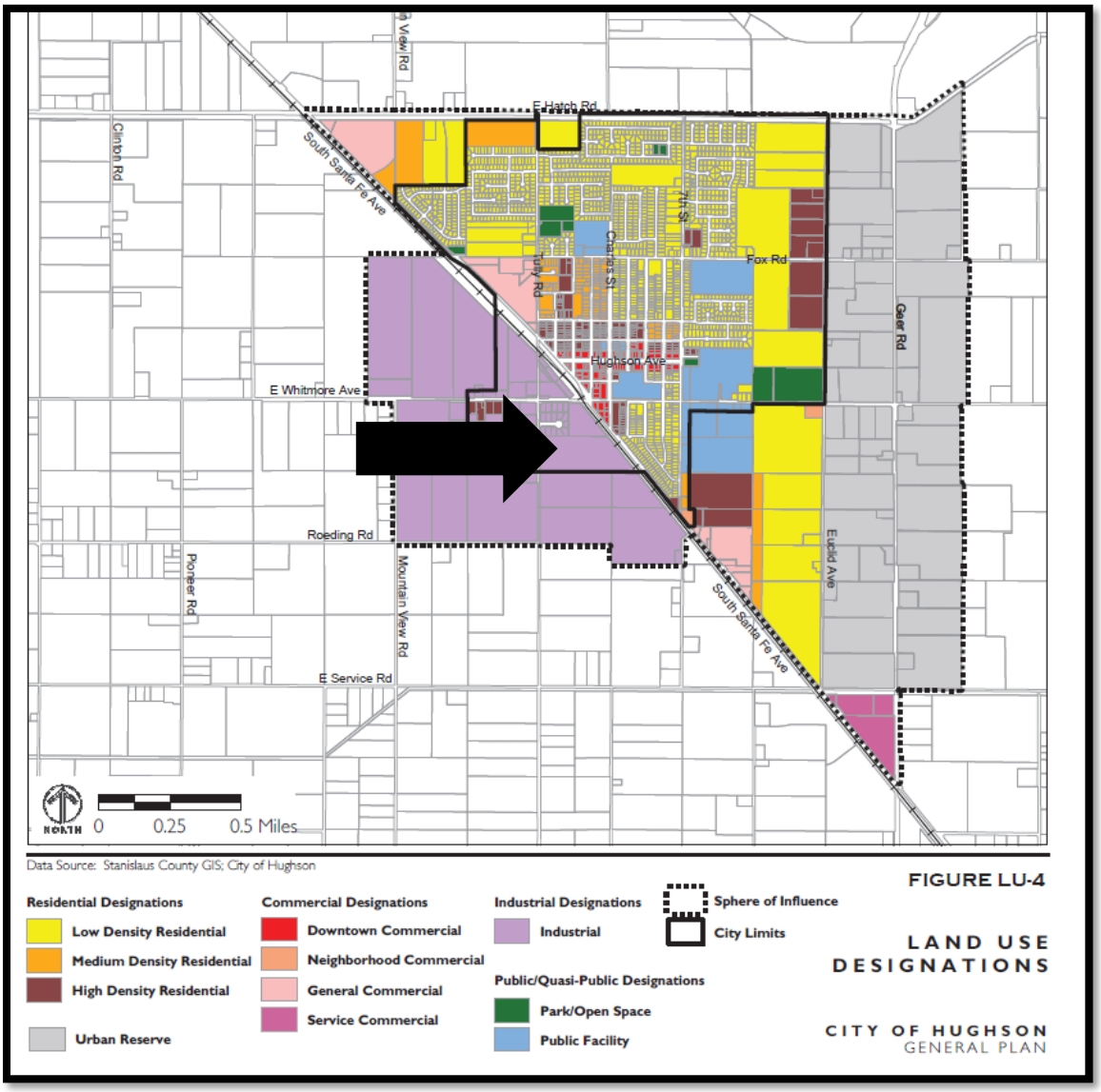


Figure 3 – Existing Zoning

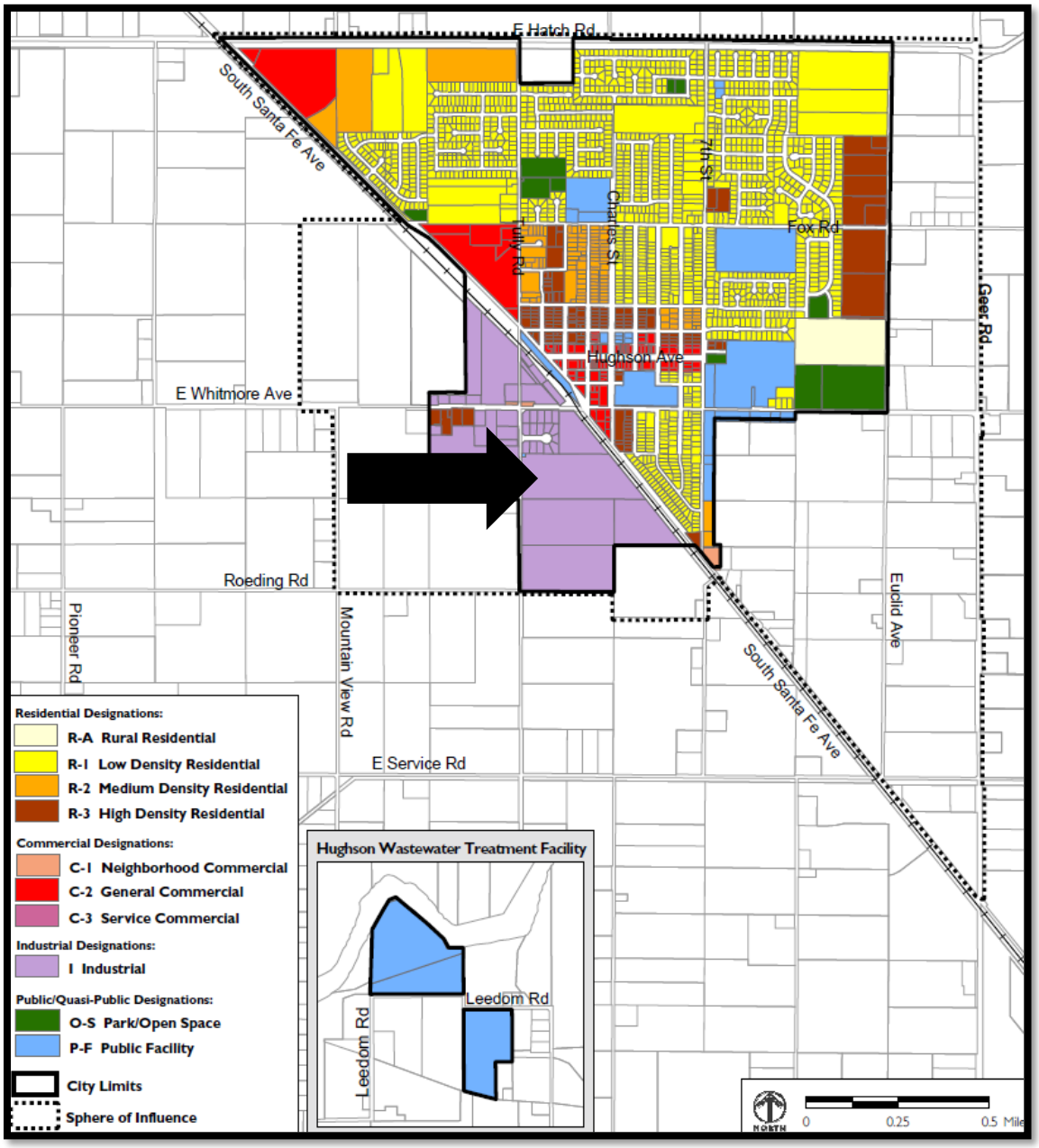
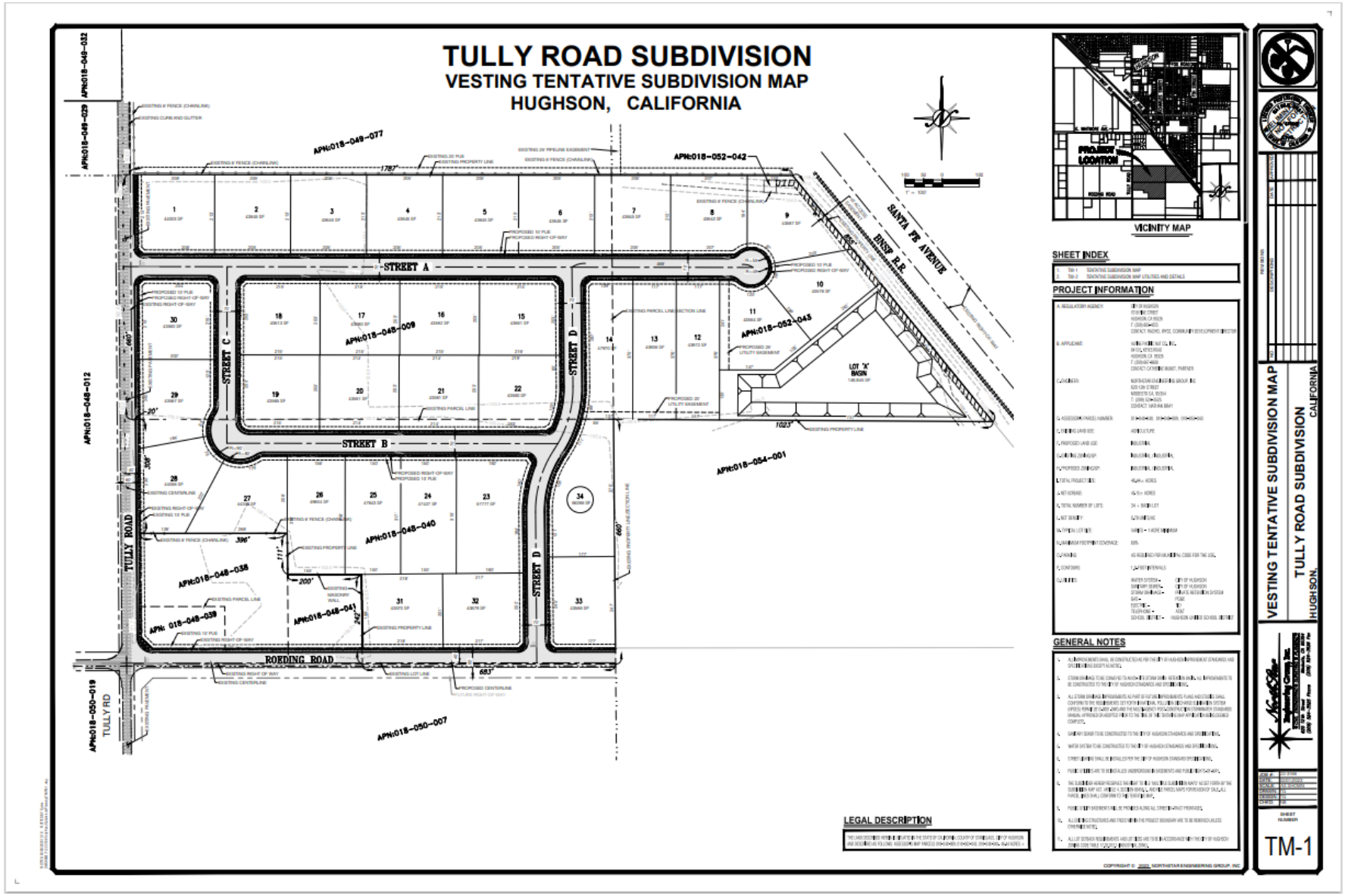
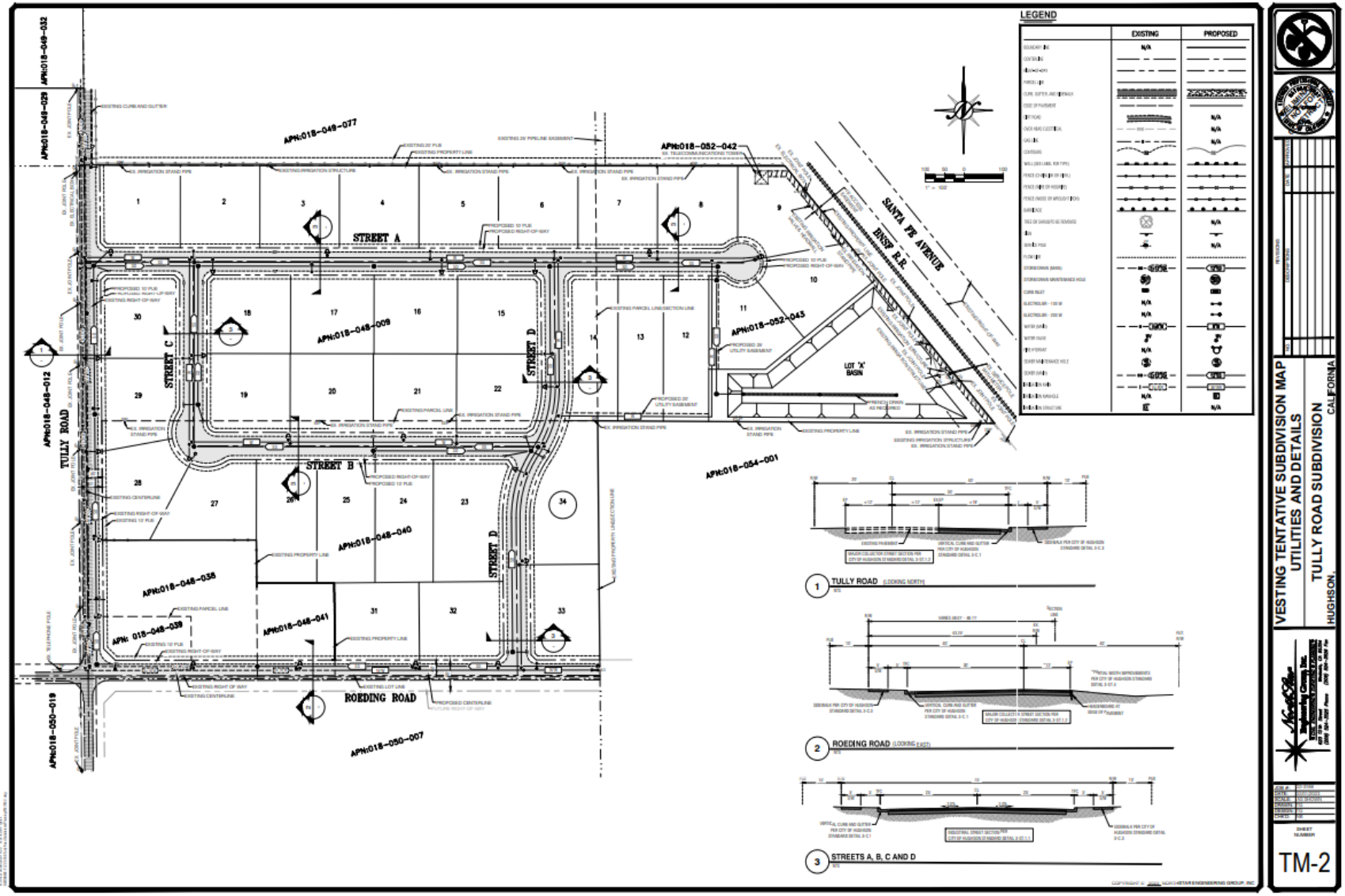


Figure 4 – Vesting Tentative Subdivision Map




LEGEND
EXISTING
PROPOSED
STREET A
STREET B
STREET C
STREET D
TULLY ROAD
ROEDING ROAD
SANTA FE AVENUE
BNSP R.R.
LOT 'A' BASIN
APN:018-049-077
APN:018-049-029
APN:018-049-032
APN:018-052-042
APN:018-052-043
APN:018-048-009
APN:018-048-012
APN:018-054-001
APN:018-048-040
APN:018-048-035
APN:018-048-039
APN:018-048-041
APN:018-050-019
APN:018-050-007
1 TULLY ROAD (LOOKING NORTH)
2 ROEDING ROAD (LOOKING EAST)
3 STREETS A, B, C AND D
VESTING TENTATIVE SUBDIVISION MAP
UTILITIES AND DETAILS
TULLY ROAD SUBDIVISION
HUGHSON, CALIFORNIA
TM-2

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

14. LEAD AGENCY DETERMINATION:

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.
X	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.

Ms. Carla Jauregui, Community Development Director	Date

SECTION 2.0 EVALUATION INSTRUCTIONS:

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 Section XVII, "Earlier Analyses," 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 impact to less than significance.

INITIAL STUDY CHECKLIST

This section of the Initial Study incorporates the most current Appendix "G" Environmental Checklist Form, contained in the CEQA Guidelines.

1. AESTHETICS -- WOULD THE PROJECT:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Have a substantial adverse effect on a scenic vista?			X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?				X
c) 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 points.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?			X	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			X	

IMPACT ANALYSIS

a. Would the project have a substantial adverse effect on a scenic vista?

According to the City's 2005 General Plan Environmental Impact Report (EIR), due to the City's relatively flat topography and distance from both the Sierra and Coastal Ranges, there are limited opportunities for views other than the surrounding agricultural lands. As a result, the scenery around Hughson is characterized by the surrounding active agricultural lands, which include fruit and nut orchards, and row crops. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

b. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings along a state scenic highway?

The Project site and surrounding area is not identified as a scenic resource. Per the City's 2005 General Plan EIR, there are no official State-designated scenic routes in or near Hughson. Consequently, the Proposed Project will have **No Impact** under this threshold.

c. *Would the project, 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 points.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?*

The Proposed Project is located in the Industrial (I) area of the City of Hughson. Although the City does not have any adopted design guidelines for development of industrial buildings, the Project would be consistent with the development surrounding the site. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

d. *Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?*

Outdoor lighting for safety and security could potentially be added to future structures on resultant parcels. Land Use Policy LU-3.12 states that lighting on private and public property should be designed to provide safe and adequate lighting while minimizing light spillage to adjacent properties. In an effort to combat substantial light or glare spillage, the City's Zoning Ordinance requires Industrial uses to ensure that lighting is directed and shielded so as not to illuminate neighboring properties in the area. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

MITIGATION MEASURES:

Mitigation is not required for this topic.

2. AGRICULTURE AND FORESTRY RESOURCES: WOULD THE PROJECT:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
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, as updated) prepared by the California Department 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. Would the Project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?			X	
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?			X	
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104 (g))?			X	
d) Result in the loss of forest land or conversion of forest land to non-forest use?			X	
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?			X	

IMPACT ANALYSIS

a. Would the project convert Prime Farmland, Unique Farmland, 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?

According to the California Department of Conservation – 2020 Farmland Mapping and Monitoring Program and Stanislaus LAFCO (City Limits & Spheres of Influence), May 2020, the project site is within the City of Hughson's city limits. Despite the Proposed Project location being within the city limits, development of the Proposed Project would convert Prime Farmland, to non-agricultural use.

In an effort to curb the loss of farmland resulting from urban development, the City of Hughson established a Farmland Preservation Program. The program establishes standards for the acquisition and long-term oversight of agricultural conservation easements purchased in accordance with the Farmland Preservation Program. It is purposely patterned after the Farmland Mitigation Program adopted by Stanislaus County for ease of future coordination between each jurisdiction. The guidelines apply to development projects which will convert agricultural land over one (1) acre in size to residential land use. As such, the Farmland Preservation Program is not applicable to the Proposed Project.

The Proposed Project site is designated as Industrial by the Hughson General Plan Land Use Map. The General Plan Environmental Impact Report anticipated development of the Proposed Project site as part of the overall buildout of the city. The General Plan EIR addressed the conversion and loss of agricultural land that would result from the build out of the General Plan; it determined that even with the implementation of the General Plan goals and policies, the impact would be significant and unavoidable. Because conversion of the Proposed Project site from agricultural to nonagricultural uses was previously analyzed in the city's General Plan EIR, implementation of the Proposed Project will have a **Less Than Significant Impact**.

b. Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

The Proposed Project site is zoned Industrial (I). It is not zoned for agriculture use nor is it restricted by a Williamson Act contract; a Notice of Non-Renewal California Land Conservation Contract was recorded April 27, 2007, which expired December 31, 2016. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

c. Would the project 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 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?

The project site is not located in a timber resource zone. The project site is also not classified as forest land, pursuant to California Public Resources Code Section 12220(g). Therefore, the Proposed Project would not conflict with, or cause the rezoning of, a timber resource zoning designation. Therefore, the Proposed Project will have a **Less Than Significant Impact.**

d. Would the project result in the loss of forest land or conversion of forest land to non-forest use?

The project site is not considered forest land; and therefore, the Proposed Project would not result in loss or conversion of forest land to a non-forest use. Therefore, the Proposed Project will have a **Less Than Significant Impact.**

e. Would the project involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?

The project site is not designated for agricultural or forest use. There are no known changes to the existing environment that would result in the conversion of farmland to non-agricultural use or the conversion of forest land to non-forest use. Therefore, the Proposed Project will have a **Less Than Significant Impact.**

MITIGATION MEASURES:

Mitigation is not required for this topic.

3. AIR QUALITY -- WOULD THE PROJECT:

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

REGULATORY SETTING

The Proposed Project site is located within the San Joaquin Valley Air Pollution Control District (SJVAPCD). This agency is responsible for monitoring air pollution levels and ensuring compliance with federal and state air quality regulations within the San Joaquin Valley Air Basin (SJVAB) and has jurisdiction over most air quality matters within its borders. Having primary responsibility for compliance with both the federal and state standards and ensuring that air quality conditions are maintained, SJVAPCD accomplishes this through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues.

As noted, the SJVAPCD is tasked with implementing regulations designed to attain ambient air quality standards. SJVAPCD regulations that are potentially applicable to the project are summarized below:

Regulation VIII (Fugitive Dust PM10 Prohibitions)

Rules 8011-8081 are designed to reduce PM10 emissions - predominantly dust/dirt - generated by human activity, including construction and demolition activities, road construction, bulk materials storage, paved and unpaved roads, carryout and track out, landfill operations, etc.

Rule 4101 (Visible Emissions)

This rule prohibits emissions visible air contaminants to the atmosphere and applies to any source operation that emits or may emit air contaminants.

Rule 9510 (Indirect Source Review)

Rule 9510, also known as the Indirect Source Rule, is intended to reduce or mitigate construction and operational emissions of NOx and PM10 generated by new development, either directly and/or by payment of off-site mitigation fees. Construction emissions of NOx and PM10 exhaust must be reduced by 20% and 45%, respectively. Operational emissions of NOx and PM10 must be reduced by 33.3% and 50%, respectively. All projects subject to Rule 9510 are required to submit an Air Impact Assessment to the SJVAPCD. Rule 9510 applies to projects of land use not otherwise identified in the rule that is 9,000 square feet of space or greater. However, development projects that have a mitigated baseline below two tons per year of NOx and two tons per year of PM10 are exempt from the requirements in Sections 6.0 and 7.0 of the rules, which involve general mitigation requirements and the off-site emission reduction fee.

ASSUMPTIONS

In an effort to produce the most accurate Emissions Model for the Proposed Project and to provide the most accurate impact analysis possible, the following assumptions were made while utilizing the California Emissions Estimator Model:

1. The Floor Area Ration (FAR) requirement per table 17.02.012 of the Hughson Municipal Code is 0.6.
2. Building square footage is estimated based on assumption of one (1) story buildings.
3. Default traffic counts were utilized for CALEEMOD.
4. Landscaping square footage is assumed to be 10% of net site area.
5. Limit Heavy-Duty Vehicle Idling.
6. Exposed surfaces shall be watered on a regular basis.

IMPACT ANALYSIS

a. Would the project conflict with or obstruct implementation of the applicable air quality plan?

In 2015, the San Joaquin Valley Air Pollution Control District (SJVAPCD) adopted an updated Guide for Assessing and Mitigating Air Quality Impacts. The guide establishes a method for analysis, thresholds of significance, and mitigation measures for the assessment of air quality impacts for development projects within SJVAPCD's jurisdiction. The table below shows the thresholds for significance for pollutant emissions of the SJVAPCD and the mitigated construction emissions for the Proposed Project.

SJVAPCD SIGNIFICANCE THRESHOLDS AND PROPOSED PROJECT AIR POLLUTANT EMISSIONS

	CO	NO_x	ROG	SO_x	PM_{10}	$PM_{2.5}$
Significance Thresholds	100	10	10	27	15	15
Construction Emissions [Mitigated]	4.07	2.17	2.14	0.01	0.56	0.18

Note: Figures are in tons per year.

Source: CALEEMOD Analysis; SJVAPCD, March 2015.

The California Emissions Estimator Model (CALEEMOD) was used to estimate the sum pollutant emissions which would result from the Proposed Project's construction. The full CALEEMOD results are shown in Appendix A of this document. As is indicated in the table above, the construction emissions resulting from the Proposed Project will be substantially less than the significance threshold established by SJVAPCD for criteria pollutant emissions. As a significant threshold was established to ensure consistency with the objectives of air quality attainment plans adopted by the SJVAPCD, the Proposed Project construction emissions will not conflict with these plans.

While the construction emissions resulting from the Proposed Project will not be significant, the Proposed Project will still be required to comply with the applicable rules and regulations which will further reduce potential air quality impacts. To that point, SJVAPCD regulations contains measures to reduce dust emissions produced during construction activities. Dust control provisions are routinely included in site improvement plans and specifications in order to curtail the impacts resulting from construction activities. Thus, the Proposed Project will have a **Less Than Significant Impact**.

b. *Would the project 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?*

As discussed, the SJVAPCD is the agency responsible for ensuring that air quality conditions are attained, and where non-attainment is determined, this agency develops strategies to achieve attainment in the future. This effort to achieve attainment is documented in the SJVAPCD's many air quality plans (i.e., 2007 Ozone Plan, 2008 $PM_{2.5}$ Plan, and 2012 $PM_{2.5}$ Plan), which are updated periodically to accommodate changes. While the scope of the SJVAPCD's strategies to achieve attainment is wide ranging, the agency has established thresholds of significance for individual new projects and if a project exceeds the threshold of significance, then it would also be a significant contribution to a cumulative impact.

The SJVAPCD's air quality significance thresholds represent the maximum emissions from a project that are not expected to conflict with the District's air quality plans and are not expected to exceed the most stringent applicable federal or state ambient air quality standards. These are developed based on the ambient concentrations of the pollutant for each source. Similar to the project related construction emissions displayed above, the operational emissions resulting from the Proposed Project are significantly lower than the threshold established by the SJVAPCD as can be seen in the table below.

	CO	NO_x	ROG	SO_x	PM_{10}	$PM_{2.5}$
Significance Thresholds	100	10	10	27	15	15
Operation Emissions [*Mitigated*]	20.6	3.77	6.28	0.04	3.24	0.93

Note: Figures are in tons per year.
Source: CALEEMOD Analysis; SJVAPCD, March 2015.

Because the Proposed Project will not exceed the air quality significance threshold during construction and operation and would not otherwise conflict with the SJVAPCD's air quality plans, the cumulative emissions resulting from the Proposed Project will not be a significant contribution to a cumulative impact and therefore the emissions will not result in a cumulatively considerable net increase of any criteria pollutant. Thus, the Proposed Project will have a **Less Than Significant Impact**.

c. Would the project expose sensitive receptors to substantial pollutant concentrations?

Sensitive Receptors, as defined in the Guide for Assessing and Mitigating Air Quality Impacts, include residences, schools, parks and playgrounds, day care centers, nursing homes, and hospitals (SJVAPCD March 2015). Potential sensitive receptors near the Proposed Project site include the single-family residence along Tully Road, south of Roeding Road, and the single-family residence adjacent to the Proposed Project site, west of Tully Road.

Construction related emissions could affect the above-mentioned residences adjacent to the Proposed Project site; however, potential exposure of any individual residence to these emissions would be temporary and cease once construction work has been completed. Additionally, assumptions utilized in the CALEEMOD analysis provided mitigation measures to limit the impact to surrounding receptors by 1) limiting any heavy-duty diesel vehicle idling, and 2) ensuring exposed surfaces are watered on a regular basis.

Therefore, implementation of the Proposed Project will not be anticipated to result in an increase in exposure of sensitive receptors to localized concentrations of criteria pollutants that would exceed the relevant standards or thresholds established by the SJVAPCD. Thus, implementation of the Proposed Project will have a **Less Than Significant Impact With Mitigation Incorporated**.

d. Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

The Proposed Project would not generate objectionable odors. People in the immediate vicinity of construction activities may be subject to temporary odors typically associated with construction

activities (engine exhaust, new asphalt, etc.). However, any odors generated by construction activities would be minor and temporary in nature and duration.

Some examples of known producers of operational odors include wastewater treatment facilities, sanitary landfills, composting facilities, petroleum refineries, dairies, etc. Further, if a development project placed sensitive receptors and known odor sources in relatively close proximity to each other, more analysis would be warranted. Conversely, if a development project does not locate sensitive receptors near known odor sources, further analysis is not warranted.

The Proposed Project does not propose to include any of the aforementioned uses. Thus, implementation of the Proposed Project will have a **Less Than Significant Impact**.

MITIGATION MEASURES:

Mitigation Measure Air-1: Prior to the commencement of construction activities for each phase of construction, the Project Proponent shall prepare and submit a Dust Control Plan that meets all of the applicable requirements of APCD Rule 8021, Section 6.3.

Mitigation Measure Air-2: During all construction activities, the project proponent shall implement the following dust control practices identified in Tables 6-2 and 6-3 of the GAMAQI (San Joaquin Valley APCD, 2002):

1. All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover.
2. All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.
3. All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall control fugitive dust emissions by application of water or by presoaking.
4. When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, or at least six inches of freeboard space from the top of the container shall be maintained.
5. All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.
6. Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
7. Limit traffic speeds on unpaved roads to 5 mph; and
8. Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.

4. BIOLOGICAL RESOURCES -- WOULD THE PROJECT:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*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?			X	
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?			X	
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			X	
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			X	
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X

IMPACT ANALYSIS

a. *Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service?*

The Proposed Project would not have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife (CDFW) or U.S. Fish and Wildlife Service (USFWS). Figure 4.4-1 of the 2005 General Plan EIR identifies the project site as Orchard Crop; while the project site was historically used and is presently used for agricultural production as an Almond orchard, the lack of protective cover in the agricultural fields generally limits their suitability as habitat for wildlife. Further, Policy COS-3.2 requires new development to meet all federal, State, and regional regulations for habitat and species protection. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

b. *Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*

The Tuolumne River supports the last remnant of native vegetation and sensitive natural community in the Hughson vicinity, serves an important movement corridor for fish and wildlife, and is considered to be of regional and State-wide significance both hydrologically and biologically. However, the riparian habitat associated with the Tuolumne River is technically outside the city limits and SOI. The nearby lands are either agricultural or marginally developed and the project site is not adjacent to or near the Tuolumne River. Thus, impacts to riparian habitat or sensitive natural communities with the project site are not anticipated. The Proposed Project will have a **Less Than Significant Impact**.

c. *Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*

Wetlands are areas where water covers the soil or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season. Based on the existing topography and aerial imagery, the project site does not have any wetlands that would be impacted by existing and any future development. Therefore, the Proposed Project will have a **Less Than Significant Impact.**

d. *Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native residents or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*

No major migratory routes have been designated through the project site nor would the project interfere substantially with the movement of native residents or migratory fish. The existing developed components of the project site, for example, roads and agriculture, impede use of the project area as a migratory wildlife corridor for large mammals. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

e. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

According to the City of Hughson 2005 General Plan EIR, the city has adopted a Street Tree Ordinance that addresses the removal of trees by new development in the city's Standard Conditions of Approval. The Ordinance addresses the protection of street trees and trees within other public areas from unauthorized removal and/or damage. The Proposed Project would also have to adhere to Policy COS-3.1 where new development shall preserve, protect, and incorporate established native trees into the site design. Therefore, the project will have a **Less Than Significant Impact**.

f. Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

As the Hughson area is primarily characterized by agricultural and urban development, there are no active Habitat Conservation Plans, Natural Community Conservation Plans or other natural resource conservation plans in the Hughson area. The Proposed Project would not conflict with the provisions of other regional or state habitat conservation plans because no such plans are applicable to this project site. Therefore, the Proposed Project will have **No Impact**.

MITIGATION MEASURES:

Mitigation is not required for this topic.

5. CULTURAL RESOURCES -- Would the project:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Cause a substantial adverse change in the significance of a historical resource as defined in '15064.5?			X	
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to '15064.5?			X	
c) Disturb any human remains, including those interred outside of formal cemeteries?			x	

IMPACT ANALYSIS

a. *Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?*

In order to protect cultural resources, the city of Hughson established Policy COS-4.2 which requires developers to provide an assessment by appropriate professionals regarding the presence and condition of on-site historical resources on and adjacent to the project site as well as the potential for adverse impacts on these resources and appropriate mitigation measures. Thus, the Proposed Project will have a **Less Than Significant Impact.**

b. *Would the project cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?*

According to the 2005 General Plan Environmental Impact Report (EIR), the Central California Information Center (CCIC) conducted a detailed search for prehistoric and historic resources within the Hughson city limits, Sphere of Influence (SOI) and immediate vicinity in 2005. No prehistoric or historic archaeological resources within the project area or its vicinity, nor resources that would have value to local cultural groups have been reported to the CCIC. As a safeguard, should archaeological sites and resources be uncovered during construction or other similar activities, Policy COS-4.3 outlines the City's commitment to require an immediate halt to these activities until appropriate mitigation is implemented. Therefore, the Proposed Project would have will have a **Less Than Significant Impact**.

c. *Would the project disturb any human remains, including those interred outside of dedicated cemeteries?*

Under CEQA, human remains are protected under the definition of archaeological materials as being "any evidence of human activity." Additionally, Public Resources Code section 5097.98 has specific stop-work and notification procedures to follow in the event that human remains are inadvertently discovered during project implementation. While some activities have the potential to impact cultural resources in Hughson and the SOI, 2005 General Plan policies and compliance with federal and state regulations reduce the project-specific impact to a **Less Than Significant Impact**.

MITIGATION MEASURES:

Mitigation is not required for this topic.

6. ENERGY -- Would the project:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*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?			X	
b) Conflict with or obstruct a State or local plan for renewable energy or energy efficiency?			X	

IMPACT ANALYSIS

The following discussion is an analysis for criteria (a) and (b):

a. *Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; and,*

b. *Would the project conflict with or obstruct a State or local plan for renewable energy or energy efficiency?*

While the Proposed Project consists of the Vesting Tentative Subdivision Map to allow for the subdivision of approximately 46.44 acres into thirty-four (34) industrial lots, it can be assumed that future physical development and build out of the industrial sites will occur. Thus, the current Proposed Project and future development would consume energy primarily in one of two ways: first, future construction activities would consume energy via various heavy equipment, machines, trucks, and worker traffic; and, secondly, future industrial uses would cause long-term energy consumption from electricity and propane gas consumption, energy used for water conveyance, and motor vehicle operations to and from the project site, etc.

The City of Hughson's 2005 General Plan includes policies and actions to help reduce the overall consumption of electricity and natural gas by new development; for example, Policy COS-5.1 states that new development would be required to comply with State Title 24 energy conservation standards. Combining the City's policies and actions with increasingly stringent state and federal regulations on engine efficiency in conjunction with local, state, and federal regulations limiting engine idling times and recycling of construction debris, would further reduce the amount of transportation fuel demand during future construction.

Therefore, the Proposed Project would result in a less than significant impact during project operation. As such, the Proposed Project would not result in a potential significant impact due to wasteful, inefficient, unnecessary consumption of energy resources during project construction or operation. Additionally, the Proposed Project would not conflict with applicable state or local plans for renewable energy because it would be required to conform to current federal, state, and local

energy conservation standards. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

MITIGATION MEASURES:

Mitigation is not required for this topic.

7. GEOLOGY AND SOILS -- WOULD THE PROJECT:

	Potentially Significant Impact	*Less Than Significant with Mitigation*	*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.			X	
ii) Strong seismic ground shaking?			X	
iii) Seismic-related ground failure, including liquefaction?			X	
iv) Landslides?			X	
b) Result in substantial soil erosion or the loss of topsoil?			X	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			X	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?			X	
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				X
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?			X	

IMPACT ANALYSIS

The following discussion is an analysis for criteria (a.1, a.2, a.3, a.4):

a.1. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake, 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?

a.2. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?

a.3. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?

a.4. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structure for human occupancy. The law requires the State Geologist to establish regulatory zones (known as Earthquake Fault Zones or Alquist-Priolo Zones) around the surface traces of active faults, and to issue appropriate maps. Active faults are defined as a fault that has surface displacement within the last 11,000 years*. Per the City of Hughson's 2005 General Plan, the closest fault line to Hughson is the San Joaquin Fault, which runs approximately 20 miles west of the city. The project site is not located within or adjacent to an Alquist-Priolo Earthquake Fault Zone†. Therefore, fault rupture through the site is not anticipated, and the Proposed Project would not directly or indirectly cause substantial adverse effects related to fault rupture. Therefore, under this threshold the Proposed Project will have a **Less Than Significant Impact**.

b. Would the project result in substantial soil erosion or the loss of topsoil?

Since Hughson is relatively flat and the soil in Hughson is fairly stable, there is a limited potential for landslides, erosion and expansion. While the Project site is presently utilized as an orchard, the Proposed Project would result in the creation of new impervious surface areas throughout the Project site. Additionally, development of the Project site would cause ground disturbance of topsoil due to grading and excavating activities; thus, the potential for wind and water erosion to occur does exist.

Since the Proposed Project would disturb more than one acre, it would be required to obtain a Construction General Permit from the State Water Resources Control Board (SWRCB). The Construction General Permit requirement includes preparation and implementation of a Storm Water

* State of California. 2023. Department of Conservation. Alquist-Priolo Earthquake Fault Zones. Website: https://www.conservation.ca.gov/cgs/alquist-priolo

† California Geological Survey. 2021. California Earthquake Hazards Zone Application. Website: htpps://maps.conservation.ca.gov/cgs/EQZApp/app

Pollution Prevention Plan (SWPPP) which includes Best Management Practices (BMPs) aimed at curbing soil erosion. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

The following discussion is an analysis for criteria c and d:

c. *Would the project be located on a geologic unit or soil that is unstable as a result of the project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?*

d. *Would the project be located on expansive soil, as defined in Table 1-B of the Uniform Building Code, creating substantial risks to life or property?*

Expansive soils contain higher levels of clay and present hazards for development since these soils expand and shrink depending on water content, damaging structures that were not appropriately engineered. Since all of the soil in the Hughson area is mainly comprised of sand, it poses a very low risk of expansion. The 2005 General Plan includes several policies and actions to minimize risks to life and property. For example, Policy S-1.1 requires that new development would be subject to adequate professional geological and engineering studies while Policy S-1.2 requires the City to enforce building codes adopted by the State of California for all new construction and renovations. Thus, the Proposed Project will have a **Less Than Significant Impact**.

e. *Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?*

The City of Hughson requires all new development to connect with the municipal wastewater system, so there would be **No Impact** associated with the local soil capacity to support septic systems.

f. *Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?*

Based on a review of the 2005 General Plan EIR, the project site is not known or identified to contain any unique paleontological or geologic features. Therefore, it is not likely that unique paleontological resources would be found in the project area during future development of the project. Should the discovery of fossils occur during future construction or grading activities, implementation of the City's Policy COS-4.3 would require the immediate cessation of these activities until appropriate mitigation occurs. Thus, this Proposed Project will have a **Less Than Significant Impact**.

MITIGATION MEASURES:

Mitigation is not required for this topic.

8. GREENHOUSE GAS EMISSIONS -- WOULD THE PROJECT:

	Potentially Significant Impact	*Less Than Significant with Mitigation*	*Less Than Significant Impact*	*No Impact*
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			X	

REGULATORY SETTING:

California Air Resources Board (CARB) is responsible for the coordination and oversight of state and local air pollution control programs in California. California has numerous regulations aimed at reducing the State's GHG emissions. These initiatives are summarized below:

Assembly Bill 1943

Assembly Bill (AB) 1943 (2002), California's Advanced Clean Cars program (referred to as "Pavley"), requires CARB to develop and adopt regulations to achieve "the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles." On June 30, 2009, U.S. EPA granted the waiver of Clean Air Act preemption to California for its greenhouse gas emission standards for motor vehicles beginning with the 2009 model year. Pavley, I took effect for model years starting in 2009 to 2016 and Pavley II, which is now referred to as "LEV (Low Emission Vehicle) III GHG" will cover 2017 to 2025. Fleet average emission standards would reach 22 percent reduction from 2009 levels by 2012 and 30 percent by 2016. The Advanced Clean Cars program coordinates the goals of the Low Emission Vehicles (LEV), Zero Emissions Vehicles (ZEV), and Clean Fuels Outlet programs and would provide major reductions in GHG emissions. By 2025, when rules will be fully implemented, new automobiles will emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions from their model year 2016 levels.

Executive Order S-3-05

In 2005, the governor issued Executive Order (EO) S-3-05, establishing statewide GHG emissions reduction targets. EO S-3-05 provides that by 2010, emissions shall be reduced to 2000 levels; by 2020, emissions shall be reduced to 1990 levels; and by 2050, emissions shall be reduced to 80 percent below 1990 levels (California Environmental Protection Agency [CalEPA]). In response to EO S-3-05, CalEPA created the Climate Action Team (CAT), which in March 2006 published the Climate Action Team Report (the "2006 CAT Report") (CalEPA 2006). The 2006 CAT Report identified a recommended list of strategies that the state could pursue to reduce GHG emissions. These are strategies that could be implemented by various state agencies to ensure that the emission reduction targets in EO S-3-05 are met and can be met with existing authority of the state agencies. The strategies include the reduction of passenger and light duty

truck emissions, the reduction of idling times for diesel trucks, an overhaul of shipping technology/infrastructure, increased use of alternative fuels, increased recycling, and landfill methane capture, etc. In April 2015 the governor issued EO B-30-15, calling for a new target of 40 percent below 1990 levels by 2030.

Assembly Bill 32

California's major initiative for reducing GHG emissions is outlined in Assembly Bill 32 (AB 32), the "California Global Warming Solutions Act of 2006," signed into law in 2006. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 (essentially a 15 percent reduction below 2005 emission levels; the same requirement as under S-3-05) and requires CARB to prepare a Scoping Plan that outlines the main State strategies for reducing GHGs to meet the 2020 deadline. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions. California is on track to meet or exceed the current target of reducing GHG emission to 1990 levels by 2020, as established by AB 32.

Senate Bill 97

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is an environmental issue that requires analysis in California Environmental Quality Act (CEQA) documents. In March 2010, the California Resources Agency (Resources Agency) adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted guidelines give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts.

CARB Resolution 07-54

CARB Resolution 07-54 establishes 25,000 MT of GHG emissions as the threshold for identifying the largest stationary emission sources in California for purposes of requiring the annual reporting of emissions. This threshold is just over 0.005 percent of California's total inventory of GHG emissions for 2004.

Senate Bill 375

Senate Bill (SB) 375, signed into law in September 2008, builds on AB 32 by requiring CARB to develop regional GHG reduction targets to be achieved from the automobile and light truck sectors for 2020 and 2035; these regional targets will help achieve the goals of AB 32 and the Scoping Plan through changed land use patterns and improved transportation systems. The Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) adopted a Sustainable Community Strategies in July 2013 that meets greenhouse gas reduction targets. The *Plan Bay Area* is the SCS document for the Bay Area, which is an integrated long-range plan that discusses climate protection, housing, healthy and safe communities, open space and agricultural preservation, equitable access, economic vitality, and transportation system effectiveness within the San Francisco Bay Area. The document is updated every four years and most recently, the update, *Plan Bay Area 2040* was adopted on July 26, 2017.

Executive Order S-13-08

Executive Order S-13-08 indicates that "climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California's economy, to the health and welfare of tis population and to its natural resources." Pursuant to the requirements in the order, the 2009 California Climate Adaptation Strategy (California Natural Resources Agency 2009) was adopted, which is the "…first statewide, multi-sector, region-specific, and information-based climate change adaption strategy in the United States." Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

Senate Bill 2X

In April 2011, the governor signed SB2X requiring California to generate 33 percent of its electricity from renewable energy by 2020.

Senate Bill 32

On September 8, 2016, the governor signed Senate Bill 32 (SB 32) into law, which requires the State to further reduce GHGs to 40 percent below 1990 levels by 2030. SB 32 is an extension of AB 32. The other provisions of AB 32 remain unchanged. CARB adopted the 2017 Climate Change Scoping Plan Update on December 14, 2017, for achieving California's 2030 greenhouse gas target.

IMPACT ANALYSIS

The following discussion is an analysis for criteria (a) and (b):

a. *Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?*
b. *Would the project conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*

The Proposed Project would generate greenhouse gas emissions during the construction and operation of residences, when developed. Construction related emissions during development may be generated from numerous sources, but construction related emissions would occur over a short duration and consist primarily of equipment exhaust emissions.

The City of Hughson's Climate Action Plan (CAP) was adopted December 9, 2013, and includes strategies and associated actions related to public education and outreach efforts regarding reducing greenhouse gas emissions and administrative actions to monitor progress. The Proposed Project's construction activities and operations are consistent with the City of Hughson's General Plan.

The Proposed Projects consistency with the City of Hughson's General Plan ensures compliance with the GHG emission reduction strategies in the City of Hughson's Climate Action Plan, which in turn, support City-wide efforts to meet statewide GHG emission reduction goals consistent with Assembly Bill (AB) 32, the Global Warming Solutions Act. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

MITIGATION MEASURES:

Mitigation is not required for this topic.

9. HAZARDS AND HAZARDOUS MATERIALS -- WOULD THE PROJECT:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*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?			X	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			X	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?			X	
e) For a project located within an **airport** land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?			X	
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X	
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?			X	

IMPACT ANALYSIS

The following discussion is an analysis for criteria (a) and (b):

a. *Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*
b. *Would the project 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?*

The Proposed Project consists of a Vesting Tentative Subdivision Map to create thirty-four (34) industrial lots. This type of project does not typically result in creating significant hazards to the public or environment through upset and accident conditions involving the release of hazardous materials. Nor do they result in the use, transport, or disposal of hazardous materials. However, the physical development and build out of the individual lots will have a higher probability of incidents that include hazardous materials, i.e., gasoline, diesel fuel, hydraulic fluid, solvents, oils, etc. Should the release of hazardous materials occur, the Project Proponent shall comply with all applicable Federal, State, and local policies and regulations related to hazardous materials. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

c. *Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?*

No existing or proposed schools have been identified within one-quarter mile of the project site. The nearest school to the project site is Hughson Elementary School, located at 7201 East Whitmore Avenue, which is approximately 4,200-feet northeast from the project site. Therefore, under this threshold the project will have **No Impact**.

d. *Would the project be located on a site 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?*

The Proposed Project is not located on a site which is included on a list of hazardous materials sites compiled pursuant to California Government Code §65962.5. A review of the State hazardous material site databases* found one record near the project site: Santa Fe Railway Case #2 AKA Dairy Farmers, 2331 Tully & Santa Fe, Hughson, CA 95326; considered a Leaking Underground Storage Tank (LUST) Cleanup Site. The case was opened 12/18/1995 and the case was completed and closed as of 6/30/2000. As a result, the Proposed Project would not create a hazard to the public or the environment; therefore, the Proposed Project will have a **Less Than Significant Impact**.

e. *For a project located within an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?*

The closest airport to Hughson is the Modesto City-County Airport, located approximately six miles west of Hughson. General aviation facilities are also located about 15 miles south of Turlock and about 15 miles north in Oakdale. Since the project site is not located within two miles of a public airport or public use airport, the Proposed Project will have **No Impact**.

* https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0609900380

f. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

The Proposed Project would design, construct, and maintain roads and driveways in accordance with applicable standards associated with vehicular access allowing for adequate emergency access and evacuation. The project would not pose a unique or unusual use that would impair the effective and efficient implementation of an adopted emergency response or evacuation plan. To minimize risks posed by construction of new development Standard No. 59 of the Standard Conditions of Approval requires that all commercial and industrial projects include a hazardous materials management plan. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

g. Would the project expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Since Hughson is primarily surrounded by agricultural land, the danger from wildland fire is considered low. The City of Hughson has identified the lone remaining wildlands which are found in limited amounts along the Tuolumne River to the north. Goal PSF-2 of the 2005 General Plan aims at minimizing the loss of life and property from all fires by ensuring the Hughson Fire Protection District firefighters quick and easy access to all areas within the Hughson Planning Area. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

MITIGATION MEASURES:

Mitigation is not required for this topic.

10. HYDROLOGY AND WATER QUALITY -- Would the project:

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

IMPACT ANALYSIS

a. Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

The Proposed Project would be required to meet all water quality standards and requirements. During construction related activities, specific erosion control and surface water protection methods for each construction activity would be implemented on the project site. The type and number of measures implemented would be based upon location specific characteristics (slope, soil type, weather conditions, etc.). Additionally, new development is required to adopt Best Management Practices (BMPs) to minimize grading and control runoff, which pollutes storm drains and can eventually lead to the pollution of groundwater sources. Applicants are also required to submit a grading and drainage plan for review as part of the development approval process. Thus, the Proposed Project will have a **Less Than Significant Impact**.

b. *Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?*

The City of Hughson depends on the Turlock groundwater basin (approximately 540 square miles in area) for all of its potable water. Conjunctive use of surface and groundwater has been a hallmark of water management in the Turlock Subbasin. Future development of the Proposed Project could potentially interfere with groundwater recharge by increasing the area covered by impervious surfaces. However, the Proposed Project includes a 148,845 square foot storm water retention basin along the eastern portion of the Project site. This proposed stormwater basin will detain stormwater runoff onsite and drain into the subbasin, thereby allowing for groundwater recharge. Thus, the Proposed Project will have a **Less Than Significant Impact**.

c. *Would the project 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 on- or offsite erosion or siltation;*
ii. *Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;*
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?*

The Proposed Project will not alter the course of a stream or river, as it is not located near a stream or river. The project site is located south of the Tuolumne River and is located on a site that is currently utilized as agriculture. Compliance with construction and operation-phase storm water requirements would ensure that development of the Proposed Project would not result in substantial erosion or siltation on or off site. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

d. *Would the project be located in flood hazard, tsunami, or seiche zones, or risk release of pollutants due to project inundation?*

The Proposed Project is not located adjacent to the ocean or other large body of water; the city of Hughson is not at risk from tsunami due to its inland location. The project site, therefore, is not susceptible to flooding or seiches, and as a result, the Proposed Project would not result in a risk of pollutant release during a flood hazard, tsunami or seiche event. Therefore, the project will have a **Less Than Significant Impact**.

e. *Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?*

The Proposed Project will connect to and be provided domestic water from the city of Hughson. The City of Hughson is located within the Turlock Groundwater Basin, which is governed by Turlock Subbasin Groundwater Sustainability Agencies (GSAs) and the Turlock Subbasin Groundwater Sustainability Plan (GSP). In addition, the City of Hughson also has an adopted Urban Water Management Plan (2005). The Proposed Project will be required to comply with both Plans. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

MITIGATION MEASURES:

Mitigation is not required for this topic.

11. LAND USE AND PLANNING - Would the project:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Physically divide an established community?				X
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?			X	

IMPACT ANALYSIS

a. Would the project physically divide an established community?

The Proposed Project is located within the city limits of Hughson, but it would not physically divide an established community as it is located at the southern end of the city limits. Per the 2005 General Plan EIR, most industrial lands are located southwest of the railroad and Santa Fe Avenue—in a well-planned, orderly fashion, the project area would continue the extension of industrial uses from the north to the south. Therefore, this project will have **No Impact**.

b. Would the project 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?

All impacts to the environment resulting from the Proposed Project are subject to applicable mitigation and local, State and/or federal regulations, which would reduce said impacts to a Less Than Significant level. Consequently, impacts related to conflict with any applicable land use plan, policy, or regulation of any agency with jurisdiction over the Proposed Project adopted for the purpose of avoiding or mitigating an environmental effect will have a **Less Than Significant Impact**.

MITIGATION MEASURES:

Mitigation is not required for this topic.

12. MINERAL RESOURCES -- WOULD THE PROJECT RESULT IN:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*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?			X	
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?			X	

IMPACT ANALYSIS

The following discussion is an analysis for criteria (a) and (b):

a. *Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?*
b. *Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?*

Per the 2005 General Plan EIR, no portion of the Hughson city limits, or SOI, is designated by the California Department of Conservation as having the potential for being a significant source of composite minerals or industrial minerals. Additionally, there are no known economically viable sources of rock materials in the immediate vicinity of the project site. The only significant mineral resources in the area are the MRZ-3a SG(C14) aggregate resources throughout most of the city limits, and the MRZ-3a SG(C17) aggregate resources along the Tuolumne River near the City's wastewater treatment plant. However, neither of these mineral categories have a great potential for significant mineral resources due to the type and quantity of resource. Consequently, the Proposed Project will have a **Less Than Significant Impact** under this threshold.

MITIGATION MEASURES:

Mitigation is not required for this topic.

13. NOISE -- WOULD THE PROJECT RESULT IN:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*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 other applicable standards of other agencies?		X		
b) Generation of excessive ground borne vibration or ground borne noise levels?			X	
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?				X

The following is based on the Environmental Noise Assessment that was completed for the Proposed Project by First carbon Solutions (September 2023).

FUNDAMENTALS OF NOISE

Sound can be described in terms of its loudness (amplitude) and frequency (pitch). The standard unit of measurement for sound is the decibel, abbreviated dB. Because the human ear is not equally sensitive to sound at all frequencies, the A-weighted scale (dBA) is used to reflect the normal hearing sensitivity range of the human ear. Table 1 provides examples of A-weighted noise levels from common sources.

Although the terms “sound” and “noise” are often used synonymously, noise is commonly defined as sound that is either loud, unpleasant, unexpected, or undesired. Because decibels are logarithmic units, they cannot be simply added or subtracted. For example, two cars each producing 60 dBA of noise would not produce a combined 120 dBA.

Generally speaking, noise levels decrease, or “attenuate,” as distances from noise sources to receivers increase. For each doubling of distance, noise from stationary or small, localized sources, commonly referred to as “point sources,” may attenuate at a rate of 6 dBA for each doubling of distance. This attenuation is referred to as the inverse square law. For example, if a point source emits a noise level of 80 dBA at a reference distance of 50 feet, its noise level would be approximately 74 dBA at a distance of 100 feet, 68 dBA at a distance of 200 feet, etc. Noise emitted by “line” sources, such as highways, attenuates at the rate of 3 dBA for each doubling of distance.

Factors such as ground absorption and atmospheric effects may also affect the propagation of noise. In particular, ground attenuation by non-reflective surfaces, such as soft dirt or grass, may contribute to increased attenuation rates of up to an additional 8–10 dBA per doubling of distance. A characteristic of noise is that the lowest audible increase in noise levels generally refers to a change of 3 dBA, as this level has been found to be barely perceptible to the human ear in outdoor environments, while a change of 5 dBA is considered a readily perceptible change to the human ear in outdoor environments. Furthermore, a doubling of sound sources with equal strength is required to result in a perceptible increase (defined to be a 3 dBA or greater) in noise levels.

Table 1: A-Weighted Decibel Scale

Common Noise Sources	Sound Level, dBA
Near Jet Engine	130
Rock and Roll Band	110
Jet Flyover at 1,000 feet	100
Power Motor	90
Food Blender	80
Living Room Music	70
Human Voice at 3 feet	60
Residential Air Conditioner at 50 feet	50
Bird Calls	40
Quiet Living Room	30
Average Whisper	20
Rustling Leaves	10

Notes:
dBA = A-weighted decibel
These noise levels are approximations intended for general reference and information use. They do not meet the standard required for detailed noise analysis but are provided for the reader to gain a rudimentary concept of various noise levels.
Source: Cowan, James P. 1993. Handbook of Environmental Acoustics.

Noise is most audible when traveling by direct line of sight, an unobstructed visual path between a noise source and a receiver. Barriers that break the line of sight between noise sources and receivers, such as walls and buildings, can greatly reduce source noise levels by allowing noise to reach receivers by diffraction only. Barriers can reduce source noise levels by up to 20 dBA, though it is generally infeasible for temporary barriers to reduce source noise levels by more than 15 dBA. In cases where the noise path from source to receiver is direct but grazes the top of a barrier, noise attenuation of up to 5 dBA may still occur.

Existing Noise Environment

The existing noise environment in the project vicinity was documented through ambient noise monitoring. Three short-term noise measurements (15 minutes each) were taken on Tuesday, September 5, 2023. The

short-term noise measurements taken at the project site are summarized in Table 3. The noise measurement data sheets are attached to this document.
The noise measurements indicate that daytime ambient noise levels average from 64.8 dBA to 67.8 dBA Leq along the Proposed Project's western boundary adjacent to Tully Road; and 75.4 dBA Leq at the Proposed Project's eastern boundary adjacent to the railroad. The noise technician observed that the dominant noise sources in the project vicinity are traffic on local roadways and train activity on the railroad.

One long-term, 24-hour noise measurement was also conducted at the project's eastern border adjacent to the railroad. The resulting noise level was 82.5 dBA CNEL as measured at 75 feet from the railroad line, along the project's eastern property line. The nighttime average noise level was 76.3 dBA Leq.

Table 3: Existing Ambient Noise Levels in the Project Vicinity

Site Location	Location Description	dBA	Primary Noise Sources
ST-1	Northwest corner of the project site adjacent to Tully Road	67.8 L_{eq}	Traffic on Tully Road
ST-2	Southwest corner of the project site adjacent to Tully Road	64.8 L_{eq}	Traffic on Tully Road
ST-3	Eastern boundary of the project site adjacent to the railroad	75.4 L_{eq}	Traffic on Santa Fe Avenue and railroad activity
LT-1	Eastern boundary of the project site adjacent to the railroad	82.5 CNEL	Traffic on Santa Fe Avenue and railroad activity

Notes:
dBA = A-weighted decibel
L_{eq} = equivalent sound level
CNEL=Community Noise Equivalent Level, a 24-hour weighted average.
Source: FirstCarbon Solutions (FCS). 2023.

IMPACT ANALYSIS

a. *Would the project result in the 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?*

The City of Hughson's Noise Ordinance is enforced from 10:00 p.m. to 7:00 a.m. Monday through Friday and 10:00 p.m. to 8:00 a.m. on Saturdays, Sundays, and holidays. Restricting construction activity to daytime hours in conjunction with the implementation of Mitigation Measure (MM) NOI-1, restricting construction activity to daytime hours and implementing best management noise reduction measures would ensure future construction noise levels would not result in a substantial temporary increase in ambient noise level as measured at the nearest sensitive receptor land use. Therefore, the Proposed Project will have a **Less Than Significant Impact with Mitigation Incorporated**.

b. *Would the project result in generation of excessive ground borne vibration or ground borne noise levels?*

The primary vibration-generating activities associated with the Proposed Project would occur during construction when activities such as grading, utilities placement, and roadway construction occur. Since the City of Hughson has not adopted criteria for groundborne vibration impacts for industrial projects, the Federal Transit Administration (FTA) guidelines for construction vibration impacts were used to determine potential significant construction-related impacts. The FTA has established construction vibration damage criteria of 0.3 peak particle velocity (PPV); for the Proposed Project, large vibratory rollers are anticipated to be utilized in the site preparation phase of construction and produce the greatest groundborne vibration levels. To fully realize the impact of groundborne vibration and groundborne noise, it is important to recognize the many factors which influence the level of impact including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Considering these impacts, it is also important to note that the nearest noise-sensitive receptor to the Proposed Project would be the single-family residential dwelling located across Tully Road. It is estimated that this dwelling is approximately 100 feet from the nearest construction area where the heaviest construction equipment would potentially operate. At this distance, groundborne vibration levels would range up to 0.03 PPV, well below the FTA's established threshold. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

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?*

The Project site is not located within the vicinity of 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. The closest airport to Hughson is the Modesto City-County Airport, located approximately six miles west of Hughson. General aviation facilities are also located about 15 miles south in Turlock and about 15 miles north in Oakdale. Since the Project site is not located within two miles of a public airport or public use airport, the Proposed Project would not expose persons residing or working in the Project vicinity to noise levels from airport activity that would be in excess of normally acceptable standards for the proposed land use development. Therefore, implementation of the Proposed Project will have **No Impact**.

MITIGATION MEASURES:

The following Mitigation Measures shall be incorporated into the Proposed Project:

Mitigation Measure NOI -1 – Implementation of the following multi-part mitigation measure is required to reduce potential construction-period noise impacts:

Prior to issuance of construction permits, the following language shall be included, verbatim, in the general notes section of all the civil plan construction documents.

- The construction contractor shall ensure that all equipment driven by internal combustion engines shall be equipped with mufflers which are in good condition and appropriate for the equipment.
- The construction contractor shall ensure that unnecessary idling of internal combustion engines (i.e., idling in excess of five (5) minutes) is prohibited.
- The construction contractor shall utilize “quiet” models of air compressors and other stationary noise sources where technology exists.
- At all times during project grading construction, the construction contractor shall ensure that stationary noise-generating equipment shall be located as far as practicable from sensitive receptors and placed so that emitted noise is directed away from adjacent residences.
- The construction contractor shall ensure that the construction staging areas shall be located to create the greatest feasible distance between the staging area and noise-sensitive receptors nearest the project site.
- The construction contractor shall ensure that all on-site construction activities, including the operation of any tools or equipment used in construction, drilling, repair, alteration, grading, or demolition work, are limited to between the hours of 7:00 a.m. and 10:00 p.m. Monday through Friday and between the hours of 8:00 a.m. and 10:00 p.m. on Saturdays, Sundays, and holidays.

14. POPULATION AND HOUSING -- Would the project:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?			X	
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				X

IMPACT ANALYSIS

a. *Would the project induce substantial population in one area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?*

The Proposed Project is consistent with the current zoning and General Plan Land Use designation. The property is presently zoned Industrial (I) and is currently used as an agriculture orchard. The Proposed Project does not have a residential element, the project site is not zoned residential, thus the Proposed Project will not have a direct effect on spurring population growth; however, consistent with the 2005 General Plan EIR, the project may have an indirect impact on employment opportunities for residents in the long run, thus the project will have a **Less Than Significant Impact**.

b. *Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?*

As stated, the Project site is presently functioning as an almond orchard with no structures currently existing, residential or otherwise. Thus, the Proposed Project would not displace existing individuals or housing as none exist. Therefore, the Proposed Project will have **No Impact**.

MITIGATION MEASURES:

Mitigation is not required for this topic.

15. PUBLIC SERVICES

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the 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?			X	
b) Police protection?			X	
c) Schools?			X	
d) Parks?			X	
e) Other public facilities?			X	

IMPACT ANALYSIS

a. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection?*

The City of Hughson provides fire protection services primarily via Hughson Fire Protection District (HFPD) in conjunction with, and assistance from, surrounding fire protection agencies. The HFPD works closely with neighboring fire departments that border the City's district by way of mutual aid agreements. These departments include Denair Fire Protection District, Keyes Fire Protection District, Turlock Rural Fire Protection District, and Stanislaus Consolidated Fire Protection District; consequently, if the HFPD is unable or unavailable to answer a call in Hughson, a neighboring fire department or fire district will respond to the call.

The HFPD is made up of three paid staff, and approximately 25 volunteer firefighters. HFPD has a single fire station located at 2316 3rd Street that serves approximately 10,000 residents within its 35 square miles district boundaries.

The Proposed Project does not propose physical development at this time and would not result in adverse environmental impacts associated with the need for construction of new, or alteration of the existing, fire protection facilities in order to maintain acceptable service ratios, response times, or other performance objectives. Further, Project Proponents for Industrial-type developments currently pay a development impact fee of $.30 per square foot to mitigate the impact of new development on the need for facilities, apparatus, vehicles and other equipment (capital assets) used by the Hughson FPD to serve development in the district∗. Therefore, the Proposed Project would have a **Less Than Significant Impact**.

b. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for police protection?*

The City of Hughson experiences a relatively low level of crime where emergency calls and complaints are typically related to traffic accidents or vehicle-related problems, per Hughson 2005 General Plan. The city of Hughson contracts with the Stanislaus County Sheriff's Department to supply the residents and businesses of Hughson with law enforcement and protection services. Contracted law enforcement services are based upon a philosophy of community-oriented policing which is the foundation to ensure and maintain a safe community for the residents and visitors to Stanislaus County.

The Department operates a single base station which is attached to City Hall, centrally located in the city at 7018 Pine Street. Per the 2005 General Plan, the calculated ratio of police officers per 1,000 residents is 0.85 officers. The Department reviews new development proposals for crime prevention design and general safety and keeps abreast of population increases which might trigger a need for additional staff or facilities. As such, it is anticipated that project implementation would not require any new law enforcement facilities or the alteration of existing facilities to maintain acceptable performance objectives. Additionally, response time would not be affected by the Proposed Project as existing infrastructure would provide adequate transportation routes to reach the project site in the event of an emergency. Further, development impact fees are collected from Project Proponents in order to offset future costs for capital assets in order to maintain the current level of services. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

c. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the 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 schools?*

The Proposed Project is not expected to have a significant impact on schools or generate a demand for new school facilities. Due in part because the Proposed Project is not expected to generate

∗ Hughson Fire Protection District Draft Development Impact Fee Study, April 14, 2023.

population growth and as such would not generate an increase in demand for school services. No new buildings or residences are proposed with this project, so no new students would be generated. However, Public school facilities and services are partially supported through the assessment of development impact fees. The Project Proponent would be expected to pay an established amount of development impact fees to offset any potential impact the Proposed Project may have. Therefore, under this threshold the Proposed Project will have a **Less Than Significant Impact**.

d. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for parks?*

   The Proposed Project would not have a significant impact on parks because it would not generate a need for additional park land or create an additional impact on existing parks in the region. This project would not result in any new residences which require parking services. Therefore, the Proposed Project will have a **Less Than Significant Impact** on parks citywide.

e. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the 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 o*ther public facilities*?*

   The Proposed Project is not anticipated to impact other public facilities because the project would not result in the need for additional or new public facilities. No new buildings or residences are proposed with this project that would generate a demand for other public services. Therefore, the Proposed Project will have a **Less Than Significant Impact** on public facilities.

MITIGATION MEASURES:

Mitigation is not required for this topic.

16. RECREATION

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*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?			X	
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?			X	

IMPACT ANALYSIS

The following discussion is an analysis for criteria (a) and (b):

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 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?

The Proposed Project will not 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. The Proposed Project consists of a Tentative Subdivision Map to allow for the development of industrial land uses, of which do not typically increase the use of existing parks or require the expansion or construction of parking facilities. The Proposed Project would not result in residential development, which would generate demand for recreational facilities such that new or expanded facilities would be required. There are no existing neighborhood or regional parks in the project vicinity that would be potentially affected. However, the City of Hughson's Parks Master Plan directs the establishment of appropriate development of impact fees in order that the City might pass along land acquisition and construction costs to project proponents. The Proposed Project will pay the applicable park impact fees as building permits are issued within the Project site. These fees are intended to provide funding for park capital improvements within the City of Hughson. Thus, under this threshold the Proposed Project will have a **Less Than Significant Impact.**

MITIGATION MEASURES:

Mitigation is not required for this topic.

17. TRANSPORTATION/TRAFFIC -- WOULD THE PROJECT:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*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?		X		
b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?			X	
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?			X	
d) Result in inadequate emergency access?			X	

Background

The network of roadways in and around Hughson consists of arterials, collectors and local streets. The closest major highway, SR 99, is approximately 4.5 miles west of Hughson, where it passes through the community of Ceres, connecting through Modesto and Stockton to points north, and through Merced and Fresno to points south. Many of Hughson's streets have existed since the earliest days of the City's development. The roadway system is comprised of arterials, collectors and local streets; all of which are two-lane with one lane in each direction.

The following is based on the Traffic Analysis Impact Report that was completed for the Proposed Project by GHD (March 2024).

Roadway Classifications

Major - The function of a Major road is to carry moderate- to high-volume traffic to and from collectors to other Majors, Expressways, and Freeways with a secondary function of land access. Majors located within areas zoned for heavy or light industrial or that are expected to carry large or heavy trucks shall be constructed to Industrial Major standards. Limited direct access is provided to abutting property. On-street parking will be permitted only where the Department of Public Works has determined that traffic flow and safety conditions allow on-street parking. The typical right-of-way is 110 feet (up to 6 lanes, ultimately). On limited rights-of-way, Majors may be 100 feet.

Santa Fe Avenue, within the communities of Empire and Denair, and within the City of Hughson, is planned to be an 85-foot Major measured from the railroad right-of-way.

Collector - Collectors serve a dual function by providing both access to abutting property and movement of moderate volumes of people and goods for medium length trips. Collectors serve as transition facilities, carrying traffic from lower to higher level roads. Most Collectors are two-lane roads with a typical right-of-way of 60 feet. On-street parking will be permitted only where the Department of Public Works has determined that traffic flow and safety conditions allow on-street parking. In urban residential subdivisions, roads not shown on the General Plan Circulation Diagram or as an Official Plan Line that will serve more than 50 dwelling units, when the maximum density and full extent of the development is considered, shall be deemed Collectors. In some instances, the Department of Public Works may determine that project design features dictate that a road serving as few as 20 urban dwelling units be deemed a Collector. Under certain circumstances, 80 feet of right of-way may be required to provide additional capacity to provide two additional through lanes to accommodate projected traffic demand, to facilitate the movement of large trucks, or to improve safety due to limited visibility or other safety hazards.

City of Hughson (Excerpts from Hughson General Plan Transportation Element)

Roadway Classifications

Arterials - Hughson's arterial streets are the primary movers of traffic, providing the main routes within and through the city, and also carrying traffic to and from the regional highways and other communities. Santa Fe Avenue is an arterial that runs northwest-southeast through Hughson, parallel to the railroad. Santa Fe Avenue's alignment cuts across the orthogonal grid that characterizes Hughson's roadway system complicating circulation patterns since all roadway intersections with Santa Fe Avenue have a skewed configuration. Intersection improvements along Santa Fe Avenue are also limited due to the presence of the adjoining railroad and canals.

Other existing arterials follow a grid pattern. Geer Road runs north south along Hughson's eastern SOI boundary, ultimately connecting Hughson to Turlock to the south and Oakdale to the north. Hatch Road, Whitmore Avenue and Service Road are east-west arterials that connect Hughson to Ceres and SR-99.

Collectors **-** The backbone of the City's roadway system consists of its collector streets, which connect arterial streets to local streets. The collector street system is also oriented around a grid. Existing collector streets include Tully Road, Charles Street, 7th Street and Euclid Avenue, which run north-south, and Fox Road and Hughson Avenue that run east-west.

Study Area Roadway Network

Tully Road extends in a north-south direction primarily between E. Hatch Road and E. Keys Road and would provide direct access to the Proposed Project site. In the immediate vicinity of the project site, Tully Road extends between E. Whitmore Avenue through Roeding Road to Service Road. In this area, Tully Road is a two-lane facility with unimproved shoulders serving agricultural uses and more improved areas (curb and gutter) as it approaches commercial/light industrial areas south of E. Whitmore Avenue. The posted speed limit on Tully Road is 40 mph in the project study area.

East Whitmore Avenue extends in an east-west direction approximately one-half mile north of the Proposed Project site. A major arterial street, E. Whitmore Avenue provides access to downtown Hughson as well as agricultural areas both east and west of the City. A two-lane facility, E. Whitmore Avenue widens to two travel lanes and a two-way-left turn lane immediately east of Tully Road for approximately 450-feet before transitioning back to two-travel lane as it extends across the existing railroad tracks to Santa Fe Avenue. As with Service Avenue, E. Whitmore Avenue is a regional route that provides access west to Smyrna and State Route 99 and east to more agricultural areas and Montpeller Road. In the project study area. The posted speed limit on E. Whitmore Avenue is 35 mph.

Santa Fe Avenue is located east of the project site and extends in a northwest-southeast direction paralleling the railroads tracks on the east side. A major arterial and regional route, Sante Fe Avenue provides access along the west side of downtown Hughson as well as regionally to Modesto (north) and Merced (south). In the project study area, Santa Fe Avenue is a two-lane arterial street with striped shoulders. The posted speed limit on Santa Fe Avenue is 45 mph.

Service Road extends in an east-west direction approximately one-half mile south of the Proposed Project site. Similar to E. Whitmore Avenue, Service Road is a two-lane facility that provides access west to Smyrna and State Route 99 and east to Downie Road. Service Road primarily serves primarily agricultural and residential areas and has a posted speed limit of 55 mph.

Roeding Road extends in an east-west direction between 6th Street (in Smyrna) and Tully Road and would provide direct access to the Proposed Project site. In the project study area, Roeding Road is an unimproved, two-lane road that provides access to agricultural and residential areas.

Study Intersections & Roadway Segments

Four primary intersections and one future intersection adjacent to and providing access to the project site were selected for evaluation in coordination with the City of Hughson staff for the weekday AM and PM peak hour conditions. The study intersections for the project are listed below:

1. E. Whitmore Avenue / Tully Road
2. Tully Road / Street A (future)
3. Tully Road / Roeding Road
4. Tully Road / Service Road
5. E. Whitmore Avenue / Santa Fe Avenue

Table 4.2 LOS Summary Table: AM & PM Peak Hour Intersection Level-of-Service

ID	Intersection	Target LOS	Peak Hour	Existing			Near Term			Cumulative		
				Control	Delay	LOS	Control	Delay	LOS	Control	Delay	LOS
1	Tully Road & East Whitmore Avenue	D	AM	AWSC	11.4	B	AWSC	11.9	B	AWSC	16.1	C
			PM		14.2	B		15.1	C		27.1	D
2	Tully Road & Street A (Future)	D	AM	This intersection does not exist in this scenario.			This intersection does not exist in this scenario.			This intersection does not exist in this scenario.		
			PM									
3	Tully Road & Roeding Road	D	AM	AWSC	7.7	A	AWSC	7.8	A	AWSC	8.3	A
			PM		7.7	A		7.8	A		8.3	A
4	Tully Road & Service Road	D	AM	AWSC	8.6	A	AWSC	8.8	A	AWSC	10.2	B
			PM		8.8	A		9.1	A		11.1	B
5	Santa Fe Avenue & East Whitmore Avenue	D	AM	AWSC	23.6	C	AWSC	27.7	D	AWSC	**57.5**	**F**
			PM		**43.6**	**E**		**50.6**	**F**		**112.2**	**F**

Note: **Bold** text indicates target level of service (LOS) is exceeded.

