PUBLIC REVIEW DRAFT

INITIAL STUDY/
MITIGATED NEGATIVE DECLARATION

FOR THE

WATERSTONE RESIDENTIAL SUBDIVISIONS

Waterford, CA

May 2024

Prepared for:

City of Waterford
101 E Street
Waterford, CA 95386

Prepared by:

BaseCamp Environmental, Inc.
802 W. Lodi Avenue
Lodi, CA 95240

BaseCamp Environmental, Inc.

PUBLIC REVIEW DRAFT

INITIAL STUDY/ MITIGATED NEGATIVE DECLARATION

FOR THE

WATERSTONE RESIDENTIAL SUBDIVISIONS

Waterford, CA

May 2024

Prepared for:

City of Waterford
101 E Street
Waterford, CA 95386
209-874-2328

Prepared by:

BaseCamp Environmental, Inc.
802 W. Lodi Avenue
Lodi, CA 95240
209-224-8213
www.basecampenv.com

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS USED IN THIS DOCUMENT

AB	Assembly Bill
APN	Assessor's Parcel Number
ARB	California Air Resources Board
BMP	Best Management Practice
CalEEMod	California Emissions Estimator Model
CalEnviroScreen	California Communities Environmental Health Screening
CALGreen	California Green Building Code
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CO	carbon monoxide
CO_2e	carbon dioxide equivalent
CUPA	Certified Unified Program Agency
dBA	A-weighted decibel
DTSC	California Department of Toxic Substances Control
EIR	Environmental Impact Report
FEMA	Federal Emergency Management Agency
GHG	greenhouse gas
GSP	Groundwater Sustainability Plan
IS/MND	Initial Study/Mitigated Negative Declaration
LOS	Level of Service
MID	Modesto Irrigation District
MS4	municipal separate storm sewer system
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
PM_{10}	particulate matter 10 microns or less in diameter
$PM_{2.5}$	particulate matter 2.5 microns or less in diameter
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SJVAPCD	San Joaquin Valley Air Pollution Control District
StanCOG	Stanislaus Council of Governments
StanRTA	Stanislaus Regional Transit Authority
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
VMT	vehicle miles traveled
WWTP	Wastewater Treatment Plant

MITIGATED NEGATIVE DECLARATION

A. General Project Information

Project Title:	Waterstone Residential Subdivisions
Lead Agency Name and Address:	City of Waterford 101 E Street Waterford, CA 95386
Contact Person and Phone Number:	Mark Niskanen, Planning Manager 209-599-8377
Project Locations:	At and near intersection of Bonnie Brae Avenue and Tim Bell Road, Waterford, CA
Project Sponsor Name and Address:	UC Construction Company 4805 Sisk Road Salida, CA 95368
General Plan Designation:	Low Density Residential (all three sites)
Zoning:	RE – Rural Estates (Site #1), RS – Residential Single (Sites #2 and #3)
Project Description:	The project proposes a Tentative Subdivision Map for each of three sites that would subdivide each of the three sites into single family residential lots, the total of which would be 113. Site A would be subdivided into 30 lots, Site B would be subdivided into 29 lots, and Site C would be subdivided into 54 lots. Public streets and utilities would be provided on each site. All three sites would be rezoned to PC, Planned Community.
Surrounding Land Uses and Setting:	All three sites are in northern Waterford. Site A is bounded by residential development to the east and southwest and by vacant land to the south. The MID Waterford Lower Main Canal forms the northern site boundary. Site B is surrounded by residential development of varying densities and vacant land, and the Modesto Irrigation District (MID) Main Canal forms the approximate northern site boundary. Site C is bounded by residential development on its northwest and southeast

corners and by vacant land along its northeastern boundary. The Waterford Lower Main Canal forms the southern site boundary, and Tim Bell Road forms the western boundary.

Other Public Agencies Whose Approval is Required:	Modesto Irrigation District (encroachment).
Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code Section 21080.3.1? If so, has consultation begun?	All requesting tribes notified, and no consultation was requested.

B. Environmental Factors Potentially Affected

The environmental factors checked below may be significantly affected by this project, involving at least one impact that is a "Potentially Significant Impact" prior to mitigation. Mitigation measures that would avoid potential effects or reduce them to a less than significant level have been prescribed for each of these effects, as described in the checklist and narrative on the following pages, and in the Summary Table at the end of Chapter 1.0.

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

C. 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.

- ✓ 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 and/or mitigation measures that would reduce potential effects to a less than significant level 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.

CITY OF WATERFORD

	5/14/24
Mark Niskanen, Planning Manager	Date

1.0 INTRODUCTION

1.1 Project Brief

This document is an Initial Study/Mitigated Negative Declaration (IS/MND) for the Waterstone Residential Subdivisions Project (project). The project, which consists of three sites, is in northern Waterford in Stanislaus County (Figures 1-1 through 1-4C). UC Construction Company is the project applicant. The IS/MND has been prepared in compliance with the requirements of the California Environmental Quality Act (CEQA). For the purposes of this CEQA analysis, the City of Waterford (City) is the Lead Agency for the project.

The project proposes a Tentative Subdivision Map for each of three sites that would subdivide each site into single-family residential lots, the total of which would be 118. Site A would be subdivided into 30 lots, Site B would be subdivided into 34 lots, and Site C would be subdivided into 54 lots. Public streets and utilities would be provided on each site, with connections to existing roadways in the area. To accommodate the proposed subdivisions, all three sites are proposed to be rezoned from their current zoning to PC, Planned Community. The rezoning, along with the Tentative Subdivision Maps, would require approval from the Waterford City Council, with the recommendation of the Waterford Planning Commission.

1.2 Purpose of Initial Study

CEQA requires that public agencies document and consider the potential environmental effects of the agency's actions that meet CEQA's definition of a "project." Briefly summarized, a "project" is an action that has the potential to result in direct or indirect physical changes in the environment. A project includes the agency's direct activities as well as activities that involve public agency approvals or funding. Guidelines for an agency's implementation of CEQA are found in the CEQA Guidelines (California Code of Regulations Title 14, Division 6, Chapter 3).

Provided that a project is not exempt from CEQA, the first step in the agency's consideration of its potential environmental effects is the preparation of an Initial Study. The purpose of an Initial Study is to determine whether the project would involve "significant" environmental effects, as defined by CEQA, and to describe feasible mitigation measures that would avoid significant effects or reduce them to a level that is less than significant. If the Initial Study does not identify significant effects, then the agency ordinarily prepares a Negative Declaration. If the Initial Study notes significant effects but also identifies mitigation measures that would reduce these significant effects to a level that is less than significant, then the agency ordinarily prepares a Mitigated Negative Declaration. If, however, a project would involve significant effects that cannot be readily mitigated, then the agency must prepare an Environmental Impact Report. The agency may also decide to proceed directly with the preparation of an Environmental Impact Report without first preparing an Initial Study.

The proposed project is a "project" as defined by CEQA and is not exempt from CEQA consideration. The City has determined that the project may potentially have significant environmental effects and therefore requires preparation of an Initial Study. This Initial Study describes the proposed project and its environmental setting, discusses the potential environmental effects of the project, and identifies feasible mitigation measures that would eliminate any potentially significant environmental effects of the project or reduce them to a level that would be less than significant. The Initial Study considers the project's potential for significant environmental effects in the following subject areas:

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

This Initial Study concludes that the project would have potentially significant environmental effects, but that all of these effects would be avoided or reduced to a level that would be less than significant with identified mitigation measures. The project applicant has accepted the obligation to implement all the mitigation measures. As a result, the City has prepared a Mitigated Negative Declaration and has issued a Notice of Intent to adopt the IS/MND for the project. The Notice of Intent, located just inside the cover of this document, shows the time available for public comment on the IS/MND.

1.3 Project Background

The three project sites are currently vacant with no existing structures. The Waterford General Plan, adopted in 2007, has designated all three project sites as Low Density Residential, which allows for single-family residential development, up to 6.0 dwellings per gross acre. The zoning for Sites A and C is currently RS – Residential Single, while Site B is zoned RE – Rural Estates. Both zones allow for single-family residences, but the RE zone allows less density of residential development than the RS zone.

The current Waterford Housing Element, an element of the Waterford General Plan, is designed to guide future housing development in Waterford in accordance with anticipated housing needs. Waterford was allocated a need of 525 housing units in the Regional Housing Needs Plan, prepared by the Stanislaus Council of Governments (StanCOG), for the 2014 to 2023 planning period. In addition, since Waterford did not have a Housing

Element for the previous planning period of 2007 to 2014 certified by the California Department of Housing and Community Development, allocations made by StanCOG for that planning period were combined with those for the current planning period. Therefore, the combined need is 882 housing units. Of these housing units, 368 would be for above moderate-income households, and the remainder would be for households of moderate or lower income. It is anticipated that most of the total 882 units, including all above moderate-income units, would be provided by new construction. An inventory of vacant sites that could potentially be used for residential development included the three project sites (City of Waterford 2018).

The City has recently submitted a draft Sixth Cycle Housing Element Update to the California Department of Housing and Community Development, after releasing the document for public review and comment. This Housing Element Update, which covers the years 2023 to 2031, states that StanCOG has determined the City would need to provide 557 housing units during the planning period, including 181 units for low- and very low-income households. The City has identified a total of 278.4 net acres that are potentially available for single-family, multifamily, and mixed use residential development, which could realistically result in an additional 1,779 housing units (City of Waterford 2024).

1.4 Environmental Evaluation Checklist Terminology

The project's potential environmental effects are evaluated in the Environmental Evaluation Checklist presented in Chapter 3.0 of this IS/MND. The checklist includes a list of environmental considerations against which the project is evaluated. For each question, the City determines whether the project would involve 1) a Potentially Significant Impact, 2) a Less Than Significant Impact with Mitigation Incorporated, 3) a Less Than Significant Impact, or 4) No Impact.

> A Potentially Significant Impact occurs when there is substantial evidence that the project would involve a substantial adverse change to the physical environment, i.e., the environmental effect may be significant, and mitigation measures have not been defined that would reduce the impact to a level that would be less than significant. If there is a Potentially Significant Impact entry in the Initial Study, then an EIR is required. No Potentially Significant Impacts are identified in this Initial Study.
>
> An environmental effect that is Less Than Significant with Mitigation Incorporated is a Potentially Significant Impact that can be avoided or reduced to a level that is less than significant with the application of defined mitigation measures. This Initial Study identifies several impacts that are Less than Significant with Mitigation Incorporated.
>
> A Less Than Significant Impact occurs when the project would involve an environmental impact, but the impact would not cause a substantial adverse change to the physical environment that would require mitigation. This Initial Study identifies several impacts that are considered Less than Significant.

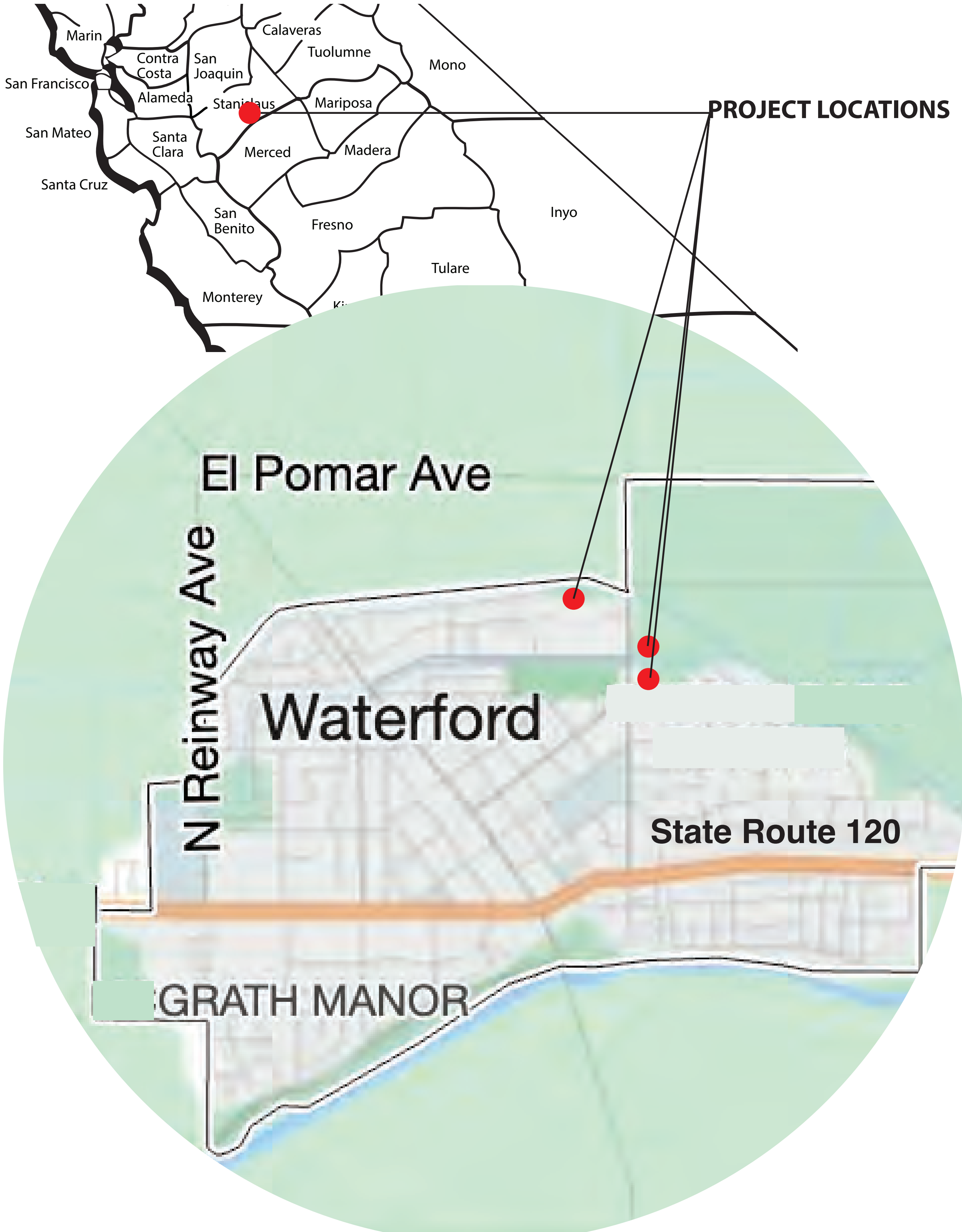
A determination of No Impact is self-explanatory. This Initial Study identifies several areas of environmental concern in which the project would have No Impact.

This IS/MND identifies certain potentially significant environmental effects that would be mitigated by implementation of existing provisions of law and standards of practice related to land use planning and environmental protection. Such provisions are identified and considered in the environmental impact analysis, and the degree to which they would reduce potential environmental effects is discussed. These protections are considered part of the existing regulatory environment and are assumed to counter the potential environmental effects of the project as discussed. Additional mitigation measures are described in this Initial Study when existing environmental protections are not adequate to avoid potential environmental effects or to reduce them to a level that is less than significant.

1.5 Summary of Environmental Effects and Mitigation Measures

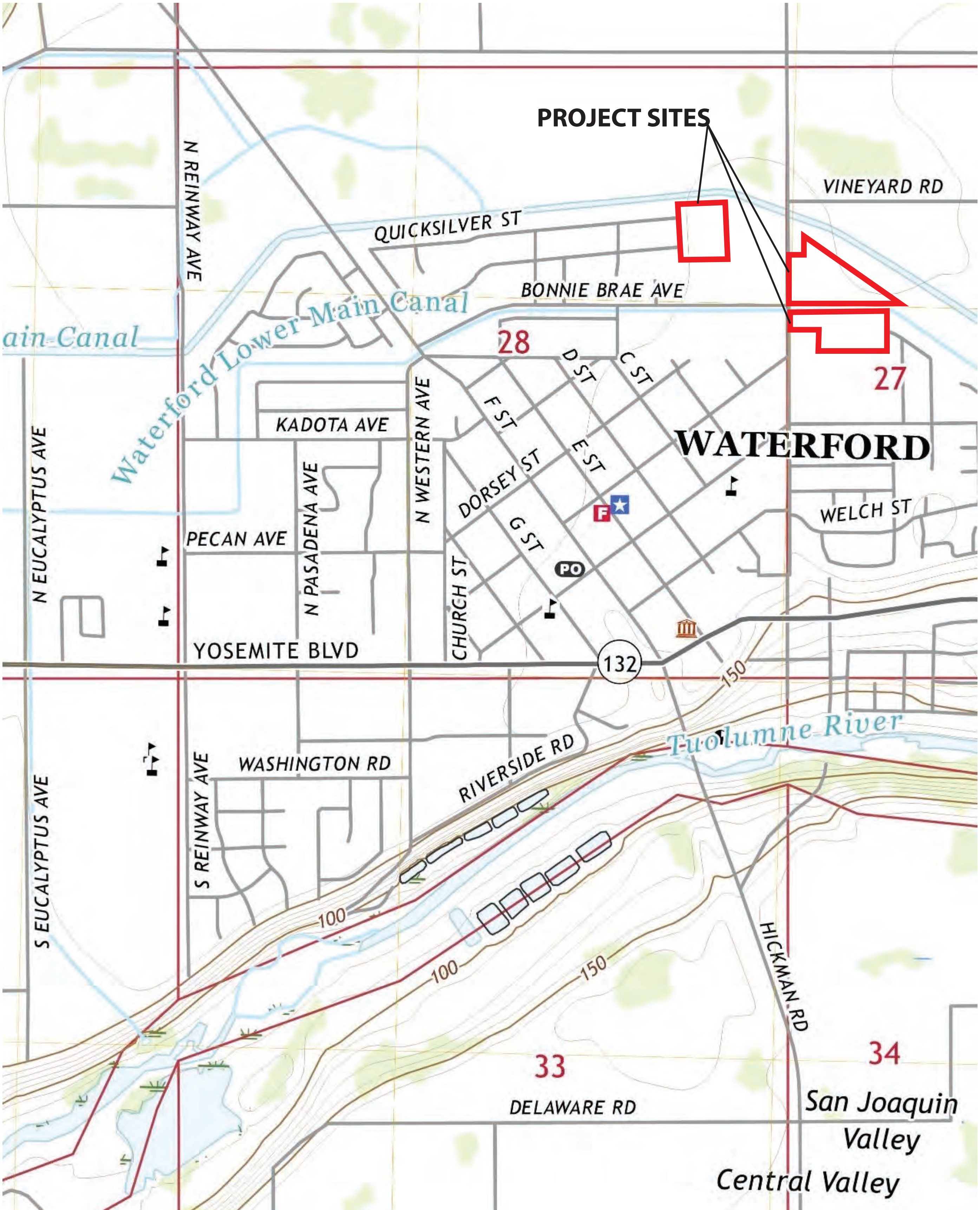
Table 1-1, which follows Figures 1-1 through 1-5, summarizes the results of the Environmental Evaluation Checklist and associated narrative discussion in Chapter 3.0 of this IS/MND. The potential environmental impacts of the proposed project are listed in the left-most column of this table. The level of significance of each impact is indicated in the second column. Feasible mitigation measures that are considered necessary to avoid or minimize any identified significant impacts are shown in the third column, and the significance of the impact after mitigation measures are applied is shown in the fourth column.

As previously noted, all potentially significant environmental effects identified in the IS/MND would be avoided or reduced to a level that would be less than significant with existing environmental protection measures or mitigation measures recommended in this Initial Study. For other issues, the project would have no impact or would have impacts that are less than significant.



BaseCamp Environmental

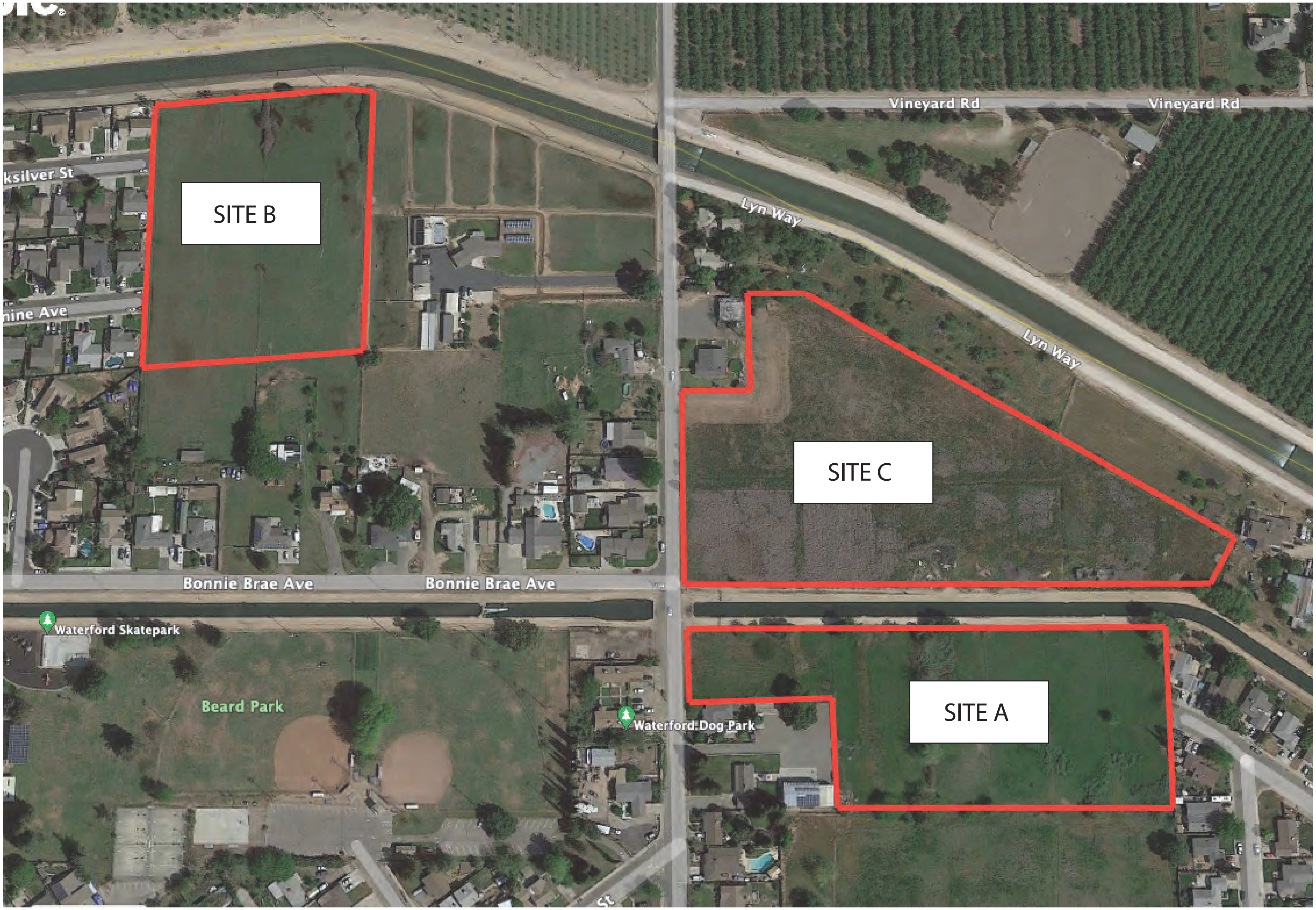
Figure 1-1
REGIONAL PROJECT LOCATION



SOURCE: USGS Quadrangle Map, Waterford CA, 2021.

BaseCamp Environmental

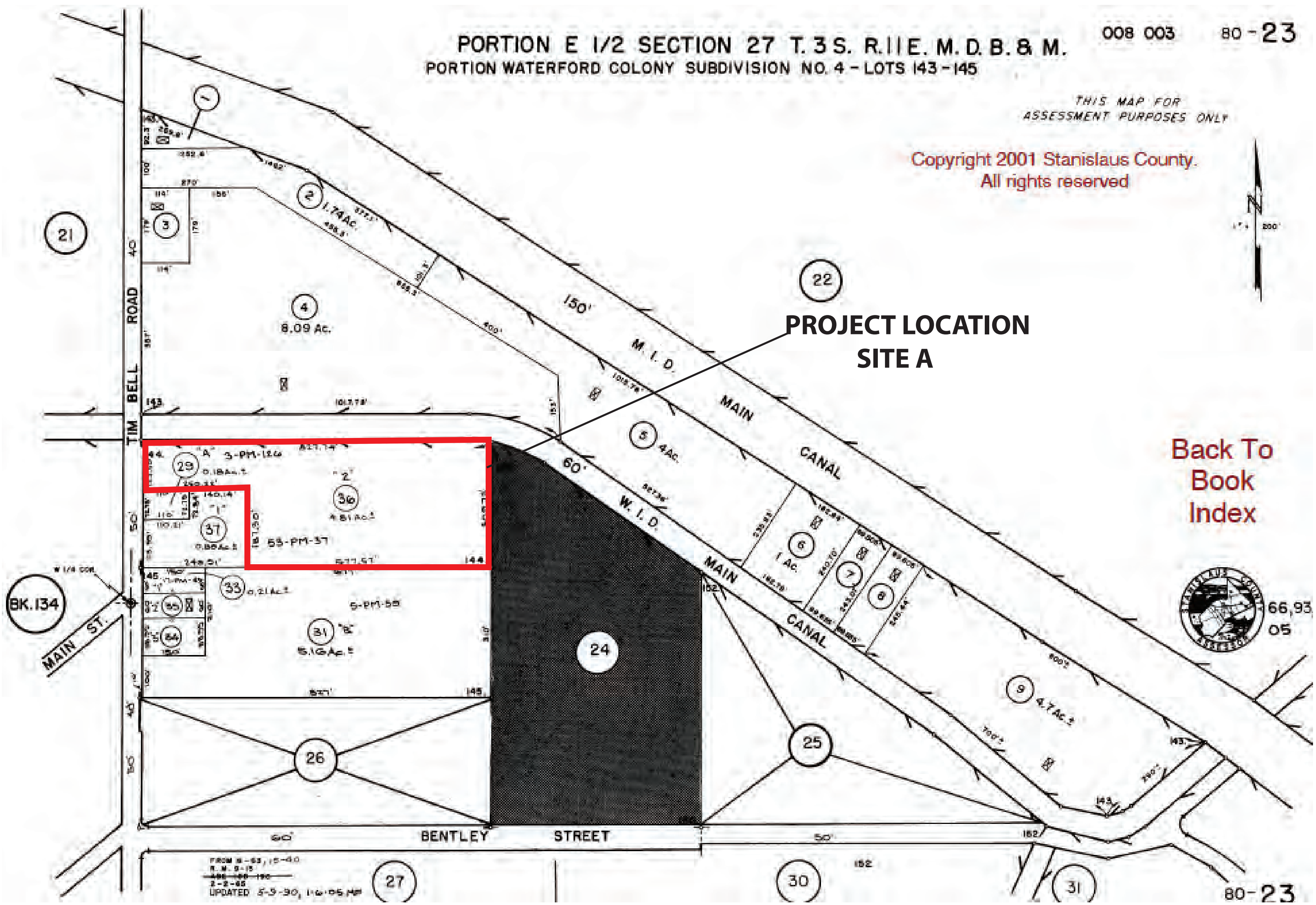
Figure 1-2
USGS MAP



BaseCamp Environmental

SOURCE: Google Earth

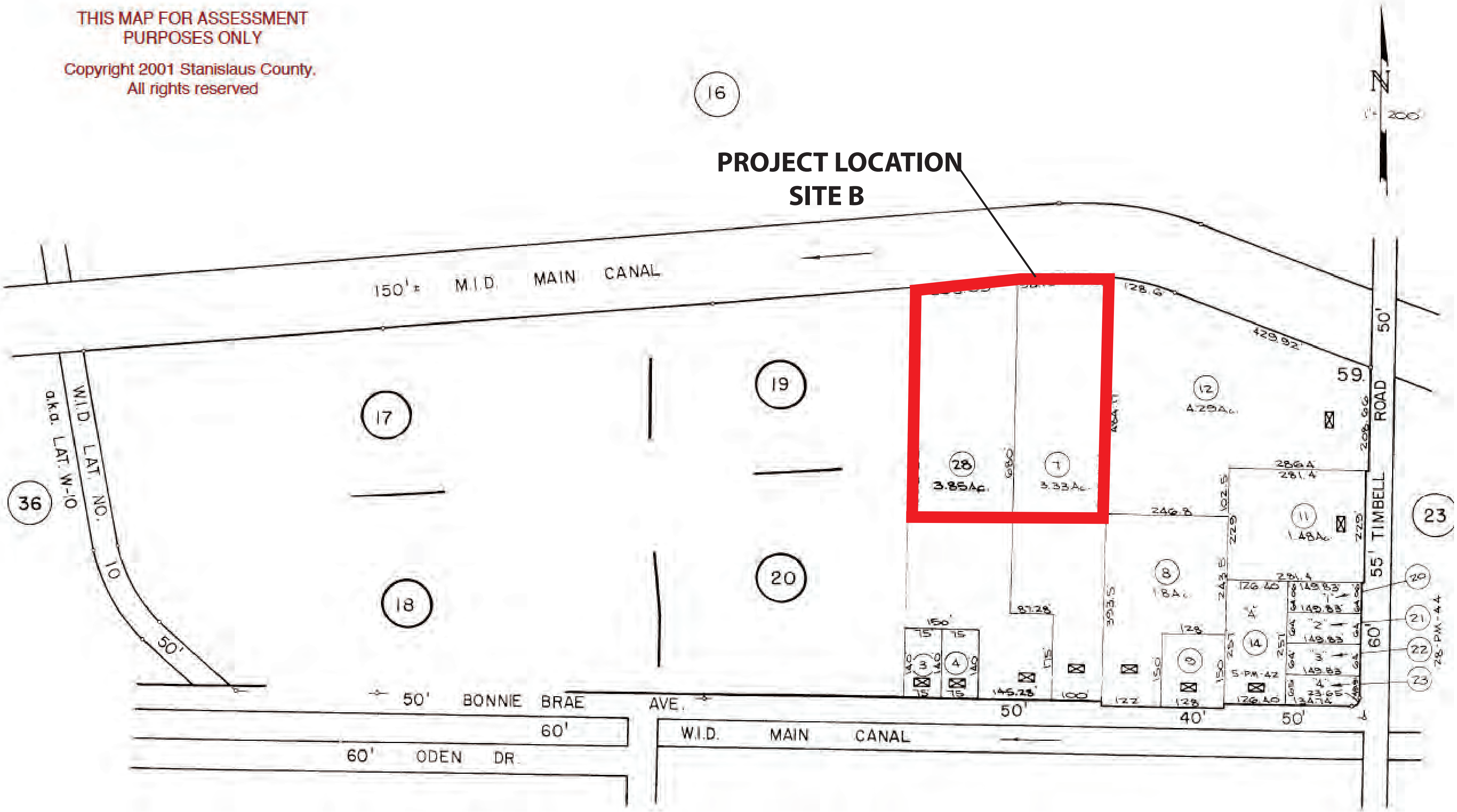
Figure 1-3
AERIAL PHOTO



Back To Book Index

BaseCamp Environmental

Figure 1-4A
SITE A ASSESSOR PARCEL MAP



BaseCamp Environmental

Figure1-4B
SITE B ASSESSOR PARCEL MAP

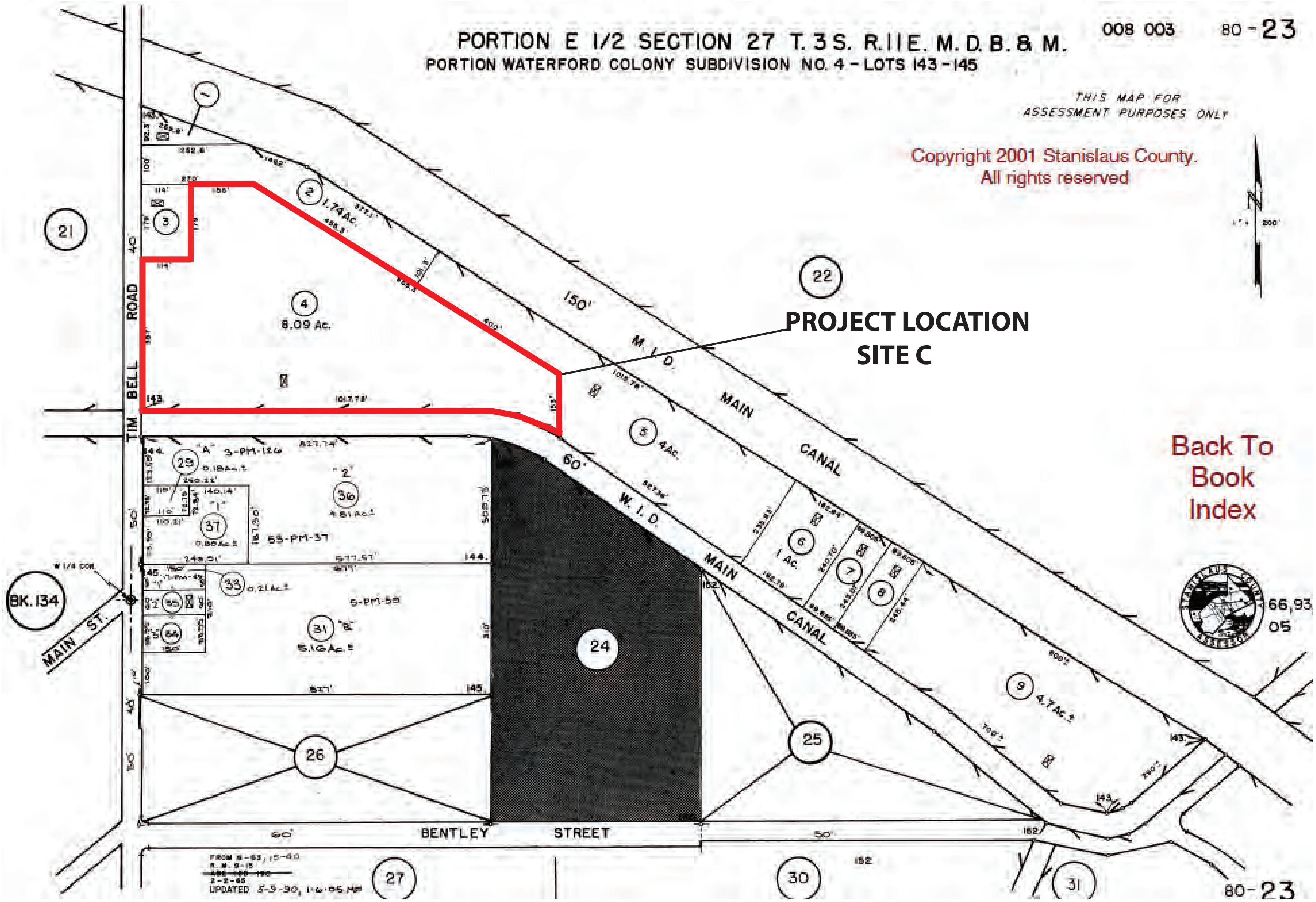


Figure 1-4C
SITE C ASSESSOR PARCEL MAP

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
3.1 AESTHETICS			
a) Scenic Vistas	LS	None required	-
b) Scenic Resources and Highways	NI	None required	-
c) Visual Character and Quality	LS	None required	-
d) Light and Glare	LS	None required	-
3.2 AGRICULTURE AND FORESTRY RESOURCES			
a) Agricultural Land Conversion	LS	None required	-
b) Conflict with Agricultural Zoning or Williamson Act Contract	NI	None required	-
c) Conflict with Forest Land Zoning	NI	None required	-
d) Forest Land Conversion	NI	None required	-
e) Conversion or loss of Farmland, Forestland, and Timberland	NI	None required	-
3.3 AIR QUALITY			
a) Consistency with Air Quality Plans	LS	None required	-
b) Cumulative Emissions	LS	None required	-
c) Exposure of Sensitive Receptors	LS	None required	-
d) Odors and Other Emissions	LS	None required	-

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
3.4 BIOLOGICAL RESOURCES			
a) Special-Status Species	PS	BIO-1: If project construction commences during the Swainson's hawk nesting season (March 1 through September 15), a pre-construction survey for nesting Swainson's hawk shall be conducted within one-quarter mile of the construction site. If active nests are found, then a qualified biologist shall determine the need, if any, for temporal restrictions on construction. The determination shall utilize criteria set forth by the Swainson's Hawk Technical Advisory Committee in its 2000 report *Determining a Project's Potential for Impacting Swainson's Hawk*. Any temporal restrictions advised by the biologist shall be implemented by the project. BIO-2: If project construction commences during the burrowing owl nesting season (February 1 through August 31), a pre-construction survey for nesting burrowing owls shall be completed on the construction site in accordance with CDFW guidelines described in the 1995 *Staff Report on Burrowing Owl Mitigation*. If owls are present on the site, the biologist shall specify setbacks, construction timing or other mitigation needed to avoid significant effects on owls.	LS
b) Riparian and Sensitive Habitats,	NI	None required	-
c) Waters of the U.S. and Wetlands	NI	None required	-
d) Fish and Wildlife Movement	PS	BIO-3: If tree removal is proposed during the general avian nesting season (March 1 through July 31), a pre-construction survey for all species of nesting birds shall be conducted. If active nests for any bird species are found, work in the vicinity of the nests shall be delayed until the young have fledged. No survey shall be required if tree removal occurs outside the general avian nesting season.	LS
e) Local Biological Requirements	NI	None required	-

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
f) Habitat Conservation Plans	NI	None required	-
3.5 CULTURAL RESOURCES			
a) Historic Resources	NI	None required	-
b) Archaeological Resources	PS	CULT-1: If buried cultural or paleontological resources are inadvertently discovered during ground-disturbing activities, work shall stop within 50 feet of the find until a qualified archaeologist or paleontologist can assess the significance of the find. If necessary, the archaeologist or paleontologist will develop appropriate treatment measures in consultation with the City of Waterford Community Development Department and other agencies as appropriate. Treatment measures may include, but are not limited to, preservation in place or excavation under supervision of a qualified archaeologist or paleontologist.	LS
c) Human Burials	LS	None required	-
3.6 ENERGY			
a) Consumption of Energy Resources	LS	None required	-
b) Conflict with Energy Plans	LS	None required	-
3.7 GEOLOGY AND SOILS			
a-i) Fault Rupture Hazards	NI	None required	-
a-ii) Seismic Ground Shaking	LS	None required	-
a-iii) Seismic-Related Ground Failure	LS	None required	-
a-iv) Landslides	NI	None required	-
b) Soil Erosion	LS	None required	-

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
c) Geologic Instability	PS	GEO-1: The project applicant shall implement the recommendations contained in the report titled *Preliminary Geotechnical Investigation -Update, Proposed Subdivision, Site-2 Tim Bell Road (APN: 080-023-036), Waterford, California,* prepared by North American Technical Services, Inc. on February 8, 2024. These recommendations address site preparation, fill placement and compaction, fill materials, temporary construction slopes, and foundations and slabs, among other issues. These recommendations shall be implemented for design and construction work on all three project sites.	LS
d) Expansive Soils	PS	Mitigation Measure GEO-1.	LS
e) Adequacy of Soils for Sewage Disposal	NI	None required	-
f) Paleontological Resources	PS	Mitigation Measure CULT-1.	LS
3.8 GREENHOUSE GAS EMISSIONS			
a) Project GHG Emissions	LS	None required	-
b) Consistency with GHG Reduction Plans	LS	None required	-
3.9 HAZARDS AND HAZARDOUS MATERIALS			
a) Hazardous Materials Transport, Use and Disposal	LS	None required	-
b) Upset and Accident Conditions	LS	None required	-
c) Release of Hazardous Materials near Schools	NI	None required	-
d) Hazardous Materials Sites	NI	None required	-
e) Public Airports	NI	None required	-
f) Emergency Response and Evacuations	PS	HAZ-1: Prior to the start of project construction, the developer shall prepare and implement a Traffic Control	LS

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
		Plan, which shall include such items as traffic control requirements, resident notification of access closure, and daily access restoration. The contractor shall specify dates and times of road closures or restrictions, if any, and shall ensure that adequate access will be provided for emergency vehicles. The Traffic Control Plan shall be reviewed and approved by the City Department of Public Works and shall be coordinated with Waterford Police Services (Stanislaus County Sheriff's Department) and the Stanislaus Consolidated Fire Protection District if construction will require road closures or lane restrictions.	
g) Wildland Fire Hazards	LS	None required	-
3.10 HYDROLOGY AND WATER QUALITY			
a) Water Quality	LS	None required	-
b) Groundwater Supplies and Recharge	LS	None required	-
c-i, ii, iii) Drainage Patterns and Runoff	LS	None required	-
c-iv) Flooding Hazards	NI	None required	-
d) Release of Pollutants in Flood, Tsunami, or Seiche Zones	NI	None required	-
e) Conflicts with Water Quality or Groundwater Management Plans	LS	None required	-
3.11 LAND USE AND PLANNING			
a) Division of Established Community	NI	None required	-
b) Conflicts with Land Use Plans, Policies and Regulations	LS	None required	-

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
3.12 MINERAL RESOURCES			
a, b) Availability of Mineral Resources	NI	None required	
3.13 NOISE			
a) Generation of Noise Exceeding Local Standards	PS	NOISE-1: The City shall establish the following as conditions of approval for any permit that results in the use of construction equipment: • In accordance with Waterford Municipal Code Chapter 8.22, construction activities shall not occur between 7:00 p.m. and 7:00 a.m. on weekdays and between 8:00 p.m. and 9:00 a.m. on weekends and legal holidays. • All construction equipment powered by internal combustion engines shall be properly muffled and maintained. Quiet construction equipment, particularly air compressors, are to be selected whenever possible. • All stationary noise-generating construction equipment such as generators or air compressors are to be located as far as is practical from existing residences. In addition, the project contractor shall place such stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site. • Unnecessary idling of internal combustion engines is prohibited, and in no case shall idling exceed five minutes per State regulation.	LS

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
		• The construction contractor shall, to the maximum extent practical, locate on-site equipment staging areas to maximize the distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.	
b) Exposure to Groundborne Vibrations	LS	None required	-
c) Public Airport and Private Airstrip Noise	NI	None required	-
3.14 POPULATION AND HOUSING			
a) Unplanned Population Growth	LS	None required	-
b) Displacement of Housing or People	NI	None required	-
3.15 PUBLIC SERVICES			
a-i) Fire Protection	LS	None required	-
a-ii) Police Protection	LS	None required	-
a-iii) Schools	LS	None required	-
a-iv) Parks	LS	None required	-
a-v) Other Public Facilities	LS	None required	-
3.16 RECREATION			
a, b) Recreational Facilities	LS	None required	-
3.17 TRANSPORTATION			
a) Conflicts with Transportation Programs and Plans	LS	None required	-

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
b) Conflict with CEQA Guidelines Section 15064.3(b)	LS	None required	-
c) Traffic Hazards	LS	None required	-
d) Emergency Access	LS	None required	-
3.18 TRIBAL CULTURAL RESOURCES			
a, b) Tribal Cultural Resources	PS	Mitigation Measure CULT-1	LS
3.19 UTILITIES AND SERVICE SYSTEMS			
a) Relocation or Construction of Utility Facilities	PS	UTIL-1: Prior to final approval of the site plan, the project applicant shall prepare an improvement plan that shall show the locations of proposed utility lines and other facilities. The improvement plan(s) shall show how these facilities would connect to existing City utility systems and demonstrate compliance with City standards and specifications pertinent to these facilities. The Waterford Department of Public Works shall review and approve the improvement plan.	LS
b) Water Supplies	LS	None required	-
c) Wastewater Treatment Capacity	LS	None required	-
d, e) Solid Waste Services	LS	None required	-
3.20 WILDFIRE			
a) Emergency Response Plans and Emergency Evacuation Plans	NI	None required	-
b) Exposure of Project Occupants to Wildfire Hazards	NI	None required	-

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
c) Installation and Maintenance of Infrastructure	NI	None required	-
d) Risks from Runoff, Post-Fire Slope Instability, or Drainage Changes	NI	None required	-
3.21 MANDATORY FINDINGS OF SIGNIFICANCE			
a) Findings on Biological and Cultural Resources	PS	Mitigation measures in Sections 3.4 and 3.5 above.	LS
b) Findings on Cumulatively Considerable Impacts	LS	None required	-
c) Findings on Adverse Effects on Human Beings	LS	None required	-

Notes: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

2.0 PROJECT DESCRIPTION

2.1 Project Overview

The project proposes to subdivide three parcels in northern Waterford that are in proximity to each other into residential lots (see Figure 1-3). Table 2-1 lists the three project sites, with their Assessor's Parcel Numbers (APNs), their sizes, and proposed number of residential lots.

TABLE 2-1
PROJECT SITES

Site*	APN	Acres	Current Zoning	Current GP Designation	GP density (du/ac)	Proposed Residential Lots	Proposed Density (du/ac)
A	080-023-036	4.81	RS	Low Density Residential	4.0-6.0	30	6.24
B	080-021-028 (portion) 080-021-007 (portion)	7.18	RE	Low Density Residential	4.0-6.0	34	4.74
C	080-023-004	8.09	RS	Low Density Residential	4.0-6.0	54	6.67
	TOTAL	**20.08**				**118**	

* See Figure 1-3 for site locations.

2.2 Project Location

Project Site A is adjacent to and southeast of the intersection of Tim Bell Road and the Waterford Lower Main Canal operated by the Modesto Irrigation District (MID). This site consists of the parcel APN 080-023-036. Project Site B is located at the end of Quicksilver Street and Goldmine Avenue. Site B consists of the northern and central portions of parcels APN 080-021-028 and APN 080-021-007, which are adjacent to each other. Project Site C is adjacent to and north of Site A, east of Tim Bell Road. The Waterford Lower Main Canal separates Sites A and C. The MID Main Canal parallels the northeastern boundary of Site C, which consists of the parcel APN 080-023-004.

The project sites are shown on the U.S. Geological Survey's Waterford, California, 7.5-minute quadrangle map as within Sections 27 and 28, Township 3 South, Range 11 East, Mt. Diablo Base and Meridian. The approximate latitude and longitude of Project Site A are 37° 38′ 46″ North and 120° 45′ 14″ West, respectively. The approximate latitude and longitude of Project Site B are 37° 38′ 55″ North and 120° 45′ 30″ West, respectively. The approximate latitude and longitude of Project Site C are 37° 38′ 50″ North and 120° 45′ 15″ West, respectively.

2.3 Project Details

The project proposes a Tentative Subdivision Map, per California Government Code Section 66426 *et seq*, for each of the three sites, totaling 20.08 acres, that would subdivide them into lots for single-family residences. Table 2-1 above shows the number of residential lots resulting from the subdivision of each of the sites. A more detailed description is provided below.

Site A

As indicated in Table 2-1, Site A consists of APN 080-023-036, which is approximately 4.81 acres. The project proposes to subdivide Site A into 30 residential lots ranging in size from 4,545 square feet to 8,074 square feet (Figure 2-1). Access to Site A would be provided by extension of the existing Enid Drive from the east onto the site, eventually connecting with Tim Bell Road along the western site boundary. Two side streets are proposed to be installed south of the Enid Drive extension. The width of the on-site streets would be approximately 50 feet.

Along the boundary with the existing residence to the west, a drainage swale would be installed with two pairs of NDS Flo-Well units, in stacked arrangement, with 12-inch grates. These units would be interconnected with 40 linear feet of a four-inch diameter perforated pipe laid in a deep rock trench approximately two feet wide and eight feet deep. No other special features are proposed at this time.

As a result of discussions with MID, the project applicant has agreed to remove four existing concrete irrigation structures/valves connecting Site A with the bordering Waterford Lower Main Canal. The project applicant has also agreed to abandon existing irrigation lines on the site in place. The pipeline abandonment can be accomplished in Accordance with MID Standard Detail C55, “Concrete Plug for Concrete Pipeline”, or the contractor may elect to pump the entire pipeline full of concrete.

Site B

Site B consists of the northern and central portions of APNs 080-021-028 and 080-021-007, which when combined would total approximately 7.18 acres. The total residential lot area would be 4.39 acres. The project proposes to subdivide Site B into 34 residential lots, ranging in size from approximately 4,047 square feet to 9,928 square feet (Figure 2-2).

Access to Site B would be provided by extensions of the existing Quicksilver Street and Goldmine Avenue from the west onto the site, with an internal street connecting the extensions. A cul-de-sac would extend south of the Goldmine Avenue extension to provide access to some of the parcels. The width of the on-site streets would be approximately 50 feet. No other special features are proposed at this time.

Site C

Site C consists of APN 080-023-004, which is approximately 8.09 acres. The project proposes to subdivide Site C into 54 residential lots, ranging in size from approximately 4,041 square feet to 8,007 square feet (Figure 2-3). Access to Site C would be provided by two streets extending east from Tim Bell Road, north of the intersection of Tim Bell Road and Bonnie Brae Avenue. Internal streets and a cul-de-sac would provide access to the lots. The width of the on-site streets would be approximately 50 feet. No other special features are proposed at this time.

Other Project Features

It is expected that future development on the project sites would connect to the water, sanitary sewer, and storm drainage systems operated by the City of Waterford. A sewer easement approximately 20 feet in width is proposed to be extended from Site B to Bonnie Brae Avenue. Water and sewer lines are available in the vicinity of the project sites; however, storm drainage facilities may need to be extended to, or constructed on, all the sites. Section 3.19, Utilities and Service Systems, discusses the provision of facilities in more detail.

All internal streets would be constructed in accordance with City standards and specifications. As noted in Waterford General Plan Implementing Action 2.6.e, the City requires the provision of sidewalks in all new developments, except in industrial areas.

2.4 Permits and Approvals

All three project sites are designated by the Waterford General Plan as Low Density Residential. Sites A and C are zoned RS, Residential Single; however, Site B is zoned RE, Rural estates. The existing General Plan designations would be retained for the project sites. However, all three sites are proposed to be rezoned from their current zoning to PC, Planned Community, which permit variations from the density, height, and other standards in the various zones, including the residential zones.

Rezoning decisions are made by the Waterford City Council, with a recommendation from the Waterford Planning Commission. A decision on the proposed Tentative Subdivision Maps is also made by the City Council, with Planning Commission recommendation.

Encroachment permits from the City's Public Works Department are required for any project work within local streets. An encroachment permit from MID would be required for any work that may affect the nearby laterals. Other permits and approvals that would be required from other agencies include the Construction General Permit from the State Water Resources Control Board (SWRCB).

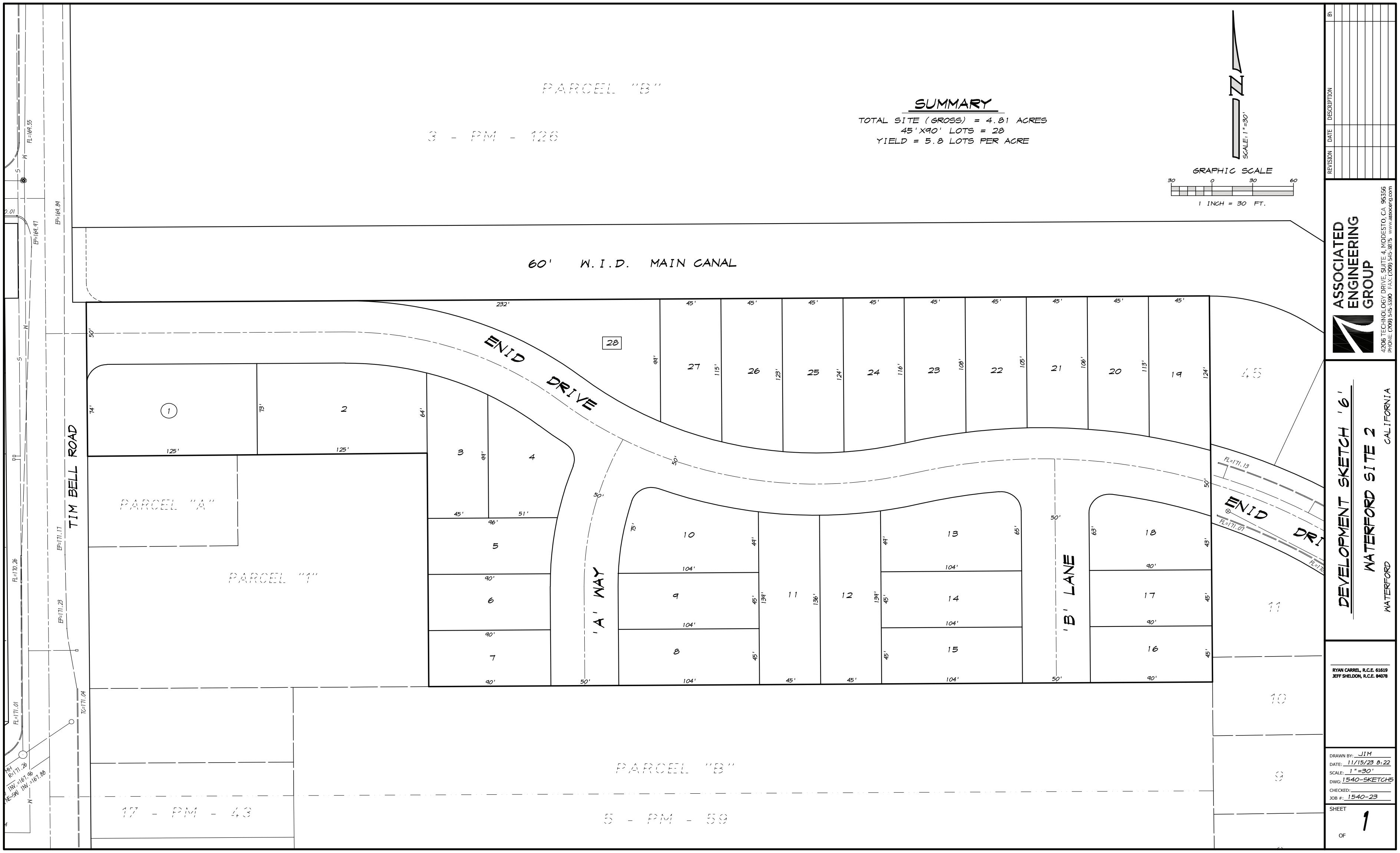
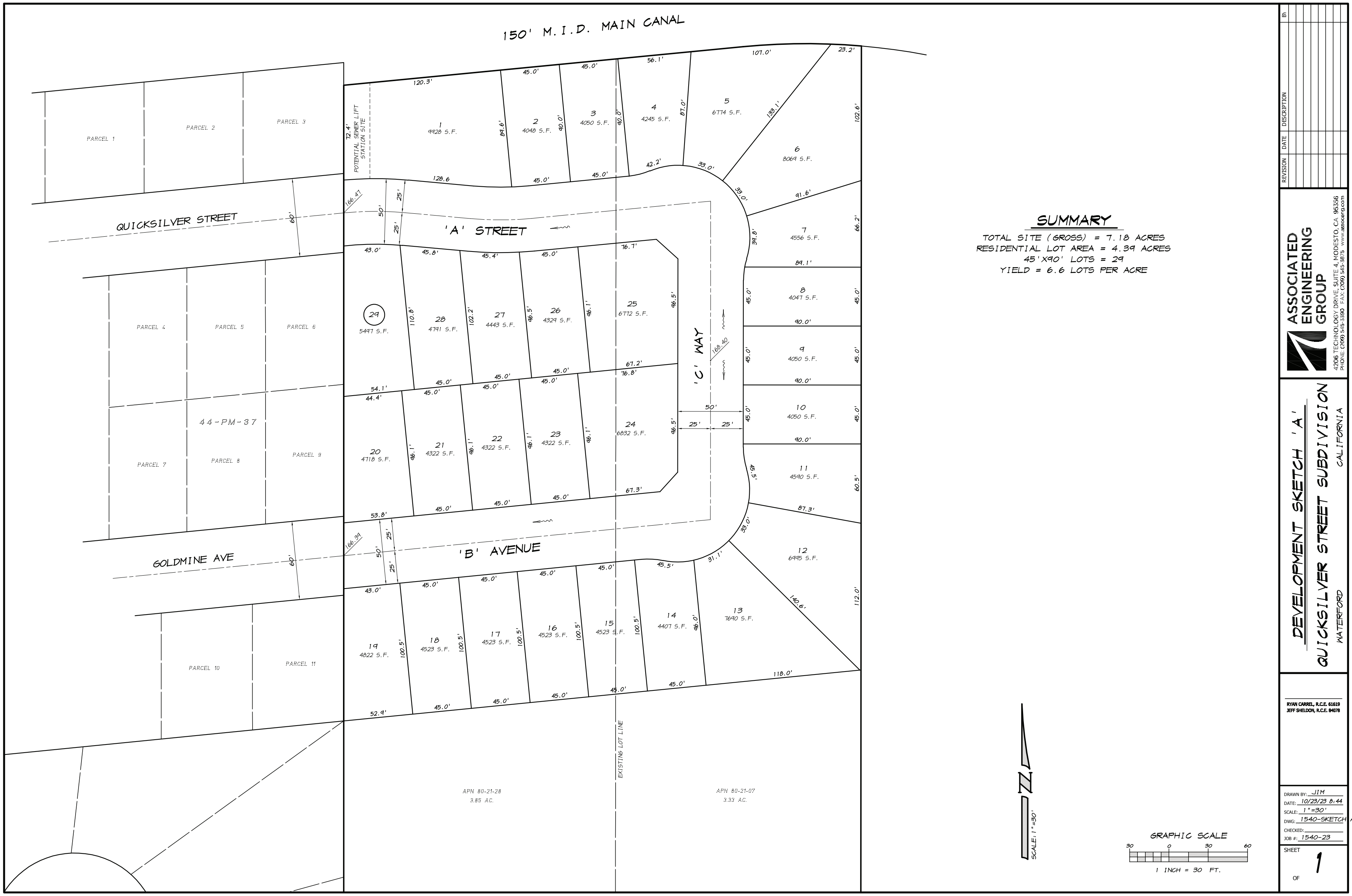
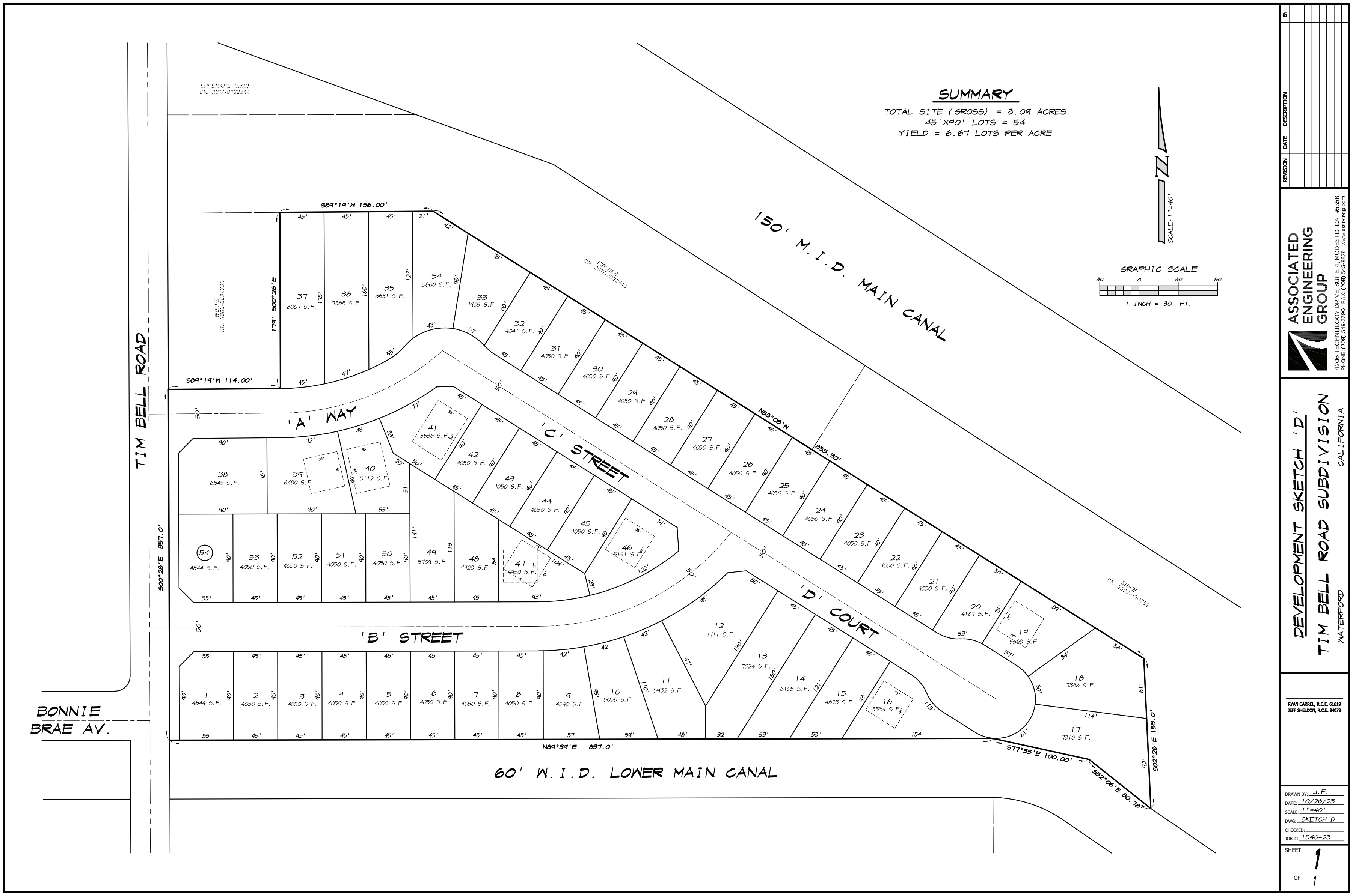


Figure 2-1
SITE A TENTATIVE SUBDIVISION MAP



BaseCamp Environmental

Figure 2-2
SITE B TENTATIVE SUBDIVISION MAP



BaseCamp Environmental

Figure 2-3
SITE C TENTATIVE SUBDIVISION MAP

3.0 ENVIRONMENTAL CHECKLIST

The following environmental evaluation considers the potential environmental effects of City approval of the proposed project, as described in Chapter 2.0, Project Description. The format of this evaluation is based on the Environmental Checklist presented in CEQA Guidelines Appendix G.

3.1 AESTHETICS

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

Environmental Setting

The project sites are mostly vacant and covered with grass and weeds. Trees are found in the northern part of Site B and scattered throughout Sites A and C. Outside of the trees, the most prominent visual feature on or adjacent to the project sites are the MID laterals that divide Sites A and C and border Site B. All three sites are within an urbanizing area of the City, with a mix of residential development and vacant land.

California Public Resources Code Section 21099 states that the aesthetic and parking impacts of residential, mixed-use residential, or employment center projects on an infill site within a transit priority area shall not be considered significant. While the project is proposed for residential development and may be considered an infill project, it is not within a transit priority area. Therefore, it does not meet the criteria of Section 21099, and the aesthetic impacts of the project are analyzed below.

Environmental Impacts and Mitigation Measures

a) Scenic Vistas.

The City's General Plan EIR defines a scenic vista as typically a rural area containing natural visual elements that can be seen from a distance. However, the General Plan EIR does not explicitly identify any scenic vistas from Waterford. Based on the definition provided, the most likely scenic vistas available from the project sites are views of the Sierra Nevada mountains and foothills to the east.

The project proposes the eventual development of single-family residences. These structures are relatively low in height and therefore would not substantially views of the Sierra Nevada. Project impacts on scenic vistas would be less than significant.

b) Scenic Resources.

As described above, the project sites are vacant and covered mostly with grass and weeds. Trees are on two of the project sites; however, they are mostly ornamental. None are considered to have substantial scenic value. No other outstanding scenic resources are on the project sites.

According to the Caltrans list of designated scenic highways, there is only one officially designated state scenic highway within Stanislaus County: Interstate 5 from the San Joaquin County line to the Merced County line (Caltrans 2019). This scenic highway is in southwestern Stanislaus County, well away from the project sites. Stanislaus County does not have any designated scenic highways. The project would have no impact on scenic resources or scenic highways.

c) Visual Character and Quality.

Public views of Site B are currently from the ends of Quicksilver Street and Goldmine Avenue. While the visual character of Site B would change with proposed future development, this development would be consistent with the existing residential development in the area. As noted in b) above, no significant scenic resources are found on Site B.

Public views of Sites A and C are mainly from Tim Bell Road along their western boundaries. Existing views of the project sites are generally the same – vacant areas covered mostly with grass and weeds, with few distinctive visual features other than the trees and the MID laterals. As with Site B, the project proposes development of the two sites with a residential land use, which would be similar in visual character to the existing residential development in the vicinity. Project impacts on visual character and quality are considered less than significant.

d) Light and Glare.

The project would introduce lighting from new residential buildings and streetlights. Project lighting would be similar to that in existing development in the area, mainly exterior lighting on buildings and along streets. As such, existing residential areas are unlikely to experience a noticeable increase in indirect illumination from project lighting.

Glare is mainly a result of sunlight reflection off flat building surfaces, with glass and reflective metal surfaces typically contributing to the highest degree of reflectivity. Glare from proposed residential development is expected to be limited, as the materials used would not typically be reflective. Project impacts related to light and glare are considered less than significant.

3.2 AGRICULTURAL RESOURCES

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

Environmental Setting

Currently, the project sites are vacant and not used for agriculture. A review of Google Earth aerial photographs indicates that none of the project sites have been used for agriculture for at least the past 20 years.

The Important Farmland Maps, prepared by the California Department of Conservation as part of the Farmland Mapping and Monitoring Program, designate the viability of lands for farmland use, based on the physical and chemical properties of the soils. The maps categorize farmland, in decreasing order of soil quality, as “Prime Farmland,” “Farmland of Statewide Importance,” and “Unique Farmland," which together comprise "Farmland” as defined by the CEQA Guidelines Appendix G, as well as other categories. According to the 2018 Important Farmland Map of Stanislaus County, the project sites have land designated as Prime Farmland and Farmland of Statewide Importance (FMMP 2018).

Environmental Impacts and Mitigation Measures

a) Agricultural Land Conversion.

The project would facilitate urban development of land classified as Prime Farmland and Farmland of Statewide Importance, which are Farmland as defined in CEQA Guidelines Appendix G. The total amount of converted Farmland would be approximately the same as the total project size – 20.08 acres.