1 AWSC = All-Way-Stop-Control

2 Based on Synchro-Simtraffic (Version 11.0), Highway Capacity Manual (HCM 6), Operations,Unsignalized Intersections, 2019.

Level of Service Methodologies

In an effort to maintain consistency with the County of Stanislaus and City of Hughson policies for transportation facilities (Hughson GP, Transportation, 2005), the following level of service methodologies for intersections will be used to determine if the project causes an increase in traffic that is substantial and adverse in relation to the traffic load and capacity of the existing street system. Level of Service is a qualitative measure of traffic operating conditions, whereby a letter grade "A" through "F" is assigned to an intersection, or roadway segment, representing progressively worsening traffic conditions. LOS "A" represents free-flow operating conditions and LOS "F" represents over-capacity conditions. Levels of Service will be calculated for all intersection control types using the methods documented in the Transportation Research Board Publication Highway Capacity Manual, Sixth Edition, A Guide for Multimodal Mobility Analysis, 2016 (HCM 6).

IMPACT ANALYSIS

a. *Would the project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?*

The Proposed Project is consistent with the City of Hughson's General Plan land use designation and is located within the City of Hughson and is zoned for Industrial uses. Based on the analysis provided, the Proposed Project would generate approximately 312 weekdays AM peak hour trips and 312 weekday PM peak hour trips. Consistent with the September 2005 City of Hughson General Plan Circulation Element and 2015 County of Stanislaus Circulation Element, various traffic scenarios were analyzed including but not limited to existing conditions, existing conditions plus Project conditions, near and long-term conditions.

To reduce potential vehicle conflicts to and from Tully Road, the Proposed Project will have two (2) primary access streets. Given the number of trips generated during peak hours, both Proposed Project intersections would meet the minimum volumes for installation of southbound left-turn lanes. With the Proposed Project development, transportation mitigation has been recommended for both the E. Whitmore Avenue/Tully Road and E. Whitmore Avenue/Santa Fe Avenue intersections. The Traffic

Impact Analysis recommends the installation of a signal at each intersection to improve vehicle delays and reduce overall vehicle queuing during the AM and PM peak hours. As such, the Proposed Project development would represent its share of overall cumulative traffic growth at each intersection as defined by Caltrans methodology for equitable mitigation. The Proposed Project's equitable share is calculated using the measures outlined in the Caltrans Guide for the Preparation of Traffic Impact Studies. The Proposed Project's pro rata fair share for the E. Whitmore Avenue and Tully Road intersection is 30.03% while the pro rata fair share for the E. Whitmore Avenue and Santa Fe Avenue is 15.2%

From the existing Roeding Road/Tully Road intersection, Roeding Road would be extended east into the Proposed Project site approximately 1,000 feet to an internal drive (Street D). A second street (Street A) would extend into the site approximately 1,000 feet north of Roeding Road. Street A would connect to Tully Road and extend east into the Proposed Project approximately 1,500 feet ending in a cul-de-sac just prior to the BNSF railroad tracks and Santa Fe Avenue. Hence, off-site improvements including curb, gutter and sidewalks will be installed through the Project site as the build out of the Proposed Project occurs. Thus, there will be no conflict between the Proposed Project and the existing circulation system.

Further, transit facilities in the Hughson area are provided by the Stanislaus Regional Transit Authority (StanRTA). Bus service is provided by Route 61 between Modesto, Ceres, and Hughson with headways every hour operating between 6:45 a.m. and 7:55 p.m. In the Hughson area, Route 61 access is available via E. Whitmore Avenue extending east past Tully Road and Santa Fe Avenue to Charles Street. In the Proposed Project area, a bus stop is located on the north side of E. Whitmore Avenue just east of Tully Road. Route 61 extends east on E. Whitmore Avenue through Santa Fe Avenue to Charles Street before turning onto Hughson Avenue east to 7th Street. The route then circles around Hughson High School on 7th Street, Fox Road, Euclid Avenue, and Whitmore Avenue before extending west via the same roadways. Thus, there will be no conflict between the Proposed Project and existing Transit services available.

Consequently, the Proposed Project will not conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities. Therefore, the Proposed Project will have a **Less Than Significant Impact with Mitigation Incorporated**.

b. *Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?*

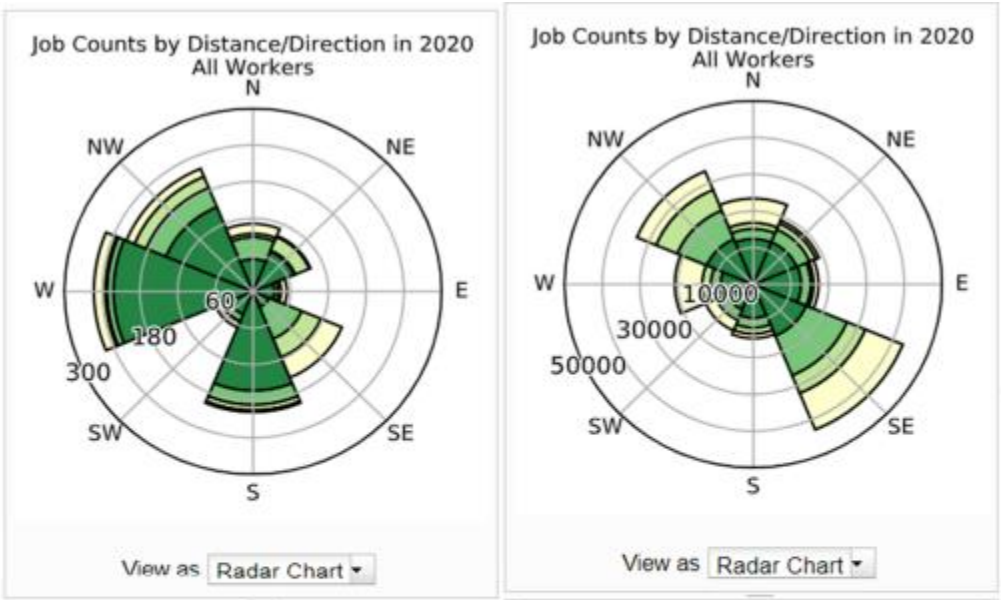
CEQA Guidelines Section 15064.3, subdivision (a) defines VMT as the amount and distance of automobile travel attributable to a project. This means that for a proposed industrial park, only trips associated with employees are evaluated in terms of VMT, as heavy trucks are not considered. Because Stanislaus County does not currently have adopted VMT guidelines, no specific methodology has been mandated. As a result, analysis for VMT is based off US Census data due to it being considered the most reliable source of commute data available. Journey-to-work data is available from the Longitudinal Employer-Household Dynamics (LEHD) program; the LEHD data provides a

nearly complete enumeration of home-to-work flows covering over 90% of all workers and employers in the United States. The LEHD Origin-Destination Employment Statistics (LODES) data provides employer-based work destinations and home origins, which were used to approximate weighted average trip lengths to and from Stanislaus County.

The LODES data was used to calculate trip lengths and associated VMT for the census tract where the Proposed Project is located. Because Stanislaus County does not currently have adopted VMT thresholds, the VMT threshold used for this analysis was based on SB 375 Regional Plan Climate Targets set by the California Air Resources Board (CARB). For Stanislaus Council of Governments, the threshold is 16% below the regional average.

The above-mentioned data was used to determine the countywide regional average travel distances for employees who work in the county and the average distance of the Proposed Project's employees, located in Hughson. As the figure below illustrates, a larger portion of employees countywide travel longer distances than those employed in the City of Hughson. Similarly, the table below presents the jobs, estimated VMT (jobs x average distance), the VMT per job for the City of Hughson and Stanislaus County, and the associated -16% threshold.

Figure 9.1 LODES Jobs by Distance (Work to Home) for Hughson (left) and Stanislaus County as a whole (right)



Jobs by Distance - Work Census Block to Home Census Block

	2020 Count	2020 Share
Total All Jobs	1,150	100.0%
Less than 10 miles	762	66.3%
10 to 24 miles	179	15.6%
25 to 50 miles	101	8.8%
Greater than 50 miles	108	9.4%

Jobs by Distance - Work Census Block to Home Census Block

	2020 Count	2020 Share
Total All Jobs	184,916	100.0%
Less than 10 miles	91,485	49.5%
10 to 24 miles	36,920	20.0%
25 to 50 miles	19,960	10.8%
Greater than 50 miles	36,551	19.8%

Table 9.1 Estimated Jobs and VMT for Hughson and Stanislaus County

LODES Distance Interval	**Assumed Average Distance (mi)**	Hughson		Stanislaus County	
		Number of Jobs	VMT	Number of Jobs	VMT
Less than 10 miles	5	762	3,810	91,485	457,425
10 to 24 miles	17	179	3,043	36,920	627,640
25 to 50 miles	37.5	101	3,788	19,960	748,500
Greater than 50 miles	75	108	8,100	36,551	2,741,325
Total		1,150	18,741	184,916	4,574,890
VMT per Job		**16.3**		**24.7**	
	Countywide threshold (16% below county average)			**20.7**	

The VMT per job for Hughson (16.3 VMT/job) is lower than the countywide threshold of 20.7 VMT/job (16% below the countywide average VMT per job). Because the Proposed Project is consistent with the Zoning and General Plan designations for the City of Hughson, its contribution toward VMT is considered in the LODES analysis for the City of Hughson. As discussed, the City of Hughson's VMT is far below the targeted 16% threshold for the region. Therefore, the Project site is considered to be in a "low-VMT" area; as such, the Proposed Project will not conflict with the CEQA guidelines section 15064.3 subdivision (b). Therefore, the Proposed Project will have a **Less Than Significant Impact**.

The following discussion is an analysis for criteria (c) and (d):

c. *Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?*
d. *Would the project result in inadequate emergency access?*

The Proposed Project will have two (2) primary access driveways (streets) to reduce potential vehicle conflicts on Tully Road. On an internal basis, overall circulation will be acceptable with wide travel lanes and large turning radii—specifically, all internal streets will have a 70-foot improvement width, including lanes, curbs, gutters, and sidewalks. Large turning radii will be provided at the intersection of Streets B and C as well as at the cul-de-sac at the end of Street D (49-foot radius).

Both Proposed Project street connections of Street A and the Roeding Road extension at Tully Road were evaluated for adequate turning radii to and from Tully Road. Adequate turning radii were analyzed using the Surface Transportation Assistance Act (STAA) Design Vehicle as defined by Caltrans and the American Association of State Highway and Transportation Officials (ASSHTO). Both inbound and outbound turning movements of large trucks were evaluated for left-turn movements and right-turn movements and based off the analysis provided in the Traffic Impact Analysis Report, large truck turning paths to and from Tully Road into the Proposed Project Street A and the Roeding Road extension will be adequate.

Additionally, no site circulation or access issues would cause a traffic safety problem, hazard or any unusual traffic congestion or delay. Emergency vehicles arriving to and departing from the Proposed Project site would be able to enter via the newly expanded Roeding Road and Proposed Street A. This

multiple entry and exit points provide a measure of flexibility for emergency vehicles to access and or evacuate from multiple directions during an emergency. There are no safety, capacity, or sight distance issues identified with the Proposed Project site plan. Therefore, impacts associated with design features and emergency access will have a **Less Than Significant Impact**.

MITIGATION MEASURES:

The following Mitigation Measures shall be incorporated into the Proposed Project:

Mitigation Measure Transportation-1: A southbound left-turn lane should be installed on Tully Road at the proposed project intersection with Street A. Based on Caltrans guidelines and projected left-turn volumes, the left-turn lane should be designed to provide the maximum storage (to the extent possible) given project frontage and available ROW (100-125 feet) of storage (4 vehicles and/or combination of heavy vehicles.

Mitigation Measure Transportation-2: Install a signal at the intersection of East Whitmore Avenue/Tully Road to improve vehicle delays and reduce overall vehicle queuing during the AM and PM peak hours. In addition, widen and/or re-stripe the eastbound E. Whitmore Avenue approach to include a separate left-turn lane and shared through/right-turn lane. Under Cumulative Year 2043 plus Project conditions, the intersection meets the peak hour signal warrant (Warrant #3). Based on Cumulative Year 2043 plus Project conditions, it is recommended that the proposed project contribute a "proportional share" of the costs to improve the intersection based on Caltrans "pro-rata" fair share calculations; or construction of a single/multi-lane modern roundabout could be given consideration.

Mitigation Measure Transportation-3: Install a signal at the intersection of E. Whitmore Avenue/Santa Fe Avenue to improve vehicle delays and reduce overall vehicle queuing during the AM and PM peak hours. The signal should be coordinated with existing automated railroad crossing gates located approximately 75-feet west of Santa Fe Avenue. Since unacceptable intersection LOS and vehicle delay is an existing deficient condition, it is recommended that the proposed project contribute a "proportional share" of the costs to improve the intersection based on Caltrans "pro-rata" fair share calculations. Please refer to Cumulative Year 2043 Plus Project Conditions for a discussion of Caltrans "pro-rata" fair share methodology and proposed project fair share contribution.

18. TRIBAL CULTURAL RESOURCES -- WOULD THE PROJECT:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
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:				
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)?			X	
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 Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?			X	

Effective July 1, 2015, Assembly Bill 52 (AB 52) amended CEQA to mandate consultation with California Native American tribes during the CEQA process to determine whether or not the Proposed Project may have a significant impact on a Tribal Cultural Resource. Section 21073 of the Public Resources Code defines California Native American tribes as "a Native American tribe located in California that is on the contact list maintained by the Native American Heritage Commission for the purposes of Chapter 905 of the Statutes of 2004." This includes both federally and non-federally recognized tribes. Section 21074(a) of the Public Resource Code defines Tribal Cultural Resources for the purpose of CEQA as:

1) Sites, features, places, cultural landscapes (geographically defined in terms of the size and scope), sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

a. included or determined to be eligible for inclusion in the California Register of Historical Resources; and/or
b. included in a local register of historical resources as defined in subdivision (k) of Section 5020.1; and/or

c. 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 Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

Because criteria A and B also meet the definition of a Historical Resource under CEQA (see Section 5 of this document), a Tribal Cultural Resource may also require additional (and separate) consideration as a Historical Resource. Tribal Cultural Resources may or may not exhibit archaeological, cultural, or physical indicators.

Recognizing that California tribes are experts in their Tribal Cultural Resources and heritage, AB 52 requires that CEQA lead agencies carry out consultation with tribes at the commencement of the CEQA process to identify Tribal Cultural Resources. Furthermore, because a significant effect on a Tribal Cultural Resource is considered a significant impact on the environment under CEQA, consultation is required to develop appropriate avoidance, impact minimization, and mitigation measures. Consultation is concluded when either the lead agency and tribes agree to appropriate mitigation measures to mitigate or avoid a significant effect, if a significant effect exists, or when a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached, whereby the lead agency uses its best judgement in requiring mitigation measures that avoid or minimize impact to the greatest extent feasible.

IMPACT ANALYSIS

a. *Would the project cause a significant 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:*

    1. *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)?*
    2. *A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?*

A Records Search was conducted for the Project site and surrounding area through the Central California Information Center (CCIC) of the California Historical Resources Information System (CCIC file No.:12638N). The record search indicates that the Project site does not contain any recorded prehistoric or historic archaeological resources or historic buildings. Additionally, with the regular disturbance associated with the agricultural operations it is anticipated that any buried resources would have been found over time.

Based on the above information, the Project site has a low potential for the discovery of prehistoric, ethnohistoric, or historic archaeological sites that may meet the definition of Tribal Cultural Resources.

Although no Tribal Cultural Resources have been documented in the Project site, the Proposed Project is located in a region where cultural resources have been recorded and there remains a potential that undocumented archaeological resources that may meet the Tribal Cultural Resources definition could be unearthed or otherwise discovered during ground-disturbing and construction activities. If archaeological resources or human remains are discovered during project-related activities, work should be temporarily halted in the vicinity of the discovered materials and worked should avoid altering the materials and their context until a qualified professional archaeologist has evaluated the situation and provided appropriate recommendations. Project Personnel should not collect or disturb cultural resources. Based on the CCIC official records search and recommendations provided, the Proposed Project will have a **Less Than Significant Impact**.

MITIGATION MEASURES:

Mitigation is not required for this topic.

19. UTILITIES AND SERVICE SYSTEMS -- WOULD THE PROJECT:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunication facilities, the construction or relocation of which could cause significant environmental effects?			X	
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?		X		
c) Result in a determination by the wastewater treatment provider that 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?			X	
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?			X	
e) Comply with Federal, State, and local management and reduction statutes and regulations related to solid waste?			X	

IMPACT ANALYSIS

a. *Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunication facilities, the construction or relocation of which could cause significant environmental effects?*

This Proposed Project would not require or result in the relocation or construction of new or expanded water, wastewater treatment, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects. The Proposed Project includes the installation of a storm drainage basin that will accommodate stormwater

generated by the Proposed Project. The storm drainage basin is located on Lot A as shown in Figure 4 (Tentative Subdivision Map) and will be installed in accordance with City standards. Future development of the Project site would require the installation of a stormwater management system. A new retention basin is proposed to be constructed on-site located northeast of the future extension of Roeding Road and Tully Road intersection. The applicant is required to obtain coverage via a State Construction General Permit, which requires implementation of a Storm Water Pollution Prevention Plan (SWPPP) that includes BMPs to control runoff, erosion, and sedimentation from the site. No additional mitigation is required. Thus, the Proposed Project will have a **Less Than Significant Impact**.

b. *Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?*

Development of the Project site with industrial uses would be consistent with the General Plan; according to the General Plan EIR, implementation of the General Plan may increase water demand for new and existing development. Policy PSF-6.1 of the 2005 General Plan ensures that the city of Hughson will continue to expand its water treatment and distribution facilities to provide good quality water to meet the needs of current and future businesses. Expansion may include the construction of additional storage facilities and/or additional wells. The Proposed Project proposes connecting to the City's water system to allow for domestic and potable water services to be provided to individual lots. The Project Proponent will install a looped water system, connecting to existing lines located in Tully Road. Water lines will then be extended through Roeding Road, and Streets A, B, C, and D. To allow for a looped system, a water line will be installed through Lots 12, 13, and 14 and easements will be established to allow for future maintenance. At this time, the City has the water capacity to allow for a maximum demand of 3,600 gallons per day per acre. To implement and monitor water supply for the Proposed Project, City staff will evaluate specific development projects as they are formally proposed to ensure their respective water demand complies with the maximum demand allowed by the City for the Proposed Project.

Based on the above, the Proposed Project will have a **Less Than Significant Impact with Mitigation Incorporated**. Mitigation Measure No. Utility and Service Systems - 1, defined below, will be incorporated into the Proposed Project.

c. *Would the project result in a determination by the wastewater treatment provider that 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?*

The Proposed Project would not result in a determination by the wastewater treatment provider that serves the project that it has adequate capacity to serve the projects demand in addition to the provider's existing commitments because all new development within the city is required to connect to the wastewater collection system. Policy PSF-7.2 of the 2005 General Plan explains that approval of new development shall be conditioned on the availability of adequate long-term capacity for wastewater conveyance, treatment, and disposal sufficient to service the proposed development. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

The following discussion is an analysis for criteria (d) and (e):

d. Would the project 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. Would the project comply with Federal, State, and local management and reduction statutes and regulations related to solid waste?

The Proposed Project will be provided solid waste services by Gilton Solid Waste. Per the 2005 General Plan EIR, solid waste is transported to a transfer station in Modesto, where it is sorted to remove items that can be recycled. Remaining refuse which cannot be recycled is sent to Stanislaus County's Fink Road Landfill, located on Crows Landing Road. The Fink Road Sanitary Landfill is operated by the Department of Environmental Resources and has been providing municipal solid waste services since it opened in 1973. Disposal of project solid waste into that facility would comply with Federal, State, and local statutes and regulations related to solid waste and would not cause solid waste providers to be out of compliance with applicable statutes and regulations related to solid waste. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

MITIGATION MEASURES:

The following mitigation measure will be incorporated into the Proposed Project:

Mitigation Measure Utility and Service Systems-1: Prior to the approval of any specific development projects within the Proposed Project, the City Engineer shall review the respective development project and determine, in writing, that the specific development project complies with the maximum water demand of 3,600 gallons per day per acre.

20. WILDFIRE -- Would the project:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
If located in or near State responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?			X	
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?			X	
c) Require the installation 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?			X	
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?			X	

IMPACT ANALYSIS

The following discussion is an analysis for criteria (a), (b), (c), and (d):

a. *Would the project s*ubstantially impair an adopted emergency response plan or emergency evacuation plan*?*
b. *Would the project, 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. *Would the project require the installation 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. *Would the project 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?*

Compared to many communities in California, Hughson faces a low risk of many of the natural hazards that threaten many California cities. For example, Hughson is relatively flat, far from fault lines and is

outside the floodplain. Further, according to the Board of Forestry and Fire Protection* and the Office of the State Fire Marshal‡, there are no state responsibility areas nor are there any lands classified as Very High, High, or Moderate Fire Hazard Severity Zones in or around the project site. The Proposed Project would not be subject to any wildfire hazards. Therefore, the Proposed Project will have **Less Than Significant Impact**.

MITIGATION MEASURES:

Mitigation is not required for this topic.

* https://bof.fire.ca.gov/projects-and-programs/state-responsibility-area-viewer/

‡ https://osfm.fire.ca.gov/fire-hazard-severity-zones-maps-2022

21. MANDATORY FINDINGS OF SIGNIFICANCE --

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*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?			X	
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			X	
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?		X		

IMPACT ANALYSIS

a. *Does the project have the potential to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, 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?*

This Initial Study/Mitigated Negative Declaration includes analysis of the Proposed Projects potential impacts associated with agricultural and forest resources, biological resources, cultural resources, mineral resources, and various other potential impacts. The analysis covers a broad spectrum of topics related to the potential for the Proposed Project to have an environmental impact; this includes the potential for the Proposed Project to substantially 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 species or animal community, and more. The analysis found that the Proposed Project would have either no impact, a less than significant impact, or a less than significant impact with the implementation of mitigation measures. For the reasons presented throughout this Initial Study, the Proposed Project would not substantially degrade

the quality of the environment. Therefore, the Proposed Project will have a **Less Than Significant Impact**.

b. *Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in the connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?*

As described in this IS/MND, the potential environmental effects of the Proposed Project will either be less than significant, or the Proposed Project will have no impact at all, when compared to baseline conditions. Where the Proposed Project involves potentially significant effects, these effects would be reduced to a less than significant level with proposed mitigation measures and compliance with required permits and applicable regulations.

The potential environmental effects identified in this IS/MND have been considered in conjunction with each other as to their potential to generate other potentially significant effects. The various potential environmental effects of the Proposed Project would not combine to generate any potential significant cumulative effects. There are no other known, similar projects with which the Proposed Project might combine to produce adverse cumulative impacts. Therefore, the Proposed Project will have a **Less Than Significant Impact.**

c. *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?*

This Initial Study has considered the potential environmental impacts of the Proposed Project in the discrete issue areas outlined in the CEQA Environmental Checklist. During the environmental analysis, the potential for the Proposed Project to result in substantial impacts on human beings in these issue areas, as well as the potential for substantial impacts on human beings to occur outside of these issue areas, were considered. Potential adverse effects on human beings were discussed in Section 3, Air Quality; Section 13, Noise; and Section 17, Transportation/Traffic. No significant adverse effects were identified in these sections that could not be mitigated to a level that would be less than significant. The Proposed Project impacts related to potential adverse effects on human beings will be **Less Than Significant with Mitigation Incorporated**.

REFERENCES

In accordance with Section 15063(a)(3) of the CEQA Guidelines, the following expert opinion, technical studies, and substantial evidence has been referenced and/or cited in the discussion included in the Initial Study Checklist:

- Bureau of Land Management, USGS. Retrieved from: maps.conservation.ca.gov: https://maps.conservation.ca.gov/cgs/EQZApp/app/.
- California Air Pollution Control Officers Association. California Emissions Estimator Model User's Guide, Version 2013.2.
- CAL FIRE (2023). Stanislaus County Fire Hazard Severity Zones in State Responsibility Area Map. Retrieved from: https://osfm.fire.ca.gov/media/bk3jcxqp/fhsz_county_sra_11x17_2022_stanislaus_2.pdf and https://bof.fire.ca.gov/projects-and-programs/state-responsibility-area-viewer/.
- Central California Information Center, California Historical Resources Information System; Records Search File Number: 12638N.
- City of Hughson – Hughson Fire Protection District Draft Development Impact Fee Study, April 14, 2023.
- City of Hughson – City of Hughson General Plan (2005).
- City of Hughson – City of Hughson General Plan Environmental Impact Report (2005).
- City of Hughson - City of Hughson Urban Water Management Plan (Carollo Engineers; November 2006).
- Department of Conservation – California Alquist-Priolo Earthquake Fault Zones. Retrieved from: https://www.conservation.ca.gov/cgs/alquist-priolo.
- Department of Conservation – California Important Farmland Finder. Retrieved from California Department of Conservation: https://maps.conservation.ca.gov/dlrp/ciff/.
- Noise Impact Assessment for the Proposed Tully Road Subdivision Industrial Park Project – First carbon Solutions, FCS International, Inc., September 13, 2023.
- State Water Resources Control Board, Contaminated Site Map Report for Public Noticing. Retrieved from: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0609900380.
- Tully Road Subdivision – Traffic Impact Analysis Report. GHD, March 4, 2024.
- United States Department of Agriculture, Natural Resources Conservation Service. Retrieved from: https://www.nrcs.usda.gov.

APPENDIX A

CALEEMOD AIR QUALITY MODELING SUMMARY REPORT

Tully Road Subdivision Summary Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Tully Road Subdivision
Construction Start Date	6/1/2024
Operational Year	2025
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.10
Precipitation (days)	29.2
Location	37.58986620534712, -120.8681849652331
County	Stanislaus
City	Hughson
Air District	San Joaquin Valley APCD
Air Basin	San Joaquin Valley
TAZ	2226
EDFZ	14
Electric Utility	Turlock Irrigation District
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.20

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description

Industrial Park	918	1000sqft	45.1	917,825	196,000	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-2*	Limit Heavy-Duty Diesel Vehicle Idling
Construction	C-10-A	Water Exposed Surfaces
Transportation	T-34*	Provide Bike Parking
Area Sources	AS-1	Use Low-VOC Cleaning Supplies

* Qualitative or supporting measure. Emission reductions not included in the mitigated emissions results.

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	4.43	77.8	36.0	35.5	0.06	1.60	19.8	21.4	1.47	10.1	11.6	—	8,958	8,958	0.33	0.65	21.8	9,181
Mit.	4.43	77.8	36.0	35.5	0.06	1.60	7.80	9.40	1.47	3.97	5.44	—	8,958	8,958	0.33	0.65	21.8	9,181
% Reduced	—	—	—	—	—	—	61%	56%	—	61%	53%	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	4.28	77.7	34.4	31.1	0.06	1.45	9.36	10.8	1.33	3.69	5.02	—	8,622	8,622	0.28	0.65	0.57	8,822
Mit.	4.28	77.7	34.4	31.1	0.06	1.45	3.84	5.19	1.33	1.46	2.79	—	8,622	8,622	0.28	0.65	0.57	8,822
% Reduced	—	—	—	—	—	—	59%	52%	—	60%	44%	—	—	—	—	—	—	—

Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.35	11.8	11.9	22.3	0.03	0.41	3.46	3.87	0.38	1.55	1.94	—	6,195	6,195	0.18	0.46	6.62	6,342
Mit.	2.35	11.8	11.9	22.3	0.03	0.41	2.70	3.05	0.38	0.66	0.99	—	6,195	6,195	0.18	0.46	6.62	6,342
% Reduced	—	—	—	—	—	—	22%	21%	—	57%	49%	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.43	2.14	2.17	4.07	0.01	0.08	0.63	0.71	0.07	0.28	0.35	—	1,026	1,026	0.03	0.08	1.10	1,050
Mit.	0.43	2.14	2.17	4.07	0.01	0.08	0.49	0.56	0.07	0.12	0.18	—	1,026	1,026	0.03	0.08	1.10	1,050
% Reduced	—	—	—	—	—	—	22%	21%	—	57%	49%	—	—	—	—	—	—	—

ROG NOx CO PM10 PM10 PM10 PM25 PM25 PM25

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	23.5	42.3	21.5	162	0.29	0.89	19.7	20.6	0.86	5.02	5.88	1,020	66,354	67,374	118	20.3	336	76,684
Mit.	23.5	40.8	21.5	162	0.29	0.89	19.7	20.6	0.86	5.02	5.88	1,020	66,354	67,374	118	20.3	336	76,684
% Reduced	—	3%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	14.9	34.2	23.1	105	0.27	0.82	19.7	20.5	0.81	5.02	5.83	1,020	64,295	65,315	118	20.3	241	74,562
Mit.	14.9	32.7	23.1	105	0.27	0.82	19.7	20.5	0.81	5.02	5.83	1,020	64,295	65,315	118	20.3	241	74,562
% Reduced	—	4%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	16.7	35.9	20.6	113	0.24	0.83	16.9	17.7	0.81	4.31	5.12	1,020	61,991	63,011	117	20.2	275	72,228
Mit.	16.7	34.4	20.6	113	0.24	0.83	16.9	17.7	0.81	4.31	5.12	1,020	61,991	63,011	117	20.2	275	72,228
% Reduced	—	4%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.05	6.55	3.77	20.6	0.04	0.15	3.09	3.24	0.15	0.79	0.93	169	10,263	10,432	19.4	3.34	45.6	11,958
Mit.	3.05	6.28	3.77	20.6	0.04	0.15	3.09	3.24	0.15	0.79	0.93	169	10,263	10,432	19.4	3.34	45.6	11,958
% Reduced	—	4%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

6. Climate Risk Detailed Report

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	1	1	2
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	1	1	2	1
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	5	1	1	4

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.

The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	1	2	1
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	1	1	2	1
Drought	1	1	2	1
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	5	1	1	4

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

7. Health and Equity Details

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	60.0
Healthy Places Index Score for Project Location (b)	30.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

APPENDIX B

CENTRAL CALIFORNIA INFORMATION CENTER (CCIC) RECORDS SEARCH, DATED SEPTEMBER 6, 2023

CENTRAL CALIFORNIA INFORMATION CENTER
California Historical Resources Information System
Department of Anthropology – California State University, Stanislaus
One University Circle, Turlock, California 95382
(209) 667-3307

Alpine, Calaveras, Mariposa, Merced, San Joaquin, Stanislaus & Tuolumne Counties

Date: 9/6/2023

Records Search File #: 12638N
Project: Tully Road Vesting Tentative Subdivision Map No. USE23-0112-Project Hughson, CA

Michael Arroyo, Contract Planner
J. B. Anderson Land Use Planning
139 S. Stockton Avenue
Ripon, CA 95366
209-599-8377 michael@jbandersonplanning.com

Dear Mr. Arroyo:

We have conducted a non-confidential extended records search as per your request for the above-referenced project area located on portions of the Ceres and the Denair USGS 7.5-minute quadrangles in Stanislaus County.

Search of our files includes review of our maps for the specific project area and the immediate vicinity of the project area, and review of the following:

National Register of Historic Places (NRHP)
California Register of Historical Resources (CRHR)
California Inventory of Historic Resources (1976)
California Historical Landmarks
California Points of Historical Interest listing
Office of Historic Preservation Built Environment Resource Directory (BERD) and the Archaeological Resources Directory (ARD)
Survey of Surveys (1989)
Caltrans State and Local Bridges Inventory
General Land Office Plats
Other pertinent historic data available at the CCaIC for each specific county

The following details the results of the records search:

Prehistoric or historic resources within the project area:

- There are no formally recorded prehistoric or historic archaeological resources or buildings or structures within the project area.

- The General Land Office survey plat for T4S R10E (dated 1854) shows a historic road traversing Section 16 from northwest to southeast.

- The Official Map of the County of Stanislaus, California (1906) references H. H. Hughson as the landowner in Sections 15 and 16.

- The 1916 edition of the Denair USGS quadrangle shows the alignment of Whitmore Road.

- The 1916 edition of the Ceres USGS quadrangle shows the alignment of Tully Road.

Prehistoric or historic resources within the immediate vicinity of the project area: None has been formally reported to the Information Center,

Resources that are known to have value to local cultural groups: None has been formally reported to the Information Center.

Previous investigations within the project area: A one-acre investigation has been conducted within the project area, referenced as follows:

CCaIC Report No. ST-08578
Jensen, S. M.
2013 Archaeological Inventory, Hughson Well Project, ca. 1-acre, Stanislaus County, California. Genesis Society.

Recommendations/Comments:

Please be advised that a historical resource is defined as a building, structure, object, prehistoric or historic archaeological site, or district possessing physical evidence of human activities over 45 years old. Since the entire project area has not been subject to previous investigations, there may be unidentified features involved in your project that are 45 years or older and considered as historical resources requiring further study and evaluation by a qualified professional of the appropriate discipline.

If the current project does not include ground disturbance, further study for archaeological resources is not recommended at this time. If ground disturbance is considered a part of the current project, we recommend further review for the possibility of identifying prehistoric or historic-era archaeological resources.

If the proposed project contains buildings or structures that meet the minimum age requirement (45 years in age or older) it is recommended that the resource/s be assessed by a professional familiar with architecture and history of the county. Review of the available historic building/structure data has included only those sources listed above and should not be considered comprehensive.

If at any time you might require the services of a qualified professional the Statewide Referral List for Historical Resources Consultants is posted for your use on the internet at http://chrisinfo.org

If archaeological resources are encountered during project-related activities**,** work should be temporarily halted in the vicinity of the discovered materials and workers should avoid altering the materials and their context until a qualified professional archaeologist has evaluated the situation and provided appropriate recommendations. Project personnel should not collect cultural resources.

If human remains are discovered, California Health and Safety Code Section 7050.5 requires you to protect the discovery and notify the county coroner, who will determine if the find is Native American. If the remains are recognized as Native American, the coroner shall then notify the Native American Heritage Commission (NAHC). California Public Resources Code Section 5097.98 authorizes the NAHC to appoint a Most Likely Descendant (MLD) who will make recommendations for the treatment of the discovery.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the State Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

The California Office of Historic Preservation (OHP) contracts with the California Historical Resources Information System's (CHRIS) regional Information Centers (ICs) to maintain information in the CHRIS inventory and make it available to local, state, and federal agencies, cultural resource professionals, Native American tribes, researchers, and the public. Recommendations made by IC coordinators or their staff regarding the interpretation and application of this information are advisory only. Such recommendations do not necessarily represent the evaluation or opinion of the State Historic Preservation Officer in carrying out the OHP's regulatory authority under federal and state law.

We thank you for contacting this office regarding historical resource preservation. Please let us know when we can be of further service. Please sign and return the attached **Access Agreement Short Form.**

Note: Billing will be transmitted separately via email from the Financial Services office ($150.00), payable within 60 days of receipt of the invoice.

If you wish to include payment by Credit Card, you must wait to receive the official invoice from Financial Services so that you can reference the CMP # (Invoice Number), and then contact the link below:

https://commerce.cashnet.com/ANTHROPOLOGY

Sincerely,

E. A. Greathouse

E. A. Greathouse, Coordinator
Central California Information Center
California Historical Resources Information System

* Invoice Request sent to: ARBilling@csustan.edu, CSU Stanislaus Financial Services

APPENDIX C

ENVIRONMENTAL NOISE IMPACT ASSESSMENT, PREPARED BY FIRST CARBON SOLUTIONS, DATED SEPTEMBER 13, 2023

Memorandum

Date: September 13, 2023

To: Corey Walker, PE, LSIT, QSD/QSP
NorthStar Engineering Group, Inc.

From: Philip Ault, Director Noise and Air Quality

Subject: Noise Impact Assessment for the Proposed Tully Road Subdivision Industrial Park Project in Hughson, California

The proposed Tully Road Subdivision Industrial Park Project (proposed project) is located on the east side of Tully Road, south of East Whitmore Avenue, in the City of Hughson (City), in Stanislaus County, California, and consists of a Vesting Tentative Subdivision Map (VTM) to allow for the subdivision of approximately 46.44 acres into 34 industrial lots and a parcel set aside for a future storm drain basin. The proposed project does not include physical development of the individual lots at this time, but future development within the project site would conform to the City's Zoning Ordinance, including Section 17.02.032 (Uses Allowed in Each District) and Section 17.02.061 (I-Industrial Zone). The new parcels that would be created as part of the proposed project are approximately 1 acre in size. Access to the proposed project would be provided by driveways from Tully Road and Roeding Road. The proposed project would also install frontage improvements to Tully Road and Roeding Road, including curb, gutter, sidewalk, and roadway improvements.

FirstCarbon Solutions (FCS) has prepared this report to evaluate the proposed project's noise and groundborne vibration impacts with respect to applicable City's standards.

Based on FCS's evaluation, when assuming reasonable worst-case conditions, future construction of the proposed project may result in a substantial temporary increase in ambient noise levels if construction activities are not limited to daytime hours. However, with the incorporation of FCS's recommendations, potential construction noise impacts would be reduced to less than significant. All other project-related potential noise impacts are identified as being "less than significant" or "no impact" without mitigation.

INTRODUCTION

Fundamentals of Noise

Sound can be described in terms of its loudness (amplitude) and frequency (pitch). The standard unit of measurement for sound is the decibel, abbreviated dB. Because the human ear is not equally sensitive to sound at all frequencies, the A-weighted scale (dBA) is used to reflect the normal hearing sensitivity range of the human ear. Table 1 provides examples of A-weighted noise levels from common sources.

Although the terms “sound” and “noise” are often used synonymously, noise is commonly defined as sound that is either loud, unpleasant, unexpected, or undesired. Because decibels are logarithmic units, they cannot be simply added or subtracted. For example, two cars each producing 60 dBA of noise would not produce a combined 120 dBA.

Table 1: A-Weighted Decibel Scale

Common Noise Sources	Sound Level, dBA
Near Jet Engine	130
Rock and Roll Band	110
Jet Flyover at 1,000 feet	100
Power Motor	90
Food Blender	80
Living Room Music	70
Human Voice at 3 feet	60
Residential Air Conditioner at 50 feet	50
Bird Calls	40
Quiet Living Room	30
Average Whisper	20
Rustling Leaves	10

Notes:
dBA = A-weighted decibel
These noise levels are approximations intended for general reference and information use. They do not meet the standard required for detailed noise analysis but are provided for the reader to gain a rudimentary concept of various noise levels.
Source: Cowan, James P. 1993. Handbook of Environmental Acoustics.

Table 2 briefly defines common noise measurement descriptors and other sound terminology used in this analysis.

Table 2: Sound Terminology

Term	Definition
Sound	A vibratory disturbance created by a vibrating object which, when transmitted by pressure waves through a medium such as air, can be detected by a receiving mechanism such as the human ear or a microphone.

Term	Definition
Noise	Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
Ambient Noise	The composite of noise from all sources near and far in a given environment.
Decibel (dB)	A unitless measure of sound on a logarithmic scale which represents the squared ratio of sound pressure amplitude to a reference sound pressure. The reference pressure is 20 micropascals, representing the threshold of human hearing (0 dB).
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level that approximates the frequency response of the human ear.
Equivalent Noise Level (L_{eq})	The average sound energy occurring over a specified time period. In effect, L_{eq} is the steady-state sound level that in a stated period would contain the same acoustical energy as the time-varying sound that actually occurs during the same period.
Maximum and Minimum Noise Levels (L_{max} and L_{min})	The maximum or minimum instantaneous sound level measured during a measurement period.
Source: Data compiled by FirstCarbon Solutions (FCS). 2023.	

Generally speaking, noise levels decrease, or "attenuate," as distances from noise sources to receivers increase. For each doubling of distance, noise from stationary or small, localized sources, commonly referred to as "point sources," may attenuate at a rate of 6 dBA for each doubling of distance. This attenuation is referred to as the inverse square law. For example, if a point source emits a noise level of 80 dBA at a reference distance of 50 feet, its noise level would be approximately 74 dBA at a distance of 100 feet, 68 dBA at a distance of 200 feet, etc. Noise emitted by "line" sources, such as highways, attenuates at the rate of 3 dBA for each doubling of distance.

Factors such as ground absorption and atmospheric effects may also affect the propagation of noise. In particular, ground attenuation by non-reflective surfaces, such as soft dirt or grass, may contribute to increased attenuation rates of up to an additional 8–10 dBA per doubling of distance.

A characteristic of noise is that the lowest audible increase in noise levels generally refers to a change of 3 dBA, as this level has been found to be barely perceptible to the human ear in outdoor environments, while a change of 5 dBA is considered a readily perceptible change to the human ear in outdoor environments. Furthermore, a doubling of sound sources with equal strength is required to result in a perceptible increase (defined to be a 3 dBA or greater) in noise levels.

Noise is most audible when traveling by direct line of sight, an unobstructed visual path between a noise source and a receiver. Barriers that break the line of sight between noise sources and receivers, such as walls and buildings, can greatly reduce source noise levels by allowing noise to reach receivers by diffraction only. Barriers can reduce source noise levels by up to 20 dBA, though it is generally infeasible for temporary barriers to reduce source noise levels by more than 15 dBA. In cases where the noise path from source to receiver is direct but grazes the top of a barrier, noise attenuation of up to 5 dBA may still occur.

Noise Standards and Guidelines

The City's noise ordinance is contained in Chapter 9.30 of the City of Hughson Municipal Code (Municipal Code). Chapter 9.30 defines noise as "excessive undesirable sound" generated by people, animals, vehicles, or equipment. The Ordinance states that it is unlawful to make "unnecessary or unusual noise which unreasonably disturbs the peace and quiet of any zone classified R-A, R-1, R-2, R-3 C-1, C-2, or C-3, which causes discomfort or annoyance" to an average person within those zones, and which is audible without amplification 50 feet or more from the source of the noise. Additionally, the City enforces the Noise Ordinance from 10:00 p.m. to 7:00 a.m. Monday through Friday and from 10:00 p.m. to 8:00 a.m. on weekends and holidays.

The Hughson General Plan (General Plan) contains goals, policies, and actions regarding noise impacts within the City. The applicable goals, policies, and actions from the General Plan are listed below:

Goal N-1 Minimize the exposure of community residents to excessive noise.

Policy N-1.1 The City will utilize the noise/land use compatibility standards in Figure N-1 as a guide for future planning and development decisions, as well as the projected future noise contours for the buildout of the General Plan, shown in Figure N-2 and detailed in Table N-2.

Policy N-1.2 The City will maintain a pattern of land uses that separates noise-sensitive land uses from major noise sources, to the extent feasible.

Policy N-1.4 The City should require new development deemed to be noise generators to minimize noise at the source through site design, building design, landscaping, hours of operation and other techniques.

Policy N-1.5 During all phases of construction activity, the City will require project developers to incorporate mitigation measures that minimize the exposure of neighboring properties to excessive noise levels.

Action N-1.1 Enforce the Hughson Noise Ordinance to avoid unnecessary and unusual noise during the hours of 10 p.m. to 7 a.m. Monday through Friday, and 10 p.m. to 8 a.m. Saturday, Sunday, and holidays.

Action N-1.2 Require acoustical analyses for proposed sensitive land uses to be located within the 60 dBA Ldn noise contour, or in the vicinity of existing and proposed commercial and industrial areas. Acoustical analyses will also be required for commercial and industrial uses proposed in the vicinity of existing or proposed sensitive land uses. Where the noise analyses indicate that the noise compatibility standards contained in the Noise Element will be exceeded, require noise control measures to be incorporated into the proposed development to reduce noise levels to the extent feasible.

Action N-1.3 Require construction techniques for noise buffering, barriers, or setbacks in development subject to high noise levels, such as the railroad and major roadways, to reduce noise to a level within the noise/land use compatibility standards, as shown in Figure N-1. Sound walls are discouraged unless there is no other feasible design available to minimize noise impacts along major roadways and the railroad.

Goal N-2 Reduce noise levels from traffic and railroad operation.

Policy N-2.3 The City will seek to reduce impacts from ground borne vibrations associated with rail operations by requiring that habitable buildings are sited at least 100-feet from the centerline of the tracks, whenever feasible.

Action N-2.2 Require development of habitable buildings within 100-feet from the centerline of the railroad tracks to provide a study demonstrating that ground borne vibration issues associated with rail operations have been adequately addressed (i.e., through building siting or construction techniques).

Existing Noise Environment

The existing noise environment in the project vicinity was documented through ambient noise monitoring. Three short-term noise measurements (15 minutes each) were taken on Tuesday, September 5, 2023. The short-term noise measurements taken at the project site are summarized in Table 3. The noise measurement data sheets are attached to this document.

The noise measurements indicate that daytime ambient noise levels average from 64.8 dBA to 67.8 dBA L_{eq} along the proposed project's western boundary adjacent to Tully Road; and 75.4 dBA L_{eq} at the proposed project's eastern boundary adjacent to the railroad. The noise technician observed that the dominant noise sources in the project vicinity are traffic on local roadways and train activity on the railroad.

One long-term, 24-hour noise measurement was also conducted at the project's eastern border adjacent to the railroad. The resulting noise level was 82.5 dBA CNEL as measured at 75 feet from the railroad line, along the project's eastern property line. The nighttime average noise level was 76.3 dBA L_{eq}.

Table 3: Existing Ambient Noise Levels in the Project Vicinity

Site Location	Location Description	dBA	Primary Noise Sources
ST-1	Northwest corner of the project site adjacent to Tully Road	67.8 L_{eq}	Traffic on Tully Road
ST-2	Southwest corner of the project site adjacent to Tully Road	64.8 L_{eq}	Traffic on Tully Road
ST-3	Eastern boundary of the project site adjacent to the railroad	75.4 L_{eq}	Traffic on Santa Fe Avenue and railroad activity
LT-1	Eastern boundary of the project site adjacent to the railroad	82.5 CNEL	Traffic on Santa Fe Avenue and railroad activity

Notes:
dBA = A-weighted decibel
L_{eq} = equivalent sound level
CNEL=Community Noise Equivalent Level, a 24-hour weighted average.
Source: FirstCarbon Solutions (FCS). 2023.

NOISE IMPACT ANALYSIS

Thresholds of Significance

According to California Environmental Quality Act (CEQA) Guidelines Appendix G, to determine whether impacts related to noise and vibration are significant environmental effects, the following questions are analyzed and evaluated.

Would the proposed plan:

a) Generate 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) Generate 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?

Substantial Noise Increase in Excess of Standards

Construction Noise Impacts

For the purposes of this analysis, a significant impact would occur if construction activities would result in a substantial temporary increase in ambient noise levels in excess of the City's applicable noise

standards. The City's Noise Ordinance is enforced from 10:00 p.m. to 7:00 a.m. Monday through Friday and 10:00 p.m. to 8:00 a.m. on Saturdays, Sundays, and holidays. Therefore, any construction activity during these hours would be required to not result in a substantial temporary increase above ambient noise levels for receiving land uses. A characteristic of noise is that the lowest audible increase in noise levels generally refers to a change of 3 dBA, as this level has been found to be barely perceptible to the human ear in outdoor environments, while a change of 5 dBA is considered a readily perceptible change to the human ear in outdoor environments. Therefore, for the purposes of this analysis, a significant impact would occur if the proposed project would cause the $L_{eq(h)}$ to increase by 5 dBA or greater.

Construction-related Traffic Noise

Noise impacts from construction activities associated with the proposed project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. One type of short-term noise impact that could occur during project construction would result from the increase in traffic flow on local streets associated with the transport of workers, equipment, and materials to and from the project site. The transport of workers and construction equipment and materials to the project site would incrementally increase noise levels on access roads leading to the site. Because workers and construction equipment would use existing routes, noise from passing trucks would be similar to existing vehicle-generated noise on these local roadways. Typically, a doubling of the Average Daily Traffic (ADT) hourly volumes on a roadway segment is required in order to result in an increase of 3 dBA in traffic noise levels, which is the lowest change that can be perceptible to the human ear in outdoor environments. Project-related construction trips would not be expected to double the hourly or daily traffic volumes along any roadway segment in the project vicinity. For this reason, short-term intermittent noise from construction trips would not be expected to result in a perceptible increase in hourly- or daily-average traffic noise levels in the project vicinity. Therefore, short-term construction-related noise impacts associated with the transportation of workers and equipment to the project site would be less than significant.

Construction Equipment Operational Noise

The second type of short-term noise impact is related to noise generated during construction on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full-power operation followed by 3 or 4 minutes at lower power settings. Impact equipment, such as impact pile drivers, are not expected to be used during construction of this proposed project.

The loudest phase of construction is typically the site preparation and grading phase, as that is when the loudest pieces of heavy construction equipment would operate. For example, the maximum noise level

generated by each scraper is assumed to be 85 dBA L_{max} at 50 feet from this equipment. Each bulldozer would also generate 85 dBA L_{max} at 50 feet. The maximum noise level generated by graders is approximately 85 dBA L_{max} at 50 feet.

A conservative but reasonable assumption is that this equipment would operate simultaneously and continuously over at least a 1-hour period in the vicinity of the closest existing residential receptors but would move linearly over the project site as they perform their earth-moving operations, spending a relatively short amount of time adjacent to any one receptor. A characteristic of sound is that each doubling of sound sources with equal strength increases a sound level by 3 dBA. Assuming that each piece of construction equipment operates at some distance from the other equipment, a reasonable worst-case combined noise level during this phase of construction would be 90 dBA L_{max} at a distance of 50 feet from the acoustic center of a construction area. The acoustical center reference is used because construction equipment must operate at some distance from one another on a project site, and the combined noise level as measured at a point equidistant from the sources (acoustic center) would be the worst-case maximum noise level. These operations would be expected to result in a reasonable worst-case hourly average of 81 dBA L_{eq} at a distance of 50 feet from the acoustic center of a construction area. These worst-case construction noise levels would only occur during the site preparation phase of development.

The nearest noise-sensitive receptor to the proposed parking areas of the proposed project would be the single-family residential home located across Tully Road. The closest residence would be located approximately 130 feet from the acoustic center of construction activity where multiple pieces of heavy construction equipment would potentially operate at the project site. At this distance, worst-case construction noise levels could range up to approximately 77 dBA L_{max}, intermittently, and could have an hourly average of up to 71 dBA L_{eq}, at the façade of the nearest single-family residential home. The calculation sheet is attached to this document.

Existing ambient noise levels in the vicinity of the closest sensitive receptor are documented by noise measurement ST-1 to be 67.8 dBA L_{eq}, as shown in Table 3. Therefore, these construction noise levels would not result in a substantial temporary increase of more than 5 dBA above existing daytime ambient noise levels as measured at this nearest sensitive receptor.

Documented nighttime noise levels adjacent to the railroad line along the project's eastern border are 76.3 dBA L_{eq}. The property line of the nearest residential receptor west of the project site across Tully Road is 1,500 feet from the rail line. At this distance, average nighttime noise levels from railroad activity at this nearest sensitive receptor would be below 50 dBA L_{eq}. Therefore, if construction were to occur during nighttime hours, reasonable worst-case construction noise levels could exceed documented existing nighttime background ambient noise levels by more than 5 dBA, resulting in a significant impact as measured at the closest sensitive receptor.

Therefore, a mitigation measure limiting construction activities to the daytime hours should be implemented to reduce the effects of noise levels produced by these activities on longer-term (hourly or

daily) ambient noise levels and reduce the potential for noise-related annoyance or sleep disturbances at nearby sensitive receptors.

The City's Noise Ordinance is enforced from 10:00 p.m. to 7:00 a.m. Monday through Friday and 10:00 p.m. to 8:00 a.m. on Saturdays, Sundays, and holidays. Therefore, restricting construction activity to daytime hours, as well as implementing the best management noise reduction techniques and practices outlined in Mitigation Measure (MM) NOI-1, would ensure that construction noise would not result in a substantial temporary increase in ambient noise levels that would result in annoyance or sleep disturbance of nearby sensitive receptors and would ensure construction activity noise levels would not exceed the City's nighttime noise level standard. Therefore, with implementation of MM NOI-1, temporary construction noise impacts would be reduced to less than significant.

Mobile Source Operational Noise Impacts

A significant impact would occur if project-generated traffic would result in a substantial increase in ambient noise levels compared with those that would exist without the proposed project. As noted in the fundamentals of noise discussion above, a characteristic of noise is that the lowest audible increase in noise levels generally refers to a change of 3 dBA, as this level has been found to be barely perceptible to the human ear in outdoor environments, while a change of 5 dBA is considered a readily perceptible change to the human ear in outdoor environments. Therefore, for the purposes of this analysis, a significant impact would occur if the proposed project would cause hourly or daily average traffic noise levels to increase by 5 dBA or greater. Another characteristic of noise is that a doubling of sound sources with equal strength is required to result in a perceptible increase (defined to be a 3 dBA or greater) in noise levels.

GHD traffic consultants prepared a traffic analysis for the proposed project that included near-term without project and near-term with project peak-hour traffic volumes at various intersections in the project vicinity. The near-term peak-hour traffic volume data sheets are attached to this report. The near-term scenario assumes the earliest year that the proposed project could be built out, generating full project trips.

This near-term peak-hour traffic data shows that traffic along Tully Road adjacent to the project site, north of Roeding Road, would average 215 AM peak-hour trips and 234 PM peak-hour trips, without implementation of the proposed project.

The traffic data also shows that near-term traffic conditions with implementation of the proposed project would result in an average of 264 AM peak-hour trips and 329 PM peak-hour trips. This represents an increase of only 49 trips in the AM peak-hour and an increase of 95 PM peak-hour trips with implementation of the proposed project compared to conditions that would exist without implementation of the proposed project.

Thus, plus-project trips would not result in a doubling of trips on access roadway segments in the project vicinity and would therefore result in a less than 3 dBA increase in traffic noise levels compared to traffic

noise levels that would exist without the proposed project. Therefore, project-related traffic would result in a less than significant permanent increase in traffic noise levels.

Stationary Source Operational Noise Impacts

A significant impact would occur if operational noise levels generated by stationary noise sources at the project site would result in a substantial permanent increase in ambient noise levels in excess of any of the noise performance thresholds established in the City's Noise Ordinance.

As noted previously, audible increases in noise levels generally refer to a change of 3 dBA or more as this level has been found to be barely perceptible to the human ear in outdoor environments. A change of 5 dBA is considered the minimum readily perceptible change to the human ear in outdoor environments. Therefore, for purposes of this analysis, an increase of more than 5 dBA above the applicable noise performance thresholds would be considered a substantial permanent increase in ambient noise levels.

The proposed project does not include any specific development proposal at this time, and therefore, no project-specific development is known at this time. However, future development on the project site would include new stationary noise sources, including mechanical ventilation equipment and parking lot activities.

Mechanical Ventilation Equipment

Implementation of the proposed project would include operation of new rooftop mechanical ventilation equipment. The proposed project does not include any project-specific development at this time, thus, specific details of rooftop mechanical ventilation systems were not available; therefore, a reference noise level for typical rooftop mechanical ventilation systems was used. Noise levels from typical commercial-grade mechanical ventilation equipment systems range up to approximately 60 dBA L_{eq} at a distance of 25 feet.

The reasonable worst-case operational noise level of these mechanical ventilation systems would be 48 dBA L_{eq} as measured at the nearest off-site residential property line (for the single-family residential home located across Tully Road). The noise calculation sheet is attached to this document.

Existing ambient noise levels in the vicinity of the closest sensitive receptor are documented by noise measurement ST-1 to be 67.8 dBA L_{eq}, as shown in Table 3. Therefore, mechanical ventilation equipment noise levels would not result in a substantial temporary increase of more than 5 dBA above existing daytime ambient noise levels as measured at this nearest sensitive receptor.

Therefore, operational mechanical equipment noise levels would not result in a substantial permanent increase in ambient noise levels in excess of existing ambient noise levels and would represent a less than significant impact.

Parking Lot Activities

Typical parking lot activities include people conversing, doors shutting, and vehicles idling which generate noise levels ranging from approximately 60 dBA to 70 dBA L_{max} at 50 feet. The proposed project does not contain any specific development proposals, and thus, no project-specific development is known at this time. However, future development on the project site would contain on-street parking for employees and guests. Therefore, the project site would include parking areas that would experience parking activities sporadically throughout the day as cars and trucks arrive and leave parking lot areas on the project site.

The nearest noise-sensitive receptor to the proposed parking areas of the proposed project would be the single-family residential home located across Tully Road, approximately 100 feet from the nearest parking areas on the project site. Assuming a minimum of one parking movement per stall per hour, reasonable worst-case hourly average noise levels associated with daily parking lot activities would be approximately 44 dBA L_{eq} at the exterior of the nearest residential receptor. The noise calculation sheet is attached to this document.

Existing ambient noise levels in the vicinity of the closest sensitive receptor are documented by noise measurement ST-1 to be 67.8 dBA L_{eq}, as shown in Table 3. Therefore, these operational parking lot activity noise levels would not result in a substantial temporary increase of more than 5 dBA above existing daytime ambient noise levels as measured at this nearest sensitive receptor.

Therefore, operational parking lot activity noise levels would not result in a substantial permanent increase in ambient noise levels in excess of existing ambient noise levels and would represent a less than significant impact.

Mitigation Measures

Project construction activity noise impacts, which could result in a temporary increase in ambient noise levels in the project vicinity that could result in annoyance or sleep disturbance of nearby sensitive receptors and exceed the established nighttime noise standard, would be reduced to less than significant with implementation of the following multi-part mitigation measure.

MM NOI-1 Implementation of the following multi-part mitigation measure is required to reduce potential construction-period noise impacts:

Prior to issuance of construction permits, the following language shall be included, verbatim, in the general notes section of all the civil plan construction documents.

- The construction contractor shall ensure that all equipment driven by internal combustion engines shall be equipped with mufflers which are in good condition and appropriate for the equipment.
- The construction contractor shall ensure that unnecessary idling of internal combustion engines (i.e., idling in excess of 5 minutes) is prohibited.

- The construction contractor shall utilize “quiet” models of air compressors and other stationary noise sources where technology exists.
- At all times during project grading and construction, the construction contractor shall ensure that stationary noise-generating equipment shall be located as far as practicable from sensitive receptors and placed so that emitted noise is directed away from adjacent residences.
- The construction contractor shall ensure that the construction staging areas shall be located to create the greatest feasible distance between the staging area and noise-sensitive receptors nearest the project site.
- The construction contractor shall ensure that all on-site construction activities, including the operation of any tools or equipment used in construction, drilling, repair, alteration, grading, or demolition work, are limited to between the hours of 7:00 a.m. and 10:00 p.m. Monday through Friday and between the hours of 8:00 a.m. and 10:00 p.m. on Saturdays, Sundays, and holidays.

Groundborne Vibration/Noise Levels

This section analyzes both construction and operational groundborne vibration and noise impacts. Groundborne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. Vibrating objects in contact with the ground radiate vibration waves through various soil and rock strata to the foundations of nearby buildings. Groundborne noise is generated when vibrating building components radiate sound, or noise generated by groundborne vibration. In general, if groundborne vibration levels do not exceed levels considered to be perceptible, then groundborne noise levels would not be perceptible in most interior environments. Therefore, this analysis focuses on determining exceedances of groundborne vibration levels.

The City has not adopted criteria for groundborne vibration impacts for industrial projects. Therefore, for purposes of this analysis, the Federal Transit Administration (FTA) guidelines for construction vibration impacts are used to determine potential significant construction-related impacts.

Short-term Construction Vibration Impacts

A significant impact would occur if existing structures at the project site or in the project vicinity would be exposed to groundborne vibration levels in excess of the above levels established by the City.

Of the variety of equipment used during construction, the large vibratory rollers that are anticipated to be used in the site preparation phase of construction would produce the greatest groundborne vibration levels. Large vibratory rollers produce groundborne vibration levels ranging up to 0.201 in/sec peak particle velocity (PPV) at 25 feet from the operating equipment.

The nearest noise-sensitive receptor to the proposed parking areas of the proposed project would be the single-family residential home located across Tully Road. The façade of this building would be located approximately 100 feet from the nearest construction footprint where the heaviest construction

equipment would potentially operate. At this distance, groundborne vibration levels would range up to 0.03 PPV from operation of the types of equipment that would produce the highest vibration levels. This is well below the FTA's construction vibration damage criteria of 0.3 PPV for this type of structure, a building of engineered concrete and masonry (no plaster) construction. Therefore, the impact to off-site receptors of short-term groundborne vibration associated with construction would be less than significant.

Operational Vibration Impacts

Implementation of the proposed project would not include any permanent sources that would expose persons in the project vicinity to groundborne vibration levels that could be perceptible without instruments at any existing sensitive land use in the project vicinity. Existing sources of groundborne vibration in the project vicinity include railroad activity along the Burlington Northern Santa Fe (BNSF) railroad, located approximately 50 feet east of the project boundaries.

According to the City's General Plan Noise Element, approximately 33 train movements take place each day with approximately 54 percent daytime operations (7:00 a.m. to 7:00 p.m.), 11 percent evening operations (7:00 p.m. to 10:00 p.m.), and 35 percent nighttime operations (10:00 p.m. to 7:00 a.m.).

According to the FTA's vibration impact assessment guidelines,[1] train passing frequency in the range of 30 to 70 events per day are categorized as occasional events. The FTA's groundborne vibration impact criteria for Category 3, institutional land uses with primarily daytime use, exposed to occasional rail events is 78 VdB. The FTA's generalized ground surface vibration equation is as follows:

$$Lv = 92.28 + 14.81\ log(D) – 14.17 log(D)^2 + 1.65 Log(D)^3$$

Where L*v* is the velocity level (VdB), and D is the distance in feet.

The proposed project has a required 15-foot access easement along the eastern project boundary adjacent to the railroad. Therefore, the minimum distance from any future structure on the project site to the railroad would be 65 feet.

The above formula is for trains traveling at 50 miles per hour (mph), so the FTA adjustment for trains traveling at 40 mph is -1.9. The FTA guidelines provide a further adjustment of -5.0 for coupling to a building foundation for wood-frame structures.

Utilizing the FTA's vibration impact screening methodology, the calculated vibration level at 65 feet from the rail line for the projected rail by-pass events (including freight train passings), with trains traveling up to 50 mph, would be 76.7 VdB.

[1] Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. September.

Therefore, projected groundborne vibration levels from rail activity adjacent to the project site would be less than the FTA's vibration impact screening criteria of 78 VdB as measured at the nearest potential future structure on the project site. Therefore, the impact of groundborne vibration levels from rail activity on proposed on-site receptors would be less than significant.

Noise Levels from Airport Activity

A significant impact would occur if the proposed project would expose people residing or working in the project area to excessive noise levels 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 2 miles of a public airport or public use airport.

The project site is not located within the vicinity of a private airstrip. Additionally, there is not a private airstrip located within a 5-mile radius of the project site. The nearest public airport to the project site is Modesto City-County Airport, located approximately 5.26 miles northwest of the project site. The project site is also not located within a 55 dBA CNEL airport noise contour of any private or public use airport. Therefore, implementation of the proposed project would not expose persons residing or working in the project vicinity to noise levels from airport activity that would be in excess of normally acceptable standards for the proposed land use development, and no impact would occur.

SUMMARY

Based on FCS's review of the proposed project, implementation of MM NOI-1 restricting construction activity to daytime hours and implementing best management noise reduction measures would ensure future construction noise levels would not result in a substantial temporary increase in ambient noise levels as measured at the nearest sensitive receptor land use.

The analysis also identifies that project-related mobile and stationary noise sources would not result in a substantial permanent increase in ambient noise levels as measured at the nearest sensitive receptor land use, and impacts would be less than significant without mitigation.

Future development construction activities would not generate excessive groundborne vibration levels that would exceed the FTA's screening thresholds, and future development on the project site would not be exposed to groundborne vibration levels from railroad activity in excess of the FTA's screening levels for Category 3 land use development, and impacts would be less than significant without mitigation.

Finally, the proposed project would not expose persons residing or working in the project vicinity to noise levels from airport activity that would be in excess of normally acceptable standards for the proposed land use development, and no impact would occur.

Sincerely,



Philip Ault, Director of Noise and Air Quality
FirstCarbon Solutions
2999 Oak Road, Suite 250
Walnut Creek, CA 94597

Attachment A: Noise Monitoring and Modeling Data

FIRSTCARBON
SOLUTIONS
FCS INTERNATIONAL, INC.

Attachment A:
Noise Monitoring and Modeling Data

FIRSTCARBON
SOLUTIONS
FCS INTERNATIONAL, INC.

LxT_Data.012

Project Number: 3473.0002 Sheet 1 of 3
Project Name: ~~Hudson Tully Road~~ Tully Road Subdivision
Test Personnel: ISOBEL COOPER

NOISE MEASUREMENT SURVEY

Site Number: ST-1 Date: 9/5/2023 Time: From 3:51 To 4:01

Site Location: ST-1: near northwest corner of project site along Tully Road, across from single family residence

Primary Noise Sources: Traffic on Tully Road, single family residence (barking dog, sprinklers), noise from lumber yard/trucking operation to the north

Measurement Results

	dBA
L_{eq}	67.8
L_{max}	81.3
L_{min}	41.3
L_{peak}	101.3
L_5	75.3
L_{10}	73.1
L_{50}	55.2
L_{90}	41.3
SEL	95.5

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
3:51	train horn (from east)	

Comments:

Equipment:
Settings: A-Weighted ☐ Other ☐
Measured Difference: -0.07 dBA
Slow ☐ Fast ☐ Windscreen ☑

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
	3 mph	90°	29%	
Comments:				

Photos Taken:

Photo Number	Location/Description
ST-1 East	taken across Tully Road facing east into orchard
ST-1 North	facing north along Tully Road
ST-1 South	facing south along Tully Road
ST-1 West	facing west towards home across Tully Road

Traffic Description:

Roadway	# Lanes	Posted Speed	Average Speed	NB/EB Counts	SB/WB Counts
Tully Road	2	40 mph			

Diagram/Further Comments:

FIRSTCARBON SOLUTIONS
FCS INTERNATIONAL, INC.

LxT_Data.011

Project Number: 3473.0002 Sheet 2 of 3
Project Name: Tully Road Subdivision
Test Personnel: Isobel Cooper

NOISE MEASUREMENT SURVEY

Site Number: ST-2 Date: 9/5/2023 Time: From 3:22 To 3:32

Site Location: ST-2 : Southwest corner of project site, along Tully Road

Primary Noise Sources: traffic along Tully road, trucks/equipment from "Grassi Fabrications" to the south, potentially noise from farming equipment (?)

Measurement Results

	dBA
L_{eq}	64.8
L_{max}	80.3
L_{min}	39.9
L_{peak}	98.6
L_5	71.7
L_{10}	69.9
L_{50}	54.1
L_{90}	46.8
SEL	92.6

Observed Noise Sources/Events

Time	Noise Source/Event	dBA

Comments:

Equipment: Measured Difference: 0.05 dBA
Settings: A-Weighted ☐ Other ☐ Slow ☐ Fast ☐ Windscreen ☑

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
	3 mph	90°	29%	
Comments:				

Photos Taken:

Photo Number	Location/Description
ST-2 East	taken across Tully Road facing east into orchard
ST-2 North	facing north along Tully Road
ST-2 South	facing south along Tully Road
ST-2 West	facing west across Tully Road towards opposite orchard

Traffic Description:

Roadway	# Lanes	Posted Speed	Average Speed	NB/EB Counts	SB/WB Counts
Tully Road	2	40mph			

Diagram/Further Comments:

LxT_Data.013

Project Number: 3473.0002 Sheet 3 of 3
Project Name: Tully Road Subdivision
Test Personnel: Isobel Cooper

NOISE MEASUREMENT SURVEY

Site Number: LT-1 Date: 9/5/2023 Time: From 4:16 To 4:26

Site Location: LT-1 (short term measurements ~~locast~~ located at eastern boundary of project site along train tracks, just northwest of intersection of 7th Street and Santa Fe Avenue

Primary Noise Sources: train tracks, Santa Fe Ave across train track to east

Measurement Results

	dBA
L_{eq}	75.4
L_{max}	97.5
L_{min}	40.6
L_{peak}	113.0
L_5	61.0
L_{10}	57.0
L_{50}	50.4
L_{90}	44.7
SEL	103.2

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
4:22	train passing	

Comments:

Equipment: Measured Difference: -0.07 dBA
Settings: A-Weighted ☐ Other ☐ Slow ☐ Fast ☐ Windscreen ☑

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
	3 mph	91°	27%	
Comments:				

Photos Taken:

Photo Number	Location/Description
LT-1 (ST) East	facing east towards train tracks
LT-1 (ST) NW	facing northwest along train tracks
LT-1 (ST) SE	facing south east along train tracks
LT-1 (ST) West	facing west into project site

Traffic Description:

Roadway	# Lanes	Posted Speed	Average Speed	NB/EB Counts	SB/WB Counts

Diagram/Further Comments:

Summary

File Name on Meter	LxT_Data.014.s
File Name on PC	LxT_0004397-20230905 165250-LxT_Data.014.ldbin
Serial Number	0004397
Model	SoundTrack LxT®
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-09-05 16:52:50
Stop	2023-09-06 16:55:21
Duration	24:02:31.0
Run Time	24:02:31.0
Pause	00:00:00.0
Pre-Calibration	2023-09-05 16:44:42
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	Z Weighting
Detector	Slow
Preamplifier	Direct
Microphone Correction	Off
Integration Method	Exponential
OBA Range	Low
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	Z Weighting
OBA Max Spectrum	Bin Max
Overload	226.2 dB

	A	C	Z
Under Range Peak	182.4	179.4	**184.4** dB
Under Range Limit	**118.3**	116.8	121.1 dB
Noise Floor	109.2	107.7	112.0 dB

	First	Second	Third
Instrument Identification			

Results

LASeq	75.1 dB	
LASE	124.5 dB	
EAS	311.193 mPa²h	
EAS8	103.550 mPa²h	
EAS40	517.750 mPa²h	
LZpk (max)	2023-09-06 05:33:13	128.5 dB
LASmax	2023-09-06 00:52:02	110.2 dB
LASmin	2023-09-06 02:40:35	39.1 dB
SEA	147.4 dB	

	Exceedance Counts	Duration
LAS > 85.0 dB	77	1248.5 s
LAS > 115.0 dB	0	0.0 s
LZpk > 135.0 dB	0	0.0 s
LZpk > 137.0 dB	0	0.0 s
LZpk > 140.0 dB	0	0.0 s

Community Noise	**LDN**	**LDay 07:00-22:00**	**LNight 22:00-07:00**	**LDEN**	**LDay 07:00-19:00**	**LEvening 19:00-22:00**	**LNight 22:00-07:00**
	82.4	74.2	76.3	82.5	74.5	72.3	76.3

LCSeq	79.2 dB	
LASeq	75.1 dB	
LCSeq - LASeq	4.1 dB	
LAIeq	78.2 dB	
LAeq	75.1 dB	
LAIeq - LAeq	3.1 dB	

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
Leq	75.1					
LS(max)	110.2	2023/09/06 0:52:02				
LS(min)	39.1	2023/09/06 2:40:35				
Lpk(max)					128.5	2023/09/06 5:33:13

Overload Count	0	
Overload Duration	0.0	s
OBA Overload Count	57	
OBA Overload Duration	231.3	s

Dose Settings

Dose Name	OSHA-1	OSHA-2
Exchange Rate	5	5 dB
Threshold	90	80 dB
Criterion Level	90	90 dB
Criterion Duration	8	8 h

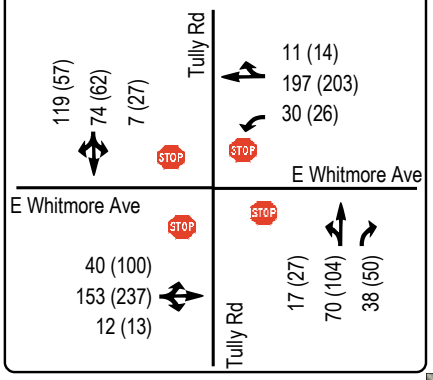
Results

Dose	3.06	5.47 %
Projected Dose	1.02	1.82 %
TWA (Projected)	56.9	61.1 dB
TWA (t)	64.8	69.0 dB
Lep (t)	79.9	79.9 dB

Statistics

LAS 5.00	62.6 dB
LAS 10.00	59.6 dB
LAS 33.30	54.7 dB
LAS 50.00	52.2 dB
LAS 66.60	49.4 dB
LAS 90.00	45.5 dB

1 Tully Rd/E Whitmore Ave



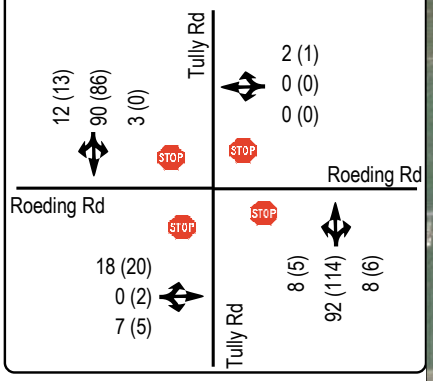
5 Santa Fe Ave/E Whitmore Ave



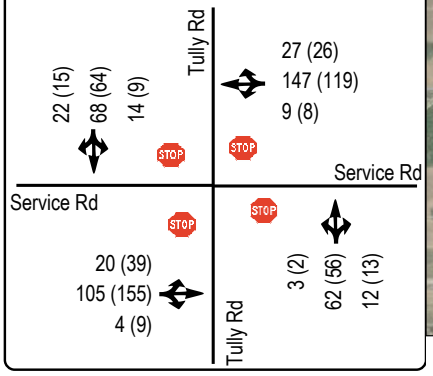
2 Tully Rd/Street A

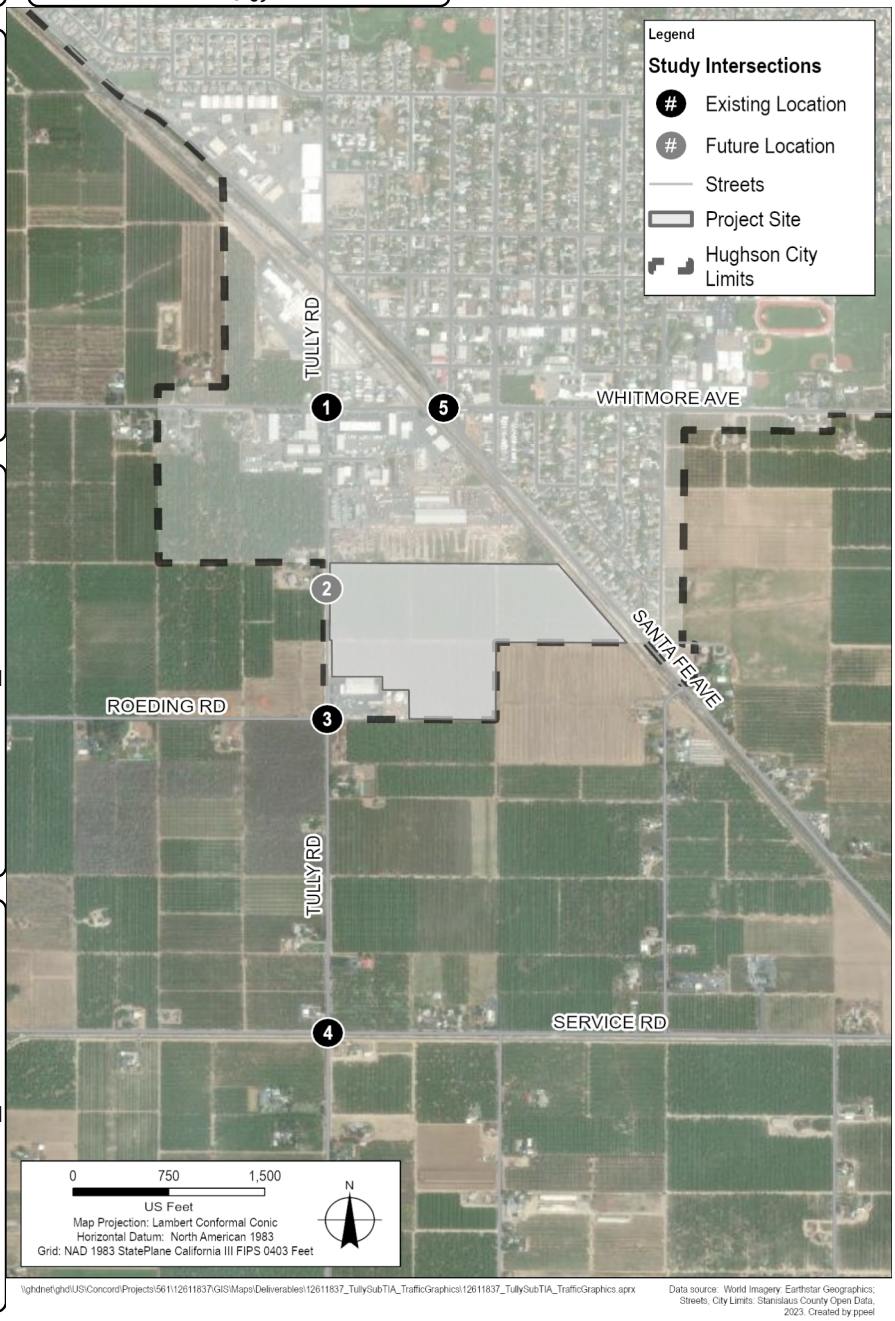
Intersection does not exist in this scenario.