The Waterford General Plan has designated all three project sites for residential development, and the City has zoned all three sites for such development. Given their relatively small sizes, it is unlikely that agriculture would be economically feasible for these sites in the future. Moreover, given the existence of residential development near these areas, there would likely be conflicts between potential agricultural operations and this development. Given this, the project sites are unlikely to be used for agriculture, and project impacts on Farmland conversion are considered less than significant.

b) Agricultural Zoning and Williamson Act Lands.

The project sites are currently designated and zoned for residential use, not for agriculture. The Williamson Act preserves agricultural land by means of a contract between the landowner and local government that keeps the contracted land in agricultural use in exchange for a lower property tax assessment. The project sites are not under a Williamson Act contract. The project would have no impact on agricultural zoning or Williamson Act contracts.

c, d) Forest Lands.

There are no forest lands on the project sites or in the vicinity. Neither the project sites nor any land in the vicinity is zoned as forest land or timberland. The project would have no impact on forest lands.

e) Indirect Conversion of Farmland or Forest Land.

The project sites are adjacent to urban development that is served by existing street and utility infrastructure provided by the City. The utility infrastructure would be extended to the project sites from the existing developed areas. There are no agricultural lands designated near the project sites, outside of land beyond the Main Canal. No infrastructure is proposed to be extended beyond the canal. The project would have no impact on indirect conversion of agricultural lands. As noted, there are no forest lands in the area, so the project would have no impact on indirect conversion of forest land.

3.3 AIR QUALITY

Where available, the significance criteria established by the applicable air quality management district or air pollutant control district may be relied upon to make the following determinations. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable Air Quality Attainment Plan?			✓	
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?			✓	
c) Expose sensitive receptors to substantial pollutant concentrations?			✓	
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			✓	

Environmental Setting

The project area is within the San Joaquin Valley Air Basin, which includes Stanislaus County and all or part of seven other Central Valley counties. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has jurisdiction over most air quality matters in the Air Basin. The SJVAPCD is tasked with implementing programs and regulations required by both the federal and California Clean Air Acts. Under their respective Clean Air Acts, both the State of California and the federal government have established ambient air quality standards for six criteria air pollutants: ozone, particulate matter, carbon monoxide (CO), nitrogen dioxide, sulfur dioxide, and lead. California has standards for four additional criteria pollutants under its Clean Air Act.

Table 3-1 shows the current attainment status of the Air Basin relative to the federal and State ambient air quality standards for the criteria pollutants. Except for ozone and particulate matter, the Air Basin is in attainment of, or unclassified for, all federal and State ambient air quality standards. Ozone is not emitted directly into the air but is formed when reactive organic gases (ROG) and nitrogen oxides (NO_x) react in the atmosphere in the presence of sunlight. The SJVAPCD currently has a 2022 Plan for the 2015 8-Hour Ozone Standard and the 2023 Maintenance Plan and Redesignation Request for the Revoked 1-Hour Ozone Standard to attain federal ambient air quality standards for ozone.

Particulate matter is a mixture of solid and liquid particles suspended in air, including dust, pollen, soot, smoke, and liquid droplets. Particulate matter less than 10 micrometers in diameter (PM_{10}) and less than 2.5 micrometers in diameter ($PM_{2.5}$) are subject to regulation, as both can be inhaled into the lungs. The SJVAPCD currently has a 2018 Plan for the 1997, 2006, and 2012 PM2.5 Standards to attain federal ambient air quality standards for $PM_{2.5}$ and the 2007 PM10 Maintenance Plan to maintain its current PM_{10} attainment status.

TABLE 3-1
SAN JOAQUIN VALLEY AIR BASIN ATTAINMENT STATUS

	Designation/Classification	
Pollutant	**Federal Primary Standards**	**State Standards**
Ozone - One hour	No Federal Standard	Nonattainment/Severe
Ozone - Eight hour	Nonattainment/Extreme	Nonattainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
Carbon Monoxide	Attainment/Unclassified	Attainment/Unclassified
Nitrogen Dioxide	Attainment/Unclassified	Attainment
Sulfur Dioxide	Attainment/Unclassified	Attainment
Lead (Particulate)	No Designation/Classification	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility Reducing Particles	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment

Source: SJVAPCD 2023.

CO is an odorless, colorless gas that is toxic in high concentrations. It is formed by the incomplete combustion of fuels and is emitted directly into the air, unlike ozone. The main source of CO in the San Joaquin Valley is on-road motor vehicles (SJVAPCD 2015). The San Joaquin Valley Air Basin is in attainment/unclassified status for CO; as such, the SJVAPCD has no CO attainment plans. However, high CO concentrations may occur in areas of limited geographic size referred to as “hotspots,” which are ordinarily associated with areas of heavy traffic volumes and congestion.

In addition to the criteria pollutants, the California Air Resources Board (ARB) has also identified other air pollutants as toxic air contaminants (TACs) - pollutants that are carcinogenic (i.e., cause cancer) or that may cause other adverse short-term or long-term health effects. Diesel particulate matter, considered a carcinogen, is the most common TAC, as it is a product of combustion in diesel engines. Other TACs are less common and are typically associated with industrial operations. However, the dispensing of fuel at fueling stations has the potential to emit TACs such as benzene, toluene, and naphthalene, among others.

The City received and reviewed a comment letter on the project from SJVAPCD dated March 4, 2024. The comment letter listed regulations that are potentially applicable to the project. Regulations potentially applicable to the project are summarized below:

Regulation VIII (Fugitive Dust PM_{10} Prohibitions)

Rules 8011-8081 are designed to reduce PM_{10} 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 of visible air contaminants to the atmosphere and applies to any source operation that emits or may emit air contaminants.

Rule 4601 (Architectural Coatings)

This rule sets limits on the volatile organic compounds, a component of ROG, allowed in various paints and other coatings.

Rule 4901 (Wood-Burning Fireplaces and Heaters)

This rule establishes limitations on the installation of new wood-burning fireplaces and heaters. Specifically, at elevations below 3,000 feet in areas with natural gas service, no person shall install a wood-burning fireplace, low-mass fireplace, masonry heater, or wood-burning heater.

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 NO_x and PM_{10} generated by new development, either directly by the incorporation of mitigation into projects and/or by payment of off-site mitigation fees. Construction emissions of NO_x and PM_{10} exhaust must be reduced by 20% and 45%, respectively. Operational emissions of NO_x and PM_{10} must be reduced by 33.3% and 50%, respectively. Rule 9510 applies to residential projects of 50 units or more. Therefore, the proposed project would be subject to this rule.

In 2015, the SJVAPCD adopted a revised Guide for Assessing and Mitigating Air Quality Impacts. The Guide defines an analysis methodology, thresholds of significance, and mitigation measures for the assessment of air quality impacts for projects within SJVAPCD's jurisdiction (SJVAPCD 2015). Row 1 of Table 3-2 shows the CEQA thresholds for significance for pollutant emissions within the SJVAPCD for both project construction and project operations. Projected construction and operational emissions from the project are shown in the subsequent rows, along with a determination as to whether the applicable significance threshold is exceeded.

Environmental Impacts and Mitigation Measures

a) Air Quality Plan Consistency.

The project's construction and annual operational emissions were estimated using the California Emissions Estimator Model (CalEEMod) computer program, a modeling program recommended by SJVAPCD. The full CalEEMod results for the project are available in Appendix A of this IS/MND, and the results are summarized in Table 3-2 above. As indicated by Table 3-2, none of the project construction and operational emissions would exceed the SJVAPCD significance thresholds. As the significance thresholds were established in part to ensure consistency with the objectives of the air quality plans adopted by the SJVAPCD, the project would therefore be consistent with these plans.

TABLE 3-2
SJVAPCD SIGNIFICANCE THRESHOLDS
AND ESTIMATED PROJECT EMISSIONS

	ROG	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Significance Thresholds[1]	**10**	**10**	**100**	**27**	**15**	**15**
Construction Emissions[2]	0.45	2.36	2.36	<0.01	0.76	0.38
Exceeds Threshold?	*No*	*No*	*No*	*No*	*No*	*No*
Operational Emissions[3]	1.72	0.57	4.79	0.01	0.81	0.32
Exceeds Threshold?	*No*	*No*	*No*	*No*	*No*	*No*

Note: All figures are in tons per year and are "unmitigated" (i.e., emissions that do not include project features or mitigations that would reduce emissions).
[1] Applies to both construction and operational emissions.
[2] Maximum unmitigated emissions in a calendar year.
[3] Annual unmitigated emissions.
Sources: CalEEMod Version 2022.1.1.22, SJVAPCD 2015.

While project emissions would not be significant, as defined by the SJVAPCD significance thresholds, the project would still be required to observe applicable SJVAPCD rules and regulations. As noted, SJVAPCD Regulation VIII contains measures to reduce fugitive dust emissions during construction. Dust control provisions are also routinely included in site improvement plans and specifications, along with construction contracts. In addition, the project would be subject to SJVAPCD Rule 9510, which requires reductions in NO_x and particulate matter emissions from both project construction and project operations. Implementation of these actions would further reduce estimated project emissions that are already considered less than significant without mitigation.

b) Cumulative Emissions.

As noted in a) above, project operational emissions would not exceed SJVAPCD significance thresholds. Future attainment of federal and State ambient air quality standards is a function of successful implementation of the SJVAPCD's attainment plans. Consequently, the application of significance thresholds for criteria pollutants is relevant to the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality. Pursuant to the SJVAPCD's guidance, if project-specific emissions would be less than the thresholds of significance for criteria pollutants, the project would not be expected to result in a cumulatively considerable net increase of any criteria pollutant for which the SJVAPCD is in nonattainment under applicable federal or State ambient air quality standards. Cumulative impacts on air quality would be less than significant.

c) Exposure of Sensitive Receptors.

"Sensitive receptors" refer to those segments of the population most susceptible to poor air quality, mainly children, the elderly, and those with pre-existing serious health problems affected by air quality. Land uses where sensitive individuals are most likely to spend time also may be called sensitive receptors; these include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities (SJVAPCD 2015). The nearest land uses to the project sites that may be considered sensitive receptors are residences east and southwest of Site A, surrounding Site B, and west and northwest of Site C.

As indicated in Table 3-2 above, the project would not emit pollutants at levels that would exceed SJVAPCD significance thresholds. These significance thresholds were established in part to ensure consistency with the objectives of the air quality plans adopted by the SJVAPCD, which were prepared in part to meet federal air quality standards designed to protect human health. The pollutant emissions generated by the proposed development would be consistent with pollutants generated by existing residential development, which is limited.

As noted, CO hotspots may occur in areas with heavy traffic volumes and congestion. CO hotspots have the potential to expose sensitive receptors to emissions that violate state and/or federal CO standard even if the broader Air Basin is in attainment for federal and state levels. A project would create no violations of the CO standards if neither of the following criteria are met (SJVAPCD 2015):

- A traffic study for the project indicates that the Level of Service (LOS) on one or more streets or at one or more intersections in the project vicinity will be reduced to LOS E or F; or
- A traffic study indicates that the project will substantially worsen an already existing LOS F on one or more streets or at one or more intersections in the project vicinity (See Section 3.17, Transportation, for an explanation of LOS).

As discussed in Section 3.17, Transportation, a Transportation Impact Analysis for the project was conducted, in which potential impacts on LOS at eight intersections were evaluated under existing conditions with the project. Under such conditions, all intersections would maintain an LOS above E. As such, no CO hotspots that could potentially affect sensitive receptors in the vicinity would develop. Overall, project air quality impacts on sensitive receptors would be less than significant.

d) Odors and Other Emissions.

The project may result in localized odors during construction from equipment and vehicle emissions. However, these odor emissions would be temporary and would readily dissipate before affecting surrounding land uses. Construction activities associated with the project would also generate TACs, mainly diesel particulate matter from equipment and vehicle exhaust. These emissions are likewise temporary and would cease when construction work is completed. No TACs would be generated by the residential development after construction. Project impacts related to odors and other emissions would be less than significant.

3.4 BIOLOGICAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		✓		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				✓
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				✓
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		✓		
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				✓
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?				✓

Environmental Setting

Biological Communities

The majority of the Waterford area outside the City limits consists of agricultural lands that support non-native annual grasses and forbs, when they are not being cultivated for annual crops, orchard, or irrigated pasture. As a result, little undisturbed natural habitat remains in the area except along the Dry Creek and Tuolumne River corridors. Eight biological communities were documented in the Waterford area; non-native annual grassland, artificially created seasonal wetland, drainage, mixed riparian woodland, agricultural field, orchard and vineyard, irrigated pasture, and developed (City of Waterford 2006a).

BaseCamp Environmental conducted a visit of all three project sites. Given existing conditions on the three project sites, non-native annual grassland appears to be the predominant biological community. Non-native annual grasslands consist of dense to sparse covers of annual grasses that often grow with a variety of showy annual forbs, both native and non-native. Germination occurs with the onset of the late fall rains; growth, flowering, and seed-set occur from winter though spring and plants are typically senescent through the summer and fall dry season. Grasslands support insects, amphibians, reptiles, and small birds and animals that are preyed on by other wildlife. Representative species include red-tailed hawk, red-shouldered hawk, American kestrels, great-horned owl, California voles, deer mice, California ground squirrels, and coyotes (City of Waterford 2006a).

The site visits indicated that all three project sites were covered with mostly grasses and weeds. A portion of Site A is being used as pasture for at least one horse that was observed. A blackberry shrub and other shrubs were observed on Site C. There are few trees on Sites B and C, but there are more on Site A. No blue elderberry shrubs, habitat for the Valley elderberry longhorn beetle, were observed. Other than the horse and common birds, no animal life was observed.

Special-Status Species

Special-status species are plants and animals that are legally protected under the state and/or federal Endangered Species Act. Special-status species also include other species that are considered rare enough by the scientific community and trustee agencies to warrant special consideration, particularly protection of isolated populations, nesting or denning locations, communal roosts, and other essential habitats. Special-status plants also include species considered rare or endangered under the conditions of Section 15380 of the CEQA Guidelines, such as those plant species identified on Lists 1A, 1B and 2 in the Inventory of Rare and Endangered Vascular Plants of California by the California Native Plant Society. In addition, special-status plants may include other species that are considered sensitive or of special concern due to limited distribution or lack of adequate information to permit listing or rejection for state or federal status, such as those included on List 3 in the California Native Plant Society Inventory.

Table 3-3 provides a summary of the listing status and habitat requirements of special-status species that have been documented in the greater project vicinity or for which there is potentially suitable habitat in the greater project vicinity. This information is based on searches of the California Natural Diversity Database, managed by the California Department of Fish and Wildlife, and the IPaC database, managed by the U.S. Fish and Wildlife Service. Appendix B contains the results of both database searches. Table 3-3 also includes an assessment of the likelihood of occurrence of each of these species on the site. Habitats available on the sites are fragmented and isolated by surrounding urban development. The table excludes fish species, as there is no aquatic habitat on any of the project sites.

TABLE 3-3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING
IN THE PROJECT VICINITY

Common Name	Scientific Name	Fed. Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence
Plants						
Stinkbells	*Fritillaria agrestis*	None	None	4	Foothill woodland, chaparral, valley grassland, wetland-riparian. Grows in heavy soils, particularly clay.	Unlikely: the sites do not provide suitable habitat for this species; clay soils not found on the sites.
Beaked clarkia	*Clarkia rostrata*	None	None	1B	Cismontane woodland and valley and foothill grassland.	Unlikely: the sites do not provide suitable habitat for this species.
Colusa grass	*Neostapfia colusana*	T	E	1B	Large, deep vernal pools.	Unlikely: there are no vernal pools or seasonal wetlands on the sites.
San Joaquin Valley Orcutt grass	*Orcuttia inaequalis*	T	E	1B	Vernal pools	Unlikely: there are no vernal pools or seasonal wetlands on the sites.
Greene's tuctoria	*Tuctoria greenei*	E	R	1B	Vernal pools within the Central Valley.	Unlikely: there are no vernal pools or seasonal wetlands on the sites.
Birds						
Tricolored blackbird	*Agelaius tricolor*	None	T	N/A	Nests in dense brambles and emergent wetland vegetation associated with open water habitat.	Unlikely: the sites do not provide suitable habitat for this species.
Swainson's hawk	*Buteo swainsoni*	None	T	N/A	Breeds in stands of tall trees in open areas. Requires adjacent suitable foraging habitats such as grasslands or	Possible: the sites provide small areas of potential foraging habitat, albeit of low quality. Nesting habitat has been identified along the nearby Tuolumne River and Dry Creek.

Common Name	Scientific Name	Fed. Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence
					alfalfa fields supporting rodents.	
Burrowing owl	*Athene cunicularia*	None	SC	N/A	Open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation.	Possible: a few features on Site C may be ground squirrel burrows. None of them contained evidence of past or present burrowing owl activity.
Mammals						
San Joaquin kit fox	*Vulpes macrotis mutica*	E	T	N/A	Grasslands and scrublands. Oak woodland, alkali sink scrubland, and vernal pool and alkali meadow communities also provide habitat.	Unlikely: the sites do not provide suitable habitat for this species.
Reptiles and Amphibians						
California tiger salamander	*Ambystoma californiense*	T	T	N/A	Breeds in seasonal water bodies such as deep vernal pools or stock ponds. Requires small mammal burrows for summer refugia.	Unlikely: there are no areas within or near the sites that could provide breeding habitat for this species, and the sites are not suitable for aestivation.
Western spadefoot	*Spea hammondii*	PT	SC	N/A	Shallow streams with riffles and seasonal wetlands, such as vernal pools in annual grasslands and oak woodlands.	Unlikely: the sites do not provide suitable habitat for this species.
Northwestern pond turtle	*Actinemys marmorata*	PT	SC	N/A	Marshes, streams, rivers, ponds, and lakes.	Unlikely: the sites do not provide suitable habitat for this species.
Invertebrates						
Vernal pool tadpole shrimp	*Lepidurus packardi*	E	None	N/A	Vernal pools and seasonally wet depressions within the Central Valley.	Unlikely: there are no vernal pools or seasonal wetlands on the sites.

Common Name	Scientific Name	Fed. Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence
Vernal pool fairy shrimp	*Branchinecta lynchi*	T	None	N/A	Vernal pools and seasonally inundated depressions within the Central Valley.	Unlikely: there are no vernal pools or seasonal wetlands on the sites.
Conservancy fairy shrimp	*Branchinecta conservatio*	E	None	N/A	Vernal pools and seasonal wetlands.	Unlikely: there are no vernal pools or seasonal wetlands on the sites. Species is known from one area west of Modesto.
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	T	None	N/A	Elderberry shrubs in the Central Valley and surrounding foothills.	None: No blue elderberry shrubs are / reported on the sites.
American bumble bee	*Bombus pensylvanicus*	C	None	N/A	Prefers habitats offered by farmlands and open fields, where they nest below the grass or underground.	Unlikely: range is predominantly in the eastern United States.
Monarch butterfly	*Danaus plexippus*	C	None	N/A	Variety of habitats in California, primarily associated with coastal environments; larvae dependent on milkweed.	Unlikely: although this species may fly over the sites during its migration, the sites do not provide suitable habitat for this species.

1 T = Threatened; E = Endangered; C = Candidate; PT – Proposed Threatened.
2 T = Threatened; E = Endangered; SC=State of California Species of Special Concern, R = Rare.
3 1B = Rare, threatened, or endangered in California and elsewhere; 4 = Limited distribution or infrequent throughout a broader area in California; N/A = not applicable.

Environmental Impacts and Mitigation Measures

a) Special-Status Species.

As indicated by Table 3-3, most of the special-status species that have been identified in the Waterford area are unlikely to occur on the project sites, due to lack of suitable habitat and fragmentation by past urban development. Swainson's hawk and burrowing owl were identified as the only species that could possibly occur on the sites. Swainson's hawk, listed as threatened under the California Endangered Species Act, has been observed in the Waterford area. At least one of the sites potentially contains burrows that could be used by burrowing owl, a State Species of Special Concern. Mitigation described below would minimize potential impacts of project construction on these two special-status species should either be found on the sites. Implementation of these mitigation measures would reduce project impacts on special-status species to a level that would be less than significant.

Mitigation Measures:

BIO-1: If project construction commences during the Swainson's hawk nesting season (March 1 through September 15), a qualified biologist shall conduct a pre-construction survey for nesting Swainson's hawk within one-quarter mile of the construction site. If active nests are found, then a qualified biologist shall determine the need, if any, for temporal restrictions on project construction. The determination shall utilize criteria set forth by the Swainson's Hawk Technical Advisory Committee in its 2000 report *Determining a Project's Potential for Impacting Swainson's Hawk*. Any temporal restrictions advised by the biologist shall be implemented by the project.

BIO-2: If project construction commences during the burrowing owl nesting season (February 1 through August 31), a pre-construction survey for nesting burrowing owls shall be completed on the construction site in accordance with CDFW guidelines described in the 1995 *Staff Report on Burrowing Owl Mitigation*. If owls are present, the biologist shall specify setbacks, construction timing or other mitigation needed to avoid significant effects on owls.

b) Riparian and Other Sensitive Habitats.

As there are no streams on or near the project sites, there is no riparian habitat. The only riparian areas identified are along the Tuolumne River and Dry Creek (City of Waterford 2006a). None of the project sites are on or near these streams. The only sensitive habitats outside the riparian areas are seasonal wetlands northeast of the Waterford city limits (City of Waterford 2006a) which are distant from the project sites. The project would have no impact on riparian or other sensitive habitats.

c) Wetlands and Waters of the U.S.

Waters of the U.S. include navigable waterways, their tributaries, and adjacent wetlands. More specifically, Waters of the U.S. encompass territorial seas, tidal waters, and non-tidal waters, along with perennial and intermittent creeks and drainages; lakes, seeps, and springs; emergent marshes; riparian wetlands; and seasonal wetlands. Under Section 404 of the Clean Water Act, a permit issued by the U.S. Army Corps of Engineers must be secured prior to the discharge of dredged or fill materials into these waters. Waters of the State, subject to oversight by the State Water Resources Control Board (SWRCB) and by the Regional Water Quality Control Board (RWQCB) with jurisdiction over the affected water, include isolated wetlands not covered by federal regulations.

A search of the National Wetlands Inventory, the results of which are available in Appendix B, indicates no wetlands or Waters of the U.S. on the project sites. The nearest identified Waters of the U.S. are the MID canals, and proposed development would not affect these canals. A site visit by BaseCamp staff found no evidence of any Waters of the State on the project sites. The project would have no impact on State or federally protected wetlands or waters.

d) Fish and Wildlife Movement.

As noted, there are no streams on or near the project sites. The project sites are not a part of any known wildlife migration corridor and are unlikely to provide migration opportunities, given their locations amid urban development. However, the project sites contain trees that potentially could be used by raptors and other migratory birds during their nesting seasons. Some of these birds could be protected by the Migratory Bird Treaty Act and the California Fish and Game Code. If these trees are removed during nesting seasons for these birds, the project would have a direct, adverse impact. Mitigation presented below would reduce impacts on any nesting birds on the project site. Implementation of this mitigation measure would reduce impacts on nesting migratory birds to a level that would be less than significant.

Mitigation Measure:

BIO-3: If tree removal is proposed during the general avian nesting season (March 1 through July 31), a pre-construction survey for all species of nesting birds shall be conducted. If active nests for bird species are found, work in the vicinity of the nests shall be delayed until the young have fledged. No survey shall be required if tree removal occurs outside the general avian nesting season.

e) Local Biological Requirements.

The Waterford General Plan contains several policies related to the conservation of biological resources. However, only Policy OS-A-1c appears to have been codified. Waterford Municipal Code Section 17.72.060 requires projects to be reviewed for environmental impacts in accordance with CEQA and to have any significant environmental impacts mitigated to the maximum extent feasible. This IS/MND complies with this section of the Municipal Code. There are no other local ordinances or other requirements related to biological resources that are applicable to this project. The project would have no impact related to local biological requirements.

f) Conflict with Habitat Conservation Plans.

No Habitat Conservation Plans, Natural Conservation Community Plans, or other approved local, regional, or state habitat conservation plans apply to the project sites. The project would have no impact related to habitat conservation plans.

3.5 CULTURAL RESOURCES

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

Environmental Setting

The project site lies within the ethnographically reported territory of the Northern Valley Yokuts, whose lands once extended from the San Joaquin River near Mendota north to the confluence of the San Joaquin and Calaveras Rivers. Section 3.18, Tribal Cultural Resources, discusses the Yokuts and potential tribal cultural resources in more detail, as well as applicable statutes.

Waterford began as Bakersville, named for pioneer William W. Baker who may have established a ferry crossing the Tuolumne River prior to 1866 but did homestead 160 acres on the south bank of the Tuolumne River near the future Tuolumne River bridge at Waterford. The first ferry franchise recorded was in 1866 for the Waterford Ferry owned by Charles Dallas. The Waterford Ferry Company operated from 1866 until 1889 when it was replaced by the first bridge crossing opened in 1889, until it was replaced in 1914, and again replaced in 1964 with what is now the F Street Bridge. The name Bakersville was changed to Waterford in 1870, named for an established ford of the Tuolumne River here. The center of town was relocated to the west and north in 1892 to adjoin the Stockton & Tulare Railroad, which was purchased by Southern Pacific Railroad in 1897. Waterford was incorporated as a city in 1969.

Environmental Impacts and Mitigation Measures

a) Historical Resources.

The Central California Information Center conducted a search of its databases for recorded historical buildings or structures in the vicinity of the site. The results of the search, available in Appendix C, indicated no records of historical resources on the project sites. The MID Main Canal has been recorded, but it has not been evaluated for inclusion in the National Register of Historic Places, the California Register of Historical Resources, or local lists (CCIC 2024). In any case, future development associated with the project would not affect the canal. No other historical resources have been identified on the project sites. The project would have no impact on historical resources.

b) Archaeological Resources.

The Central California Information Center search found no formally recorded prehistoric or historic archaeological resources within the project area (CCIC 2024). However, it is possible that previously unknown subsurface archaeological resources could be uncovered during development of the project sites. Alteration or damage to such resources would be a potentially significant impact.

Mitigation described below would require work to be stopped when cultural resources are uncovered until these resources can be evaluated by a qualified archaeologist and recommendations made for their proper disposition. Implementation of this mitigation measure would reduce potential cultural resource impacts to a level that would be less than significant.

Mitigation Measure:

CULT-1: If buried cultural or paleontological resources are inadvertently discovered during ground-disturbing activities, work shall stop within 50 feet of the find until a qualified archaeologist or paleontologist can assess the significance of the find. If necessary, the archaeologist or paleontologist will develop appropriate treatment measures in consultation with the City of Waterford Community Development Department and other agencies as appropriate. Treatment measures may include, but are not limited to, preservation in place or excavation under supervision of a qualified archaeologist or paleontologist.

c) Human Burials.

As with other cultural resources, it is not expected that any human burials, particularly those of Native Americans, would be uncovered by future development of the project sites. However, it is conceivable that future development could uncover a previously unknown burial.

CEQA Guidelines Section 15064.5(e) describes the procedure to be followed when human remains are uncovered in a location outside a dedicated cemetery. All work in the vicinity of the find shall be halted, and the County Coroner shall be notified to determine if an investigation of the death is required, in accordance with California Health and Safety Code Section 7050.5. If it is determined that the remains are Native American in origin, then the County Coroner must contact the Native American Heritage Commission within 24 hours. The Native American Heritage Commission shall identify the most likely descendants of the deceased Native American, and the most likely descendants may make recommendations on the disposition of the remains and any associated grave goods with appropriate dignity. If a most likely descendant cannot be identified, the descendant fails to make a recommendation, or the landowner rejects the recommendations of the most likely descendant, then the landowner shall rebury the remains and associated grave goods with appropriate dignity on the property in a location not subject to further disturbance.

Compliance with the provisions of CEQA Guidelines Section 15064.5(e) would ensure that any human remains and associated grave goods encountered during project construction would be treated with appropriate dignity. Project impacts on human remains would be less than significant.

3.6 ENERGY

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

Environmental Setting

Electricity and natural gas are major energy sources for residences and businesses in California. In Stanislaus County, electricity consumption in 2022 totaled approximately 5,245 million kilowatt-hours, of which approximately 2,026 million kilowatt-hours were consumed by residential uses and the remainder by non-residential uses (CEC 2024a). Natural gas is another major energy source. In Stanislaus County, natural gas consumption in 2022 totaled approximately 203 million therms, of which approximately 62 million therms were consumed by residential uses and the remainder by non-residential uses (CEC 2024b).

Motor vehicle use also accounts for substantial energy usage. Approximately 236 million gallons of fuel were consumed annually in Stanislaus County, of which approximately 197 million gallons were gasoline and 39 million gallons were diesel fuel (StanCOG 2022).

The State of California has adopted comprehensive energy efficiency standards as part of its Building Standards Code, California Code of Regulations, Title 24. Part 6 of Title 24 is referred to as the California Energy Code. In 2009, the California Building Standards Commission adopted a voluntary Green Building Standards Code (CALGreen), which became mandatory in 2011. CALGreen sets forth mandatory measures, applicable to new residential and nonresidential structures as well as additions and alterations, on water efficiency and conservation, building material conservation, and interior environmental quality. It also mentions energy efficiency, although CALGreen defers to the Energy Code for actions. The City has adopted the 2022 versions of both the California Energy Code and CALGreen.

Environmental Impacts and Mitigation Measures

a) Project Energy Consumption.

Project construction would involve fuel consumption and use of other non-renewable resources. Construction equipment used for such improvements typically runs on diesel fuel or gasoline. The same fuels typically are used for vehicles that transport equipment and workers to and from a construction site. The ARB is actively working to reduce emissions from construction equipment by requiring such equipment to meet zero and near-zero emission standards. Construction-related fuel consumption would be finite, short-term, and consistent with construction activities of a similar character. This energy use would not be considered wasteful, inefficient, or unnecessary.

Electricity may be used for equipment operation during construction activities. It is expected that more electrical construction equipment will be used in the future, as it would generate fewer air pollutant emissions. This electrical consumption would be consistent with construction activities of a similar character; therefore, the use of electricity in construction activities would not be considered wasteful, inefficient, or unnecessary, especially since fossil fuel consumption would be reduced. Moreover, under California's Renewables Portfolio Standard, a greater share of electricity would be provided from renewable energy sources over time, so less fossil fuel consumption to generate electricity would occur.

According to the most recent Residential Energy Consumption Survey by the U.S. Energy Information Administration, average annual energy consumption by single-family detached residences in the western United States was 10,330 kWh of electricity per household and 52,700 cubic feet of natural gas per household (EIA 2018). Based on these factors, development on the project sites at buildout would consume approximately 1,146,630 kilowatt-hours of electricity and 5,849,700 cubic feet of natural gas (approximately 609.6 therms) annually.

The project would be required to comply with the adopted California Energy Code and CALGreen in effect at the time of project approval. Compliance with these standards would reduce energy consumption associated with project operations, although reductions from compliance cannot be readily quantified. Gasoline and diesel fuel consumption associated with fueling station projects are typically associated with passenger vehicle and truck traffic stopping for fuel and/or for convenience store items. Excessive fuel consumption resulting from these vehicle trips is not anticipated, especially since actions at the federal and State level are being taken to improve vehicle fuel economy (Congressional Research Service 2021).

Overall, project construction and operations would not consume energy resources in a manner considered wasteful, inefficient, or unnecessary. Project impacts related to energy consumption are considered less than significant.

b) Consistency with Energy Plans.

The City does not have adopted plans for renewable energy or energy efficiency. However, the City has adopted the 2022 versions of the California Energy Code and CALGreen, which contain provisions that promote energy efficiency. The project would be required to comply with the requirements of these two codes, which are designed to forward State energy conservation goals. Project impacts related to energy plans would be less than significant.

3.7 GEOLOGY AND SOILS

Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)				✓
ii) Strong seismic ground shaking?			✓	
iii) Seismic-related ground failure, including liquefaction?			✓	
iv) Landslides?				✓
b) Result in substantial soil erosion or the loss of topsoil?			✓	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?		✓		
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?		✓		
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				✓
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		✓		

Environmental Setting

The project sites are in the San Joaquin Valley in central California. The Valley is filled with thick sedimentary rock sequences that were deposited as much as 130 million years ago. Large alluvial fans have developed on each side of the Valley. The project sites are underlain by the Riverbank Formation (Wagner et al. 1991). The Riverbank Formation, ranging in depth from 1 to 200 feet, consists of weathered gravel, sand, and silt that were deposited from 130,000 to 450,000 years ago (DWR 2014).

The project sites are relatively flat with minimal slope. The soils on the project sites are listed below (SCS 1964; NRCS 2007, 2024):

- <u>Greenfield sandy loam, deep to hardpan</u> – A well-drained soil found in nearly level to very gently sloping alluvial fans. Permeability is moderately rapid; runoff is very slow. The erosion hazard is slight.

- <u>Hanford fine sandy loam, deep over silt</u> – A well-drained soil found in nearly level to very gently sloping alluvial fans. Permeability is moderately rapid; runoff is very slow. The erosion hazard is slight.

- <u>Madera sandy loam</u> – A moderately well-drained soil found in very gently undulating old fans. Permeability is very slow; runoff is very slow. The erosion hazard is slight.

- <u>Montpelier coarse sandy loam</u> – A well-drained soil found in gently undulating high old fans. Permeability is slow; runoff is very slow. The erosion hazard is slight.

No active faults have been identified in Stanislaus County other than the Ortigalita Fault, which traverses the southwestern corner of the county. However, Stanislaus County is subject to a range of ground-shaking intensities, mainly from faults outside the county. Using the Modified Mercalli Intensity Scale as a reference, the eastern half of the county can be expected to have an intensity of VI or VII, producing minor to moderate damage (Stanislaus County 2016). On September 18-19, 2023, a series of earthquakes occurred in southwestern Stanislaus County, including one of 4.5 magnitude centered approximately nine miles southwest of the community of Westley. No damage or injuries were reported to have occurred in Waterford from these earthquakes.

Environmental Impacts and Mitigation Measures

a-i) Fault Rupture Hazards.

As noted, the project sites are not on a known earthquake fault. The Alquist-Priolo Earthquake Fault Zoning Act, enacted in 1972 and subsequently amended, requires the delineation of Special Studies Zones along known active faults in California. Cities and counties must regulate certain development projects within the zones. The project sites are not within an Alquist-Priolo Special Studies Zone (California Geological Survey 2023).

The Seismic Hazards Mapping Act, passed in 1990, requires mapping of seismic hazard zones and sets requirements for projects located within such zones. The project sites are not within a seismic hazard zone map prepared under the Seismic Hazards Mapping Act (California Geological Survey 2023). Based on this information, the project would have no impact related to fault rupture hazards.

a-ii) Seismic Ground Shaking.

The project sites are potentially subject to seismic shaking, mainly from earthquakes occurring outside Stanislaus County. The City has adopted the 2022 California Building Code, which contain seismic design criteria that must be incorporated into project design to ensure that improvements can withstand anticipated ground shaking from maximum credible earthquakes on active faults within the region. Compliance with the adopted California Building Code would reduce seismic ground shaking impacts to a level that would be less than significant.

a-iii) Seismic-Related Ground Failure.

The seismic-related ground failure discussed in the Waterford General Plan EIR is liquefaction. Liquefaction is the phenomena whereby strong, cyclic ground motions during an earthquake transform a soil mass from a solid to a liquid state. The process involves densification and pore pressure increases in a saturated soil mass. The occurrence of liquefaction is strongly dependent upon the strength and duration of ground shaking, the depth to saturated soil, and local soil properties. It most readily occurs in loose, Holocene-age soil with a near-surface groundwater table, typically within 50 feet of the ground surface (City of Waterford 2006a).

Based on information in a geotechnical investigation conducted for Site A, the current groundwater level in the vicinity of the project sites is approximately 119 feet (North American Technical Services 2024). Given this depth to the groundwater table, it is unlikely that liquefaction would occur on the project sites. Therefore, project impacts related to seismic-related ground failure would be less than significant.

a-iv) Landslides.

The project sites are in a topographically flat area, and there are no areas of steep slopes in the vicinity. The Waterford General Plan EIR states that all areas along the Tuolumne River and Dry Creek channels should be considered subject to landslide activity (City of Waterford 2006a). The project sites are not along either of these streams. The project would have no impact related to landslides.

b) Soil Erosion.

As noted, the soils on the project sites have only a slight erosion hazard. However, the construction and grading associated with site preparation and construction of the project would temporarily increase the exposure of soils on the project site to water and wind erosion.

Dust control measures noted in Chapter 6.0, Air Quality, would reduce potential wind erosion impacts of the project, particularly the watering of exposed soils. In addition, construction activities that would disturb more than an acre of land would need to obtain a Construction General Permit from the SWRCB. The Construction General Permit would require preparation of a Storm Water Pollution Prevention Plan (SWPPP) by a Qualified SWPPP Developer. The SWPPP would include implementation of Best Management Practices (BMPs) to avoid or minimize adverse water quality impacts from erosion and sedimentation. BMPs fall within the categories of Temporary Soil Stabilization, Temporary Sediment Control, Wind Erosion Control, Tracking Control, Non-Storm Water Management, and Waste Management and Materials Pollution Control.

With implementation of Construction General Permit conditions and dust control measures, potential erosion resulting from construction activities would be minimized. No erosion is expected after project work is completed, with the project sites being paved and landscaped. Project impacts related to soil erosion would be less than significant.

c) Geologic Instability.

The Waterford General Plan EIR states that bluff areas along the north bank of the Tuolumne River, west of the Hickman Bridge, exhibit a high degree of instability, as do some of the bluffs along the south bank of the river from the bridge to the east. No other areas of instability have been identified (City of Waterford 2006a).

As part of the City's development review program, individual development projects are typically required to prepare soils reports to evaluate the project site's soil stability. As a result of these studies, specific project-level mitigation measures are required as part of the project's conditions of approval (City of Waterford 2006a). A geotechnical investigation had been prepared for Site A, which is available in Appendix D of this document. It concluded that proposed improvements on Site A are feasible, provided the preliminary recommendations in the report are incorporated into the design and construction of the project (North American Technical Services 2024). These recommendations, provided in the mitigation measure below, would be applicable to the other two sites along with Site A. Implementation of this mitigation measure would reduce project impacts related to geologic instability to a level that would be less than significant.

Mitigation Measure:

GEO-1: The project applicant shall implement the recommendations contained in the report titled *Preliminary Geotechnical Investigation -Update, Proposed Subdivision, Site-2 Tim Bell Road (APN: 080-023-036), Waterford, California,* prepared by North American Technical Services, Inc. on February 8, 2024. These recommendations address site preparation, fill placement and compaction, fill materials, temporary construction slopes, and foundations and slabs, among other issues. These recommendations shall be implemented for design and construction work on all three project sites.

d) Expansive Soils.

Both Greenfield sandy loam and Madera sandy loam contain clay. Soils with high clay content typically have the potential to be expansive. Expansive soils can lead to damage of buildings and supporting infrastructure if not addressed. Concentrations of expansive soils are known to exist in the developable areas of the City and its urban expansion area (City of Waterford 2006a).

As noted, as part of the city's development review program, individual development projects are typically required to prepare soils reports to evaluate the project site's soil stability. As a result of these studies, specific project-level mitigation measures are required as part of the project's conditions of approval (City of Waterford 2006a). The geotechnical investigation prepared for Site A contains recommendations regarding soils, including those applicable to expansive soils. Mitigation Measure GEO-1 would ensure that these recommendations are incorporated into the design and construction of the project. With implementation of this mitigation measure, project impacts related to expansive soils would be less than significant.

Mitigation Measure: Implementation of Mitigation Measure GEO-1.

e) Adequacy of Soils for Sewage Disposal.

The project would not require any onsite sewage disposal systems. All proposed development on the project sites would connect to the City's wastewater collection and treatment system. The project would have no impact related to soil adequacy for sewage disposal.

f) Paleontological Resources.

The Riverbank Formation underlying the project sites has been a source of paleontological resources. These include ground sloth, dire wolf, horse, rabbit, birds, wood rat, bison, camel, coyote, antelope, deer, and mammoth, as well as clams, fish, turtles, frogs, and snakes. The paleontological sensitivity of the Riverbank Formation is classified as "high" (Stanislaus County 2016).

Given the previous agricultural use of the project site, it is unlikely that intact paleontological resources would be found; however, there is the possibility that unknown resources could be uncovered during project construction. Mitigation Measure CULT-1 would require work to be stopped when paleontological resources are uncovered until these resources can be evaluated by a qualified paleontologist and recommendations made for their disposition. Implementation of this mitigation measure would reduce paleontological resource impacts to a level that would be less than significant.

Mitigation Measures: Implementation of Mitigation Measure CULT-1.

3.8 GREENHOUSE GAS EMISSIONS

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

Environmental Setting

Background

A greenhouse gas (GHG) is a gas that absorbs and emits radiation within the thermal infrared range, trapping heat in the earth's atmosphere. There are several types of GHGs, which are both naturally occurring and generated by human activity. Increased atmospheric concentrations of GHGs are considered a primary contributor to global climate change, which is a subject of concern for the State of California. Potential climate change impacts occurring in the San Joaquin Valley include higher temperatures, longer and more severe droughts, more intense precipitation events, and more frequent and extensive wildfires (Fernandez-Bou et al. 2021).

Unlike the criteria air pollutants described in Section 3.3, Air Quality, GHGs have no "attainment" standards established by the federal or State government. In fact, GHGs are not generally thought of as traditional air pollutants because their impacts are global in nature and not directly health-related, while air pollutants mainly affect the general region of their release to the atmosphere and can have adverse human effects. Nevertheless, the U.S. Environmental Protection Agency has found that GHG emissions endanger both the public health and public welfare under Section 202(a) of the Clean Air Act due to their impacts associated with climate change (EPA 2009).

GHG emissions in California in 2020, the most recent year for which data are available, were estimated at approximately 369.2 million metric tons carbon dioxide equivalent (CO_2e) – a decrease of approximately 24% from the peak level in 2004. Transportation was the largest contributor to GHG emissions in California, with 37% of total emissions - a smaller share than in recent years, most likely due to reduced traffic volume during the COVID-19 lockdown. Other significant sources include industrial activities, with approximately 20% of total emissions, and electric power generation, both in-state and imported, with approximately 16% of total emissions (ARB 2022a). No information on GHG emissions from Waterford is available.

GHG Reduction Plans

The State of California has implemented GHG emission reduction strategies through AB 32, the Global Warming Solutions Act of 2006, which requires total statewide GHG emissions to reach 1990 levels by 2020, or an approximately 29% reduction from 2004 levels. For the target year of 2020, state GHG emissions were 369.2 million metric tons CO_2e, which was 61.8 million metric tons CO_2e below the AB 52 target (ARB 2022a). It should be noted that the 2020 GHG emissions were most likely affected by the lockdown ordered by the State that year in response to the COVID-19 pandemic, which in turn affected traffic volumes and economic activity contributing to GHG emissions.

In 2016, Senate Bill (SB) 32 became law. SB 32 extends the GHG reduction objectives of AB 32 by mandating statewide reductions in GHG emissions to levels that are 40% below 1990 levels by the year 2030. The State has adopted an updated Scoping Plan that sets forth strategies for achieving the SB 32 target, which is 260 million metric tons CO_2e. The 2017 Scoping Plan proposes various measures to achieve the 2030 target. Most of these are State measures, such as use of the cap-and-trade program, the Short-Lived Climate Pollutant Plan, and achievement of the 50% renewable sources of electricity in the Renewables Portfolio Standard. The updated Scoping Plan continues many existing programs such as low-carbon fuel standards, renewable energy, and methane reduction strategies, along with a proposed 20% reduction in GHG emissions from refineries. It also addresses for the first time GHG emissions from the natural and working lands of California, including the agriculture and forestry sectors (ARB 2017).

In 2022, ARB adopted an update to the Scoping Plan. The 2022 Scoping Plan assesses progress towards achieving the SB 32 2030 reduction target and lays out a path to achieve carbon neutrality no later than 2045. Proposed strategies to achieve these reductions include rapid movement to zero-emission transportation, phasing out fossil fuel use for heating homes and buildings, restricting use of chemicals and refrigerants that are thousands of times more powerful at trapping heat than carbon dioxide, expanded development of renewable energy sources, increased use of natural and working lands for incorporating and storing carbon, and greater employment of carbon removal technology (ARB 2022b).

The SJVAPCD adopted a Climate Change Action Plan in 2008 and issued guidance for development project compliance with the plan in 2009. The guidance adopted an approach that relies on the use of Best Performance Standards to reduce GHG emissions. Specified projects implementing Best Performance Standards would be determined to have a less than cumulatively significant impact. Other projects shall demonstrate a 29% reduction in project-specific (i.e., operational) GHG emissions from business-as-usual conditions to show a less-than-significant cumulative impact (SJVAPCD 2009). The City does not have a GHG reduction plan, nor is the project one of the specified projects for which Best Performance Standards were established.

California also has adopted a Renewables Portfolio Standard, the intent of which in part is to reduce the use of fossil fuels, a main source of GHG emissions. The Renewables Portfolio Standard requires electricity retailers in the state by the end of 2020 to generate 33% of electricity they sell from renewable energy sources, such as solar, wind, geothermal, and hydroelectric from small generators. Almost of the electricity retail sellers reported meeting the 2020 compliance target (CPUC 2022). In 2018, SB 100 was signed into law, which increased the electricity generation requirement from renewable sources to 60% by 2030 and requires all the state's electricity to come from carbon-free resources by 2045.

Environmental Impacts and Mitigation Measures

a, b) Project GHG Emissions and Consistency with GHG Reduction Plans.

GHG emissions from project construction and operations were estimated using CalEEMod. Detailed results are available in Appendix A of this IS/MND. Total estimated GHG emissions during the construction period were approximately 1,433 metric tons CO_2e, with the maximum emissions for one calendar year being 439 metric tons CO_2e. There was practically no difference between the "unmitigated" construction GHG emissions modeled by CalEEMod and the GHG emissions that included actions that mitigate emissions ("mitigated"). Construction emissions are temporary and would cease when project work is completed.

CalEEMod estimated that the project would generate "business-as-usual" (unmitigated) operational GHG emissions of approximately 1,080 metric tons CO_2e annually. The project contains features that would reduce GHG emissions, and it must comply with other requirements that would likewise reduce emissions. These include the following:

- Building energy efficiency would exceed 2019 Title 24 standards.
- In accordance with Senate Bill X7-7, new development would implement water conservation measures that lead to a 20% reduction in indoor and outdoor water use.

With these features and requirements, mitigated project operational GHG emissions would be approximately 1,071 metric tons CO_2e annually - a reduction of approximately 1% from the business-as-usual level.

SJVAPCD has not established quantitative significance thresholds for GHG emissions. However, the nearby Sacramento Metropolitan Air Quality Management District has established a quantitative threshold of 1,100 metric tons CO_2e per year to determine significance of project GHG emissions for CEQA purposes (SMAQMD 2021). This threshold applies to both construction and operational emissions. CEQA Guidelines Section 15064.7 allows for the use of significance thresholds established by other agencies.

The maximum project GHG construction emissions for a year are below the threshold of 1,100 metric tons CO_2e. Based on this, project GHG construction emissions are considered less than significant. In any event, GHG construction emissions would be limited due to the length of time of construction activity, and these emissions would cease once work is completed. Project operational GHG emissions, both unmitigated and mitigated, would also be below this significance threshold.

GHG emissions are inherently reduced by the infill nature of the project. The State of California has comprehensive GHG regulatory requirements, with laws and regulations requiring reductions that affect project emissions. The project is subject to several State regulations applicable to project design, construction, and operation that would reduce GHG emissions, increase energy efficiency, and ensure compliance with the Scoping Plan. Legal mandates to reduce GHG emissions from vehicles, for example, would reduce project-related vehicular emissions. Other mandates that would reduce GHG emissions include reducing per capita water consumption and imposing waste management standards to reduce methane and other GHGs from solid wastes.

As discussed in Section 3.6, Energy, the project would be subject to codes that require energy efficiency measures, which would reduce the demand for electricity produced by fossil fuels – a major source of GHG emissions. Also, as discussed in Section 3.6, attainment of the targets of the Renewables Portfolio Standard would reduce the amount of electricity generated by fossil fuels, further reducing GHG emissions from energy sources.

Based on the information provided above, the project would be consistent with GHG reduction plans of the State. Project impacts related to GHG emissions and consistency with GHG emission reduction plans would be less than significant.

3.9 HAZARDS AND HAZARDOUS MATERIALS

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			✓	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			✓	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				✓
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				✓
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?				✓

f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?		✓		
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?			✓	

Environmental Setting

Hazardous material sites of all statuses are recorded in the GeoTracker database, maintained by the SWRCB, and the EnviroStor database, maintained by the Department of Toxic Substances Control (DTSC). A search of the GeoTracker and EnviroStor databases found no record of active hazardous material sites on or within one-half mile of the project sites (SWRCB 2024, DTSC 2024).

The regulation of hazardous materials at the federal level is primarily under the Resource Conservation and Recovery Act, which creates a framework for the transport, storage, and disposal of hazardous wastes. The U.S. Department of Transportation sets regulations for the transport of hazardous materials, such as gasoline and diesel fuels. Several state agencies regulate the transportation and use of hazardous materials, including the California Environmental Protection Agency and the Office of Emergency Services. Within the California Environmental Protection Agency, the DTSC has primary authority to enforce hazardous materials regulations.

On the local level, the Stanislaus County Environmental Health Department is approved by the State as a Certified Unified Program Agency (CUPA). A CUPA administers the Hazardous Material Business Plan, California Accidental Release Prevention, Aboveground Petroleum Storage Act, Hazardous Waste Generator, Hazardous Waste Onsite Treatment and Underground Storage Tank programs to minimize potential risks to public health and safety.

Environmental Impacts and Mitigation Measures

a) Hazardous Material Transportation, Use, and Storage.

Proposed project development of single-family residences would use a limited quantity of hazardous materials, mainly cleaning products and pesticides, herbicides, and fertilizers for landscaping. None of these materials would be stored or used in large quantities. Therefore, project impacts related to transport, use, and storage of hazardous materials would be less than significant.

b) Upset and Accident Conditions.

Construction activities on the project sites may involve the use of hazardous materials such as fuels and solvents, and thus create a potential for hazardous material spills. Construction and maintenance vehicles would transport and use fuels in ordinary quantities. Fuel spills, if any occur, would typically be minimal and would not typically have significant adverse effects. In accordance with SWPPP requirements (see Section 3.7, Geology and Soils), contractors have absorbent materials at construction sites to clean up minor spills. All construction work will be required to follow the existing City ordinances related to construction-related hazards, materials usage, and disposal.

As noted in a) above, proposed project development would use a limited quantity of hazardous materials. As such, upset and accident impacts related to the residences would be limited. Project impacts related to upset and/or accident conditions involving the release of hazardous materials would be less than significant.

c) Release of Hazardous Materials near Schools.

The closest existing school to any of the project sites is Waterford Middle School, approximately one-quarter mile southwest of Site A. As noted in a) above, proposed project development would not involve significant amounts of hazardous materials. Any releases of hazardous materials used by project development would be limited and infrequent and would not have the potential to reach Waterford Middle School. The project would have no impact related to hazardous material releases near schools.

d) Hazardous Material Sites.

As noted, the project sites do not have a recorded hazardous material site regulated by the State of California, nor are there any such sites within one-half mile of the project sites. The project would not disturb or be constructed on or near any hazardous material sites. The project would have no impact on hazardous material sites.

e) Public Airports.

There are no public or public-use airports in Waterford. The nearest public airport, Oakdale Municipal Airport, is approximately eight miles to the north. The project site is not within any of the airport's safety zones, and it is outside the Airport Influence Area as indicated in the Stanislaus County Airport Land Use Compatibility Plan (Stanislaus County 2016). The project would not affect, or be affected by, Oakdale Municipal Airport operations. The project would have no impact related to public airports.

f) Emergency Response and Evacuations.

Project construction activity along roadways adjacent to the project sites, along with construction equipment and vehicle traffic, could potentially disrupt vehicle traffic flow on these roads. This would not be a concern regarding Site B development, as existing streets would remain open. However, construction work along Tim Bell Road at Sites A and C could lead to the restriction of travel lanes on this road. This could potentially affect emergency vehicles responding to calls from the project vicinity, and it also could hinder any evacuations that may use these roads as evacuation routes.

All construction work in City streets shall comply with the encroachment permit issued by the City. Waterford Municipal Code Chapter 12.24 sets forth provisions regarding encroachment permits, which typically include conditions related to traffic control. In addition, mitigation identified below would require a Traffic Control Plan from the developer indicating the traffic controls that would be implemented, in coordination with the Waterford fire and police agencies. Implementation of this mitigation measure would reduce construction impacts on emergency vehicle traffic to a level that would be less than significant.

Once construction work is completed, emergency vehicle traffic on local roads would not be obstructed by any project features, nor would the project interfere with any evacuations that may use these roads. Project impacts on emergency response and evacuations would be less than significant.

Mitigation Measure:

HAZ-1: Prior to the start of project construction, the developer shall prepare and implement a Traffic Control Plan, which shall include such items as traffic control requirements, resident notification of access closure, and daily access restoration. The contractor shall specify dates and times of road closures or restrictions, if any, and shall ensure that adequate access will be provided for emergency vehicles. The Traffic Control Plan shall be reviewed and approved by the City Department of Public Works and shall be coordinated with Waterford Police Services (Stanislaus County Sheriff's Department) and the Stanislaus Consolidated Fire Protection District if construction will require road closures or lane restrictions.

g) Wildland Fire Hazards.

The project sites are in an urbanized area, which is not susceptible to wildland fire hazards. The most significant open space areas susceptible to wildland fires are the project sites themselves. The project would reduce the existing fire hazard on these sites by replacing the existing weedy vegetation with buildings, pavement and landscaping. Project impacts related to wildland fire hazards would be less than significant. Refer to Section 3.20, Wildfire, for additional discussion.

3.10 HYDROLOGY AND WATER QUALITY

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			✓	
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			✓	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a				

stream or river runoff or through the addition of impervious surfaces, in a manner which would:				
i) Result in substantial erosion or siltation on- or off-site?	☐	☐	✓	☐
ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	✓	☐
iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	✓	☐
iv) Impede or redirect flood flows?	☐	☐	☐	✓
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	✓
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	✓	☐

Environmental Setting

Surface Waters

As discussed in Section 3.4, Biological Resources, there are no surface streams, wetlands, or other bodies of water on or in the immediate vicinity of the project sites. The Tuolumne River is approximately two-thirds of a mile to the south. The nearest surface water features are the MID Main Canal and the Waterford Lower Main Canal managed by MID. The MID Main Canal parallels the northern boundary of Site C and forms the northern boundary of Site B. The Waterford Lower Main Canal divides Site A from Site C.

Surface water quality in the Waterford area is maintained through the City's compliance with the SWRCB's Water Quality Order No. 2013-0001-DWQ, which is a general permit issued to small municipal separate storm sewer systems (MS4) statewide, as part of the National Pollutant Discharge Elimination System (NPDES) program authorized by the federal Clean Water Act.

Groundwater

The project site is within the Modesto Groundwater Subbasin, which covers an area of approximately 245,253 acres between the Stanislaus and Tuolumne Rivers in northern Stanislaus County. The City relies solely on groundwater for its drinking water (see Section 3.19, Utilities and Service Systems). Groundwater levels measured at the City of Waterford wells range from 68 to 82 feet below ground surface. The City has experienced a decrease in the groundwater surface elevation of nearly 15 feet in recent years (City of Waterford 2016).

The State's Sustainable Groundwater Management Act requires the formation of local groundwater sustainability agencies that must assess conditions in their local water basins and adopt locally based Groundwater Sustainability Plans for sustainable use of groundwater and avoidance of overdraft. Plans for "critically overdrafted" basins must be completed and adopted by January 31, 2020, while plans for high- and medium-priority basins have an adoption deadline of January 31, 2022. The Modesto Subbasin has been designated a high-priority basin.

The City is a member of the Stanislaus and Tuolumne Rivers Groundwater Basin Association, which prepared and submitted a Groundwater Sustainability Plan (GSP) for the Modesto Subbasin to the California Department of Water Resources in January 2022. The GSP analyzed groundwater conditions in the Subbasin based on water levels measurements from approximately 450 wells and prepared an annual water budget from this information. Based on the basin setting and water budget analysis, the GSP developed sustainable management criteria that were subject to a sustainable conditions analysis to determine a sustainable water yield for the Subbasin. To achieve this sustainable yield, the GSP identified 13 projects and management actions, which mainly involve direct or in-lieu groundwater recharge, as well as water conservation and stormwater capture. One of the proposed projects is a surface water pump station and storage tank project in the Waterford/Hickman area (Stanislaus and Tuolumne Rivers GBA 2022).

The Department of Water Resources recently determined that the Modesto Subbasin GSP is "incomplete," identifying deficiencies that need corrective action. It is unknown at this time if this determination will lead to substantial changes in the GSP that may affect the Waterford area.

The groundwater quality in the Waterford area is good in general, with no major water quality concerns. However, two City wells currently use a granular activated carbon treatment system to remove an agricultural chemical found to exceed its maximum contaminant level, and another well is limited to non-potable use only due to elevated levels of manganese (City of Waterford 2016).

Flooding

Potential flooding hazards are designated on maps prepared by the Federal Emergency Management Agency (FEMA). FEMA maps focus on areas potentially subject to inundation by a 100-year flood (i.e., a flood of such magnitude that occurs on average once every 100 years). According to FEMA Map Panel 06099C0369E, the project sites are not within a flood hazard area (FEMA 2008).

In 2007, the State of California approved SB 5 and a series of related Senate and Assembly bills intended to set new flood protection standards for urban areas in the Central Valley. The SB 5 bills establish the State standard for flood protection in these areas as protection from the 200-year frequency flood of three feet depth or more. Urban and urbanizing areas must be provided with 200-year flood protection no later than 2025. Best Available Maps drafted by the California Department of Water Resources do not show the project sites within a 200-year floodplain under SB 5 jurisdiction (DWR 2023).

Environmental Impacts and Mitigation Measures

a) Water Quality.

The project would not involve any direct effects on surface waters; none exist on or adjacent to the sites. Project construction work could have an impact on surface water quality due to exposure of soils to potential erosion, which could lead to sediments being transported and released to streams. As discussed above, there are no streams or other water bodies on or near the project sites. Moreover, as described in Section 3.7, Geology and Soils, construction activities that would disturb more than an acre of land area would need to obtain a Construction General Permit, which would require preparation of a SWPPP that includes construction BMPs to control soil erosion, runoff, and waste discharges, including methods to clean up contaminants if they are released. Implementation of the SWPPP would reduce potential surface water quality impacts from construction activities to a level that would be less than significant.

It is expected that project development would connect to the City’s storm drainage system. As a condition of project approval, the project would be required to comply with the City’s MS4 permit requirements. Implementation of this action would ensure that stormwater generated on the project site would not result in the violation of any water quality standards. Project impacts on water quality would be less than significant.

b) Groundwater Supplies and Recharge.

Future project development would connect to the City’s water service, which relies solely on groundwater. The most recent Consumer Confidence Report indicates that water from the City wells meets all California Department of Health Services drinking water standards (City of Waterford 2022). As described in Section 3.19, Utilities and Service Systems, the project would generate an estimated water demand of 54,230 gallons per day, or approximately 60.79 acre-feet per year. As of 2016, the City used 1,413 acre-feet per year; therefore, the impact of the project on groundwater supplies would be small; based on an analysis conducted in Section 3.19, adequate groundwater supplies would exist for the project.

The project would reduce potential recharge areas on the sites, but these sites have been designated by the city for urban development. The project would not be expected to interfere substantially with overall recharge of the Modesto Subbasin such that there would be an adverse effect on aquifer volume or the groundwater table in the area. Moreover, Waterford Municipal Code Section 17.20.050 requires residential development to conform to setback requirements that would leave unpaved space, which would be available for groundwater recharge. Conformance with City storm drainage will require installation of post-construction Best Management Practices that will include runoff detention and infiltration features that will reduce runoff from the sites and help maintain existing recharge. Project impacts on groundwater supplies and recharge would be less than significant.

c-i, ii, iii) Drainage Patterns and Runoff.

The project would change drainage patterns and increase runoff at the project sites due to the addition of impervious surfaces such as building footprints and parking areas. All development on the project sites would be served by the City's utility systems, including the storm drainage system. Because of this, the project would not change drainage patterns such that increased erosion, siltation, or flooding would occur on- or off-site. As discussed in a) above, storm water collected from the project site would ultimately be treated and discharged in a manner consistent with the requirements of the City's MS4 permit. Project impacts related to drainage patterns and runoff would be less than significant.

c-iv) Flooding Hazards.

As noted, the applicable FEMA floodplain map does not designate any of the project sites as being within a flood zone. FEMA generally designates areas at risk from a 100-year flood within Zone A or a variant thereof. Since the project site is not within Zone A, it is not considered by FEMA to be within a special flood hazard area. The project sites are not within a 200-year floodplain as defined by the SB 5 bills. The project would have no impact related to flooding hazards.

d) Release of Pollutants in Flood, Tsunami, or Seiche Zones.

As described in c-iv) above, the project sites are not within any designated flood zones, plus they are designated for residential development. Therefore, it is unlikely that any flooding would occur that would lead to the release of significant amounts of hazardous materials. The project sites are not on or near any large bodies of water; therefore, the site would not experience tsunami or seiche hazards. The project would have no impact related to the release of pollutants in flood, tsunami, or seiche zones.

e) Conflicts with Water Quality or Groundwater Management Plans.

As discussed in a) above, project storm drainage would be subject to the City's NPDES MS4 permit, which is intended to maintain water quality in the Waterford area. As noted, the Modesto Subbasin GSP includes a pump station and storage tank project in the Waterford/Hickman area. The project would not interfere with its implementation, assuming no changes are made. Project impacts on water quality and sustainable groundwater plans would be less than significant.

3.11 LAND USE AND PLANNING

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?				✓

b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?			✓	

Environmental Setting

The project sites are currently vacant with no structures. As noted, the MID Main Canal is along the northern boundary of Sites B and C, while an MID lateral divides Sites A and C. Site B is at the ends of Quicksilver Street and Goldmine Avenue, while Sites A and C are bounded by Tim Bell Road on the west. No roads exist on the project sites.

A residential subdivision has been developed east of Site A, with less intensive residential development to the southwest and west, along with the Waterford Dog Park across Tim Bell Road. Vacant land is south of Site A. A residential subdivision has been developed west of Site B along Quicksilver Street and Goldmine Avenue. Less intensive residential development has occurred to the south and east of this site, mixed with some open space area. Site C is mostly undeveloped. There are a few single-family residences adjacent to the northwest corner of this site, and limited development adjacent to the southeast corner.

The City of Waterford General Plan, adopted in 2007, guides development within the City and its Planning Area, in part by designating parcels for specific types of development. The land use designation for all three project sites is Low Density Residential. The Low Density Residential designation is intended to allow for single-family residential dwellings served by City services. This designation consists primarily of single-family detached housing, but a diversity of single-family housing types, such as condominium and zero lot- line residential units, can be developed (City of Waterford 2007). As noted in Chapter 1.0, Introduction, the City is in the process of updating the Housing Element to its General Plan.

Waterford Municipal Code Title 17, the City's Zoning Ordinance, was adopted for the general purpose of promoting and protecting public health, safety, peace, morals, comfort, convenience, and general welfare. A more specific purpose is to guide the physical development of Waterford to achieve progressively the general arrangement of land use described and depicted in the City's General Plan. The current City zoning for Sites A and C is RS - Residential Single Family. The purpose of the RS zone is to provide single-family residential dwellings served by City services throughout the city of Waterford. The current City zoning for Site B is RE - Rural Estates. The RE zone is intended to allow development that can accommodate non-intensive agricultural uses, residential and some types of commercial and industrial uses, while serving as a buffer between agricultural and residential lands within and adjacent to the city of Waterford.

The State has enacted SB 535, which seeks to address the adverse environmental impacts of projects that disproportionately affect minority and/or lower income communities, particularly those already burdened with environmental problems. The California Office of Environmental Health Hazard Assessment has developed the California Communities Environmental Health Screening Tool (CalEnviroScreen) to identify "environmental justice" or "disadvantaged" communities, as part of SB 535. CalEnviroScreen measures pollution and population characteristics of each U.S. Census tract in California using 20 indicators such as air and drinking water quality, waste sites, toxic emissions, asthma rates, and poverty. It then applies a formula to generate a score that rates the level of cumulative impacts on each Census tract. A Census tract that scores in the top 25% is considered a disadvantaged community. The project site is within Census Tract 6099002801, which according to CalEnviroScreen has an overall score of 62 (OEHHA 2024). This is not within the top 25 percent; therefore, the project site is not within a disadvantaged community as defined by SB 535.

Environmental Impacts and Mitigation Measures

a) Division of Established Community.

A common definition of "community" is a group of people living in the same area. By this definition, the "division of an established community" is a division of an existing residential area. The project would be built on vacant sites designated for residential development. Project development would be consistent with and contribute to the existing pattern of residential development in the project vicinity. The project would have no impact related to the division of an established community.

b) Conflicts with Land Use Plans, Policies, and Regulations.

The project proposes residential development on three nearby sites. Proposed residential development would also be consistent with the existing RS zoning on Sites A and C; however, proposed development on Site B would not be consistent with the current RE zoning, which allows a maximum residential density of one dwelling unit for every three acres. As part of the project application, all three project sites would be rezoned from their current zoning to PC, Planned Community. The PC zone is intended to encourage creative and efficient residential land uses, to encourage mixed or multiple use projects, to permit variations from density, height, and other standards in the various zones and to permit development based on a high standard of performance and design. All residential uses, when consistent with the General Plan, are allowed in PC districts, subject to City Council approval of the development plan and schedule.

The proposed residential development on all three sites would be consistent with the existing Low Density Residential designation of the General Plan. Because of this, the proposed rezoning is not expected to substantially change the environmental impact analysis conducted for the General Plan, and the project woud not result in any new or more severe conflicts with environmental policies in the General Plan.