3 Tully Rd/Roeding Rd



4 Tully Rd/Service Rd





\\ghdnet\ghd\US\Concord\Projects\561\12611837\GIS\Maps\Deliverables\12611837_TullySubTIA_TrafficGraphics\12611837_TullySubTIA_TrafficGraphics.aprx

Data source: World Imagery: Earthstar Geographics; Streets, City Limits: Stanislaus County Open Data, 2023. Created by: ppeel

Legend

XX (YY) AM (PM) Peak Hour Volumes

Turn Lane

Stop Sign

Traffic Signal

Roundabout

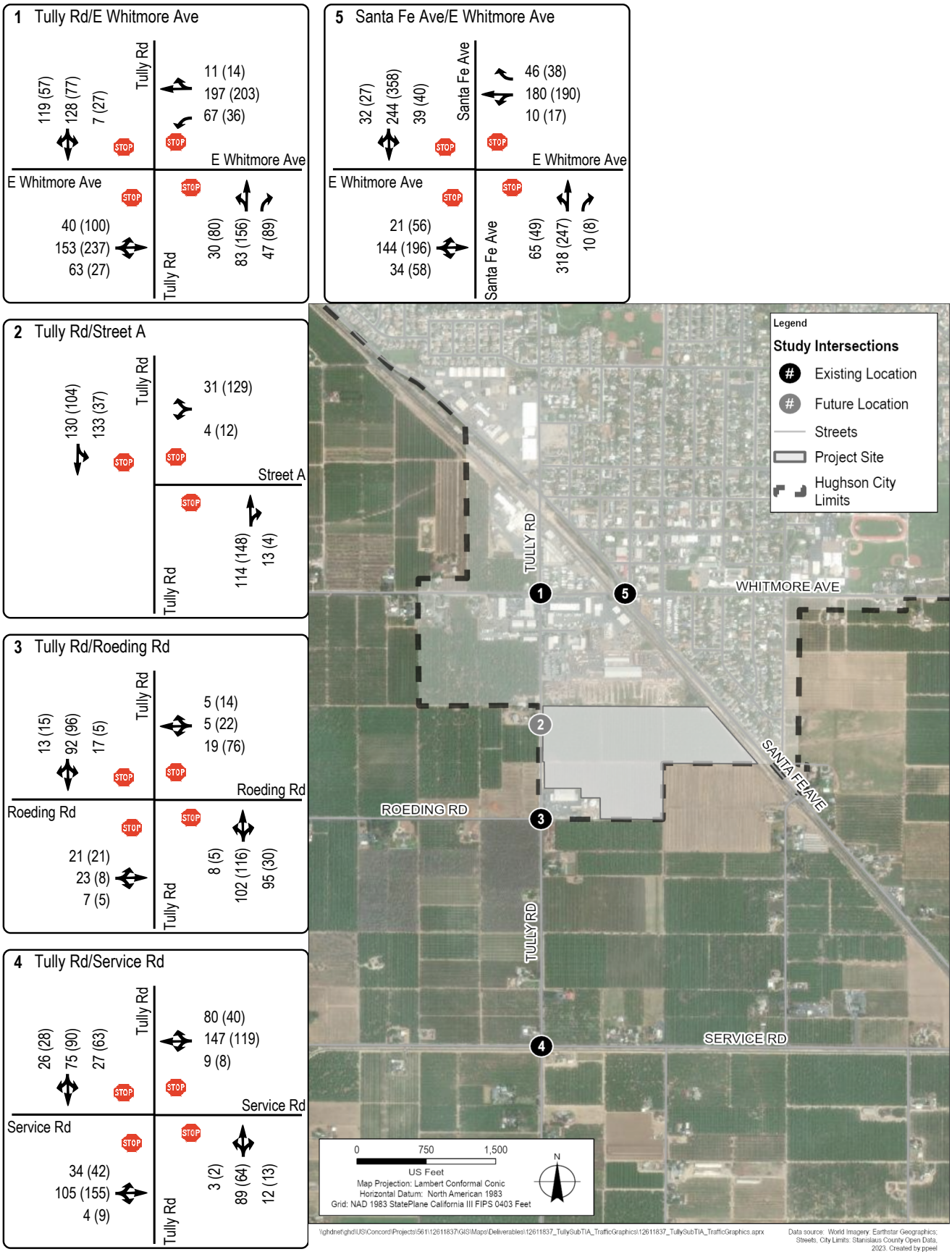
GHD

Altine Pacific Nut Company, Inc.
Tully Road Subdivision TIAR

Near Term
Peak Hour Volumes

Project No. **12611837**
Report No. **001**
Date **8/15/23**

FIGURE X.X



Legend

XX (YY) AM (PM) Peak Hour Volumes

Turn Lane

Stop Sign

Traffic Signal

Roundabout

Altine Pacific Nut Company, Inc.
Tully Road Subdivision TIAR

Near Term Plus Project Peak Hour Volumes

Project No. **12611837**
Report No. **001**
Date **8/15/23**

FIGURE X.X

Mobile Construction Activity Noise Calculation

Receptor:	Receiving residential property line	Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements								
		Reference (dBA) 50 ft		Usage	Distance to	Ground	Shielding	Calculated (dBA)		
No.	Equipment Description	Lmax	Quantity	factor[1]	Receptor	Effect[2]	(dBA)[3]	Lmax	Leq	Energy
1	Grader	85	1	40	130	1	0	76.7	68.6	7196808.512
2	Excavator	85	1	40	180	1	0	73.9	64.3	2711143.399
3	Dozer	85	1	40	180	1	0	73.9	64.3	2711143.399
4	Front End Loader	80	1	40	230	1	0	66.7	56.1	410947.6453
5	Backhoe	80	1	40	230	1	0	66.7	56.1	410947.6453
6										
7										
8										
9										
10										
							Lmax[4]	77	Leq	71

Notes:

[1] Percentage of time activity occurs each hour

[2] Soft ground terrain between project site and receptor.

[3] Shielding due to terrain or structures

[4] Calculated Lmax is the Loudest value.

Mechanical Equipment Noise Calculation

Receptor:	Receiving residential property line	Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements								
		Reference (dBA) 25 ft		Usage	Distance to	Ground	Shielding	Calculated (dBA)		
No.	Equipment Description	Lmax	Quantity	factor[1]	Receptor	Effect[2]	(dBA)[3]	Lmax	Leq	Energy
1	Commercial grade mechanical ventilation equipment	60	1	100	100	0.5	0	48.0	44.9	31250
2	Commercial grade mechanical ventilation equipment	60	1	100	150	0.5	0	44.4	40.5	11340.23029
3	Commercial grade mechanical ventilation equipment	60	1	100	150	0.5	0	44.4	40.5	11340.23029
4	Commercial grade mechanical ventilation equipment	60	1	100	200	0.5	0	41.9	37.4	5524.271728
5										
6										
7										
8										
9										
10										
							Lmax[4]	48	Leq	48

Notes:

[1] Percentage of time activity occurs each hour

[2] Soft ground terrain between project site and receptor.

[3] Shielding due to rooftop parapet or soundwall shielding

[4] Calculated Lmax is the Loudest value.

Parking Lot Activity Noise Calculation

Receptor:	Receiving residential property line									
		Reference (dBA) 50 ft		Usage	Distance to	Ground	Shielding	Calculated (dBA)		
No.	Equipment Description	Lmax	Quantity	factor[1]	Receptor	Effect[2]	(dBA)[3]	Lmax	Leq	Energy
1	parking lot activity	70	1	1	100	1	0	64.0	41.0	12500
2	parking lot activity	70	1	1	125	1	0	62.0	38.1	6400
3	parking lot activity	70	1	1	150	1	0	60.5	35.7	3703.703704
4	parking lot activity	70	1	1	175	1	0	59.1	33.7	2332.361516
5	parking lot activity	70	1	1	200	1	0	58.0	31.9	1562.5
6										
7										
8										
9										
10										
							Lmax[4]	64	Leq	44

Notes:

[1] Percentage of time activity occurs each hour

[2] Soft ground terrain between project site and receptor.

[3] Shielding due to terrain or structures

[4] Calculated Lmax is the Loudest value.

APPENDIX D

TRAFFIC IMPACT ANALYSIS REPORT, PREPARED BY GHD, DATED MARCH 4, 2024

Tully Road Subdivision

Traffic Impact Analysis Report

Alpine Pacific Nut Co., Inc.

March 04, 2024

→ The Power of Commitment



DRAFT

GHD 380-
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[Compliance statement]

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Executive Summary

The following report presents the results of a traffic impact analysis report (TIAR) prepared by GHD for the proposed Tully Road Subdivision Industrial Park project in the City of Hughson, Stanislaus County.

The term “Project” as used in this study will refer to the proposed Tully Road subdivision industrial park development on the parcel(s) located one-quarter mile south E. Whitmore Avenue and east of Tully Road. The proposed development consists of the following:

Main Development Parcel(s)

- Industrial Park – 45.15 Net Acreage (includes streets, basin, infrastructure)
- Net Density—35.11 acres (less streets, basin, infrastructure)
- Total Square Feet – 35.11 acres x 43,560 sf/acre = 1,529,392 square feet
- 60 Percent Coverage Rate —1,529,392 sf x 60% = 917,635 square feet
- Proposed Project Net Square Feet – 917,635 square feet

The proposed project is consistent with the City of Hughson’s General Plan land use designation and is located within the City’s Sphere of Influence zoned for Industrial uses. The proposed site is located along the east side of Tully Road one-quarter mile south of E. Whitmore Avenue extending east and north of Roeding Road in Hughson, CA. (Stanislaus County).

The proposed project site would generate approximately 312 weekday AM peak hour trips and 312 weekday PM peak hour trips.

The traffic analysis considered potential impacts (selected in coordination with City of Hughson staff) along the following corridors:

- Tully Road (between E. Whitmore Avenue and Service Road)
- E. Whitmore Avenue (between Tully Road and Santa Fe Avenue)

Consistent with the September 2005 City of Hughson General Plan Circulation Element and 2015 County of Stanislaus Circulation Element, the following traffic scenarios were analyzed as a part of this TIAR:

- Existing Conditions
- Existing Plus Project Conditions
- Near-Term Year 2026 (No Project) Conditions
- Near-Term Year 2026 Plus Project Conditions
- Cumulative Year 2043 (No Project) Conditions
- Cumulative Year 2043 Plus Project Conditions

The traffic analysis determined that all significant project impacts could be mitigated. The following is a summary of the proposed project’s mitigations for significant traffic impacts:

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Study Intersections:

Intersection #1—E. Whitmore Avenue/Tully Road

Cumulative Year 2043 Plus Project Conditions

- Consider installation of a traffic signal
- Widen and/or re-stripe the eastbound E. Whitmore Avenue approach to provide a separate left-turn lane and a shared through/right-turn lane;
- With a signal, overall intersection operation would improve from LOS F (51.7 seconds of delay) to LOS B (12.0 seconds of delay) during the PM peak hour.

OR

- Consider construction of a single/multi-lane modern roundabout.

The proposed project's impact at this intersection is **significant** under the "cumulative year 2043 plus project" scenario. The project's fair-share for the improvement(s) is **30%**.

Intersection #5—E. Whitmore Avenue/Santa Fe Avenue

Existing Plus Project Conditions

- Consider installation traffic signal. A signal at this location would need to be coordinated with existing railroad automated crossing gates on E. Whitmore Avenue approximately 75-feet west of the intersection and with any future signal at the E. Whitmore Avenue/Tully Road intersection.
- With a signal, overall intersection operation would improve from LOS F (74 0 seconds of delay AM & 128.5 seconds of delay PM) to LOS B (11.1 seconds of delay AM & 13.0 seconds of delay PM).

The proposed project's impact at this intersection is **significant** under the "existing plus project" scenario. The project's fair-share for the improvement(s) is **15%**.

Site Access/Circulation

Based on Cumulative Plus Project AM peak hour volumes at the Street A intersection at Tully Road, the proposed project intersection would meet the minimum volume for installation of a southbound left-turn lane. The Roeding Road/Tully Road intersection would not meet the left-turn lane warrant given its lower southbound left-turn volumes. Please note, proposed project volumes represent build-out of the entire industrial park. As described, proposed industrial uses would develop over a period of time (10-20 years) and southbound left-turn project volumes may remain low for a number of years as infrastructure is developed. However, heavy vehicles (trucks) would be utilizing the facility given the nature of the industrial park.

Based on the associated AASHTO left-turn guidelines and warrant requirements, the following mitigation is recommended for the proposed project access at Tully Road:

- A southbound left-turn lane should be installed on Tully Road at the proposed project intersection with Street A. Based on Caltrans guidelines and projected left-turn volumes, the left-turn lane should be designed to provide the maximum storage (to the extent possible) given project frontage and available ROW (100-125 feet of storage [4 vehicles and/or combination of heavy vehicles])

Vehicle Miles Traveled (VMT):

The proposed Tully Road subdivision industrial park project is anticipated to have a lower VMT based on journey-to-work data for the City of Hughson when compared to the same VMT average for Stanislaus County. Based on US Census data associated journey-to-work data for Hughson, the VMT per job for Hughson (16.3 VMT/job) is lower than the countywide threshold of 20.7 VMT/job (16% below the countywide average VMT per job). Since the proposed project is consistent with the zoning and General Plan designations for the City of Hughson, its contribution toward VMT is considered in the LODES analysis for the City of Hughson. As noted, the City of Hughson's VMT is far below

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the targeted 16% threshold for the region. Therefore, the proposed project is in a “low-VMT” area and has a less-than-significant impact on VMT.

Please refer to **Section 9** (Vehicle Miles Traveled Results) for a comprehensive VMT analysis and **Appendix G**.

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1. Introduction

This technical document has been prepared to present the results of a TIAR and Vehicle Miles Traveled (VMT) analysis at the request of Alpine Pacific Nut Company, Inc. The term "project," as used in this report refers to the proposed Tully Road Subdivision Industrial Park project in Hughson, CA. with the following land uses:

Land Use Quantities:

The term "Project" as used in this study will refer to the proposed Tully Road subdivision industrial park development on the parcel(s) located one-quarter mile south E. Whitmore Avenue and east of Tully Road. The proposed development consists of the following:

Main Development Parcel(s)

- Industrial Park – 45.15 Net Acreage (includes streets, basin, infrastructure)
- Net Density—35.11 acres (less streets, basin, infrastructure)
- Total Square Feet – 35.11 acres x 43,560 sf/acre = 1,529,392 square feet
- 60 Percent Coverage Rate —1,529,392 sf x 60% = 917,635 square feet
- Proposed Project Net Square Feet – 917,635 square feet

The proposed project is consistent with the City of Hughson's General Plan land use designation and is located within the City's Sphere of Influence zoned for Industrial uses. The proposed site is located along the east side of Tully Road one-quarter mile south of E. Whitmore Avenue extending east and north of Roeding Road in Hughson, CA. (Stanislaus County). **Figure 1.1** presents the vicinity area map and project location.

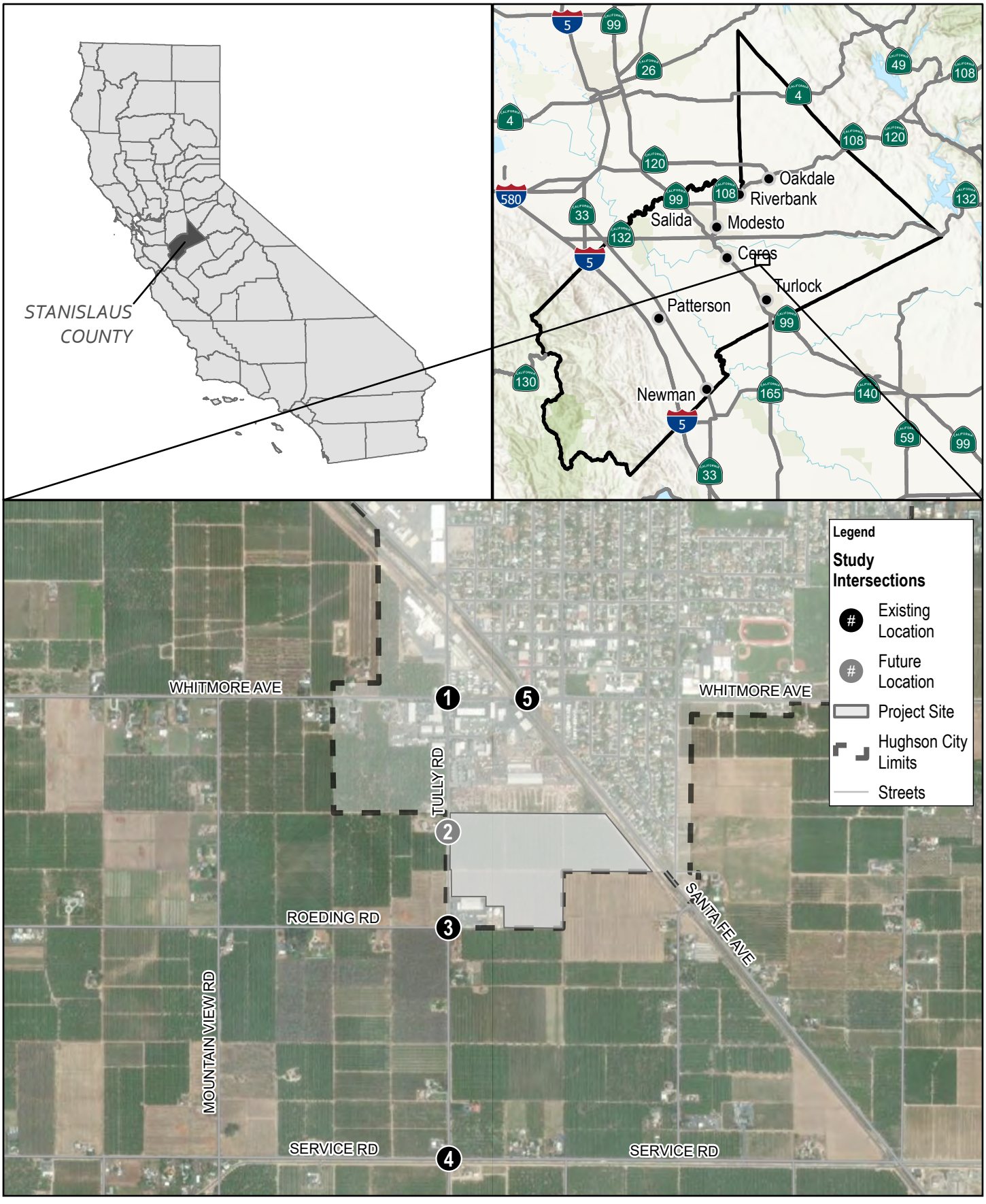
The project site plan and proposed land uses are shown in **Figure 1.2**

Included in this TIAR are analyses and discussions of the following items:

- Quantification of proposed project trip generation is based on accepted Industrial Park trip rates found in the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition).
- The trip distribution was estimated using existing intersection counts adjacent to the project site and detailed demographic analyses on the City of Hughson work trips from the United States Census Bureau;
- Resulting proposed project impacts on existing weekday AM and PM peak hour intersection operations along E. Whitmore Avenue, Santa Fe Avenue, and Tully Road study intersections;
- The projected Cumulative (Year 2043) weekday AM and PM peak hour intersection operations with and without the development of the proposed project based on StanCOG transportation model AM and PM peak hour projections;
- Vehicle Miles Traveled (VMT) analysis related to the SB 743 and the trip characteristics of the proposed project associated with location, size, and screening criteria;
- Planned project circulation improvements and project-related mitigation measures that, if necessary, alleviate unacceptable traffic operations.

Consistent with the County of Stanislaus and City of Hughson guidelines, the following traffic scenarios were evaluated for overall project analyses:

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Paper Size ANSI A

0 750 1,500

US Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California III FIPS 0403 Feet

N

GHD

Alpine Pacific Nut Company, Inc.
Tully Road Subdivision TIAR

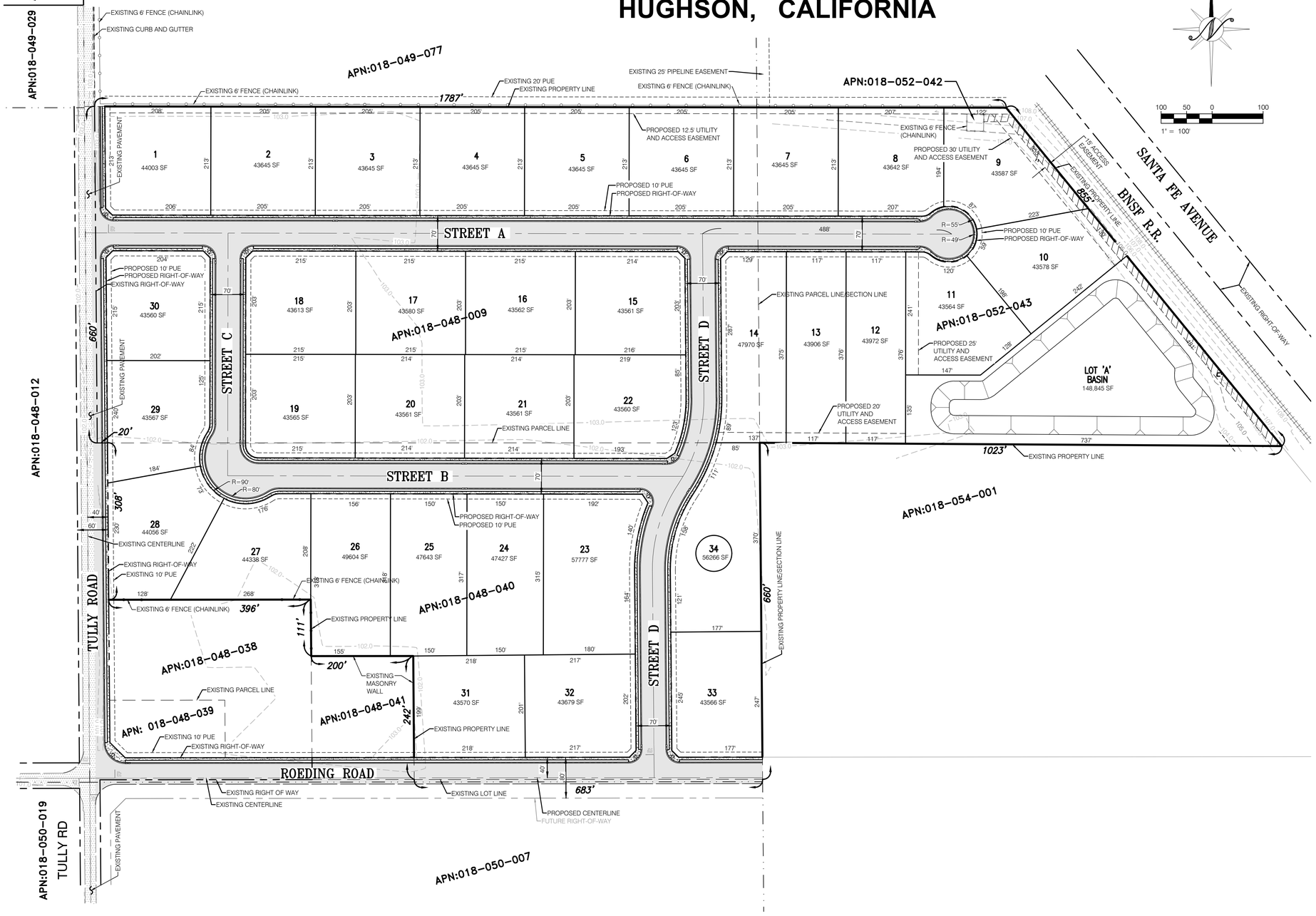
Project No. **12611837**
Revision No. **-**
Date **6/9/2023**

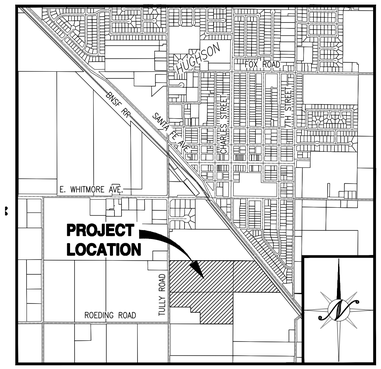
Vicinity Map

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Data source: World Topographic Map - labelless: Merced County Association of Gov, California State Parks, Esri, HERE, Garmin, FAO, NOAA, USGS, Bureau of Land Management, EPA, NPS; World Imagery: Maxar; World Hillshade: Esri, CGIAR, USGS; Streets, City Limits: Stanislaus County Open Data, 2023. Created by: ppeel

TULLY ROAD SUBDIVISION
VESTING TENTATIVE SUBDIVISION MAP
HUGHSON, CALIFORNIA





VICINITY MAP

SHEET INDEX

1.	TM-1	TENTATIVE SUBDIVISION MAP
2.	TM-2	TENTATIVE SUBDIVISION MAP UTILITIES AND DETAILS

PROJECT INFORMATION

A. REGULATORY AGENCY:	CITY OF HUGHSON 7018 PINE STREET HUGHSON, CA 95326 T: (209) 883-4055 CONTACT: RACHEL WYSE, COMMUNITY DEVELOPMENT DIRECTOR
B. APPLICANT:	ALPINE PACIFIC NUT CO., INC. 6413 E. KEYES ROAD HUGHSON, CA 95326 T: (209) 667-8688 CONTACT: CATHERINE MUNDT, PARTNER
C. ENGINEER:	NORTHSTAR ENGINEERING GROUP, INC 620 12th STREET MODESTO CA, 95354 T: (209) 524-3525 CONTACT: NATHAN BRAY
D. ASSESSOR'S PARCEL NUMBER:	018-048-040, 018-048-009, 018-052-043
E. EXISTING LAND USE:	AGRICULTURE
F. PROPOSED LAND USE:	INDUSTRIAL
G. EXISTING ZONING/GP:	INDUSTRIAL / INDUSTRIAL
H. PROPOSED ZONING/GP:	INDUSTRIAL / INDUSTRIAL
I. TOTAL PROJECT SIZE:	46.44± ACRES
J. NET ACREAGE:	45.15± ACRES
K. TOTAL NUMBER OF LOTS:	34 + BASIN LOT
L. NET DENSITY:	0.78 UNITS/AC
M. TYPICAL LOT SIZE:	VARIES - 1 ACRE MINIMUM
N. MAXIMUM FOOTPRINT COVERAGE:	60%
O. PARKING:	AS REQUIRED PER MUNICIPAL CODE FOR THE USE.
P. CONTOURS:	1.0-FOOT INTERVALS
Q. UTILITIES:	WATER SYSTEM - CITY OF HUGHSON SANITARY SEWER - CITY OF HUGHSON STORM DRAINAGE - PRIVATE RETENTION SYSTEM GAS - PG&E ELECTRIC - TID TELEPHONE - AT&T SCHOOL DISTRICT - HUGHSON UNIFIED SCHOOL DISTRICT

GENERAL NOTES

1. ALL IMPROVEMENTS SHALL BE CONSTRUCTED AS PER THE CITY OF HUGHSON IMPROVEMENT STANDARDS AND SPECIFICATIONS EXCEPT AS NOTED.
2. STORM DRAINAGE TO BE CONVEYED TO AN ON-SITE STORM DRAIN RETENTION BASIN. ALL IMPROVEMENTS TO BE CONSTRUCTED TO THE CITY OF HUGHSON STANDARDS AND SPECIFICATIONS.
3. ALL STORM DRAINAGE IMPROVEMENTS AS PART OF FUTURE IMPROVEMENTS PLANS AND STUDIES SHALL CONFORM TO THE REQUIREMENTS SET FORTH IN NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT 2013-0001-DWQ AND THE MULTI-AGENCY POST-CONSTRUCTION STORMWATER STANDARDS MANUAL APPROVED OR ADOPTED PRIOR TO THE TIME OF THIS TENTATIVE MAP APPLICATION BEING DEEMED COMPLETE.
4. SANITARY SEWER TO BE CONSTRUCTED TO THE CITY OF HUGHSON STANDARDS AND SPECIFICATIONS.
5. WATER SYSTEM TO BE CONSTRUCTED TO THE CITY OF HUGHSON STANDARDS AND SPECIFICATIONS.
6. STREET LIGHTING SHALL BE INSTALLED PER THE CITY OF HUGHSON STANDARD SPECIFICATIONS.
7. PUBLIC UTILITIES ARE TO BE INSTALLED UNDERGROUND IN EASEMENTS AND PUBLIC RIGHTS-OF-WAY.
8. THE SUBDIVIDER HEREBY RESERVES THE RIGHT TO FILE 'MULTIPLE SUBDIVISION MAPS' AS SET FORTH BY THE SUBDIVISION MAP ACT, ARTICLE 4, SECTION 66456.1., AND FILE PARCEL MAPS FOR REASON OF SALE. ALL PARCEL LINES SHALL CONFORM TO THIS TENTATIVE MAP.
9. PUBLIC UTILITY EASEMENTS WILL BE PROVIDED ALONG ALL STREET IN-TRACT FRONTAGES.
10. ALL EXISTING STRUCTURES AND TREES WITHIN THE PROJECT BOUNDARY ARE TO BE REMOVED UNLESS OTHERWISE NOTED.
11. ALL LOT SETBACK REQUIREMENTS AND LOT SIZES ARE TO BE IN ACCORDANCE WITH THE CITY OF HUGHSON ZONING CODE TABLE 17.02.012.1 (INDUSTRIAL ZONE).

LEGAL DESCRIPTION

THE LAND DESCRIBED HEREIN IS SITUATED IN THE STATE OF CALIFORNIA, COUNTY OF STANISLAUS, CITY OF HUGHSON AND DESCRIBED AS FOLLOWS: ASSESSORS MAP PARCELS 018-048-009, 018-052-043, 018-048-040, 46.44 ACRES ±

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CALL BEFORE YOU DIG 811 800-227-2600

REGISTERED PROFESSIONAL ENGINEER NATHAN D. BRAY No. 87431 PRELIMINARY NOT FOR CONSTRUCTION STATE OF CALIFORNIA

NO.	REVISIONS DESCRIPTIONS	DATE	APPROVED

VESTING TENTATIVE SUBDIVISION MAP
TULLY ROAD SUBDIVISION
HUGHSON, CALIFORNIA

NorthStar Engineering Group, Inc.
• CIVIL ENGINEERING • SURVEYING • PLANNING •
620 12th Street Modesto, CA 95354
(209) 524-3525 Phone (209) 524-3526 Fax

JOB #:	22-3166
DATE:	07/07/2023
SCALE:	AS SHOWN
DRAWN:	TG
DESIGN:	TG
CHK'D:	NB

SHEET NUMBER

TM-1

PLOTTED: 07/25/2023 11:17 PLOTTED BY: Cindy
DWGNAME: F:\22-3166 Tully Road Subdivision\Planning\TM-TM-1.dwg

- Existing Conditions
- Existing plus Project Conditions
- Near-Term Year 2026 (No Project) Conditions
- Near-Term Year 2026 plus Project Conditions
- Cumulative Year 2043 (No Project) Conditions
- Cumulative Year 2043 plus Project Conditions

Existing Conditions (Year 2023) quantify the current traffic operations at project study intersections;

Existing Plus Project Conditions refers to the analysis scenario in which traffic impacts associated with the proposed project are investigated in comparison to the Existing Conditions scenario. Within this scenario, the project generated peak hour traffic volumes have been added to the Existing Conditions volumes to obtain the Existing Plus Project volumes.

Near-Term (Year 2026) No-Project Conditions refer to a short period (2-3 years) that would typically reflect the conditions when project development is under construction (if approved). The scenario includes any approved/pending projects and/or background regional growth rate based on StanCOG model projections but excludes the development of the proposed project.

Near-Term (Year 2026) Plus Project Conditions refers to the analysis scenario in which traffic impacts associated with the proposed project are investigated in comparison to the Near-Term (Year 2026) No Project Conditions scenario. Within this scenario, the project generated peak hour traffic volumes have been added to the Near-Term Year 2026 (No Project) volumes to obtain the Near-Term Year 2026 Plus Project volumes.

Cumulative Year 2043 Conditions refer to the analysis scenario that would exist following approximately twenty years of development in the Hughson area as well as regional growth but excludes the development of the proposed project.

Cumulative Year 2043 Plus Project Conditions is the analysis scenario in which traffic impacts associated with the proposed project are investigated in comparison to the Year 2043 Conditions scenario. Within this scenario, the project generated peak hour traffic volumes that have been added to the Year 2043 Conditions volumes to obtain the Year 2043 Plus Project volumes.

The above traffic scenarios are described in further detail and evaluated in subsequent sections of this report.

1.1 Purpose and Need

The purpose of this development is to provide additional and expanded Industrial Park opportunities (light industrial & R&D) in the City of Hughson and Stanislaus County. The proposed project is consistent with the County of Stanislaus General Plan land use and regional transportation model zoned for Industrial Uses. The proposed project site is located along Tully Road south of E. Whitmore Avenue and east of Roeding Road and compliments existing light-industrial and commercial uses located just north of the site.

1.2 Assumptions

A technical memorandum (referred to as the Memorandum of Assumptions (MOA), was prepared to initiate the transportation impact analysis and serve as technical documentation to obtain concurrence from the City of Hughson and Stanislaus County on the technical data and information contained herein. Please note, the City of Hughson has reviewed and approved the proposed transportation scope-of-work for the development based on recent coordination through J.B. Anderson Land Use Planning and NorthStar Engineering (Mark Niskanen, J.B. Anderson Land Use

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Planning, May 18, 2023) The data and assumptions in the MOA was used in the preparation of administrative draft TIAR and VMT analysis as follows:[1]

- Technical analysis parameters and methodologies
- Vehicle Miles Traveled (VMT)
- Level-of-Service (LOS) methodologies
- Study locations, data collection, existing conditions
- Project description, site plan, and site access
- Project trip generation and distribution
- Near-Term and Cumulative (No Project) methodology (3 & 20-Year StanCOG forecasts)
- Impact Determination and Mitigation Measures

The Tully Road Subdivision Transportation MOA is available (*upon request*).

2. Technical Analysis Parameters & Methodologies

2.1 Senate Bill (SB) 743

Senate Bill (SB) 743 was signed into law in 2013, with the intent to better align CEQA practices with statewide sustainability goals related to efficient land use, greater multimodal choices, and greenhouse gas reductions. The provisions of SB 743 became effective Statewide on July 1, 2020.

Under SB 743, automobile delay, traditionally measured as level of service (LOS), are no longer considered an environmental impact under CEQA. Instead, impacts are determined by changes to VMT. VMT measures the number and length of vehicle trips made on a daily basis. VMT is a useful indicator of overall land use and transportation efficiency, where the most efficient system is one that minimizes VMT by encouraging shorter vehicle trip lengths, more walking and biking, or increased carpooling and transit. In recognition that the character of communities, availability of travel modes options and geographic areas all differ throughout the State, each jurisdiction, from regional agency, to County, to City, have been given the opportunity to establish their own VMT thresholds consistent with the State's guidelines and regulatory framework. Still, LOS will be utilized as a metric outside of CEQA, within agency policies for development approval. The following section outlines the analysis parameters and methodologies that will be used in the transportation impact study to quantify potential project impacts for the analysis scenarios.

The following section outlines the analysis parameters and methodologies that will be used in the transportation impact study to quantify the measures of effectiveness for the analysis scenarios.

impact study to quantify the measures of effectiveness for the analysis scenarios.

2.1.1 Vehicle Miles Traveled (VMT)

Caltrans recently published an update for their Transportation Impact Study Guidelines (TISG, May 20, 2020). The Caltrans' TISG is intended for use in preparing a transportation impact analysis of land use projects or plans they may impact of affect the State Highway System and replaces the prior 2002 Guidelines. The TISG heavily references OPR's Technical Advisory as a basis for its guidance. The TISG recommends use of OPR's recommended thresholds

[1] GHD Inc., Tully Road Subdivision Industrial Park Project, Hughson CA, Memorandum of Assumptions, Transportation, Technical Memorandum to Rob Marler, City Engineer, Hughson CA, June 20, 2023

for land use projects (15% below existing city or regional VMT per capita or per employee). As each lead agency develops and adopts its own VMT thresholds for land use projects, Caltrans will review them for consistency with OPR's recommendations, and with the state's greenhouse gas emissions reduction targets and California Air Resources Board Scoping Plan. Caltrans identifies possible mitigation framework for projects found to have a potentially significant impact on VMT. These include the following programmatic measures:

- Impact fee programs that contain a demonstrated nexus and proportionality between a fee and capital projects that result in VMT reduction;
- VMT mitigation bank programs; and,
- VMT mitigation exchange programs.

Caltrans also indicates that additional future guidance will include the basis for requesting transportation impact analysis that is not based on VMT, but rather a simplified safety analysis approach that reduces risk to all road users and focuses on multimodal analysis as well as access management issues.

Understanding Caltrans requirements for VMT, GHD will provide professional engineering services to analyze the transportation impacts of the Project in terms of vehicle-miles travelled (VMT) to fulfill the requirements of SB-743 and to provide inputs to the air and noise analysis.

For industrial uses, GHD will focus exclusively on commute trips by workers at the site, since SB-743 limits the VMT analysis to light-duty vehicles (i.e., it excludes truck VMT). GHD will use Big Data from the United States Census Bureau to compare the average commute distance for the Census tract or block group that the Project is located to the average commute distance for Stanislaus County as a whole. GHD will then describe why the county average is the correct comparison for CEQA analysis and describe an appropriate VMT threshold based on the county average and guidance from the California Air Resources Board (CARB). GHD will use this threshold to determine whether the Project will have significant VMT impacts and document this analysis.

2.2 Level of Service Methodologies

In an effort to maintain consistency with the County of Stanislaus and City of Hughson policies for transportation facilities (Hughson GP, Transportation, 2005), the following level of service methodologies for intersections will be used to determine if the project causes an increase in traffic that is substantial and adverse in relation to the traffic load and capacity of the existing street system. Level of Service is a qualitative measure of traffic operating conditions, whereby a letter grade "A" through "F" is assigned to an intersection, or roadway segment, representing progressively worsening traffic conditions. LOS "A" represents free-flow operating conditions and LOS "F" represents over-capacity conditions. Levels of Service will be calculated for all intersection control types using the methods documented in the Transportation Research Board Publication Highway Capacity Manual, Sixth Edition, A Guide for Multimodal Mobility Analysis, 2016 (HCM 6).

2.2.1 Intersection Operations

The Synchro 11.0 (Trafficware) software program will be used to implement the HCM 6 analysis methodologies for signalized and stop-controlled intersections. Synchro 11.0 takes into account intersection signal timing and queuing constraints when calculating delay and the corresponding LOS. Intersection Level of Service (LOS) will be calculated for all control types using the methods documented in HCM 6. For signalized or all-way stop-controlled (AWSC) intersections, an LOS determination is based on the calculated averaged delay for all approaches and movements. For two-way or side-street stop controlled (TWSC) intersections, an LOS determination is based upon the calculated average delay for all movements of the worst performing approach. The vehicular-based LOS criteria for different types of intersection controls are presented in **Table 2.1**

Vehicles queue lengths at project driveways and intersection turn pockets will be evaluated using microsimulation. *Simtraffic* traffic simulation software was used in capturing real world queuing conditions. An average of five (5) microsimulation runs were used in capturing 95th percentile queue.

Table 2.1 Level of Service (LOS) Criteria for Intersections

Level of Service	Type of Flow	Delay	Maneuverability	Stopped Delay/Vehicle	
				Signalized	Un-signalized
A	Stable Flow	Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all.	Turning movements are easily made, and nearly all drivers find freedom of operation.	≤10.0	≤10.0
B	Stable Flow	Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	>10.0 and ≤20.0	>10.0 and ≤15.0
C	Stable Flow	Higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted	>20.0 and ≤35.0	>15.0 and ≤25.0
D	Approaching Unstable Flow	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	Maneuverability is severely limited during short periods due to temporary back-ups.	>35.0 and ≤55.0	>25.0 and ≤35.0
E	Unstable Flow	Generally considered to be the limit of acceptable delay. Indicative of poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	There are typically long queues of vehicles waiting upstream of the intersection.	>55.0 and ≤80.0	>35.0 and ≤50.0
F	Forced Flow	Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors.	Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	>80.0	>50.0

Source: *Highway Capacity Manual Sixth Edition, A Guide for Multimodal Mobility Analysis*, 2016 (HCM 6)

To determine whether “significance” should be associated with unsignalized intersection operations, a supplemental traffic signal “warrant” analysis will also be completed. The term “signal warrants” refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or ascertain the need for installation of a traffic signal at an otherwise unsignalized intersection. This study will employ the signal warrant criteria presented in the latest edition of California’s Manual on Uniform Traffic Control Devices (CA MUTCD) for specific study intersections impacted by proposed project traffic. The signal warrant criteria are based upon several factors including volume of vehicular and pedestrian traffic, frequency of accidents, location of school areas etc. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. The ultimate decision to signalize an intersection should be determined after careful analysis of all intersection and area characteristics.

This traffic operations analysis will specifically utilize the Peak-Hour-Volume based Warrant 3 as one representative type of traffic signal warrant analysis. Warrant 3 provides the option to use the lower threshold criteria (CA MUTCD

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Figure 4C-4) if the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000. In addition Warrant 3 (Peak Hour Volume), Warrant 9 (Intersection Near Grade Crossing) has specifically been used for the East Whitmore Avenue/Santa Fe Avenue intersection. Warrant 9 thresholds are based on proximity to railroad tracks and intersection approach volumes.

Roadway Segment Levels of Service

Two-lane roadway segments will be analyzed using methodologies based on the daily volume thresholds consistent with City of Hughson General Plan Transportation Element. Specifically, Level-of-Service (LOS) thresholds for both collector and arterial streets and lane capacity have been established consistent with the Stanislaus County Congestion Management Plan. The LOS criteria for two-lane highways are shown in **Table 2.2.**

Table 2.2 LOS Threshold for Roadway Segments

Street Classification	Average Daily Traffic (ADT) – Total of Both Directions				
	Lanes	Control	C	D	E
Collector	2	undivided	7,700	11,600	12,900
Arterial	2	undivided	9,200	13,700	15,450
	4	divided	20,100	30,200	33,200

Source: kdAnderson, Stanislaus County Congestion Management Plan

2.2.2 Technical Analysis Parameters

This traffic study focuses on a "planning level" evaluation of traffic operating conditions, which is considered sufficient for CEQA/NEPA purposes. The planning level evaluation incorporates appropriate heavy vehicle adjustment factors, peak hour factors, and signal lost time factors and reports the resulting operational analysis as estimated using the HCM 6 based analysis methodologies. Assessments of some "design level" parameters (including queuing on intersection lane groups, stacking length requirements, etc.) have also been included in this study.

Table 2.3 presents the technical parameters that will be utilized for the evaluation of the study intersection for the analysis scenarios. All parameters not listed should be assumed as default values or calculated based on parameters listed. It is noted that the study intersection's AM and PM peak hours varied during the data collection process. For the AM peak hour, the peak hour typically occurred between 7:30-8:30 or 7:45-8:45 a.m. However, PM peak hours ranged from 4:00-5:00 to 4:45-5:45 p.m. Looking at the study locations, intersections located along Tully Road south of E. Whitmore Avenue tended to peak during the earlier time periods during the AM and PM peak hour. Study intersections along E. Whitmore Avenue peak during the later time periods. In all cases, the most conservative peak hour volumes were analyzed for operations and queuing.

Table 2.3 Transportation Technical Parameters

	Technical Parameter	Assumption
1	Intersection Peak Hour Factor	0.92 and/or field counts
2	Intersection Heavy Vehicle %	Based on counts, intersection overall, minimum 5%
3	Grades	3% or less, flat terrain

3. Development Guidelines/Level of Service Policies

3.1 Stanislaus County[2] (Excerpts from General Plan Circulation Element)

Level of Service

Level of service (LOS) is a standard measure of traffic service along a roadway or at an intersection. It ranges from A to F, with LOS A being best and LOS F being worst. In very general terms, LOS A, B and C indicate conditions where traffic can move relatively freely. LOS D describes conditions where delay is more noticeable and average travel speeds are more unstable. LOS E indicates significant delays and average travel speeds vary greatly and are unpredictable; traffic volumes are generally at or close to capacity. Finally, LOS F characterizes traffic flow at very slow speeds (stop-and-go) and significant delays with queuing at unsignalized intersections; in effect, traffic demand on the roadway exceeds the roadway's capacity. As a matter of policy, Stanislaus County strives to maintain LOS C or better on all roadways. When measuring levels of service, Stanislaus County uses the criteria established in the Highway Capacity Manual published and updated by the Transportation Research Board.

Traffic Analysis

To confirm the need for transportation improvements identified in the Circulation Element, a forecast of traffic volumes and Level of Service is prepared based upon the level of growth anticipated by the year 2030, the planning horizon for the General Plan. The forecast is based on the latest population, housing and employment projections prepared by StanCOG; the agency designated by the State to prepare these forecasts. These forecasts were adjusted to reflect additional growth anticipated by the cities or the County since the adoption of the StanCOG forecast.

Roadway Classifications

Major. The function of a Major road is to carry moderate- to high-volume traffic to and from collectors to other Majors, Expressways, and Freeways with a secondary function of land access. Majors located within areas zoned for heavy or light industrial or that are expected to carry large or heavy trucks shall be constructed to Industrial Major standards. Limited direct access is provided to abutting property. On-street parking will be permitted only where the Department of Public Works has determined that traffic flow and safety conditions allow on-street parking. The typical right-of-way is 110 feet (up to 6 lanes, ultimately). On limited rights-of-way, Majors may be 100 feet.

Santa Fe Avenue, within the communities of Empire and Denair, and within the City of Hughson, is planned to be an 85-foot Major measured from the railroad right-of-way.

Collector. Collectors serve a dual function by providing both access to abutting property and movement of moderate volumes of people and goods for medium length trips. Collectors serve as transition facilities, carrying traffic from lower to higher level roads. Most Collectors are two-lane roads with a typical right-of-way of 60 feet. On-street parking will be permitted only where the Department of Public Works has determined that traffic flow and safety conditions allow on-street parking. In urban residential subdivisions, roads not shown on the General Plan Circulation Diagram or as an Official Plan Line that will serve more than 50 dwelling units, when the maximum density and full extent of the development is considered, shall be deemed Collectors. In some instances, the Department of Public Works may determine that project design features dictate that a road serving as few as 20 urban dwelling units be deemed a Collector. Under certain circumstances, 80 feet of right of-way may be required to provide additional capacity to provide two additional through lanes to accommodate projected traffic demand, to facilitate the movement of large trucks, or to improve safety due to limited visibility or other safety hazards.

[2] Stanislaus County General Plan, Chapter 2, Circulation Element, 2015.

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Policy Two

Implementation Standards

The County shall maintain LOS C or better for all County roadways and intersections, except, within the sphere of influence of a city that has adopted a lower level of service standard, the City standard shall apply. The County may adopt either a higher or lower level of service standard for roadways and intersections within urban areas such as Community Plan areas, but in no case shall the adopted LOS fall below LOS D.

3.2 City of Hughson[3] (Excerpts from Hughson General Plan Transportation Element)

Roadway Classifications

Arterials. Hughson's arterial streets are the primary movers of traffic, providing the main routes within and through the city, and also carrying traffic to and from the regional highways and other communities. Santa Fe Avenue is an arterial that runs northwest-southeast through Hughson, parallel to the railroad. Santa Fe Avenue's alignment cuts across the orthogonal grid that characterizes Hughson's roadway system complicating circulation patterns since all roadway intersections with Santa Fe Avenue have a skewed configuration. Intersection improvements along Santa Fe Avenue are also limited due to the presence of the adjoining railroad and canals.

Other existing arterials follow a grid pattern. Geer Road runs north south along Hughson's eastern SOI boundary, ultimately connecting Hughson to Turlock to the south and Oakdale to the north. Hatch Road, Whitmore Avenue and Service Road are east-west arterials that connect Hughson to Ceres and SR-99.

Collectors. The backbone of the City's roadway system consists of its collector streets, which connect arterial streets to local streets. The collector street system is also oriented around a grid. Existing collector streets include Tully Road, Charles Street, 7th Street and Euclid Avenue, which run north-south, and Fox Road and Hughson Avenue that run east-west.

Level-of-Service Criteria

a. Roadway Level of Service Standards

The proposed 2005 General Plan would establish LOS D as the threshold below which roadways are considered to be operating unacceptably; however, the 2005 General Plan would also recognize that LOS D may not always be feasible in areas that are constrained by existing development.

b. Intersection Level of Service Standards

Like other roadway facilities, intersections are evaluated using a LOS system. For this EIR and for preparation of the 2005 General Plan, this evaluation is based on methodologies provided in the 2000 Highway Capacity Manual. At signalized intersections, the LOS rating is based on the weighted average control delay measured in seconds per vehicle.

To evaluate unsignalized intersections, the operations method of the 2000 Highway Capacity Manual was utilized. When the intersection is controlled with one or two-way stop signs this methodology determines the LOS based on delay for the worst approach. When the intersection is controlled with all-way stop signs, the delay is an average for all approaches. **As with roadway segments, this EIR uses LOS D as the acceptable operating threshold for both signalized and unsignalized intersections**.

As noted in Section 2.1 (VMT Analysis), while LOS policies may apply to the findings of consistency for the proposed project, LOS may not be used to determine a significant transportation impact under CEQA. However, as noted previously, the City and County's transportation policies do include related LOS thresholds for roadways and

[3] Design, Community, Environment (DCE), Hughson 2005 General Plan EIR, Transportation, June 30, 2005

intersections. ***For the purpose of this analysis (when evaluating the operational characteristics of intersections and roadways), a target LOS of D will be the threshold***.

To determine whether "significance" should be associated with unsignalized intersection operations, a supplemental traffic signal "warrant" analysis has also been completed and is included in Appendix **C: Peak Hour Signal Warrant Output**. The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or ascertain the need for installation of a traffic signal at an otherwise unsignalized intersection. This study has employed the signal warrant criteria in the 2014 California Manual on Uniform Traffic Control Devices (CA MUTCD) for all study intersections. The signal warrant criteria are based upon several factors including volume of vehicular and pedestrian traffic, frequency of accidents, location of school, etc. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. The ultimate decision to signalize an intersection should be determined after careful analysis of all intersection and area characteristics.

This traffic study will specifically utilize the Peak-Hour-Volume based Warrant 3 as one representative type of traffic signal warrant analysis. Since Warrant 3 provides specialized warrant criteria for intersections with rural characteristics (e.g. located in communities with populations less than 10,000 persons or with adjacent major streets operating above 40 mph), the study intersection will be evaluated with this specialized criteria.

4. Setting

4.1 Preface

The following sections describe the roadway network, study intersections, data collection, multi-modal pedestrian/transit facilities, railroad activity, Collision History, and existing intersection LOS, delay, and vehicle queuing.

4.1.1 Study Area Roadway Network

The following provides a description of the primary highway and roadways within the study area:

Tully Road extends in a north-south direction primarily between E. Hatch Road and E. Keys Road and would provide direct access to the proposed project site. In the immediate vicinity of the project site, Tully Road extends between E. Whitmore Avenue through Roeding Road to Service Road. In this area, Tully Road is a two-lane facility with unimproved shoulders serving agricultural uses and more improved areas (curb and gutter) as it approaches commercial/light industrial areas south of E. Whitmore Avenue. The posted speed limit on Tully Road is 40 mph in the project study area.

East Whitmore Avenue extends in an east-west direction approximately one-half mile north of the proposed project site. A major arterial street, E. Whitmore Avenue provides access to downtown Hughson as well as agricultural areas both east and west of the City. A two-lane facility, E. Whitmore Avenue widens to two travel lanes and a two-way-left-turn lane immediately east of Tully Road for approximately 450-feet before transitioning back to two-travel lane as it extends across the existing railroad tracks to Santa Fe Avenue. As with Service Avenue, E. Whitmore Avenue is a regional route that provides access west to Smyrna and State Route 99 and east to more agricultural areas and Montpeller Road. In the project study area. The posted speed limit on E. Whitmore Avenue is 35 mph.

Santa Fe Avenue is located east of the project site and extends in a northwest-southeast direction paralleling the railroads tracks on the east side. A major arterial and regional route, Sante Fe Avenue provides access along the west side of downtown Hughson as well as regionally to Modesto (north) and Merced (south). In the project study area, Santa Fe Avenue is a two-lane arterial street with striped shoulders. The posted speed limit on Santa Fe Avenue is 45 mph.

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Service Road extends in an east-west direction approximately one-half mile south of the proposed project site. Similar to E. Whitmore Avenue, Service Road is a two-lane facility that provides access west to Smyrna and State Route 99 and east to Downie Road. Service Road primarily serves primarily agricultural and residential areas and has a posted speed limit of 55 mph.

Roeding Road extends in an east-west direction between 6th Street (in Smyrna) and Tully Road and would provide direct access to the proposed project site. In the project study area, Roeding Road is an unimproved, two-lane road that provides access to agricultural and residential areas.

4.1.2 Study Intersections & Roadway Segments

Four primary intersections and one future intersection adjacent to and providing access to the project site were selected for evaluation in coordination with the City of Hughson staff for the weekday AM and PM peak hour conditions. The study intersections for the project are listed below:

1. E. Whitmore Avenue / Tully Road
2. Tully Road / Street A (future)
3. Tully Road / Roeding Road
4. Tully Road / Service Road
5. E. Whitmore Avenue/Santa Fe Avenue

In addition to key intersection analyses, the following roadway segments were evaluated for volume capacities adjacent to the proposed project site:

- Tully Road between Roeding Road and E. Whitmore Avenue
- Tully Road between Roeding Road and Service Road
- E. Whitmore Avenue between Tully Road and Santa Fe Avenue

4.1.3 Data Collection

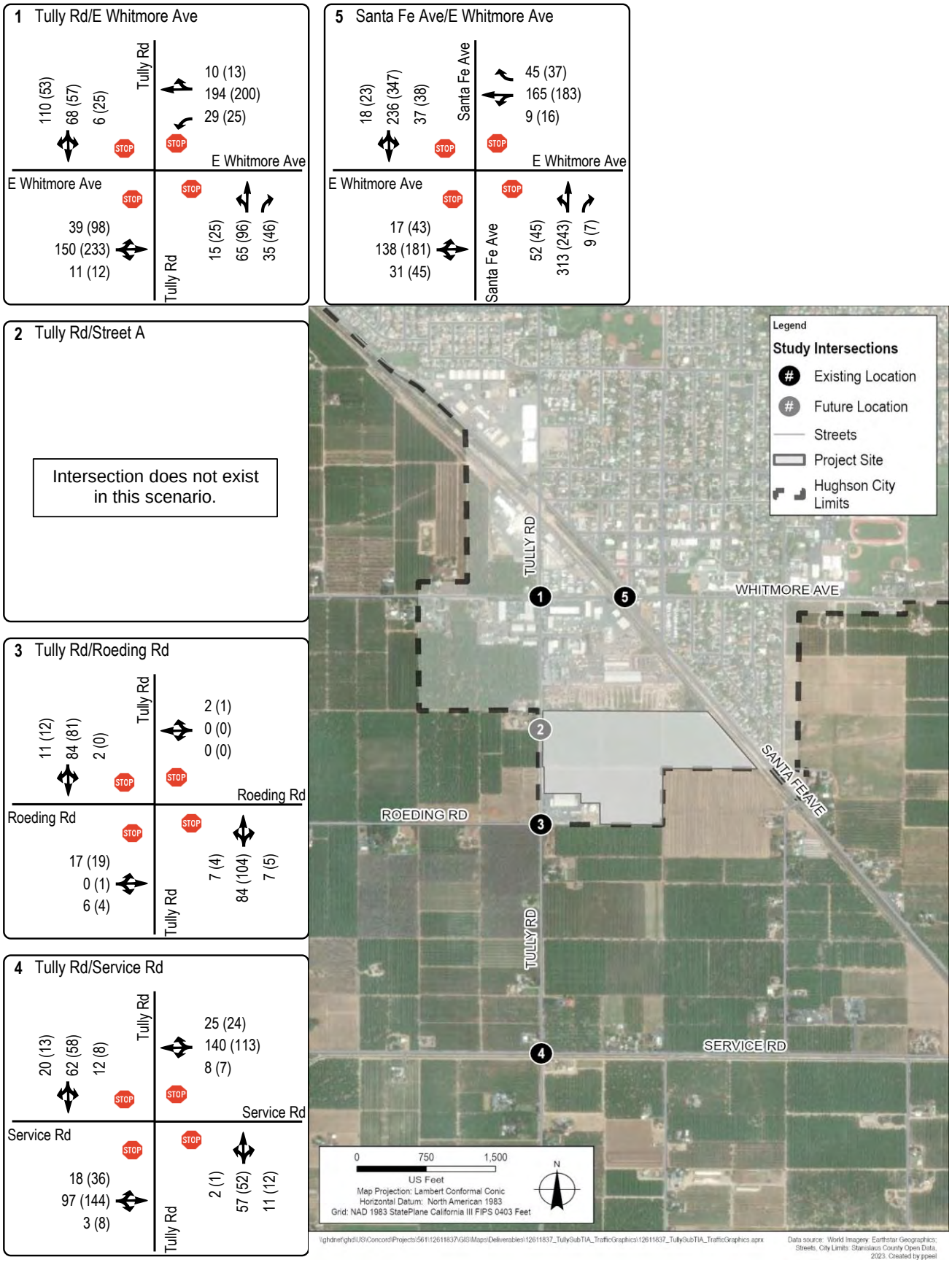
For the purposes of proposed project analysis, new intersection turning movement counts for the four existing intersections were collected on Tuesday May 16, 2023 during the weekday AM peak and PM peak periods based on City direction. The traffic data collection was conducted to capture peak commute traffic when schools were in session during the weekday conditions. The AM peak hour is defined as the one continuous hour of peak traffic flow counted between 7:00 AM and 9:00 AM, and the PM peak hour is defined as the one continuous hour of peak traffic flow counted between 4:00 PM and 6:00 PM under typical weekday conditions (see Turning Movement Count Data—**Appendix A).**

Figure 4.1 presents the turning movement volumes and lane geometry/control at the study intersections under Existing Conditions, based on the turning movement counts discussed above.

All project study intersections on Tully Road, Service Road, E. Whitmore Avenue, and Santa Fe Avenue are all-way-stop-controlled (AWSC). E. Whitmore Avenue, Santa Fe Avenue, Service Road are classified as arterial roadways in the City's Transportation element. Tully Road is classified as a collector street. All roadways have two travel lanes. The intersection of E. Whitmore Avenue/Santa Fe Avenue is slightly skewed, with Santa Fe Avenue paralleling the railroad on the east side of the tracks extending in a northwest-southeast direction.

Field observations indicate that the Tully Road and Santa Fe Avenue study intersections at E. Whitmore Avenue can experience vehicle queuing during peak hour operations. Vehicle queuing is related to somewhat higher east-west traffic volumes, all-way-stop-control, and train activity along the BNSF and AmTrak tracks immediately west of the intersection.

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Legend

XX (YY) AM (PM) Peak Hour Volumes

Turn Lane | Stop Sign

Traffic Signal | Roundabout

GHD

Altine Pacific Nut Company, Inc.
Tully Road Subdivision TIAR

Existing Conditions
Peak Hour Traffic Volumes,
Lane Geometries & Traffic Control

Project No. **12611837**
Report No. **001**
Date **9/1/23**

FIGURE 4.1

4.1.4 Multimodal Bicycle/Pedestrian/Transit Facilities

The City of Hughson's General Plan defines bicycle facilities consistent with Caltrans classifications associated with Class 1 (Multimodal Off-Street Path), Class II (Bike Lane), and Class III (Bike Route) facilities. Bicycle facilities in the project study area are few due to the primarily rural nature of roadways, agriculture uses, and lack of roadway frontage improvements. Where more recent development has occurred, frontage improvements along Tully Road and E. Whitmore Avenue have provided sidewalks and limited striped shoulder lanes. However, these striped lanes are not designated as Class II bike facilities. In addition, commercial and industrial development along Tully Road and E. Whitmore Avenue is discontinuous and not linked. The City's General Plan indicates that bicycle facilities have not been prioritized due to relatively low traffic volumes on surface streets. However, surveyed traffic volumes on Tully Road, E. Whitmore Avenue, and Santa Fe Avenue would be considered moderate during peak commute periods and where newer developments have occurred, improvements have been installed (curb, gutter, and sidewalks).

Transit for the Hughson area is provided by the Stanislaus Regional Transit Authority (StanRTA). Bus service is provided by Route 61 between Modesto, Ceres, and Hughson with headways every hour operating between 6:45 a.m. and 7:55 p.m. In the Hughson area, Route 61 access E. Whitmore Avenue extending east past Tully Road and Santa Fe Avenue to Charles Street. In the project study area, a bus stop is located on the north side of E. Whitmore Avenue just east of Tully Road. Route 61 extends east on E. Whitmore Avenue through Santa Fe Avenue to Charles Street before turning onto Hughson Avenue east to 7th Street. The route then circles around Hughson High School on 7th Street, Fox Road, Euclid Avenue, and Whitmore Avenue before extending west via the same roadways. Bus stops are located on 7th Street, Fox Street, and Euclid Avenue Saturday and Sunday schedules typically are reduced between 8:00 a.m. and 7:00 p.m. with one-hour headways.

4.1.5 Railroad Activity

As noted, existing railroad track(s) extend in a northwest-southeast direction east of the proposed project site and parallel Santa Fe Avenue on the west side of the roadway. The railroad tracks accommodate both passenger rail (Amtrak) service and freight (BNSF) service. An at-grade rail crossing is located approximately 75-feet west of Santa Fe Avenue on East Whitmore Avenue. The at-grade crossing has automated crossing gates with flashing warning lights to alert east-west motorists when trains are approaching. Based on the California Rail Network information website, the BNSF freight operations are based out of Stockton. Amtrak operations serve the San Joaquin Valley network. Freight operations are continuous 24-hour with Amtrak operating multiple passenger trains between the Turlock-Denair platform and Modesto daily with four trains southbound and four trains northbound.

4.1.6 Collision Analysis

A collision analysis was conducted for the study area to determine any trends or patterns that may indicate a safety issue at adjacent intersections and roadways in the study area. Collision rates are calculated based on records provided by the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five (5) year period from January 1, 2018 through December 31, 2022 was analyzed.

As presented in **Table 4.1**, three of the four primary intersections are experiencing collision rates below the State average for similar facilities. However, the Santa Fe Avenue/E. Whitmore Avenue intersection has experienced 10 collisions over the past five years with a collision rate approximately twice the State average (0.45 compared to 0.21). The majority of the collisions involved "rear-end" (2) and "broadside" (6). Broadside collisions typically occur when vehicles do not yield the right of way or violate the stop signs. There were no pedestrian/bicycle collisions.

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Table 4.1 Study Intersection Collision Analysis

Intersection ID	Intersection	By Severity					By Type							By Year					Bicycle Involved Collisions	Pedestrian Involved Collisions	Total Collisions (2017-2021)	24-Hr Entering Volume	Collision Rate (Per Million Entering Vehicles)	CA Average Collision Rate (Per Million Entering Vehicles)
		Fatal	Severe Injury	Injury (Other Visible)	Injury (Complaint of Pain)	Property Damage Only	Head-On	Sideswipe	Rear End	Broadside	Hit Object	Vehicle/Pedestrian	Other	2018	2019	2020	2021	2022						
1	Tully Rd / E. Whitmore Ave	0	0	0	1	4	1	1	0	3	0	0	0	4	0	0	0	1	0	0	5	9010	**0.30**	0.59
3	Tully Rd / Roeding Rd	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	2310	**0.24**	0.59
4	Tully Rd / Service Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4760	**0.00**	0.59
5	Santa Fe / E. Whitmore Ave	0	0	0	4	6	0	1	2	6	1	0	0	3	1	0	3	3	0	0	10	12080	**0.45**	0.21

4.1.7 Existing Intersection Operation

LOS Summary Table 4.2 for all "No Project" Conditions summarizes the intersection performance during the AM and PM peak hour at Existing Conditions.

As presented in **Table 4.2**, all unsignalized all-way-stop-controlled study intersections are operating at acceptable conditions (LOS D or better) during the AM and PM peak hour with the exception of the Santa Fe Avenue/East Whitmore Avenue location. During the PM peak hour, the intersection is operating at LOS E (43.6 seconds of delay). The Santa Fe Avenue/E. Whitmore Avenue intersection experiences fairly high north-south through volumes on Santa Fe Avenue (600+ vehicles) during this time period and has single-lane approaches that contribute to overall vehicle delays (see Synchro LOS Reports---**Appendix B**)

Table 4.2 LOS Summary Table: AM & PM Peak Hour Intersection Level-of-Service

ID	Intersection	Target LOS	Peak Hour	Existing			Near Term			Cumulative		
				Control	Delay	LOS	Control	Delay	LOS	Control	Delay	LOS
1	Tully Road & East Whitmore Avenue	D	AM	AWSC	11.4	B	AWSC	11.9	B	AWSC	16.1	C
			PM		14.2	B		15.1	C		27.1	D
2	Tully Road & Street A (Future)	D	AM	This intersection does not exist in this scenario.			This intersection does not exist in this scenario.			This intersection does not exist in this scenario.		
			PM									
3	Tully Road & Roeding Road	D	AM	AWSC	7.7	A	AWSC	7.8	A	AWSC	8.3	A
			PM		7.7	A		7.8	A		8.3	A
4	Tully Road & Service Road	D	AM	AWSC	8.6	A	AWSC	8.8	A	AWSC	10.2	B
			PM		8.8	A		9.1	A		11.1	B
5	Santa Fe Avenue & East Whitmore Avenue	D	AM	AWSC	23.6	C	AWSC	27.7	D	AWSC	**57.5**	**F**
			PM		**43.6**	**E**		**50.6**	**F**		**112.2**	**F**

Note: **Bold** text indicates target level of service (LOS) is exceeded.

1 AWSC = All-Way-Stop-Control

2 Based on Synchro-Simtraffic (Version 11.0), Highway Capacity Manual (HCM 6), Operations,Unsignalized Intersections, 2019.

Based on the peak hour signal warrant (Warrant 3) and/or intersections near grade crossing (Warrant 9), the E. Whitmore Avenue/Santa Fe Avenue intersection *would qualify* for signalization under Warrant 9 criteria under Existing (No Project) Conditions. Coordination with at-grade crossing gates on E. Whitmore Avenue would be required should a signal be installed at this location. All remaining study intersections would not qualify for signalization due to not meeting minimum volume criteria (see Signal Warrant Worksheets—**Appendix C**).

In addition to intersection LOS and delay, vehicle queuing at each study intersection was evaluated. For vehicle queuing analyses, the Synchro Suite microsimulation component, Sim Traffic, was used in capturing real world queuing conditions. An average of 5 microsimulations runs were used in capturing the 95th percentile queue (see Vehicle Queuing Reports---**Appendix D**).

As shown in Table 4.3, the 95th percentile queues are displayed for existing conditions and rounded to the nearest 5' increment. The all-way-stop-controlled (AWSC) intersection of Santa Fe Avenue/Tully Road currently exceeds the storage capacity for the eastbound left/through/right-turn movement on E. Whitmore Avenue by approximately two vehicles (assuming 25-feet per vehicle). All remaining study intersections have adequate storage capacity with existing traffic volumes.

Table 4.3 Existing Conditions Vehicle Queues

Int. #	Intersection/Approach	Control Type	Existing No Project 95th Percentile Queue (ft)		Available Storage
			AM Peak Hour	PM Peak Hour	
1	***Tully Road & East Whitmore Avenue***				
	Eastbound Left/Thru/Right	AWSC	90	115	2500
	Westbound Left		40	35	85
	Westbound Thru/Right		60	55	705
	Northbound Left/Thru		45	60	370
	Northbound Right		45	45	65
	Southbound Left/Thru/Right		70	65	295
3	***Tully Road & Roeding Road***				
	Eastbound Left/Thru/Right	AWSC	35	40	2600
	Westbound Left/Thru/Right		15	10	1030
	Northbound Left/Thru/Right		50	55	2600
	Southbound Left/Thru/Right		50	50	1150
4	***Tully Road & Service Road***				
	Eastbound Left/Thru/Right	AWSC	60	55	2560
	Westbound Left/Thru/Right		60	60	1295
	Northbound Left/Thru/Right		50	50	5245
	Southbound Left/Thru/Right		55	50	2600
5	***Santa Fe Avenue & East Whitmore Avenue***				
	Eastbound Left/Thru/Right	AWSC	70	**110**	70
	Westbound Left/Thru		85	95	330
	Westbound Right		45	55	125
	Northbound Left/Thru		135	120	570
	Northbound Right		25	30	50
	Southbound Left/Thru/Right		105	180	310

Note: **Bold** text indicates queues that exceed available storage

4.1.8 Roadway Segment LOS

The two-lane roadway segments of Tully Road north and south of Roeding Road and E. Whitmore Avenue between Tully Road and Santa Fe Avenue are operating at acceptable conditions based on current average daily traffic (ADT) volumes. Using daily volume thresholds consistent with City of Hughson General Plan Transportation Element, all three segments are operating at LOS C or better based on collector and arterial streets for two-lane capacity thresholds consistent with the Stanislaus County Congestion Management Plan shown in **Table 4.4.**

Table 4.4 Existing Average Daily Traffic (ADT) Volumes & Level of Service

Classification/Location	Existing Average Daily Traffic (ADT) – Total of Both Directions				
	Lanes	Control	C	D	E
Collector Street	**2**	**undivided**	**7,700**	**11,600**	**12,900**
Tully Rd. s/o Roeding Rd.	2	Existing ADT	2,330		
Tully Rd. n/o Roeding Rd.	2	Existing ADT	3,130		
Arterial Street	**2**	**undivided**	**9,200**	**13,700**	**15,450**
E. Whitmore e/o Tull Rd.	2	Existing ADT	6,505		

Source: kdAnderson, Stanislaus County Congestion Management Plan

5. Near-Term (No Project) Conditions

5.1 Methodology

Based on a review of the transportation memorandum of assumptions (MOA) for the proposed Tully Road Subdivision project, no approved/pending projects were identified by City and/or County staff. Typically, short-term growth from approved/pending projects provide for a 2-3 year development window (Year 2026) to account for proposed project completion and/or infrastructure development for future industrial pads (should the project gain approval).In the absence of approved/pending projects in the Tully Road study area, traffic growth rates were developed using the StanCOG transportation model AM and PM peak hour base model year 2019 and horizon year 2046 (see **Section 6**: Cumulative Year 2043 No Project Conditions). Existing AM and PM peak hour intersection approach volumes were increased by 0.5-4% (dependent on intersection approach) per year for the three-year period to account for near-term (no project) conditions.