This IS/MND analyzes the potential environmental impacts of the proposed project. For all environmental issues, the project would have no significant environmental impacts related to Waterford land use plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect. These are discussed under the applicable environmental issue elsewhere in this document. No potential conflicts have been identified in other issue sections. Project impacts regarding conflicts with applicable land use plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect are considered less than significant.

3.12 MINERAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	✓
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	✓

Environmental Setting

As mandated by the Surface Mining and Reclamation Act, the California Geological Survey has classified mineral resource development potential of lands in counties into an appropriate Mineral Resource Zone. No mineral resource deposits have been identified on the project sites. Oil and natural gas deposits have been identified throughout the Central Valley; however, the project sites contain no active oil or gas wells. The nearest active oil/natural gas well is approximately 0.70 miles to the south of the project (DOGGR 2024).

Environmental Impacts and Mitigation Measures

a, b) Availability of Mineral Resources.

The project sites do not have any identified mineral resources, nor do they have any existing mineral extraction activities, including oil or gas wells. The City's General Plan has not designated the project sites as having locally important mineral resources. The project would have no impact on mineral resources.

3.13 NOISE

Would the project result in:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	✓	☐	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	✓	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or	☐	☐	☐	✓

public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Environmental Setting

Assessment of noise impacts focuses on the “ambient" noise level, which is the general noise level in a project area. The principal noise source in Waterford is traffic on State Route 132 and the Oakdale/Waterford Highway, both roads constituting major arterial roadways within the city limits (City of Waterford 2006a). The existing noise environment in the project vicinity is primarily defined by traffic on local streets and roads. These include Tim Bell Road, traffic on which has been identified as a future noise source (City of Waterford 2006a).

City standards and policies established in the Noise Element of the Waterford General Plan are designed to protect community residents from noise impacts and to establish criteria to mitigate noise-generating land uses and development, based on A-weighted decibels (dBA). According to the Noise Element, exterior noise levels in residential areas up to a maximum of 60 dBA are considered “acceptable,” while noise levels between 60 and 70 dBA are considered “conditionally acceptable.” The maximum interior noise level considered acceptable for buildings in residential areas is 45 dBA (City of Waterford 2007).

Waterford Municipal Code Chapter 8.22 contains provisions designed to reduce noise impacts. Under this ordinance, it is unlawful for any person to willfully or negligently make or continue, or cause to be made or continued, any loud, unnecessary, or unusual noise which disturbs the peace and quiet of any neighborhood or which causes any discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area. Chapter 8.22 sets exterior noise limits based on receiving land uses. Table 3-4 shows these exterior noise limits. In addition, the maximum allowable interior noise levels for multifamily residential units are 45 dBA during daytime hours (7:00 a.m. to 10:00 p.m.) and 45 dBA during nighttime hours (10:00 p.m. to 7:00 a.m.).

TABLE 3-4
EXTERIOR NOISE LIMITS BY RECEIVING LAND USE

	Maximum Exterior Noise Level (dBA)	
Receiving Land Use	**Daytime (7:00 a.m. – 10:00 p.m.)**	**Nighttime (10:00 p.m. – 7:00 a.m.)**
One-, two-family residential[1]	55	45
Multifamily residential public space	55	50
Some multiple dwellings (commercial)	60	55

Note: Levels not to be exceeded more than 30 minutes in any hour.
[1] Levels are suburban levels.
Source: Waterford Municipal Code Chapter 8.22.

Chapter 8.22 of the Municipal Code also prohibits specified activities that generate noise, with limited exemptions. Among the prohibited activities are construction and demolition work between 7:00 p.m. and 7:00 a.m. on weekdays and between 8:00 p.m. and 9:00 a.m. on weekends and legal holidays. In addition, where technically and economically feasible, such work shall be conducted so that noise from mobile and stationary equipment shall not exceed the sound levels across residential or commercial property lines as set forth in Table 3-5 below.

TABLE 3-5
MAXIMUM CONSTRUCTION NOISE LIMITS BY RECEIVING LAND USE

	Maximum Noise Level (dBA)	
Land Use	**Weekdays**	**Weekends and Legal Holidays**
Mobile Equipment		
R-1 and R-2 Residential	75	60
R-3 and Above Multifamily Residential	80	65
Commercial and Industrial	85	70
Stationary Equipment		
R-1 and R-2 Residential	60	50
R-3 and Above Multifamily Residential	65	55
Commercial and Industrial	70	60

Source: Waterford Municipal Code Chapter 8.22.

Environmental Impacts and Mitigation Measures

a) Generation of Noise Exceeding Local Standards.

The project is expected to increase ambient noise levels due to an increase in traffic generated by the proposed residential development. According to the Transportation Impact Analysis conducted for the project, most of this traffic would occur on Tim Bell Road and Bonnie Brae Avenue. Traffic from Site B would affect local streets and Oakdale-Waterford Highway (Fehr and Peers 2024). Noise levels along these streets and roads would be affected accordingly.

The Waterford General Plan EIR conducted a noise analysis of future development of Waterford, with a focus on noise generated by traffic and its impact on lands adjacent to roadways. The EIR stated that the development review process for subdivisions and zoning entitlements will be utilized to moderate noise increases through the application of improvement conditions such as sound walls, buffers, and other acceptable sound attenuation techniques. The increase will be within the limits established for the various uses permitted in these unimproved areas and therefore will be considered acceptable, and not substantial, within the context of an urban environment (City of Waterford 2006a). Because of this, and because the proposed development is consistent with existing General Plan designations, project impacts related to traffic noise increases are considered less than significant.

Temporary noise impacts would occur with project construction, mainly from construction equipment and from worker vehicle traffic. As shown in Table 3-6, activities involved in construction would generate maximum noise levels ranging from 76 to 90 dB at 50 feet.

TABLE 3-6
CONSTRUCTION EQUIPMENT NOISE LEVELS

Type of Equipment	**Maximum Level (dBA at 50 feet)**
Auger Drill Rig	84
Backhoe	78
Compactor	83
Compressor (air)	78
Concrete Saw	90
Dozer	82
Dump Truck	76
Excavator	81
Generator	81
Jackhammer	89
Pneumatic Tools	85

Source: FHWA 2006.

Caltrans defines a significant increase due to construction noise as an increase of 12 dBA over existing ambient noise levels. Construction noise was evaluated as occurring at the center of the site to represent average noise levels generated over the duration of construction across the project site. The nearest sensitive receptors are residences adjacent to the eastern and southwestern boundaries of Site A and to the western boundary of Site B. It is expected that construction noise levels at these residences would exceed City standards for exterior noise levels. This could result in sleep interference if activities were to occur outside the normal daytime hours. Therefore, project construction noise impacts are considered significant.

Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours. As noted, the Waterford Municipal Code prohibits activities are construction and demolition work between 7:00 p.m. and 7:00 a.m. on weekdays and between 9:00 p.m. and 8:00 a.m. on weekends and legal holidays. In addition, mitigation described below would minimize the construction noise that reaches the sensitive receptors, thereby reducing impacts to a level that would be less than significant.

Mitigation Measures:

NOISE-1: The City shall establish the following as conditions of approval for any permit that results in the use of construction equipment:

- In accordance with Waterford Municipal Code Chapter 8.22, construction activities shall not occur between 7:00 p.m. and 7:00 a.m. on weekdays and between 8:00 p.m. and 9:00 a.m. on weekends and legal holidays.

- All construction equipment powered by internal combustion engines shall be properly muffled and maintained. Quiet construction equipment, particularly air compressors, are to be selected whenever possible.

- All stationary noise-generating construction equipment such as generators or air compressors are to be located as far as is practical from existing residences. In addition, the project contractor shall place such stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.

- Unnecessary idling of internal combustion engines is prohibited, and in no case shall idling exceed five minutes per State regulation.

- The construction contractor shall, to the maximum extent practical, locate on-site equipment staging areas to maximize the distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.

b) Exposure to Groundborne Vibrations.

Groundborne vibration is not a common environmental problem. It is typically associated with transportation facilities, although it is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of groundborne vibration are trains, buses on rough roads, and construction activities such as blasting, pile-driving, and operating heavy earth-moving equipment.

Other than operation of construction equipment during construction, the project would not involve these potential noise sources. In most cases, vibration induced by typical construction equipment does not result in adverse effects on people or structures. Noise from the equipment typically overshadows any meaningful ground vibration effects on people (Caltrans 2013). In any case, any vibrations generated by construction activities would cease once construction work is completed, and project operations would not generate any vibrations. Project impacts related to groundborne vibrations would be less than significant.

c) Public Airport and Private Airstrip Noise.

As noted in Section 3.9, Hazards, the nearest public airport is Modesto City-County Airport, approximately six miles to the south. The noise contours delineated in the Stanislaus County Airport Land Use Compatibility Plan show the project site is well outside the Modesto Airport 60-dBA noise contour, the outermost contour (Stanislaus County 2016). The 60-dB contour is located approximately the same distance from the project site as the airport. Therefore, the project site would likely experience exterior noise from airport operations below 45 dB, the maximum allowable exterior noise level at nighttime for residential and other noise-sensitive land uses. No private airstrips were identified within two miles of the project site. The project would have no impact related to airport and airstrip noise.

3.14 POPULATION AND HOUSING

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

Environmental Setting

According to the 2020 U.S. Census, the population of Waterford was 9,099, an increase of approximately 7.6 percent from its 2010 U.S. Census population of 8,456. By comparison, the population of California increased by 6.1 percent during the same period, and the population of Stanislaus County increased by 7.5 percent (U.S. Census Bureau 2020). The estimated population of Waterford as of January 1, 2023 is 9,042 (California Department of Finance 2023).

The California Department of Finance estimated a total of 2,786 housing units in Waterford in 2023. Of that total, 2,236 were single-family detached units - typical houses -

approximately 80.3 percent of the total. Another 364 were multifamily units in buildings of five or more, which was approximately 13.1 percent of the total. By comparison, approximately 9.9 percent of all housing units in Stanislaus County were in multifamily units of five or more (California Department of Finance 2023).

The Housing Element, as noted in Chapter 1.0, Introduction, is an element of the City's General Plan. The City originally adopted its current Housing Element in 2016. After subsequent revisions, it was found in compliance with Housing Element law by the California Department of Housing and Community Development in 2018. The Housing Element is designed to coordinate residential development and renewal efforts in ways that are consistent with the overall economic and social values of the City. It must show that the City can accommodate its fair share of regional housing needs as allocated by the Stanislaus Council of Governments (StanCOG) and the California Department of Housing and Community Development. For the planning period of the Housing Element (2014-2023), the housing fair share for Waterford is 882 units, of which 356 units would be for low- and very low-income households and the remainder for moderate- and above moderate-income households (City of Waterford 2018).

Environmental Impacts and Mitigation Measures

a) Unplanned Population Growth.

The proposed project would involve tentative maps and a rezoning of one site to allow for the construction of single-family residences totaling 118 units. Based on the average number of persons per household in Waterford of 3.37 (California Department of Finance 2023), the population of the project sites at buildout would be approximately 398.

As noted in Section 3.11, Land Use, Sites A and C are designated Low Density Residential by the City General Plan, which allows for residential development. Therefore, development on these two sites would not lead to an increase in population not anticipated by the adopted General Plan.

The project proposes a rezoning of Site B from RE to PC. Under the RE zone, the maximum residential development density allowed is one dwelling unit per three acres. Therefore, the maximum number of dwelling units currently allowed on Site B would be two dwelling units. By contrast, the project would allow for the construction of 29 dwelling units on Site B. This would mean an estimated increase in population from approximately 7 to 98.

However, the Waterford General Plan designates Site B as Low Density Residential. As such, population estimates developed for the General Plan from anticipated land uses already consider the Low Density Residential designation of Site B. Therefore, there would be no unplanned population increases since the General Plan designation of Site B would not change. Project impacts related to unplanned population increases would be less than significant.

b) Displacement of Housing or People.

The project sites are vacant; therefore, the project would not displace any existing housing or people residing on-site. The project would have no impact on displacement of housing or people.

3.15 PUBLIC SERVICES

Would the project:

a) Result in substantial adverse physical impacts associated with the provision of, 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:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
i) Fire protection?	☐	☐	✓	☐
ii) Police protection?	☐	☐	✓	☐
iii) Schools?	☐	☐	✓	☐
iv) Parks?	☐	☐	✓	☐
v) Other public facilities?	☐	☐	✓	☐

Environmental Setting

Fire Protection

Fire protection services for the City of Waterford are provided by the Stanislaus Consolidated Fire Protection District. The Fire District provides fire and emergency medical services in a 199-square mile area that includes unincorporated Stanislaus County and the Cities of Waterford and Riverbank. It has 56 full-time personnel and two part-time personnel that staff five fire stations. The Fire District responded to 5,603 incidents in 2022 (SCFPD 2024).

The Fire District maintains one fire station within the City limits: Station 24 at 129 E Street. The station houses one Type 1 engine, one Type 3 Brush engine, one water rescue boat, and one OES Type 1 engine. This station is staffed with three personnel 24 hours per day, seven days per week. (SCFPD 2024). The General Plan indicates that the maintenance of a ratio of one firefighter per 1,000 population is desirable (City of Waterford 2007).

Law Enforcement

Since 1998, law enforcement services for the City of Waterford are provided by the Stanislaus County Sheriff's Department under contract with the City. The Sheriff's Department maintains an office at 115 E Street under the name of Waterford Police Services. Waterford Police Services currently has 7 deputies, one sergeant and a chief assigned. The deputies are split up into two squads and work one day shift, one swing shift, and one graveyard shift, each shift being 12 hours. In 2023, the average response time of Waterford Police Services to calls was 3.81 minutes (Michael Parker electronic mail). The General Plan indicates that the maintenance of a ratio of one sworn officer per 1,000 population is desirable (City of Waterford 2007).

Schools

The project sites are within the boundaries of the Waterford Unified School District, which provides public educational services from transitional kindergarten to 12th grade for approximately 1,760 students as of the 2021-22 school year. The School District currently operates one elementary school, one intermediate school, one junior high school, and two high schools, one of which is a continuation school (Waterford Unified School District 2021). Students residing within the project sites would attend all these schools except for the continuation school, attendance of which would be decided on an individual basis by the School District.

Other Public Services

There are five parks in Waterford, along with trails, greenways, and other recreational facilities. Section 3.16, Recreation, provides more information. Parks and recreational facilities within Waterford are managed by the City's Parks and Recreation Department.

Other public services in Waterford include the Nora Ballard Public Library, a branch of the Stanislaus County Library system. The library, located at 324 E Street, is open five days per week and offers public computers, a library document station, and a self-serve kiosk.

Environmental Impacts and Mitigation Measures

a-i) Fire Protection Services.

The project would increase demand for fire protection service, as new residential buildings would be constructed and occupied. Based on the desired firefighter ratio, Station 24 is currently understaffed, and the project would add to this situation.

However, while the proposed development would make an incremental addition to the responsibilities of the Stanislaus Consolidated Fire Protection District, it would not involve a significant effect on the Fire District's fire protection responsibilities or ability to provide services to the Fire District as a whole. Moreover, Station 24 is approximately 0.6 miles from the project sites, so no new facilities would be needed to improve response times from Station 24 to the project sites. The Fire District indicated that it could adequately serve the project site and did not indicate a need for new or expanded fire facilities to provide service (Ciera Sansing electronic mail).

Project development would be subject to the California Fire Code adopted at the time of development approval. The Fire Code sets requirements for fire flow, fire hydrant locations, and access roads, which would aid firefighters. Project impacts related to fire protection services would be less than significant.

a-ii) Police Protection Services.

The project would increase demand for police protection service, as new residential development would be constructed and occupied. However, while the proposed development would make an incremental addition to the responsibilities of the Waterford Police Services, it would not involve a significant effect on its police protection responsibilities or ability to provide services to the City as a whole.

The Waterford Police Services station would be less than three-quarters mile from the project sites. Response times from the police station to the project sites are anticipated to be similar to the average response time to emergency calls. The Chief of Waterford Police Services stated that the project site can be adequately served (Michael Parker electronic mail). No new or expanded facilities would be required. Project impacts related to police protection services would be less than significant.

a-iii) Schools.

Because residential development is proposed for construction in the future, the project would likely generate a direct demand for school services in the Waterford Unified School District. The School District imposes development impact fees of $4.79 per square foot of residential development, which would be used for school construction; under State law, the payment of development impact fees is considered adequate mitigation for the potential impact of a project on school facilities. Therefore, project environmental impacts related to schools would be less than significant.

a-iv) Parks.

The project would likely generate a population increase that would in turn affect existing usage of existing City parks. Existing parks are expected to accommodate the small additional demand resulting from the project without requiring new or expanded park facilities. The project would contribute to the ongoing improvement of the Waterford park system through payment of park fees as discussed in the following section. Project environmental impacts related to parks would be less than significant. See Section 3.16, Recreation, for a more detailed analysis.

a-v) Other Public Facilities.

The project may generate an additional demand for library services provided by the Nora Ballard Library. However, the existing facility is expected to accommodate this demand. The project would not result in a substantial need for new or expanded library facilities. Project environmental impacts related to library services would be less than significant.

3.16 RECREATION

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated?	☐	☐	✓	☐
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	✓	☐

Environmental Setting

Parks and recreational services within Waterford are provided by the City of Waterford through its Parks and Recreation Department. As noted in Section 3.15, Public Services, the City operates five parks, including mini-parks (less than 0.1 to 1.5 acres), a neighborhood park, and a community park. The nearest City park to the project site is Beard Park, an 11.6-acre community park just west of the intersection of Bonnie Brae Avenue and Tim Bell Road. Beard Park has a playground, ballfields, tennis courts, horseshoe pits, and a community center. The City Parks and Recreation Department also maintains a series of linear greenways.

The City is currently pursuing the development of the Tuolumne River Parkway. This facility would consist of access, trail, park, and riverfront improvements along an approximately 1.25-mile open space corridor along the north bank of the Tuolumne River. The Parkway is proposed to be constructed in four phases, of which only the first two phases have been defined at this time (City of Waterford 2023).

All residential subdivisions are required to either dedicate land or pay in-lieu fees for park purposes, per Waterford Municipal Code Section 16.13.050. A park and recreation construction fee shall be assessed for any mobile home lot or residential dwelling unit constructed in the city. The fees collected pursuant to this chapter shall be deposited in the revenue and expense account called a “park and recreation construction fee fund.” This fund shall be used solely for the acquisition, improvement and expansion of the public park, playground, and recreational facilities of the City, and for the installation and development of playground and recreational facilities owned by the elementary and high school districts provided these facilities and improvements are accessible to the public outside of the school operating hours.

Environmental Impacts and Mitigation Measures

a, b) Recreational Facilities.

As indicated in Section 3.15, Public Services, the project could generate an additional demand for City park and recreational services. However, it is expected that the existing parks can accommodate the increase in demand. It is expected that the project would pay in-lieu fees to satisfy the park requirements set forth in Waterford Municipal Code Section 16.13.050. This would offset potential impacts of demand for park and recreational services by the residential component of the project. Therefore, project environmental impacts related to parks and recreational facilities would be less than significant.

3.17 TRANSPORTATION

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

Information on traffic for this section is provided by a Transportation Impact Analysis prepared for the project by Fehr and Peers. Appendix E contains a copy of the analysis. The analysis evaluated traffic impacts at eight intersections, three of which would be created by the project under existing conditions without and with the projects.

Environmental Setting

Transportation Facilities

Five primary roadways were evaluated in the transportation analysis:

- *Tim Bell Road* is a two-lane, north-south collector that provides access between Yosemite Boulevard/SR 132 and residential homes to the north. In the study area, it has a posted speed limit of 25 miles per hour (mph). As noted, Tim Bell Road is along the western boundaries of Sites A and C.

- *Bonnie Brae Avenue* is a two-lane, east-west collector that provides access between Tim Bell Road and the Oakdale-Waterford Highway. It intersects Tim Bell Road adjacent to the southwest corner of Site C. Bonnie Brae Avenue has a posted speed limit of 25 mph.

- *Bentley Street* is a two-lane, east-west collector that provides access between Yosemite Avenue/SR 132 and the commercial developments and Waterford Middle School on Bentley Street, as well as the residential homes west of Tim Bell Road. Bentley Street has a posted speed limit of 25 mph.
- *Yosemite Boulevard (SR 132)* is a two-lane, east-west arterial that is a Caltrans facility. It provides a regional connection between Coulterville and communities/destinations to the east, including Yosemite National Park, and Modesto and ultimately Interstate 580 to the west. In the vicinity of the project sites, Yosemite Boulevard has a posted speed limit of 35 mph.
- *Oakdale-Waterford Highway* is a two lane north-south arterial that provides access between the City of Waterford and the City of Oakdale. It also provides connection to other arterial and collector streets north of Waterford that provide access to Modesto and SR 99. It is maintained by the City of Waterford in the City limits and by Stanislaus County in the unincorporated County. In the vicinity of the project sites, Oakdale-Waterford Highway has a posted speed limit of 45 mph.

Tim Bell Road is classified and signed as a Class III Bike Route; however, there is limited signage and no striping. Sidewalks are present along both sides of Tim Bell Road between Welch Street and Main Street, but a sidewalk gap exists between Main Street and Bonnie Brae Avenue and between C Street and Yosemite Boulevard. Between Welch Street and C Street, sidewalks are generally only present on the east side of the road.

Bonnie Brae Avenue is classified and signed as a Class III Bike Route, and sidewalks are present on the north side between Oakdale-Waterford Highway and approximately 175 feet east of Ranchwood Court. However, a sidewalk gap is present between Ranchwood Court and Tim Bell Road.

Waterford is served by the Stanislaus Regional Transit Authority (StanRTA). StanRTA offers fixed route service between Waterford and Modesto on Route 50. Buses on Route 50 run every hour, beginning at 5:45 a.m. weekdays and at 7:45 a.m. Saturdays and Sundays. The last Route 50 bus run begins in Modesto at 6:45 p.m. weekdays and at 4:45 p.m. Saturdays and Sundays. The closest transit stop to the project sites is on E Street and Bentley Avenue in downtown Waterford. StanRTA also offers paratransit service to Waterford seven days a week. Neither the City's General Plan nor StanCOG's Unmet Transit Needs Analysis Report (StanCOG 2024) has identified any planned or necessary transit improvements near the project sites.

Regulatory Framework

Circulation Element Policy CIR 1.12 of the City's General Plan states that all major intersections and roadway segments should maintain LOS D or better. LOS is a quantitative measure of traffic operating conditions whereby a letter grade from A (the best) to F (the worst) is assigned. LOS is no longer used to determine the environmental impacts of projects related to transportation, as explained below. However, the Transportation Impact Analysis evaluated the effects of the project on LOS to determine consistency with the City's General Plan policy.

The State of California has recently added Section 15064.3 to the CEQA Guidelines, which is meant to incorporate SB 743 into CEQA analysis. SB 743 was enacted in 2013 with the intent to balance congestion management needs and the mitigation of the environmental impacts of traffic with statewide GHG emission reduction goals, mainly by developing an alternative mechanism for evaluating transportation impacts. Section 15064.3 states that VMT is the preferred method for evaluating transportation impacts, rather than LOS. The VMT metric measures the total miles traveled as a result of a given project. Unlike LOS, VMT accounts for the total environmental impact of transportation associated with a project, including use of non-vehicle travel modes.

The Governor's Office of Planning and Research (OPR) has issued a Technical Advisory on the evaluation of CEQA transportation impacts based on VMT. Based on OPR's extensive review of the applicable research and an assessment by the ARB quantifying the need for VMT reduction to meet the State's long-term climate goals, the OPR Technical Advisory recommends that a per capita or per employee VMT that is 15 percent below that of existing development may be a reasonable threshold. More specifically, for residential projects, OPR suggests that a proposed project exceeding a level of 15 percent below existing VMT per capita may indicate a significant transportation impact (OPR 2018).

The City of Waterford has not adopted VMT impact thresholds for general use. For this project, the Transportation Impact Analysis developed a VMT threshold based on direction from City staff. This figure was estimated using a custom data set from StreetLight Data, which is based on anonymized locational records, passively collected from smart phones and connected vehicles, down to the U.S. Census block group level. Based on these data, the Citywide average home-based VMT per capita is 28.34. The City has determined that a significant impact would occur if the proposed project's home-based VMT per capita exceeds this Citywide average home-based VMT per capita.

Environmental Impacts and Mitigation Measures

a) Conflicts with Transportation Programs and Plans.

<u>Motor Vehicles</u>

Traffic operations at the eight intersections studied in the Transportation Impact Analysis were evaluated for the weekday AM and PM peak hours for both existing conditions and for existing conditions with all three development projects. The results of the evaluations, available in Appendix E and shown in Table 3-7, indicated that traffic at all eight study intersections would operate at LOS C or better under both conditions. Therefore, LOS at traffic intersections would operate above the minimum LOS D standard set in the City's General Plan, even with development of all three sites.

TABLE 3-7
INTERSECTION OPERATIONS UNDER EXISTING CONDITIONS
WITHOUT AND WITH PROJECTS

Intersection	Control Type	Peak Hour	Existing Conditions		Existing Plus Three Projects	
			Delay (sec.)[1]	LOS	Delay (sec.)[1]	LOS
Tim Bell Rd/Bonnie Brae Ave	SSSC	AM	1 (9)	A (A)	1 (9)	A (A)
		PM	2 (9)	A (A)	2 (10)	A (A)
Tim Bell Rd/Bentley St	AWSC	AM	8	A	8	A
		PM	8	A	8	A
Tim Bell Rd/Welch St	AWSC	AM	8	A	8	A
		PM	8	A	8	A
Tim Bell Rd/Yosemite Blvd	SSSC	AM	3 (16)	A (C)	3 (17)	A (C)
		PM	3 (20)	A (C)	3 (22)	A (C)
Oakdale-Waterford Hwy/Tweed St	SSSC	AM	2 (11)	A (B)	2 (11)	A (B)
		PM	2 (13)	A (B)	2 (13)	A (B)
Tim Bell Rd/Enid Dr	SSSC	AM			1 (9)	A (A)
		PM			1 (9)	A (A)
Tim Bell Rd/"B" St	SSSC	AM			1 (10)	A (A)
		PM			1 (10)	A (A)
Tim Bell Rd/"A" Way	SSSC	AM			1 (10)	A (A)
		PM			1 (10)	A (A)

Bold indicates LOS does not meet City criteria.
Notes: SSSC = Side-Street Stop Control; AWSC = All-Way Stop Control; LOS = Level of Service
[1] For AWSC intersections, average intersection delay is reported in seconds per vehicle for all approaches. For SSSC intersections, intersection delay is reported seconds per vehicle for the overall intersection and (worst-case) movement.
Source: Fehr and Peers 2024.

The proposed projects would construct sidewalks along all interior streets and project frontages consistent with City requirements. For Site A, a contiguous sidewalk would be provided on Enid Drive between Tim Bell Road and Tisdell Drive. Sidewalks would also be constructed on Tim Bell Road along the project frontage and along the Waterford Lower Main Canal to the north. For Site B, this would result in contiguous sidewalks between the project site and Oakdale-Waterford Highway along Goldmine Avenue and Quicksilver Street. For Site C, contiguous sidewalks along internal streets would provide a connection to Tim Bell Road, which would connect to the sidewalks being constructed to the south with Site A. The proposed projects would not disrupt or interfere with any existing or planned pedestrian improvements, nor would they result in a physical change that is inconsistent with any policies in the City of Waterford General Plan.

The only existing bicycle facilities directly adjacent to the project site are on Tim Bell Road and Bonnie Brae Avenue, which are both classified and signed as a Class III Bike Route.

The proposed projects would not disrupt or interfere with the existing facilities and would not result in any physical change that is inconsistent with policies in the City of Waterford General Plan. As noted, there are no bus routes or bus stops in the vicinity of the project sites. As such, the project would not disrupt or interfere with these existing facilities.

In summary, the project would not substantially conflict with applicable plans or policies related to transportation, either for motor vehicles or for alternative modes of transportation, as defined under the current framework for evaluating the transportation environmental impacts of a project. Project impacts related to transportation programs and plans would be less than significant.

b) Conflict with CEQA Guidelines Section 15064.3(b).

The Environmental Checklist in CEQA Guidelines Appendix G has been revised to include a question regarding consistency of the project with CEQA Guidelines Section 15064.3(b). Section 15064.3(b) states that VMT is the preferred method for evaluating transportation impacts, rather than the commonly used LOS. Section 15064.3 subdivision (b) sets forth the criteria for analyzing transportation impacts using the preferred VMT metric.

As noted, the Transportation Impact Analysis developed a VMT threshold indicating a significant impact if the project's home-based VMT per capita would exceed the existing Citywide average home-based VMT per capita. The project sites are in two different block groups. The average home-based VMT per capita figures for these two block groups were used to evaluate project VMT. The existing block groups were determined to be generally representative of the proposed projects, and it is anticipated that future residents would have similar trip making characteristics as the existing residents in these block groups. Based on these data, the proposed projects are estimated to generate an average home-based VMT per capita of 27.73, which is lower than the Citywide average home-based VMT per capita of 28.34. Therefore, the project would not conflict with CEQA Guidelines Section 15064.3(b). Project impacts would be less than significant.

c) Traffic Hazards.

The project would create new intersections and roadways that would be designed to comply with the City of Waterford Improvement Standards and the Waterford Municipal Code. City improvement standards and the Municipal Code include design criteria to ensure residential subdivisions would meet or exceed uniform levels of sound engineering practices. The design criteria address speed, sight distance and clear zones, roadway grade, curve radius, intersection spacing and lighting and more. Intersection signing and striping would be designed to meet applicable industry standards from the California Manual on Uniform Traffic Control Devices and *A Policy on Geometric Design of Highways and Streets* by the American Associations of State Highway and Transportation Officials.

Applicable to Sites A and C, Section 16.03.110 of the Waterford Municipal Code requires that when local street intersections are off set, the offset must be a minimum 100 feet centerline to centerline. Bonnie Brae Avenue and Tim Bell Road are classified as collector streets; however, the City has not established a minimum off-set necessary for collectors. Due to a posted speed limit of 25 mph, low volumes on Bonnie Brae Avenue, and anticipated low volumes on the proposed side streets, the City of Waterford has confirmed the proposed intersection spacing for Sites A and C is acceptable.

No other potential traffic hazards were identified in the Transportation Impact Analysis. Project impacts regarding traffic hazards would be less than significant.

d) Emergency Access.

Section 16.03.120 of the Municipal Code requires each tentative tract or parcel map provide at least two different routes for ingress and egress. All three proposed development projects have two access routes. Therefore, the project would provide adequate access for vehicles, including emergency vehicles. Moreover, each development application would be subject to review and approval by the City's Fire Department, which would review for consistency with City design criteria to ensure safe vehicle access is provided, including for emergency vehicles. Project impacts related to emergency access would be less than significant.

3.18 TRIBAL CULTURAL RESOURCES

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or		✓		
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.		✓		

Environmental Setting

As noted in Section 3.5, Cultural Resources, the project site is within the ethnographically reported territory of the Northern Valley Yokuts, who lived in the northern San Joaquin Valley from around Bear Creek north of Stockton to the bend in the San Joaquin River near Mendota. In general, the Yokuts were seasonally mobile hunter-gatherers with semi-permanent villages. Seasonal movements to temporary camps occurred to exploit food resources in other environmental zones. The Northern Valley Yokuts relied heavily on acorns as a food staple, along with salmon and other fish (City of Waterford 2006a).

The Yokuts first encountered Europeans when Spanish explorers visited the area in the late 1700s. These early visits were followed by expeditions to recover individuals who had escaped from the missions located further west. The Northern Valley Yokuts were far more affected by missions than were the other Yokut groups. The loss of individuals to the missions, the influence of runaway neophytes, various epidemics in the 1800s, and the arrival of settlers and miners contributed to the disintegration of Yokut culture (City of Waterford 2006a). Despite this, the Yokuts tribe continues to exist today; the Nototomne/North Valley Yokut Tribe, Inc., represents the Northern Valley Yokuts in the region.

AB 52

In 2015, the California Legislature enacted AB 52, which focuses on consultation with Native American tribes to avoid or mitigate potential impacts on tribal cultural resources, which are defined as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe." When a tribe requests consultation with 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 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 (1) the resource in question is not considered significant, (2) the parties agree to mitigate or avoid a significant effect on a tribal cultural resource, or (3) 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 under CEQA to mitigate any significant environmental effects, as explicitly noted in AB 52.

Environmental Impacts and Mitigation Measures

a, b) Tribal Cultural Resources.

As noted in Section 3.5, Cultural Resources, the Central California Information Center conducted a records search for historical and archaeological resources and other items of cultural significance. The report states that no discoveries of potential prehistoric resources within or near the project sites have been reported. Additionally, no resources that are known to have value to local cultural groups have been formally reported (CCIC 2024).

Notification letters, available in Appendix C, were sent to potentially interested tribes inviting them to consult on the project per AB 52. Letters were sent to representatives of seven tribes: Calaveras Band of Mi-Wuk Indians, Chicken Ranch Rancheria of Me-Wuk Indians, Nashville Enterprise Miwok-Maidu-Nishinam Tribe, Northern Valley Yokut/ Ohlone Tribe, Southern Sierra Miwuk Nation, Tule River Indian Tribe, and Wuksachi Indian Tribe/Eshom Valley Band. To date, none of these tribes has sent a response to the City requesting consultation.