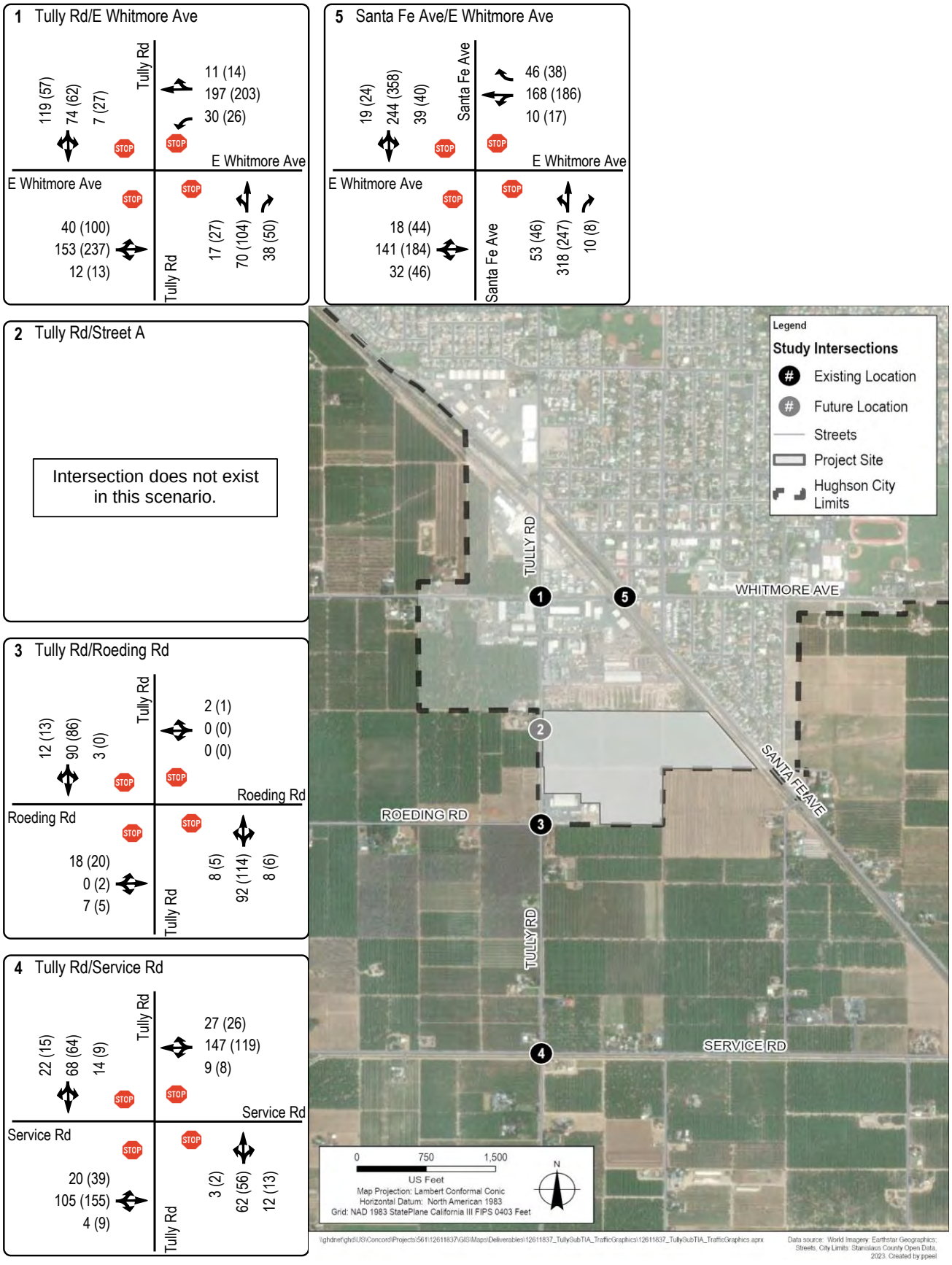
Figure 5.1 presents the turning movement volumes and lane geometry/control at the study intersections under Near-Term Year 2026 (No Project) Conditions.

5.1.1 Intersection Operation

LOS Summary Table 4.2 summarizes the intersection performance during the AM and PM peak hour for Near-Term Year 2026 (No Project) Conditions.

As presented in **LOS Summary Table 4.2**, all unsignalized all-way-stop-controlled study intersections are operating at acceptable conditions (LOS D or better) during the AM and PM peak hour with the exception of the Santa Fe Avenue/East Whitmore Avenue location. During the PM peak hour, the intersection is operating at LOS F (50.6 seconds of delay). As noted, the Santa Fe Avenue/E. Whitmore Avenue intersection experiences fairly high north-south through volumes on Santa Fe Avenue (600+ vehicles) and has single-lane approaches that contribute to overall vehicle delays.

Based on the peak hour signal warrant (Warrant 3) and/or intersections near grade crossing (Warrant 9), the E. Whitmore Avenue/Santa Fe Avenue intersection *would qualify* for signalization under Warrant 9 criteria under Near-Term Year 2026 (No Project) Conditions. Coordination with at-grade crossing gates on E. Whitmore Avenue would be required should a signal be installed at this location. All remaining study intersections would not qualify for signalization due to not meeting minimum volume criteria.



Legend

XX (YY) AM (PM) Peak Hour Volumes

Turn Lane | Stop Sign

Traffic Signal | Roundabout

Altine Pacific Nut Company, Inc.
Tully Road Subdivision TIAR

Near Term
Peak Hour Volumes

Project No. **12611837**
Report No. **001**
Date **9/1/23**

FIGURE 5.1

5.1.2 Vehicle Queuing

As shown in **Table 5.1**, the 95th percentile queues are displayed for near-term year 2026 (no project) conditions and rounded to the nearest 5' increment. The all-way-stop-controlled (AWSC) intersection of Santa Fe Avenue/Tully Road would exceed the storage capacity for the eastbound left/through/right-turn movement on E. Whitmore Avenue by approximately two vehicles (assuming 25-feet per vehicle). All remaining study intersections have adequate storage capacity with existing traffic volumes.

Table 5.1 Near-Term Year 2026 (No Project) Vehicle Queuing

Int. #	Intersection/Approach	Control Type	Near Term No Project 95th Percentile Queue (ft)		Available Storage
			AM Peak Hour	PM Peak Hour	
1	***Tully Road & East Whitmore Avenue***				
	Eastbound Left/Thru/Right	AWSC	85	115	2500
	Westbound Left		40	35	85
	Westbound Thru/Right		65	60	705
	Northbound Left/Thru		55	65	370
	Northbound Right		40	45	65
	Southbound Left/Thru/Right		80	60	295
3	***Tully Road & Roeding Road***				
	Eastbound Left/Thru/Right	AWSC	35	40	2600
	Westbound Left/Thru/Right		20	10	1030
	Northbound Left/Thru/Right		50	50	2600
	Southbound Left/Thru/Right		55	45	1150
4	***Tully Road & Service Road***				
	Eastbound Left/Thru/Right	AWSC	60	60	2560
	Westbound Left/Thru/Right		65	60	1295
	Northbound Left/Thru/Right		55	50	5245
	Southbound Left/Thru/Right		55	55	2600
5	***Santa Fe Avenue & East Whitmore Avenue***				
	Eastbound Left/Thru/Right	AWSC	65	**95**	70
	Westbound Left/Thru		95	100	330
	Westbound Right		50	45	125
	Northbound Left/Thru		135	125	570
	Northbound Right		30	25	50
	Southbound Left/Thru/Right		120	245	310

Note: **Bold** text indicates queues that exceed available storage

5.1.3 Roadway Segment LOS

The two-lane roadway segments of Tully Road north and south of Roeding Road and E. Whitmore Avenue between Tully Road and Santa Fe Avenue would be operating at acceptable conditions based on near-term year 2026 (No Project) ADT volumes. Using daily volume thresholds consistent with City of Hughson General Plan Transportation Element, all three segments are operating at LOS C or better based on collector and arterial streets for two-lane capacity thresholds consistent with the Stanislaus County Congestion Management Plan shown in **Table 5.2.**

Table 5.2 Neat-Term Year 2026 (No Project) ADT Volumes & Level of Service

Classification/Location	Existing Average Daily Traffic (ADT) – Total of Both Directions				
	Lanes	Control	C	D	E
Collector Street	**2**	**undivided**	**7,700**	**11,600**	**12,900**
Tully Rd. s/o Roeding Rd.	2	N-T (NP) ADT	2,555		
Tully Rd. n/o Roeding Rd.	2	N-T (NP) ADT	3,385		
Arterial Street	**2**	**undivided**	**9,200**	**13,700**	**15,450**
E. Whitmore e/o Tull Rd.	2	N-T (NP) ADT	6,685		

Source: kdAnderson, Stanislaus County Congestion Management Plan

6. Cumulative Year 2043 (No Project) Conditions

6.1 Methodology/Future Volume Forecasts

Cumulative (No Project) conditions refer to the analysis scenario which reflects future conditions represented by local and regional growth in approximately 20 years or Year 2043 (see below). Based on County direction, Cumulative (No Project) conditions analyzed the scenario that considers the projected 20-Year development forecast, including any planned and/or approved developments, but without the proposed Tully Road Subdivision Industrial project. The Cumulative Year 2043 Plus Project condition is the analysis scenario in which traffic impacts associated with the proposed Tully Road Subdivision Industrial development are investigated in comparison to the Cumulative Year 2043 (No Project) conditions.

GHD recently obtained the Stanislaus County Transportation Model Programming for baseline and future horizon year output to determine an appropriate growth rate for Service Road, Tully Road, E. Whitmore Avenue, and Santa Fe Avenue. Baseline model Year 2019 and future horizon Year 2046 were generated and reviewed for AM and PM peak hour volume projections. The proposed project site is located within the City of Hughson's sphere of influence on the border of the City/County (TAZ #242). AM and PM peak hour volume projections are specific to each study intersection's approach in these areas compared to other TAZ's located more centrally within the context of the StanCOG's model output. Therefore, it was determined that the StanCOG's peak hour model volume projection would be used to develop more consistent traffic growth ratios in the project study area (see StanCOG model AM and PM peak hour volume projections for baseline year 2019 and future year 2046 **Appendix E**)

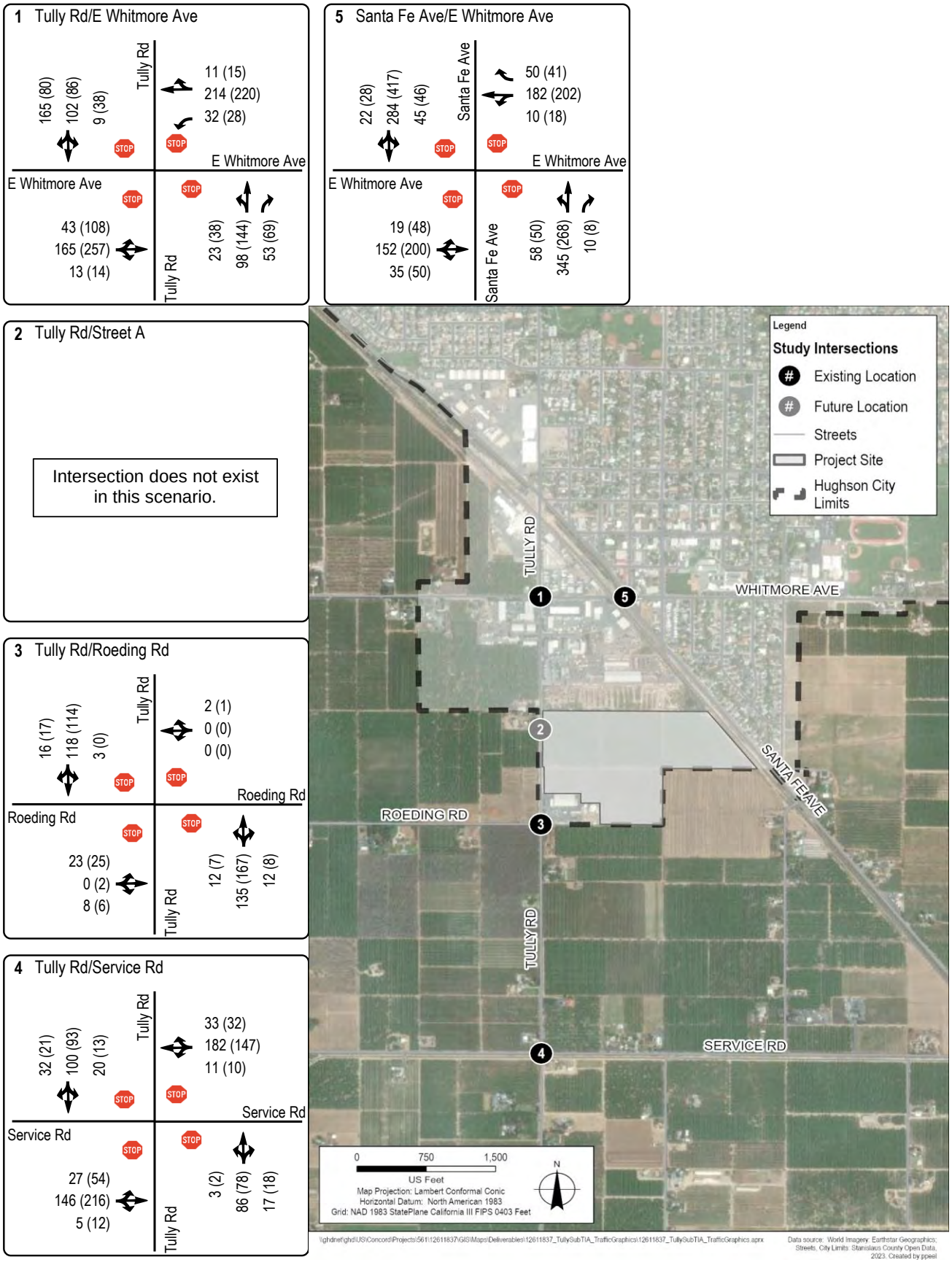
Based on the delta between baseline year 2019 and future year 2046 daily volumes, traffic growth for intersection approaches ranged from 0.5% to 4.0%. A yearly growth rate of 4% is somewhat conservative in nature and was typically limited to a few intersection approaches along E. Whitmore Avenue.

Figure 6.1 presents the turning movement volumes and lane geometry/control at the study intersections under Cumulative Year 2043 (No Project) Conditions.

6.1.1 Intersection Operation

LOS Summary Table 4.2 summarizes the intersection performance during the AM and PM peak hour for cumulative year 2043 (No Project) Conditions.

As presented in **LOS Summary Table 4.2**, all unsignalized all-way-stop-controlled study intersections would be operating at acceptable conditions (LOS D or better) during the AM and PM peak hour with the exception of the Santa



Legend

XX (YY) AM (PM) Peak Hour Volumes

Turn Lane | Stop Sign

Traffic Signal | Roundabout

GHD

Altine Pacific Nut Company, Inc.
Tully Road Subdivision TIAR

Cumulative
Peak Hour Volumes

Project No. **12611837**
Report No. **001**
Date **9/1/23**

FIGURE 6.1

Fe Avenue/East Whitmore Avenue location. During both the AM and PM peak hours, the intersection would be operating at LOS F (57.5 seconds AM & 112.2 seconds PM of delay).

Based on the peak hour signal warrant (Warrant 3) and/or intersections near grade crossing (Warrant 9), the E. Whitmore Avenue/Santa Fe Avenue intersection *would qualify* for signalization under Warrant 9 criteria under Cumulative Year 2043 (No Project) Conditions. Coordination with at-grade crossing gates on E. Whitmore Avenue would be required should a signal be installed at this location. All remaining study intersections would not qualify for signalization due to not meeting minimum volume criteria.

6.1.2 Vehicle Queuing

As shown in **Table 6.1**, the 95th percentile queues are displayed for cumulative year 2043 (no project) conditions and rounded to the nearest 5' increment. The all-way-stop-controlled (AWSC) intersection of Santa Fe Avenue/Tully Road would continue to exceed the storage capacity for the eastbound left/through/right-turn movement on E. Whitmore Avenue by approximately 3-4 vehicles (assuming 25-feet per vehicle). In addition, the southbound Santa Fe Avenue approach would have significant queuing of 620-feet with 310-feet of capacity. All remaining study intersections have adequate storage capacity with existing traffic volumes.

Table 6.1 Cumulative Year 2043 (No Project) Vehicle Queues

Int. #	Intersection/Approach	Control Type	Cumulative No Project 95th Percentile Queue (ft)		Available Storage
			AM Peak Hour	PM Peak Hour	
1	***Tully Road & East Whitmore Avenue***				
	Eastbound Left/Thru/Right	AWSC	90	155	2500
	Westbound Left		40	40	85
	Westbound Thru/Right		65	70	705
	Northbound Left/Thru		60	75	370
	Northbound Right		50	55	65
	Southbound Left/Thru/Right		105	90	295
3	***Tully Road & Roeding Road***				
	Eastbound Left/Thru/Right	AWSC	40	40	2600
	Westbound Left/Thru/Right		10	10	1030
	Northbound Left/Thru/Right		60	55	2600
	Southbound Left/Thru/Right		60	55	1150
4	***Tully Road & Service Road***				
	Eastbound Left/Thru/Right	AWSC	70	80	2560
	Westbound Left/Thru/Right		75	65	1295
	Northbound Left/Thru/Right		65	55	5245
	Southbound Left/Thru/Right		75	65	2600
5	***Santa Fe Avenue & East Whitmore Avenue***				
	Eastbound Left/Thru/Right	AWSC	**95**	**150**	70
	Westbound Left/Thru		100	110	330
	Westbound Right		55	55	125
	Northbound Left/Thru		275	170	570
	Northbound Right		**60**	40	50
	Southbound Left/Thru/Right		170	**620**	310

Note: **Bold** text indicates queues that exceed available storage

6.1.3 Roadway Segment LOS

The two-lane roadway segments of Tully Road north and south of Roeding Road and E. Whitmore Avenue between Tully Road and Santa Fe Avenue would be operating at acceptable conditions based on cumulative year 2043 (No Project) ADT volumes. Using daily volume thresholds consistent with City of Hughson General Plan Transportation Element, all three segments are operating at LOS C or better based on collector and arterial streets for two-lane capacity thresholds consistent with the Stanislaus County Congestion Management Plan shown in **Table 6.2.**

Table 6.2 Near-Term Year 2026 (No Project) ADT Volumes & Level of Service

Classification/Location	Cumulative Year 2043 No Project (ADT) – Total of Both Directions				
	Lanes	Control	C	D	E
Collector Street	**2**	**undivided**	**7,700**	**11,600**	**12,900**
Tully Rd. s/o Roeding Rd.	2	C (NP) ADT	3,575		
Tully Rd. n/o Roeding Rd.	2	C (NP) ADT	4,550		
Arterial Street	**2**	**undivided**	**9,200**	**13,700**	**15,450**
E. Whitmore e/o Tull Rd.	2	C (NP) ADT	7,525		

Source: kdAnderson, Stanislaus County Congestion Management Plan

7. Project Impacts

7.1 Project Description

The term “Project” as used in this study will refer to the proposed Tully Road Subdivision industrial park development (Project) on the parcel(s) located one-quarter mile south E. Whitmore Avenue and east of Tully Road. The proposed development consists of the following:

Main Development Parcel(s)

- Industrial Park – 45.15 Net Acreage (includes streets, basin, infrastructure)
- Net Density—35.11 acres (less streets, basin, infrastructure)
- Total Square Feet – 35.11 acres x 43,560 sf/acre = 1,529,392 square feet
- 60 Percent Coverage Rate —1,529,392 sf x 60% = 917,635 square feet
- Proposed Project Net Square Feet – 917,635 square feet

The proposed project is consistent with the City of Hughson’s General Plan land use designation and is located within the City’s Sphere of Influence zoned for Industrial uses. The proposed site is located along the east side of Tully Road one-quarter mile south of E. Whitmore Avenue extending east and north of Roeding Road.

7.1.1 Planned Project Circulation Improvements

The proposed development would have two (2) primary access streets to reduce potential vehicle conflicts to/from Tully Road. From the existing Roeding Road/Tully Road intersection, Roeding Road would be extended east into the project site approximately 1,000 feet to an internal drive (Street D). A second street (Street A) would extend into the site approximately 1,000 feet north of Roeding Road. Street A would connect to Tully Road and extend east into the project approximately 1,500-feet ending in a cul-de-sac just prior to the BNSF railroad tracks and Santa Fe Avenue. The project site plan is shown in **Figure 1.2**.

7.1.2 Project Trip Generation

Project site trip generation has been estimated for the proposed Tully Road subdivision industrial park project based on the overall gross leasable area (per 1,000 square feet). These estimations were achieved by subtracting out all acreage related to roadways, infrastructure, basins, and ROW (10.04 acres) from the "net acreage" of 45.15 yielding 35.11 acres.[4] Based on the City's maximum coverage rate for Industrial uses of 60 percent, the proposed project would yield 917,635 square feet of gross floor area based on 35.11 acres industrial park development.

Daily and peak hour project trip generation has been based on the Institute of Transportation Engineers (ITE) Publication *Trip Generation Manual (11th Ed.)* based on trip rates for industrial parks. It is noted that for ITE land use code #130, trip generation research is based on over 27-34 industrial park development sites ranging in size from 762,000-956,000 square feet. Therefore, applying the average trip generation rates for proposed land uses (lacking logarithmic rates) is reasonable. .

Table 7.1 presents the project trip generation for daily and AM/PM peak hours. As calculated, the proposed project would be expected to generate 3,092 daily trips with 312 AM peak hour trips and 312 PM peak hour trips.

Table 7.1 Proposed Project Daily, AM and PM Peak Hour Project Trip Generation

Land Use Category (ITE Code)	Unit[1]	Daily Trip Rate/Unit[2]	AM Peak Hour Trip Rate/Unit			PM Peak Hour Trip Rate/Unit		
			Total	In %	Out %	Total	In %	Out %
Industrial Park (130)	KSF	3.37	0.34	81%	19%	0.34	22%	78%
Description	**Quantity (Units)**	**Daily Trips**	**AM Peak Hour Trips**			**PM Peak Hour Trips**		
			Total	In	Out	Total	In	Out
Project Trips								
Industrial Subdivision	917.63	3,092	312	253	59	312	69	243
Net New Project Trips		**3,092**	**312**	**253**	**59**	**312**	**69**	**243**

Notes:

1. KSF = 1,000 square feet

2. Trip rates based on ITE Trip Generation Manual 11th edition average rates

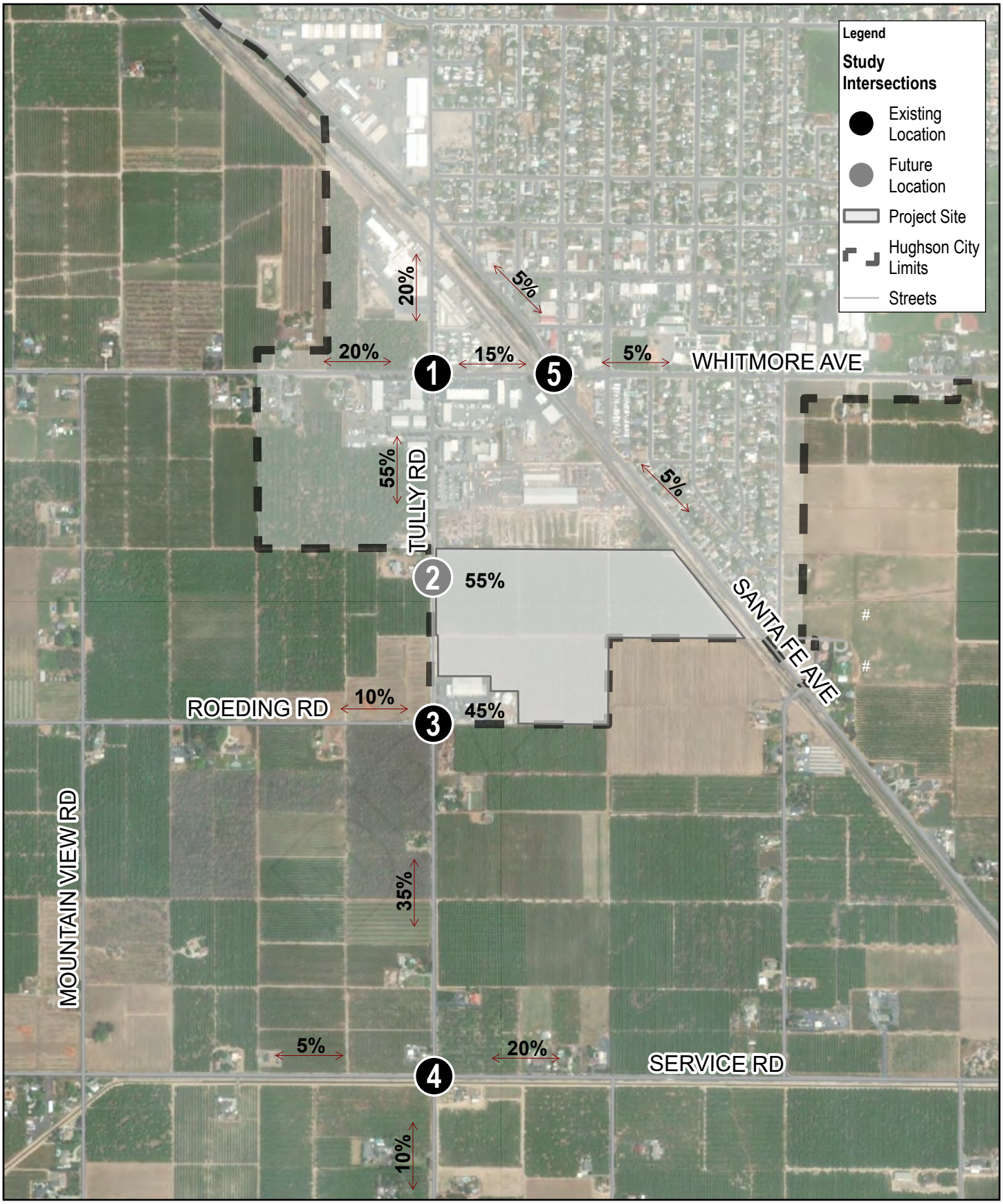
7.1.3 Project Trip Distribution & Assignment

Assignment of project-generated industrial trips were estimated using detailed demographic analyses on City of Hughson work trips from the United States Census Bureau. Specifically, all job distances and directions from work-to-home employment for the past five (5) surveyed years (2016-2020) were analyzed.[5] In addition, project trip distribution was also based on intersection counts and vehicle flows along E. Whitmore Avenue and Service Road, local demographics, and StanCOG model output.

Figure 7.1 presents the trip distribution for the Project-generated primary trips inbound/outbound during the AM and PM peak hours. AM and PM peak hour project trips are shown in **Figure 7.2.**

During the AM and PM peak hours, an estimated 35% of the external project primary trips would be to/from the west via E. Whitmore Avenue, Roeding Road, and Service. An additional 30% of the project trips would be to/from the south via Santa Fe Avenue and Tully Road (south of Service Road). Finally, the remaining 35% of the project trips would be to/from the north and east via Tully Road (north of E. Whitmore Avenue) and E. Whitmore Avenue via Santa Fe Avenue as follows:

[4] Tom Geiss, NorthStar Engineering Group, Personal communication, Net gross floor area (Tully Road Subdivision), June 8, 2023.
[5] United States Census Bureau, OnTheMap, City of Hughson, Work-to-home, Distance/Direction, 2106-2020,



Paper Size ANSI A

0 750 1,500

US Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California III FIPS 0403 Feet

N

GHD

Alpine Pacific Nut Company, Inc.

Tully Road Subdivision
Traffic Impact Analysis

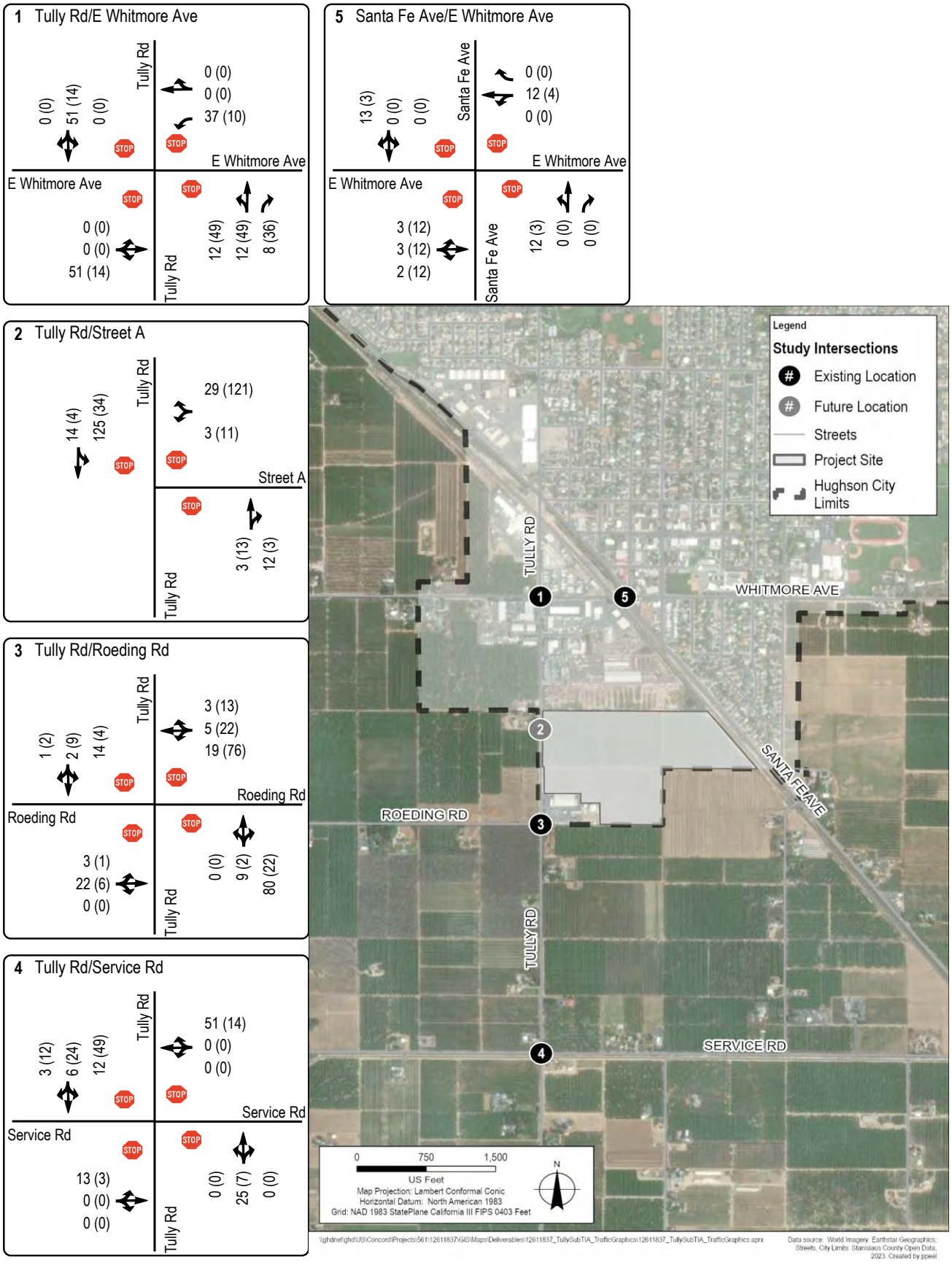
Trip Distribution

Project No. **12611837**
Revision No. **-**
Date **7/21/2023**

FIGURE 7.1

\\ghdnet\ghd\US\Concord\Projects\561\12611837\GIS\Maps\Deliverables\12611837_TullySubTIA_TrafficGraphics\12611837_TullySubTIA_TrafficGraphics.aprx - TRIPDIST_ANSIA_PORTRAIT_20230721 Print date: 21 Jul 2023 - 09:35

Data source: World Imagery: Maxar; Streets, City Limits: Stanislaus County Open Data, 2023. Created by: edarke



Legend

XX (YY) AM (PM) Peak Hour Volumes

Turn Lane | Stop Sign

Traffic Signal | Roundabout

GHD

Altine Pacific Nut Company, Inc.
Tully Road Subdivision TIAR

Project Trips

Project No. **12611837**
Report No. **001**
Date **9/1/23**

FIGURE 7.2

55% to/from the north via Tully Road

20% to/from the west via E. Whitmore Avenue

20% to/from the north via Tully Road (north of E. Whitmore Avenue)

15% to/from the east via E. Whitmore Avenue

5% to/from the north via Santa Fe Avenue

5% to/from the south via Santa Fe Avenue

5% to/from the east via E. Whitmore Avenue

10% to/from the west via Roeding Road

35% to/from the south via Tully Road

5% to/from the west via Service Road

20% to/from the east via Service Road

10% to/from the south via Tully Road (south of Service Road)

Figure 7.2 presents Existing Plus Proposed Project AM and PM peak hour trips.

7.2 Existing Plus Project Conditions

7.2.1 Intersection Operation

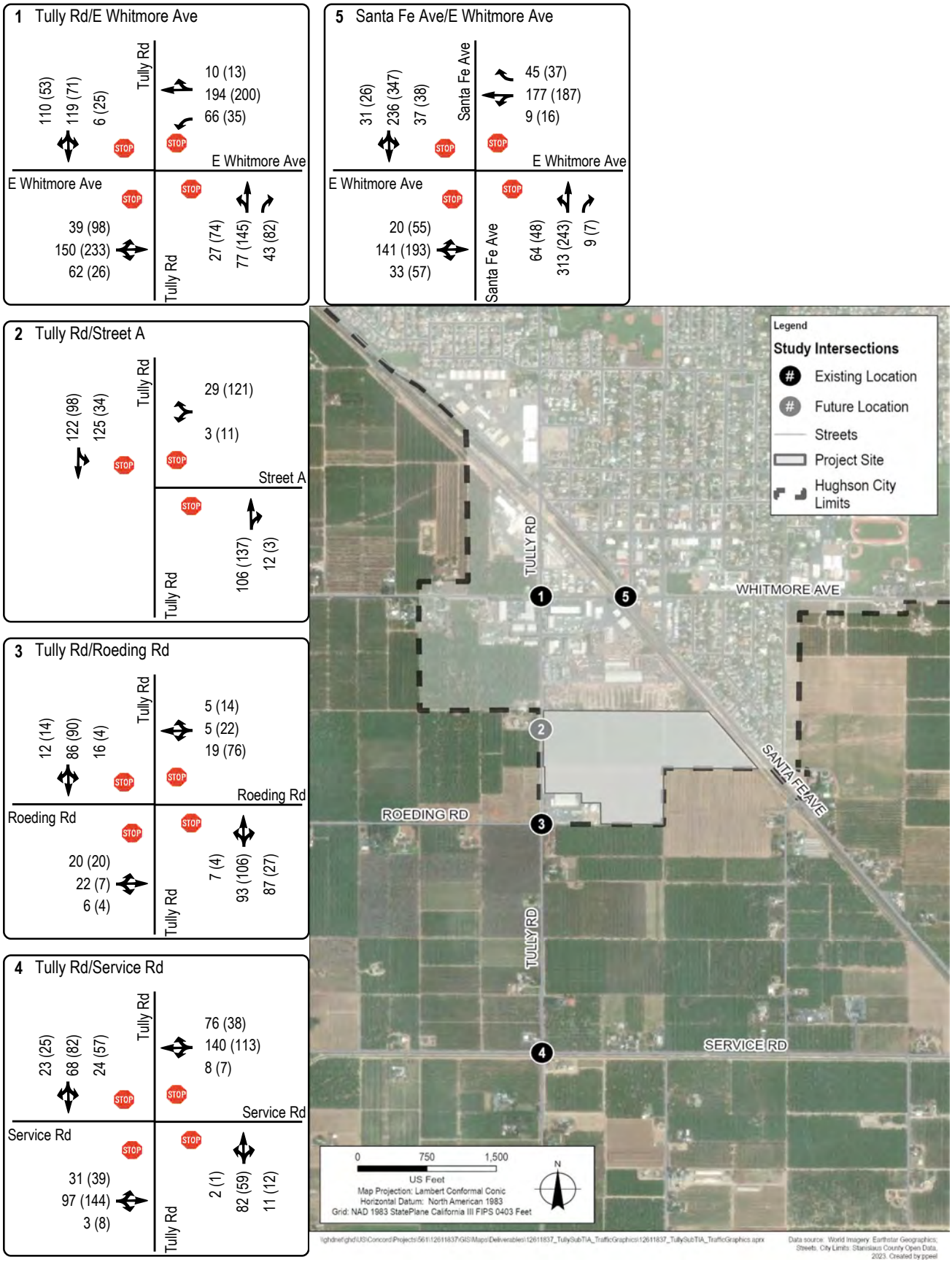
LOS Summary Table 7.2 "With Project" Conditions summarizes the intersection performance during the AM and PM peak hour for Existing plus Project Conditions.

As presented in **LOS Summary Table 7.2 "With Project" Conditions**, all unsignalized all-way-stop-controlled study intersections would be operating at acceptable conditions (LOS D or better) during the AM and PM peak hour with the exception of the Santa Fe Avenue/East Whitmore Avenue location. With proposed project trips, the Santa Fe Avenue/East Whitmore Avenue intersection would continue to operate at unacceptable levels during the PM peak hour changing from LOS E (43.6 seconds of delay) to LOS F (50.2 seconds of delay).

Based on the peak hour signal warrant (Warrant 3) and/or intersections near grade crossing (Warrant 9), the E. Whitmore Avenue/Santa Fe Avenue intersection *would qualify* for signalization under Warrant 9 criteria with Existing plus Project Conditions. Coordination with at-grade crossing gates on E. Whitmore Avenue would be required should a signal be installed at this location. All remaining study intersections would not qualify for signalization due to not meeting minimum volume criteria.

Based on proposed project trips adding to an existing, deficient condition, the following mitigation measures are recommended to improve overall vehicle delays and operations:

- Install a signal at the intersection of Santa Fe Avenue/East Whitmore Avenue to improve vehicle delays and reduce overall vehicle queuing during the AM and PM peak hours. The signal should be coordinated with existing automated railroad crossing gates located approximately 75-feet west of Santa Fe Avenue. Under Existing plus Project conditions, the all-way-stop-control intersection meets the intersection near grade crossing warrant (Warrant #9). Since unacceptable intersection LOS and vehicle delay is an existing deficient condition, it is recommended that the proposed project contribute a "proportional share" of the costs to improve the intersection based on Caltrans "pro-rata" fair share calculations. Please refer to Cumulative Year



Legend

XX (YY) AM (PM) Peak Hour Volumes

Turn Lane

Traffic Signal

Stop Sign

Roundabout

Altine Pacific Nut Company, Inc.
Tully Road Subdivision TIAR

Existing Plus Project Peak Hour Volumes

Project No. **12611837**
Report No. **001**
Date **9/1/23**

FIGURE 7.3

Table 7.2 "With Project" LOS Summary Table; AM and PM Peak Hour Intersection LOS

ID	Intersection	Target LOS	Peak Hour	Existing			Existing Plus Project			Near Term			Near Term Plus Project			Cumulative			Cumulative Plus Project		
				Control	Delay	LOS	Control	Delay	LOS	Control	Delay	LOS	Control	Delay	LOS	Control	Delay	LOS	Control	Delay	LOS
1	Tully Road & East Whitmore Avenue	D	AM	AWSC	11.4	B	AWSC	13.4	B	AWSC	11.9	B	AWSC	14.5	B	AWSC	16.1	C	AWSC	28.4	D
			PM		14.2	B		17.6	C		15.1	C		19.8	C		27.1	D		**51.7**	**F**
2	Tully Road & Street A (Future)	D	AM	This intersection does not exist in this scenario.			TWSC	9.5	A	This intersection does not exist in this scenario.			TWSC	9.7	A	This intersection does not exist in this scenario.			TWSC	10.5	B
			PM					10.0	A					10.2	B					11.5	B
3	Tully Road & Roeding Road	D	AM	AWSC	7.7	A	AWSC	8.4	A	AWSC	7.8	A	AWSC	8.5	A	AWSC	8.3	A	AWSC	9.7	A
			PM		7.7	A		8.4	A		7.8	A		8.5	A		8.3	A		9.3	A
4	Tully Road & Service Road	D	AM	AWSC	8.6	A	AWSC	9.2	A	AWSC	8.8	A	AWSC	9.5	A	AWSC	10.2	B	AWSC	12.0	B
			PM		8.8	A		8.4	A		9.1	A		9.9	A		11.1	B		13.6	B
5	Santa Fe Avenue & East Whitmore Avenue	D	AM	AWSC	23.6	C	AWSC	28.4	D	AWSC	27.7	D	AWSC	32.9	D	AWSC	**57.5**	**F**	AWSC	**74.0**	**F**
			PM		**43.6**	**E**		**50.2**	**F**		**50.6**	**F**		**58.7**	**F**		**112.2**	**F**		**128.5**	**F**

Note: **Bold** text indicates target level of service (LOS) is exceeded.

1 AWSC = All-Way-Stop-Control

2 Based on Synchro-Simtraffic (Version 11.0), Highway Capacity Manual (HCM 6), Operations,Unsignalized Intersections, 2019.

DRAFT

2043 Plus Project Conditions for a discussion of Caltrans “pro-rata” fair share methodology and proposed project fair share contribution.

7.2.2 Vehicle Queuing

As shown in **Table 7.3**, the 95th percentile queues are displayed for existing plus project conditions and rounded to the nearest 5’ increment. The all-way-stop-controlled (AWSC) intersection of Santa Fe Avenue/Tully Road would continue to exceed the storage capacity for the eastbound left/through/right-turn movement on E. Whitmore Avenue by approximately 1-2 vehicles (assuming 25-feet per vehicle). All remaining study intersections have adequate storage capacity with existing traffic volumes.

Table 7.3 Existing Plus Project Vehicle Queues

Int. #	Intersection/Approach	Control Type	Existing Plus Project 95th Percentile Queue (ft)		Available Storage
			AM Peak Hour	PM Peak Hour	
1	***Tully Road & East Whitmore Avenue***				
	Eastbound Left/Thru/Right	AWSC	95	125	2500
	Westbound Left		50	40	85
	Westbound Thru/Right		60	60	705
	Northbound Left/Thru		50	80	370
	Northbound Right		45	60	65
	Southbound Left/Thru/Right		85	60	295
2	***Tully Road & Street A (Future)***				
	Westbound Left/Right	TWSC	55	65	200
	Northbound Thru/Right		0	0	1150
	Southbound Left/Thru		45	25	1050
3	***Tully Road & Roeding Road***				
	Eastbound Left/Thru/Right	AWSC	45	40	2600
	Westbound Left/Thru/Right		45	60	1030
	Northbound Left/Thru/Right		60	55	2600
	Southbound Left/Thru/Right		65	50	1150
4	***Tully Road & Service Road***				
	Eastbound Left/Thru/Right	AWSC	55	65	2560
	Westbound Left/Thru/Right		75	60	1295
	Northbound Left/Thru/Right		65	50	5245
	Southbound Left/Thru/Right		65	65	2600
5	***Santa Fe Avenue & East Whitmore Avenue***				
	Eastbound Left/Thru/Right	AWSC	65	**95**	70
	Westbound Left/Thru		95	95	330
	Westbound Right		50	50	125
	Northbound Left/Thru		185	105	570
	Northbound Right		40	20	50
	Southbound Left/Thru/Right		115	205	310

Note: **Bold** text indicates queues that exceed available storage

7.2.3 Roadway Segment LOS

The two-lane roadway segments of Tully Road north and south of Roeding Road and E. Whitmore Avenue between Tully Road and Santa Fe Avenue would be operating at acceptable conditions based on existing plus project ADT volumes. Using daily volume thresholds consistent with City of Hughson General Plan Transportation Element, all three segments are operating at LOS C or better based on collector and arterial streets for two-lane capacity thresholds consistent with the Stanislaus County Congestion Management Plan shown in **Table 7.4.**

Table 7.4 Existing Plus Project ADT Volumes

Classification/Location	Existing Plus Project (ADT) – Total of Both Directions				
	Lanes	Control	C	D	E
Collector Street	**2**	**undivided**	**7,700**	**11,600**	**12,900**
Tully Rd. s/o Roeding Rd.	2	Exist+Project	3,650		
Tully Rd. n/o Roeding Rd.	2	Exist+Project	5,195		
Arterial Street	**2**	**undivided**	**9,200**	**13,700**	**15,450**
E. Whitmore e/o Tull Rd.	2	Exist+Project	7,055		

Source: kdAnderson, Stanislaus County Congestion Management Plan

7.3 Near-Term Year 2026 Plus Project Conditions

7.3.1 Intersection Operation

Proposed project AM and PM peak hour trips were added to Near-Term Year 2026 (No Project) volumes are shown in **Figure 7.1**

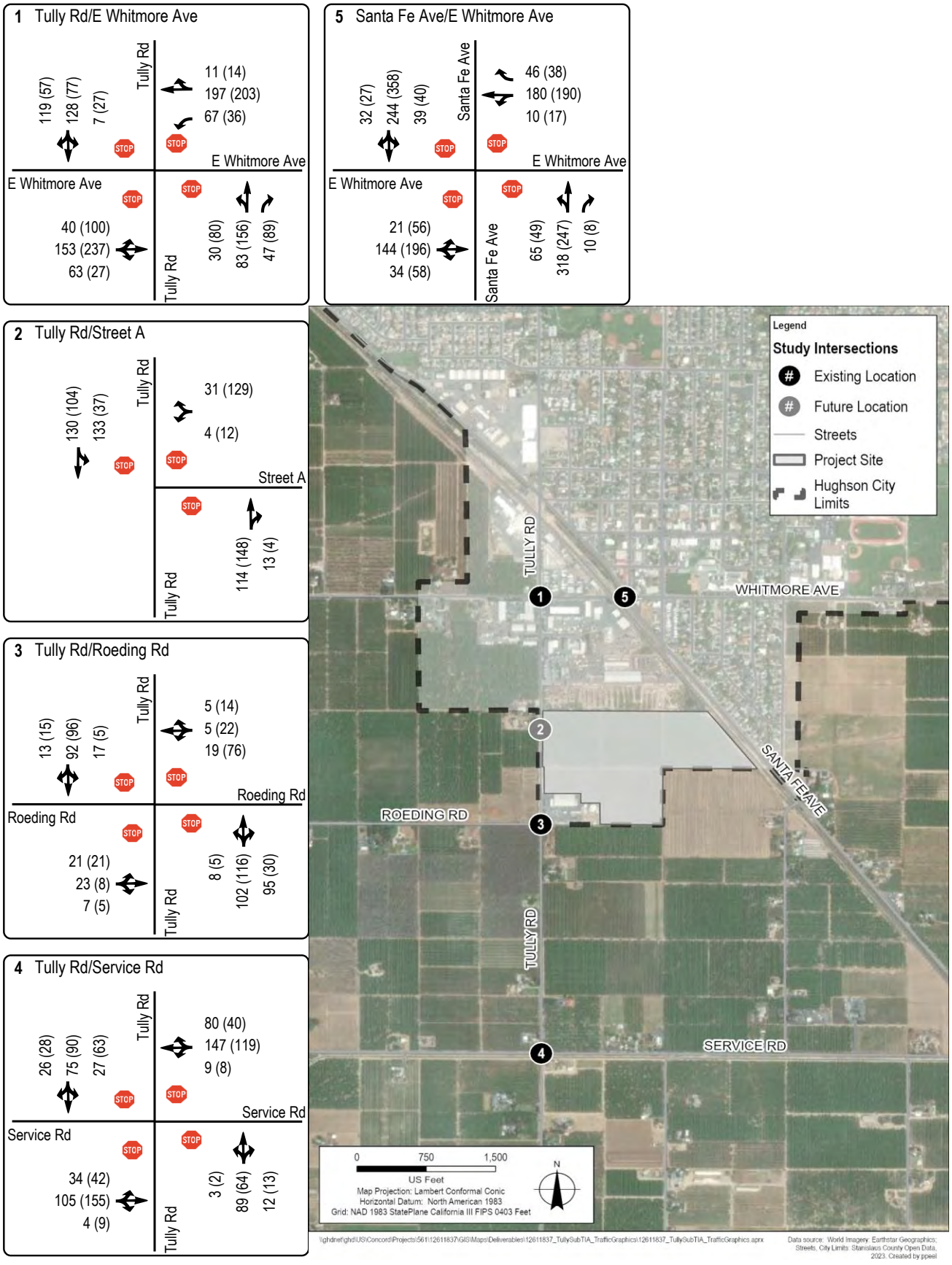
LOS Summary Table 7.2 "With Project" Conditions summarizes the intersection performance during the AM and PM peak hour for Near-Term Year 2026 plus Project Conditions.

As presented in **LOS Summary Table 7.2 "With Project" Conditions**, all unsignalized all-way-stop-controlled study intersections would be operating at acceptable conditions (LOS D or better) during the AM and PM peak hour with the exception of the Santa Fe Avenue/East Whitmore Avenue location. With proposed project trips, the Santa Fe Avenue/East Whitmore Avenue intersection would continue to operate at unacceptable levels during the PM peak hour changing from LOS F (50.6 seconds of delay) to LOS F (58.7 seconds of delay).

Based on the peak hour signal warrant (Warrant 3) and/or intersections near grade crossing (Warrant 9), the E. Whitmore Avenue/Santa Fe Avenue intersection *would qualify* for signalization under both Warrant 3 and Warrant 9 criteria under Near-Term Year 2026 plus Project Conditions. Coordination with at-grade crossing gates on E. Whitmore Avenue would be required should a signal be installed at this location. All remaining study intersections would not qualify for signalization due to not meeting minimum volume criteria.

Based on proposed project trips adding to an existing, deficient condition, the same mitigation measures are recommended as part of "Existing Plus Project" Conditions to improve overall vehicle delays and operations as follows:

- Install a signal at the intersection of East Whitmore Avenue/Santa Fe Avenue to improve vehicle delays and reduce overall vehicle queuing during the AM and PM peak hours. The signal should be coordinated with existing automated railroad crossing gates located approximately 75-feet west of Santa Fe Avenue. Under Near-Term Year 2026 plus Project conditions, the intersection would meet the peak hour signal warrant.



Legend

XX (YY) AM (PM) Peak Hour Volumes

Turn Lane | Stop Sign

Traffic Signal | Roundabout

GHD

Altine Pacific Nut Company, Inc.
Tully Road Subdivision TIAR

Near Term Plus Project Peak Hour Volumes

Project No. **12611837**
Report No. **001**
Date **9/1/23**

FIGURE 7.4

(Warrant #3 and #9). Since unacceptable intersection LOS and vehicle delay is an existing deficient condition, it is recommended that the proposed project contribute a "proportional share" of the costs to improve the intersection based on Caltrans "pro-rata" fair share calculations. Please refer to Cumulative Year 2043 Plus Project Conditions for a discussion of Caltrans "pro-rata" fair share methodology and proposed project fair share contribution.

7.3.2 Vehicle Queuing

As shown in **Table 7.5**, the 95th percentile queues are displayed for near-term year 2026 plus project conditions and rounded to the nearest 5' increment. The all-way-stop-controlled (AWSC) intersection of Santa Fe Avenue/Tully Road would continue to exceed the storage capacity for the eastbound left/through/right-turn movement on E. Whitmore Avenue by approximately 1-2 vehicles (assuming 25-feet per vehicle). All remaining study intersections have adequate storage capacity with existing traffic volumes.

Table 7.5 Near-Term Year 2026 Plus Project Vehicle Queues

Int. #	Intersection/Approach	Control Type	Near Term Plus Project 95th Percentile Queue (ft)		Available Storage
			AM Peak Hour	PM Peak Hour	
1	***Tully Road & East Whitmore Avenue***				
	Eastbound Left/Thru/Right	AWSC	90	140	2500
	Westbound Left		50	40	85
	Westbound Thru/Right		65	65	705
	Northbound Left/Thru		55	85	370
	Northbound Right		45	60	65
	Southbound Left/Thru/Right		85	65	295
2	***Tully Road & Street A (Future)***				
	Westbound Left/Right	TWSC	50	65	200
	Northbound Thru/Right		0	0	1150
	Southbound Left/Thru		40	20	1050
3	***Tully Road & Roeding Road***				
	Eastbound Left/Thru/Right	AWSC	45	40	2600
	Westbound Left/Thru/Right		50	65	1030
	Northbound Left/Thru/Right		70	50	2600
	Southbound Left/Thru/Right		65	55	1150
4	***Tully Road & Service Road***				
	Eastbound Left/Thru/Right	AWSC	60	70	2560
	Westbound Left/Thru/Right		80	60	1295
	Northbound Left/Thru/Right		60	50	5245
	Southbound Left/Thru/Right		65	70	2600
5	***Santa Fe Avenue & East Whitmore Avenue***				
	Eastbound Left/Thru/Right	AWSC	70	**100**	70
	Westbound Left/Thru		90	100	330
	Westbound Right		50	60	125
	Northbound Left/Thru		240	135	570
	Northbound Right		50	30	50
	Southbound Left/Thru/Right		140	245	310

Note: **Bold** text indicates queues that exceed available storage

7.3.3 Roadway Segment LOS

The two-lane roadway segments of Tully Road north and south of Roeding Road and E. Whitmore Avenue between Tully Road and Santa Fe Avenue would be operating at acceptable conditions based on existing plus project ADT volumes. Using daily volume thresholds consistent with City of Hughson General Plan Transportation Element, all three segments are operating at LOS C or better based on collector and arterial streets for two-lane capacity thresholds consistent with the Stanislaus County Congestion Management Plan shown in **Table 7.6**

Table 7.6 Near-Term Year 2026 Plus Project ADT Volumes

Classification/Location	Near-Term Year 2023 No Project (ADT) – Total of Both Directions				
	Lanes	Control	C	D	E
Collector Street	**2**	**undivided**	**7,700**	**11,600**	**12,900**
Tully Rd. s/o Roeding Rd.	2	N-T+Project	3,970		
Tully Rd. n/o Roeding Rd.	2	N-T+Project	5,580		
Arterial Street	**2**	**undivided**	**9,200**	**13,700**	**15,450**
E. Whitmore e/o Tull Rd.	2	N-T+Project	7,270		

Source: kdAnderson, Stanislaus County Congestion Management Plan

7.4 Cumulative Year 2043 Plus Project Conditions

7.4.1 Intersection Operation

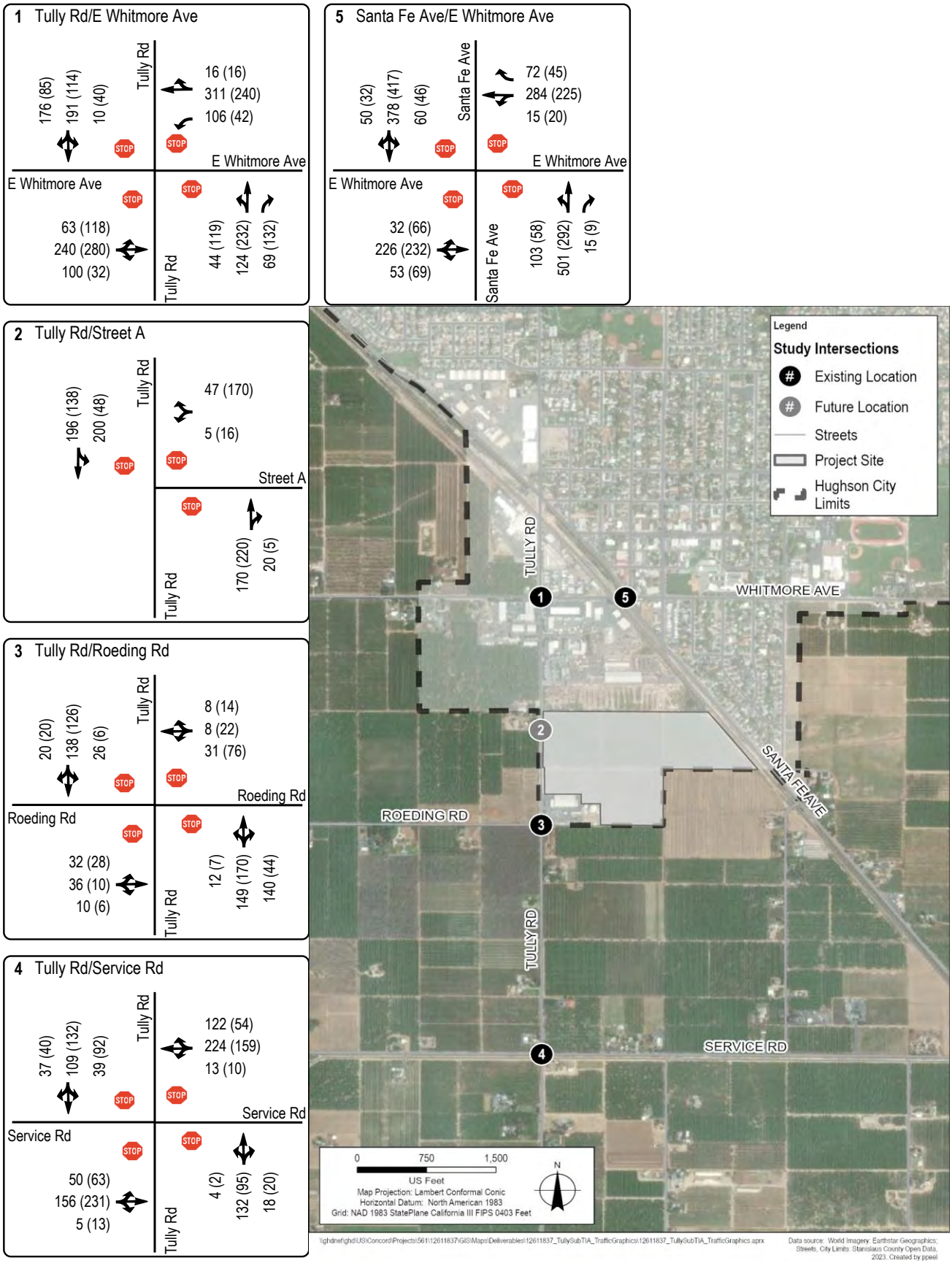
Proposed project AM and PM peak hour trips were added to Cumulative Year 2043 (No Project) volumes and are shown in **Figure 7.4**

LOS Summary Table 7.2 "With Project" Conditions summarizes the intersection performance during the AM and PM peak hour for Cumulative Year 2043 plus Project Conditions.

As presented in **LOS Summary Table 7.2 "With Project" Conditions**, the three unsignalized all-way-stop-controlled study intersections of Tully Road/Street A, Tully Road/Roeding Road, and Tully Road/Service Road would be operating at acceptable conditions (LOS D or better). However, the E. Whitmore Avenue/Tully Road intersection would change from LOS D (27.1 seconds of delay) to LOS F (51.7 seconds of delay) during the PM peak hour. In addition, during the AM and PM peak hour the Santa Fe Avenue/East Whitmore Avenue intersection would continue to operate at unacceptable levels at LOS F.

Based on the peak hour signal warrant (Warrant 3) and/or intersections near grade crossing (Warrant 9), the E. Whitmore Avenue/Tully Road intersection *would qualify* for signalization under Warrant 3. The E. Whitmore Avenue/Santa Fe Avenue intersection *would quality* for signalization under both Warrant 3 and Warrant 9 criteria with Cumulative Year 2043 plus Project Conditions. Coordination with at-grade crossing gates on E. Whitmore Avenue would be required should a signal be installed at this location. All remaining study intersections would not qualify for signalization due to not meeting minimum volume criteria.

In response to Cumulative Year 2043 plus Project impacts, the following intersection improvements are recommended:



Legend

XX (YY) AM (PM) Peak Hour Volumes

Turn Lane | Stop Sign

Traffic Signal | Roundabout

GHD

Altine Pacific Nut Company, Inc.
Tully Road Subdivision TIAR

Cumulative Plus Project Peak Hour Volumes

Project No. **12611837**
Report No. **001**
Date **9/1/23**

FIGURE 7.5

- Install a signal at the intersection of East Whitmore Avenue/Tully Road to improve vehicle delays and reduce overall vehicle queuing during the AM and PM peak hours. In addition, widen and/or re-stripe the eastbound E. Whitmore Avenue approach to include a separate left-turn lane and shared through/right-turn lane. Under Cumulative Year 2043 plus Project conditions, the intersection meets the peak hour signal warrant (Warrant #3). Based on Cumulative Year 2043 plus Project conditions, it is recommended that the proposed project contribute a “proportional share” of the costs to improve the intersection based on Caltrans “pro-rata” fair share calculations;

  Or)

  Construction of a single/multi-lane modern roundabout could be given consideration
- Install a signal at the intersection of E. Whitmore Avenue/Santa Fe Avenue to improve vehicle delays and reduce overall vehicle queuing during the AM and PM peak hours. The signal should be coordinated with existing automated railroad crossing gates located approximately 75-feet west of Santa Fe Avenue. Since unacceptable intersection LOS and vehicle delay is an existing deficient condition, it is recommended that the proposed project contribute a “proportional share” of the costs to improve the intersection based on Caltrans “pro-rata” fair share calculations. Please refer to Cumulative Year 2043 Plus Project Conditions for a discussion of Caltrans “pro-rata” fair share methodology and proposed project fair share contribution.

7.4.2 Vehicle Queuing

As shown in **Table 7.7**, the 95th percentile queues are displayed for cumulative year 2043 plus project conditions and rounded to the nearest 5’ increment. The all-way-stop-controlled (AWSC) intersection of East Whitmore Avenue/Tully Road would exceed the storage capacity for the northbound right-turn movement on Tully Road by approximately 2 vehicles (assuming 25-feet per vehicle). All remaining study intersections have adequate storage capacity with existing traffic volumes.

In addition, the all-way-stop-controlled (AWSC) intersection of Santa Fe Avenue/Tully Road would continue to exceed the storage capacity for the eastbound left/through/right-turn movement on E. Whitmore Avenue by approximately 7-8 vehicles queuing behind the BNSF railroad track crossing during the PM peak hour. In addition, the southbound left/through/right-turn lane would experience significant queuing of 735 feet. Given projected intersection operations of LOS F during the peak hours, vehicle queuing is not unexpected under cumulative year 2043 plus project conditions. All remaining study intersections have adequate storage capacity with existing traffic volumes.

Table 7.7 Cumulative Year 2043 Plus Project Vehicle Queues

Int. #	Intersection/Approach	Control Type	Cumulative Plus Project 95th Percentile Queue (ft)		Available Storage
			AM Peak Hour	PM Peak Hour	
1	***Tully Road & East Whitmore Avenue***				
	Eastbound Left/Thru/Right	AWSC	130	475	2500
	Westbound Left		50	40	85
	Westbound Thru/Right		70	80	705
	Northbound Left/Thru		75	195	370
	Northbound Right		60	**105**	65
	Southbound Left/Thru/Right		165	110	295
2	***Tully Road & Street A (Future)***				
	Westbound Left/Right	TWSC	55	80	200
	Northbound Thru/Right		0	0	1150
	Southbound Left/Thru		60	35	1050
3	***Tully Road & Roeding Road***				
	Eastbound Left/Thru/Right	AWSC	50	45	2600
	Westbound Left/Thru/Right		50	65	1030
	Northbound Left/Thru/Right		80	60	2600
	Southbound Left/Thru/Right		60	55	1150
4	***Tully Road & Service Road***				
	Eastbound Left/Thru/Right	AWSC	80	90	2560
	Westbound Left/Thru/Right		95	80	1295
	Northbound Left/Thru/Right		70	60	5245
	Southbound Left/Thru/Right		80	80	2600
5	***Santa Fe Avenue & East Whitmore Avenue***				
	Eastbound Left/Thru/Right	AWSC	**90**	**260**	70
	Westbound Left/Thru		110	140	330
	Westbound Right		60	65	125
	Northbound Left/Thru		445	235	570
	Northbound Right		**70**	40	50
	Southbound Left/Thru/Right		195	**735**	310

Note: **Bold** text indicates queues that exceed available storage

7.4.3 Roadway Segment LOS

The two-lane roadway segments of Tully Road north and south of Roeding Road and E. Whitmore Avenue between Tully Road and Santa Fe Avenue would be operating at acceptable conditions based on cumulative year 2043 plus project ADT volumes. Using daily volume thresholds consistent with City of Hughson General Plan Transportation Element, all three segments are operating at LOS C or better based on collector and arterial streets for two-lane capacity thresholds consistent with the Stanislaus County Congestion Management Plan shown in **Table 7.8**

Table 7.8 Cumulative Year 2043 Plus Project ADT Volumes

Classification/Location	Cumulative Year 2043 No Project (ADT) – Total of Both Directions				
	Lanes	Control	C	D	E
Collector Street	**2**	**undivided**	**7,700**	**11,600**	**12,900**
Tully Rd. s/o Roeding Rd.	2	C+Project	5,870		
Tully Rd. n/o Roeding Rd.	2	C+Project	7,610		
Arterial Street	**2**	**undivided**	**9,200**	**13,700**	**15,450**
E. Whitmore e/o Tull Rd.	2	C+Project	9,025		

Source: kdAnderson, Stanislaus County Congestion Management Plan

8. Site Access & Circulation

8.1 Project Access Driveways/Streets

The proposed Tully Road subdivision industrial park project would have two (2) primary access driveways (streets) to reduce potential vehicle conflicts on the Tully Road as shown in **Figure 1.2**. From the existing Roeding Road/Tully Road intersection, Roeding Road would be extended east into the project site approximately 1,000 feet to an internal drive (Street D). A second east-west street (Street A) would be located approximately 1,000 feet north of Roeding Road. Specifically, Street A would connect to Tully Road and extend east into the project approximately 1,500-feet ending in a cul-de-sac just prior to the BNSF railroad tracks and Santa Fe Avenue.

Internal project streets would be labeled Streets A, B, C, and D extending in a mostly grid pattern to serve the various parcels. As noted, Street A and Roeding Road would extend directly east into the project site from Tully Road. Another internal street (Street D) would extend north-south and connect Roeding Road with Street A. Finally, Streets B and C would intersect south of Street A and west of Street D. At the intersection of Streets B and C, there would be a large radius corner (80-foot radius) for large trucks/vehicles.

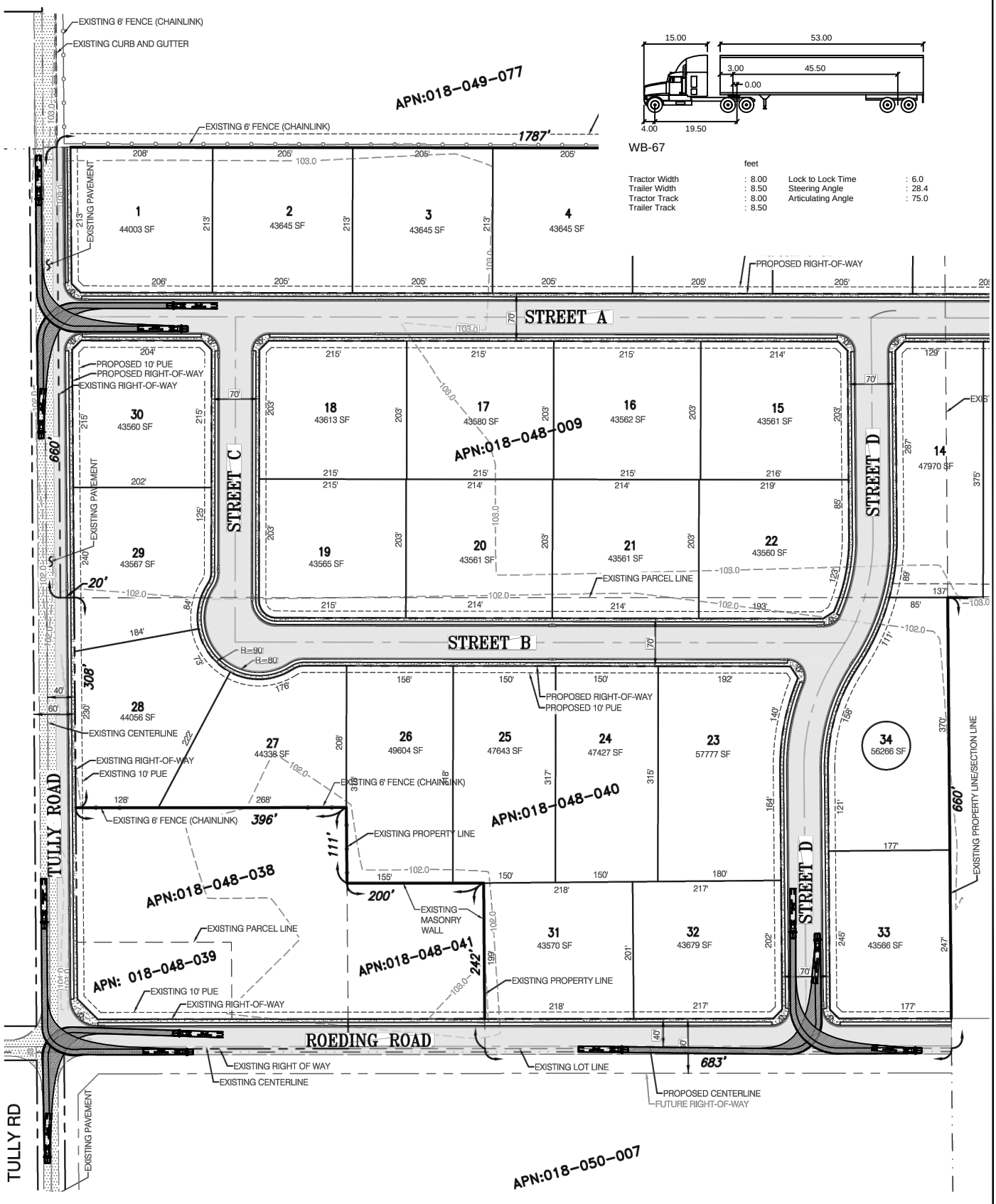
On an internal basis, overall circulation would be acceptable with wide travel lanes and large turning radii. Specifically, all internal streets would have a 70-foot improvement width (includes travel lanes, curb, gutter, and sidewalks). Large turning radii would be provided at the intersection of Streets B and C as well as at the cul-de-sac at the end of Street D (49-foot radius).

Tully Road would be widened along the entire project frontage. From the new project curb along Tully Road, there would be 40-feet to the roadway centerline with a 60-foot ROW. Pedestrian sidewalks with ADA ramps would be present along all project streets and the entire Tully Road frontage.