While there is no recorded evidence of known cultural resources on the project site, there is a potential for unknown resources, which may be associated with Native American tribes, to be uncovered during project construction. Types of archaeological sites that could occur in Waterford include, but are not limited to, occupation sites, indicated by structural features such as house pits, ceremonial locations, and remains of sweathouses and storage structures, which are often found in areas that have been organically enriched by the accumulation of domestic debris (City of Waterford 2006a).

Implementation of Mitigation Measure CULT-1, described in Section 3.5, sets forth procedures for the treatment and disposition of uncovered resources. Also, as noted, CEQA Guidelines Section 15064(e) sets forth procedures to be followed should any human remains be uncovered, with special requirements for burials determined to be Native American. Impacts on tribal cultural resources are considered less than significant with mitigation.

Mitigation Measures: Implementation of Mitigation Measure CULT-1.

3.19 UTILITIES AND SERVICE SYSTEMS

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?		✓		
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?			✓	
c) Result in a determination by the wastewater treatment provider that would serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			✓	
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?			✓	
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?			✓	

Environmental Setting

The City of Waterford provides potable water service to City residents and businesses, except for a portion of southeastern Waterford that is served by the separate River Pointe water system. Both the City and the River Pointe water systems are connected. Source water for the City, as well as for the River Pointe system, is local groundwater aquifers. The City does not currently use surface water. The City owns and operates six water production wells with a total production capacity for the system of 2,875 gallons per minute, along with approximately 91,000 feet of distribution pipe of various sizes and conditions but no storage capacity. The City has approximately 2,260 service connections, all of which have water meters (City of Waterford 2016). Eight-inch diameter PVC water lines are beneath Quicksilver Street and Goldmine Avenue west of Site B. A six-inch diameter PVC water line is beneath Enid Drive east of Site A, and a two-inch diameter steel water line is beneath Tim Bell Road along Sites A and C.

MID operates the Main Canal, which forms the northern boundary of Site B. The MID Main Canal conveys water from Modesto Reservoir to downstream laterals that provide irrigation water to MID customers. MID also manages the Waterford Lower Main Canal, a lateral that was formerly operated by the Waterford Irrigation District before its merger with MID. This lateral extends westward from the Main Canal through the northern and western portions of Waterford before leaving the city altogether. As noted, this lateral separates Site A from Site C.

The City provides wastewater collection and treatment services for City residents and businesses. The City owns and operates a wastewater collection system comprised of gravity sewers, force mains, and three lift stations (City of Waterford 2006b). Sewer lines six inches in diameter are underneath Quicksilver Street and Goldmine Avenue west of Site B. A six-inch diameter line is located along the Tim Bell Road frontage of Site A, and an eight-inch diameter line is beneath Enid Drive east of this site. No known sewer lines currently serve Site C.

All the City’s wastewater is currently conveyed to and treated at a single wastewater treatment plant (WWTP), which lies just south of Riverside Drive, on a bluff above the northern bank of the Tuolumne River. The current capacity of the WWTP is 1.0 million gallons per day. Current discharge requirements for the treatment plant are prescribed under Waste Discharge Requirements Order No. 94-100 and the associated monitoring and reporting program, which was adopted by the Central Valley RWQCB in 1994 (City of Waterford 2006c).

The City provides storm water collection services for City residents and businesses. The primary drainage pattern for the city of Waterford is south towards the Tuolumne River. Most runoff flows to the Tuolumne River through eight storm drains. However, two drain lines that collect storm water in the northern portion of the city drain into the MID Main Canal along the northern boundary of the city. Waterford has been subject to localized flooding, and several improvements have been installed to drain the area. These improvements include storm and detention ponds with lift/pump stations (City of

Waterford 2006a). The three project sites currently are not served by any storm drainage facilities. As described in Section 3.10, Hydrology and Water Quality, the City's drainage system is subject to SWRCB's Water Quality Order No. 2013-0001-DWQ, which is a general MS4 permit issued as part of the NPDES program.

The City contracts with Waste Management, Inc. to provide refuse collection and disposal services for residences. Commercial and construction wastes are collected by a variety of permitted haulers. Solid waste collected in Waterford is deposited in the Fink Road Landfill in southwestern Stanislaus County. The Fink Road Landfill is at approximately 50 percent capacity (CalRecycle 2023). It was scheduled to close in December 2023, but the closure date has been extended to 2050.

Electrical service in Waterford is provided by MID. There is an electrical substation in Waterford, and major (60-kilovolt) electric transmission lines run through the area. PG&E provides natural gas service to the city. The transmission lines and pipelines run parallel with existing transportation corridors, minimizing the effects on land use activities (City of Waterford 2006a).

Environmental Impacts and Mitigation Measures

a) Relocation or Construction of Utility Facilities.

The project would require the extension of utility lines to the project sites. Existing water and sewer lines beneath Quicksilver Street and Goldmine Avenue are anticipated to be extended onto Site B to provide water and sewer service. The water and sewer line extensions would be part of the development of Site B, which currently has no water or sewer facilities. As such, the extension of these lines would have no significant impact outside the impact of developing Site B.

Similarly, Sites A and C are anticipated to be provided water and sewer service through extension from existing lines in the area. However, it is not known if the existing two-inch diameter water line beneath Tim Bell Road would adequately serve development on these two sites. Also, a sewer line would need to be extended to serve Site C, as there are currently no lines adjacent to this site. It is anticipated that an extension of the existing sewer line beneath Tim Bell Road that currently ends near Bonnie Brae Avenue would be necessary to provide sewer service to Site C. Inadequate water and sewer facilities could lead to adverse impacts such as insufficient water pressure for residences, inadequate fire flows, and ruptures leading to releases of water and raw sewage. Waterford Municipal Code Chapter 16.07 requires that an application for a tentative subdivision map include information on the proposed source of water supply and method of sewage disposal, along with preliminary engineering calculations that demonstrate the adequacy of the design of the proposed improvements.

In addition, storm drainage facilities would need to be installed to serve development at all three sites. Existing storm drainage facilities are not on or near any of the three sites. Waterford Municipal Code Chapter 16.03 sets forth design requirements for stormwater detention basins, among other facilities.

All these facilities would be constructed either on the project sites or within the right-of-way of existing roads. As such, their construction would not have a significant environmental impact separate from development of the project sites in general. However, due to concern with the provision of water service from the existing Tim Bell Road line plus storm drainage concerns, the following mitigation measure shall be implemented. The mitigation measure would reduce impacts related to relocation or installation of infrastructure to a level that would be less than significant.

Mitigation Measures:

UTIL-1: Prior to final approval of the site plan, the project applicant shall prepare an improvement plan that shall show the locations of proposed utility lines and other facilities. The improvement plan(s) shall show how these facilities would connect to existing City utility systems and demonstrate compliance with City standards and specifications pertinent to these facilities. The Waterford Department of Public Works shall review and approve the improvement plan(s).

b) Water Supplies.

The project would connect to the City's water system, which is supplied exclusively by groundwater. According to the City's Water Master Plan, many of the Waterford service area wells are past their useful life and will need to be replaced. Although no additional source capacity is needed in the near term, the City should anticipate some or all the aging wells will fail. In addition, there are concerns about the lowering groundwater table and nearby "cones of depression" that indicate the groundwater supply may not be as reliable a source as it has been historically (City of Waterford 2016).

The Water Master Plan estimates that average water demand is 145 gallons per capita per day (City of Waterford 2016). Based on the projected population of the project sites of 398 (see Section 3.14, Population and Housing), the estimated water demand would be 57,710 gallons per day, or approximately 64.64 acre-feet per year. As noted, the water demand for the City was 1,413 acre-feet per year (see Section 3.10, Hydrology and Water Quality).

Concerns about the long-term capability of the City's water system to provide water for anticipated future development. The City acknowledges that future availability of groundwater may be limited due to the implementation of groundwater sustainability legislation. Therefore, reliance exclusively on groundwater may not be feasible, although pursuit of additional groundwater sources is considered an option (City of Waterford 2016).

The connection of the City's water system with the River Pointe system provided the City with more access to water. The River Pointe system was originally developed to supply both the River Pointe development and another development that was not constructed and has been abandoned. Therefore, the two water wells that were developed as part of the River Pointe system are oversized for the system, and excess water is available for City use. The amount of water available from the River Pointe system, less 20 percent reduced capacity for fire protection needs, is approximately 420 million gallons per year, or 1,289 acre-feet per year. In 2023, 38.51 million gallons of water were pumped from the River Pointe wells (Pitcock 2024).

Since anticipated project use would be approximately 61.92 acre-feet per year, the City would have adequate water available from the River Pointe water system. The City would not need to obtain additional water supplies for the project. Therefore, project impacts on water supply would be less than significant.

c) Wastewater Treatment Capacity.

The project would result in a small increase in wastewater flows to the City's system. All wastewater generated by the project would be treated at the City's wastewater treatment plant, which as noted has a current treatment capacity of 1.0 million gallons per day. According to the City's Sewer System Master Plan, the average dry weather flow generated by low-density residential development is 1,215 gallons per acre per day (City of Waterford 2006b). Therefore, the project at full development is expected to generate approximately 24,397 gallons of wastewater per day. The WWTP treated approximately 207 million gallons of wastewater in 2023, or 567,123 gallons per day (Pitcock 2024). Therefore, even with the wastewater from the project, the WWTP would have adequate capacity to accommodate the additional flow. No additional capacity would be required. Project impacts on wastewater treatment capacity would be less than significant.

d, e) Solid Waste Services.

The project would contribute to the solid waste disposal stream from the City and place demands on existing landfill operations and capacity. CalRecycle posted a solid waste generation rate for commercial retail uses from a solid waste guide for development projects in Santa Barbara County. According to this source, a conservative estimate of the amount of solid waste generated by single-family residential use is 12.23 pounds per household per day (CalRecycle 2019). Based on this, the estimated amount of solid waste that would be generated by project development would be approximately 1,382 pounds per day, or approximately 252 tons per year.

As noted, the Fink Road Landfill has approximately half of its capacity remaining. Therefore, this landfill would have adequate capacity to accommodate the solid waste that would be generated by the project at buildout. The project would comply with applicable state and local statutes and regulations related to solid waste as discussed above. Project impacts on solid waste would be less than significant.

3.20 WILDFIRE

If located in or near State Responsibility Areas or lands classified as Very High Fire Hazard Severity Zones, would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?				✓

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	✓
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	✓
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	✓

Environmental Setting

Wildland fires in Stanislaus County are generally limited to the foothills on either side of the county. Fire hazard severity in the foothills is very high in the western portion of the county and high along the eastern edge (Stanislaus County 2016). The unincorporated and/or undeveloped areas adjacent to the city of Waterford's urban planning area are predominantly irrigated cropland. As the city annexes rural areas, agricultural management practices sometimes result in weeds and grasses growing in such a manner as to create a fire hazard. Wildland fire hazards are reduced by enforcement of city building and fire codes, use of green belting, prescription burning to control fuel load, weed abatement, and implementation of other fire safe practices (City of Waterford 2006a).

The California Department of Forestry and Fire Protection's Fire and Resource Assessment Program identifies fire threat based on a combination of two factors: 1) fire frequency, or the likelihood of a given area burning, and 2) potential fire behavior. These two factors are combined in determining the following Fire Hazard Severity Zones: Moderate, High, Very High, Extreme. These zones apply to areas designated as State Responsibility Areas – areas in which the State has primary firefighting responsibility. Waterford is not within a State Responsibility Area, and it is not in any designated fire hazard zone (Cal Fire 2022).

Environmental Impacts and Mitigation Measures

a) Emergency Response Plans and Emergency Evacuation Plans.

The project site is not part of a State Responsibility Area, and the Cal Fire map indicates the site is not designated within a Very High Fire Hazard Severity Zone or a zone of higher severity. As discussed in Section 3.9, Hazards, project construction is not expected to substantially obstruct emergency vehicles or any evacuations that may occur in the area, and project operations would not obstruct any roadways. The project would have no impact related to wildfire emergency response plans or emergency evacuation plans.

b) Exposure of Project Occupants to Wildfire Hazards.

The project site is currently vacant and covered with grasses and weeds. The project would reduce the existing fire hazard on the parcel by replacing existing vegetation with urban development. Cal Fire maps indicate that the project sites are not in high fire hazard zones. The project would have no impact related to exposure of project occupants to wildfire hazards.

c) Installation and Maintenance of Infrastructure.

The project proposes the installation of urban development and the extension of utilities. The installation of these facilities is not expected to exacerbate the wildfire risk on the project sites, as explained in b) above. The project would have no impact related to infrastructural exacerbation of wildfire hazards.

d) Risks from Runoff, Post-Fire Slope Instability, or Drainage Changes.

The project site is in a topographically flat area. There are no natural streams that cross the site. As such, it is not expected that people or structures would be exposed to significant risks from changes resulting from fires in steeper areas, including downslope or downstream flooding or landslides. The project would have no impact related to risks from runoff, post-fire slope instability, or drainage changes.

3.21 MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential 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 or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	✓	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? "Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	✓	☐
c) Does the project have environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	✓	☐

a) Findings on Biological and Cultural Resources.

The potential biological resource and cultural resource impacts of the revised project were described in this IS/MND in Section 3.4, Biological Resources; Section 3.5, Cultural

Resources; and Section 3.18, Tribal Cultural Resources. Potentially significant environmental effects on biological and cultural resources were identified, but implementation of mitigation measures described in Sections 3.4 and 3.5 would reduce these effects to a level that would be less than significant.

b) Findings on Cumulatively Considerable Impacts.

A cumulative impact is an environmental impact that may result from the combination of two or more environmental impacts associated with the proposed project with each other, or the combination of one or more project impacts with related environmental impacts caused by other projects.

As has been noted, the project is consistent with the land use designation of the Waterford General Plan; as such, the project is not expected to introduce any new or more severe environmental impacts not otherwise analyzed in the Waterford General Plan EIR, including impacts related to noise and transportation. The preparers of the Transportation Impact Analysis for the project considered the EIR analysis of cumulative impacts related to traffic as sufficient to describe the potential cumulative impacts of the project (Carly Hoyt electronic mail).

For project-specific effects identified as potentially significant, mitigation measures would reduce these effects to a level that would be less than significant, so the project would not make a considerable contribution to potential cumulative impacts. None of the potential environmental effects addressed individually in this IS/MND would combine with other effects to result in a cumulatively considerable effect.

c) Findings on Adverse Effects on Human Beings.

Potential adverse project effects on human beings were discussed in Section 3.3, Air Quality; Section 3.7, Geology and Soils (seismic hazards); Section 3.9, Hazards and Hazardous Materials; Section 3.10, Hydrology and Water Quality (flooding); Section 3.17, Transportation (traffic hazards); and Section 3.20, Wildfire. For most aspects of these issues, no potential adverse effects on human beings were identified. Potential adverse effects that were identified would be reduced to levels considered less than significant through compliance with applicable laws, regulations, and City ordinances and standards, along with mitigation measures where necessary.

4.0 REFERENCES

4.1 DOCUMENT PREPARERS

This IS/MND was prepared by BaseCamp Environmental, Inc. for use by and under the supervision of the City of Waterford Planning Division. The following persons were involved in preparation of the IS/MND:

<u>City of Waterford</u>

Mark Niskanen, Contract Planner
Michael Arroyo, Contract Planner
Mike Pitcock, City Manager
Rob Marler, City Engineer

<u>BaseCamp Environmental, Inc.</u>

Charlie Simpson, Principal
Terry Farmer, AICP, Senior Environmental Planner
Krista Simpson, Maps/Graphics
Rayanna Beck, Research and Document Production

4.2 REFERENCES CITED

California Air Resources Board (ARB). 2017. California's 2017 Climate Change Scoping Plan. November 2017.

______. 2022a. California Greenhouse Gas Emissions for 2000 to 2020: Trends of Emissions and Other Indicators. October 26, 2022.

______. 2022b. 2022 Scoping Plan for Achieving Carbon Neutrality. November 16, 2022.

California Department of Conservation, Division of Land Resources Protection, Farmland Mapping and Monitoring Program (FMMP). 2018. Stanislaus County Important Farmland 2018, Sheet 1 of 2 (map).

California Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR). 2024. Well Finder – CalGEM GIS. Available online at https://maps.conservation.ca.gov/doggr/wellfinder/. Accessed January 10, 2024.

California Department of Finance. 2023. Report E-5, Report E-5 - Population and Housing Estimates for Cities, Counties, and the State - January 1, 2021-2023. Sacramento, California, May 2023.

California Department of Forestry and Fire Protection (Cal Fire). 2022. State Responsibility Area Fire Hazard Severity Zones, Stanislaus County (map). November 21, 2022.

California Department of Resources Recovery and Recycling (CalRecycle). 2019. Solid Waste Generation Rates. Available online at https://www2.calrecycle.ca.gov/WasteCharacterization/General/Rates#Commercial. Accessed August 7, 2019.

______. 2023. SWIS Facility/Site Activity Details, Fink Road Landfill (50-AA-0001). Available online at https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/992?siteID=3733. Accessed August 22, 2023.

California Department of Toxic Substances Control (DTSC). 2024. EnviroStor database, https://www.envirostor.dtsc.ca.gov/. Accessed January 10, 2024.

California Department of Transportation (Caltrans). 2013. Transportation and Construction Vibration Guidance Manual. September 2013.

______. 2019. List of Officially Designated State Scenic Highways. Available online at http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/scenic_hwy.htm. August 2019.

California Department of Water Resources (DWR). 2014. Geology of the Northern Sacramento Valley. June 2014, updated September 22, 2014.

______. 2023. Best Available Maps. Available online at https://gis.bam.water.ca.gov/bam/. Accessed August 4, 2023.

California Energy Commission. California Energy Commission (CEC). 2024a. Electricity Consumption by County – Stanislaus County 2022. Available online at ecdms.energy.ca.gov/elecbycounty.aspx. Accessed February 2, 2024.

______. 2024b. Gas Consumption by County – Stanislaus County 2022. Available online at ecdms.energy.ca.gov/gasbycounty.aspx. Accessed February 2, 2024.

California Geological Survey. 2023. CGS Information Warehouse: Regulatory Maps. Available online at maps.conservation.ca.gov/cgs/informationwarehouse/regulatorymaps/. Accessed July 31, 2023.

California Office of Environmental Health Hazard Assessment (OEHHA). 2024. CalEnviroScreen 4.0. Available online at oehha.ca.gov/calenviroscreen/report/draft-calenviroscreen-40. Accessed January 25, 2024.

California Public Utilities Commission (CPUC). 2022. 2022 California Renewables Portfolio Standard Annual Report. November 2022.

Central California Information Center (CCIC). 2024. Records Search File #: 12785N. Project: Waterford Subdivision, Bonnie Brae and Tim Bell Road, Waterford. January 26, 2024.

City of Waterford. 2006a. The City of Waterford General Plan Program Environmental Impact Report. August 2006.

______. 2006b. City of Waterford Sewer System Master Plan. Prepared by RMC Water and Environment. February 2006.

______. 2006c. City of Waterford Wastewater Treatment Plant Master Plan. Prepared by RMC Water and Environment. March 2006.

______. 2007. City of Waterford General Plan Update Vision 2025. June 21, 2007.

______. 2016. City of Waterford Water Master Plan 2016. Prepared by Shoreline Environmental Engineering. April 2016.

______. 2018. Waterford Vision 2025 General Plan Final Housing Element 2014 – 2023. July 2018.

______. 2022. Waterford 2022 Annual Water Quality Report for the Waterford Water System 5010006.

______. 2023. Initial Study/Mitigated Negative Declaration, Tuolumne River Parkway Project.

______. 2024. 2023-2031 6th Cycle Housing Element Update, HCD Review Draft. Prepared by J.B. Anderson Land Use Planning. March 2024.

Congressional Research Service. 2021. Vehicle Fuel Economy and Greenhouse Gas Standards: Frequently Asked Questions. Updated June 1, 2021.

Federal Emergency Management Agency (FEMA). 2008. Flood Insurance Rate Map No. 06099C0369E, Stanislaus County, California and Incorporated Areas. Effective date September 26, 2008.

Federal Highway Administration (FHWA). 2006. Roadway Construction Noise Model User’s Guide. FHWA-HEP-05-054. January 2006.

Fehr and Peers. Carly Hoyt. 2024. Waterford Residential Development Projects, Draft Transportation Impact Analysis Report. February 15, 2024.

Fernandez-Bou, Angel Santiago, J. Pablo Ortiz-Partida, Chantelise Pells, Leticia M. Classen-Rodriguez, Vicky Espinoza, Jose M. Rodríguez-Flores, Lorenzo Booth, Julia Burmistrova, Alan Cai, Ariadna Cairo, John A. Capitman, Spencer Cole, Humberto Flores-Landeros, Alexander Guzman, Mahesh L. Maskey, Dalia Martínez- Escobar, Pedro Andres Sanchez-Perez, Jorge Valero-Fandiño, Joshua H. Viers, Leroy Westerling, and Josué Medellín-Azuara. 2021. Regional Report for the San Joaquin Valley Region on Impacts of Climate Change. California Natural Resources Agency. Publication number: SUM-CCCA4-2021-003.

Governor’s Office of Planning and Research (OPR). 2018. Technical Advisory on Evaluating Transportation Impacts in CEQA. December 2018.

North American Technical Services, Inc. 2024. Preliminary Geotechnical Investigation - Update, Proposed Subdivision, Site-2 Tim Bell Road (APN: 080-023-036), Waterford, California. February 8, 2024.

Pitcock, Michael. 2024. Current Water/Wastewater Availability. Memorandum from City of Waterford, March 12, 2024.

Sacramento Metropolitan Air Quality Management District (SMAQMD). 2021. Guide to Air Quality Assessment in Sacramento County: Chapter 6 – Greenhouse Gas Emissions. Adopted February 26, 2021.

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2009. Final Staff Report – Climate Change Action Plan: Addressing Greenhouse Gas Emissions Impact under the California Environmental Quality Act. December 17, 2009.

______. 2015. Guide for Assessing and Mitigating Air Quality Impacts. Adopted March 19, 2015.

______. 2023. Ambient Air Quality Standards and Valley Attainment Status. Available online at http://www.valleyair.org/aqinfo/attainment.htm. Accessed July 28, 2023.

Stanislaus and Tuolumne Rivers Groundwater Banking Agency (GBA). 2022. Modesto Subbasin Groundwater Sustainability Plan. Prepared by Todd Groundwater. January 2022.

Stanislaus Consolidated Fire Protection District (SCFPD). 2024. Website https://www.scfpd.us/. Accessed January 25, 2024.

Stanislaus Council of Governments. (StanCOG). 2022. 2022 Regional Transportation Plan and Sustainable Communities Strategy Draft Program Environmental Impact Report. Prepared by Rincon Consultants, Inc. June 2022.

______. 2024. Fiscal Year 2024/25 Adopted Unmet Transit Needs Analysis Report. Adopted February 21, 2024.

Stanislaus County. 2016. Stanislaus County General Plan and Airport Land Use Compatibility Plan Update Draft Program Environmental Impact Report. Prepared by ICF International. April 2016.

State Water Resources Control Board (SWRCB). 2024. GeoTracker database, https://geotracker.waterboards.ca.gov/. Accessed January 10, 2024.

U.S. Census Bureau. 2020. Census 2020 Geography Profile - Waterford city, California. Available online at https://data.census.gov/cedsci/.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2007. Soil Survey of Stanislaus County, California, Northern Part.

______. 2024. Custom Soil Resource Report for Eastern Stanislaus Area, California. Available online through https://websoilsurvey.sc.egov.usda.gov/. January 10, 2024.

U.S. Department of Agriculture, Soil Conservation Service (SCS). 1964. Soil Survey, Eastern Stanislaus Area, California.

U.S. Energy Information Administration (EIA). 2018. 2015 Residential Energy Consumption Survey: Energy Consumption and Expenditures Tables. Table CE4.10: Annual household site end-use consumption by fuel in the West - averages, 2015. Release date May 2018.

U.S. Environmental Protection Agency (EPA). 2009. Endangerment and Cause of Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act. Federal Register Vol. 74, No. 239, pp. 66496-66546. December 15, 2009.

Wagner, D. L., E. J. Bortugno, and R. D. McJunkin. 1991. Geologic Map of the San Francisco-San Jose Quadrangle, California, 1:250,000. California Division of Mines and Geology, Regional Geologic Map Series.

Waterford Unified School District. 2021. 2021-22 LCFF Budget Overview for Parents Data Input Sheet.

4.3 PERSONS CONSULTED

Michael Arroyo. J.B. Anderson Land Use Planning.

Jim Freitas. Associated Engineering Group.

Carly Hoyt. Fehr and Peers.

Rob Marler. City Engineer, City of Waterford.

Mark Niskanen. Vice President, J.B. Anderson Land Use Planning.

Michael Parker. Chief, Waterford Police Services.

Michael G. Pitcock. City Manager, City of Waterford.

Ciera Sansing. Administrative Assistant II, Stanislaus Consolidated Fire Protection District.

5.0 NOTES RELATED TO EVALUATION OF ENVIRONMENTAL IMPACTS

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

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

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

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

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

    a) Earlier Analysis Used: Identify and state where they are available for review.

    b) Impacts Adequately Addressed: Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

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

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

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

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

9) The explanation of each issue should identify:

    a) the significance criteria or threshold, if any, used to evaluate each question; and

    b) the mitigation measure identified, if any, to reduce the impact to less than significance.

APPENDIX A
AIR QUALITY MODELING RESULTS

Waterford 3 Subdivisions Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Waterford 3 Subdivisions
Construction Start Date	4/1/2025
Operational Year	2030
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.10
Precipitation (days)	16.4
Location	37.64775609791974, -120.75602045251063
County	Stanislaus
City	Waterford
Air District	San Joaquin Valley APCD
Air Basin	San Joaquin Valley
TAZ	2223
EDFZ	15
Electric Utility	Modesto Irrigation District
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.22

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

Single Family Housing	118	Dwelling Unit	38.3	230,100	1,382,117	—	374	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-5	Use Advanced Engine Tiers
Construction	C-10-A	Water Exposed Surfaces
Construction	C-11	Limit Vehicle Speeds on Unpaved Roads
Construction	C-12	Sweep Paved Roads
Energy	E-1	Buildings Exceed 2019 Title 24 Building Envelope Energy Efficiency Standards
Water	W-7	Adopt a Water Conservation Strategy

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.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.39	31.7	31.1	0.06	1.37	19.8	21.2	1.26	10.1	11.4	6,788
Mit.	2.47	22.2	36.4	0.06	0.92	7.80	7.90	0.84	3.97	4.07	6,788
% Reduced	27%	30%	-17%	—	33%	61%	63%	33%	61%	64%	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	25.2	29.8	29.1	0.06	1.23	9.36	10.6	1.14	3.69	4.83	6,770
Mit.	25.2	4.50	36.2	0.06	0.12	3.74	3.87	0.12	1.46	1.58	6,770
% Reduced	—	85%	-24%	—	90%	60%	63%	89%	60%	67%	—

Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.45	12.9	13.0	0.02	0.54	3.60	4.14	0.50	1.60	2.10	2,649
Mit.	2.07	4.55	14.4	0.02	0.17	1.47	1.63	0.16	0.64	0.80	2,649
% Reduced	15%	65%	-11%	—	69%	59%	61%	68%	60%	62%	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.45	2.36	2.36	< 0.005	0.10	0.66	0.76	0.09	0.29	0.38	439
Mit.	0.38	0.83	2.64	< 0.005	0.03	0.27	0.30	0.03	0.12	0.15	439
% Reduced	15%	65%	-11%	—	69%	59%	61%	68%	60%	62%	—

2.2. Construction Emissions by Year, Unmitigated

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

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
2025	3.39	31.7	31.1	0.06	1.37	19.8	21.2	1.26	10.1	11.4	6,788
2026	1.26	10.3	15.1	0.03	0.38	0.38	0.77	0.35	0.09	0.44	3,018
2027	1.21	9.83	14.9	0.03	0.34	0.38	0.72	0.31	0.09	0.41	3,004
2028	1.16	9.34	14.8	0.03	0.30	0.38	0.69	0.28	0.09	0.37	2,992
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
2025	3.28	29.8	29.1	0.06	1.23	9.36	10.6	1.14	3.69	4.83	6,770
2026	1.24	10.4	14.6	0.03	0.38	0.38	0.77	0.35	0.09	0.44	2,982
2027	1.19	9.88	14.5	0.03	0.34	0.38	0.72	0.31	0.09	0.41	2,969
2028	25.2	9.38	14.4	0.03	0.30	0.38	0.69	0.28	0.09	0.37	2,958
2029	25.2	0.81	1.36	< 0.005	0.01	0.06	0.07	0.01	0.01	0.03	190
Average Daily	—	—	—	—	—	—	—	—	—	—	—
2025	1.43	12.9	13.0	0.02	0.54	3.60	4.14	0.50	1.60	2.10	2,649

2026	0.89	7.39	10.5	0.02	0.27	0.27	0.54	0.25	0.07	0.32	2,136
2027	0.85	7.04	10.4	0.02	0.24	0.27	0.51	0.22	0.07	0.29	2,127
2028	2.45	5.68	8.78	0.01	0.19	0.21	0.40	0.17	0.05	0.22	1,721
2029	2.07	0.07	0.11	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	15.7
Annual	—	—	—	—	—	—	—	—	—	—	—
2025	0.26	2.36	2.36	< 0.005	0.10	0.66	0.76	0.09	0.29	0.38	439
2026	0.16	1.35	1.92	< 0.005	0.05	0.05	0.10	0.05	0.01	0.06	354
2027	0.16	1.28	1.89	< 0.005	0.04	0.05	0.09	0.04	0.01	0.05	352
2028	0.45	1.04	1.60	< 0.005	0.03	0.04	0.07	0.03	0.01	0.04	285
2029	0.38	0.01	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	2.60

2.3. Construction Emissions by Year, Mitigated

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

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
2025	2.47	22.2	36.4	0.06	0.92	7.80	7.90	0.84	3.97	4.07	6,788
2026	0.51	3.28	17.0	0.03	0.08	0.38	0.46	0.08	0.09	0.17	3,018
2027	0.50	3.26	16.8	0.03	0.08	0.38	0.46	0.08	0.09	0.17	3,004
2028	0.50	3.23	16.7	0.03	0.08	0.38	0.46	0.08	0.09	0.17	2,992
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
2025	0.72	4.50	36.2	0.06	0.12	3.74	3.87	0.12	1.46	1.58	6,770
2026	0.50	3.33	16.5	0.03	0.08	0.38	0.46	0.08	0.09	0.17	2,982
2027	0.49	3.30	16.4	0.03	0.08	0.38	0.46	0.08	0.09	0.17	2,969
2028	25.2	3.27	16.3	0.03	0.08	0.38	0.46	0.08	0.09	0.17	2,958
2029	25.2	0.81	1.36	< 0.005	0.01	0.06	0.07	0.01	0.01	0.03	190
Average Daily	—	—	—	—	—	—	—	—	—	—	—

2025	0.59	4.55	14.4	0.02	0.17	1.47	1.63	0.16	0.64	0.80	2,649
2026	0.35	2.36	11.8	0.02	0.06	0.27	0.33	0.05	0.07	0.12	2,136
2027	0.35	2.34	11.7	0.02	0.06	0.27	0.33	0.05	0.07	0.12	2,127
2028	2.04	1.96	9.81	0.01	0.04	0.21	0.25	0.04	0.05	0.09	1,721
2029	2.07	0.07	0.11	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	15.7
Annual	—	—	—	—	—	—	—	—	—	—	—
2025	0.11	0.83	2.64	< 0.005	0.03	0.27	0.30	0.03	0.12	0.15	439
2026	0.06	0.43	2.16	< 0.005	0.01	0.05	0.06	0.01	0.01	0.02	354
2027	0.06	0.43	2.14	< 0.005	0.01	0.05	0.06	0.01	0.01	0.02	352
2028	0.37	0.36	1.79	< 0.005	0.01	0.04	0.05	0.01	0.01	0.02	285
2029	0.38	0.01	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	2.60

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.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	12.4	4.09	51.9	0.13	3.79	3.66	7.45	3.65	0.93	4.58	8,317
Mit.	12.4	4.06	51.9	0.13	3.79	3.66	7.45	3.65	0.93	4.58	8,260
% Reduced	< 0.5%	1%	< 0.5%	—	< 0.5%	—	< 0.5%	< 0.5%	—	< 0.5%	1%
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	11.4	4.33	44.0	0.13	3.79	3.66	7.45	3.65	0.93	4.58	7,981
Mit.	11.4	4.31	44.0	0.13	3.79	3.66	7.45	3.65	0.93	4.58	7,925
% Reduced	< 0.5%	< 0.5%	< 0.5%	—	< 0.5%	—	< 0.5%	< 0.5%	—	< 0.5%	1%
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	9.45	3.12	26.3	0.06	0.91	3.54	4.45	0.87	0.90	1.78	6,526