8.2 Truck Off-Tracking Analysis

Both proposed project street connections of Street A and the Roeding Road extension at Tully Road were evaluated for adequate turning radii to/from Tully Road. Adequate turning radii were analyzed using the Surface Transportation Assistance Act (STAA) Design Vehicle as defined by Caltrans and the American Association of State Highway and Transportation Officials (ASSHTO).[6] Using accept software (*AutoTURN 11.0*), inbound/outbound turning movements of large trucks has been evaluated for left-turn movements in **Figure 8.1** and right-turn movements in **Figure 8.2.**

[6] Caltrans, Highway Design Manual, Chapter 400 Intersections At-Grade, Section 404.4, Design Vehicles and Related Definitions, July 1, 2020.,



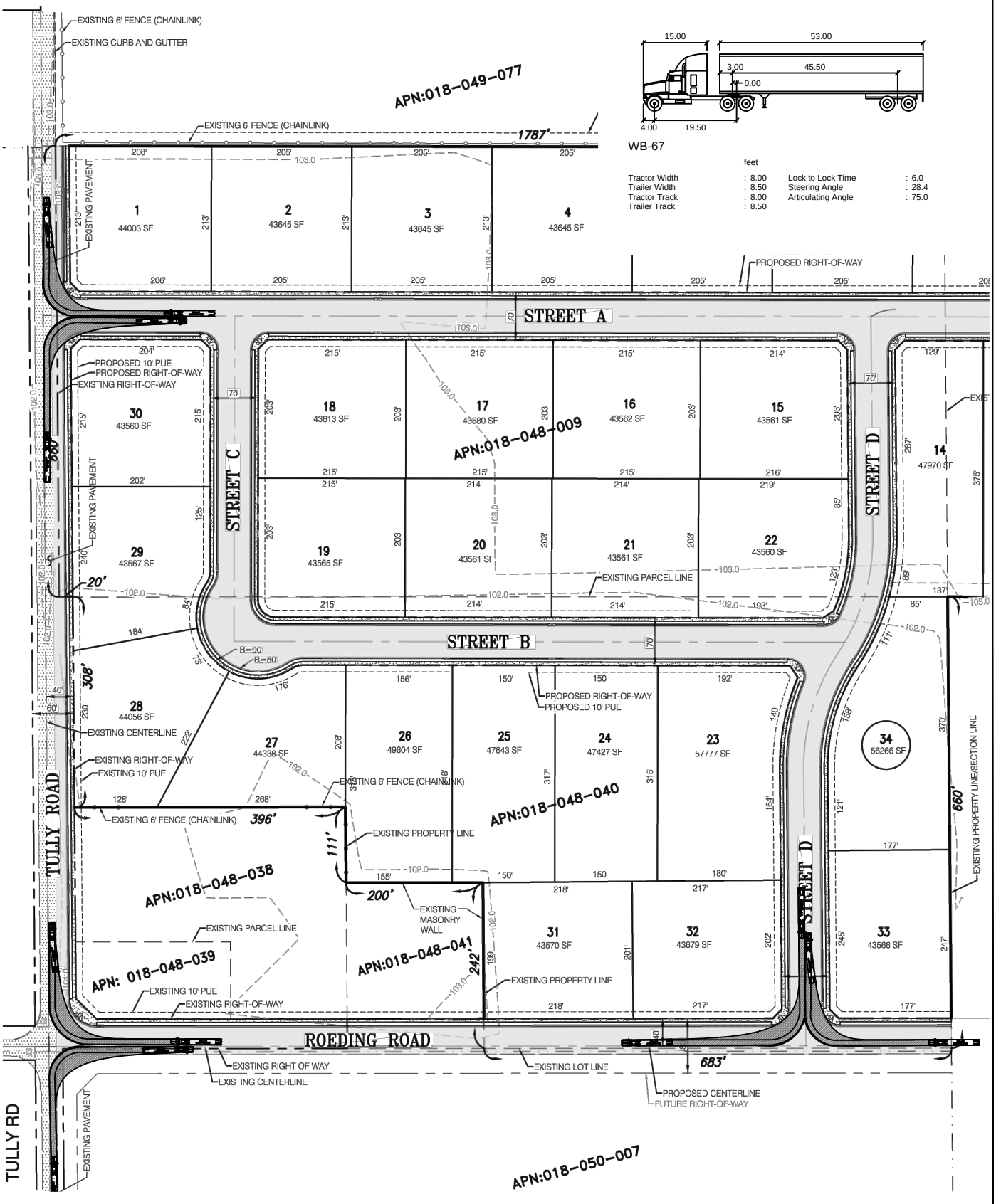
Atline Pacific Nut Company, Inc.
Tully Road Subdivision TIAR

WB-67 Left Turning Movements

Project No. **12511837**
Date **8/28/2023**

FIGURE 8.1

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Plot Date: 28 August 2023 1:36 PM



Atline Pacific Nut Company, Inc.
Tully Road Subdivision TIAR

Project No. **12511837**
Date **8/28/2023**

WB-67 Right Turning Movements

FIGURE 8.2

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Plot Date: 28 August 2023 1:37 PM

As shown in Figure 8.1, truck turning paths to/from Tully Road into proposed project Street A and the Roeding Road extension would be adequate.

8.3 Left-Turn Channelization

Consideration has been given to the provision of southbound left-turn lanes from Tully Road into the proposed project site. Based on the American Association of State Highway and Transportation Officials (ASSHTO) guidelines for the provision of left-turn lanes, the project access points have been investigated for potential satisfaction of left-turn requirements.[7]

Left-turn installation warrants are based on four factors:

1. The number of lanes;
2. Design and operating speeds;
3. Left-turn volumes;
4. Opposing traffic volumes.

Selected ASSHTO guidelines for the installation of a left-turn lane indicate that these parameters are “suggested.” Volume guidelines are provided from Table 9-23 “Guide for Left-Turn Lanes on Two-Lane Highways” as well as Table 9-25 and Figure 9-36 “Suggested Left-Turn Treatment Guidelines Based on Results from Benefit-Cost Evaluations for Intersections on Two-Lane Highways in Rural Areas”. (Left-Turn Warrant Table 9-25 & Figure 9-36 sheets are provided in **Appendix F).** The minimum left-turn volume warrants found in Table 9-25 and Figure 9-36 are very conservative in nature, indicating the left-turn lane warrant would potentially be met with just 5 left-turn movements and an overall intersection volume of 100 vehicles. As such, AASHTO provides the following guidance associated with these specific warrants:

> ASSHTO indicates prudence when considering the left-turn volume warrants stating, “The volume-based guidelines or warrants presented Table 9-25 and Figure 9-36 indicate situations where a left-turn lane may be *desirable*, not necessarily situations where a left-turn lane is *definitely needed*."

Based on the above recommendations, AASHTO volume guidelines from Table 9-23 has been utilized to analyze southbound left-turn access from Tully Road into Street A and Roeding Road (Left-Turn Warrant Table 9-23 sheets are provided in **Appendix F**). The left-turn lane warrant is based on the overall percentage of left-turn movements in the advancing volume versus the opposing volume.

Based on Cumulative Plus Project AM peak hour volumes at the Street A intersection at Tully Road, the proposed project intersection would meet the minimum volume for installation of a southbound left-turn lane. The Roeding Road/Tully Road intersection would not meet the left-turn lane warrant given its lower southbound left-turn volumes. Please note, proposed project volumes represent build-out of the entire industrial park. As described, proposed industrial uses would develop over a period of time (10-20 years) and southbound left-turn project volumes may remain low for a number of years as infrastructure is developed. However, heavy vehicles (trucks) would be utilizing the facility given the nature of the industrial park.

Based on the associated AASHTO left-turn guidelines and warrant requirements, the following mitigation is recommended for the proposed project access at Tully Road:

- A southbound left-turn lane should be installed on Tully Road at the proposed project intersection with Street A. Based on Caltrans guidelines and projected left-turn volumes, the left-turn lane should be designed to provide the maximum storage (to the extent possible) given project frontage and available ROW (100-125 feet of storage [4 vehicles and/or combination of heavy vehicles])

[7] American Association of State Highway and Transportation Officials (ASSHTO), A Policy on Geometric Design of Highways and Streets, Section 9.7.3.1, Guideline for Provision and Design of Left-Turn and Bypass Lanes, 7th Edition, 2018.

9. Vehicle Miles Traveled (VMT)

CEQA Guidelines Section 15064.3, subdivision (a), defines VMT as the amount and distance of automobile travel attributable to a project. This means that for a proposed industrial park, only trips associated with the employees are evaluated in terms of VMT, as heavy trucks are not considered.

9.1 Methodology

Stanislaus County does not currently have adopted VMT guidelines, so no specific methodology has been mandated for VMT analysis in the county. The study team elected to estimate the VMT for the Project's employees using US Census data, because it is considered the most reliable source of commute data available. Journey-to-work data is available from the Longitudinal Employer-Household Dynamics (LEHD) program via a website called "On the Map[8]." The primary source of data used in the LEHD program is the enhanced Quarterly Census of Employment and Wages (QCEW) microdata files obtained from each participating Local Employment Dynamics (LED) state. The employer-based QCEW data is merged with additional worker-based administrative data collected by the US Census Bureau to create integrated employer-worker data, available through two different databases, Quarterly Workforce Indicators (QWI) and LEHD Origin-Destination Employment Statistics (LODES).

Unlike sample-based surveys, such as the U.S. Census's American Community Survey, the LEHD data provides a nearly complete enumeration of home-to-work flows covering over 90% of all workers and employers in the United States[9]. The LEHD data does not contain details on the work trips such as mode choice, route, or travel times. The LEHD data does not include federal workers, self-employed or the military, and workplace location is assigned algorithmically for people who work for a business with multiple locations in a county. The LODES data provides employer-based work destinations and home origins, which were used to approximate weighted average trip lengths to and from the County. The LODES data provides many more origin-destination pairs than collected through sampled data and provides sufficient data for home-to-work flows.

The LODES data was used to calculate trip lengths and associated VMT for the census tract where the Project is located. Since Stanislaus County does not currently have adopted VMT thresholds, the VMT threshold used for this analysis was based on the SB 375 Regional Plan Climate Targets[10] set by the California Air Resources Board (CARB). For Stanislaus Council of Governments, the threshold is 16% below the regional average (i.e., the average for Stanislaus County).

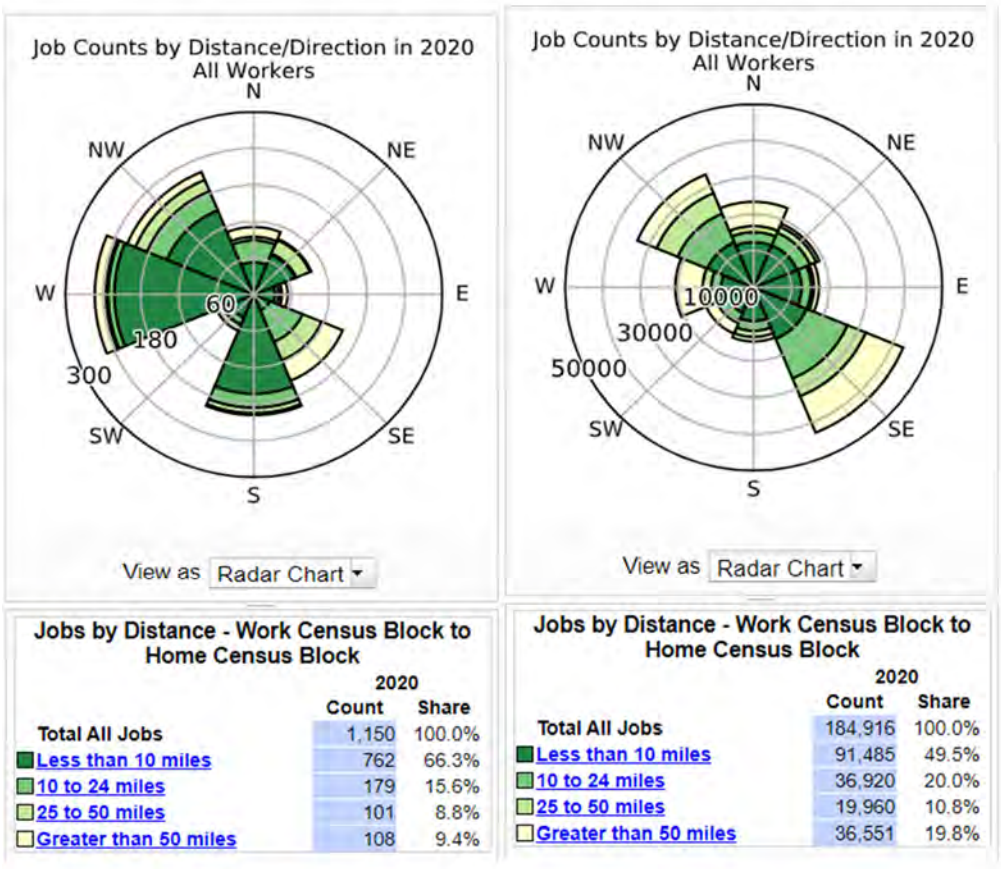
9.2 VMT Analysis Results

The LODES data from "On the Map" was used to determine the countywide regional average travel distances for employees who work in the county and the average distance of the Project's employees, located in Hughson. The two were then compared. **Figure 9.1** presents the travel distance for employees in Hughson (left) compared to Stanislaus County (right). As shown, a larger proportion of employee's countywide travel longer distances than those employed in Hughson. **Table 9.1** presents the jobs, estimated VMT (jobs x average distance), the VMT per job for Hughson and Stanislaus County, and the associated -16% threshold.

[8] **https://onthemap.ces.census.gov/**
[9] "Improving Employment Data for Transportation Planning", NCRHP 08-36, Task 098. Cambridge Systematics, Inc. September 2011. **http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP08-36(98)_FR.pdf**

[10] **https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-program/regional-plan-targets**

Figure 9.1 LODES Jobs by Distance (Work to Home) for Hughson (left) and Stanislaus County as a whole (right)



Jobs by Distance - Work Census Block to Home Census Block

	2020 Count	2020 Share
Total All Jobs	1,150	100.0%
Less than 10 miles	762	66.3%
10 to 24 miles	179	15.6%
25 to 50 miles	101	8.8%
Greater than 50 miles	108	9.4%

Jobs by Distance - Work Census Block to Home Census Block

	2020 Count	2020 Share
Total All Jobs	184,916	100.0%
Less than 10 miles	91,485	49.5%
10 to 24 miles	36,920	20.0%
25 to 50 miles	19,960	10.8%
Greater than 50 miles	36,551	19.8%

Table 9.1 Estimated Jobs and VMT for Hughson and Stanislaus County

LODES Distance Interval	**Assumed Average Distance (mi)**	Hughson		Stanislaus County	
		Number of Jobs	VMT	Number of Jobs	VMT
Less than 10 miles	5	762	3,810	91,485	457,425
10 to 24 miles	17	179	3,043	36,920	627,640
25 to 50 miles	37.5	101	3,788	19,960	748,500
Greater than 50 miles	75	108	8,100	36,551	2,741,325

LODES Distance Interval	**Assumed Average Distance (mi)**	Hughson		Stanislaus County	
		Number of Jobs	VMT	Number of Jobs	VMT
Total		1,150	18,741	184,916	4,574,890
VMT per Job		**16.3**		**24.7**	
	Countywide threshold (16% below county average)			**20.7**	

As shown, the VMT per job for Hughson (16.3 VMT/job) is lower than the countywide threshold of 20.7 VMT/job (16% below the countywide average VMT per job). Since the proposed project is consistent with the zoning and General Plan designations for the City of Hughson, its contribution toward VMT is considered in the LODES analysis for the City of Hughson. As noted, the City of Hughson's VMT is far below the targeted 16% threshold for the region. Therefore, the project site is in a "low-VMT" area and has a less-than-significant impact on VMT.

10. Proposed Project Fair Share Contributions

10.1 Methodology

With proposed project development, transportation mitigation has been recommended for both the E. Whitmore Avenue/Tully Road and E. Whitmore Avenue/Santa Fe Avenue intersections. In the case of the E. Whitmore Avenue/Tully Road intersection, the proposed project would impact the intersection when added to Cumulative Year 2043 (No Project) Conditions. With the E. Whitmore Avenue/Tully Road intersection, the proposed project would be adding to an existing, deficient condition that is present regardless of proposed project development. Therefore, proposed project development would represent its share of overall cumulative traffic growth at each intersection as defined by Caltrans methodology for equitable mitigation. Specifically, the proposed project's equitable share is calculated using the method for calculating equitable mitigation measures outlined in the Caltrans *Guide for the Preparation of Traffic Impact Studies* (State of California, DOT, December 2002), which is shown below:[11]

$$P=T/(T_B - T_E)$$

Where:

P = The equitable share for the proposed project's traffic impact.

T = The vehicle trips generated by the project during the peak hour of adjacent State highway facility in vehicles per hour (vph).

TB = The forecasted traffic volume on an impacted State highway facility at the time of general plan build-out (e.g., 20-year model or the furthest future model date feasible), vph.

TE = The traffic volume existing on the impacted State highway facility plus other approved projects that will generate traffic that has yet to be constructed/opened, vph.

10.2 Proposed Project Pro Rata Share

Table 10.1 below is a listing of the study intersections warranting improvements, the corresponding improvements that the proposed project would be required to pay a Fair-Share of Improvement cost towards, and the proposed project's equitable share of these improvements. Note that the percent Fair-Share calculated using the above formula is

[11] Caltrans' *Guide for the Preparation of Traffic Impact Studies* (December 2002).

reported based upon the highest fair share percentage from the AM and/or PM peak hour scenarios, whichever proportional share was higher (see **Appendix H**—Fair Share Calculations).

Table 10.1 Summary of Fair Share Calculations for Project Impacted Study Intersections

#	Intersection	T	T_B	T_E	P
1	E. Whitmore Avenue/Tully Road	172	1,450	883	**30.03%**
5	E. Whitmore Avenue/Santa Fe Avenue	46	1511	1,208	**15.20%**

Please note, the methodology described in Caltrans' *Guide for the Preparation of Traffic Impact Studies*, **Table 10.1** is neither intended as nor does it establish a legal standard for determining equitable responsibility and cost of the project's traffic impact. However, the intent is to provide the following:

1. A starting point for early discussions to address traffic mitigation equitably;
2. A means for calculating the equitable share for mitigating traffic impacts; and
3. A means for establishing rough proportionality [Dolan vs. City of Tigard, 1994, 512 U.S. 374 (114 S. Ct. 2309)].


GHD

Attachment A: Turning Movement Counts

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit AM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

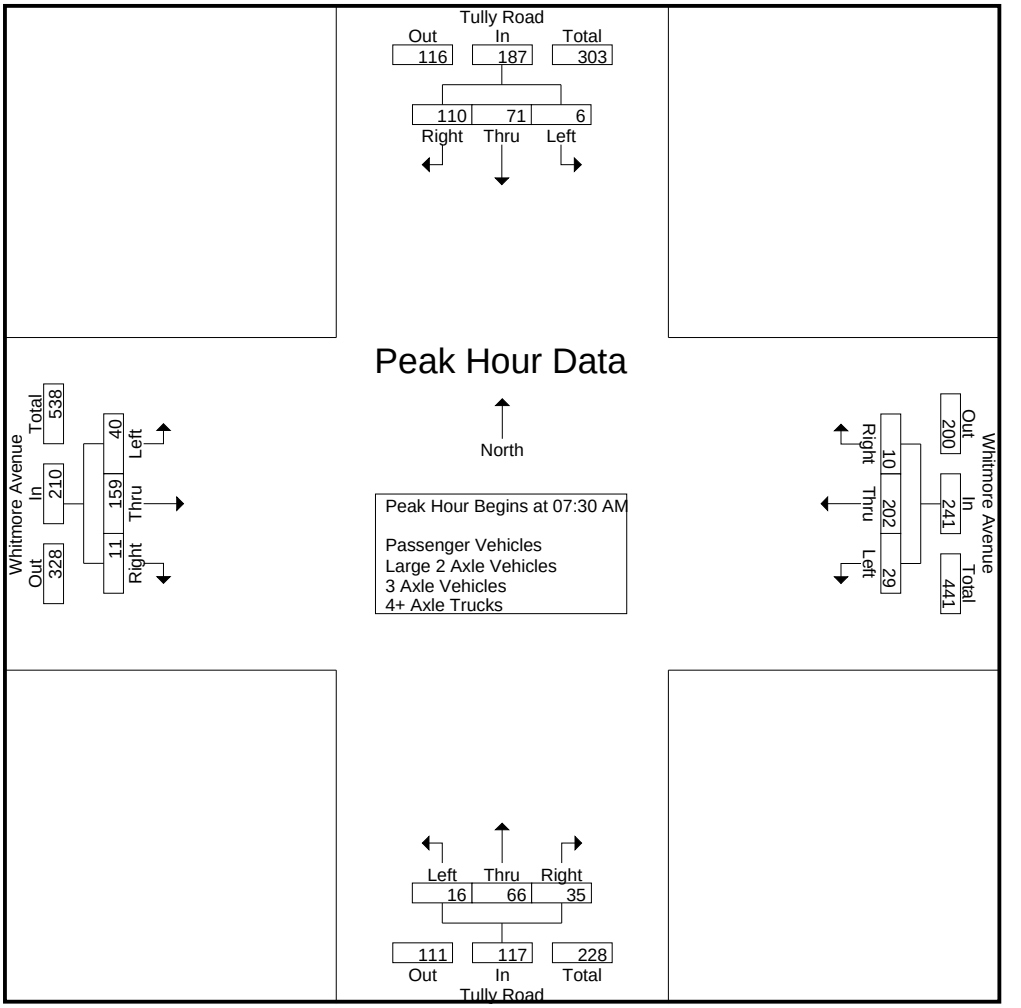
	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	2	11	21	34	6	32	1	39	3	5	3	11	3	18	3	24	108
07:15 AM	2	16	22	40	11	57	1	69	1	11	1	13	2	21	2	25	147
07:30 AM	1	15	31	47	9	57	1	67	4	16	9	29	10	27	3	40	183
07:45 AM	1	20	31	52	7	50	3	60	2	21	3	26	6	24	3	33	171
Total	6	62	105	173	33	196	6	235	10	53	16	79	21	90	11	122	609
08:00 AM	2	15	26	43	4	47	2	53	6	18	10	34	12	51	5	68	198
08:15 AM	2	21	22	45	9	48	4	61	4	11	13	28	12	57	0	69	203
08:30 AM	2	19	17	38	8	61	0	69	5	11	8	24	8	31	3	42	173
08:45 AM	3	7	7	17	5	29	1	35	2	7	5	14	5	27	5	37	103
Total	9	62	72	143	26	185	7	218	17	47	36	100	37	166	13	216	677
Grand Total	15	124	177	316	59	381	13	453	27	100	52	179	58	256	24	338	1286
Apprch %	4.7	39.2	56		13	84.1	2.9		15.1	55.9	29.1		17.2	75.7	7.1		
Total %	1.2	9.6	13.8	24.6	4.6	29.6	1	35.2	2.1	7.8	4	13.9	4.5	19.9	1.9	26.3	
Passenger Vehicles	15	120	174	309	58	363	13	434	25	95	52	172	57	242	21	320	1235
% Passenger Vehicles	100	96.8	98.3	97.8	98.3	95.3	100	95.8	92.6	95	100	96.1	98.3	94.5	87.5	94.7	96
Large 2 Axle Vehicles	0	0	3	3	1	10	0	11	0	3	0	3	1	6	3	10	27
% Large 2 Axle Vehicles	0	0	1.7	0.9	1.7	2.6	0	2.4	0	3	0	1.7	1.7	2.3	12.5	3	2.1
3 Axle Vehicles	0	0	0	0	0	2	0	2	1	0	0	1	0	4	0	4	7
% 3 Axle Vehicles	0	0	0	0	0	0.5	0	0.4	3.7	0	0	0.6	0	1.6	0	1.2	0.5
4+ Axle Trucks	0	4	0	4	0	6	0	6	1	2	0	3	0	4	0	4	17
% 4+ Axle Trucks	0	3.2	0	1.3	0	1.6	0	1.3	3.7	2	0	1.7	0	1.6	0	1.2	1.3

	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue 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	1	15	**31**	47	**9**	**57**	1	**67**	4	16	9	29	10	27	3	40	183
07:45 AM	1	20	31	**52**	7	50	3	60	2	**21**	3	26	6	24	3	33	171
08:00 AM	**2**	15	26	43	4	47	2	53	**6**	18	10	**34**	**12**	51	**5**	68	198
08:15 AM	2	**21**	22	45	9	48	**4**	61	4	11	**13**	28	12	**57**	0	**69**	**203**
Total Volume	6	71	110	187	29	202	10	241	16	66	35	117	40	159	11	210	755
% App. Total	3.2	38	58.8		12	83.8	4.1		13.7	56.4	29.9		19	75.7	5.2		
PHF	.750	.845	.887	.899	.806	.886	.625	.899	.667	.786	.673	.860	.833	.697	.550	.761	.930

Counts Unlimited, Inc.
PO Box 1178
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(951) 268-6268

City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit AM
Site Code : 22323476
Start Date : 5/16/2023
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				07:15 AM				07:30 AM				08:00 AM			
+0 mins.	1	15	**31**	47	**11**	**57**	1	**69**	4	16	9	29	**12**	51	**5**	68
+15 mins.	1	20	31	**52**	9	57	1	67	2	**21**	3	26	12	**57**	0	**69**
+30 mins.	**2**	15	26	43	7	50	**3**	60	**6**	18	10	**34**	8	31	3	42
+45 mins.	2	**21**	22	45	4	47	2	53	4	11	**13**	28	5	27	5	37
Total Volume	6	71	110	187	31	211	7	249	16	66	35	117	37	166	13	216
% App. Total	3.2	38	58.8		12.4	84.7	2.8		13.7	56.4	29.9		17.1	76.9	6	
PHF	.750	.845	.887	.899	.705	.925	.583	.902	.667	.786	.673	.860	.771	.728	.650	.783

Counts Unlimited, Inc.
PO Box 1178
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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
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File Name : 01_HSN_Tul_Whit AM
Site Code : 22323476
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Page No : 1

Groups Printed- Passenger Vehicles

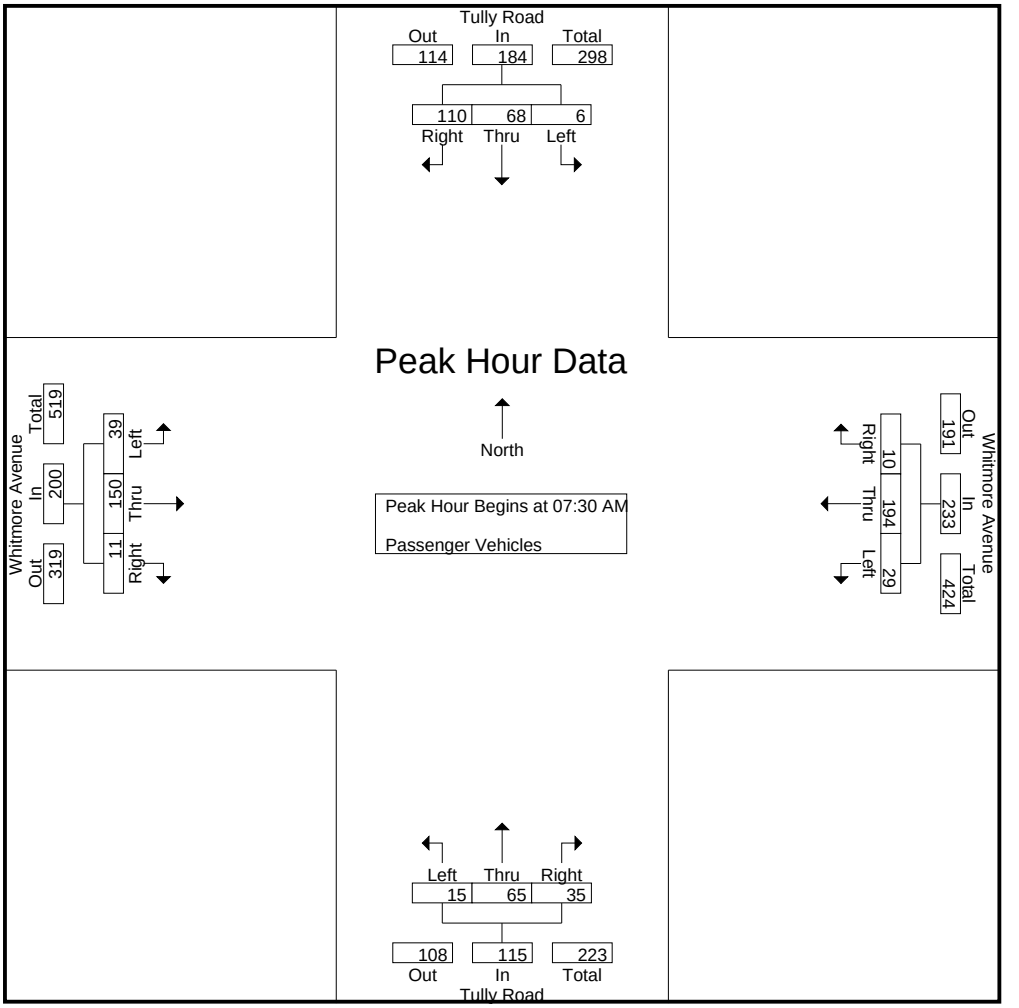
	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	2	11	20	33	6	29	1	36	3	4	3	10	3	16	1	20	99
07:15 AM	2	15	22	39	10	57	1	68	1	10	1	12	2	20	2	24	143
07:30 AM	1	14	31	46	9	54	1	64	4	16	9	29	10	27	3	40	179
07:45 AM	1	19	31	51	7	48	3	58	2	20	3	25	5	21	3	29	163
Total	6	59	104	169	32	188	6	226	10	50	16	76	20	84	9	113	584
08:00 AM	2	15	26	43	4	44	2	50	5	18	10	33	12	48	5	65	191
08:15 AM	2	20	22	44	9	48	4	61	4	11	13	28	12	54	0	66	199
08:30 AM	2	19	15	36	8	57	0	65	4	10	8	22	8	30	3	41	164
08:45 AM	3	7	7	17	5	26	1	32	2	6	5	13	5	26	4	35	97
Total	9	61	70	140	26	175	7	208	15	45	36	96	37	158	12	207	651
Grand Total	15	120	174	309	58	363	13	434	25	95	52	172	57	242	21	320	1235
Apprch %	4.9	38.8	56.3		13.4	83.6	3		14.5	55.2	30.2		17.8	75.6	6.6		
Total %	1.2	9.7	14.1	25	4.7	29.4	1.1	35.1	2	7.7	4.2	13.9	4.6	19.6	1.7	25.9	

	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	1	14	**31**	46	**9**	**54**	1	**64**	4	16	9	29	10	27	3	40	179
07:45 AM	1	19	31	**51**	7	48	3	58	2	**20**	3	25	5	21	3	29	163
08:00 AM	**2**	15	26	43	4	44	2	50	**5**	18	10	**33**	**12**	48	**5**	65	191
08:15 AM	2	**20**	22	44	9	48	**4**	61	4	11	**13**	28	12	**54**	0	**66**	**199**
Total Volume	6	68	110	184	29	194	10	233	15	65	35	115	39	150	11	200	732
% App. Total	3.3	37	59.8		12.4	83.3	4.3		13	56.5	30.4		19.5	75	5.5		
PHF	.750	.850	.887	.902	.806	.898	.625	.910	.750	.813	.673	.871	.813	.694	.550	.758	.920

Counts Unlimited, Inc.
PO Box 1178
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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit AM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 2



Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	1	14	**31**	46	**9**	**54**	1	**64**	4	16	9	29	10	27	3	40
+15 mins.	1	19	31	**51**	7	48	3	58	2	**20**	3	25	5	21	3	29
+30 mins.	**2**	15	26	43	4	44	2	50	**5**	18	10	**33**	**12**	48	**5**	65
+45 mins.	2	**20**	22	44	9	48	**4**	61	4	11	**13**	28	12	**54**	0	**66**
Total Volume	6	68	110	184	29	194	10	233	15	65	35	115	39	150	11	200
% App. Total	3.3	37	59.8		12.4	83.3	4.3		13	56.5	30.4		19.5	75	5.5	
PHF	.750	.850	.887	.902	.806	.898	.625	.910	.750	.813	.673	.871	.813	.694	.550	.758

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit AM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 1

Groups Printed- Large 2 Axle Vehicles

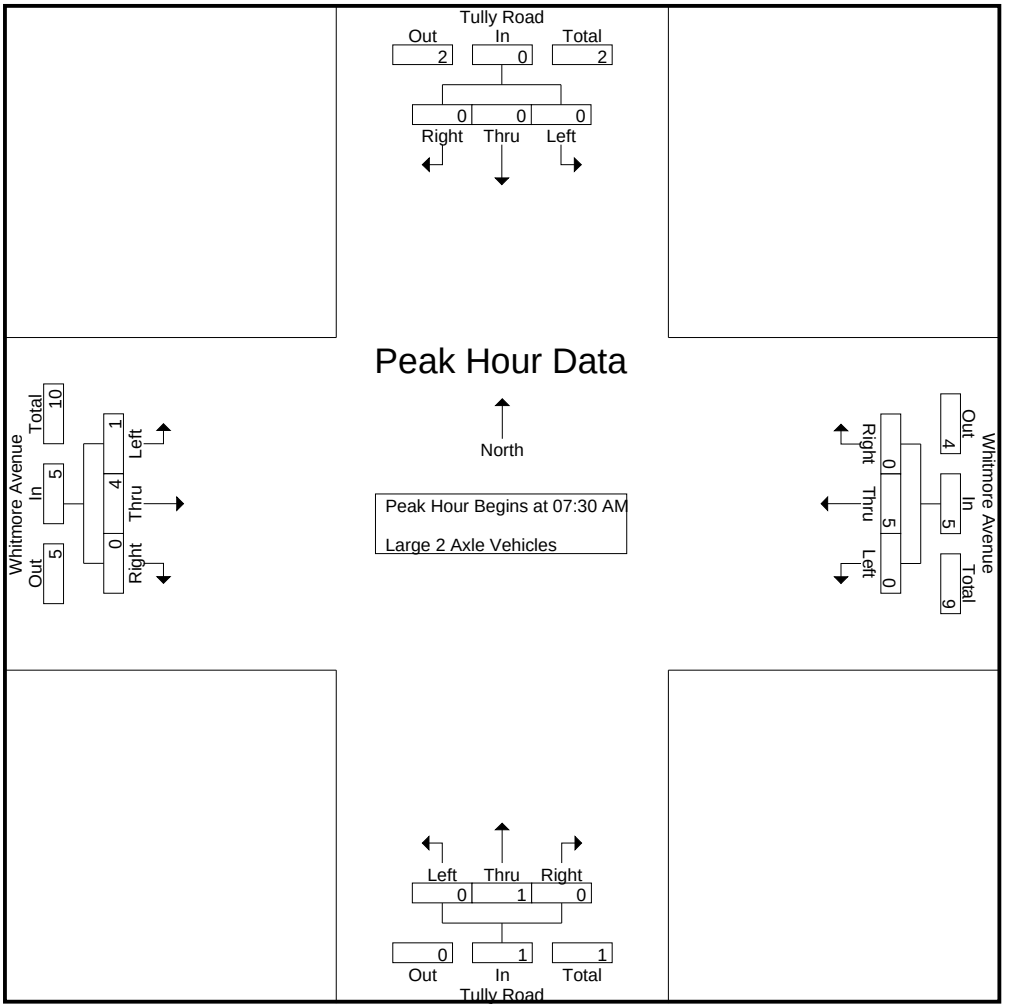
	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	1	1	0	1	0	1	0	0	0	0	0	1	2	3	5
07:15 AM	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	2
07:30 AM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3
07:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	2
Total	0	0	1	1	1	4	0	5	0	2	0	2	1	1	2	4	12
08:00 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	2	4
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
08:30 AM	0	0	2	2	0	2	0	2	0	1	0	1	0	1	0	1	6
08:45 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	1	1	3
Total	0	0	2	2	0	6	0	6	0	1	0	1	0	5	1	6	15
Grand Total	0	0	3	3	1	10	0	11	0	3	0	3	1	6	3	10	27
Apprch %	0	0	100		9.1	90.9	0		0	100	0		10	60	30		
Total %	0	0	11.1	11.1	3.7	37	0	40.7	0	11.1	0	11.1	3.7	22.2	11.1	37	

	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	**3**	0	**3**	0	0	0	0	0	0	0	0	3
07:45 AM	0	0	0	0	0	0	0	0	0	**1**	0	**1**	**1**	0	0	1	2
08:00 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	**2**	0	**2**	**4**
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
Total Volume	0	0	0	0	0	5	0	5	0	1	0	1	1	4	0	5	11
% App. Total	0	0	0		0	100	0		0	100	0		20	80	0		
PHF	.000	.000	.000	.000	.000	.417	.000	.417	.000	.250	.000	.250	.250	.500	.000	.625	.688

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit AM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 2



Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	0	0	0	0	**3**	0	**3**	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	**1**	0	**1**	**1**	0	0	1
+30 mins.	0	0	0	0	0	2	0	2	0	0	0	0	0	**2**	0	**2**
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Total Volume	0	0	0	0	0	5	0	5	0	1	0	1	1	4	0	5
% App. Total	0	0	0		0	100	0		0	100	0		20	80	0	
PHF	.000	.000	.000	.000	.000	.417	.000	.417	.000	.250	.000	.250	.250	.500	.000	.625

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit AM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 1

Groups Printed- 3 Axle Vehicles

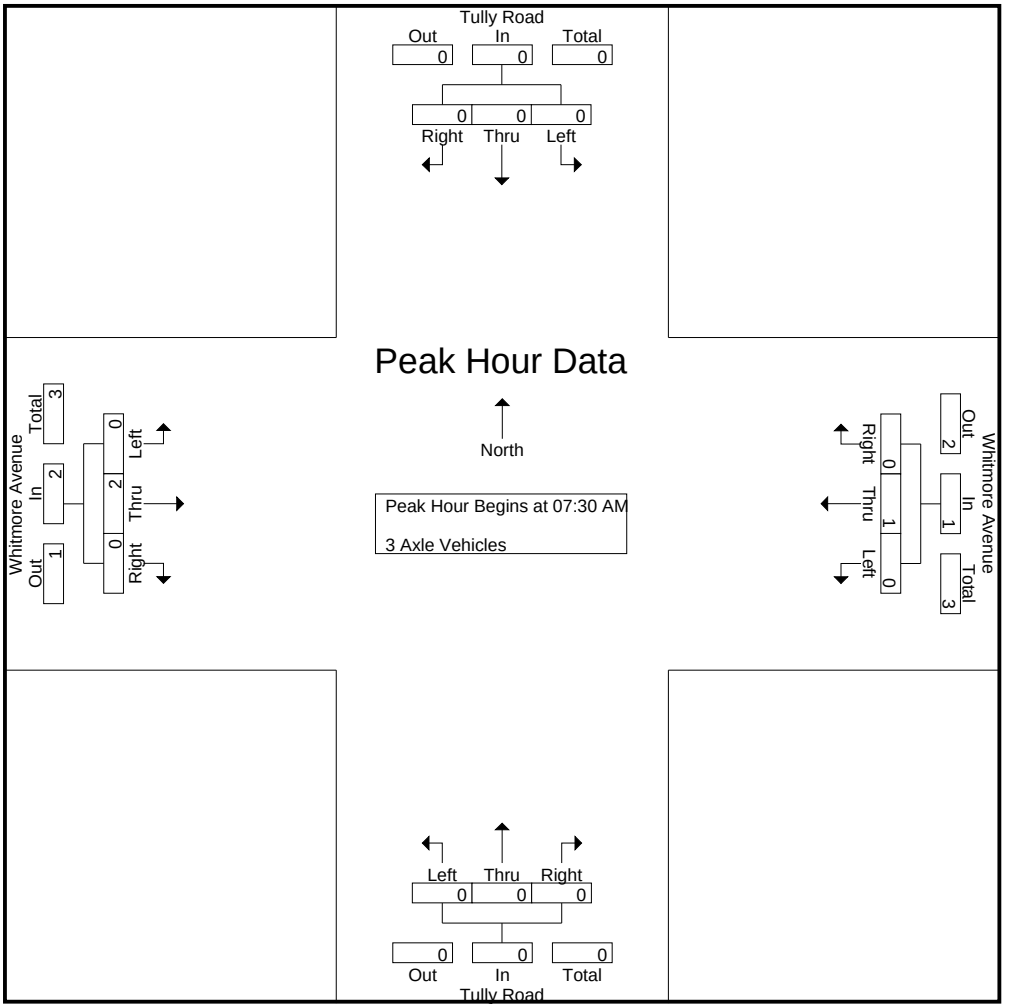
	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
Total	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	2	3
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
08:45 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
Total	0	0	0	0	0	1	0	1	1	0	0	1	0	2	0	2	4
Grand Total	0	0	0	0	0	2	0	2	1	0	0	1	0	4	0	4	7
Apprch %	0	0	0		0	100	0		100	0	0		0	100	0		
Total %	0	0	0	0	0	28.6	0	28.6	14.3	0	0	14.3	0	57.1	0	57.1	

	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	**1**	0	**1**	**2**
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	2	3
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.500	.000	.500	.375

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit AM
Site Code : 22323476
Start Date : 5/16/2023
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Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	**1**	0	**1**
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	2
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0	
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.500	.000	.500

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit AM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 1

Groups Printed- 4+ Axle Trucks

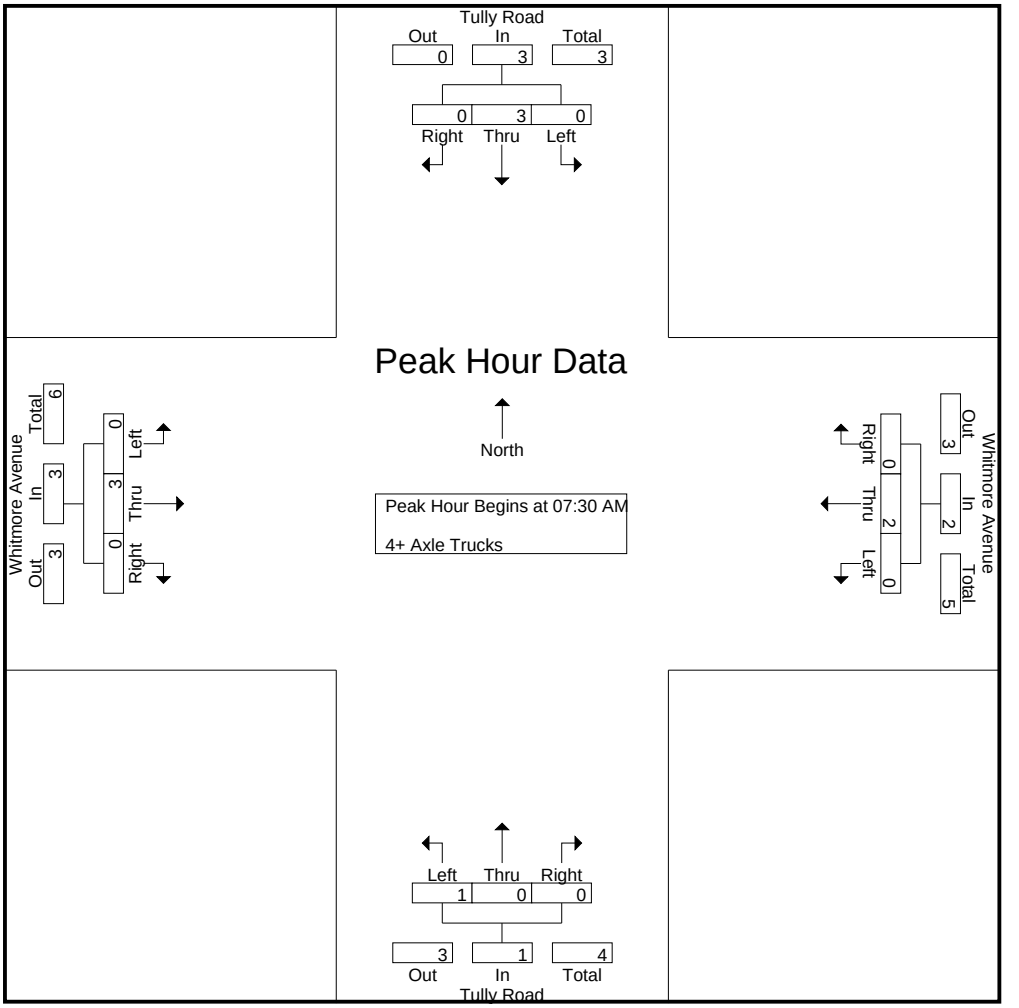
	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	2	0	2	0	1	0	1	0	0	0	0	3
07:15 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	2
07:30 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	2	0	2	4
Total	0	3	0	3	0	3	0	3	0	1	0	1	0	3	0	3	10
08:00 AM	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	2
08:15 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	2
08:30 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
08:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Total	0	1	0	1	0	3	0	3	1	1	0	2	0	1	0	1	7
Grand Total	0	4	0	4	0	6	0	6	1	2	0	3	0	4	0	4	17
Apprch %	0	100	0		0	100	0		33.3	66.7	0		0	100	0		
Total %	0	23.5	0	23.5	0	35.3	0	35.3	5.9	11.8	0	17.6	0	23.5	0	23.5	

	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	0	1	0	1	0	**1**	0	**1**	0	0	0	0	0	**2**	0	**2**	**4**
08:00 AM	0	0	0	0	0	1	0	1	**1**	0	0	**1**	0	0	0	0	2
08:15 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	2
Total Volume	0	3	0	3	0	2	0	2	1	0	0	1	0	3	0	3	9
% App. Total	0	100	0		0	100	0		100	0	0		0	100	0		
PHF	.000	.750	.000	.750	.000	.500	.000	.500	.250	.000	.000	.250	.000	.375	.000	.375	.563

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit AM
Site Code : 22323476
Start Date : 5/16/2023
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Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	1	0	1	0	**1**	0	**1**	0	0	0	0	0	**2**	0	**2**
+30 mins.	0	0	0	0	0	1	0	1	**1**	0	0	**1**	0	0	0	0
+45 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1
Total Volume	0	3	0	3	0	2	0	2	1	0	0	1	0	3	0	3
% App. Total	0	100	0		0	100	0		100	0	0		0	100	0	
PHF	.000	.750	.000	.750	.000	.500	.000	.500	.250	.000	.000	.250	.000	.375	.000	.375

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit PM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

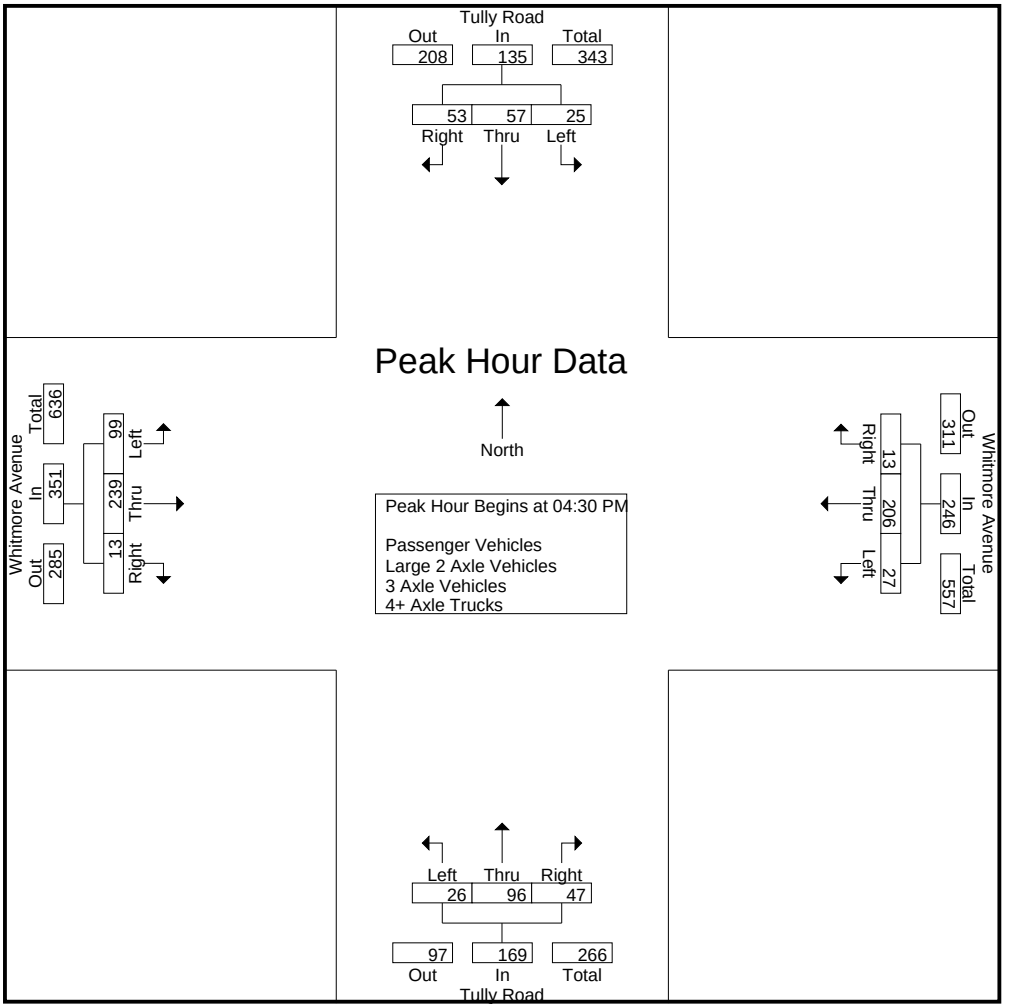
	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	4	17	15	36	6	48	6	60	5	22	12	39	17	64	2	83	218
04:15 PM	7	21	17	45	6	52	1	59	2	16	7	25	19	37	6	62	191
04:30 PM	7	17	12	36	7	53	3	63	12	28	11	51	22	63	2	87	237
04:45 PM	6	14	12	32	10	44	4	58	7	25	11	43	25	54	6	85	218
Total	24	69	56	149	29	197	14	240	26	91	41	158	83	218	16	317	864
05:00 PM	5	14	9	28	6	61	5	72	5	25	11	41	27	55	2	84	225
05:15 PM	7	12	20	39	4	48	1	53	2	18	14	34	25	67	3	95	221
05:30 PM	3	19	24	46	9	39	2	50	1	26	9	36	26	48	5	79	211
05:45 PM	2	19	8	29	4	47	1	52	2	21	9	32	24	59	3	86	199
Total	17	64	61	142	23	195	9	227	10	90	43	143	102	229	13	344	856
Grand Total	41	133	117	291	52	392	23	467	36	181	84	301	185	447	29	661	1720
Apprch %	14.1	45.7	40.2		11.1	83.9	4.9		12	60.1	27.9		28	67.6	4.4		
Total %	2.4	7.7	6.8	16.9	3	22.8	1.3	27.2	2.1	10.5	4.9	17.5	10.8	26	1.7	38.4	
Passenger Vehicles	40	132	113	285	50	382	23	455	34	178	83	295	184	436	26	646	1681
% Passenger Vehicles	97.6	99.2	96.6	97.9	96.2	97.4	100	97.4	94.4	98.3	98.8	98	99.5	97.5	89.7	97.7	97.7
Large 2 Axle Vehicles	1	1	4	6	0	8	0	8	0	3	0	3	1	9	0	10	27
% Large 2 Axle Vehicles	2.4	0.8	3.4	2.1	0	2	0	1.7	0	1.7	0	1	0.5	2	0	1.5	1.6
3 Axle Vehicles	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	2
% 3 Axle Vehicles	0	0	0	0	0	0	0	0	2.8	0	0	0.3	0	0.2	0	0.2	0.1
4+ Axle Trucks	0	0	0	0	2	2	0	4	1	0	1	2	0	1	3	4	10
% 4+ Axle Trucks	0	0	0	0	3.8	0.5	0	0.9	2.8	0	1.2	0.7	0	0.2	10.3	0.6	0.6

	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue 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	**7**	**17**	12	36	7	53	3	63	**12**	**28**	11	**51**	22	63	2	87	**237**
04:45 PM	6	14	12	32	**10**	44	4	58	7	25	11	43	25	54	**6**	85	218
05:00 PM	5	14	9	28	6	**61**	**5**	**72**	5	25	11	41	**27**	55	2	84	225
05:15 PM	7	12	**20**	**39**	4	48	1	53	2	18	**14**	34	25	**67**	3	**95**	221
Total Volume	25	57	53	135	27	206	13	246	26	96	47	169	99	239	13	351	901
% App. Total	18.5	42.2	39.3		11	83.7	5.3		15.4	56.8	27.8		28.2	68.1	3.7		
PHF	.893	.838	.663	.865	.675	.844	.650	.854	.542	.857	.839	.828	.917	.892	.542	.924	.950

Counts Unlimited, Inc.
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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit PM
Site Code : 22323476
Start Date : 5/16/2023
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				04:30 PM				04:30 PM			
+0 mins.	4	17	15	36	6	52	1	59	**12**	**28**	11	**51**	22	63	2	87
+15 mins.	**7**	**21**	**17**	**45**	7	53	3	63	7	25	11	43	25	54	**6**	85
+30 mins.	7	17	12	36	**10**	44	4	58	5	25	11	41	**27**	55	2	84
+45 mins.	6	14	12	32	6	**61**	**5**	**72**	2	18	**14**	34	25	**67**	3	**95**
Total Volume	24	69	56	149	29	210	13	252	26	96	47	169	99	239	13	351
% App. Total	16.1	46.3	37.6		11.5	83.3	5.2		15.4	56.8	27.8		28.2	68.1	3.7	
PHF	.857	.821	.824	.828	.725	.861	.650	.875	.542	.857	.839	.828	.917	.892	.542	.924

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit PM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 1

Groups Printed- Passenger Vehicles

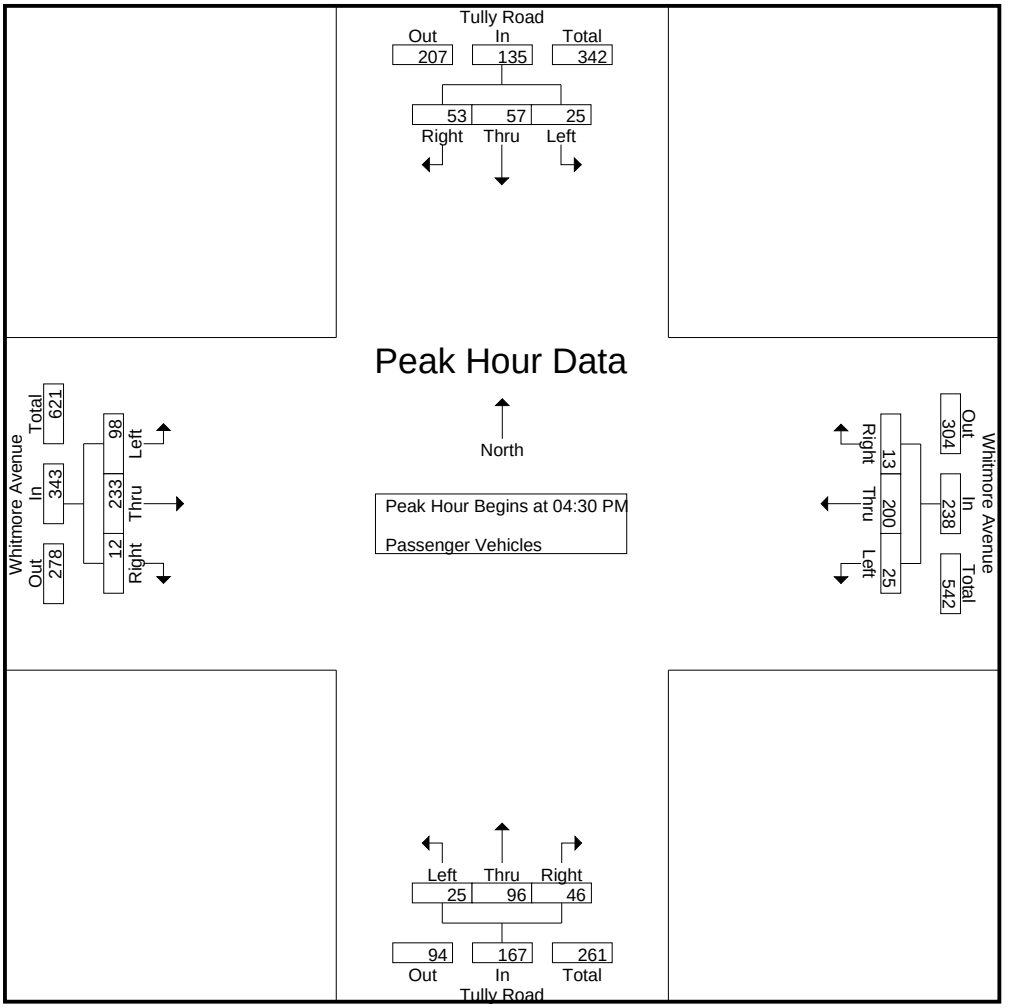
	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	4	17	13	34	6	46	6	58	4	21	12	37	17	63	1	81	210
04:15 PM	7	20	17	44	6	52	1	59	2	15	7	24	19	34	5	58	185
04:30 PM	7	17	12	36	7	50	3	60	12	28	11	51	22	61	2	85	232
04:45 PM	6	14	12	32	8	44	4	56	6	25	11	42	25	53	5	83	213
Total	24	68	54	146	27	192	14	233	24	89	41	154	83	211	13	307	840
05:00 PM	5	14	9	28	6	59	5	70	5	25	10	40	26	53	2	81	219
05:15 PM	7	12	20	39	4	47	1	52	2	18	14	34	25	66	3	94	219
05:30 PM	2	19	23	44	9	37	2	48	1	25	9	35	26	48	5	79	206
05:45 PM	2	19	7	28	4	47	1	52	2	21	9	32	24	58	3	85	197
Total	16	64	59	139	23	190	9	222	10	89	42	141	101	225	13	339	841
Grand Total	40	132	113	285	50	382	23	455	34	178	83	295	184	436	26	646	1681
Apprch %	14	46.3	39.6		11	84	5.1		11.5	60.3	28.1		28.5	67.5	4		
Total %	2.4	7.9	6.7	17	3	22.7	1.4	27.1	2	10.6	4.9	17.5	10.9	25.9	1.5	38.4	

	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**7**	**17**	12	36	7	50	3	60	**12**	**28**	11	**51**	22	61	2	85	**232**
04:45 PM	6	14	12	32	**8**	44	4	56	6	25	11	42	25	53	**5**	83	213
05:00 PM	5	14	9	28	6	**59**	**5**	**70**	5	25	10	40	**26**	53	2	81	219
05:15 PM	7	12	**20**	**39**	4	47	1	52	2	18	**14**	34	25	**66**	3	**94**	219
Total Volume	25	57	53	135	25	200	13	238	25	96	46	167	98	233	12	343	883
% App. Total	18.5	42.2	39.3		10.5	84	5.5		15	57.5	27.5		28.6	67.9	3.5		
PHF	.893	.838	.663	.865	.781	.847	.650	.850	.521	.857	.821	.819	.942	.883	.600	.912	.952

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit PM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	**7**	**17**	12	36	7	50	3	60	**12**	**28**	11	**51**	22	61	2	85
+15 mins.	6	14	12	32	**8**	44	4	56	6	25	11	42	25	53	**5**	83
+30 mins.	5	14	9	28	6	**59**	**5**	**70**	5	25	10	40	**26**	53	2	81
+45 mins.	7	12	**20**	**39**	4	47	1	52	2	18	**14**	34	25	**66**	3	**94**
Total Volume	25	57	53	135	25	200	13	238	25	96	46	167	98	233	12	343
% App. Total	18.5	42.2	39.3		10.5	84	5.5		15	57.5	27.5		28.6	67.9	3.5	
PHF	.893	.838	.663	.865	.781	.847	.650	.850	.521	.857	.821	.819	.942	.883	.600	.912

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit PM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 1

Groups Printed- Large 2 Axle Vehicles

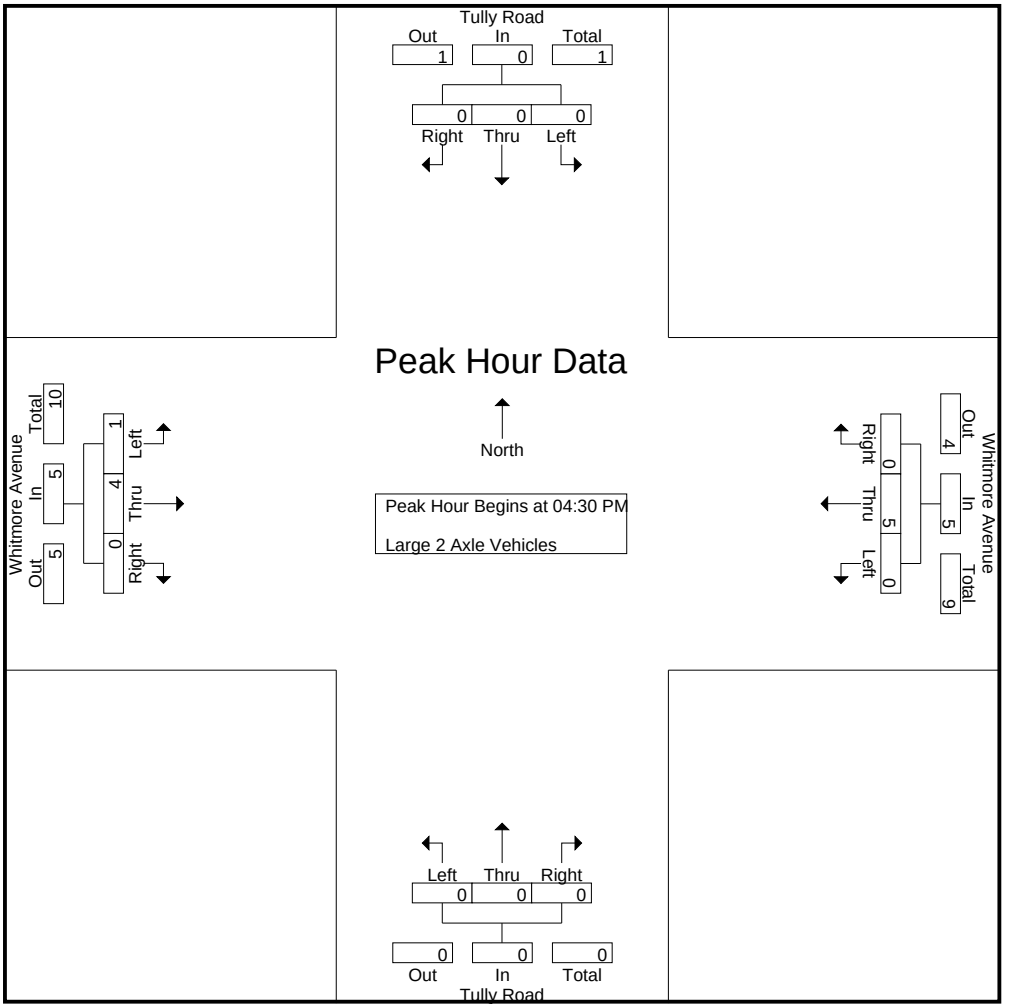
	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	2	2	0	1	0	1	0	1	0	1	0	1	0	1	5
04:15 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	3	0	3	5
04:30 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	2	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	2	3	0	3	0	3	0	2	0	2	0	6	0	6	14
05:00 PM	0	0	0	0	0	2	0	2	0	0	0	0	1	1	0	2	4
05:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
05:30 PM	1	0	1	2	0	2	0	2	0	1	0	1	0	0	0	0	5
05:45 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	2
Total	1	0	2	3	0	5	0	5	0	1	0	1	1	3	0	4	13
Grand Total	1	1	4	6	0	8	0	8	0	3	0	3	1	9	0	10	27
Apprch %	16.7	16.7	66.7		0	100	0		0	100	0		10	90	0		
Total %	3.7	3.7	14.8	22.2	0	29.6	0	29.6	0	11.1	0	11.1	3.7	33.3	0	37	

	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	**2**	0	**2**	0	0	0	0	0	**2**	0	**2**	**4**
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	2	0	2	0	0	0	0	**1**	1	0	2	4
05:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
Total Volume	0	0	0	0	0	5	0	5	0	0	0	0	1	4	0	5	10
% App. Total	0	0	0		0	100	0		0	0	0		20	80	0		
PHF	.000	.000	.000	.000	.000	.625	.000	.625	.000	.000	.000	.000	.250	.500	.000	.625	.625

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit PM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	0	**2**	0	**2**	0	0	0	0	0	**2**	0	**2**
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	2	0	2	0	0	0	0	**1**	1	0	2
+45 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1
Total Volume	0	0	0	0	0	5	0	5	0	0	0	0	1	4	0	5
% App. Total	0	0	0		0	100	0		0	0	0		20	80	0	
PHF	.000	.000	.000	.000	.000	.625	.000	.625	.000	.000	.000	.000	.250	.500	.000	.625

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit PM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 1

Groups Printed- 3 Axle Vehicles

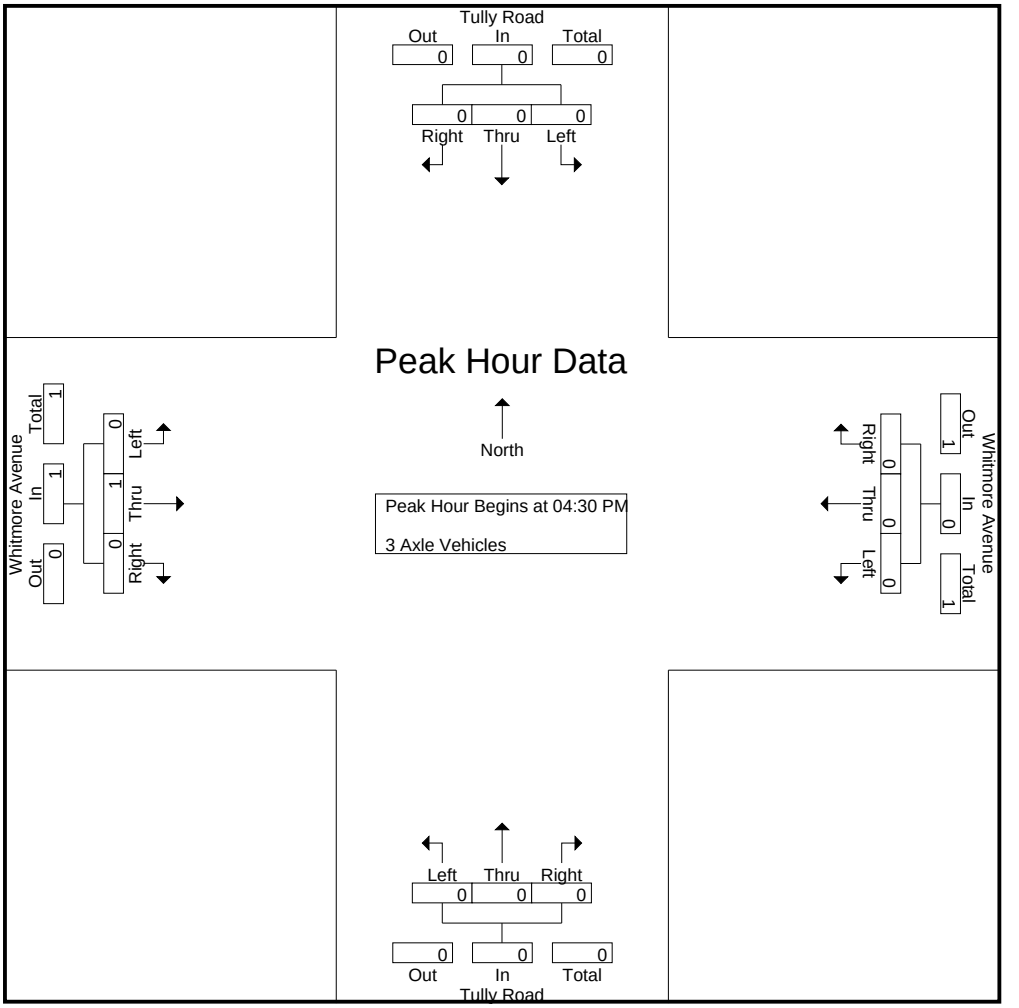
	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Grand Total	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	2
Apprch %	0	0	0		0	0	0		100	0	0		0	100	0		
Total %	0	0	0	0	0	0	0	0	50	0	0	50	0	50	0	50	

	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	**1**
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
% App. Total	0	0	0		0	0	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.250

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit PM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
% App. Total	0	0	0		0	0	0		0	0	0		0	100	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit PM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 1

Groups Printed- 4+ Axle Trucks

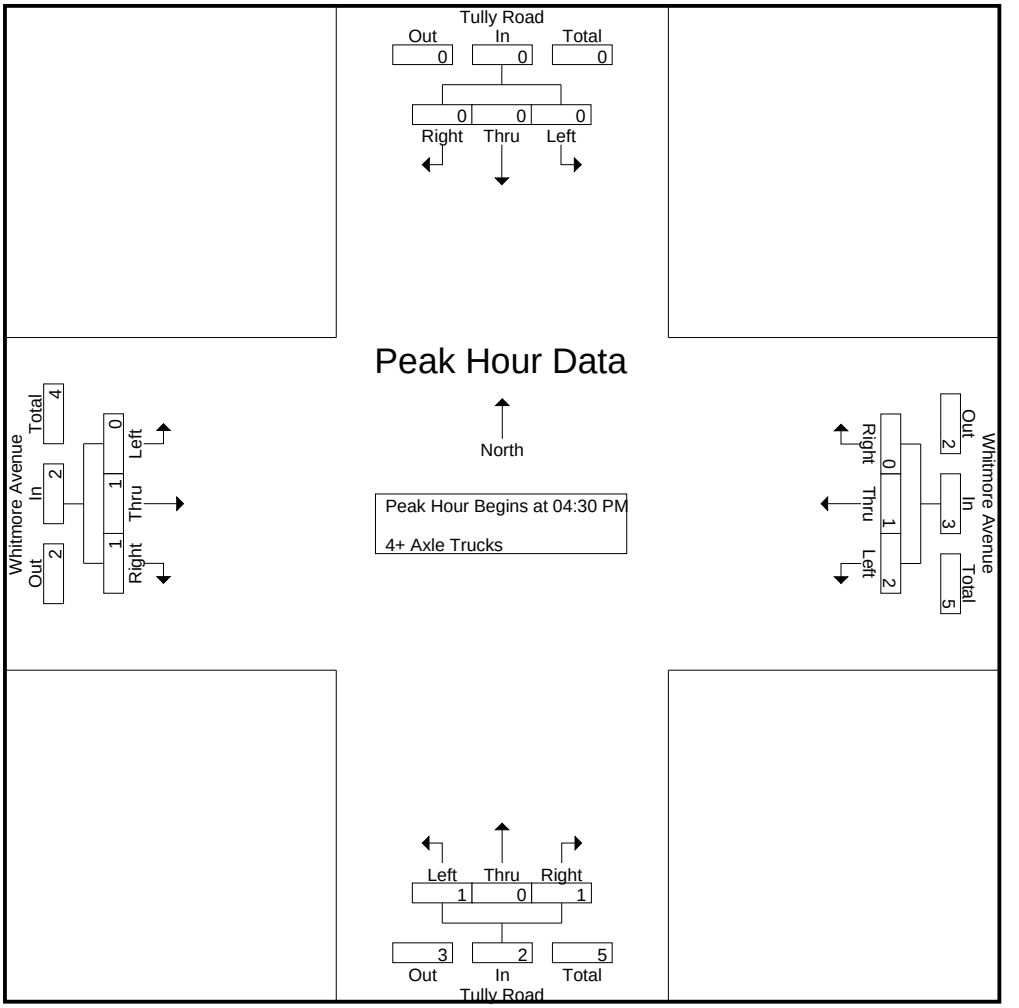
	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	2
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
04:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	2	0	0	2	1	0	0	1	0	1	1	2	5
Total	0	0	0	0	2	2	0	4	1	0	0	1	0	1	3	4	9
05:00 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
Grand Total	0	0	0	0	2	2	0	4	1	0	1	2	0	1	3	4	10
Apprch %	0	0	0		50	50	0		50	0	50		0	25	75		
Total %	0	0	0	0	20	20	0	40	10	0	10	20	0	10	30	40	

	Tully Road Southbound				Whitmore Avenue Westbound				Tully Road Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	**1**	0	1	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	**2**	0	0	**2**	**1**	0	0	**1**	0	**1**	**1**	**2**	**5**
05:00 PM	0	0	0	0	0	0	0	0	0	0	**1**	1	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	2	1	0	3	1	0	1	2	0	1	1	2	7
% App. Total	0	0	0		66.7	33.3	0		50	0	50		0	50	50		
PHF	.000	.000	.000	.000	.250	.250	.000	.375	.250	.000	.250	.500	.000	.250	.250	.250	.350

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City of Hughson
N/S: Tully Road
E/W: Whitmore Avenue
Weather: Clear

File Name : 01_HSN_Tul_Whit PM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	0	**1**	0	1	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	**2**	0	0	**2**	**1**	0	0	**1**	0	**1**	**1**	**2**
+30 mins.	0	0	0	0	0	0	0	0	0	0	**1**	1	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	2	1	0	3	1	0	1	2	0	1	1	2
% App. Total	0	0	0		66.7	33.3	0		50	0	50		0	50	50	
PHF	.000	.000	.000	.000	.250	.250	.000	.375	.250	.000	.250	.500	.000	.250	.250	.250

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City of Hughson
N/S: Tully Road
E/W: Roeding Road
Weather: Clear

File Name : 02_HSN_Tully_Roe AM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 1

Groups Printed- Total Volume

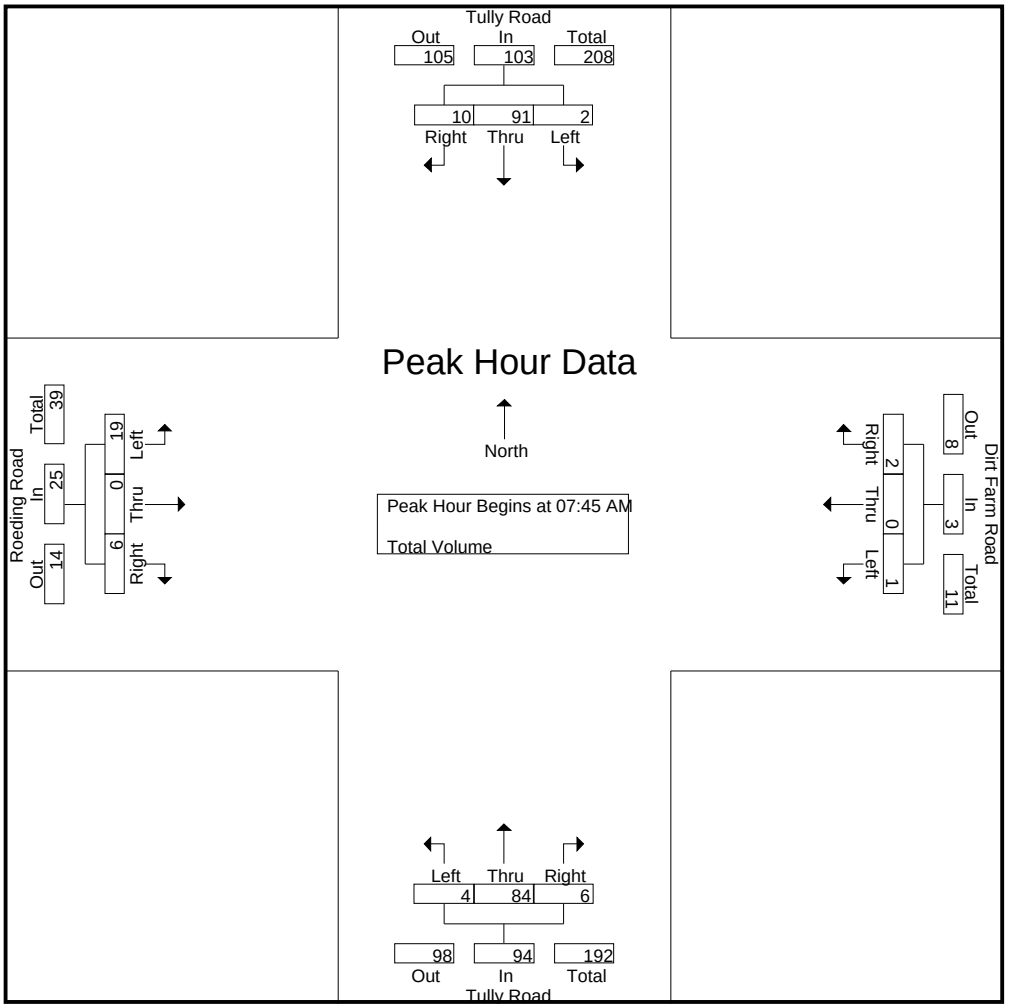
	Tully Road Southbound				Dirt Farm Road Westbound				Tully Road Northbound				Roeding Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	11	0	11	0	0	0	0	0	15	0	15	1	0	0	1	27
07:15 AM	1	23	6	30	0	0	0	0	2	13	3	18	3	0	1	4	52
07:30 AM	0	13	6	19	0	0	0	0	4	19	1	24	4	0	0	4	47
07:45 AM	1	26	3	30	0	0	1	1	0	14	0	14	5	0	2	7	52
Total	2	73	15	90	0	0	1	1	6	61	4	71	13	0	3	16	178
08:00 AM	0	18	1	19	0	0	1	1	3	23	5	31	4	0	2	6	57
08:15 AM	1	27	1	29	0	0	0	0	0	28	1	29	4	0	2	6	64
08:30 AM	0	20	5	25	1	0	0	1	1	19	0	20	6	0	0	6	52
08:45 AM	0	16	0	16	0	0	0	0	2	11	0	13	4	0	1	5	34
Total	1	81	7	89	1	0	1	2	6	81	6	93	18	0	5	23	207
Grand Total	3	154	22	179	1	0	2	3	12	142	10	164	31	0	8	39	385
Apprch %	1.7	86	12.3		33.3	0	66.7		7.3	86.6	6.1		79.5	0	20.5		
Total %	0.8	40	5.7	46.5	0.3	0	0.5	0.8	3.1	36.9	2.6	42.6	8.1	0	2.1	10.1	