Mit.	9.44	3.10	26.2	0.06	0.90	3.54	4.45	0.87	0.90	1.77	6,470
% Reduced	< 0.5%	1%	< 0.5%	—	< 0.5%	—	< 0.5%	< 0.5%	—	< 0.5%	1%
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.72	0.57	4.79	0.01	0.17	0.65	0.81	0.16	0.16	0.32	1,080
Mit.	1.72	0.56	4.79	0.01	0.17	0.65	0.81	0.16	0.16	0.32	1,071
% Reduced	< 0.5%	1%	< 0.5%	< 0.5%	< 0.5%	—	< 0.5%	< 0.5%	—	< 0.5%	1%

2.5. Operations Emissions by Sector, Unmitigated

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

Sector	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Mobile	3.60	2.19	19.1	0.04	0.03	3.66	3.69	0.03	0.93	0.96	4,202
Area	8.74	1.42	32.6	0.09	3.72	—	3.72	3.58	—	3.58	1,895
Energy	0.03	0.48	0.21	< 0.005	0.04	—	0.04	0.04	—	0.04	1,917
Water	—	—	—	—	—	—	—	—	—	—	108
Waste	—	—	—	—	—	—	—	—	—	—	193
Refrig.	—	—	—	—	—	—	—	—	—	—	1.65
Total	12.4	4.09	51.9	0.13	3.79	3.66	7.45	3.65	0.93	4.58	8,317
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Mobile	3.22	2.50	17.9	0.04	0.03	3.66	3.69	0.03	0.93	0.96	3,885
Area	8.17	1.35	25.9	0.09	3.72	—	3.72	3.58	—	3.58	1,877
Energy	0.03	0.48	0.21	< 0.005	0.04	—	0.04	0.04	—	0.04	1,917
Water	—	—	—	—	—	—	—	—	—	—	108
Waste	—	—	—	—	—	—	—	—	—	—	193
Refrig.	—	—	—	—	—	—	—	—	—	—	1.65
Total	11.4	4.33	44.0	0.13	3.79	3.66	7.45	3.65	0.93	4.58	7,981

Average Daily	—	—	—	—	—	—	—	—	—	—	—
Mobile	3.19	2.30	16.9	0.04	0.03	3.54	3.57	0.03	0.90	0.93	3,876
Area	6.23	0.33	9.13	0.02	0.84	—	0.84	0.81	—	0.81	430
Energy	0.03	0.48	0.21	< 0.005	0.04	—	0.04	0.04	—	0.04	1,917
Water	—	—	—	—	—	—	—	—	—	—	108
Waste	—	—	—	—	—	—	—	—	—	—	193
Refrig.	—	—	—	—	—	—	—	—	—	—	1.65
Total	9.45	3.12	26.3	0.06	0.91	3.54	4.45	0.87	0.90	1.78	6,526
Annual	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.58	0.42	3.09	0.01	0.01	0.65	0.65	0.01	0.16	0.17	642
Area	1.14	0.06	1.67	< 0.005	0.15	—	0.15	0.15	—	0.15	71.3
Energy	0.01	0.09	0.04	< 0.005	0.01	—	0.01	0.01	—	0.01	317
Water	—	—	—	—	—	—	—	—	—	—	17.8
Waste	—	—	—	—	—	—	—	—	—	—	31.9
Refrig.	—	—	—	—	—	—	—	—	—	—	0.27
Total	1.72	0.57	4.79	0.01	0.17	0.65	0.81	0.16	0.16	0.32	1,080

2.6. Operations Emissions by Sector, Mitigated

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

Sector	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Mobile	3.60	2.19	19.1	0.04	0.03	3.66	3.69	0.03	0.93	0.96	4,202
Area	8.74	1.42	32.6	0.09	3.72	—	3.72	3.58	—	3.58	1,895
Energy	0.03	0.46	0.20	< 0.005	0.04	—	0.04	0.04	—	0.04	1,883
Water	—	—	—	—	—	—	—	—	—	—	86.0
Waste	—	—	—	—	—	—	—	—	—	—	193

Refrig.	—	—	—	—	—	—	—	—	—	—	1.65
Total	12.4	4.06	51.9	0.13	3.79	3.66	7.45	3.65	0.93	4.58	8,260
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Mobile	3.22	2.50	17.9	0.04	0.03	3.66	3.69	0.03	0.93	0.96	3,885
Area	8.17	1.35	25.9	0.09	3.72	—	3.72	3.58	—	3.58	1,877
Energy	0.03	0.46	0.20	< 0.005	0.04	—	0.04	0.04	—	0.04	1,883
Water	—	—	—	—	—	—	—	—	—	—	86.0
Waste	—	—	—	—	—	—	—	—	—	—	193
Refrig.	—	—	—	—	—	—	—	—	—	—	1.65
Total	11.4	4.31	44.0	0.13	3.79	3.66	7.45	3.65	0.93	4.58	7,925
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Mobile	3.19	2.30	16.9	0.04	0.03	3.54	3.57	0.03	0.90	0.93	3,876
Area	6.23	0.33	9.13	0.02	0.84	—	0.84	0.81	—	0.81	430
Energy	0.03	0.46	0.20	< 0.005	0.04	—	0.04	0.04	—	0.04	1,883
Water	—	—	—	—	—	—	—	—	—	—	86.0
Waste	—	—	—	—	—	—	—	—	—	—	193
Refrig.	—	—	—	—	—	—	—	—	—	—	1.65
Total	9.44	3.10	26.2	0.06	0.90	3.54	4.45	0.87	0.90	1.77	6,470
Annual	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.58	0.42	3.09	0.01	0.01	0.65	0.65	0.01	0.16	0.17	642
Area	1.14	0.06	1.67	< 0.005	0.15	—	0.15	0.15	—	0.15	71.3
Energy	< 0.005	0.08	0.04	< 0.005	0.01	—	0.01	0.01	—	0.01	312
Water	—	—	—	—	—	—	—	—	—	—	14.2
Waste	—	—	—	—	—	—	—	—	—	—	31.9
Refrig.	—	—	—	—	—	—	—	—	—	—	0.27
Total	1.72	0.56	4.79	0.01	0.17	0.65	0.81	0.16	0.16	0.32	1,071

3. Construction Emissions Details

3.1. Demolition (2025) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.40	22.2	19.9	0.03	0.92	—	0.92	0.84	—	0.84	3,437
Demolition	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.33	3.04	2.73	< 0.005	0.13	—	0.13	0.12	—	0.12	471
Demolition	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.55	0.50	< 0.005	0.02	—	0.02	0.02	—	0.02	77.9
Demolition	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.04	0.81	0.00	0.00	0.11	0.11	0.00	0.03	0.03	125
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.09	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	15.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	2.60
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.2. Demolition (2025) - Mitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.40	22.2	19.9	0.03	0.92	—	0.92	0.84	—	0.84	3,437
Demolition	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.33	3.04	2.73	< 0.005	0.13	—	0.13	0.12	—	0.12	471
Demolition	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.55	0.50	< 0.005	0.02	—	0.02	0.02	—	0.02	77.9
Demolition	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.04	0.81	0.00	0.00	0.11	0.11	0.00	0.03	0.03	125
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.09	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	15.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	2.60
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Site Preparation (2025) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	3.31	31.6	30.2	0.05	1.37	—	1.37	1.26	—	1.26	5,314
Dust From Material Movement	—	—	—	—	—	19.7	19.7	—	10.1	10.1	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.27	2.60	2.48	< 0.005	0.11	—	0.11	0.10	—	0.10	437
Dust From Material Movement	—	—	—	—	—	1.62	1.62	—	0.83	0.83	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.47	0.45	< 0.005	0.02	—	0.02	0.02	—	0.02	72.3
Dust From Material Movement	—	—	—	—	—	0.29	0.29	—	0.15	0.15	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.05	0.94	0.00	0.00	0.13	0.13	0.00	0.03	0.03	146
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	11.0

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	1.82
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.4. Site Preparation (2025) - Mitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.50	2.59	28.3	0.05	0.10	—	0.10	0.10	—	0.10	5,314
Dust From Material Movement	—	—	—	—	—	7.67	7.67	—	3.94	3.94	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.21	2.33	< 0.005	0.01	—	0.01	0.01	—	0.01	437
Dust From Material Movement	—	—	—	—	—	0.63	0.63	—	0.32	0.32	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.01	0.04	0.42	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	72.3
Dust From Material Movement	—	—	—	—	—	0.11	0.11	—	0.06	0.06	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.05	0.94	0.00	0.00	0.13	0.13	0.00	0.03	0.03	146
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	11.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	1.82
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Grading (2025) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	3.20	29.7	28.3	0.06	1.23	—	1.23	1.14	—	1.14	6,622
Dust From Material Movement	—	—	—	—	—	9.20	9.20	—	3.65	3.65	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.20	29.7	28.3	0.06	1.23	—	1.23	1.14	—	1.14	6,622
Dust From Material Movement	—	—	—	—	—	9.20	9.20	—	3.65	3.65	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.66	6.10	5.82	0.01	0.25	—	0.25	0.23	—	0.23	1,361
Dust From Material Movement	—	—	—	—	—	1.89	1.89	—	0.75	0.75	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	1.11	1.06	< 0.005	0.05	—	0.05	0.04	—	0.04	225
Dust From Material Movement	—	—	—	—	—	0.35	0.35	—	0.14	0.14	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.06	1.08	0.00	0.00	0.15	0.15	0.00	0.04	0.04	167
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.08	0.83	0.00	0.00	0.15	0.15	0.00	0.04	0.04	148
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.18	0.00	0.00	0.03	0.03	0.00	0.01	0.01	31.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	5.20
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.6. Grading (2025) - Mitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.64	4.43	35.3	0.06	0.12	—	0.12	0.12	—	0.12	6,622
Dust From Material Movement	—	—	—	—	—	3.59	3.59	—	1.42	1.42	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.64	4.43	35.3	0.06	0.12	—	0.12	0.12	—	0.12	6,622
Dust From Material Movement	—	—	—	—	—	3.59	3.59	—	1.42	1.42	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.91	7.26	0.01	0.03	—	0.03	0.03	—	0.03	1,361
Dust From Material Movement	—	—	—	—	—	0.74	0.74	—	0.29	0.29	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.17	1.33	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	225
Dust From Material Movement	—	—	—	—	—	0.13	0.13	—	0.05	0.05	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.06	1.08	0.00	0.00	0.15	0.15	0.00	0.04	0.04	167
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.08	0.83	0.00	0.00	0.15	0.15	0.00	0.04	0.04	148
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—

Worker	0.02	0.01	0.18	0.00	0.00	0.03	0.03	0.00	0.01	0.01	31.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	5.20
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Building Construction (2025) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.13	10.4	13.0	0.02	0.43	—	0.43	0.40	—	0.40	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	1.12	1.40	< 0.005	0.05	—	0.05	0.04	—	0.04	259
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.21	0.26	< 0.005	0.01	—	0.01	0.01	—	0.01	42.9
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.15	1.68	0.00	0.00	0.31	0.31	0.00	0.07	0.07	301
Vendor	0.01	0.39	0.13	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	286
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.19	0.00	0.00	0.03	0.03	0.00	0.01	0.01	33.5
Vendor	< 0.005	0.04	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	30.8
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	5.54
Vendor	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	5.10
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.8. Building Construction (2025) - Mitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.33	2.82	14.8	0.02	0.08	—	0.08	0.07	—	0.07	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.04	0.30	1.60	< 0.005	0.01	—	0.01	0.01	—	0.01	259
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.06	0.29	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	42.9
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.15	1.68	0.00	0.00	0.31	0.31	0.00	0.07	0.07	301
Vendor	0.01	0.39	0.13	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	286
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.19	0.00	0.00	0.03	0.03	0.00	0.01	0.01	33.5
Vendor	< 0.005	0.04	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	30.8
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	5.54
Vendor	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	5.10
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Building Construction (2026) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.77	7.04	9.26	0.02	0.27	—	0.27	0.25	—	0.25	1,718
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	1.28	1.69	< 0.005	0.05	—	0.05	0.05	—	0.05	284
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.11	2.02	0.00	0.00	0.31	0.31	0.00	0.07	0.07	331
Vendor	0.01	0.36	0.13	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	281
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.16	0.13	1.55	0.00	0.00	0.31	0.31	0.00	0.07	0.07	295
Vendor	0.01	0.38	0.13	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	281
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—

Worker	0.11	0.09	1.15	0.00	0.00	0.22	0.22	0.00	0.05	0.05	218
Vendor	0.01	0.26	0.09	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	201
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.21	0.00	0.00	0.04	0.04	0.00	0.01	0.01	36.0
Vendor	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	33.2
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.10. Building Construction (2026) - Mitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.33	2.82	14.8	0.02	0.07	—	0.07	0.07	—	0.07	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.33	2.82	14.8	0.02	0.07	—	0.07	0.07	—	0.07	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.23	2.01	10.6	0.02	0.05	—	0.05	0.05	—	0.05	1,718
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.37	1.93	< 0.005	0.01	—	0.01	0.01	—	0.01	284

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.11	2.02	0.00	0.00	0.31	0.31	0.00	0.07	0.07	331
Vendor	0.01	0.36	0.13	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	281
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.16	0.13	1.55	0.00	0.00	0.31	0.31	0.00	0.07	0.07	295
Vendor	0.01	0.38	0.13	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	281
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.09	1.15	0.00	0.00	0.22	0.22	0.00	0.05	0.05	218
Vendor	0.01	0.26	0.09	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	201
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.21	0.00	0.00	0.04	0.04	0.00	0.01	0.01	36.0
Vendor	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	33.2
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Building Construction (2027) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	2,405

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.74	6.71	9.24	0.02	0.24	—	0.24	0.22	—	0.22	1,718
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	1.22	1.69	< 0.005	0.04	—	0.04	0.04	—	0.04	284
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.10	1.84	0.00	0.00	0.31	0.31	0.00	0.07	0.07	324
Vendor	0.01	0.34	0.12	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	275
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.15	0.12	1.41	0.00	0.00	0.31	0.31	0.00	0.07	0.07	289
Vendor	0.01	0.36	0.13	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	275
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.08	1.04	0.00	0.00	0.22	0.22	0.00	0.05	0.05	213
Vendor	0.01	0.25	0.09	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	196
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—

Worker	0.02	0.01	0.19	0.00	0.00	0.04	0.04	0.00	0.01	0.01	35.3
Vendor	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	32.5
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.12. Building Construction (2027) - Mitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.33	2.82	14.8	0.02	0.07	—	0.07	0.07	—	0.07	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.33	2.82	14.8	0.02	0.07	—	0.07	0.07	—	0.07	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.23	2.01	10.6	0.02	0.05	—	0.05	0.05	—	0.05	1,718
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.37	1.93	< 0.005	0.01	—	0.01	0.01	—	0.01	284
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.10	1.84	0.00	0.00	0.31	0.31	0.00	0.07	0.07	324

Vendor	0.01	0.34	0.12	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	275
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.15	0.12	1.41	0.00	0.00	0.31	0.31	0.00	0.07	0.07	289
Vendor	0.01	0.36	0.13	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	275
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.08	1.04	0.00	0.00	0.22	0.22	0.00	0.05	0.05	213
Vendor	0.01	0.25	0.09	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	196
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.19	0.00	0.00	0.04	0.04	0.00	0.01	0.01	35.3
Vendor	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	32.5
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Building Construction (2028) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	2,406

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.49	4.40	6.38	0.01	0.15	—	0.15	0.14	—	0.14	1,186
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.80	1.16	< 0.005	0.03	—	0.03	0.02	—	0.02	196
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.16	0.08	1.71	0.00	0.00	0.31	0.31	0.00	0.07	0.07	318
Vendor	0.01	0.33	0.12	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	268
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.13	0.11	1.31	0.00	0.00	0.31	0.31	0.00	0.07	0.07	284
Vendor	0.01	0.35	0.12	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	268
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.05	0.67	0.00	0.00	0.15	0.15	0.00	0.04	0.04	144
Vendor	< 0.005	0.17	0.06	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	132
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.12	0.00	0.00	0.03	0.03	0.00	0.01	0.01	23.9
Vendor	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	21.9
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.14. Building Construction (2028) - Mitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.33	2.81	14.8	0.02	0.07	—	0.07	0.07	—	0.07	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.33	2.81	14.8	0.02	0.07	—	0.07	0.07	—	0.07	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	1.39	7.31	0.01	0.04	—	0.04	0.04	—	0.04	1,186
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.25	1.33	< 0.005	0.01	—	0.01	0.01	—	0.01	196
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.16	0.08	1.71	0.00	0.00	0.31	0.31	0.00	0.07	0.07	318
Vendor	0.01	0.33	0.12	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	268
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—

Worker	0.13	0.11	1.31	0.00	0.00	0.31	0.31	0.00	0.07	0.07	284
Vendor	0.01	0.35	0.12	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	268
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.05	0.67	0.00	0.00	0.15	0.15	0.00	0.04	0.04	144
Vendor	< 0.005	0.17	0.06	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	132
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.12	0.00	0.00	0.03	0.03	0.00	0.01	0.01	23.9
Vendor	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	21.9
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Paving (2028) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.69	6.63	9.91	0.01	0.26	—	0.26	0.24	—	0.24	1,516
Paving	0.00	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.69	6.63	9.91	0.01	0.26	—	0.26	0.24	—	0.24	1,516
Paving	0.00	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.10	1.00	1.49	< 0.005	0.04	—	0.04	0.04	—	0.04	228
Paving	0.00	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.18	0.27	< 0.005	0.01	—	0.01	0.01	—	0.01	37.8
Paving	0.00	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.03	0.63	0.00	0.00	0.11	0.11	0.00	0.03	0.03	117
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.48	0.00	0.00	0.11	0.11	0.00	0.03	0.03	105
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	16.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	2.69
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.16. Paving (2028) - Mitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	1,516
Paving	0.00	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	1,516
Paving	0.00	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.29	1.60	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	228
Paving	0.00	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.05	0.29	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	37.8
Paving	0.00	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—

Worker	0.06	0.03	0.63	0.00	0.00	0.11	0.11	0.00	0.03	0.03	117
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.48	0.00	0.00	0.11	0.11	0.00	0.03	0.03	105
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	16.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	2.69
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.17. Architectural Coating (2028) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	134
Architectural Coatings	25.1	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.06	0.08	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	9.44
Architectural Coatings	1.77	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	1.56
Architectural Coatings	0.32	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.26	0.00	0.00	0.06	0.06	0.00	0.01	0.01	56.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	4.12
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.68
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.18. Architectural Coating (2028) - Mitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	134
Architectural Coatings	25.1	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.06	0.08	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	9.44
Architectural Coatings	1.77	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	1.56
Architectural Coatings	0.32	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.26	0.00	0.00	0.06	0.06	0.00	0.01	0.01	56.7

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	4.12
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.68
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.19. Architectural Coating (2029) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.79	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	134
Architectural Coatings	25.1	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.07	0.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	11.0
Architectural Coatings	2.06	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.01	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	1.82
Architectural Coatings	0.38	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.25	0.00	0.00	0.06	0.06	0.00	0.01	0.01	55.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	4.72
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.78
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.20. Architectural Coating (2029) - Mitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.79	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	134
Architectural Coatings	25.1	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.07	0.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	11.0
Architectural Coatings	2.06	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.01	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	1.82
Architectural Coatings	0.38	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.25	0.00	0.00	0.06	0.06	0.00	0.01	0.01	55.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	4.72

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.78
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	3.60	2.19	19.1	0.04	0.03	3.66	3.69	0.03	0.93	0.96	4,202
Total	3.60	2.19	19.1	0.04	0.03	3.66	3.69	0.03	0.93	0.96	4,202
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	3.22	2.50	17.9	0.04	0.03	3.66	3.69	0.03	0.93	0.96	3,885
Total	3.22	2.50	17.9	0.04	0.03	3.66	3.69	0.03	0.93	0.96	3,885
Annual	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.58	0.42	3.09	0.01	0.01	0.65	0.65	0.01	0.16	0.17	642
Total	0.58	0.42	3.09	0.01	0.01	0.65	0.65	0.01	0.16	0.17	642

4.1.2. Mitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	3.60	2.19	19.1	0.04	0.03	3.66	3.69	0.03	0.93	0.96	4,202
Total	3.60	2.19	19.1	0.04	0.03	3.66	3.69	0.03	0.93	0.96	4,202
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	3.22	2.50	17.9	0.04	0.03	3.66	3.69	0.03	0.93	0.96	3,885
Total	3.22	2.50	17.9	0.04	0.03	3.66	3.69	0.03	0.93	0.96	3,885
Annual	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.58	0.42	3.09	0.01	0.01	0.65	0.65	0.01	0.16	0.17	642
Total	0.58	0.42	3.09	0.01	0.01	0.65	0.65	0.01	0.16	0.17	642

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	1,304
Total	—	—	—	—	—	—	—	—	—	—	1,304
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	1,304
Total	—	—	—	—	—	—	—	—	—	—	1,304
Annual	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	216
Total	—	—	—	—	—	—	—	—	—	—	216

4.2.2. Electricity Emissions By Land Use - Mitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	1,296
Total	—	—	—	—	—	—	—	—	—	—	1,296
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	1,296
Total	—	—	—	—	—	—	—	—	—	—	1,296
Annual	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	215
Total	—	—	—	—	—	—	—	—	—	—	215

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.03	0.48	0.21	< 0.005	0.04	—	0.04	0.04	—	0.04	614
Total	0.03	0.48	0.21	< 0.005	0.04	—	0.04	0.04	—	0.04	614
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.03	0.48	0.21	< 0.005	0.04	—	0.04	0.04	—	0.04	614
Total	0.03	0.48	0.21	< 0.005	0.04	—	0.04	0.04	—	0.04	614
Annual	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.01	0.09	0.04	< 0.005	0.01	—	0.01	0.01	—	0.01	102
Total	0.01	0.09	0.04	< 0.005	0.01	—	0.01	0.01	—	0.01	102

4.2.4. Natural Gas Emissions By Land Use - Mitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.03	0.46	0.20	< 0.005	0.04	—	0.04	0.04	—	0.04	586
Total	0.03	0.46	0.20	< 0.005	0.04	—	0.04	0.04	—	0.04	586
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.03	0.46	0.20	< 0.005	0.04	—	0.04	0.04	—	0.04	586
Total	0.03	0.46	0.20	< 0.005	0.04	—	0.04	0.04	—	0.04	586
Annual	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	< 0.005	0.08	0.04	< 0.005	0.01	—	0.01	0.01	—	0.01	97.1

Total	< 0.005	0.08	0.04	< 0.005	0.01	—	0.01	0.01	—	0.01	97.1

4.3. Area Emissions by Source

4.3.1. Unmitigated

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

Source	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Hearths	2.86	1.35	25.9	0.09	3.72	—	3.72	3.58	—	3.58	1,877
Consumer Products	4.92	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.38	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.58	0.06	6.72	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	18.0
Total	8.74	1.42	32.6	0.09	3.72	—	3.72	3.58	—	3.58	1,895
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Hearths	2.86	1.35	25.9	0.09	3.72	—	3.72	3.58	—	3.58	1,877
Consumer Products	4.92	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.38	—	—	—	—	—	—	—	—	—	—
Total	8.17	1.35	25.9	0.09	3.72	—	3.72	3.58	—	3.58	1,877
Annual	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.12	0.06	1.06	< 0.005	0.15	—	0.15	0.15	—	0.15	69.8
Consumer Products	0.90	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.07	—	—	—	—	—	—	—	—	—	—

Landscape Equipment	0.05	0.01	0.60	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	1.47
Total	1.14	0.06	1.67	< 0.005	0.15	—	0.15	0.15	—	0.15	71.3

4.3.2. Mitigated

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

Source	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Hearths	2.86	1.35	25.9	0.09	3.72	—	3.72	3.58	—	3.58	1,877
Consumer Products	4.92	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.38	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.58	0.06	6.72	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	18.0
Total	8.74	1.42	32.6	0.09	3.72	—	3.72	3.58	—	3.58	1,895
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Hearths	2.86	1.35	25.9	0.09	3.72	—	3.72	3.58	—	3.58	1,877
Consumer Products	4.92	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.38	—	—	—	—	—	—	—	—	—	—
Total	8.17	1.35	25.9	0.09	3.72	—	3.72	3.58	—	3.58	1,877
Annual	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.12	0.06	1.06	< 0.005	0.15	—	0.15	0.15	—	0.15	69.8
Consumer Products	0.90	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.07	—	—	—	—	—	—	—	—	—	—

Landscape Equipment	0.05	0.01	0.60	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	1.47
Total	1.14	0.06	1.67	< 0.005	0.15	—	0.15	0.15	—	0.15	71.3

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	108
Total	—	—	—	—	—	—	—	—	—	—	108
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	108
Total	—	—	—	—	—	—	—	—	—	—	108
Annual	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	17.8
Total	—	—	—	—	—	—	—	—	—	—	17.8

4.4.2. Mitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	86.0
Total	—	—	—	—	—	—	—	—	—	—	86.0
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	86.0
Total	—	—	—	—	—	—	—	—	—	—	86.0
Annual	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	14.2
Total	—	—	—	—	—	—	—	—	—	—	14.2

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	193
Total	—	—	—	—	—	—	—	—	—	—	193
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	193
Total	—	—	—	—	—	—	—	—	—	—	193
Annual	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	31.9

Total	—	—	—	—	—	—	—	—	—	31.9

4.5.2. Mitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	193
Total	—	—	—	—	—	—	—	—	—	—	193
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	193
Total	—	—	—	—	—	—	—	—	—	—	193
Annual	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	31.9
Total	—	—	—	—	—	—	—	—	—	—	31.9

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	1.65
Total	—	—	—	—	—	—	—	—	—	—	1.65

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	1.65
Total	—	—	—	—	—	—	—	—	—	—	1.65
Annual	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	0.27
Total	—	—	—	—	—	—	—	—	—	—	0.27

4.6.2. Mitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	1.65
Total	—	—	—	—	—	—	—	—	—	—	1.65
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	1.65
Total	—	—	—	—	—	—	—	—	—	—	1.65
Annual	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	0.27
Total	—	—	—	—	—	—	—	—	—	—	0.27

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

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

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.7.2. Mitigated

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

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

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

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.8.2. Mitigated

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

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

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

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.9.2. Mitigated

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

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

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

Vegetation	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

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

Species	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—

Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

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

Vegetation	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

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

Species	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—

Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	4/1/2025	6/10/2025	5.00	50.0	—
Site Preparation	Site Preparation	6/11/2025	7/23/2025	5.00	30.0	—
Grading	Grading	7/24/2025	11/6/2025	5.00	75.0	—

Building Construction	Building Construction	11/7/2025	9/8/2028	5.00	740	—
Paving	Paving	9/9/2028	11/25/2028	5.00	55.0	—
Architectural Coating	Architectural Coating	11/26/2028	2/11/2029	5.00	55.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Rubber Tired Dozers	Diesel	Average	2.00	8.00	367	0.40
Demolition	Excavators	Diesel	Average	3.00	8.00	36.0	0.38
Demolition	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Grading	Scrapers	Diesel	Average	2.00	8.00	423	0.48
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Average	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	8.00	89.0	0.36

Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Rubber Tired Dozers	Diesel	Average	2.00	8.00	367	0.40
Demolition	Excavators	Diesel	Average	3.00	8.00	36.0	0.38
Demolition	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Site Preparation	Rubber Tired Dozers	Diesel	Tier 4 Final	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Tier 4 Final	1.00	8.00	148	0.41
Grading	Excavators	Diesel	Tier 4 Final	2.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	2.00	8.00	84.0	0.37
Grading	Scrapers	Diesel	Tier 4 Final	2.00	8.00	423	0.48
Grading	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.00	367	0.40
Building Construction	Forklifts	Diesel	Tier 4 Final	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Tier 4 Final	1.00	7.00	367	0.29
Building Construction	Welders	Diesel	Tier 4 Final	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	3.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Tier 4 Final	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Tier 4 Final	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Tier 4 Final	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	15.0	10.8	LDA,LDT1,LDT2
Demolition	Vendor	—	7.17	HHDT,MHDT
Demolition	Hauling	0.00	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	10.8	LDA,LDT1,LDT2
Site Preparation	Vendor	—	7.17	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	10.8	LDA,LDT1,LDT2
Grading	Vendor	—	7.17	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	40.7	10.8	LDA,LDT1,LDT2
Building Construction	Vendor	12.1	7.17	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	10.8	LDA,LDT1,LDT2
Paving	Vendor	—	7.17	HHDT,MHDT

Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	8.14	10.8	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	7.17	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	15.0	10.8	LDA,LDT1,LDT2
Demolition	Vendor	—	7.17	HHDT,MHDT
Demolition	Hauling	0.00	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	10.8	LDA,LDT1,LDT2
Site Preparation	Vendor	—	7.17	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	10.8	LDA,LDT1,LDT2
Grading	Vendor	—	7.17	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	40.7	10.8	LDA,LDT1,LDT2

Building Construction	Vendor	12.1	7.17	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	10.8	LDA,LDT1,LDT2
Paving	Vendor	—	7.17	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	8.14	10.8	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	7.17	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	446,209	148,736	0.00	0.00	—

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)

Demolition	0.00	0.00	0.00	—	—
Site Preparation	—	—	45.0	0.00	—
Grading	—	—	225	0.00	—
Paving	0.00	0.00	0.00	0.00	1.25

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Single Family Housing	1.25	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2025	0.00	478	0.03	< 0.005
2026	0.00	478	0.03	< 0.005
2027	0.00	478	0.03	< 0.005
2028	0.00	478	0.03	< 0.005
2029	0.00	478	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Single Family Housing	1,114	1,126	1,009	401,720	5,085	5,139	4,606	1,833,868

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Single Family Housing	1,114	1,126	1,009	401,720	5,085	5,139	4,606	1,833,868

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

Hearth Type	Unmitigated (number)
Single Family Housing	—
Wood Fireplaces	0
Gas Fireplaces	57
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	57
Conventional Wood Stoves	0
Catalytic Wood Stoves	6
Non-Catalytic Wood Stoves	6
Pellet Wood Stoves	0

5.10.1.2. Mitigated

Hearth Type	Unmitigated (number)
Single Family Housing	—
Wood Fireplaces	0
Gas Fireplaces	57

Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	57
Conventional Wood Stoves	0
Catalytic Wood Stoves	6
Non-Catalytic Wood Stoves	6
Pellet Wood Stoves	0

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
446208.75	148,736	0.00	0.00	—

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Single Family Housing	991,506	478	0.0330	0.0040	1,909,814

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Single Family Housing	986,035	478	0.0330	0.0040	1,824,264

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Single Family Housing	4,510,759	22,342,373

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Single Family Housing	3,608,608	17,873,899

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Single Family Housing	102	—

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)

Single Family Housing	102	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Single Family Housing	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Single Family Housing	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00

5.14.2. Mitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Single Family Housing	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Single Family Housing	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	24.1	annual days of extreme heat
Extreme Precipitation	2.05	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters

Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	2	0	0	N/A
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	0	0	0	N/A
Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

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	2	1	1	3
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	1	2
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A

Air Quality Degradation	1	1	1	2

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.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

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.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	72.8
AQ-PM	53.7
AQ-DPM	8.05
Drinking Water	92.6
Lead Risk Housing	32.0
Pesticides	89.4
Toxic Releases	26.3
Traffic	1.99
Effect Indicators	—
CleanUp Sites	0.00
Groundwater	63.7
Haz Waste Facilities/Generators	16.6
Impaired Water Bodies	77.3
Solid Waste	64.4

Sensitive Population	—
Asthma	64.0
Cardio-vascular	87.1
Low Birth Weights	20.7
Socioeconomic Factor Indicators	—
Education	61.4
Housing	8.86
Linguistic	48.2
Poverty	60.5
Unemployment	76.1

7.2. Healthy Places Index Scores

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.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	38.0341332
Employed	33.54292314
Median HI	40.56204286
Education	—
Bachelor's or higher	20.73655845
High school enrollment	24.08571795
Preschool enrollment	28.57692801
Transportation	—
Auto Access	55.28037983
Active commuting	45.77184653
Social	—
2-parent households	78.90414475

Voting	42.2302066
Neighborhood	—
Alcohol availability	74.23328628
Park access	43.92403439
Retail density	2.091620685
Supermarket access	13.17849352
Tree canopy	76.58154754
Housing	—
Homeownership	63.76235083
Housing habitability	74.63107917
Low-inc homeowner severe housing cost burden	65.18670602
Low-inc renter severe housing cost burden	65.17387399
Uncrowded housing	63.4800462
Health Outcomes	—
Insured adults	38.84255101
Arthritis	0.0
Asthma ER Admissions	63.3
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	23.0
Cognitively Disabled	50.3
Physically Disabled	52.4
Heart Attack ER Admissions	12.5

Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	19.6
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	37.8
Elderly	72.3
English Speaking	32.2
Foreign-born	39.3
Outdoor Workers	4.9
Climate Change Adaptive Capacity	—
Impervious Surface Cover	80.5
Traffic Density	2.3
Traffic Access	0.0
Other Indices	—
Hardship	70.9
Other Decision Support	—
2016 Voting	61.5

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	62.0
Healthy Places Index Score for Project Location (b)	40.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
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.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Operations: Vehicle Data	H-S and H-O trips generally confined to Waterford area.