	Tully Road Southbound				Dirt Farm Road Westbound				Tully Road Northbound				Roeding Road 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	**1**	26	3	**30**	0	0	**1**	**1**	0	14	0	14	5	0	**2**	**7**	52
08:00 AM	0	18	1	19	0	0	1	1	**3**	23	**5**	**31**	4	0	2	6	57
08:15 AM	1	**27**	1	29	0	0	0	0	0	**28**	1	29	4	0	2	6	**64**
08:30 AM	0	20	**5**	25	**1**	0	0	1	1	19	0	20	**6**	0	0	6	52
Total Volume	2	91	10	103	1	0	2	3	4	84	6	94	19	0	6	25	225
% App. Total	1.9	88.3	9.7		33.3	0	66.7		4.3	89.4	6.4		76	0	24		
PHF	.500	.843	.500	.858	.250	.000	.500	.750	.333	.750	.300	.758	.792	.000	.750	.893	.879

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City of Hughson
N/S: Tully Road
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File Name : 02_HSN_Tully_Roe AM
Site Code : 22323476
Start Date : 5/16/2023
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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				07:45 AM				07:30 AM				07:45 AM			
+0 mins.	**1**	26	3	**30**	0	0	**1**	**1**	**4**	19	1	24	5	0	**2**	**7**
+15 mins.	0	18	1	19	0	0	1	1	0	14	0	14	4	0	2	6
+30 mins.	1	**27**	1	29	0	0	0	0	3	23	**5**	**31**	4	0	2	6
+45 mins.	0	20	**5**	25	**1**	0	0	1	0	**28**	1	29	**6**	0	0	6
Total Volume	2	91	10	103	1	0	2	3	7	84	7	98	19	0	6	25
% App. Total	1.9	88.3	9.7		33.3	0	66.7		7.1	85.7	7.1		76	0	24	
PHF	.500	.843	.500	.858	.250	.000	.500	.750	.438	.750	.350	.790	.792	.000	.750	.893

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City of Hughson
N/S: Tully Road
E/W: Roeding Road
Weather: Clear

File Name : 02_HSN_Tully_Roe PM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 1

Groups Printed- Total Volume

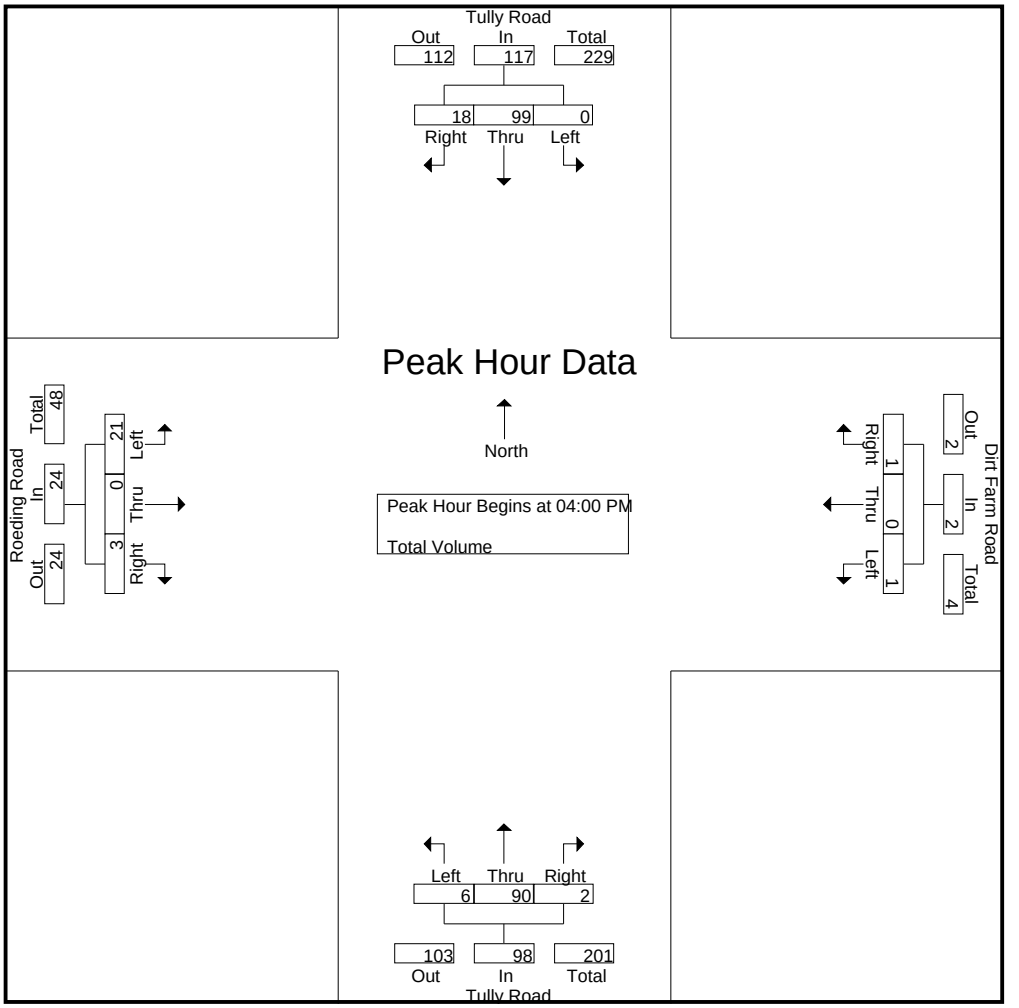
	Tully Road Southbound				Dirt Farm Road Westbound				Tully Road Northbound				Roeding Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	23	5	28	0	0	0	0	1	27	0	28	2	0	1	3	59
04:15 PM	0	25	3	28	1	0	0	1	2	16	1	19	7	0	0	7	55
04:30 PM	0	28	5	33	0	0	0	0	2	20	0	22	5	0	1	6	61
04:45 PM	0	23	5	28	0	0	1	1	1	27	1	29	7	0	1	8	66
Total	0	99	18	117	1	0	1	2	6	90	2	98	21	0	3	24	241
05:00 PM	0	16	2	18	0	0	0	0	1	31	4	36	3	1	0	4	58
05:15 PM	0	14	0	14	0	0	0	0	0	26	0	26	4	0	2	6	46
05:30 PM	0	19	5	24	0	0	0	0	1	17	0	18	4	0	1	5	47
05:45 PM	0	30	4	34	1	0	0	1	1	28	0	29	5	0	0	5	69
Total	0	79	11	90	1	0	0	1	3	102	4	109	16	1	3	20	220
Grand Total	0	178	29	207	2	0	1	3	9	192	6	207	37	1	6	44	461
Apprch %	0	86	14		66.7	0	33.3		4.3	92.8	2.9		84.1	2.3	13.6		
Total %	0	38.6	6.3	44.9	0.4	0	0.2	0.7	2	41.6	1.3	44.9	8	0.2	1.3	9.5	

	Tully Road Southbound				Dirt Farm Road Westbound				Tully Road Northbound				Roeding Road 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	23	**5**	28	0	0	0	0	1	**27**	0	28	2	0	**1**	3	59
04:15 PM	0	25	3	28	**1**	0	0	**1**	**2**	16	**1**	19	**7**	0	0	7	55
04:30 PM	0	**28**	5	**33**	0	0	0	0	2	20	0	22	5	0	1	6	61
04:45 PM	0	23	5	28	0	0	**1**	1	1	27	1	**29**	7	0	1	**8**	**66**
Total Volume	0	99	18	117	1	0	1	2	6	90	2	98	21	0	3	24	241
% App. Total	0	84.6	15.4		50	0	50		6.1	91.8	2		87.5	0	12.5		
PHF	.000	.884	.900	.886	.250	.000	.250	.500	.750	.833	.500	.845	.750	.000	.750	.750	.913

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City of Hughson
N/S: Tully Road
E/W: Roeding Road
Weather: Clear

File Name : 02_HSN_Tully_Roe PM
Site Code : 22323476
Start Date : 5/16/2023
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				04:00 PM				04:30 PM				04:15 PM			
+0 mins.	0	23	**5**	28	0	0	0	0	**2**	20	0	22	**7**	0	0	7
+15 mins.	0	25	3	28	**1**	0	0	**1**	1	27	1	29	5	0	**1**	6
+30 mins.	0	**28**	5	**33**	0	0	0	0	1	**31**	**4**	**36**	7	0	1	**8**
+45 mins.	0	23	5	28	0	0	**1**	1	0	26	0	26	3	**1**	0	4
Total Volume	0	99	18	117	1	0	1	2	4	104	5	113	22	1	2	25
% App. Total	0	84.6	15.4		50	0	50		3.5	92	4.4		88	4	8	
PHF	.000	.884	.900	.886	.250	.000	.250	.500	.500	.839	.313	.785	.786	.250	.500	.781

Location: Hughson
N/S: Tully Road
E/W: Roeding Road

Date: 5/16/2023
Day: Tuesday

PEDESTRIANS

	North Leg Tully Road	East Leg Dirt Farm Road	South Leg Tully Road	West Leg Roeding Road	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

	North Leg Tully Road	East Leg Dirt Farm Road	South Leg Tully Road	West Leg Roeding Road	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

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Location: Hughson
N/S: Tully Road
E/W: Roeding Road

Date: 5/16/2023
Day: Tuesday

BICYCLES

	Southbound Tully Road			Westbound Dirt Farm Road			Northbound Tully Road			Eastbound Roeding Road			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0	0	0	0	0	0	0	0	0

	Southbound Tully Road			Westbound Dirt Farm Road			Northbound Tully Road			Eastbound Roeding Road			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0	0	0	0	0	2	0	0	2

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County of Stanislaus
N/S: Tully Road
E/W: Service Road
Weather: Clear

File Name : 03_CSS_Tully_Ser AM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 1

Groups Printed- Total Volume

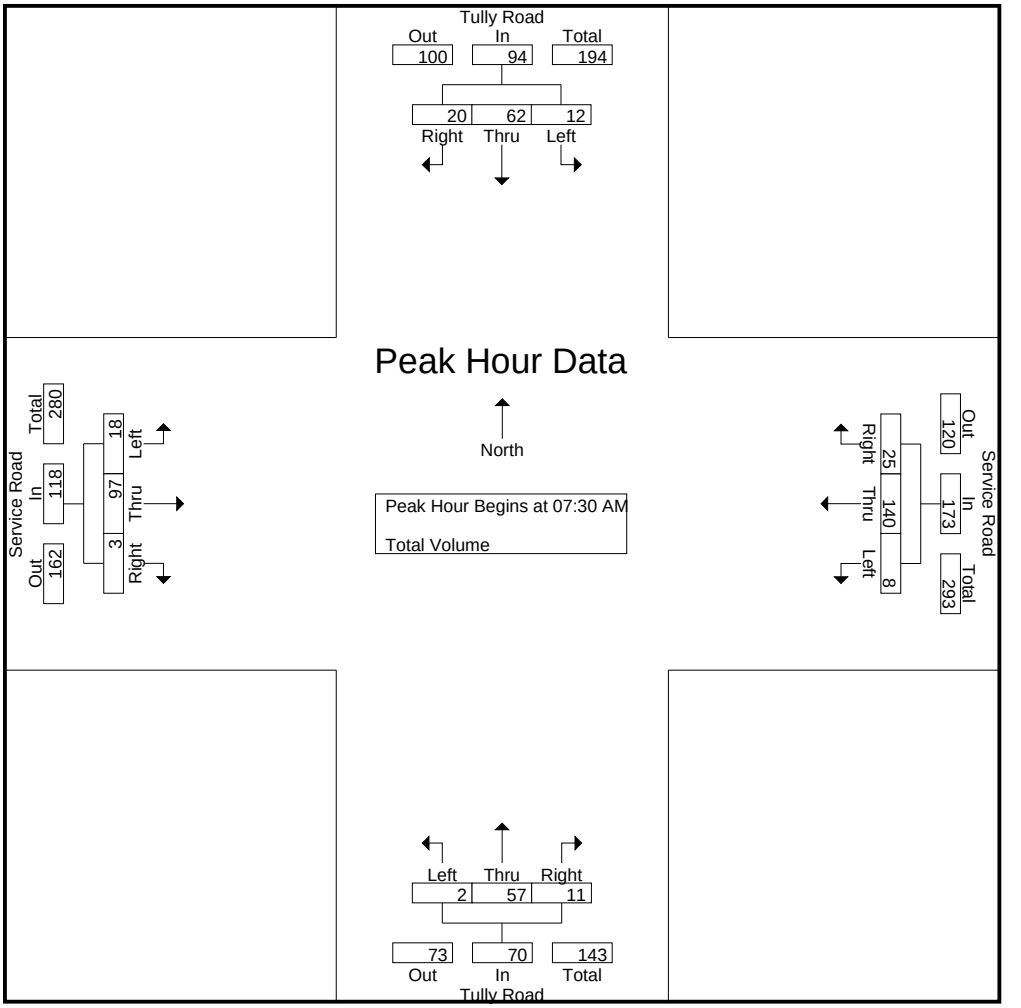
	Tully Road Southbound				Service Road Westbound				Tully Road Northbound				Service Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	6	5	11	1	23	1	25	1	6	4	11	1	10	0	11	58
07:15 AM	1	17	3	21	1	27	3	31	1	13	1	15	2	24	0	26	93
07:30 AM	6	6	5	17	1	43	4	48	1	14	3	18	3	15	1	19	102
07:45 AM	2	21	7	30	1	40	6	47	0	10	2	12	3	22	1	26	115
Total	9	50	20	79	4	133	14	151	3	43	10	56	9	71	2	82	368
08:00 AM	4	16	4	24	1	22	13	36	0	17	3	20	9	31	0	40	120
08:15 AM	0	19	4	23	5	35	2	42	1	16	3	20	3	29	1	33	118
08:30 AM	2	16	7	25	3	26	5	34	1	10	1	12	2	20	0	22	93
08:45 AM	2	11	1	14	1	23	1	25	0	10	1	11	2	13	1	16	66
Total	8	62	16	86	10	106	21	137	2	53	8	63	16	93	2	111	397
Grand Total	17	112	36	165	14	239	35	288	5	96	18	119	25	164	4	193	765
Apprch %	10.3	67.9	21.8		4.9	83	12.2		4.2	80.7	15.1		13	85	2.1		
Total %	2.2	14.6	4.7	21.6	1.8	31.2	4.6	37.6	0.7	12.5	2.4	15.6	3.3	21.4	0.5	25.2	

	Tully Road Southbound				Service Road Westbound				Tully Road Northbound				Service Road 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**	6	5	17	1	**43**	4	**48**	**1**	14	**3**	18	3	15	**1**	19	102
07:45 AM	2	**21**	**7**	**30**	1	40	6	47	0	10	2	12	3	22	1	26	115
08:00 AM	4	16	4	24	1	22	**13**	36	0	**17**	3	**20**	**9**	**31**	0	**40**	**120**
08:15 AM	0	19	4	23	**5**	35	2	42	1	16	3	20	3	29	1	33	118
Total Volume	12	62	20	94	8	140	25	173	2	57	11	70	18	97	3	118	455
% App. Total	12.8	66	21.3		4.6	80.9	14.5		2.9	81.4	15.7		15.3	82.2	2.5		
PHF	.500	.738	.714	.783	.400	.814	.481	.901	.500	.838	.917	.875	.500	.782	.750	.738	.948

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File Name : 03_CSS_Tully_Ser AM
Site Code : 22323476
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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				07:30 AM				07:30 AM				07:45 AM			
+0 mins.	2	**21**	**7**	**30**	1	**43**	4	**48**	**1**	14	**3**	18	3	22	**1**	26
+15 mins.	**4**	16	4	24	1	40	6	47	0	10	2	12	**9**	**31**	0	**40**
+30 mins.	0	19	4	23	1	22	**13**	36	0	**17**	3	**20**	3	29	1	33
+45 mins.	2	16	7	25	**5**	35	2	42	1	16	3	20	2	20	0	22
Total Volume	8	72	22	102	8	140	25	173	2	57	11	70	17	102	2	121
% App. Total	7.8	70.6	21.6		4.6	80.9	14.5		2.9	81.4	15.7		14	84.3	1.7	
PHF	.500	.857	.786	.850	.400	.814	.481	.901	.500	.838	.917	.875	.472	.823	.500	.756

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County of Stanislaus
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File Name : 03_CSS_Tully_Ser PM
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Groups Printed- Total Volume

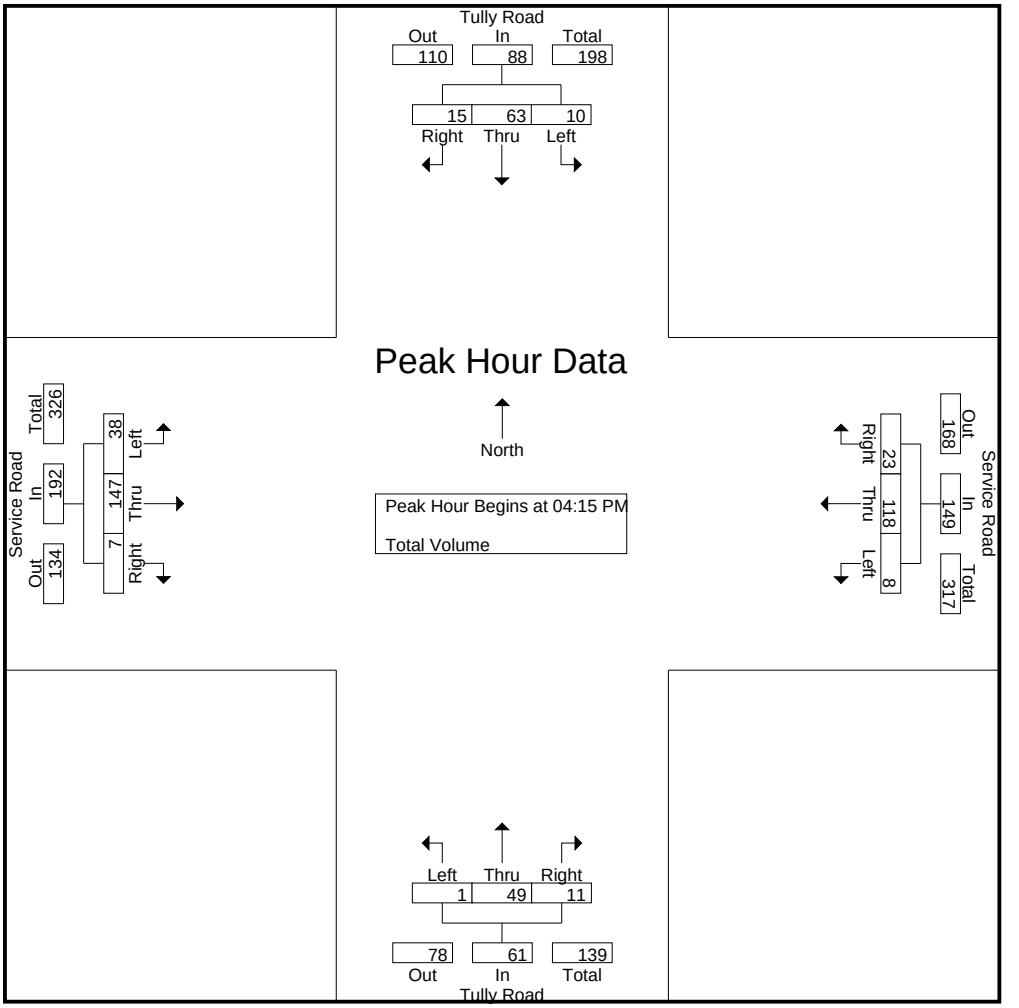
	Tully Road Southbound				Service Road Westbound				Tully Road Northbound				Service Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	3	16	4	23	2	23	4	29	0	14	1	15	10	36	2	48	115
04:15 PM	4	18	4	26	2	31	3	36	0	6	2	8	9	36	0	45	115
04:30 PM	5	19	4	28	4	28	9	41	1	9	3	13	9	38	2	49	131
04:45 PM	1	16	4	21	1	29	5	35	0	14	5	19	8	37	3	48	123
Total	13	69	16	98	9	111	21	141	1	43	11	55	36	147	7	190	484
05:00 PM	0	10	3	13	1	30	6	37	0	20	1	21	12	36	2	50	121
05:15 PM	2	13	2	17	1	26	4	31	0	9	3	12	7	33	1	41	101
05:30 PM	6	15	5	26	4	19	4	27	0	17	0	17	4	42	2	48	118
05:45 PM	5	16	4	25	2	18	3	23	2	16	5	23	9	27	2	38	109
Total	13	54	14	81	8	93	17	118	2	62	9	73	32	138	7	177	449
Grand Total	26	123	30	179	17	204	38	259	3	105	20	128	68	285	14	367	933
Apprch %	14.5	68.7	16.8		6.6	78.8	14.7		2.3	82	15.6		18.5	77.7	3.8		
Total %	2.8	13.2	3.2	19.2	1.8	21.9	4.1	27.8	0.3	11.3	2.1	13.7	7.3	30.5	1.5	39.3	

	Tully Road Southbound				Service Road Westbound				Tully Road Northbound				Service Road 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	4	18	**4**	26	2	**31**	3	36	0	6	2	8	9	36	0	45	115
04:30 PM	**5**	**19**	4	**28**	**4**	28	**9**	**41**	**1**	9	3	13	9	**38**	2	49	**131**
04:45 PM	1	16	4	21	1	29	5	35	0	14	**5**	19	8	37	**3**	48	123
05:00 PM	0	10	3	13	1	30	6	37	0	**20**	1	**21**	**12**	36	2	**50**	121
Total Volume	10	63	15	88	8	118	23	149	1	49	11	61	38	147	7	192	490
% App. Total	11.4	71.6	17		5.4	79.2	15.4		1.6	80.3	18		19.8	76.6	3.6		
PHF	.500	.829	.938	.786	.500	.952	.639	.909	.250	.613	.550	.726	.792	.967	.583	.960	.935

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E/W: Service Road
Weather: Clear

File Name : 03_CSS_Tully_Ser PM
Site Code : 22323476
Start Date : 5/16/2023
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				05:00 PM				04:15 PM			
+0 mins.	3	16	**4**	23	2	**31**	3	36	0	**20**	1	21	9	36	0	45
+15 mins.	4	18	4	26	**4**	28	**9**	**41**	0	9	3	12	9	**38**	2	49
+30 mins.	**5**	**19**	4	**28**	1	29	5	35	0	17	0	17	8	37	**3**	48
+45 mins.	1	16	4	21	1	30	6	37	**2**	16	**5**	**23**	**12**	36	2	**50**
Total Volume	13	69	16	98	8	118	23	149	2	62	9	73	38	147	7	192
% App. Total	13.3	70.4	16.3		5.4	79.2	15.4		2.7	84.9	12.3		19.8	76.6	3.6	
PHF	.650	.908	1.000	.875	.500	.952	.639	.909	.250	.775	.450	.793	.792	.967	.583	.960

Location: Hughson
N/S: Tully Road
E/W: Service Road

Date: 5/16/2023
Day: Tuesday

PEDESTRIANS

	North Leg Tully Road	East Leg Service Road	South Leg Tully Road	West Leg Service Road	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

	North Leg Tully Road	East Leg Service Road	South Leg Tully Road	West Leg Service Road	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

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Location: Hughson
N/S: Tully Road
E/W: Service Road

Date: 5/16/2023
Day: Tuesday

BICYCLES

	Southbound Tully Road			Westbound Service Road			Northbound Tully Road			Eastbound Service Road			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0	0	0	0	0	0	0	0	0

	Southbound Tully Road			Westbound Service Road			Northbound Tully Road			Eastbound Service Road			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0	0	0	0	0	0	0	0	0

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City of Hughson
N/S: Santa Fe Avenue
E/W: Whitmore Avenue
Weather: Clear

File Name : 04_HSN_SF_Whit AM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 1

Groups Printed- Total Volume

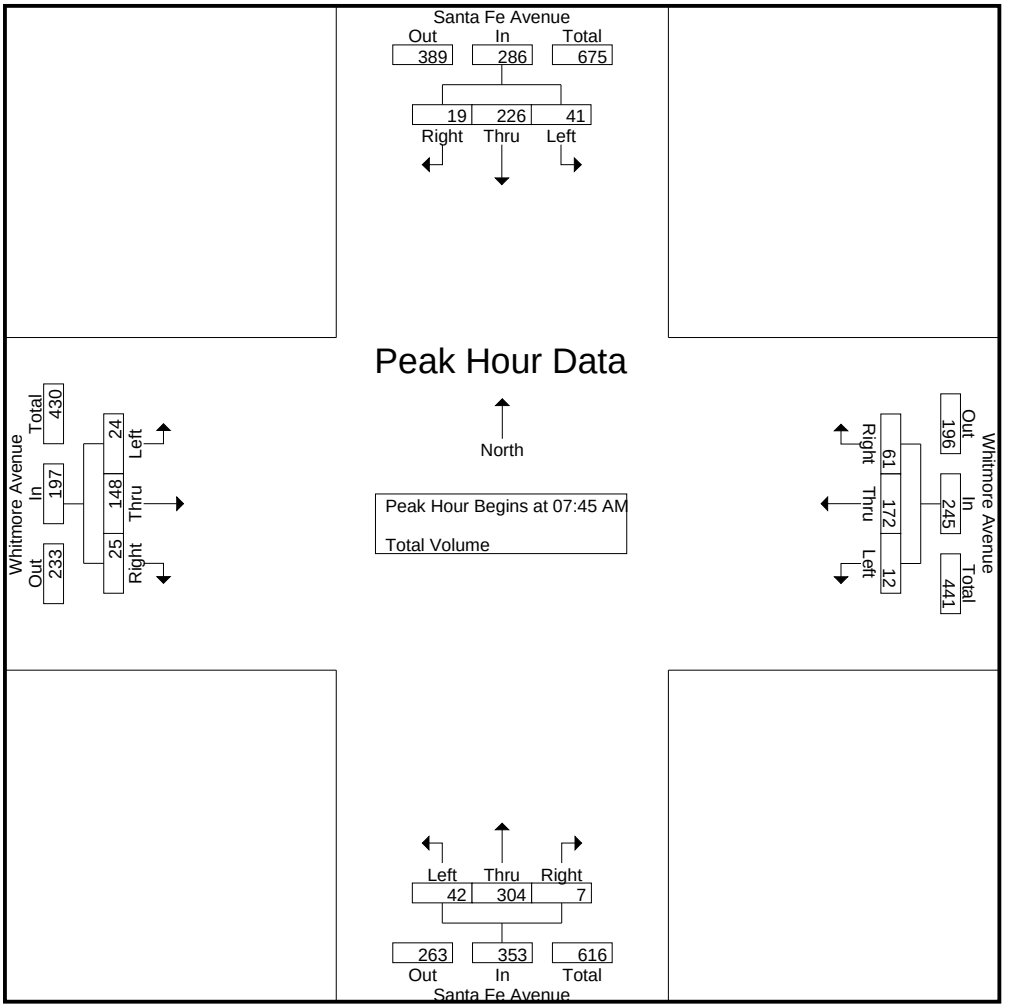
	Santa Fe Avenue Southbound				Whitmore Avenue Westbound				Santa Fe Avenue Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	3	30	1	34	3	33	3	39	7	54	1	62	8	16	1	25	160
07:15 AM	5	51	0	56	4	36	7	47	12	61	3	76	6	28	1	35	214
07:30 AM	6	54	5	65	3	43	7	53	15	68	2	85	3	33	10	46	249
07:45 AM	7	62	3	72	1	46	7	54	18	97	0	115	4	22	7	33	274
Total	21	197	9	227	11	158	24	193	52	280	6	338	21	99	19	139	897
08:00 AM	6	55	3	64	2	33	14	49	8	78	6	92	8	34	3	45	250
08:15 AM	18	65	7	90	3	43	17	63	11	70	1	82	2	49	11	62	297
08:30 AM	10	44	6	60	6	50	23	79	5	59	0	64	10	43	4	57	260
08:45 AM	7	47	5	59	4	39	8	51	7	36	0	43	8	27	10	45	198
Total	41	211	21	273	15	165	62	242	31	243	7	281	28	153	28	209	1005
Grand Total	62	408	30	500	26	323	86	435	83	523	13	619	49	252	47	348	1902
Apprch %	12.4	81.6	6		6	74.3	19.8		13.4	84.5	2.1		14.1	72.4	13.5		
Total %	3.3	21.5	1.6	26.3	1.4	17	4.5	22.9	4.4	27.5	0.7	32.5	2.6	13.2	2.5	18.3	

	Santa Fe Avenue Southbound				Whitmore Avenue Westbound				Santa Fe Avenue Northbound				Whitmore Avenue 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	7	62	3	72	1	46	7	54	**18**	**97**	0	**115**	4	22	7	33	274
08:00 AM	6	55	3	64	2	33	14	49	8	78	**6**	92	8	34	3	45	250
08:15 AM	**18**	**65**	**7**	**90**	3	43	17	63	11	70	1	82	2	**49**	**11**	**62**	**297**
08:30 AM	10	44	6	60	**6**	**50**	**23**	**79**	5	59	0	64	**10**	43	4	57	260
Total Volume	41	226	19	286	12	172	61	245	42	304	7	353	24	148	25	197	1081
% App. Total	14.3	79	6.6		4.9	70.2	24.9		11.9	86.1	2		12.2	75.1	12.7		
PHF	.569	.869	.679	.794	.500	.860	.663	.775	.583	.784	.292	.767	.600	.755	.568	.794	.910

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City of Hughson
N/S: Santa Fe Avenue
E/W: Whitmore Avenue
Weather: Clear

File Name : 04_HSN_SF_Whit AM
Site Code : 22323476
Start Date : 5/16/2023
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				07:45 AM				07:30 AM				08:00 AM			
+0 mins.	6	54	5	65	1	46	7	54	15	68	2	85	8	34	3	45
+15 mins.	7	62	3	72	2	33	14	49	**18**	**97**	0	**115**	2	**49**	**11**	**62**
+30 mins.	6	55	3	64	3	43	17	63	8	78	**6**	92	**10**	43	4	57
+45 mins.	**18**	**65**	**7**	**90**	**6**	**50**	**23**	**79**	11	70	1	82	8	27	10	45
Total Volume	37	236	18	291	12	172	61	245	52	313	9	374	28	153	28	209
% App. Total	12.7	81.1	6.2		4.9	70.2	24.9		13.9	83.7	2.4		13.4	73.2	13.4	
PHF	.514	.908	.643	.808	.500	.860	.663	.775	.722	.807	.375	.813	.700	.781	.636	.843

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City of Hughson
N/S: Santa Fe Avenue
E/W: Whitmore Avenue
Weather: Clear

File Name : 04_HSN_SF_Whit PM
Site Code : 22323476
Start Date : 5/16/2023
Page No : 1

Groups Printed- Total Volume

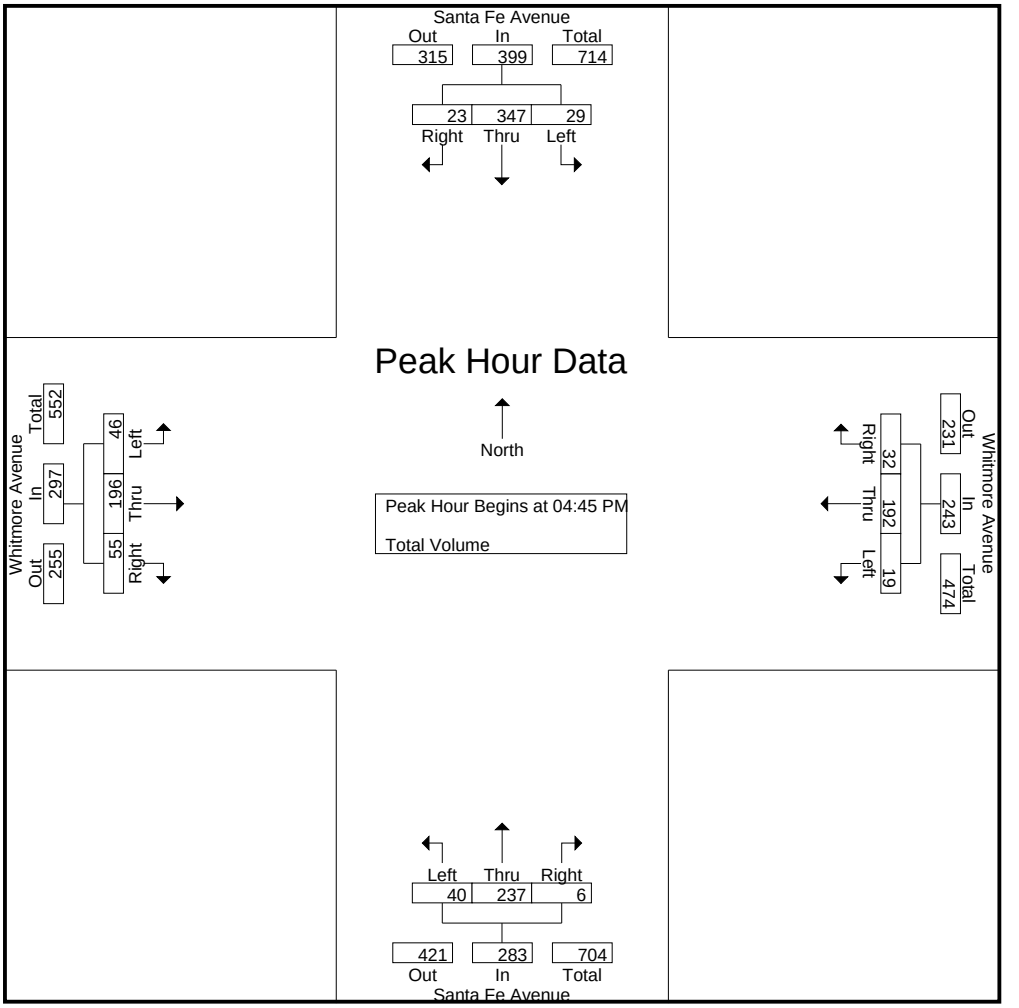
	Santa Fe Avenue Southbound				Whitmore Avenue Westbound				Santa Fe Avenue Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	7	87	6	100	0	35	11	46	15	45	0	60	7	49	8	64	270
04:15 PM	2	106	10	118	7	45	8	60	3	62	2	67	8	50	10	68	313
04:30 PM	11	89	5	105	1	41	11	53	13	60	3	76	10	42	10	62	296
04:45 PM	9	94	6	109	3	45	8	56	9	53	0	62	8	38	10	56	283
Total	29	376	27	432	11	166	38	215	40	220	5	265	33	179	38	250	1162
05:00 PM	12	82	10	104	8	48	10	66	12	48	1	61	10	44	12	66	297
05:15 PM	6	82	2	90	4	49	8	61	11	82	3	96	15	57	13	85	332
05:30 PM	2	89	5	96	4	50	6	60	8	54	2	64	13	57	20	90	310
05:45 PM	9	77	5	91	1	32	4	37	12	55	0	67	11	60	14	85	280
Total	29	330	22	381	17	179	28	224	43	239	6	288	49	218	59	326	1219
Grand Total	58	706	49	813	28	345	66	439	83	459	11	553	82	397	97	576	2381
Apprch %	7.1	86.8	6		6.4	78.6	15		15	83	2		14.2	68.9	16.8		
Total %	2.4	29.7	2.1	34.1	1.2	14.5	2.8	18.4	3.5	19.3	0.5	23.2	3.4	16.7	4.1	24.2	

	Santa Fe Avenue Southbound				Whitmore Avenue Westbound				Santa Fe Avenue Northbound				Whitmore Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	9	**94**	6	**109**	3	45	8	56	9	53	0	62	8	38	10	56	283
05:00 PM	**12**	82	**10**	104	**8**	48	**10**	**66**	**12**	48	1	61	10	44	12	66	297
05:15 PM	6	82	2	90	4	49	8	61	11	**82**	**3**	**96**	**15**	**57**	13	85	**332**
05:30 PM	2	89	5	96	4	**50**	6	60	8	54	2	64	13	57	**20**	**90**	310
Total Volume	29	347	23	399	19	192	32	243	40	237	6	283	46	196	55	297	1222
% App. Total	7.3	87	5.8		7.8	79	13.2		14.1	83.7	2.1		15.5	66	18.5		
PHF	.604	.923	.575	.915	.594	.960	.800	.920	.833	.723	.500	.737	.767	.860	.688	.825	.920

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City of Hughson
N/S: Santa Fe Avenue
E/W: Whitmore Avenue
Weather: Clear

File Name : 04_HSN_SF_Whit PM
Site Code : 22323476
Start Date : 5/16/2023
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				04:45 PM				04:30 PM				05:00 PM			
+0 mins.	2	**106**	**10**	**118**	3	45	8	56	**13**	60	**3**	76	10	44	12	66
+15 mins.	11	89	5	105	**8**	48	**10**	**66**	9	53	0	62	**15**	57	13	85
+30 mins.	9	94	6	109	4	49	8	61	12	48	1	61	13	57	**20**	**90**
+45 mins.	**12**	82	10	104	4	**50**	6	60	11	**82**	3	**96**	11	**60**	14	85
Total Volume	34	371	31	436	19	192	32	243	45	243	7	295	49	218	59	326
% App. Total	7.8	85.1	7.1		7.8	79	13.2		15.3	82.4	2.4		15	66.9	18.1	
PHF	.708	.875	.775	.924	.594	.960	.800	.920	.865	.741	.583	.768	.817	.908	.738	.906

Location: Hughson
N/S: Santa Fe Avenue
E/W: Whitmore Avenue

Date: 5/16/2023
Day: Tuesday

PEDESTRIANS

	North Leg Santa Fe Avenue	East Leg Whitmore Avenue	South Leg Santa Fe Avenue	West Leg Whitmore Avenue	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	3	0	0	0	3
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	3	0	0	0	3

	North Leg Santa Fe Avenue	East Leg Whitmore Avenue	South Leg Santa Fe Avenue	West Leg Whitmore Avenue	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
4:00 PM	0	0	0	0	0
4:15 PM	0	2	1	0	3
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	1	0	1
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	2	2	0	4

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Location: Hughson
N/S: Santa Fe Avenue
E/W: Whitmore Avenue

Date: 5/16/2023
Day: Tuesday

BICYCLES

	Southbound Santa Fe Avenue			Westbound Whitmore Avenue			Northbound Santa Fe Avenue			Eastbound Whitmore Avenue			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	1
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0	0	0	0	0	0	1	1	2

	Southbound Santa Fe Avenue			Westbound Whitmore Avenue			Northbound Santa Fe Avenue			Eastbound Whitmore Avenue			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	2	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	1	0	0	0	0	0	2	0	3
TOTAL VOLUMES:	0	0	0	0	3	0	0	0	0	2	3	0	8

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Attachment B: Synchro Level-of-Service Reports

Intersection	
Intersection Delay, s/veh	11.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	39	150	11	29	194	10	15	65	35	6	68	110
Future Vol, veh/h	39	150	11	29	194	10	15	65	35	6	68	110
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	42	161	12	31	209	11	16	70	38	6	73	118
Number of Lanes	0	1	0	1	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	12.3	11.4	9.7	11.6
HCM LOS	B	B	A	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	19%	0%	20%	100%	0%	3%
Vol Thru, %	81%	0%	75%	0%	95%	37%
Vol Right, %	0%	100%	6%	0%	5%	60%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	80	35	200	29	204	184
LT Vol	15	0	39	29	0	6
Through Vol	65	0	150	0	194	68
RT Vol	0	35	11	0	10	110
Lane Flow Rate	86	38	215	31	219	198
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.152	0.058	0.356	0.055	0.354	0.319
Departure Headway (Hd)	6.349	5.543	5.955	6.349	5.809	5.803
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	564	645	604	564	619	619
Service Time	4.091	3.285	3.99	4.084	3.543	3.842
HCM Lane V/C Ratio	0.152	0.059	0.356	0.055	0.354	0.32
HCM Control Delay	10.2	8.6	12.3	9.5	11.7	11.6
HCM Lane LOS	B	A	B	A	B	B
HCM 95th-tile Q	0.5	0.2	1.6	0.2	1.6	1.4

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	0	6	0	0	2	7	84	7	2	84	11
Future Vol, veh/h	17	0	6	0	0	2	7	84	7	2	84	11
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	20	0	7	0	0	2	8	98	8	2	98	13
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.6	6.9	7.8	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	74%	0%	2%
Vol Thru, %	86%	0%	0%	87%
Vol Right, %	7%	26%	100%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	98	23	2	97
LT Vol	7	17	0	2
Through Vol	84	0	0	84
RT Vol	7	6	2	11
Lane Flow Rate	114	27	2	113
Geometry Grp	1	1	1	1
Degree of Util (X)	0.13	0.033	0.003	0.128
Departure Headway (Hd)	4.109	4.49	3.926	4.074
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	868	802	917	875
Service Time	2.153	2.491	1.926	2.119
HCM Lane V/C Ratio	0.131	0.034	0.002	0.129
HCM Control Delay	7.8	7.6	6.9	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.1	0	0.4

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	97	3	8	140	25	2	57	11	12	62	20
Future Vol, veh/h	18	97	3	8	140	25	2	57	11	12	62	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	19	102	3	8	147	26	2	60	12	13	65	21
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.6	8.8	8.3	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	15%	5%	13%
Vol Thru, %	81%	82%	81%	66%
Vol Right, %	16%	3%	14%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	70	118	173	94
LT Vol	2	18	8	12
Through Vol	57	97	140	62
RT Vol	11	3	25	20
Lane Flow Rate	74	124	182	99
Geometry Grp	1	1	1	1
Degree of Util (X)	0.097	0.16	0.227	0.129
Departure Headway (Hd)	4.748	4.639	4.485	4.703
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	754	774	801	762
Service Time	2.781	2.666	2.51	2.734
HCM Lane V/C Ratio	0.098	0.16	0.227	0.13
HCM Control Delay	8.3	8.6	8.8	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.6	0.9	0.4

Intersection	
Intersection Delay, s/veh	23.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	138	31	9	165	45	52	313	9	37	236	18
Future Vol, veh/h	17	138	31	9	165	45	52	313	9	37	236	18
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	19	153	34	10	183	50	58	348	10	41	262	20
Number of Lanes	0	1	0	0	1	1	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	17.3	15	31.8	23.5
HCM LOS	C	B	D	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	14%	0%	9%	5%	0%	13%
Vol Thru, %	86%	0%	74%	95%	0%	81%
Vol Right, %	0%	100%	17%	0%	100%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	365	9	186	174	45	291
LT Vol	52	0	17	9	0	37
Through Vol	313	0	138	165	0	236
RT Vol	0	9	31	0	45	18
Lane Flow Rate	406	10	207	193	50	323
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.797	0.017	0.451	0.418	0.098	0.657
Departure Headway (Hd)	7.075	6.286	7.849	7.78	7.033	7.314
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	511	566	457	460	507	491
Service Time	4.851	4.061	5.944	5.569	4.821	5.399
HCM Lane V/C Ratio	0.795	0.018	0.453	0.42	0.099	0.658
HCM Control Delay	32.4	9.2	17.3	16.1	10.6	23.5
HCM Lane LOS	D	A	C	C	B	C
HCM 95th-tile Q	7.4	0.1	2.3	2	0.3	4.7

Intersection	
Intersection Delay, s/veh	14.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	98	233	12	25	200	13	25	96	46	25	57	53
Future Vol, veh/h	98	233	12	25	200	13	25	96	46	25	57	53
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	103	245	13	26	211	14	26	101	48	26	60	56
Number of Lanes	0	1	0	1	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	18	12.2	10.9	11.9
HCM LOS	C	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	21%	0%	29%	100%	0%	19%
Vol Thru, %	79%	0%	68%	0%	94%	42%
Vol Right, %	0%	100%	3%	0%	6%	39%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	46	343	25	213	135
LT Vol	25	0	98	25	0	25
Through Vol	96	0	233	0	200	57
RT Vol	0	46	12	0	13	53
Lane Flow Rate	127	48	361	26	224	142
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.238	0.08	0.605	0.048	0.378	0.258
Departure Headway (Hd)	6.732	5.914	6.031	6.613	6.062	6.537
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	531	602	596	540	592	547
Service Time	4.502	3.683	4.083	4.37	3.819	4.61
HCM Lane V/C Ratio	0.239	0.08	0.606	0.048	0.378	0.26
HCM Control Delay	11.6	9.2	18	9.7	12.5	11.9
HCM Lane LOS	B	A	C	A	B	B
HCM 95th-tile Q	0.9	0.3	4	0.2	1.8	1

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	1	4	0	0	1	4	104	5	0	81	12
Future Vol, veh/h	19	1	4	0	0	1	4	104	5	0	81	12
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	22	1	5	0	0	1	5	118	6	0	92	14
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.7	6.9	7.8	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	79%	0%	0%
Vol Thru, %	92%	4%	0%	87%
Vol Right, %	4%	17%	100%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	113	24	1	93
LT Vol	4	19	0	0
Through Vol	104	1	0	81
RT Vol	5	4	1	12
Lane Flow Rate	128	27	1	106
Geometry Grp	1	1	1	1
Degree of Util (X)	0.145	0.034	0.001	0.118
Departure Headway (Hd)	4.06	4.514	3.884	4.019
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	880	798	927	887
Service Time	2.1	2.514	1.885	2.065
HCM Lane V/C Ratio	0.145	0.034	0.001	0.12
HCM Control Delay	7.8	7.7	6.9	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.1	0	0.4

Intersection	
Intersection Delay, s/veh	8.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	144	8	7	113	24	1	52	12	8	58	13
Future Vol, veh/h	36	144	8	7	113	24	1	52	12	8	58	13
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	40	158	9	8	124	26	1	57	13	9	64	14
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.2	8.6	8.4	8.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	19%	5%	10%
Vol Thru, %	80%	77%	78%	73%
Vol Right, %	18%	4%	17%	16%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	65	188	144	79
LT Vol	1	36	7	8
Through Vol	52	144	113	58
RT Vol	12	8	24	13
Lane Flow Rate	71	207	158	87
Geometry Grp	1	1	1	1
Degree of Util (X)	0.095	0.261	0.198	0.116
Departure Headway (Hd)	4.809	4.543	4.496	4.817
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	744	791	798	742
Service Time	2.849	2.572	2.528	2.856
HCM Lane V/C Ratio	0.095	0.262	0.198	0.117
HCM Control Delay	8.4	9.2	8.6	8.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	1	0.7	0.4

Intersection	
Intersection Delay, s/veh	43.6
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	43	181	45	16	183	37	45	243	7	38	347	23
Future Vol, veh/h	43	181	45	16	183	37	45	243	7	38	347	23
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	47	199	49	18	201	41	49	267	8	42	381	25
Number of Lanes	0	1	0	0	1	1	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	30.9	20	31.3	74.5
HCM LOS	D	C	D	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	16%	0%	16%	8%	0%	9%
Vol Thru, %	84%	0%	67%	92%	0%	85%
Vol Right, %	0%	100%	17%	0%	100%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	288	7	269	199	37	408
LT Vol	45	0	43	16	0	38
Through Vol	243	0	181	183	0	347
RT Vol	0	7	45	0	37	23
Lane Flow Rate	316	8	296	219	41	448
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.742	0.016	0.714	0.537	0.091	1.011
Departure Headway (Hd)	8.436	7.63	8.701	8.846	8.076	8.117
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	430	470	414	407	442	448
Service Time	6.161	5.354	6.774	6.618	5.848	6.138
HCM Lane V/C Ratio	0.735	0.017	0.715	0.538	0.093	1
HCM Control Delay	31.8	10.5	30.9	21.5	11.7	74.5
HCM Lane LOS	D	B	D	C	B	F
HCM 95th-tile Q	6	0	5.5	3.1	0.3	13.3

Intersection	
Intersection Delay, s/veh	13.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	39	150	62	66	194	10	27	77	43	6	119	110
Future Vol, veh/h	39	150	62	66	194	10	27	77	43	6	119	110
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	42	161	67	71	209	11	29	83	46	6	128	118
Number of Lanes	0	1	0	1	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	14.9	12.4	10.9	14.4
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	26%	0%	16%	100%	0%	3%
Vol Thru, %	74%	0%	60%	0%	95%	51%
Vol Right, %	0%	100%	25%	0%	5%	47%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	104	43	251	66	204	235
LT Vol	27	0	39	66	0	6
Through Vol	77	0	150	0	194	119
RT Vol	0	43	62	0	10	110
Lane Flow Rate	112	46	270	71	219	253
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.214	0.078	0.472	0.135	0.384	0.443
Departure Headway (Hd)	6.885	6.039	6.297	6.846	6.302	6.31
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	518	589	569	521	568	569
Service Time	4.671	3.824	4.372	4.621	4.077	4.386
HCM Lane V/C Ratio	0.216	0.078	0.475	0.136	0.386	0.445
HCM Control Delay	11.6	9.3	14.9	10.7	13	14.4
HCM Lane LOS	B	A	B	B	B	B
HCM 95th-tile Q	0.8	0.3	2.5	0.5	1.8	2.3

Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	29	106	12	125	122
Future Vol, veh/h	3	29	106	12	125	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	3	32	115	13	136	133

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	527	122	0	0	128	0
Stage 1	122	-	-	-	-	-
Stage 2	405	-	-	-	-	-
Critical Hdwy	6.45	6.25	-	-	4.15	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	506	921	-	-	1440	-
Stage 1	896	-	-	-	-	-
Stage 2	667	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	454	921	-	-	1440	-
Mov Cap-2 Maneuver	454	-	-	-	-	-
Stage 1	896	-	-	-	-	-
Stage 2	599	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	3.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	840	1440	-
HCM Lane V/C Ratio	-	-	0.041	0.094	-
HCM Control Delay (s)	-	-	9.5	7.8	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.3	-

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	22	6	19	5	5	7	93	87	16	86	12
Future Vol, veh/h	20	22	6	19	5	5	7	93	87	16	86	12
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	23	26	7	22	6	6	8	108	101	19	100	14
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8.1	8.5	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	42%	66%	14%
Vol Thru, %	50%	46%	17%	75%
Vol Right, %	47%	12%	17%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	187	48	29	114
LT Vol	7	20	19	16
Through Vol	93	22	5	86
RT Vol	87	6	5	12
Lane Flow Rate	217	56	34	133
Geometry Grp	1	1	1	1
Degree of Util (X)	0.247	0.075	0.046	0.162
Departure Headway (Hd)	4.095	4.813	4.861	4.406
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	881	746	738	817
Service Time	2.108	2.833	2.883	2.421
HCM Lane V/C Ratio	0.246	0.075	0.046	0.163
HCM Control Delay	8.5	8.2	8.1	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1	0.2	0.1	0.6

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	97	3	8	140	76	2	82	11	24	68	23
Future Vol, veh/h	31	97	3	8	140	76	2	82	11	24	68	23
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	33	102	3	8	147	80	2	86	12	25	72	24
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9	9.5	8.8	9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	24%	4%	21%
Vol Thru, %	86%	74%	62%	59%
Vol Right, %	12%	2%	34%	20%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	131	224	115
LT Vol	2	31	8	24
Through Vol	82	97	140	68
RT Vol	11	3	76	23
Lane Flow Rate	100	138	236	121
Geometry Grp	1	1	1	1
Degree of Util (X)	0.138	0.186	0.296	0.166
Departure Headway (Hd)	4.971	4.859	4.524	4.93
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	718	735	792	724
Service Time	3.026	2.909	2.569	2.982
HCM Lane V/C Ratio	0.139	0.188	0.298	0.167
HCM Control Delay	8.8	9	9.5	9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.7	1.2	0.6

Intersection	
Intersection Delay, s/veh	28.4
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	141	33	9	177	45	64	313	9	37	236	31
Future Vol, veh/h	20	141	33	9	177	45	64	313	9	37	236	31
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	22	157	37	10	197	50	71	348	10	41	262	34
Number of Lanes	0	1	0	0	1	1	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	19.1	16.5	40.8	27.7
HCM LOS	C	C	E	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	0%	10%	5%	0%	12%
Vol Thru, %	83%	0%	73%	95%	0%	78%
Vol Right, %	0%	100%	17%	0%	100%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	377	9	194	186	45	304
LT Vol	64	0	20	9	0	37
Through Vol	313	0	141	177	0	236
RT Vol	0	9	33	0	45	31
Lane Flow Rate	419	10	216	207	50	338
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.865	0.018	0.493	0.466	0.102	0.715
Departure Headway (Hd)	7.433	6.627	8.227	8.112	7.364	7.625
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	490	543	438	444	486	473
Service Time	5.133	4.327	6.295	5.875	5.126	5.685
HCM Lane V/C Ratio	0.855	0.018	0.493	0.466	0.103	0.715
HCM Control Delay	41.5	9.4	19.1	17.8	11	27.7
HCM Lane LOS	E	A	C	C	B	D
HCM 95th-tile Q	9.1	0.1	2.7	2.4	0.3	5.6

Intersection	
Intersection Delay, s/veh	17.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	98	233	26	35	200	13	74	145	82	25	71	53
Future Vol, veh/h	98	233	26	35	200	13	74	145	82	25	71	53
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	103	245	27	37	211	14	78	153	86	26	75	56
Number of Lanes	0	1	0	1	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	24.3	14.1	14.4	13.7
HCM LOS	C	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	34%	0%	27%	100%	0%	17%
Vol Thru, %	66%	0%	65%	0%	94%	48%
Vol Right, %	0%	100%	7%	0%	6%	36%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	219	82	357	35	213	149
LT Vol	74	0	98	35	0	25
Through Vol	145	0	233	0	200	71
RT Vol	0	82	26	0	13	53
Lane Flow Rate	231	86	376	37	224	157
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.462	0.152	0.703	0.076	0.429	0.318
Departure Headway (Hd)	7.21	6.321	6.733	7.436	6.881	7.294
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	500	566	537	482	522	492
Service Time	4.957	4.068	4.777	5.186	4.63	5.351
HCM Lane V/C Ratio	0.462	0.152	0.7	0.077	0.429	0.319
HCM Control Delay	16	10.2	24.3	10.8	14.7	13.7
HCM Lane LOS	C	B	C	B	B	B
HCM 95th-tile Q	2.4	0.5	5.5	0.2	2.1	1.4

Intersection	
Int Delay, s/veh	3.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	121	137	3	34	98
Future Vol, veh/h	11	121	137	3	34	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	12	132	149	3	37	107

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	332	151	0	0	152	0
Stage 1	151	-	-	-	-	-
Stage 2	181	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	661	893	-	-	1423	-
Stage 1	874	-	-	-	-	-
Stage 2	848	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	642	893	-	-	1423	-
Mov Cap-2 Maneuver	642	-	-	-	-	-
Stage 1	874	-	-	-	-	-
Stage 2	824	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	865	1423	-
HCM Lane V/C Ratio	-	-	0.166	0.026	-
HCM Control Delay (s)	-	-	10	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	7	4	76	22	14	4	106	27	4	90	14
Future Vol, veh/h	20	7	4	76	22	14	4	106	27	4	90	14
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	23	8	5	86	25	16	5	120	31	5	102	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	8.6	8.4	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	65%	68%	4%
Vol Thru, %	77%	23%	20%	83%
Vol Right, %	20%	13%	12%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	137	31	112	108
LT Vol	4	20	76	4
Through Vol	106	7	22	90
RT Vol	27	4	14	14
Lane Flow Rate	156	35	127	123
Geometry Grp	1	1	1	1
Degree of Util (X)	0.189	0.047	0.166	0.152
Departure Headway (Hd)	4.371	4.788	4.682	4.446
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	822	748	766	808
Service Time	2.392	2.819	2.708	2.469
HCM Lane V/C Ratio	0.19	0.047	0.166	0.152
HCM Control Delay	8.4	8.1	8.6	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.1	0.6	0.5

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	39	144	8	7	113	38	1	59	12	57	82	25
Future Vol, veh/h	39	144	8	7	113	38	1	59	12	57	82	25
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	43	158	9	8	124	42	1	65	13	63	90	27
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.8	9.2	8.7	9.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	20%	4%	35%
Vol Thru, %	82%	75%	72%	50%
Vol Right, %	17%	4%	24%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	72	191	158	164
LT Vol	1	39	7	57
Through Vol	59	144	113	82
RT Vol	12	8	38	25
Lane Flow Rate	79	210	174	180
Geometry Grp	1	1	1	1
Degree of Util (X)	0.111	0.282	0.229	0.249
Departure Headway (Hd)	5.032	4.844	4.744	4.965
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	707	737	752	719
Service Time	3.106	2.904	2.805	3.028
HCM Lane V/C Ratio	0.112	0.285	0.231	0.25
HCM Control Delay	8.7	9.8	9.2	9.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	1.2	0.9	1

Intersection	
Intersection Delay, s/veh	50.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	193	57	16	187	37	48	243	7	38	347	26
Future Vol, veh/h	55	193	57	16	187	37	48	243	7	38	347	26
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	60	212	63	18	205	41	53	267	8	42	381	29
Number of Lanes	0	1	0	0	1	1	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	39.4	21	33.3	87.5
HCM LOS	E	C	D	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	16%	0%	18%	8%	0%	9%
Vol Thru, %	84%	0%	63%	92%	0%	84%
Vol Right, %	0%	100%	19%	0%	100%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	291	7	305	203	37	411
LT Vol	48	0	55	16	0	38
Through Vol	243	0	193	187	0	347
RT Vol	0	7	57	0	37	26
Lane Flow Rate	320	8	335	223	41	452
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.754	0.016	0.801	0.551	0.092	1.053
Departure Headway (Hd)	8.775	7.961	8.913	9.202	8.431	8.391
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	416	452	409	395	428	434
Service Time	6.475	5.661	6.913	6.902	6.131	6.391
HCM Lane V/C Ratio	0.769	0.018	0.819	0.565	0.096	1.041
HCM Control Delay	33.8	10.8	39.4	22.6	12	87.5
HCM Lane LOS	D	B	E	C	B	F
HCM 95th-tile Q	6.2	0	7.1	3.2	0.3	14.5

Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	155	12	30	200	11	17	71	39	7	75	120
Future Vol, veh/h	41	155	12	30	200	11	17	71	39	7	75	120
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	44	167	13	32	215	12	18	76	42	8	81	129
Number of Lanes	0	1	0	1	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	12.8	11.9	10	12.2
HCM LOS	B	B	A	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	19%	0%	20%	100%	0%	3%
Vol Thru, %	81%	0%	75%	0%	95%	37%
Vol Right, %	0%	100%	6%	0%	5%	59%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	88	39	208	30	211	202
LT Vol	17	0	41	30	0	7
Through Vol	71	0	155	0	200	75
RT Vol	0	39	12	0	11	120
Lane Flow Rate	95	42	224	32	227	217
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.17	0.066	0.379	0.058	0.375	0.357
Departure Headway (Hd)	6.474	5.665	6.098	6.493	5.949	5.915
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	553	630	590	551	604	608
Service Time	4.226	3.416	4.142	4.235	3.691	3.96
HCM Lane V/C Ratio	0.172	0.067	0.38	0.058	0.376	0.357
HCM Control Delay	10.6	8.8	12.8	9.6	12.2	12.2
HCM Lane LOS	B	A	B	A	B	B
HCM 95th-tile Q	0.6	0.2	1.8	0.2	1.7	1.6

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	0	7	0	0	2	8	92	8	3	90	12
Future Vol, veh/h	19	0	7	0	0	2	8	92	8	3	90	12
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	22	0	8	0	0	2	9	107	9	3	105	14
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.7	7	7.9	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	73%	0%	3%
Vol Thru, %	85%	0%	0%	86%
Vol Right, %	7%	27%	100%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	108	26	2	105
LT Vol	8	19	0	3
Through Vol	92	0	0	90
RT Vol	8	7	2	12
Lane Flow Rate	126	30	2	122
Geometry Grp	1	1	1	1
Degree of Util (X)	0.144	0.038	0.003	0.139
Departure Headway (Hd)	4.121	4.53	3.976	4.091
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	865	795	905	871
Service Time	2.171	2.531	1.977	2.142
HCM Lane V/C Ratio	0.146	0.038	0.002	0.14
HCM Control Delay	7.9	7.7	7	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.1	0	0.5

Intersection	
Intersection Delay, s/veh	8.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	106	4	9	149	27	3	63	12	14	68	22
Future Vol, veh/h	20	106	4	9	149	27	3	63	12	14	68	22
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	21	112	4	9	157	28	3	66	13	15	72	23
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.8	9.1	8.5	8.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	15%	5%	13%
Vol Thru, %	81%	82%	81%	65%
Vol Right, %	15%	3%	15%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	78	130	185	104
LT Vol	3	20	9	14
Through Vol	63	106	149	68
RT Vol	12	4	27	22
Lane Flow Rate	82	137	195	109
Geometry Grp	1	1	1	1
Degree of Util (X)	0.11	0.179	0.246	0.145
Departure Headway (Hd)	4.832	4.704	4.551	4.781
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	740	762	789	749
Service Time	2.874	2.74	2.585	2.821
HCM Lane V/C Ratio	0.111	0.18	0.247	0.146
HCM Control Delay	8.5	8.8	9.1	8.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.6	1	0.5

Intersection	
Intersection Delay, s/veh	27.7
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	143	32	10	170	47	54	323	10	39	244	19
Future Vol, veh/h	18	143	32	10	170	47	54	323	10	39	244	19
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	20	159	36	11	189	52	60	359	11	43	271	21
Number of Lanes	0	1	0	0	1	1	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	18.8	16	39.4	27.1
HCM LOS	C	C	E	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	14%	0%	9%	6%	0%	13%
Vol Thru, %	86%	0%	74%	94%	0%	81%
Vol Right, %	0%	100%	17%	0%	100%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	377	10	193	180	47	302
LT Vol	54	0	18	10	0	39
Through Vol	323	0	143	170	0	244
RT Vol	0	10	32	0	47	19
Lane Flow Rate	419	11	214	200	52	336
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.857	0.02	0.487	0.449	0.106	0.708
Departure Headway (Hd)	7.368	6.576	8.176	8.084	7.333	7.599
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	494	548	440	446	488	476
Service Time	5.068	4.276	6.238	5.841	5.089	5.653
HCM Lane V/C Ratio	0.848	0.02	0.486	0.448	0.107	0.706
HCM Control Delay	40.2	9.4	18.8	17.3	11	27.1
HCM Lane LOS	E	A	C	C	B	D
HCM 95th-tile Q	8.9	0.1	2.6	2.3	0.4	5.5

Intersection	
Intersection Delay, s/veh	15.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	101	240	13	26	206	14	28	105	51	28	63	58
Future Vol, veh/h	101	240	13	26	206	14	28	105	51	28	63	58
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	106	253	14	27	217	15	29	111	54	29	66	61
Number of Lanes	0	1	0	1	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	19.7	12.9	11.4	12.6
HCM LOS	C	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	21%	0%	29%	100%	0%	19%
Vol Thru, %	79%	0%	68%	0%	94%	42%
Vol Right, %	0%	100%	4%	0%	6%	39%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	133	51	354	26	220	149
LT Vol	28	0	101	26	0	28
Through Vol	105	0	240	0	206	63
RT Vol	0	51	13	0	14	58
Lane Flow Rate	140	54	373	27	232	157
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.267	0.09	0.64	0.052	0.401	0.292
Departure Headway (Hd)	6.876	6.055	6.187	6.788	6.234	6.693
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	519	587	581	525	574	533
Service Time	4.66	3.838	4.252	4.561	4.006	4.779
HCM Lane V/C Ratio	0.27	0.092	0.642	0.051	0.404	0.295
HCM Control Delay	12.2	9.4	19.7	9.9	13.2	12.6
HCM Lane LOS	B	A	C	A	B	B
HCM 95th-tile Q	1.1	0.3	4.5	0.2	1.9	1.2

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	2	5	0	0	1	5	114	6	0	86	13
Future Vol, veh/h	21	2	5	0	0	1	5	114	6	0	86	13
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	24	2	6	0	0	1	6	130	7	0	98	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.7	6.9	7.9	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	75%	0%	0%
Vol Thru, %	91%	7%	0%	87%
Vol Right, %	5%	18%	100%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	125	28	1	99
LT Vol	5	21	0	0
Through Vol	114	2	0	86
RT Vol	6	5	1	13
Lane Flow Rate	142	32	1	112
Geometry Grp	1	1	1	1
Degree of Util (X)	0.161	0.04	0.001	0.126
Departure Headway (Hd)	4.072	4.544	3.935	4.035
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	876	793	915	882
Service Time	2.118	2.544	1.936	2.089
HCM Lane V/C Ratio	0.162	0.04	0.001	0.127
HCM Control Delay	7.9	7.7	6.9	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.1	0	0.4

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	157	9	8	120	26	2	57	14	9	64	15
Future Vol, veh/h	40	157	9	8	120	26	2	57	14	9	64	15
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	44	173	10	9	132	29	2	63	15	10	70	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.5	8.9	8.6	8.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	19%	5%	10%
Vol Thru, %	78%	76%	78%	73%
Vol Right, %	19%	4%	17%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	73	206	154	88
LT Vol	2	40	8	9
Through Vol	57	157	120	64
RT Vol	14	9	26	15
Lane Flow Rate	80	226	169	97
Geometry Grp	1	1	1	1
Degree of Util (X)	0.109	0.29	0.215	0.132
Departure Headway (Hd)	4.901	4.611	4.575	4.906
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	728	779	782	728
Service Time	2.952	2.648	2.615	2.954
HCM Lane V/C Ratio	0.11	0.29	0.216	0.133
HCM Control Delay	8.6	9.5	8.9	8.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	1.2	0.8	0.5

Intersection	
Intersection Delay, s/veh	50.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	187	47	17	189	39	47	251	8	40	358	24
Future Vol, veh/h	45	187	47	17	189	39	47	251	8	40	358	24
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	205	52	19	208	43	52	276	9	44	393	26
Number of Lanes	0	1	0	0	1	1	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	33.6	20.9	33.7	91.2
HCM LOS	D	C	D	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	16%	0%	16%	8%	0%	9%
Vol Thru, %	84%	0%	67%	92%	0%	85%
Vol Right, %	0%	100%	17%	0%	100%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	298	8	279	206	39	422
LT Vol	47	0	45	17	0	40
Through Vol	251	0	187	189	0	358
RT Vol	0	8	47	0	39	24
Lane Flow Rate	327	9	307	226	43	464
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.763	0.019	0.74	0.555	0.096	1.067
Departure Headway (Hd)	8.658	7.849	8.985	9.129	8.356	8.282
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	419	459	405	398	432	441
Service Time	6.358	5.549	6.985	6.829	6.056	6.282
HCM Lane V/C Ratio	0.78	0.02	0.758	0.568	0.1	1.052
HCM Control Delay	34.3	10.7	33.6	22.6	11.9	91.2
HCM Lane LOS	D	B	D	C	B	F
HCM 95th-tile Q	6.4	0.1	5.9	3.3	0.3	15.1

Intersection	
Intersection Delay, s/veh	14.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	155	64	68	200	11	30	84	47	7	130	120
Future Vol, veh/h	41	155	64	68	200	11	30	84	47	7	130	120
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	44	167	69	73	215	12	32	90	51	8	140	129
Number of Lanes	0	1	0	1	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	16.3	13.2	11.5	15.9
HCM LOS	C	B	B	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	26%	0%	16%	100%	0%	3%
Vol Thru, %	74%	0%	60%	0%	95%	51%
Vol Right, %	0%	100%	25%	0%	5%	47%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	114	47	260	68	211	257
LT Vol	30	0	41	68	0	7
Through Vol	84	0	155	0	200	130
RT Vol	0	47	64	0	11	120
Lane Flow Rate	123	51	280	73	227	276
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.244	0.089	0.512	0.145	0.416	0.495
Departure Headway (Hd)	7.159	6.309	6.593	7.144	6.597	6.582
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	503	569	551	505	549	550
Service Time	4.89	4.04	4.603	4.854	4.307	4.582
HCM Lane V/C Ratio	0.245	0.09	0.508	0.145	0.413	0.502
HCM Control Delay	12.2	9.7	16.3	11.1	13.9	15.9
HCM Lane LOS	B	A	C	B	B	C
HCM 95th-tile Q	0.9	0.3	2.9	0.5	2	2.7

Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	31	116	14	133	130
Future Vol, veh/h	4	31	116	14	133	130
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	4	34	126	15	145	141

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	565	134	0	0	141	0
Stage 1	134	-	-	-	-	-
Stage 2	431	-	-	-	-	-
Critical Hdwy	6.45	6.25	-	-	4.15	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	481	907	-	-	1424	-
Stage 1	885	-	-	-	-	-
Stage 2	649	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	428	907	-	-	1424	-
Mov Cap-2 Maneuver	428	-	-	-	-	-
Stage 1	885	-	-	-	-	-
Stage 2	577	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	804	1424	-
HCM Lane V/C Ratio	-	-	0.047	0.102	-
HCM Control Delay (s)	-	-	9.7	7.8	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.3	-

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	24	7	19	5	5	8	102	95	17	92	13
Future Vol, veh/h	22	24	7	19	5	5	8	102	95	17	92	13
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	26	28	8	22	6	6	9	119	110	20	107	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.3	8.2	8.7	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	42%	66%	14%
Vol Thru, %	50%	45%	17%	75%
Vol Right, %	46%	13%	17%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	205	53	29	122
LT Vol	8	22	19	17
Through Vol	102	24	5	92
RT Vol	95	7	5	13
Lane Flow Rate	238	62	34	142
Geometry Grp	1	1	1	1
Degree of Util (X)	0.273	0.083	0.046	0.175
Departure Headway (Hd)	4.123	4.875	4.937	4.443
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	875	735	726	809
Service Time	2.137	2.901	2.965	2.46
HCM Lane V/C Ratio	0.272	0.084	0.047	0.176
HCM Control Delay	8.7	8.3	8.2	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.1	0.3	0.1	0.6

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	34	106	4	9	149	81	3	90	12	27	75	26
Future Vol, veh/h	34	106	4	9	149	81	3	90	12	27	75	26
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	36	112	4	9	157	85	3	95	13	28	79	27
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	9.9	9.1	9.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	24%	4%	21%
Vol Thru, %	86%	74%	62%	59%
Vol Right, %	11%	3%	34%	20%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	105	144	239	128
LT Vol	3	34	9	27
Through Vol	90	106	149	75
RT Vol	12	4	81	26
Lane Flow Rate	111	152	252	135
Geometry Grp	1	1	1	1
Degree of Util (X)	0.156	0.208	0.322	0.188
Departure Headway (Hd)	5.073	4.95	4.614	5.023
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	702	720	775	709
Service Time	3.144	3.013	2.67	3.091
HCM Lane V/C Ratio	0.158	0.211	0.325	0.19
HCM Control Delay	9.1	9.3	9.9	9.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.8	1.4	0.7

Intersection	
Intersection Delay, s/veh	32.9
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	146	34	10	183	47	66	323	10	39	244	32
Future Vol, veh/h	21	146	34	10	183	47	66	323	10	39	244	32
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	23	162	38	11	203	52	73	359	11	43	271	36
Number of Lanes	0	1	0	0	1	1	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	20.7	17.6	48.8	32.3
HCM LOS	C	C	E	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	0%	10%	5%	0%	12%
Vol Thru, %	83%	0%	73%	95%	0%	77%
Vol Right, %	0%	100%	17%	0%	100%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	389	10	201	193	47	315
LT Vol	66	0	21	10	0	39
Through Vol	323	0	146	183	0	244
RT Vol	0	10	34	0	47	32
Lane Flow Rate	432	11	223	214	52	350
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.911	0.021	0.527	0.497	0.11	0.764
Departure Headway (Hd)	7.588	6.781	8.491	8.349	7.598	7.855
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	475	527	424	431	471	458
Service Time	5.347	4.539	6.563	6.116	5.364	5.92
HCM Lane V/C Ratio	0.909	0.021	0.526	0.497	0.11	0.764
HCM Control Delay	49.8	9.7	20.7	19.1	11.3	32.3
HCM Lane LOS	E	A	C	C	B	D
HCM 95th-tile Q	10.3	0.1	3	2.7	0.4	6.5

Intersection	
Intersection Delay, s/veh	19.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	101	240	27	37	206	14	81	159	90	28	78	58
Future Vol, veh/h	101	240	27	37	206	14	81	159	90	28	78	58
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	106	253	28	39	217	15	85	167	95	29	82	61
Number of Lanes	0	1	0	1	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	28.4	15.3	16	14.9
HCM LOS	D	C	C	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	34%	0%	27%	100%	0%	17%
Vol Thru, %	66%	0%	65%	0%	94%	48%
Vol Right, %	0%	100%	7%	0%	6%	35%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	240	90	368	37	220	164
LT Vol	81	0	101	37	0	28
Through Vol	159	0	240	0	206	78
RT Vol	0	90	27	0	14	58
Lane Flow Rate	253	95	387	39	232	173
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.521	0.172	0.752	0.084	0.461	0.363
Departure Headway (Hd)	7.418	6.528	6.988	7.722	7.163	7.56
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	485	548	515	463	503	475
Service Time	5.179	4.288	5.045	5.487	4.928	5.634
HCM Lane V/C Ratio	0.522	0.173	0.751	0.084	0.461	0.364
HCM Control Delay	18	10.7	28.4	11.2	16	14.9
HCM Lane LOS	C	B	D	B	C	B
HCM 95th-tile Q	3	0.6	6.5	0.3	2.4	1.6

Intersection	
Int Delay, s/veh	3.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	129	150	4	37	104
Future Vol, veh/h	12	129	150	4	37	104
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	13	140	163	4	40	113

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	358	165	0	0	167	0
Stage 1	165	-	-	-	-	-
Stage 2	193	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	638	877	-	-	1405	-
Stage 1	862	-	-	-	-	-
Stage 2	837	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	619	877	-	-	1405	-
Mov Cap-2 Maneuver	619	-	-	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	812	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	847	1405	-
HCM Lane V/C Ratio	-	-	0.181	0.029	-
HCM Control Delay (s)	-	-	10.2	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	8	5	76	22	14	5	116	30	5	96	15
Future Vol, veh/h	22	8	5	76	22	14	5	116	30	5	96	15
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	25	9	6	86	25	16	6	132	34	6	109	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	8.7	8.6	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	63%	68%	4%
Vol Thru, %	77%	23%	20%	83%
Vol Right, %	20%	14%	12%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	151	35	112	116
LT Vol	5	22	76	5
Through Vol	116	8	22	96
RT Vol	30	5	14	15
Lane Flow Rate	172	40	127	132
Geometry Grp	1	1	1	1
Degree of Util (X)	0.209	0.053	0.168	0.164
Departure Headway (Hd)	4.395	4.84	4.748	4.48
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	817	739	756	801
Service Time	2.419	2.872	2.774	2.505
HCM Lane V/C Ratio	0.211	0.054	0.168	0.165
HCM Control Delay	8.6	8.1	8.7	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.2	0.6	0.6

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	43	157	9	8	120	41	2	65	14	63	90	28
Future Vol, veh/h	43	157	9	8	120	41	2	65	14	63	90	28
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	47	173	10	9	132	45	2	71	15	69	99	31
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.3	9.6	9	10.1
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	21%	5%	35%
Vol Thru, %	80%	75%	71%	50%
Vol Right, %	17%	4%	24%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	81	209	169	181
LT Vol	2	43	8	63
Through Vol	65	157	120	90
RT Vol	14	9	41	28
Lane Flow Rate	89	230	186	199
Geometry Grp	1	1	1	1
Degree of Util (X)	0.127	0.315	0.25	0.28
Departure Headway (Hd)	5.153	4.943	4.855	5.067
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	688	721	732	702
Service Time	3.245	3.018	2.933	3.145
HCM Lane V/C Ratio	0.129	0.319	0.254	0.283
HCM Control Delay	9	10.3	9.6	10.1
HCM Lane LOS	A	B	A	B
HCM 95th-tile Q	0.4	1.3	1	1.1

Intersection	
Intersection Delay, s/veh	58.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	57	199	59	17	193	39	50	251	8	40	358	27
Future Vol, veh/h	57	199	59	17	193	39	50	251	8	40	358	27
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	63	219	65	19	212	43	55	276	9	44	393	30
Number of Lanes	0	1	0	0	1	1	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	43.7	22.2	36.9	106.9
HCM LOS	E	C	E	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	0%	18%	8%	0%	9%
Vol Thru, %	83%	0%	63%	92%	0%	84%
Vol Right, %	0%	100%	19%	0%	100%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	301	8	315	210	39	425
LT Vol	50	0	57	17	0	40
Through Vol	251	0	199	193	0	358
RT Vol	0	8	59	0	39	27
Lane Flow Rate	331	9	346	231	43	467
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.785	0.019	0.829	0.572	0.097	1.112
Departure Headway (Hd)	8.993	8.177	9.161	9.449	8.675	8.568
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	407	440	398	385	416	425
Service Time	6.693	5.877	7.161	7.149	6.375	6.568
HCM Lane V/C Ratio	0.813	0.02	0.869	0.6	0.103	1.099
HCM Control Delay	37.6	11	43.7	24	12.3	106.9
HCM Lane LOS	E	B	E	C	B	F
HCM 95th-tile Q	6.7	0.1	7.6	3.4	0.3	16.5

Intersection	
Intersection Delay, s/veh	16.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	180	14	35	233	12	24	104	56	10	109	176
Future Vol, veh/h	47	180	14	35	233	12	24	104	56	10	109	176
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	51	194	15	38	251	13	26	112	60	11	117	189
Number of Lanes	0	1	0	1	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	17	15.6	11.9	18.4
HCM LOS	C	C	B	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	19%	0%	20%	100%	0%	3%
Vol Thru, %	81%	0%	75%	0%	95%	37%
Vol Right, %	0%	100%	6%	0%	5%	60%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	128	56	241	35	245	295
LT Vol	24	0	47	35	0	10
Through Vol	104	0	180	0	233	109
RT Vol	0	56	14	0	12	176
Lane Flow Rate	138	60	259	38	263	317
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.278	0.108	0.505	0.077	0.5	0.581
Departure Headway (Hd)	7.272	6.459	7.009	7.375	6.83	6.589
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	494	554	513	485	527	549
Service Time	5.024	4.211	5.058	5.122	4.576	4.632
HCM Lane V/C Ratio	0.279	0.108	0.505	0.078	0.499	0.577
HCM Control Delay	12.8	10	17	10.7	16.3	18.4
HCM Lane LOS	B	A	C	B	C	C
HCM 95th-tile Q	1.1	0.4	2.8	0.2	2.8	3.7

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	0	9	0	0	2	12	135	12	3	118	16
Future Vol, veh/h	24	0	9	0	0	2	12	135	12	3	118	16
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	28	0	10	0	0	2	14	157	14	3	137	19
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8	7.2	8.4	8.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	73%	0%	2%
Vol Thru, %	85%	0%	0%	86%
Vol Right, %	8%	27%	100%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	159	33	2	137
LT Vol	12	24	0	3
Through Vol	135	0	0	118
RT Vol	12	9	2	16
Lane Flow Rate	185	38	2	159
Geometry Grp	1	1	1	1
Degree of Util (X)	0.214	0.051	0.003	0.183
Departure Headway (Hd)	4.163	4.739	4.201	4.146
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	852	760	857	854
Service Time	2.234	2.739	2.203	2.225
HCM Lane V/C Ratio	0.217	0.05	0.002	0.186
HCM Control Delay	8.4	8	7.2	8.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.2	0	0.7

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	29	156	5	12	196	35	4	92	18	20	100	32
Future Vol, veh/h	29	156	5	12	196	35	4	92	18	20	100	32
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	31	164	5	13	206	37	4	97	19	21	105	34
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.2	10.6	9.5	9.9
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	15%	5%	13%
Vol Thru, %	81%	82%	81%	66%
Vol Right, %	16%	3%	14%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	114	190	243	152
LT Vol	4	29	12	20
Through Vol	92	156	196	100
RT Vol	18	5	35	32
Lane Flow Rate	120	200	256	160
Geometry Grp	1	1	1	1
Degree of Util (X)	0.179	0.281	0.348	0.23
Departure Headway (Hd)	5.356	5.06	4.903	5.182
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	674	702	724	683
Service Time	3.356	3.157	2.994	3.282
HCM Lane V/C Ratio	0.178	0.285	0.354	0.234
HCM Control Delay	9.5	10.2	10.6	9.9
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.6	1.2	1.6	0.9

Intersection	
Intersection Delay, s/veh	57.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	166	38	11	198	54	63	376	11	45	284	22
Future Vol, veh/h	21	166	38	11	198	54	63	376	11	45	284	22
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	23	184	42	12	220	60	70	418	12	50	316	24
Number of Lanes	0	1	0	0	1	1	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	26.6	21	98.4	52.2
HCM LOS	D	C	F	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	14%	0%	9%	5%	0%	13%
Vol Thru, %	86%	0%	74%	95%	0%	81%
Vol Right, %	0%	100%	17%	0%	100%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	439	11	225	209	54	351
LT Vol	63	0	21	11	0	45
Through Vol	376	0	166	198	0	284
RT Vol	0	11	38	0	54	22
Lane Flow Rate	488	12	250	232	60	390
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	1.099	0.025	0.619	0.565	0.134	0.898
Departure Headway (Hd)	8.114	7.316	9.417	9.198	8.44	8.68
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	449	487	385	395	427	421
Service Time	5.898	5.1	7.417	6.898	6.14	6.68
HCM Lane V/C Ratio	1.087	0.025	0.649	0.587	0.141	0.926
HCM Control Delay	100.6	10.3	26.6	23.2	12.4	52.2
HCM Lane LOS	F	B	D	C	B	F
HCM 95th-tile Q	16.4	0.1	4	3.4	0.5	9.5

Intersection	
Intersection Delay, s/veh	27.1
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	118	280	15	30	240	16	40	154	74	40	92	85
Future Vol, veh/h	118	280	15	30	240	16	40	154	74	40	92	85
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	124	295	16	32	253	17	42	162	78	42	97	89
Number of Lanes	0	1	0	1	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	44.8	18.7	15.6	18.7
HCM LOS	E	C	C	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	21%	0%	29%	100%	0%	18%
Vol Thru, %	79%	0%	68%	0%	94%	42%
Vol Right, %	0%	100%	4%	0%	6%	39%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	194	74	413	30	256	217
LT Vol	40	0	118	30	0	40
Through Vol	154	0	280	0	240	92
RT Vol	0	74	15	0	16	85
Lane Flow Rate	204	78	435	32	269	228
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.454	0.156	0.887	0.071	0.564	0.502
Departure Headway (Hd)	8.006	7.19	7.347	8.101	7.541	7.912
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	449	499	496	444	480	455
Service Time	5.76	4.931	5.364	5.823	5.263	5.971
HCM Lane V/C Ratio	0.454	0.156	0.877	0.072	0.56	0.501
HCM Control Delay	17.3	11.3	44.8	11.4	19.6	18.7
HCM Lane LOS	C	B	E	B	C	C
HCM 95th-tile Q	2.3	0.5	9.8	0.2	3.4	2.8

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	2	6	0	0	1	7	167	8	0	114	17
Future Vol, veh/h	27	2	6	0	0	1	7	167	8	0	114	17
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	31	2	7	0	0	1	8	190	9	0	130	19
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8	7.2	8.5	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	77%	0%	0%
Vol Thru, %	92%	6%	0%	87%
Vol Right, %	4%	17%	100%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	182	35	1	131
LT Vol	7	27	0	0
Through Vol	167	2	0	114
RT Vol	8	6	1	17
Lane Flow Rate	207	40	1	149
Geometry Grp	1	1	1	1
Degree of Util (X)	0.236	0.053	0.001	0.17
Departure Headway (Hd)	4.115	4.772	4.168	4.1
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	865	755	863	863
Service Time	2.184	2.772	2.17	2.181
HCM Lane V/C Ratio	0.239	0.053	0.001	0.173
HCM Control Delay	8.5	8	7.2	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.9	0.2	0	0.6

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	58	231	13	10	159	34	2	84	20	13	93	21
Future Vol, veh/h	58	231	13	10	159	34	2	84	20	13	93	21
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	64	254	14	11	175	37	2	92	22	14	102	23
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	12.4	10.4	9.8	10.1
HCM LOS	B	B	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	19%	5%	10%
Vol Thru, %	79%	76%	78%	73%
Vol Right, %	19%	4%	17%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	106	302	203	127
LT Vol	2	58	10	13
Through Vol	84	231	159	93
RT Vol	20	13	34	21
Lane Flow Rate	116	332	223	140
Geometry Grp	1	1	1	1
Degree of Util (X)	0.179	0.466	0.315	0.214
Departure Headway (Hd)	5.528	5.053	5.076	5.515
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	648	717	709	650
Service Time	3.569	3.053	3.106	3.554
HCM Lane V/C Ratio	0.179	0.463	0.315	0.215
HCM Control Delay	9.8	12.4	10.4	10.1
HCM Lane LOS	A	B	B	B
HCM 95th-tile Q	0.6	2.5	1.3	0.8

Intersection	
Intersection Delay, s/veh	112.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	218	54	20	220	45	54	292	9	46	417	28
Future Vol, veh/h	52	218	54	20	220	45	54	292	9	46	417	28
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	57	240	59	22	242	49	59	321	10	51	458	31
Number of Lanes	0	1	0	0	1	1	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	64.2	31	67.7	223.1
HCM LOS	F	D	F	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	16%	0%	16%	8%	0%	9%
Vol Thru, %	84%	0%	67%	92%	0%	85%
Vol Right, %	0%	100%	17%	0%	100%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	346	9	324	240	45	491
LT Vol	54	0	52	20	0	46
Through Vol	292	0	218	220	0	417
RT Vol	0	9	54	0	45	28
Lane Flow Rate	380	10	356	264	49	540
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.955	0.023	0.921	0.694	0.12	1.405
Departure Headway (Hd)	10.035	9.218	10.54	10.614	9.832	9.373
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	365	391	345	343	367	388
Service Time	7.735	6.918	8.54	8.314	7.532	7.448
HCM Lane V/C Ratio	1.041	0.026	1.032	0.77	0.134	1.392
HCM Control Delay	69.1	12.1	64.2	34.2	13.9	223.1
HCM Lane LOS	F	B	F	D	B	F
HCM 95th-tile Q	10.4	0.1	9.3	4.9	0.4	26.8

Intersection	
Intersection Delay, s/veh	28.4
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	180	75	80	233	12	44	124	69	10	191	176
Future Vol, veh/h	47	180	75	80	233	12	44	124	69	10	191	176
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	51	194	81	86	251	13	47	133	74	11	205	189
Number of Lanes	0	1	0	1	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	29.9	19.9	15.8	42.5
HCM LOS	D	C	C	E

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	26%	0%	16%	100%	0%	3%
Vol Thru, %	74%	0%	60%	0%	95%	51%
Vol Right, %	0%	100%	25%	0%	5%	47%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	168	69	302	80	245	377
LT Vol	44	0	47	80	0	10
Through Vol	124	0	180	0	233	191
RT Vol	0	69	75	0	12	176
Lane Flow Rate	181	74	325	86	263	405
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.426	0.157	0.727	0.206	0.59	0.862
Departure Headway (Hd)	8.496	7.635	8.063	8.617	8.065	7.652
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	423	468	448	415	448	474
Service Time	6.266	5.405	6.129	6.383	5.831	5.71
HCM Lane V/C Ratio	0.428	0.158	0.725	0.207	0.587	0.854
HCM Control Delay	17.5	11.8	29.9	13.6	21.9	42.5
HCM Lane LOS	C	B	D	B	C	E
HCM 95th-tile Q	2.1	0.6	5.8	0.8	3.7	8.9

Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	41	170	20	175	171
Future Vol, veh/h	5	41	170	20	175	171
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	5	45	185	22	190	186

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	762	196	0	0	207	0
Stage 1	196	-	-	-	-	-
Stage 2	566	-	-	-	-	-
Critical Hdwy	6.45	6.25	-	-	4.15	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	369	838	-	-	1346	-
Stage 1	830	-	-	-	-	-
Stage 2	562	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	311	838	-	-	1346	-
Mov Cap-2 Maneuver	311	-	-	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	474	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	4.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	708	1346	-
HCM Lane V/C Ratio	-	-	0.071	0.141	-
HCM Control Delay (s)	-	-	10.5	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.5	-

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	31	9	19	5	5	12	149	140	23	121	17
Future Vol, veh/h	28	31	9	19	5	5	12	149	140	23	121	17
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	33	36	10	22	6	6	14	173	163	27	141	20
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9	8.7	10.2	9.1
HCM LOS	A	A	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	41%	66%	14%
Vol Thru, %	50%	46%	17%	75%
Vol Right, %	47%	13%	17%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	301	68	29	161
LT Vol	12	28	19	23
Through Vol	149	31	5	121
RT Vol	140	9	5	17
Lane Flow Rate	350	79	34	187
Geometry Grp	1	1	1	1
Degree of Util (X)	0.412	0.115	0.05	0.241
Departure Headway (Hd)	4.239	5.228	5.326	4.626
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	847	683	669	775
Service Time	2.269	3.278	3.382	2.662
HCM Lane V/C Ratio	0.413	0.116	0.051	0.241
HCM Control Delay	10.2	9	8.7	9.1
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	2	0.4	0.2	0.9

Intersection	
Intersection Delay, s/veh	12
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	156	5	12	196	107	4	132	18	39	109	37
Future Vol, veh/h	50	156	5	12	196	107	4	132	18	39	109	37
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	53	164	5	13	206	113	4	139	19	41	115	39
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.6	13.1	10.9	11.4
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	24%	4%	21%
Vol Thru, %	86%	74%	62%	59%
Vol Right, %	12%	2%	34%	20%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	154	211	315	185
LT Vol	4	50	12	39
Through Vol	132	156	196	109
RT Vol	18	5	107	37
Lane Flow Rate	162	222	332	195
Geometry Grp	1	1	1	1
Degree of Util (X)	0.261	0.346	0.481	0.31
Departure Headway (Hd)	5.803	5.604	5.221	5.728
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	616	640	690	625
Service Time	3.863	3.658	3.269	3.784
HCM Lane V/C Ratio	0.263	0.347	0.481	0.312
HCM Control Delay	10.9	11.6	13.1	11.4
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1	1.5	2.6	1.3

Intersection	
Intersection Delay, s/veh	74
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	170	40	11	213	54	77	376	11	45	284	38
Future Vol, veh/h	24	170	40	11	213	54	77	376	11	45	284	38
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	27	189	44	12	237	60	86	418	12	50	316	42
Number of Lanes	0	1	0	0	1	1	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	30.6	24.2	130.4	68.2
HCM LOS	D	C	F	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	0%	10%	5%	0%	12%
Vol Thru, %	83%	0%	73%	95%	0%	77%
Vol Right, %	0%	100%	17%	0%	100%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	453	11	234	224	54	367
LT Vol	77	0	24	11	0	45
Through Vol	376	0	170	213	0	284
RT Vol	0	11	40	0	54	38
Lane Flow Rate	503	12	260	249	60	408
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	1.188	0.026	0.666	0.624	0.138	0.968
Departure Headway (Hd)	8.498	7.684	9.912	9.592	8.834	9.087
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	428	465	367	378	409	404
Service Time	6.252	5.437	7.912	7.292	6.534	7.087
HCM Lane V/C Ratio	1.175	0.026	0.708	0.659	0.147	1.01
HCM Control Delay	133.3	10.6	30.6	26.9	12.9	68.2
HCM Lane LOS	F	B	D	D	B	F
HCM 95th-tile Q	19.5	0.1	4.6	4	0.5	11.2

Intersection	
Intersection Delay, s/veh	51.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	118	280	32	42	240	16	119	232	132	40	114	85
Future Vol, veh/h	118	280	32	42	240	16	119	232	132	40	114	85
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	124	295	34	44	253	17	125	244	139	42	120	89
Number of Lanes	0	1	0	1	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	97.7	25.1	39.4	27.1
HCM LOS	F	D	E	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	34%	0%	27%	100%	0%	17%
Vol Thru, %	66%	0%	65%	0%	94%	48%
Vol Right, %	0%	100%	7%	0%	6%	36%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	351	132	430	42	256	239
LT Vol	119	0	118	42	0	40
Through Vol	232	0	280	0	240	114
RT Vol	0	132	32	0	16	85
Lane Flow Rate	369	139	453	44	269	252
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.874	0.295	1.083	0.113	0.649	0.627
Departure Headway (Hd)	8.923	8.019	8.617	9.623	9.056	9.475
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	410	452	425	375	402	385
Service Time	6.623	5.719	6.617	7.323	6.756	7.475
HCM Lane V/C Ratio	0.9	0.308	1.066	0.117	0.669	0.655
HCM Control Delay	48.9	14	97.7	13.5	27	27.1
HCM Lane LOS	E	B	F	B	D	D
HCM 95th-tile Q	8.8	1.2	15.4	0.4	4.4	4.1

Intersection	
Int Delay, s/veh	4.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	170	220	5	48	138
Future Vol, veh/h	16	170	220	5	48	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	17	185	239	5	52	150

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	496	242	0	0	244	0
Stage 1	242	-	-	-	-	-
Stage 2	254	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	531	794	-	-	1316	-
Stage 1	796	-	-	-	-	-
Stage 2	786	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	508	794	-	-	1316	-
Mov Cap-2 Maneuver	508	-	-	-	-	-
Stage 1	796	-	-	-	-	-
Stage 2	752	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	757	1316	-
HCM Lane V/C Ratio	-	-	0.267	0.04	-
HCM Control Delay (s)	-	-	11.5	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.1	0.1	-

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	28	10	6	76	22	14	7	170	44	6	126	20
Future Vol, veh/h	28	10	6	76	22	14	7	170	44	6	126	20
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	32	11	7	86	25	16	8	193	50	7	143	23
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.6	9.2	9.6	9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	64%	68%	4%
Vol Thru, %	77%	23%	20%	83%
Vol Right, %	20%	14%	12%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	221	44	112	152
LT Vol	7	28	76	6
Through Vol	170	10	22	126
RT Vol	44	6	14	20
Lane Flow Rate	251	50	127	173
Geometry Grp	1	1	1	1
Degree of Util (X)	0.313	0.071	0.178	0.222
Departure Headway (Hd)	4.491	5.14	5.042	4.618
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	799	693	709	776
Service Time	2.528	3.2	3.094	2.657
HCM Lane V/C Ratio	0.314	0.072	0.179	0.223
HCM Control Delay	9.6	8.6	9.2	9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.3	0.2	0.6	0.8

Intersection	
Intersection Delay, s/veh	13.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	63	231	13	10	159	54	2	95	20	92	132	40
Future Vol, veh/h	63	231	13	10	159	54	2	95	20	92	132	40
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	69	254	14	11	175	59	2	104	22	101	145	44
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	15.1	12.4	10.9	14.1
HCM LOS	C	B	B	B

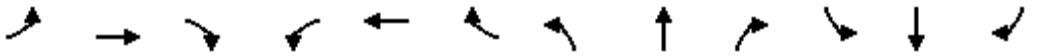
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	21%	4%	35%
Vol Thru, %	81%	75%	71%	50%
Vol Right, %	17%	4%	24%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	117	307	223	264
LT Vol	2	63	10	92
Through Vol	95	231	159	132
RT Vol	20	13	54	40
Lane Flow Rate	129	337	245	290
Geometry Grp	1	1	1	1
Degree of Util (X)	0.218	0.531	0.387	0.471
Departure Headway (Hd)	6.107	5.67	5.687	5.843
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	582	631	627	612
Service Time	4.199	3.741	3.764	3.917
HCM Lane V/C Ratio	0.222	0.534	0.391	0.474
HCM Control Delay	10.9	15.1	12.4	14.1
HCM Lane LOS	B	C	B	B
HCM 95th-tile Q	0.8	3.1	1.8	2.5

Intersection	
Intersection Delay, s/veh	128.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	66	232	69	20	225	45	58	292	9	46	417	32
Future Vol, veh/h	66	232	69	20	225	45	58	292	9	46	417	32
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	73	255	76	22	247	49	64	321	10	51	458	35
Number of Lanes	0	1	0	0	1	1	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	101.2	34.6	77.7	240.7
HCM LOS	F	D	F	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	0%	18%	8%	0%	9%
Vol Thru, %	83%	0%	63%	92%	0%	84%
Vol Right, %	0%	100%	19%	0%	100%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	350	9	367	245	45	495
LT Vol	58	0	66	20	0	46
Through Vol	292	0	232	225	0	417
RT Vol	0	9	69	0	45	32
Lane Flow Rate	385	10	403	269	49	544
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.989	0.023	1.063	0.725	0.123	1.443
Departure Headway (Hd)	10.566	9.741	10.791	11.122	10.338	9.966
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	346	370	339	328	349	370
Service Time	8.266	7.441	8.791	8.822	8.038	7.966
HCM Lane V/C Ratio	1.113	0.027	1.189	0.82	0.14	1.47
HCM Control Delay	79.4	12.7	101.2	38.3	14.5	240.7
HCM Lane LOS	F	B	F	E	B	F
HCM 95th-tile Q	11	0.1	12.9	5.3	0.4	27.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	180	75	80	233	12	44	124	69	10	191	176
Future Volume (veh/h)	47	180	75	80	233	12	44	124	69	10	191	176
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1914	1914	1841	1914	1914	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	51	194	81	86	251	13	47	133	74	11	205	189
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	330	350	146	315	492	25	261	678	822	89	468	416
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.53	0.53	0.53	0.53	0.53	0.53
Sat Flow, veh/h	1097	1282	535	1086	1804	93	304	1286	1558	14	887	789
Grp Volume(v), veh/h	51	0	275	86	0	264	180	0	74	405	0	0
Grp Sat Flow(s),veh/h/ln	1097	0	1817	1086	0	1897	1590	0	1558	1690	0	0
Q Serve(g_s), s	1.9	0.0	5.8	3.3	0.0	5.3	0.0	0.0	1.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	7.1	0.0	5.8	9.2	0.0	5.3	2.3	0.0	1.1	6.7	0.0	0.0
Prop In Lane	1.00		0.29	1.00		0.05	0.26		1.00	0.03		0.47
Lane Grp Cap(c), veh/h	330	0	495	315	0	517	939	0	822	973	0	0
V/C Ratio(X)	0.15	0.00	0.56	0.27	0.00	0.51	0.19	0.00	0.09	0.42	0.00	0.00
Avail Cap(c_a), veh/h	470	0	727	453	0	759	939	0	822	973	0	0
HCM 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
Upstream Filter(I)	1.00	0.00	1.00	0.83	0.00	0.83	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.8	0.0	14.0	17.9	0.0	13.8	5.6	0.0	5.3	6.6	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	1.0	0.4	0.0	0.6	0.5	0.0	0.2	1.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	2.1	0.8	0.0	2.0	0.6	0.0	0.2	1.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.1	0.0	15.0	18.3	0.0	14.5	6.0	0.0	5.5	7.9	0.0	0.0
LnGrp LOS	B	A	B	B	A	B	A	A	A	A	A	A
Approach Vol, veh/h		326			350			254			405	
Approach Delay, s/veh		15.3			15.4			5.9			7.9	
Approach LOS		B			B			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		28.2		16.8		28.2		16.8				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		18.0		18.0		18.0				
Max Q Clear Time (g_c+I1), s		4.3		9.1		8.7		11.2				
Green Ext Time (p_c), s		1.0		1.2		1.6		1.0				

Intersection Summary												
HCM 6th Ctrl Delay			11.3									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	41	170	20	175	171
Future Vol, veh/h	5	41	170	20	175	171
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	5	45	185	22	190	186

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	762	196	0	0	207	0
Stage 1	196	-	-	-	-	-
Stage 2	566	-	-	-	-	-
Critical Hdwy	6.45	6.25	-	-	4.15	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	369	838	-	-	1346	-
Stage 1	830	-	-	-	-	-
Stage 2	562	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	311	838	-	-	1346	-
Mov Cap-2 Maneuver	311	-	-	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	474	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	4.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	708	1346	-
HCM Lane V/C Ratio	-	-	0.071	0.141	-
HCM Control Delay (s)	-	-	10.5	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.5	-

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	31	9	19	5	5	12	149	140	23	121	17
Future Vol, veh/h	28	31	9	19	5	5	12	149	140	23	121	17
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	33	36	10	22	6	6	14	173	163	27	141	20
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9	8.7	10.2	9.1
HCM LOS	A	A	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	41%	66%	14%
Vol Thru, %	50%	46%	17%	75%
Vol Right, %	47%	13%	17%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	301	68	29	161
LT Vol	12	28	19	23
Through Vol	149	31	5	121
RT Vol	140	9	5	17
Lane Flow Rate	350	79	34	187
Geometry Grp	1	1	1	1
Degree of Util (X)	0.412	0.115	0.05	0.241
Departure Headway (Hd)	4.239	5.228	5.326	4.626
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	847	683	669	775
Service Time	2.269	3.278	3.382	2.662
HCM Lane V/C Ratio	0.413	0.116	0.051	0.241
HCM Control Delay	10.2	9	8.7	9.1
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	2	0.4	0.2	0.9

Intersection	
Intersection Delay, s/veh	12
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	156	5	12	196	107	4	132	18	39	109	37
Future Vol, veh/h	50	156	5	12	196	107	4	132	18	39	109	37
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	53	164	5	13	206	113	4	139	19	41	115	39
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.6	13.1	10.9	11.4
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	24%	4%	21%
Vol Thru, %	86%	74%	62%	59%
Vol Right, %	12%	2%	34%	20%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	154	211	315	185
LT Vol	4	50	12	39
Through Vol	132	156	196	109
RT Vol	18	5	107	37
Lane Flow Rate	162	222	332	195
Geometry Grp	1	1	1	1
Degree of Util (X)	0.261	0.346	0.481	0.31
Departure Headway (Hd)	5.803	5.604	5.221	5.728
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	616	640	690	625
Service Time	3.863	3.658	3.269	3.784
HCM Lane V/C Ratio	0.263	0.347	0.481	0.312
HCM Control Delay	10.9	11.6	13.1	11.4
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1	1.5	2.6	1.3



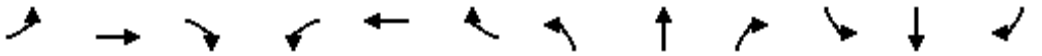
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	170	40	11	213	54	77	376	11	45	284	38
Future Volume (veh/h)	24	170	40	11	213	54	77	376	11	45	284	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1914	1914	1914	1914	1914	1914	1841	1841	1841
Adj Flow Rate, veh/h	27	189	44	12	237	60	86	418	0	50	316	42
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	98	273	59	83	412	357	204	927		151	843	105
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.60	0.60	0.00	0.60	0.60	0.60
Sat Flow, veh/h	81	1231	267	36	1861	1611	200	1548	1622	117	1408	175
Grp Volume(v), veh/h	260	0	0	249	0	60	504	0	0	408	0	0
Grp Sat Flow(s),veh/h/ln	1580	0	0	1897	0	1611	1749	0	1622	1700	0	0
Q Serve(g_s), s	2.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	7.8	0.0	0.0	5.8	0.0	1.5	7.2	0.0	0.0	5.9	0.0	0.0
Prop In Lane	0.10		0.17	0.05		1.00	0.17		1.00	0.12		0.10
Lane Grp Cap(c), veh/h	429	0	0	495	0	357	1131	0		1099	0	0
V/C Ratio(X)	0.61	0.00	0.00	0.50	0.00	0.17	0.45	0.00		0.37	0.00	0.00
Avail Cap(c_a), veh/h	659	0	0	753	0	580	1131	0		1099	0	0
HCM 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
Upstream Filter(I)	0.92	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.0	0.0	0.0	17.4	0.0	15.7	5.5	0.0	0.0	5.2	0.0	0.0
Incr Delay (d2), s/veh	1.3	0.0	0.0	0.8	0.0	0.2	1.3	0.0	0.0	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	0.0	2.4	0.0	0.5	1.6	0.0	0.0	1.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.3	0.0	0.0	18.2	0.0	16.0	6.7	0.0	0.0	6.2	0.0	0.0
LnGrp LOS	B	A	A	B	A	B	A	A		A	A	A
Approach Vol, veh/h		260			309			504			408	
Approach Delay, s/veh		19.3			17.8			6.7			6.2	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	34.4	15.6	34.4	15.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	23.0	18.0	23.0	18.0
Max Q Clear Time (g_c+I1), s	9.2	9.8	7.9	7.8
Green Ext Time (p_c), s	2.5	0.9	2.1	1.1

Intersection Summary	
HCM 6th Ctrl Delay	11.1
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	118	280	32	42	240	16	119	232	132	40	114	85
Future Volume (veh/h)	118	280	32	42	240	16	119	232	132	40	114	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1945	1945	1870	1945	1945	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	124	295	34	44	253	17	125	244	139	42	120	89
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	353	524	60	330	552	37	322	580	766	171	441	285
Arrive On Green	0.31	0.31	0.31	0.10	0.10	0.10	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	1109	1712	197	1051	1802	121	436	1176	1551	158	893	578
Grp Volume(v), veh/h	124	0	329	44	0	270	369	0	139	251	0	0
Grp Sat Flow(s),veh/h/ln	1109	0	1910	1051	0	1923	1611	0	1551	1629	0	0
Q Serve(g_s), s	4.7	0.0	6.5	1.8	0.0	6.0	2.2	0.0	2.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	10.6	0.0	6.5	8.3	0.0	6.0	6.1	0.0	2.2	3.8	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.06	0.34		1.00	0.17		0.35
Lane Grp Cap(c), veh/h	353	0	585	330	0	589	903	0	766	898	0	0
V/C Ratio(X)	0.35	0.00	0.56	0.13	0.00	0.46	0.41	0.00	0.18	0.28	0.00	0.00
Avail Cap(c_a), veh/h	457	0	764	429	0	769	903	0	766	898	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.90	0.00	0.90	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	17.3	0.0	13.1	20.9	0.0	16.7	7.2	0.0	6.3	6.7	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.9	0.2	0.0	0.5	1.4	0.0	0.5	0.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	2.3	0.5	0.0	2.6	1.6	0.0	0.5	1.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.9	0.0	13.9	21.0	0.0	17.2	8.6	0.0	6.9	7.5	0.0	0.0
LnGrp LOS	B	A	B	C	A	B	A	A	A	A	A	A
Approach Vol, veh/h		453			314			508			251	
Approach Delay, s/veh		15.0			17.7			8.1			7.5	
Approach LOS		B			B			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		26.7		18.3		26.7		18.3				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		18.0		18.0		18.0				
Max Q Clear Time (g_c+I1), s		8.1		12.6		5.8		10.3				
Green Ext Time (p_c), s		1.9		1.1		1.1		1.0				

Intersection Summary												
HCM 6th Ctrl Delay			12.0									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	4.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	170	220	5	48	138
Future Vol, veh/h	16	170	220	5	48	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	17	185	239	5	52	150

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	496	242	0	0	244	0
Stage 1	242	-	-	-	-	-
Stage 2	254	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	531	794	-	-	1316	-
Stage 1	796	-	-	-	-	-
Stage 2	786	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	508	794	-	-	1316	-
Mov Cap-2 Maneuver	508	-	-	-	-	-
Stage 1	796	-	-	-	-	-
Stage 2	752	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	757	1316	-
HCM Lane V/C Ratio	-	-	0.267	0.04	-
HCM Control Delay (s)	-	-	11.5	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.1	0.1	-

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	10	6	76	22	14	7	170	44	6	126	20
Future Vol, veh/h	28	10	6	76	22	14	7	170	44	6	126	20
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	32	11	7	86	25	16	8	193	50	7	143	23
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.6	9.2	9.6	9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	64%	68%	4%
Vol Thru, %	77%	23%	20%	83%
Vol Right, %	20%	14%	12%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	221	44	112	152
LT Vol	7	28	76	6
Through Vol	170	10	22	126
RT Vol	44	6	14	20
Lane Flow Rate	251	50	127	173
Geometry Grp	1	1	1	1
Degree of Util (X)	0.313	0.071	0.178	0.222
Departure Headway (Hd)	4.491	5.14	5.042	4.618
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	799	693	709	776
Service Time	2.528	3.2	3.094	2.657
HCM Lane V/C Ratio	0.314	0.072	0.179	0.223
HCM Control Delay	9.6	8.6	9.2	9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.3	0.2	0.6	0.8

Intersection	
Intersection Delay, s/veh	13.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	63	231	13	10	159	54	2	95	20	92	132	40
Future Vol, veh/h	63	231	13	10	159	54	2	95	20	92	132	40
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	69	254	14	11	175	59	2	104	22	101	145	44
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	15.1	12.4	10.9	14.1
HCM LOS	C	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	21%	4%	35%
Vol Thru, %	81%	75%	71%	50%
Vol Right, %	17%	4%	24%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	117	307	223	264
LT Vol	2	63	10	92
Through Vol	95	231	159	132
RT Vol	20	13	54	40
Lane Flow Rate	129	337	245	290
Geometry Grp	1	1	1	1
Degree of Util (X)	0.218	0.531	0.387	0.471
Departure Headway (Hd)	6.107	5.67	5.687	5.843
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	582	631	627	612
Service Time	4.199	3.741	3.764	3.917
HCM Lane V/C Ratio	0.222	0.534	0.391	0.474
HCM Control Delay	10.9	15.1	12.4	14.1
HCM Lane LOS	B	C	B	B
HCM 95th-tile Q	0.8	3.1	1.8	2.5



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	232	69	20	225	45	58	292	9	46	417	32
Future Volume (veh/h)	66	232	69	20	225	45	58	292	9	46	417	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1945	1945	1945	1945	1945	1945	1870	1870	1870
Adj Flow Rate, veh/h	73	255	76	22	247	49	64	321	0	51	458	35
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	154	350	95	108	587	511	177	777		132	759	55
Arrive On Green	0.10	0.10	0.10	0.32	0.32	0.32	0.48	0.48	0.00	0.48	0.48	0.48
Sat Flow, veh/h	189	1104	300	67	1851	1612	174	1609	1648	92	1573	114
Grp Volume(v), veh/h	404	0	0	269	0	49	385	0	0	544	0	0
Grp Sat Flow(s),veh/h/ln	1593	0	0	1918	0	1612	1782	0	1648	1779	0	0
Q Serve(g_s), s	6.2	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.4	0.0	0.0
Cycle Q Clear(g_c), s	11.2	0.0	0.0	4.9	0.0	1.0	5.7	0.0	0.0	9.7	0.0	0.0
Prop In Lane	0.18		0.19	0.08		1.00	0.17		1.00	0.09		0.06
Lane Grp Cap(c), veh/h	600	0	0	695	0	511	954	0		946	0	0
V/C Ratio(X)	0.67	0.00	0.00	0.39	0.00	0.10	0.40	0.00		0.57	0.00	0.00
Avail Cap(c_a), veh/h	732	0	0	846	0	645	954	0		946	0	0
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.6	0.0	0.0	12.2	0.0	10.8	7.5	0.0	0.0	8.5	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	0.4	0.0	0.1	1.3	0.0	0.0	2.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	0.0	1.8	0.0	0.3	1.6	0.0	0.0	2.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.3	0.0	0.0	12.5	0.0	10.9	8.8	0.0	0.0	11.1	0.0	0.0
LnGrp LOS	C	A	A	B	A	B	A	A		B	A	A
Approach Vol, veh/h		404			318			385			544	
Approach Delay, s/veh		20.3			12.3			8.8			11.1	
Approach LOS		C			B			A			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	26.2	18.8	26.2	18.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.0	18.0	18.0	18.0
Max Q Clear Time (g_c+I1), s	7.7	13.2	11.7	6.9
Green Ext Time (p_c), s	1.6	1.1	1.7	1.3

Intersection Summary	
HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

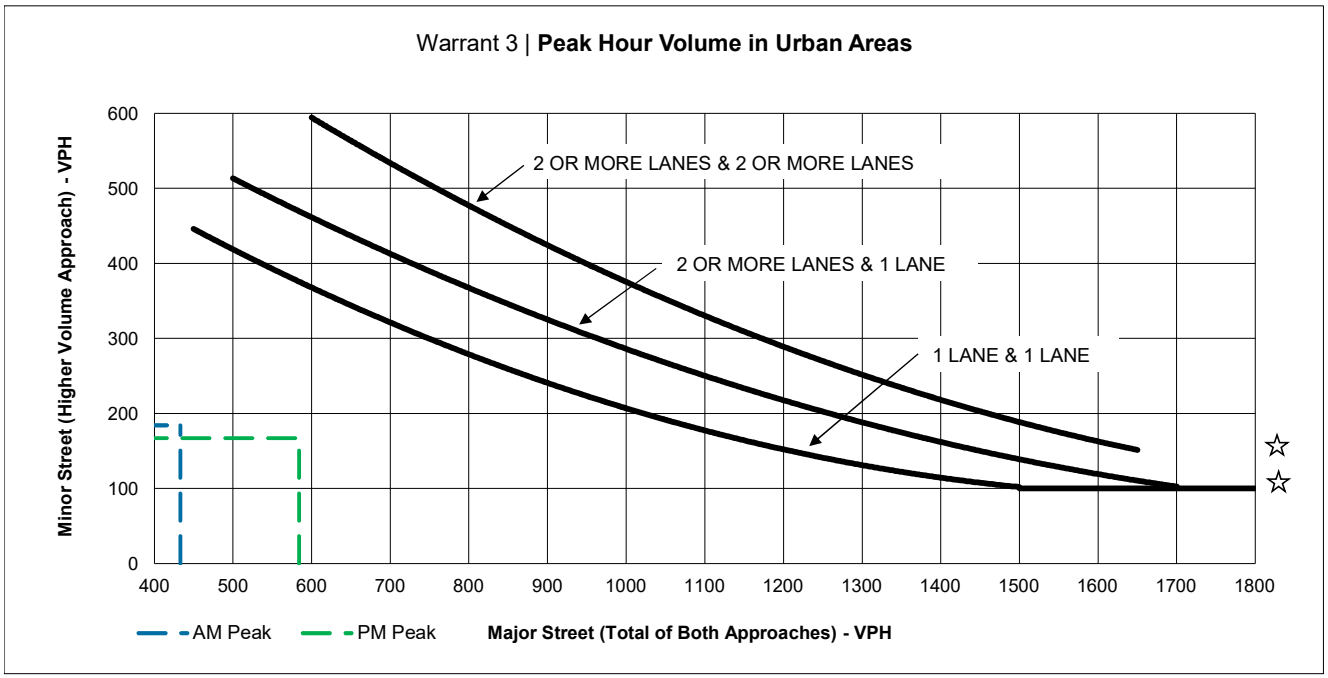
Attachment C: Signal Warrant Sheets

Existing Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ **NOTE:**

150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Tully Rd	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	433	584	
Minor St. Volume (higher volume approach):	184	167	
Warrant Met?:	**No**	**No**	

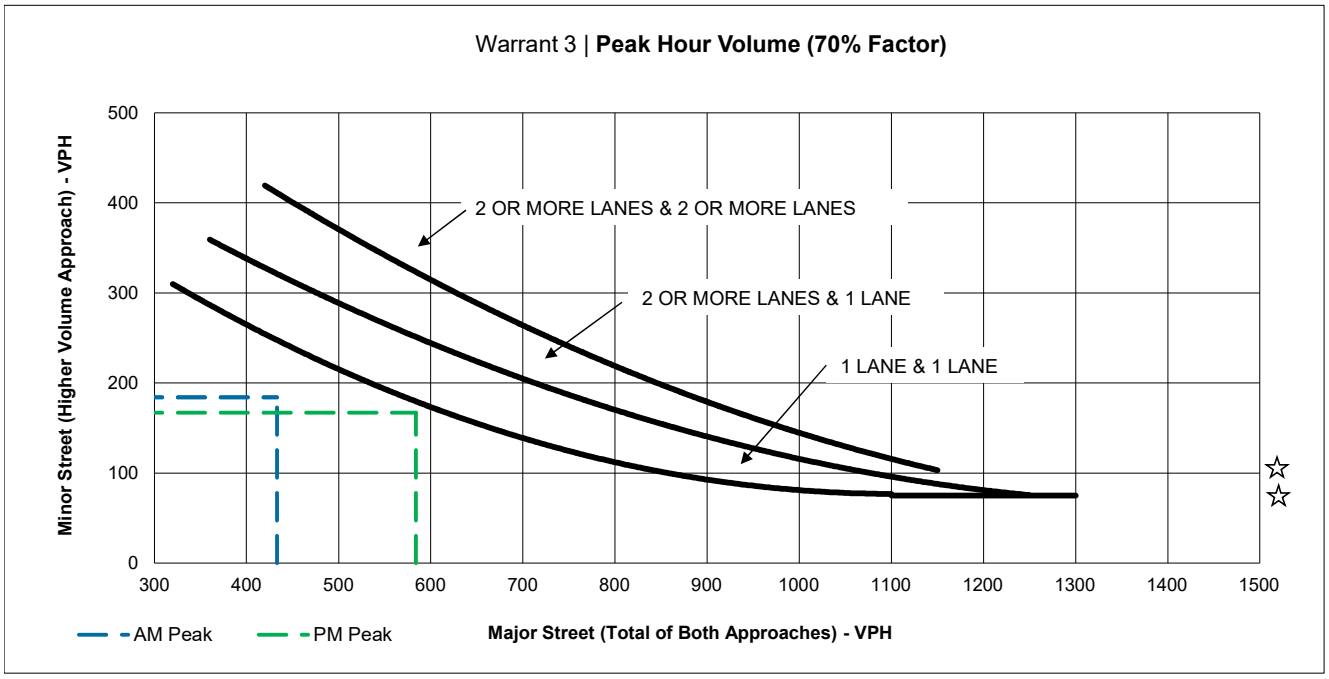
Fig 4C-3 (100% Option)

Existing Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
400	265	400	340	400	N/A
500	210	500	290	500	375
600	180	600	240	600	310
700	150	700	200	700	260
800	90	800	175	800	220
900	100	900	140	900	180
1000	85	1000	120	1000	150
1100	75	1100	95	1150	100
1200	75	1200	80	1200	100
1300	75	1250	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Tully Rd	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	433	584	
Minor St. Volume (higher volume approach):	184	167	
Warrant Met?:	**No**	**No**	

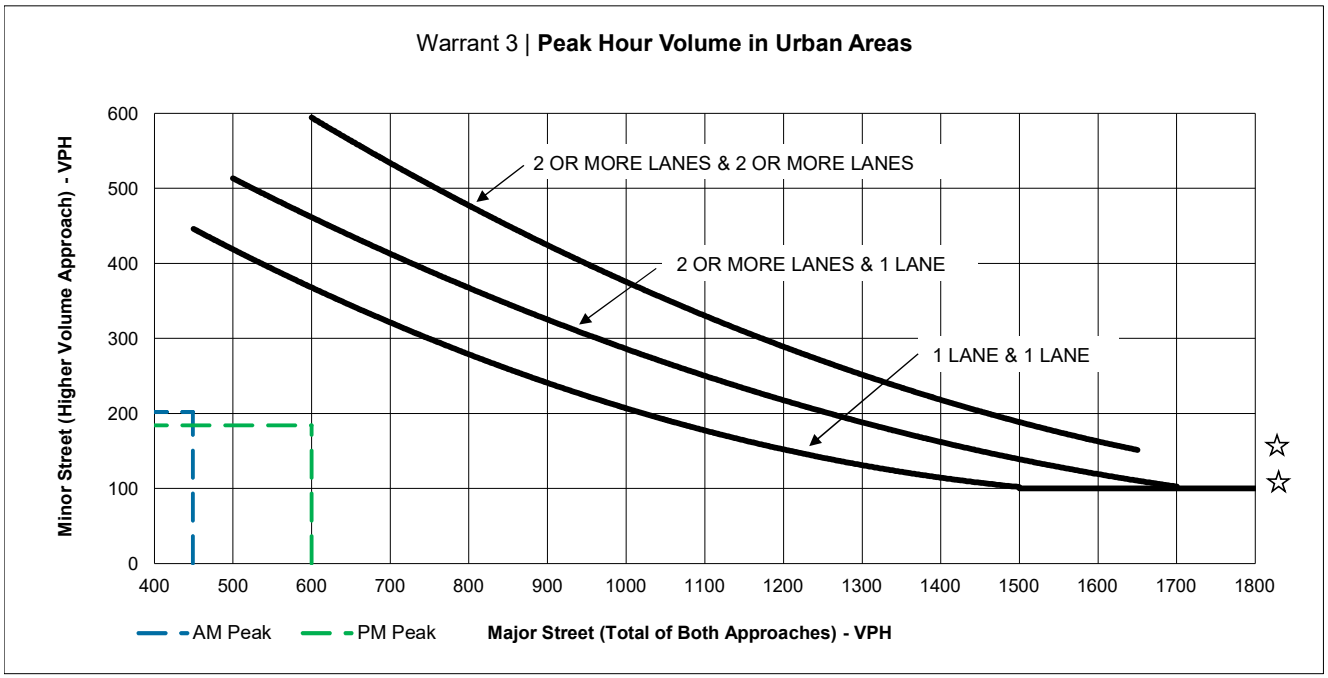
Fig 4C-4 (70% Option)

Near Term Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ **NOTE:**
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Tully Rd	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	449	600	
Minor St. Volume (higher volume approach):	202	184	
Warrant Met?:	**No**	**No**	

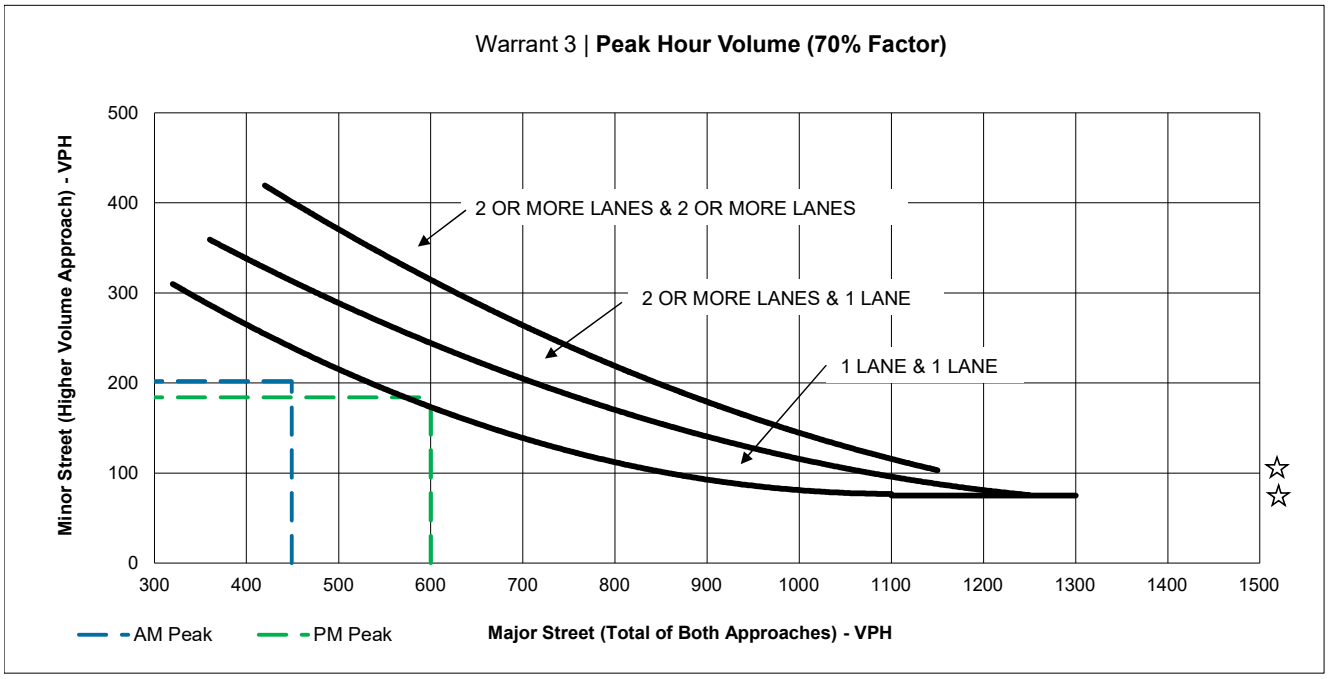
Fig 4C-3 (100% Option)

Near Term Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
400	265	400	340	400	N/A
500	210	500	290	500	375
600	180	600	240	600	310
700	150	700	200	700	260
800	90	800	175	800	220
900	100	900	140	900	180
1000	85	1000	120	1000	150
1100	75	1100	95	1150	100
1200	75	1200	80	1200	100
1300	75	1250	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Tully Rd	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	449	600	
Minor St. Volume (higher volume approach):	202	184	
Warrant Met?:	**No**	**Yes**	

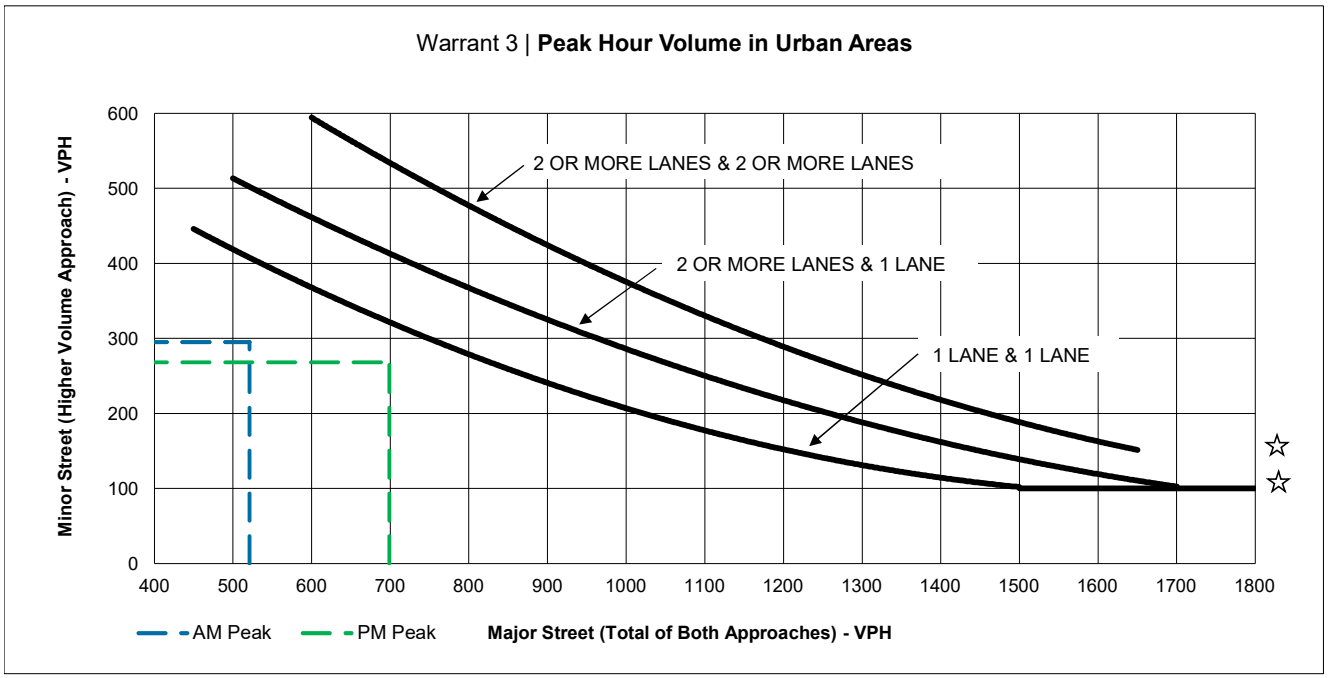
Fig 4C-4 (70% Option)

Cumulative Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ **NOTE:**

150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Tully Rd	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	521	699	
Minor St. Volume (higher volume approach):	295	268	
Warrant Met?:	**No**	**No**	

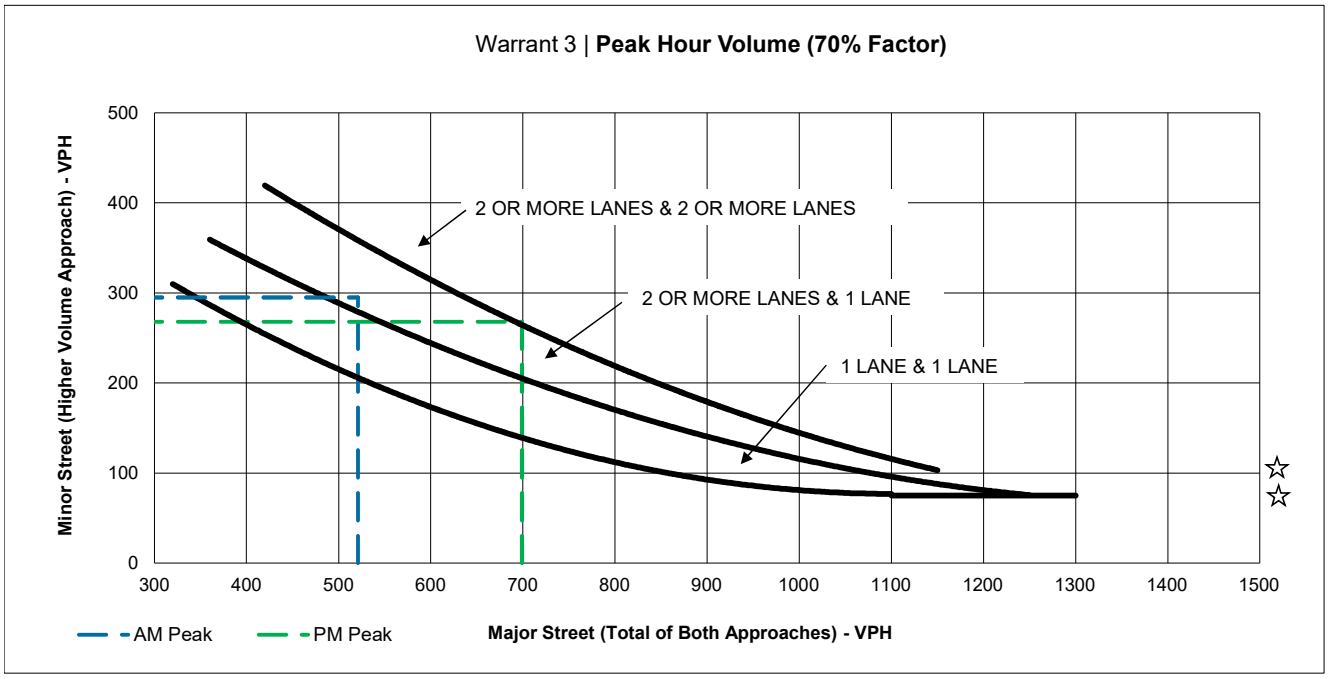
Fig 4C-3 (100% Option)

Cumulative Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
400	265	400	340	400	N/A
500	210	500	290	500	375
600	180	600	240	600	310
700	150	700	200	700	260
800	90	800	175	800	220
900	100	900	140	900	180
1000	85	1000	120	1000	150
1100	75	1100	95	1150	100
1200	75	1200	80	1200	100
1300	75	1250	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ NOTE:

100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Tully Rd	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	521	699	
Minor St. Volume (higher volume approach):	295	268	
Warrant Met?:	**Yes**	**Yes**	

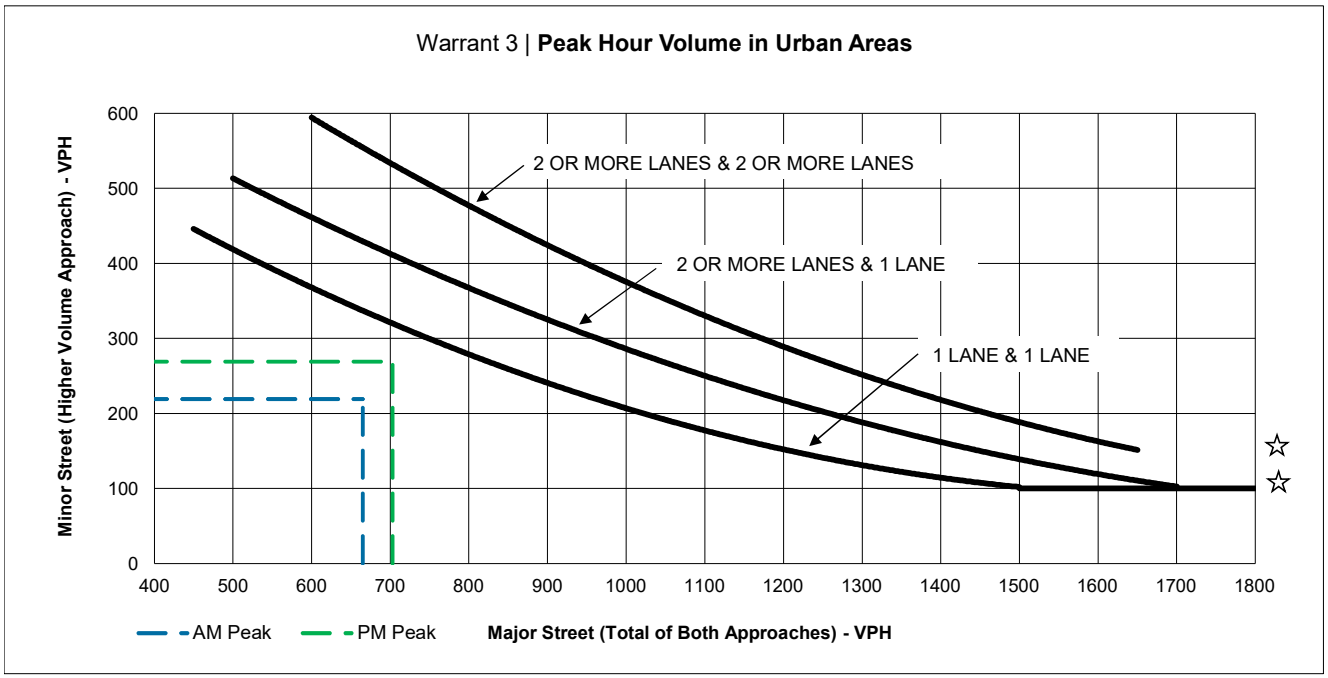
Fig 4C-4 (70% Option)

Existing Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ **NOTE:**
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Santa Fe Ave	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	665	703	
Minor St. Volume (higher volume approach):	219	269	
Warrant Met?:	**No**	**No**	

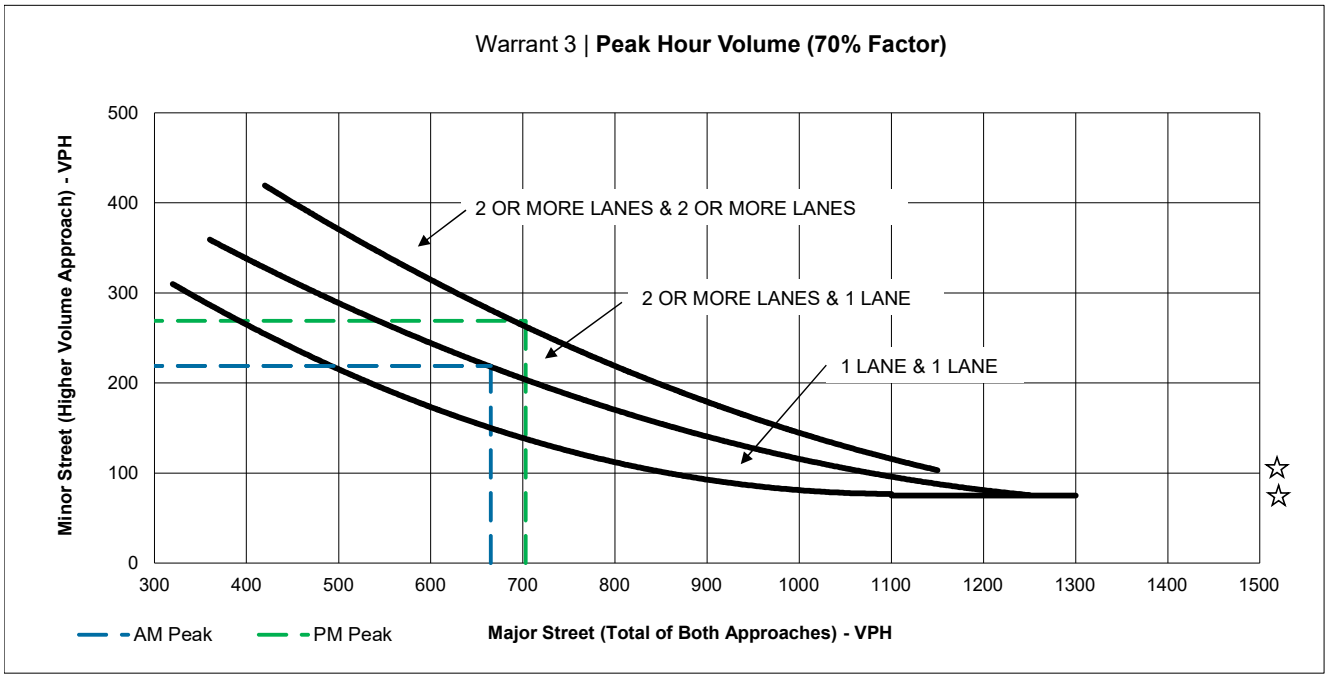
Fig 4C-3 (100% Option)

Existing Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
400	265	400	340	400	N/A
500	210	500	290	500	375
600	180	600	240	600	310
700	150	700	200	700	260
800	90	800	175	800	220
900	100	900	140	900	180
1000	85	1000	120	1000	150
1100	75	1100	95	1150	100
1200	75	1200	80	1200	100
1300	75	1250	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



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SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Santa Fe Ave	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	665	703	
Minor St. Volume (higher volume approach):	219	269	
Warrant Met?:	**Yes**	**Yes**	

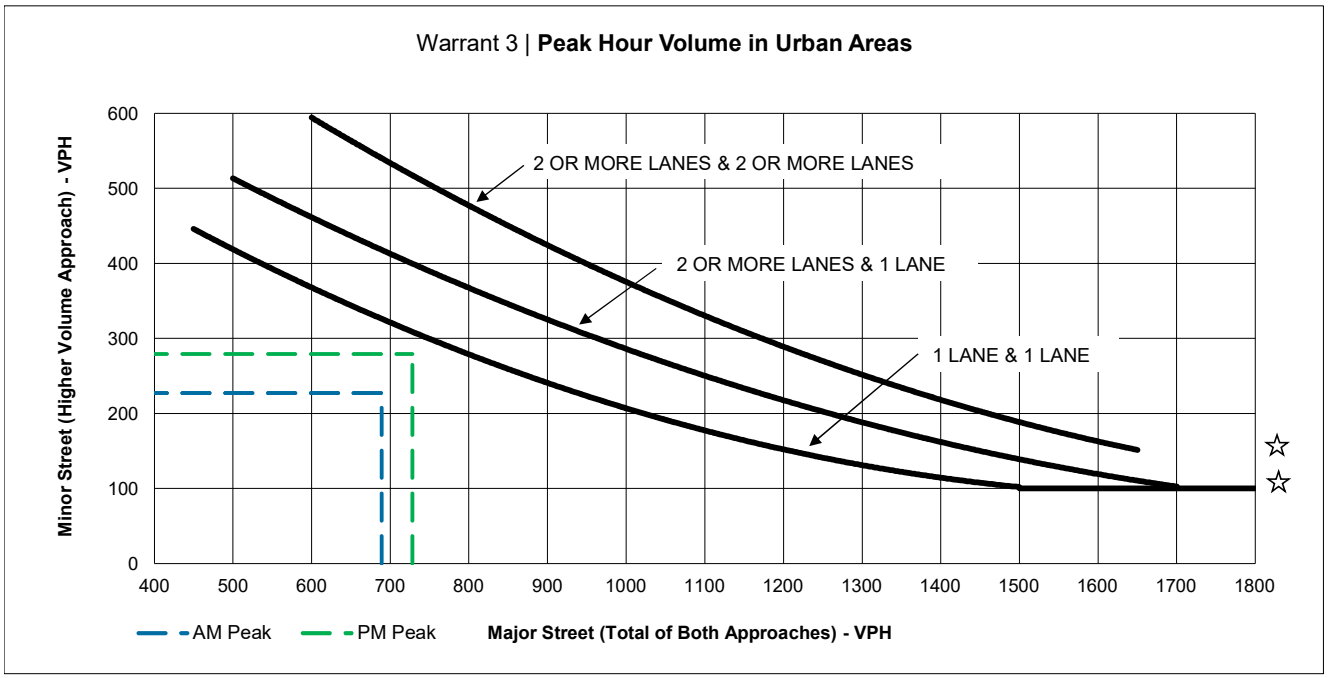
Fig 4C-4 (70% Option)

Near Term Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ **NOTE:**
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Santa Fe Ave	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	689	728	
Minor St. Volume (higher volume approach):	227	279	
Warrant Met?:	**No**	**No**	

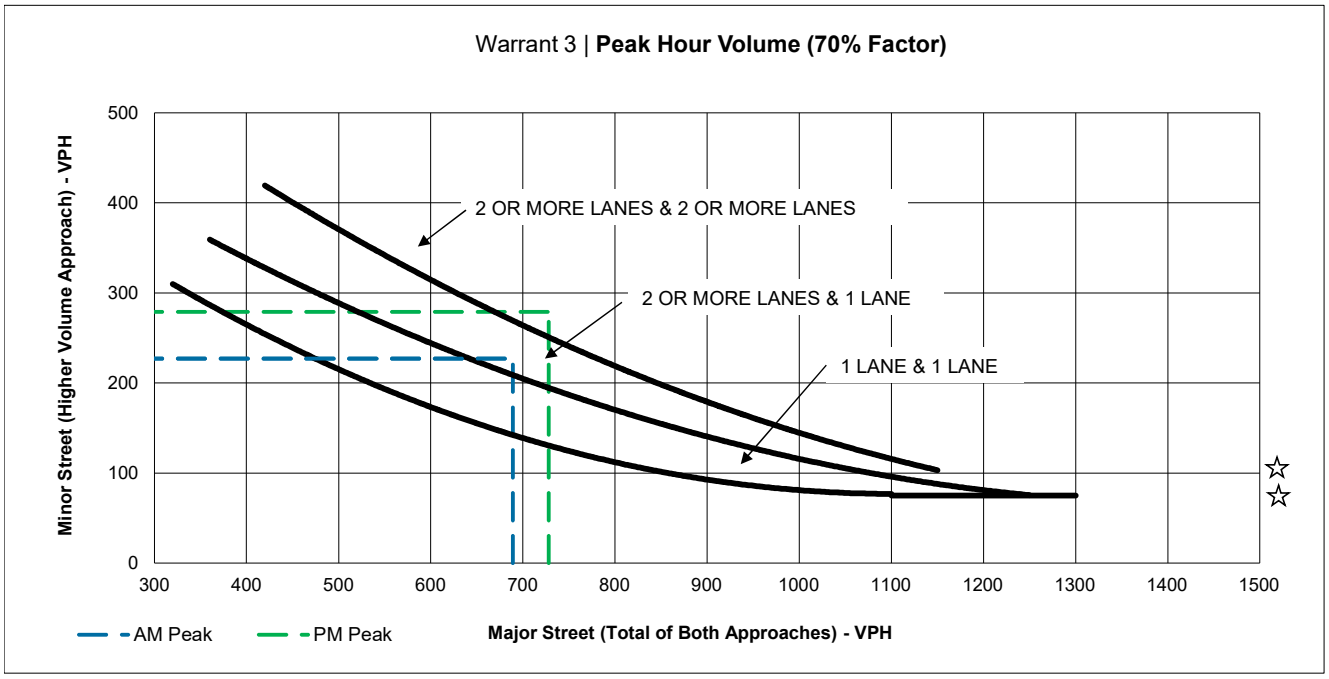
Fig 4C-3 (100% Option)

Near Term Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
400	265	400	340	400	N/A
500	210	500	290	500	375
600	180	600	240	600	310
700	150	700	200	700	260
800	90	800	175	800	220
900	100	900	140	900	180
1000	85	1000	120	1000	150
1100	75	1100	95	1150	100
1200	75	1200	80	1200	100
1300	75	1250	75	1300	100

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SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Santa Fe Ave	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	689	728	
Minor St. Volume (higher volume approach):	227	279	
Warrant Met?:	**Yes**	**Yes**	

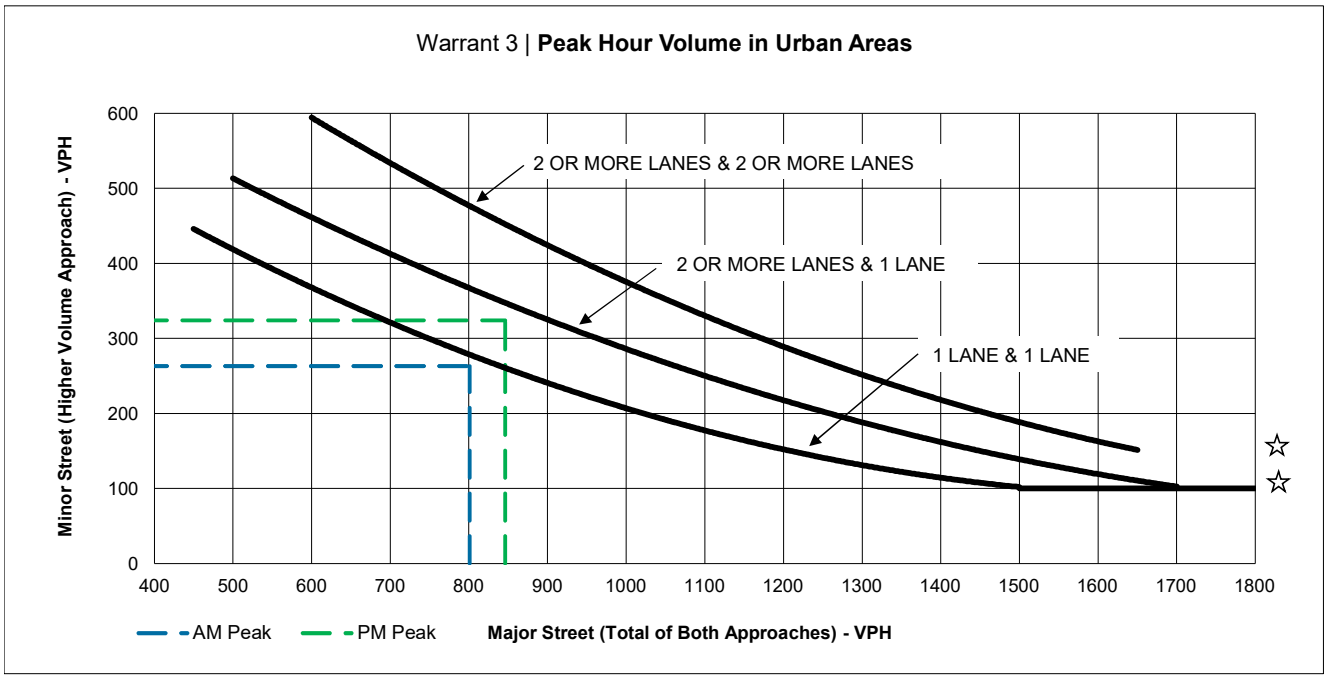
Fig 4C-4 (70% Option)

Cumulative Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



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SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Santa Fe Ave	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	801	846	
Minor St. Volume (higher volume approach):	263	324	
Warrant Met?:	**No**	**Yes**	

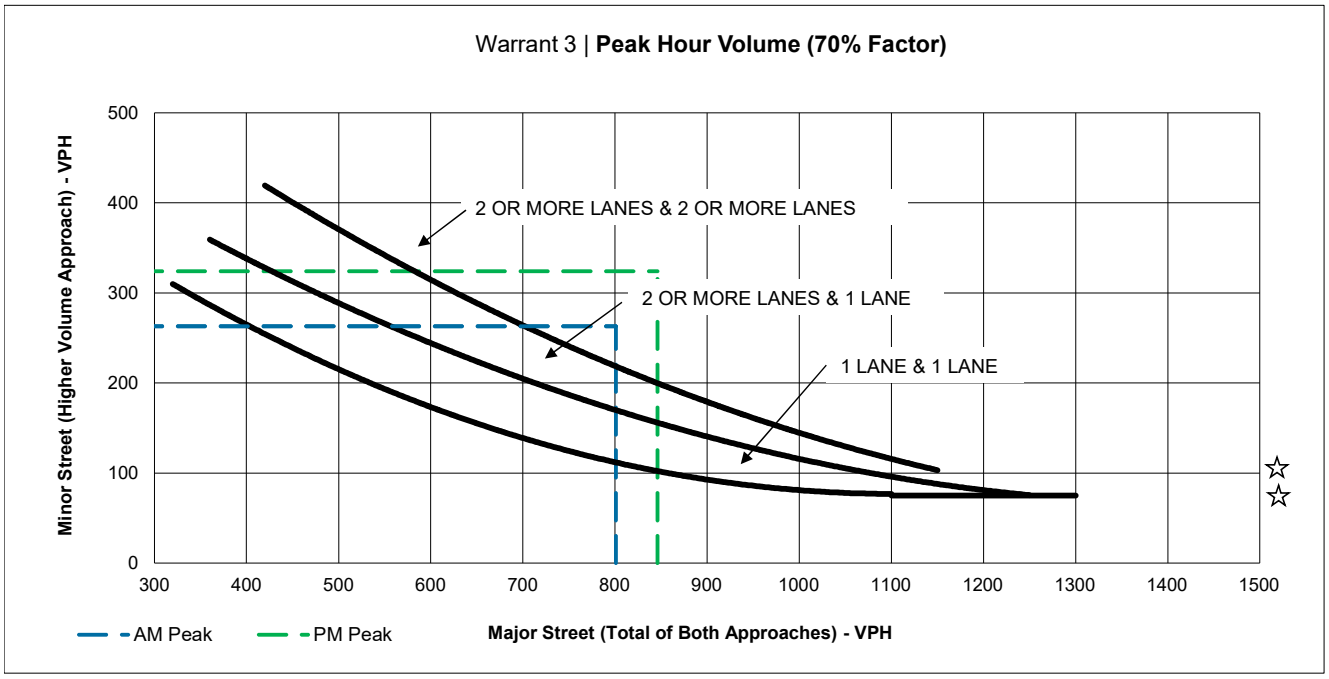
Fig 4C-3 (100% Option)

Cumulative Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
400	265	400	340	400	N/A
500	210	500	290	500	375
600	180	600	240	600	310
700	150	700	200	700	260
800	90	800	175	800	220
900	100	900	140	900	180
1000	85	1000	120	1000	150
1100	75	1100	95	1150	100
1200	75	1200	80	1200	100
1300	75	1250	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



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SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Santa Fe Ave	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	801	846	
Minor St. Volume (higher volume approach):	263	324	
Warrant Met?:	**Yes**	**Yes**	

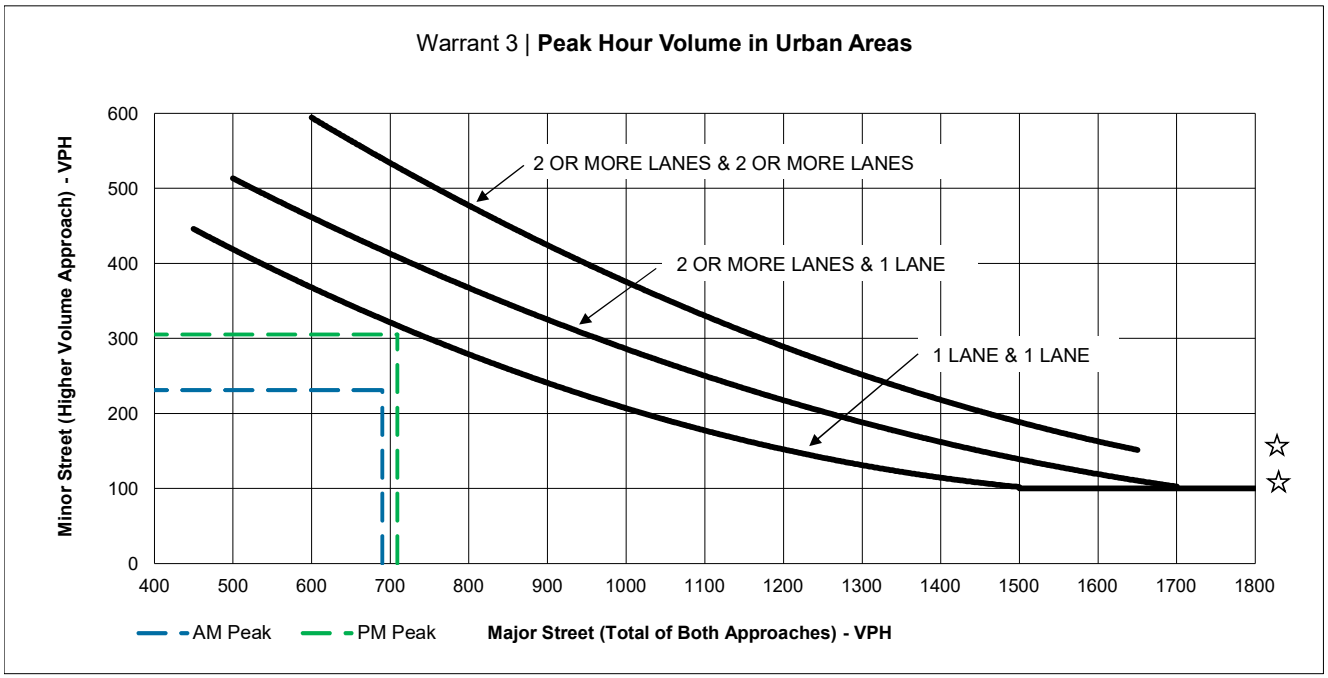
Fig 4C-4 (70% Option)

Existing Plus Project Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



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150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

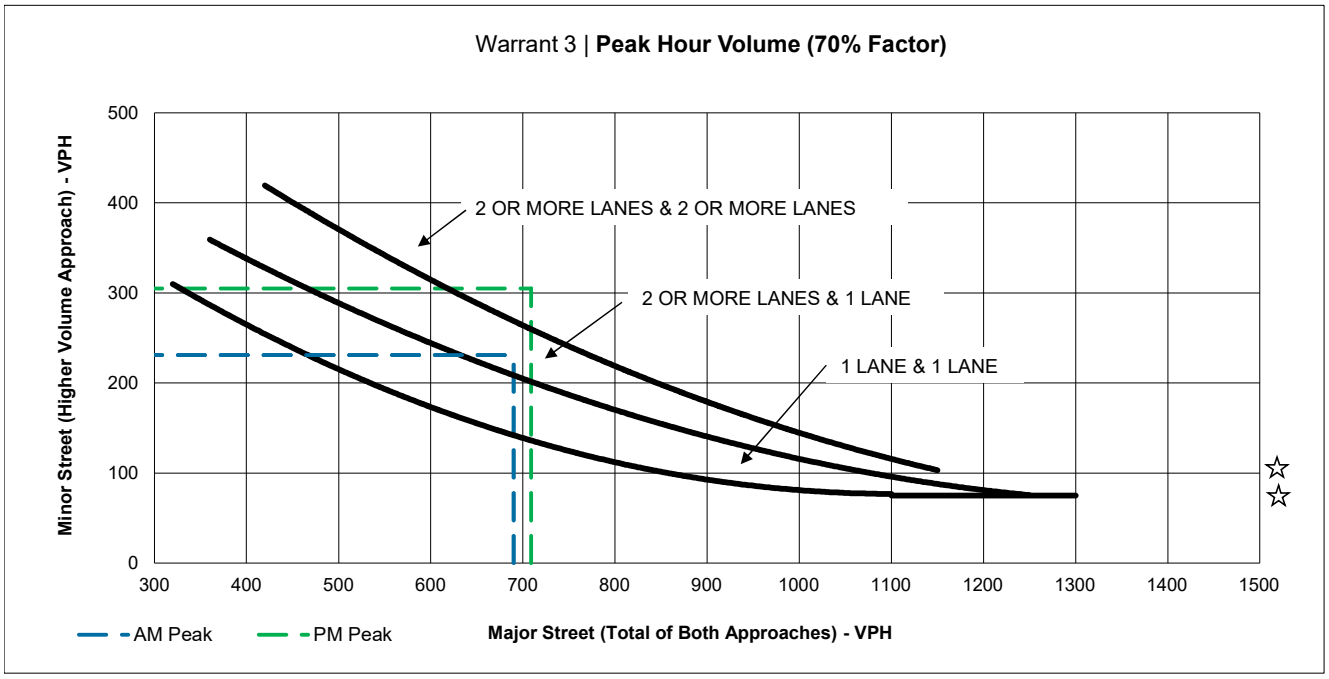
SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Santa Fe Ave	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	690	709	
Minor St. Volume (higher volume approach):	231	305	
Warrant Met?:	**No**	**No**	

Existing Plus Project Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
400	265	400	340	400	N/A
500	210	500	290	500	375
600	180	600	240	600	310
700	150	700	200	700	260
800	90	800	175	800	220
900	100	900	140	900	180
1000	85	1000	120	1000	150
1100	75	1100	95	1150	100
1200	75	1200	80	1200	100
1300	75	1250	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



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100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Santa Fe Ave	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	690	709	
Minor St. Volume (higher volume approach):	231	305	
Warrant Met?:	**Yes**	**Yes**	

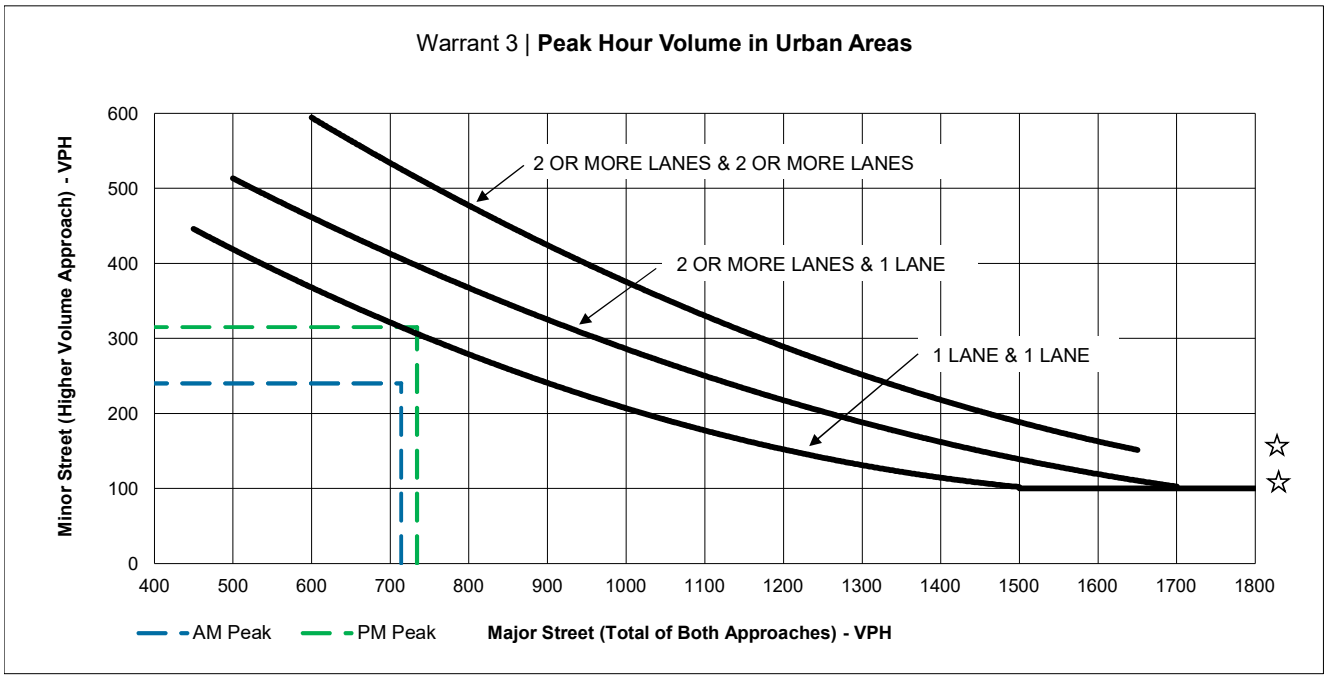
Fig 4C-4 (70% Option)

Near Term Plus Project Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



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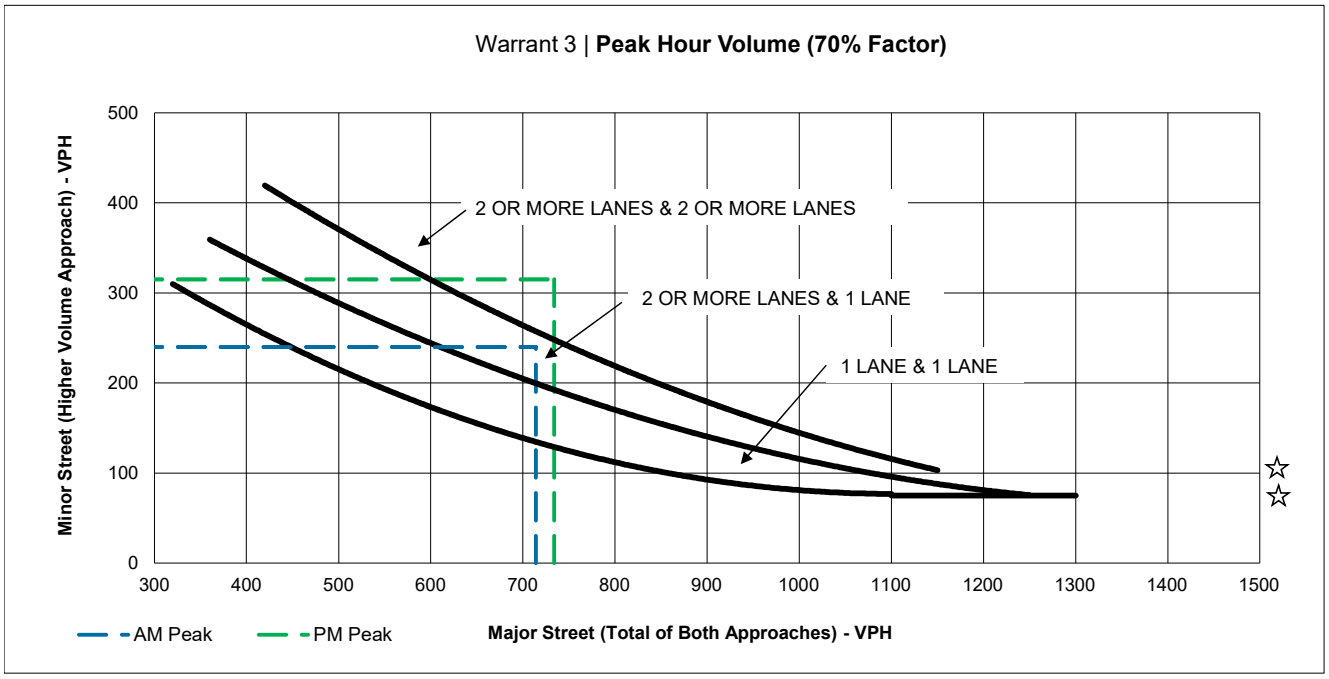
SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Santa Fe Ave	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	714	734	
Minor St. Volume (higher volume approach):	240	315	
Warrant Met?:	**No**	**Yes**	

Near Term Plus Project Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
400	265	400	340	400	N/A
500	210	500	290	500	375
600	180	600	240	600	310
700	150	700	200	700	260
800	90	800	175	800	220
900	100	900	140	900	180
1000	85	1000	120	1000	150
1100	75	1100	95	1150	100
1200	75	1200	80	1200	100
1300	75	1250	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



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100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Santa Fe Ave	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	714	734	
Minor St. Volume (higher volume approach):	240	315	
Warrant Met?:	**Yes**	**Yes**	

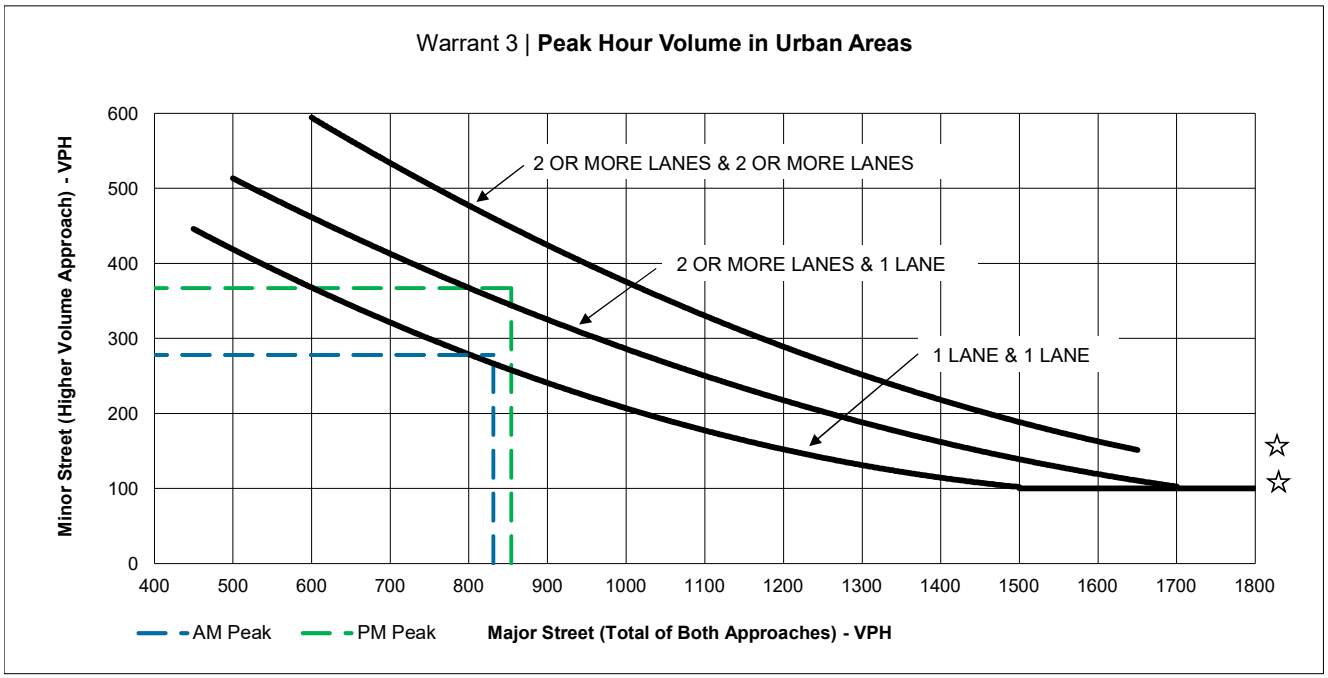
Fig 4C-4 (70% Option)

Cumulative Plus Project Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ **NOTE:**

150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Santa Fe Ave	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	831	854	
Minor St. Volume (higher volume approach):	278	367	
Warrant Met?:	**Yes**	**Yes**	

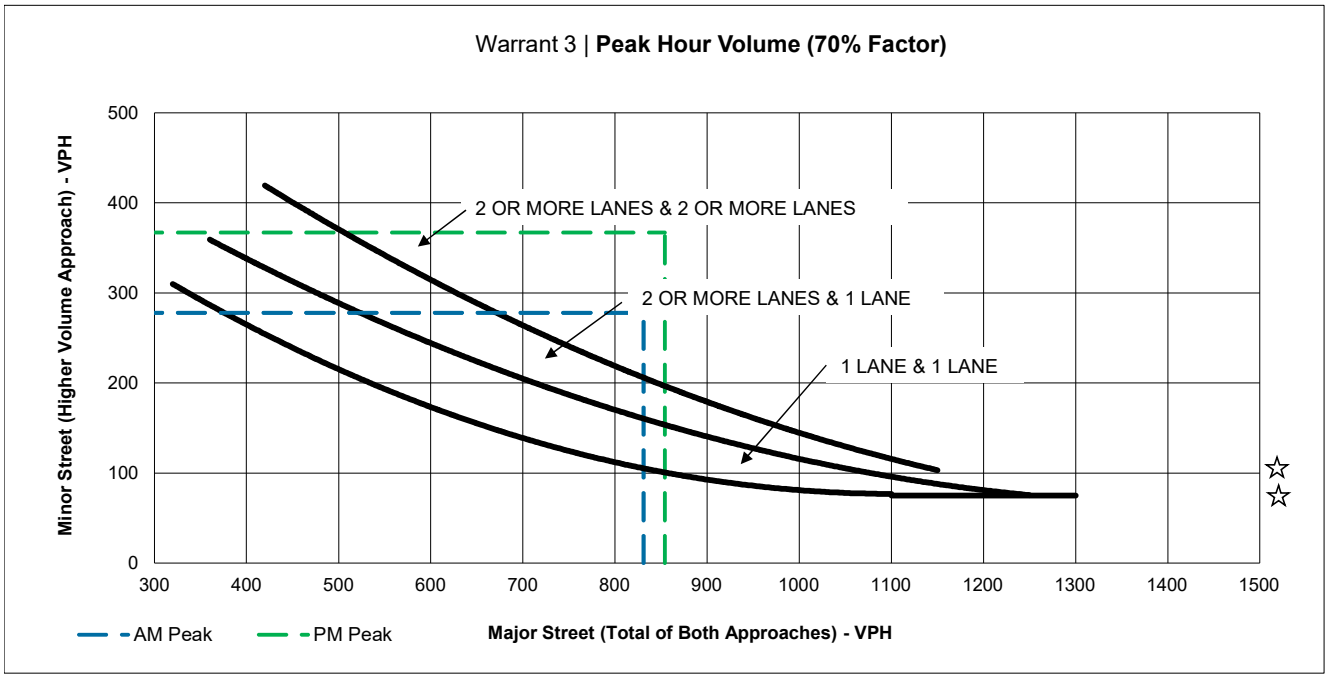
Fig 4C-3 (100% Option)

Cumulative Plus Project Conditions

Signal Warrant 3: Peak Hour

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
400	265	400	340	400	N/A
500	210	500	290	500	375
600	180	600	240	600	310
700	150	700	200	700	260
800	90	800	175	800	220
900	100	900	140	900	180
1000	85	1000	120	1000	150
1100	75	1100	95	1150	100
1200	75	1200	80	1200	100
1300	75	1250	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

SCENARIO (AM/PM)			
		Number of Lanes	
Major Approach	Santa Fe Ave	1	
Minor Approach	E Whitmore Ave	1	
	AM Peak	PM Peak	**Volumes for higher minor street**
Major St. Volume (both approaches):	831	854	
Minor St. Volume (higher volume approach):	278	367	
Warrant Met?:	**Yes**	**Yes**	

Fig 4C-4 (70% Option)

Attachment D: Intersection Queuing Results

Intersection: 1: Tully Rd & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	L	TR	LT	R	LTR
Maximum Queue (ft)	118	38	72	54	56	83
Average Queue (ft)	52	17	34	28	21	44
95th Queue (ft)	89	38	59	46	45	71
Link Distance (ft)	1588		829	1490		1044
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		85			65	
Storage Blk Time (%)			0	0	0	
Queuing Penalty (veh)			0	0	0	

Intersection: 2: Tully Rd & Street A

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: Tully Rd & Roeding Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	44	29	62	64
Average Queue (ft)	14	2	33	33
95th Queue (ft)	35	15	51	51
Link Distance (ft)	2102	1291	2601	1030
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Tully Rd & Service Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	72	73	55	63
Average Queue (ft)	36	39	29	35
95th Queue (ft)	59	59	49	56
Link Distance (ft)	1430	1261	1295	2601
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Santa Fe Ave & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	LT	R	LTR
Maximum Queue (ft)	89	112	52	162	53	126
Average Queue (ft)	38	52	24	79	3	64
95th Queue (ft)	71	86	47	134	26	107
Link Distance (ft)	829	340		579		805
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			125		60	
Storage Blk Time (%)		0		16	0	
Queuing Penalty (veh)		0		1	0	

Network Summary

Network wide Queuing Penalty: 2

Intersection: 1: Tully Rd & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	L	TR	LT	R	LTR
Maximum Queue (ft)	151	30	64	85	54	83
Average Queue (ft)	70	15	31	36	23	40
95th Queue (ft)	117	36	53	60	45	64
Link Distance (ft)	1588		829	1490		1044
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		85			65	
Storage Blk Time (%)			0	0	0	
Queuing Penalty (veh)			0	0	0	

Intersection: 2: Tully Rd & Street A

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: Tully Rd & Roeding Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	51	12	83	64
Average Queue (ft)	16	1	33	32
95th Queue (ft)	39	10	56	48
Link Distance (ft)	2102	1291	2601	1030
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Tully Rd & Service Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	72	73	72	66
Average Queue (ft)	36	36	30	32
95th Queue (ft)	56	58	51	52
Link Distance (ft)	1430	1261	1295	2601
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Santa Fe Ave & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	LT	R	LTR
Maximum Queue (ft)	145	120	72	148	62	224
Average Queue (ft)	52	57	25	69	3	99
95th Queue (ft)	108	93	54	119	28	181
Link Distance (ft)	829	340		579		805
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			125		60	
Storage Blk Time (%)		0	0	11	0	
Queuing Penalty (veh)		0	0	1	0	

Network Summary

Network wide Queuing Penalty: 1

Intersection: 1: Tully Rd & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	L	TR	LT	R	LTR
Maximum Queue (ft)	114	41	75	72	53	92
Average Queue (ft)	51	16	35	32	18	47
95th Queue (ft)	84	38	63	55	42	78
Link Distance (ft)	1588		829	1490		1044
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		85			65	
Storage Blk Time (%)			0	0	0	
Queuing Penalty (veh)			0	0	0	

Intersection: 2: Tully Rd & Street A

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: Tully Rd & Roeding Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	40	31	62	66
Average Queue (ft)	15	3	32	34
95th Queue (ft)	37	18	52	55
Link Distance (ft)	2102	1291	2601	1030
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Tully Rd & Service Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	82	84	66	64
Average Queue (ft)	37	42	32	33
95th Queue (ft)	61	66	56	56
Link Distance (ft)	1430	1261	1295	2601
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Santa Fe Ave & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	LT	R	LTR
Maximum Queue (ft)	81	111	58	155	68	148
Average Queue (ft)	35	56	24	83	4	70
95th Queue (ft)	66	93	48	133	32	120
Link Distance (ft)	829	340		579		805
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			125		60	
Storage Blk Time (%)		0		17	0	
Queuing Penalty (veh)		0		2	0	

Network Summary

Network wide Queuing Penalty: 2

Intersection: 1: Tully Rd & E Whitmore Ave

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 2: Tully Rd & Street A

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: Tully Rd & Roeding Rd

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: Tully Rd & Service Rd

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 5: Santa Fe Ave & E Whitmore Ave

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 0

Intersection: 1: Tully Rd & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	L	TR	LT	R	LTR
Maximum Queue (ft)	116	42	77	78	76	132
Average Queue (ft)	57	18	40	36	26	63
95th Queue (ft)	91	39	66	58	52	103
Link Distance (ft)	1588		829	1490		1044
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		85			65	
Storage Blk Time (%)			0	0	0	
Queuing Penalty (veh)			0	0	0	

Intersection: 2: Tully Rd & Street A

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: Tully Rd & Roeding Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	48	25	76	87
Average Queue (ft)	18	1	39	38
95th Queue (ft)	41	11	62	60
Link Distance (ft)	2102	1291	2601	1030
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Tully Rd & Service Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	81	93	83	96
Average Queue (ft)	42	46	39	44
95th Queue (ft)	68	73	64	73
Link Distance (ft)	1430	1261	1295	2601
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Santa Fe Ave & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	LT	R	LTR
Maximum Queue (ft)	135	114	70	318	85	199
Average Queue (ft)	47	61	27	136	12	94
95th Queue (ft)	97	100	55	274	60	169
Link Distance (ft)	829	340		579		805
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			125		60	
Storage Blk Time (%)		0		42	0	
Queuing Penalty (veh)		0		5	0	

Network Summary

Network wide Queuing Penalty: 5

Intersection: 1: Tully Rd & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	L	TR	LT	R	LTR
Maximum Queue (ft)	203	35	87	89	75	120
Average Queue (ft)	89	16	40	46	31	54
95th Queue (ft)	157	38	69	73	55	92
Link Distance (ft)	1588		829	1490		1044
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		85			65	
Storage Blk Time (%)			0	1	0	
Queuing Penalty (veh)			0	1	0	

Intersection: 2: Tully Rd & Street A

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: Tully Rd & Roeding Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	44	18	66	73
Average Queue (ft)	18	1	37	34
95th Queue (ft)	40	11	55	53
Link Distance (ft)	2102	1291	2601	1030
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Tully Rd & Service Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	94	76	68	74
Average Queue (ft)	50	42	35	39
95th Queue (ft)	80	65	56	63
Link Distance (ft)	1430	1261	1295	2601
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Santa Fe Ave & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	LT	R	LTR
Maximum Queue (ft)	182	140	79	230	58	638
Average Queue (ft)	77	67	24	95	6	303
95th Queue (ft)	148	110	54	170	39	618
Link Distance (ft)	829	340		579		805
Upstream Blk Time (%)						0
Queuing Penalty (veh)						0
Storage Bay Dist (ft)			125		60	
Storage Blk Time (%)		1	0	29	0	
Queuing Penalty (veh)		0	0	3	0	

Network Summary

Network wide Queuing Penalty: 4

Intersection: 1: Tully Rd & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	L	TR	LT	R	LTR
Maximum Queue (ft)	109	64	72	75	66	108
Average Queue (ft)	59	28	35	32	23	52
95th Queue (ft)	97	49	62	52	46	85
Link Distance (ft)	1588		829	1490		1044
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		85			65	
Storage Blk Time (%)		0	0	0	0	
Queuing Penalty (veh)		0	0	0	0	

Intersection: 2: Tully Rd & Street A

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	63	62
Average Queue (ft)	23	13
95th Queue (ft)	53	43
Link Distance (ft)	1748	1490
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Tully Rd & Roeding Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	54	50	66	86
Average Queue (ft)	24	20	40	39
95th Queue (ft)	45	47	59	64
Link Distance (ft)	2102	1291	2601	1030
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Tully Rd & Service Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	74	96	80	86
Average Queue (ft)	35	46	38	39
95th Queue (ft)	57	75	63	65
Link Distance (ft)	1430	1261	1295	2601
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Santa Fe Ave & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	LT	R	LTR
Maximum Queue (ft)	86	129	75	221	59	151
Average Queue (ft)	37	55	23	98	6	70
95th Queue (ft)	67	95	52	185	40	117
Link Distance (ft)	829	340		579		805
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			125		60	
Storage Blk Time (%)		0		25	0	
Queuing Penalty (veh)		0		2	0	

Network Summary

Network wide Queuing Penalty: 3

Intersection: 1: Tully Rd & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	L	TR	LT	R	LTR
Maximum Queue (ft)	157	50	72	102	89	70
Average Queue (ft)	74	18	36	49	31	39
95th Queue (ft)	124	40	61	79	60	59
Link Distance (ft)	1588		829	1490		1044
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		85			65	
Storage Blk Time (%)			0	2	0	
Queuing Penalty (veh)			0	2	0	

Intersection: 2: Tully Rd & Street A

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	80	38
Average Queue (ft)	43	4
95th Queue (ft)	66	23
Link Distance (ft)	1748	1490
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Tully Rd & Roeding Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	40	74	78	58
Average Queue (ft)	16	38	37	34
95th Queue (ft)	38	62	57	51
Link Distance (ft)	2102	1291	2601	1030
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Tully Rd & Service Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	82	72	68	74
Average Queue (ft)	41	38	31	41
95th Queue (ft)	67	58	52	63
Link Distance (ft)	1430	1261	1295	2601
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Santa Fe Ave & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	LT	R	LTR
Maximum Queue (ft)	112	115	67	125	33	245
Average Queue (ft)	52	58	22	63	2	106
95th Queue (ft)	94	93	51	107	22	207
Link Distance (ft)	829	340		579		805
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			125		60	
Storage Blk Time (%)		0		9	0	
Queuing Penalty (veh)		0		1	0	

Network Summary

Network wide Queuing Penalty: 3

Intersection: 1: Tully Rd & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	L	TR	LT	R	LTR
Maximum Queue (ft)	118	61	74	67	50	100
Average Queue (ft)	57	26	36	36	23	55
95th Queue (ft)	92	48	63	57	46	84
Link Distance (ft)	1588		829	1490		1044
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		85			65	
Storage Blk Time (%)		0	0	0	0	
Queuing Penalty (veh)		0	0	0	0	

Intersection: 2: Tully Rd & Street A

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	56	49
Average Queue (ft)	22	12
95th Queue (ft)	52	39
Link Distance (ft)	1748	1490
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Tully Rd & Roeding Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	53	53	86	73
Average Queue (ft)	24	20	41	39
95th Queue (ft)	46	48	68	64
Link Distance (ft)	2102	1291	2601	1030
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Tully Rd & Service Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	78	93	75	71
Average Queue (ft)	36	49	36	40
95th Queue (ft)	59	78	58	64
Link Distance (ft)	1430	1261	1295	2601
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Santa Fe Ave & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	LT	R	LTR
Maximum Queue (ft)	85	106	56	313	85	173
Average Queue (ft)	39	54	23	111	8	79
95th Queue (ft)	72	88	48	238	49	142
Link Distance (ft)	829	340		579		805
Upstream Blk Time (%)				0		
Queuing Penalty (veh)				0		
Storage Bay Dist (ft)			125		60	
Storage Blk Time (%)		0		27	0	
Queuing Penalty (veh)		0		3	0	

Network Summary

Network wide Queuing Penalty: 3

Intersection: 1: Tully Rd & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	L	TR	LT	R	LTR
Maximum Queue (ft)	156	26	78	93	58	72
Average Queue (ft)	67	15	35	37	23	38
95th Queue (ft)	114	35	60	63	45	59
Link Distance (ft)	1588		829	1490		1044
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		85			65	
Storage Blk Time (%)			0	1	0	
Queuing Penalty (veh)			0	0	0	

Intersection: 2: Tully Rd & Street A

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: Tully Rd & Roeding Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	46	12	69	45
Average Queue (ft)	16	1	33	30
95th Queue (ft)	40	8	48	45
Link Distance (ft)	2102	1291	2601	1030
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Tully Rd & Service Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	78	75	64	63
Average Queue (ft)	39	38	29	32
95th Queue (ft)	62	62	50	53
Link Distance (ft)	1430	1261	1295	2601
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Santa Fe Ave & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	LT	R	LTR
Maximum Queue (ft)	119	124	49	167	51	301
Average Queue (ft)	52	60	21	71	3	126
95th Queue (ft)	97	102	43	124	27	244
Link Distance (ft)	829	340		579		805
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			125		60	
Storage Blk Time (%)		0		13	0	
Queuing Penalty (veh)		0		1	0	

Network Summary

Network wide Queuing Penalty: 2

Intersection: 1: Tully Rd & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	L	TR	LT	R	LTR
Maximum Queue (ft)	149	61	81	96	84	216
Average Queue (ft)	78	30	44	45	30	91
95th Queue (ft)	128	51	71	75	61	166
Link Distance (ft)	1588		829	1490		1044
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		85			65	
Storage Blk Time (%)		0	0	1	0	
Queuing Penalty (veh)		0	0	1	0	

Intersection: 2: Tully Rd & Street A

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	63	74
Average Queue (ft)	28	24
95th Queue (ft)	54	58
Link Distance (ft)	1748	1490
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Tully Rd & Roeding Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	53	52	90	69
Average Queue (ft)	27	21	50	41
95th Queue (ft)	49	50	79	62
Link Distance (ft)	2102	1291	2601	1030
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Tully Rd & Service Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	95	115	84	107
Average Queue (ft)	47	61	44	48
95th Queue (ft)	78	95	72	81
Link Distance (ft)	1430	1261	1295	2601
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Santa Fe Ave & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	LT	R	LTR
Maximum Queue (ft)	122	124	92	459	85	238
Average Queue (ft)	48	66	28	200	16	105
95th Queue (ft)	91	109	60	445	68	195
Link Distance (ft)	829	340		579		805
Upstream Blk Time (%)				6		
Queuing Penalty (veh)				0		
Storage Bay Dist (ft)			125		60	
Storage Blk Time (%)		0		57	0	
Queuing Penalty (veh)		0		6	0	

Network Summary

Network wide Queuing Penalty: 8

Intersection: 1: Tully Rd & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	L	TR	LT	R	LTR
Maximum Queue (ft)	492	42	93	227	90	143
Average Queue (ft)	220	20	49	98	60	68
95th Queue (ft)	474	42	82	195	106	111
Link Distance (ft)	1588		829	1490		1044
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		85			65	
Storage Blk Time (%)			1	24	2	
Queuing Penalty (veh)			0	32	6	

Intersection: 2: Tully Rd & Street A

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	87	51
Average Queue (ft)	51	9
95th Queue (ft)	78	34
Link Distance (ft)	1748	1490
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Tully Rd & Roeding Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	50	80	73	66
Average Queue (ft)	20	39	40	38
95th Queue (ft)	43	66	61	56
Link Distance (ft)	2102	1291	2601	1030
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Tully Rd & Service Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	115	107	78	98
Average Queue (ft)	54	48	36	53
95th Queue (ft)	91	82	62	81
Link Distance (ft)	1430	1261	1295	2601
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

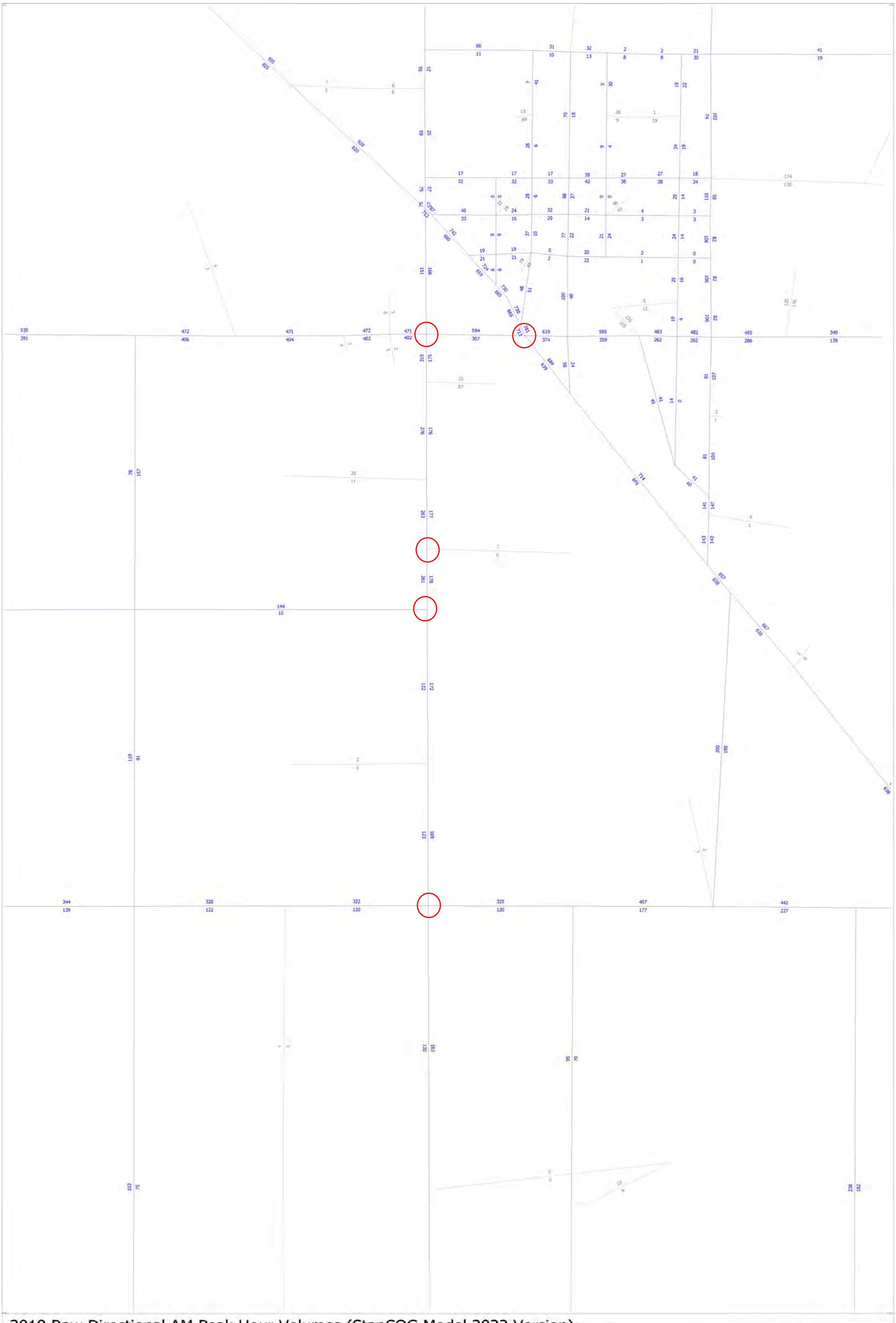
Intersection: 5: Santa Fe Ave & E Whitmore Ave

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	LT	R	LTR
Maximum Queue (ft)	272	195	92	289	78	628
Average Queue (ft)	113	75	27	110	6	362
95th Queue (ft)	261	141	64	235	41	734
Link Distance (ft)	829	340		579		805
Upstream Blk Time (%)						11
Queuing Penalty (veh)						0
Storage Bay Dist (ft)			125		60	
Storage Blk Time (%)		2	0	35	0	
Queuing Penalty (veh)		1	0	3	0	

Network Summary

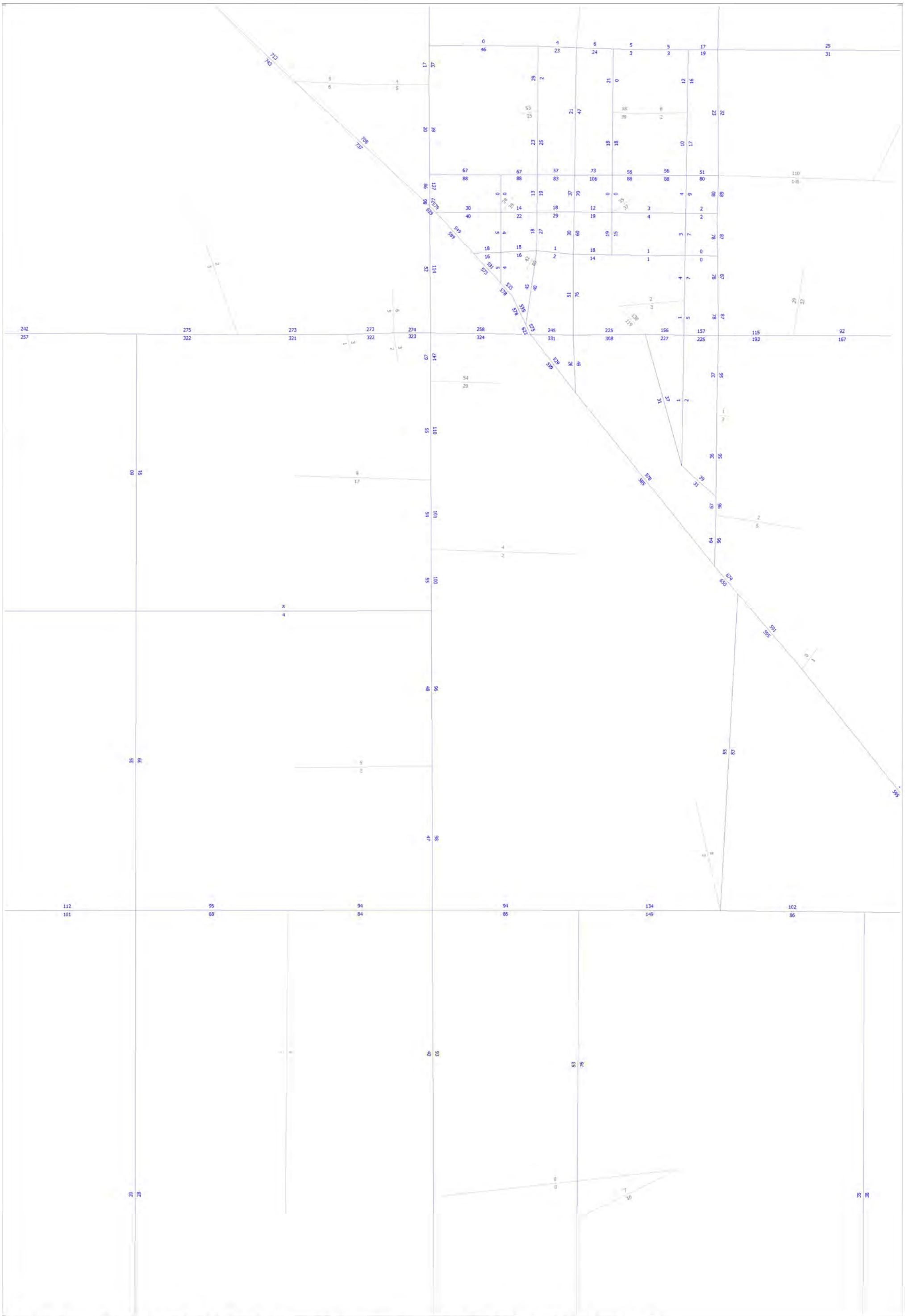
Network wide Queuing Penalty: 43

Attachment E: StanCOG Model Output



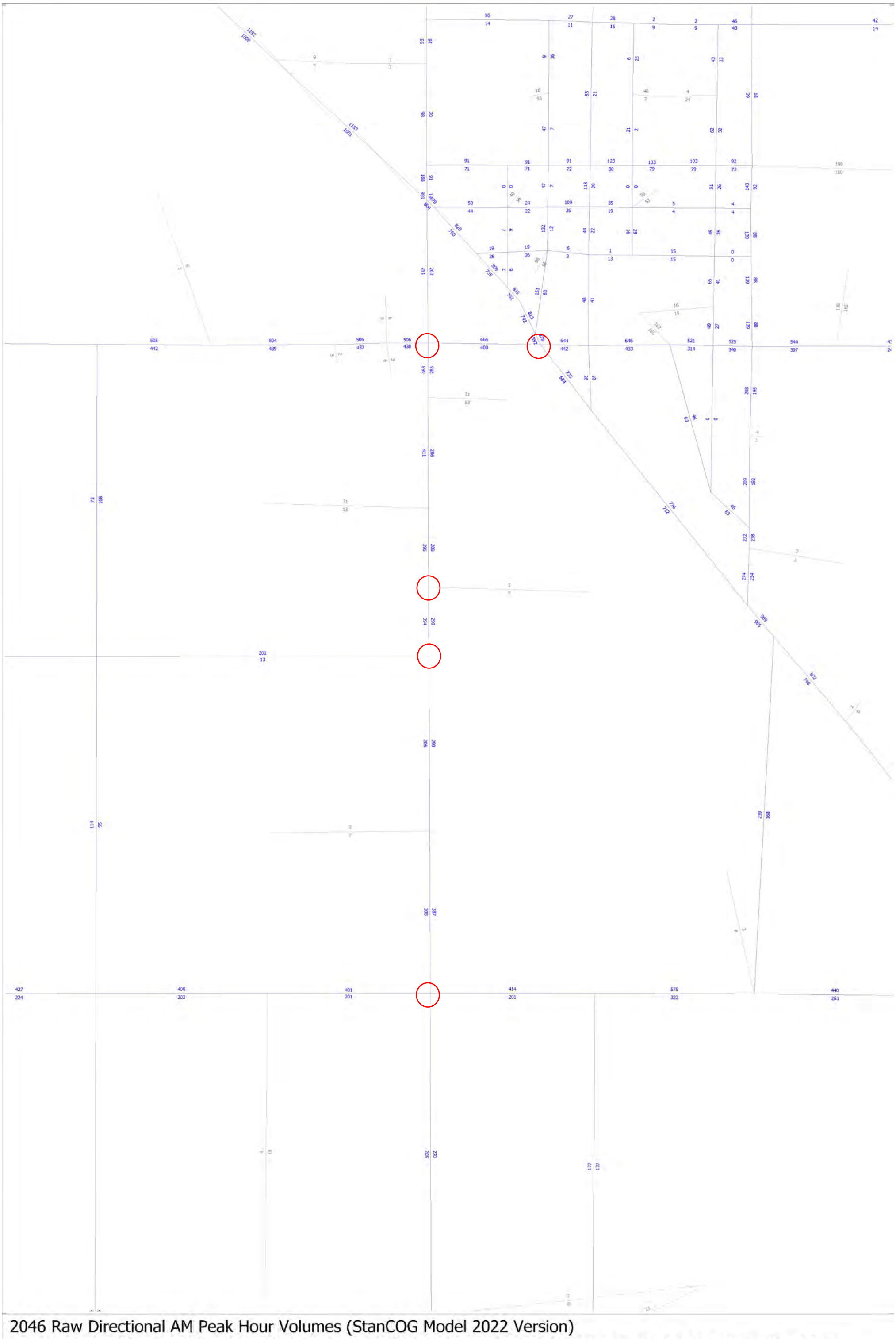
2019 Raw Directional AM Peak Hour Volumes (StanCOG Model 2022 Version)
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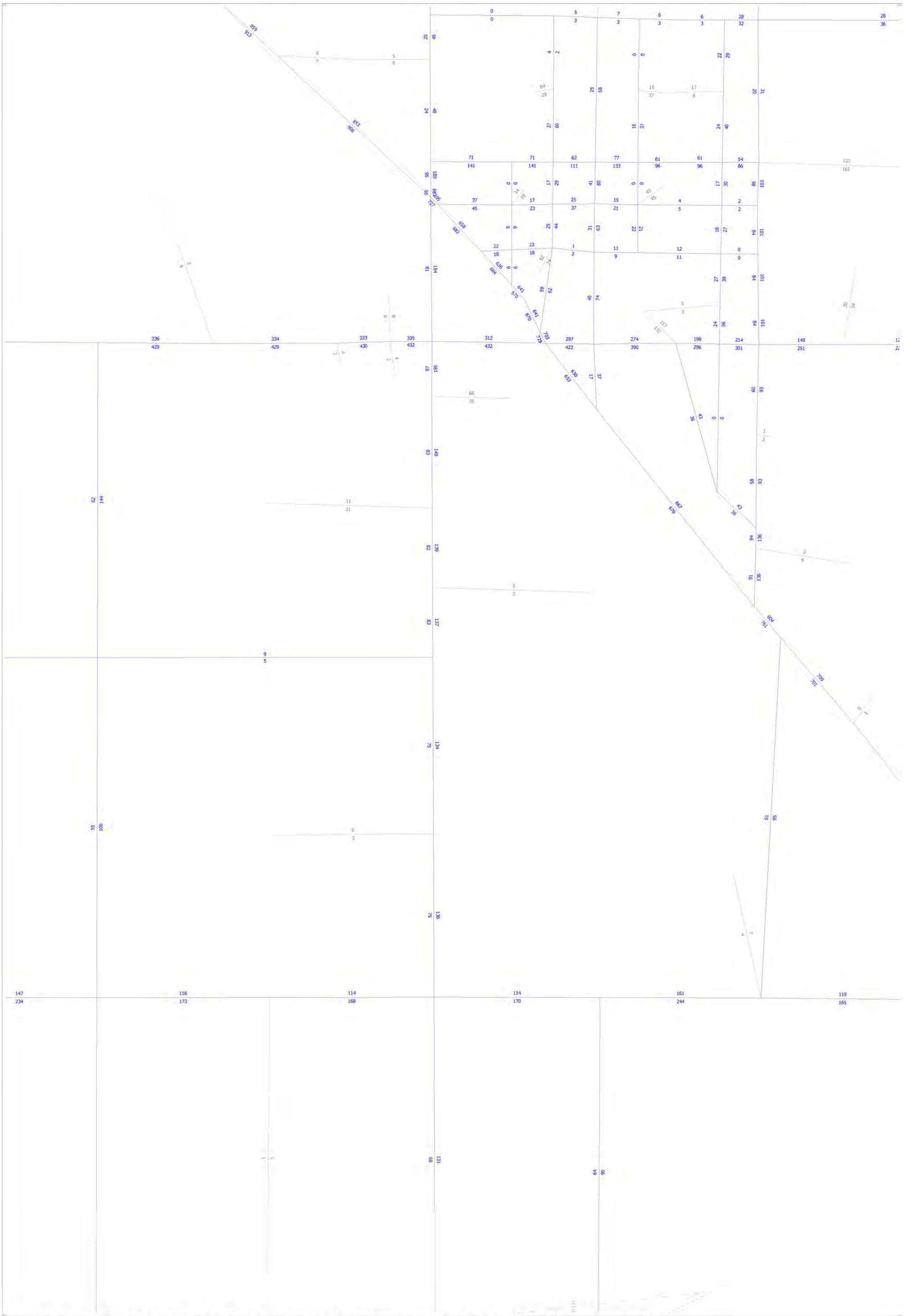


2019 Raw Directional PM Peak Hour Volumes (StanCOG Model 2022 Version)
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2046 Raw Directional AM Peak Hour Volumes (StanCOG Model 2022 Version)
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2046 Raw Directional PM Peak Hour Volumes (StanCOG Model 2022 Version)
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Attachment F: Left-Turn Warrant Worksheets

AM PEAK HOUR

STREET A / TULLY RD. Cumulative + Project

Table 9-25. Suggested Left-Turn Treatment Guidelines Based on Results from Benefit–Cost Evaluations for Intersections on Two-Lane Highways in Rural Areas (*16*)

Left-Turn Lane Peak-Hour Volume (veh/h)	Three-Leg Intersection, Major-Road Two-Lane Highway Peak-Hour Volume (veh/h/ln) that Warrants a Bypass Lane	Three-Leg Intersection, Major-Road Two-Lane Highway Peak-Hour Volume (veh/h/ln) that Warrants a Left-Turn Lane	Four-Leg Intersection, Major-Road Two-Lane Highway Peak-Hour Volume (veh/h/ln) that Warrants a Left-Turn Lane
5	50	200	150
10	50	100	50
15	< 50	100	50
20	< 50	50	< 50
25	< 50	50	< 50
30	< 50	50	< 50
35	< 50	50	< 50
40	< 50	50	< 50
45	< 50	50	< 50
50 or More	< 50	50	< 50

Note: These guidelines apply where the major road is uncontrolled and the minor-road approaches are stop- or yield-controlled. Both the left-turn peak-hour volume and the major-rad volume warrants should be met as shown in Figure 9-36.

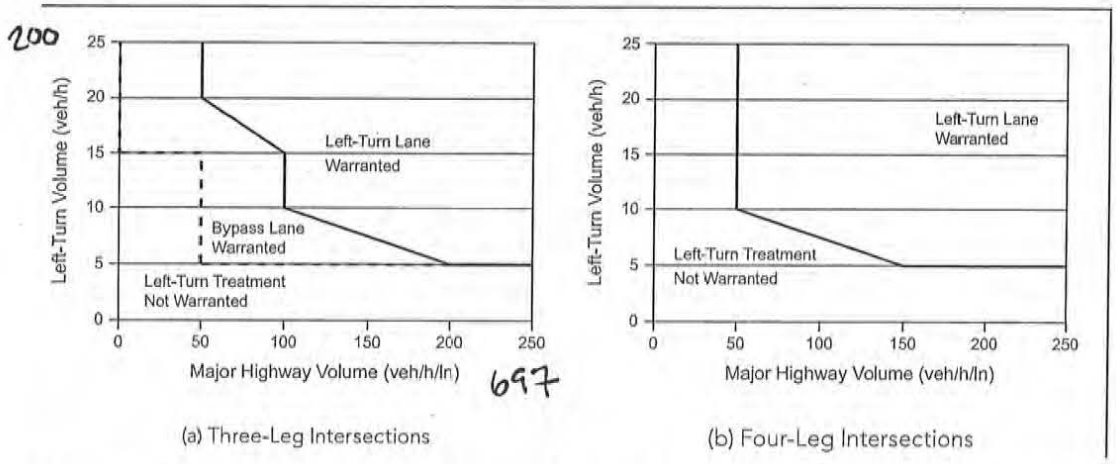


Figure 9-36. Suggested Left-Turn Treatment Warrants Based on Results from Benefit–Cost Evaluations for Intersections on Two-Lane Highways in Rural Areas (*16*)

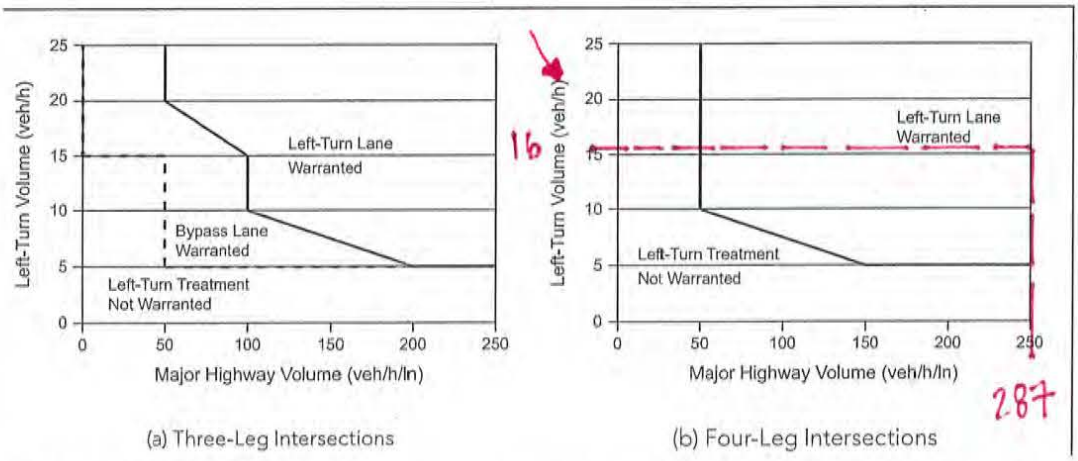
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Roeding Rd / Tully Rd. : Existing + Project

Table 9-25. Suggested Left-Turn Treatment Guidelines Based on Results from Benefit–Cost Evaluations for Intersections on Two-Lane Highways in Rural Areas (*16*)

Left-Turn Lane Peak-Hour Volume (veh/h)	Three-Leg Intersection, Major-Road Two-Lane Highway Peak-Hour Volume (veh/h/ln) that Warrants a Bypass Lane	Three-Leg Intersection, Major-Road Two-Lane Highway Peak-Hour Volume (veh/h/ln) that Warrants a Left-Turn Lane	Four-Leg Intersection, Major-Road Two-Lane Highway Peak-Hour Volume (veh/h/ln) that Warrants a Left-Turn Lane
5	50	200	150
10	50	100	50
15	< 50	100	50
20	< 50	50	< 50
25	< 50	50	< 50
30	< 50	50	< 50
35	< 50	50	< 50
40	< 50	50	< 50
45	< 50	50	< 50
50 or More	< 50	50	< 50

Note: These guidelines apply where the major road is uncontrolled and the minor-road approaches are stop- or yield-controlled. Both the left-turn peak-hour volume and the major-rad volume warrants should be met as shown in Figure 9-36.



(a) Three-Leg Intersections (b) Four-Leg Intersections

Figure 9-36. Suggested Left-Turn Treatment Warrants Based on Results from Benefit–Cost Evaluations for Intersections on Two-Lane Highways in Rural Areas (*16*)

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Project Street A / Tully Road

Cumulative + Project, Weekday AM Peak Hour

AM PEAK HOUR

Table 9-23 Guide for Left-Turn Lanes on Two-Lane Highways (*10*)

Metric					U.S. Customary				
Opposing Volume (veh/h)	Advancing Volume (veh/h)				Opposing Volume (veh/h)	Advancing Volume (veh/h)			
	5% Left Turns	10% Left Turns	20% Left Turns	30% Left Turns		5% Left Turns	10% Left Turns	20% Left Turns	30% Left Turns
60-km/h Operating Speed					40-mph Operating Speed				
800	330	240	180	160	800	330	240	180	160
600	410	305	225	200	600	410	305	225	200
400	510	380	275	245	400	510	380	275	245
200	640	470	350	305	200	640	470	350	305
100	720	515	390	340	100	720	515	390	340
80-km/h Operating Speed					50-mph Operating Speed				
800	280	210	165	135	800	280	210	165	135
600	350	260	195	170	600	350	260	195	170
400	430	320	240	210	400	430	320	240	210
200	550	400	300	270	200	550	400	300	270
100	615	445	335	295	100	615	445	335	295
100-km/h Operating Speed					60-mph Operating Speed				
800	230	170	125	115	800	230	170	125	115
600	290	210	160	140	600	290	210	160	140
400	365	270	200	175	400	365	270	200	175
200	450	330	250	215	200	450	330	250	215
100	505	370	275	240	100	505	370	275	240

190 opposing volume

396 advancing volume
200 left turns / 396 = 51%

Left-turn Lane Warranted?: YES
Advancing volume of 396 with 51% left turns, and opposing volume of 190,
is above minimum threshold of 100 opposing vehicles.

Source: American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, 7th edition, 2018.

Roeding Road / Tully Road

Cumulative + Project, Weekday AM Peak Hour

AM PEAK HOUR

Table 9-23 Guide for Left-Turn Lanes on Two-Lane Highways (*10*)

Metric					U.S. Customary				
Opposing Volume (veh/h)	Advancing Volume (veh/h)				Opposing Volume (veh/h)	Advancing Volume (veh/h)			
	5% Left Turns	10% Left Turns	20% Left Turns	30% Left Turns		5% Left Turns	10% Left Turns	20% Left Turns	30% Left Turns
60-km/h Operating Speed					40-mph Operating Speed				
800	330	240	180	160	800	330	240	180	160
600	410	305	225	200	600	410	305	225	200
400	510	380	275	245	400	510	380	275	245
200	640	470	350	305	200	640	470	350	305
100	720	515	390	340	100	720	515	390	340
80-km/h Operating Speed					50-mph Operating Speed				
800	280	210	165	135	800	280	210	165	135
600	350	260	195	170	600	350	260	195	170
400	430	320	240	210	400	430	320	240	210
200	550	400	300	270	200	550	400	300	270
100	615	445	335	295	100	615	445	335	295
100-km/h Operating Speed					60-mph Operating Speed				
800	230	170	125	115	800	230	170	125	115
600	290	210	160	140	600	290	210	160	140
400	365	270	200	175	400	365	270	200	175
200	450	330	250	215	200	450	330	250	215
100	505	370	275	240	100	505	370	275	240

301 opposing volume

184 advancing volume
26 left turns / 184 = 14%

Left-turn Lane Warranted?: NO
Advancing volume of 184 with 14% left turns, and opposing volume of 301, is below minimum threshold of 800 opposing vehicles.

Source: American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, 7th edition, 2018.

Attachment G: VMT Analysis

Technical Memorandum

August 28, 2023

To	Catherine Mundt, Alpine Pacific Nut Co.	**Project No.**	12611837
Copy to	John Ellis & Corey Walker, NorthStar Engineering		
From	Rosanna Southern, GHD Peter Galloway, GHD		
Project Name	Tully Road Subdivision, Hughson CA		
Subject	Vehicle Miles Traveled (VMT) Analysis		

1. Introduction

Alpine Pacific Nut Company, Inc. has tasked GHD with performing a transportation impact analysis and vehicle miles traveled (VMT) analysis for the proposed Tully Road Subdivision Industrial Park project in Hughson, CA. The proposed project site is located on the east side of Tully Road south of East Whitmore Avenue in Hughson, CA (Stanislaus County). This memorandum has been prepared to document the VMT analysis and findings, pursuant to SB 743.

CEQA Guidelines Section 15064.3, subdivision (a), defines VMT as the amount and distance of automobile travel attributable to a project. This means that for a proposed industrial park, only trips associated with the employees are evaluated in terms of VMT, as heavy trucks are not considered.

2. VMT Methodology

Stanislaus County does not currently have adopted VMT guidelines, so no specific methodology has been mandated for VMT analysis in the county. The study team elected to estimate the VMT for the Project's employees using US Census data, because it is considered the most reliable source of commute data available. Journey-to-work data is available from the Longitudinal Employer-Household Dynamics (LEHD) program via a website called "On the Map[1]". The primary source of data used in the LEHD program is the enhanced Quarterly Census of Employment and Wages (QCEW) microdata files obtained from each participating Local Employment Dynamics (LED) state. The employer-based QCEW data is merged with additional worker-based administrative data collected by the US Census Bureau to create integrated employer-worker data, available through two different databases, Quarterly Workforce Indicators (QWI) and LEHD Origin-Destination Employment Statistics (LODES).

Unlike sample-based surveys, such as the U.S. Census's American Community Survey, the LEHD data provides a nearly complete enumeration of home-to-work flows covering over 90% of all workers and employers in the United States[2]. The LEHD data does not contain details on the work trips such as mode

[1] **https://onthemap.ces.census.gov/**
[2] "Improving Employment Data for Transportation Planning", NCRHP 08-36, Task 098. Cambridge Systematics, Inc. September 2011. **http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP08-36(98)_FR.pdf**

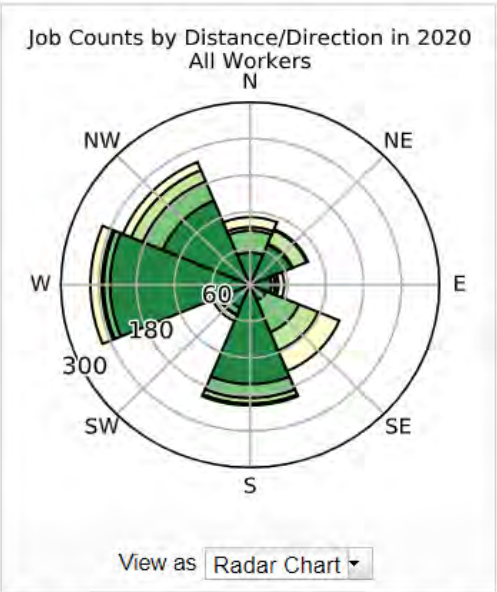
choice, route, or travel times. The LEHD data does not include federal workers, self-employed or the military, and workplace location is assigned algorithmically for people who work for a business with multiple locations in a county. The LODES data provides employer-based work destinations and home origins, which were used to approximate weighted average trip lengths to and from the County. The LODES data provides many more origin-destination pairs than collected through sampled data and provides sufficient data for home-to-work flows.

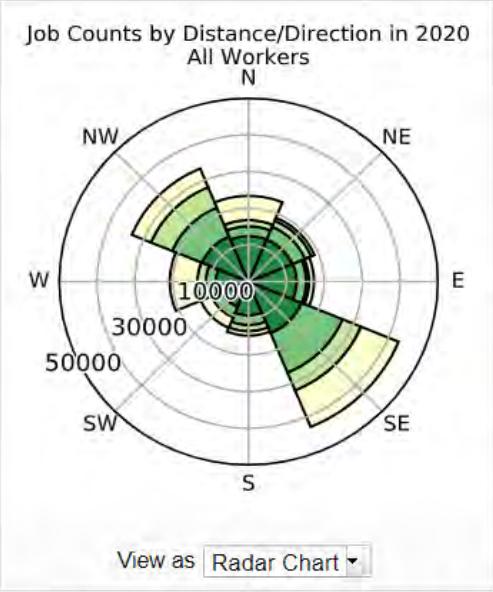
The LODES data was used to calculate trip lengths and associated VMT for the census tract where the Project is located. Since Stanislaus County does not currently have adopted VMT thresholds, the VMT threshold used for this analysis was based on the SB 375 Regional Plan Climate Targets[3] set by the California Air Resources Board (CARB). For Stanislaus Council of Governments, the threshold is 16% below the regional average (i.e., the average for Stanislaus County).

3. VMT Analysis Results

The LODES data from "On the Map" was used to determine the countywide regional average travel distances for employees who work in the county and the average distance of the Project's employees, located in Hughson. The two were then compared. Figure 1 presents the travel distance for employees in Hughson (left) compared to Stanislaus County (right). As shown, a larger proportion of employees countywide travel longer distances than those employed in Hughson. Table 1 presents the jobs, estimated VMT (jobs x average distance), the VMT per job for Hughson and Stanislaus County, and the associated -16% threshold.

Figure 1 LODES Jobs by Distance (Work to Home) for Hughson (left) and Stanislaus County as a whole (right)





Jobs by Distance - Work Census Block to Home Census Block

	2020 Count	2020 Share
Total All Jobs	1,150	100.0%
Less than 10 miles	762	66.3%
10 to 24 miles	179	15.6%
25 to 50 miles	101	8.8%
Greater than 50 miles	108	9.4%

Jobs by Distance - Work Census Block to Home Census Block

	2020 Count	2020 Share
Total All Jobs	184,916	100.0%
Less than 10 miles	91,485	49.5%
10 to 24 miles	36,920	20.0%
25 to 50 miles	19,960	10.8%
Greater than 50 miles	36,551	19.8%

[3] **https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-program/regional-plan-targets**

Table 1 Estimated Jobs and VMT for Hughson and Stanislaus County

LODES Distance Interval	**Assumed Average Distance (mi)**	Hughson		Stanislaus County	
		Number of Jobs	VMT	Number of Jobs	VMT
Less than 10 miles	5	762	3,810	91,485	457,425
10 to 24 miles	17	179	3,043	36,920	627,640
25 to 50 miles	37.5	101	3,788	19,960	748,500
Greater than 50 miles	75	108	8,100	36,551	2,741,325
Total		1,150	18,741	184,916	4,574,890
VMT per Job		**16.3**		**24.7**	
	Countywide threshold (16% below county average)			**20.7**	

As shown, the VMT per job for Hughson (16.3 VMT/job) is lower than the countywide threshold of 20.7 VMT/job (16% below the countywide average VMT per job). Therefore, the project is in a “low-VMT” area and has a less-than-significant impact on VMT.

Appendix H: Fair Share Calculations

Fair Share Calculations

All Volumes Obtained from T2057: T12611837

P-T/(Tb-Te)

P=Equitable Share for the Project's traffic impact
T= Project Generated Trips
Tb= General Buildout Traffic Volume (plus project)
Te= Existing Volume

Intersection

1	AM	PM	SAT		
P=	24%	***30%***	N/A	P=	
T=	171	172	N/A	T=	AM & PM Project
Tb=	1450	1450	N/A	Tb=	C+P Synchro
Te=	732	883	N/A	Te=	Existing Synchro

5	AM	PM	SAT		
P=	6%	***15%***	N/A	P=	
T=	45	46	N/A	T=	AM & PM Project
Tb=	1789	1511	N/A	Tb=	C+P Synchro
Te=	1070	1208	N/A	Te=	Existing Synchro

Summary Table for Fair Share Calculations:
Fair Share calculations only calculated for intersections experiencing a significant impact
Intersection with highest Fair Share was selected

#	Intersection Name	T	Tb	Te	P
1	E. Whitmore Ave./Tully Road	172	1450	883	30%
5	E. Whitmore Ave./Santa Fe Ave.	46	1511	1208	15%