APPENDIX B
BIOLOGICAL RESOURCE MATERIALS

Element_Type	Scientific_Name	Common_Name	Element_Code	Federal_Status	State_Status	CDFW_Status	CA_Rare_Plant_Rank	Quad_Code	Quad_Name	Data_Status	Taxonomic_Sort
Animals - Birds	Buteo swainsoni	Swainsons hawk	ABNKC19070	None	Threatened	-	-	3712067	WATERFORD	Mapped and Unprocessed	Animals - Birds - Accipitridae - Buteo swainsoni
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB0020	None	Threatened	SSC	-	3712067	WATERFORD	Mapped	Animals - Birds - Icteridae - Agelaius tricolor
Animals - Birds	Athene cunicularia	burrowing owl	ABNSB10010	None	None	SSC	-	3712067	WATERFORD	Unprocessed	Animals - Birds - Strigidae - Athene cunicularia
Animals - Fish	Cottus gulosus	riffle sculpin	AFC4E02140	None	None	SSC	-	3712067	WATERFORD	Unprocessed	Animals - Fish - Cottidae - Cottus gulosus
Animals - Fish	Lavinia exilicauda exilicauda	Sacramento hitch	AFCJB19012	None	None	SSC	-	3712067	WATERFORD	Unprocessed	Animals - Fish - Cyprinidae - Lavinia exilicauda exilicauda
Animals - Fish	Mylopharodon conocephalus	hardhead	AFCJB25010	None	None	SSC	-	3712067	WATERFORD	Mapped and Unprocessed	Animals - Fish - Cyprinidae - Mylopharodon conocephalus
Animals - Fish	Hysterocarpus traskii traskii	Sacramento-San Joaquin tule perch	AFCQK02012	None	None	-	-	3712067	WATERFORD	Unprocessed	Animals - Fish - Embiotocidae - Hysterocarpus traskii traskii
Animals - Fish	Entosphenus tridentatus	Pacific lamprey	AFBAA02100	None	None	SSC	-	3712067	WATERFORD	Unprocessed	Animals - Fish - Petromyzontidae - Entosphenus tridentatus
Animals - Fish	Oncorhynchus keta	chum salmon	AFCHA02020	None	None	-	-	3712067	WATERFORD	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus keta
Animals - Fish	Oncorhynchus mykiss irideus pop. 11	steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	-	-	3712067	WATERFORD	Mapped and Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus pop. 11
Animals - Fish	Oncorhynchus tshawytscha pop. 11	chinook salmon - Central Valley spring-run ESU	AFCHA0205L	Threatened	Threatened	-	-	3712067	WATERFORD	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha pop. 11
Animals - Fish	Oncorhynchus tshawytscha pop. 13	chinook salmon - Central Valley fall / late fall-run ESU	AFCHA0205N	None	None	SSC	-	3712067	WATERFORD	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha pop. 13
Animals - Insects	Bombus pensylvanicus	American bumble bee	IIHYM24260	None	None	-	-	3712067	WATERFORD	Mapped	Animals - Insects - Apidae - Bombus pensylvanicus
Animals - Insects	Desmocerus californicus dimorphus	valley elderberry longhorn beetle	IICOL48011	Threatened	None	-	-	3712067	WATERFORD	Mapped	Animals - Insects - Cerambycidae - Desmocerus

											californicus dimorphus
Plants - Vascular	Fritillaria agrestis	stinkbells	PMLIL0V010	None	None	-	4.2	3712067	WATERFORD	Unprocessed	Plants - Vascular - Liliaceae - Fritillaria agrestis
Plants - Vascular	Clarkia rostrata	beaked clarkia	PDONA050Y0	None	None	-	1B.3	3712067	WATERFORD	Mapped	Plants - Vascular - Onagraceae - Clarkia rostrata
Plants - Vascular	Neostapfia colusana	Colusa grass	PMPOA4C010	Threatened	Endangered	-	1B.1	3712067	WATERFORD	Mapped	Plants - Vascular - Poaceae - Neostapfia colusana
Plants - Vascular	Orcuttia inaequalis	San Joaquin Valley Orcutt grass	PMPOA4G060	Threatened	Endangered	-	1B.1	3712067	WATERFORD	Mapped	Plants - Vascular - Poaceae - Orcuttia inaequalis
Plants - Vascular	Tuctoria greenei	Greenes tuctoria	PMPOA6N010	Endangered	Rare	-	1B.1	3712067	WATERFORD	Mapped	Plants - Vascular - Poaceae - Tuctoria greenei

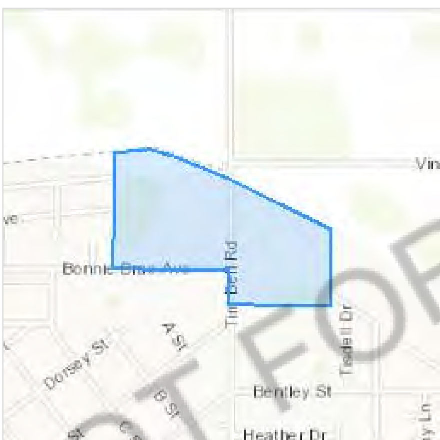
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Stanislaus County, California



Local office

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
San Joaquin Kit Fox *Vulpes macrotis mutica* Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2873	Endangered

Reptiles

NAME	STATUS
Northwestern Pond Turtle Actinemys marmorata Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1111	Proposed Threatened

Amphibians

NAME	STATUS
California Tiger Salamander Ambystoma californiense There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/2076	Threatened
Western Spadefoot Spea hammondii Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5425	Proposed Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate
Valley Elderberry Longhorn Beetle Desmocerus californicus dimorphus Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/7850	Threatened

Crustaceans

NAME	STATUS
Conservancy Fairy Shrimp Branchinecta conservatio Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/8246	Endangered
Vernal Pool Fairy Shrimp Branchinecta lynchi Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/498	Threatened

Vernal Pool Tadpole Shrimp Lepidurus packardi Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/2246	Endangered

Flowering Plants

NAME	STATUS
Colusa Grass Neostapfia colusana Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/5690	Threatened
Greene's Tuctoria Tuctoria greenei Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/1573	Endangered
San Joaquin Valley Orcutt Grass Orcuttia inaequalis Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/5506	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence ( )

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

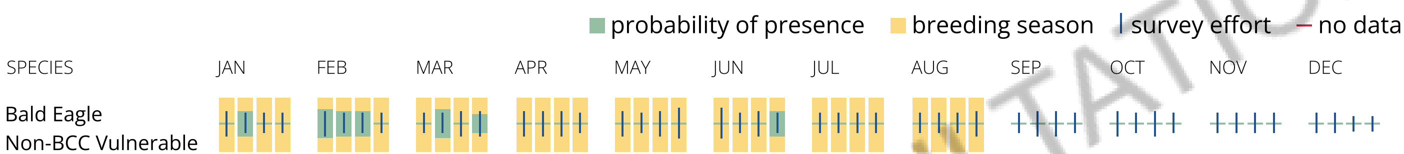
Breeding Season ( )
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31
Belding's Savannah Sparrow Passerculus sandwichensis beldingi This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8	Breeds Apr 1 to Aug 15
Bullock's Oriole Icterus bullockii This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 21 to Jul 25

California Gull Larus californicus — Breeds Mar 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

California Thrasher Toxostoma redivivum — Breeds Jan 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Clark's Grebe Aechmophorus clarkii — Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Common Yellowthroat Geothlypis trichas sinuosa — Breeds May 20 to Jul 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/2084

Lawrence's Goldfinch Carduelis lawrencei — Breeds Mar 20 to Sep 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9464

Nuttall's Woodpecker Picoides nuttallii — Breeds Apr 1 to Jul 20

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9410

Oak Titmouse Baeolophus inornatus — Breeds Mar 15 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9656

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Tricolored Blackbird Agelaius tricolor — Breeds Mar 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3910

Western Grebe aechmophorus occidentalis — Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/6743

Wrentit Chamaea fasciata — Breeds Mar 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Yellow-billed Magpie Pica nuttalli | Breeds Apr 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9726

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

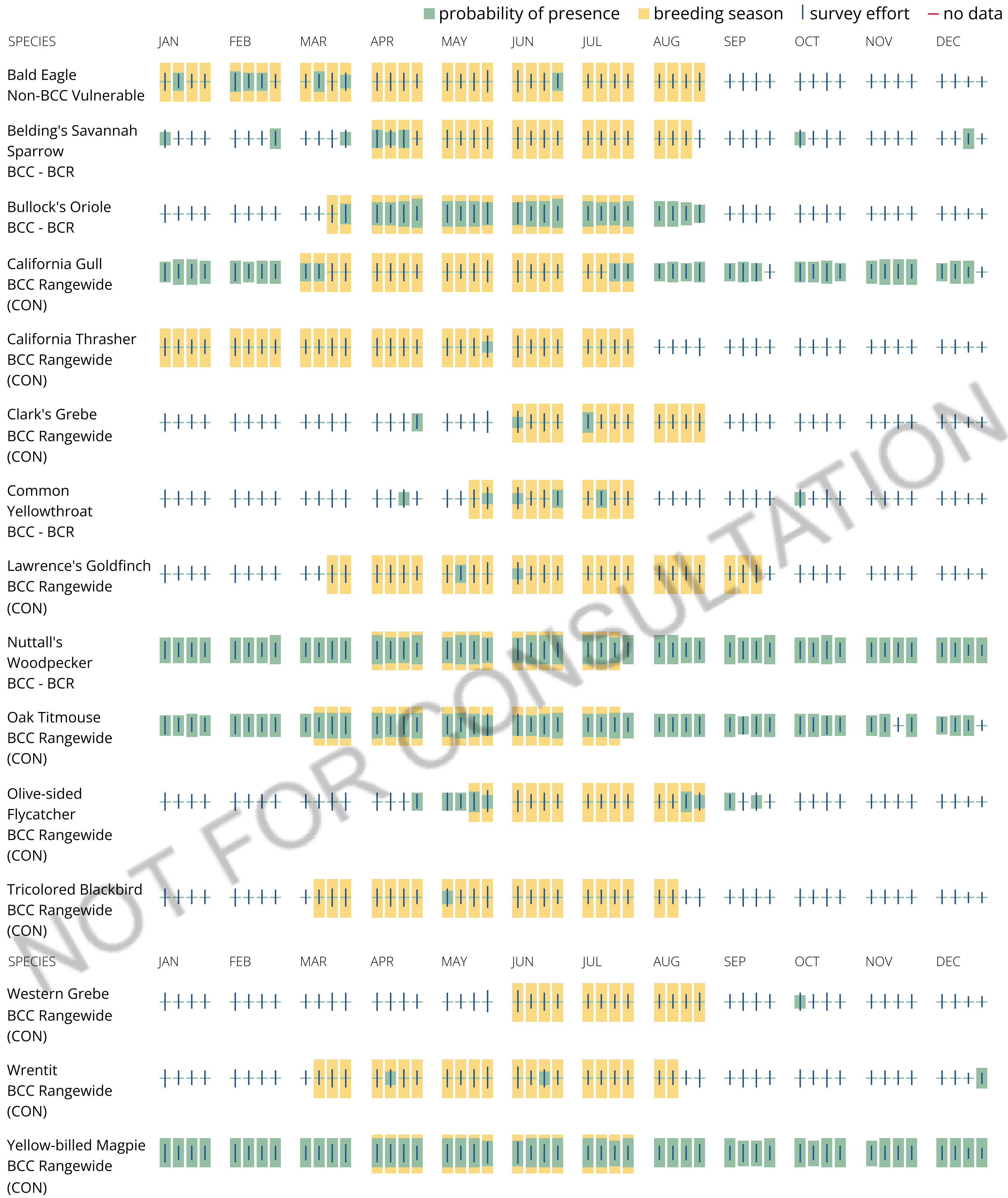
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

U.S. Fish and Wildlife Service

National Wetlands Inventory

Waterford Subdivisions

February 16, 2024

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

APPENDIX C
CULTURAL RESOURCE MATERIALS

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: 1/26/2024

Records Search File #: 12785N
Project: Waterford Subdivision, Bonnie Brae and Tim Bell Road, Waterford

Rayanna Beck
BaseCamp Environmental
802 West Lodi Ave.
Lodi, CA 95240
209-224-8213

rbeck@basecampenv.com

Dear Ms. Beck:

We have conducted a non-confidential extended records search as per your request for the above-referenced project area located on the Waterford USGS 7.5-minute quadrangle map 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 historic buildings or structures within the project area.

- The General Land Office Survey Plat for T3S R11E (dated 1854) does not reference any historic features in Sections 27 and 28.

- The Official Map of the County of Stanislaus, California (1906) shows H. Beard as the landowner in Sections 27 and 28, T3S R11E.

- The 1916 and 1953 editions of the Waterford USGS quadrangles reference the Modesto Main Canal north of the project areas, and the alignment of Tim Bell Road.

Prehistoric or historic resources within the immediate vicinity of the project area: The Modesto Main Canal has been recorded in Stanislaus County as P-50-002002 and is referenced in the Office of Historic Preservation Built Environment Resource Directory (BERD) as not having been evaluated for the National Register of Historic Places, the California Register of Historical Resources, or for Local Listing.

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: None has been formally reported to the Information Center.

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 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. Thank you for submitting the signed **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

City of Waterford Planning Department
Mark Niskanen, Planning Manager
101 "E" Street (P.O. Box 199)
Waterford, CA 95386
City Hall (202) 874-2328 or Office (209) 599-8377
Email mark@jbandersonplanning.com

February 27, 2024

Kenneth Woodrow, Chairperson
Wuksachi Indian Tribe/Eshom Valley Band
1179 Rock Haven Ct.
Salinas, CA 93906

RE: AB 52 Tribal Cultural Resource Consultation, Waterford Subdivisions

Dear Mr. Woodrow,

The City of Waterford (City) has received an application proposing the development of three residential subdivisions in the vicinity of the intersection of Tim Bell Road and Bonnie Brae Avenue in northern Waterford (see attached figures). The project proposes to subdivide three parcels totaling 20.08 acres into a total of 111 lots for the construction of single-family residences on each lot.

The Wuksachi Indian Tribe has been identified as a possible interested party in this project by the City. As the CEQA Lead Agency for the proposed project, the City hereby provides the tribe with notice of the proposed project pursuant to AB 52. The tribe has 30 days from receipt of this letter to indicate if it wishes to consult on this project. If no response is received, it will be assumed that the tribe declines consultation.

If the tribe desires to consult on this project, please send a written response to Mark Niskanen, City of Waterford, 101 E Street, Waterford, CA 95386. In your response, please designate the lead contact person for this consultation, along with contact information. If you have any questions, please contact me at (209) 599-8377.

Sincerely,

Mark Niskanen
Contract Planner, City of Waterford

City of Waterford Planning Department
Mark Niskanen, Planning Manager
101 "E" Street (P.O. Box 199)
Waterford, CA 95386
City Hall (202) 874-2328 or Office (209) 599-8377
Email mark@jbandersonplanning.com

February 27, 2024

Lloyd Mathiesen, Chairperson
Chicken Ranch Rancheria of Me-Wuk Indians
P.O. Box 1159
Jamestown, CA 95327

RE: AB 52 Tribal Cultural Resource Consultation, Waterford Subdivisions

Dear Mr. Mathiesen,

The City of Waterford (City) has received an application proposing development of three residential subdivisions in the vicinity of the intersection of Tim Bell Road and Bonnie Brae Avenue in northern Waterford (see attached figures). The project proposes to subdivide three parcels totaling 20.08 acres into a total of 111 lots for the construction of single-family residences on each lot.

The Chicken Ranch Rancheria has been identified as a possible interested party in this project by the City. As the CEQA Lead Agency for the proposed project, the City hereby provides the tribe with notice of the proposed project pursuant to AB 52. The tribe has 30 days from receipt of this letter to indicate if it wishes to consult on this project. If no response is received, it will be assumed that the tribe declines consultation.

If the tribe desires to consult on this project, please send a written response to Mark Niskanen, City of Waterford, 101 E Street, Waterford, CA 95386. In your response, please designate the lead contact person for this consultation, along with contact information. If you have any questions, please contact me at (209) 599-8377.

Sincerely,

Mark Niskanen
Contract Planner, City of Waterford

City of Waterford Planning Department
Mark Niskanen, Planning Manager
101 "E" Street (P.O. Box 199)
Waterford, CA 95386
City Hall (202) 874-2328 or Office (209) 599-8377
Email mark@jbandersonplanning.com

February 27, 2024

Timothy Perez, Tribal Compliance Officer
Northern Valley Yokut Tribe
P.O. Box 717
Linden, CA 95236

RE: AB 52 Tribal Cultural Resource Consultation, Waterford Subdivisions

Dear Mr. Perez,

The City of Waterford (City) has received an application proposing development of three residential subdivisions in the vicinity of the intersection of Tim Bell Road and Bonnie Brae Avenue in northern Waterford (see attached figures). The project proposes to subdivide three parcels totaling 20.08 acres into a total of 111 lots for the construction of single-family residences on each lot.

The Northern Valley Yokuts Tribe has been identified as a possible interested party in this project by the City. As the CEQA Lead Agency for the proposed project, the City hereby provides the tribe with notice of the proposed project pursuant to AB 52. The tribe has 30 days from receipt of this letter to indicate if it wishes to consult on this project. If no response is received, it will be assumed that the tribe declines consultation.

If the tribe desires to consult on this project, please send a written response to Mark Niskanen, City of Waterford, 101 E Street, Waterford, CA 95386. In your response, please designate the lead contact person for this consultation, along with contact information. If you have any questions, please contact me at (209) 599-8377.

Sincerely,

Mark Niskanen
Contract Planner, City of Waterford

City of Waterford Planning Department
Mark Niskanen, Planning Manager
101 "E" Street (P.O. Box 199)
Waterford, CA 95386
City Hall (202) 874-2328 or Office (209) 599-8377
Email mark@jbandersonplanning.com

February 27, 2024

Gloria Grimes, Chairperson
Calaveras Band of Mi-Wuk Indians
P.O. Box 899
West Point, CA 95255

RE: AB 52 Tribal Cultural Resource Consultation, Waterford Subdivisions

Dear Ms. Grimes,

The City of Waterford (City) has received an application proposing the development of three residential subdivisions in the vicinity of the intersection of Tim Bell Road and Bonnie Brae Avenue in northern Waterford (see attached figures). The project proposes to subdivide three parcels totaling 20.08 acres into a total of 111 lots for the construction of single-family residences on each lot.

The Calaveras Band has been identified as a possible interested party in this project by the City. As the CEQA Lead Agency for the proposed project, the City hereby provides the tribe with notice of the proposed project pursuant to AB 52. The tribe has 30 days from receipt of this letter to indicate if it wishes to consult on this project. If no response is received, it will be assumed that the tribe declines consultation.

If the tribe desires to consult on this project, please send a written response to Mark Niskanen, City of Waterford, 101 E Street, Waterford, CA 95386. In your response, please designate the lead contact person for this consultation, along with contact information. If you have any questions, please contact me at (209) 599-8377.

Sincerely,

Mark Niskanen
Contract Planner, City of Waterford

City of Waterford Planning Department
Mark Niskanen, Planning Manager
101 "E" Street (P.O. Box 199)
Waterford, CA 95386
City Hall (202) 874-2328 or Office (209) 599-8377
Email mark@jbandersonplanning.com

February 27, 2024

Jazzmyn Gegere, Director of Cultural Resource Preservation
Southern Sierra Miwuk Nation
P.O. Box 186
Mariposa, CA 95338

RE: AB 52 Tribal Cultural Resource Consultation, Waterford Subdivisions

Dear Ms. Gegere,

The City of Waterford (City) has received an application proposing development of three residential subdivisions in the vicinity of the intersection of Tim Bell Road and Bonnie Brae Avenue in northern Waterford (see attached figures). The project proposes to subdivide three parcels totaling 20.08 acres into a total of 111 lots for the construction of single-family residences on each lot.

The Southern Sierra Miwuk Nation has been identified as a possible interested party in this project by the City. As the CEQA Lead Agency for the proposed project, the City hereby provides the tribe with notice of the proposed project pursuant to AB 52. The tribe has 30 days from receipt of this letter to indicate if it wishes to consult on this project. If no response is received, it will be assumed that the tribe declines consultation.

If the tribe desires to consult on this project, please send a written response to Mark Niskanen, City of Waterford, 101 E Street, Waterford, CA 95386. In your response, please designate the lead contact person for this consultation, along with contact information. If you have any questions, please contact me at (209) 599-8377.

Sincerely,

Mark Niskanen
Contract Planner, City of Waterford
cc: Sandra Chapman, Chairperson

City of Waterford Planning Department
Mark Niskanen, Planning Manager
101 "E" Street (P.O. Box 199)
Waterford, CA 95386
City Hall (202) 874-2328 or Office (209) 599-8377
Email mark@jbandersonplanning.com

February 27, 2024

Neil Peyron, Chairperson
Tule River Indian Tribe
P.O. Box 589
Porterville, CA 93258

RE: AB 52 Tribal Cultural Resource Consultation, Waterford Subdivisions

Dear Mr. Peyron,

The City of Waterford (City) has received an application proposing the development of three residential subdivisions in the vicinity of the intersection of Tim Bell Road and Bonnie Brae Avenue in northern Waterford (see attached figures). The project proposes to subdivide three parcels totaling 20.08 acres into a total of 111 lots for the construction of single-family residences on each lot.

The Tule River Indian Tribe has been identified as a possible interested party in this project by the City. As the CEQA Lead Agency for the proposed project, the City hereby provides the tribe with notice of the proposed project pursuant to AB 52. The tribe has 30 days from receipt of this letter to indicate if it wishes to consult on this project. If no response is received, it will be assumed that the tribe declines consultation.

If the tribe desires to consult on this project, please send a written response to Mark Niskanen, City of Waterford, 101 E Street, Waterford, CA 95386. In your response, please designate the lead contact person for this consultation, along with contact information. If you have any questions, please contact me at (209) 599-8377.

Sincerely,

Mark Niskanen
Contract Planner, City of Waterford

City of Waterford Planning Department
Mark Niskanen, Planning Manager
101 "E" Street (P.O. Box 199)
Waterford, CA 95386
City Hall (202) 874-2328 or Office (209) 599-8377
Email mark@jbandersonplanning.com

February 27, 2024

Leland Valdez, Cultural Resources
Nashville Enterprise Miwok-Maidu-Nishinam Tribe
P.O. Box 580986
Elk Grove, CA 95758-0017

RE: AB 52 Tribal Cultural Resource Consultation, Waterford Subdivisions

Dear Mr. Valdez,

The City of Waterford (City) has received an application proposing the development of three residential subdivisions in the vicinity of the intersection of Tim Bell Road and Bonnie Brae Avenue in northern Waterford (see attached figures). The project proposes to subdivide three parcels totaling 20.08 acres into a total of 111 lots for the construction of single-family residences on each lot.

The Nashville Enterprise tribe has been identified as a possible interested party in this project by the City. As the CEQA Lead Agency for the proposed project, the City hereby provides the tribe with notice of the proposed project pursuant to AB 52. The tribe has 30 days from receipt of this letter to indicate if it wishes to consult on this project. If no response is received, it will be assumed that the tribe declines consultation.

If the tribe desires to consult on this project, please send a written response to Mark Niskanen, City of Waterford, 101 E Street, Waterford, CA 95386. In your response, please designate the lead contact person for this consultation, along with contact information. If you have any questions, please contact me at (209) 599-8377.

Sincerely,

Mark Niskanen
Contract Planner, City of Waterford
cc: Cosme Valdez, Chairperson

APPENDIX D
GEOTECHNICAL INVESTIGATION – SITE A

NATS

CONSTRUCTION
INSPECTION & MATERIALS
TESTING LABORATORY

PRELIMINARY GEOTECHNICAL INVESTIGATION-**UPDATE**
PROPOSED SUBDIVISION
SITE-2 TIM BELL ROAD (APN: 080-023-036)
WATERFORD, CALIFORNIA

Prepared for:

ATTENTION: MR. SHAWN FITZPATRICK
FH LAND INVESTMENTS, LLC
4805 SISK ROAD
SALIDA, CALIFORNIA

Prepared by:

NORTH AMERICAN TECHNICAL SERVICES, INC.
4713 ENTERPRISE WAY, SUITE 4
MODESTO, CALIFORNIA 95356

NATS JOB NO.: 23-834G-B

FEBRUARY 8, 2024

TABLE OF CONTENTS

1.0 INTRODUCTION AND SCOPE OF SERVICES

1.1 Introduction

North American Technical Services, Inc. (NATS) has completed a geotechnical investigation and report providing conclusions and recommendations for the proposed Subdivision (APN: 080-023-036) on Tim Bell Road in Waterford, California. Preliminary geotechnical recommendations for excavations, fill placement, and foundation design for the proposed improvements are presented herein.

1.2 Scope of Services

The scope of services provided included:

- Review of readily available geologic and geotechnical reports.
- Coordination of utility mark-out and location.
- Excavation of eight exploratory borings and soil sampling utilizing a truck-mounted drill rigs.
- Laboratory testing of selected soil samples.
- Description of site geology and evaluation of potential geologic hazards.
- Preparation of this preliminary geotechnical investigation report.

2.0 SITE DESCRIPTION

The project site is a roughly 4.81-acre site (APN: 080-035-008) located immediately east of Tim Bell Road and immediately south of the MID Main Canal in Waterford, California. The site is bounded by an existing subdivision on the east, vacant land on the north and single family residential on all other sides. Existing site conditions are illustrated on Figures 1 and 2. The property proposed for improvements is currently vacant, and being used as horse pasture. Based on historic aerial photography (Google Earth Pro 7.3.6.9245, Build Date: December 29, 2022), the project site has been vacant and no significant changes were observed dating back to at least 1985.

Preliminary plans titled "Development Sketch '6' Waterford Site 2" (Sheet 1, 1" =30') by Associated Engineering Group shows the proposed project to include 28 new single family residential lots and new paved access roadway. The project is also expected to include utilities, landscaping, drainage and other associated improvements. At the time our field work was performed the site had a low cover of grass and weeds. Based on site and review and topography, the area proposed for improvements is generally level at an approximate elevation of 168± to 172± feet above mean sea level (msl).

3.0 FIELD INVESTIGATION AND LABORATORY TESTING

3.1 Field Investigation

NATS conducted the recent field investigation for the subject site on November 28, 2023 and December 11, 2023 which included a geologic reconnaissance and excavation of eight exploratory borings. The borings were excavated with truck-mounted drill rig equipment utilizing four-inch-diameter, solid-stem augers. The borings extended to a maximum depth of approximately 60.0 feet below the existing ground surface (bgs). Relatively undisturbed soil samples were collected by driving a Standard Penetration Test (SPT) sampler using a (350 ft-lb per blow) rope and cathead actuated drop-hammer, and bulk samples were collected from the drill cuttings.

The soils from the exploratory borings were logged in the field by a NATS geotechnical representative, and were classified in general accordance with the Unified Soil Classification System via visual and tactile methods. The field descriptions have been modified, where appropriate, to reflect laboratory test results. Percolation testing was also performed at the site and tests results are being forwarded under separate cover. Boring log information is included in Appendix B. The approximate locations of the explorations are presented on Figure 2.

4.0 GEOLOGY

4.1 General Setting

The site lies within San Joaquin Valley, which represents the southern portion of the Great Valley Geomorphic Province in Central California. The "Great Valley" is a gently-sloping to essentially-flat alluvial plain situated east of the Coast Ranges and west of the Sierra Nevada. Depositional history within the valley is typified by accumulations of basin and river sediments. Earth materials in the southern portions of the "Great Valley" consist of river deposits, which can vary significantly in grain size and texture based on local relationship with the alluvial source or eroding agent.

4.2 Geologic Conditions

Regional geologic mapping by Wagner, E.J., Bortugno, E.J., and McJunkin, R.D. (1991) indicates the near surface geologic unit underlying the site consists of Arkosic Alluvium of the Quaternary Riverbank Formation. Descriptions of the geologic units encountered are presented below.

4.2.1 Quaternary Riverbank Formation

Quaternary Riverbank Formation was encountered from groundsurface to the maximum depth of the explorations and generally consisted of an upper 4± to 8± ft thick layer of very loose to medium dense silty sand (SM), and below the silty sand included hard clay and gravelly clay (CL), medium dense to very dense clayey/silty gravel with sand (GC) and clayey sand (SC). This unit is anticipated at depth throughout the site.

4.3 Groundwater Conditions

Groundwater was not encountered in the recent borings that were advanced to a maximum explored depth of approximately 60.0 feet bgs. Based on the California Department of Water Resources Sustainable Groundwater Management Act (SGMA) Data Viewer (https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#gwlevels), the most current groundwater level in the vicinity of the site is indicated to be on the order of 119± feet depth in (spring 2023) and high groundwater level was at 99± feet depth in 2011.

While groundwater conditions may vary, especially following periods of sustained precipitation or irrigation, it is generally not anticipated to adversely affect shallow construction activities or the completed improvements, if irrigation is limited and proper site drainage is designed, installed, and maintained per the recommendations of the project civil engineer. However, groundwater could have the potential to perch within the underlying soils, especially above clayey or cemented layers or during or following heavy rains or the rainy season. Such occurrences could impact grading, compaction and/or foundation excavation activities.

4.4 Geologic Hazards

Geologic hazards that were considered to have potential impacts to site development were evaluated based on field observations, literature review, and laboratory test results. It appears that geologic hazards at the site are primarily limited to those caused by shaking from earthquake-generated ground motions. The following paragraphs discuss the geologic hazards considered and their potential risk to the site.

4.4.1 Surface Fault Rupture

In accordance with the Alquist-Priolo Earthquake Fault Zoning Act, (ACT), the State of California established Earthquake Fault Zones around known active faults. The purpose of the ACT is to regulate the development of structures intended for human occupancy near active fault traces in order to mitigate hazards associated with surface fault rupture.

According to the California Geological Survey (Special Publication 42, Revised 2018), a fault that has had surface displacement within the last 11,700 years is defined as a Holocene-active fault and is either already zoned or pending zonation in accordance with the ACT.

There are several other definitions of fault activity that are used to regulate dams, power plants, and other critical facilities, and some agencies designate faults that are documented as older than Holocene (last 11,700 years) and younger than late Quaternary (1.6 million years) as potentially active faults that are subject to local jurisdictional regulations.

Based on the site reconnaissance and review of referenced literature, the site is not located within a local or State-designated Earthquake Fault Zone, no known active fault traces underlie or project toward the site, and here are no known potentially active fault traces underlie or project toward the site. Based on above, fault surface rupture potential is considered to be low at the subject site.

4.4.2 Local and Regional Faulting

The United States Geological Survey (USGS), with support of State Geological Surveys, and reviewed published work by various researchers, have developed a Quaternary Fault and Fold Database of faults and associated folds that are believed to be sources of earthquakes with magnitudes greater than 6.0 that have occurred during the Quaternary (the past 1.6 million years).

The faults and folds within the database have been categorized into four Classes (Class A-D). The classes are based on the level of evidence confirming that a Quaternary fault is of tectonic origin and whether the structure is exposed for mapping or inferred from fault related deformational features. Class A faults have been mapped and categorized based on age of documented activity ranging from Historical faults (activity within last 150 years), Latest Quaternary faults (activity within last 15,000 years), Late Quaternary (activity within last 130,000 years), to Middle to late Quaternary (activity within last 1.6 million years). The Class A faults are considered to have the highest potential to generate earthquakes and/or surface rupture, and the earthquake and surface rupture potential generally increases from oldest to youngest.

The evidence for Quaternary deformation and/or tectonic activity progressively decreases for Class B and Class C faults. When geologic evidence indicates that a fault is not of tectonic origin it is considered to be a Class D structure. Such evidence includes joints, fractures, landslides, or erosional and fluvial scarps that resemble fault features, but demonstrate a non-tectonic origin.

The nearest known Class A faults are the Foothills Fault (late Quaternary), which is located approximately 28.89 kilometers northeast of the site and the Great Valley Thrust Fault (undifferentiated Quaternary), which is located approximately 43.0 kilometers southwest of the site.

4.4.3 Liquefaction and Seismic Settlement Evaluation

Liquefaction occurs when saturated fine-grained sands or silts lose their physical strengths during earthquake-induced shaking and behave like a liquid. This is due to loss of point-to-point grain contact and transfer of normal stress to the pore water. Liquefaction potential varies with water level, soil type, material gradation, relative density, and probable intensity and duration of ground shaking. Seismic settlement can occur with or without liquefaction; it results from densification of loose soils.

As indicated above, groundwater is anticipated at depths of greater than 99 feet, therefore, the potential for liquefaction at the site is considered to be very low. The potential for seismic settlement cannot be entirely precluded within the very loose and loose sands in their current condition, therefore, the subgrade soils are recommended to be over-excavated and replaced as engineered fill as indicated below. After such grading has been completed, the potential for significant seismic settlement is considered to be low.

4.4.4 Landsliding

Landslides are not mapped in the site area and were not encountered during the recent field exploration. Based on the preliminary investigation findings, the nearest sloping feature is the Tuolumne River bank located over ½ miles south of the project site. Other than the Tuolumne River the area surrounding the site is relatively level for at least 1 mile in all directions. Based on the geometry of the surrounding terrain and lack of steeply sloping ground in the vicinity of the site, landsliding is not considered to be a significant geologic hazard at the project site.

4.4.5 Flooding

Based on Federal Emergency Management Agency mapping (FEMA 2012), site improvement areas are located within Zone X (unshaded), which is defined as: "Minimal Flood Hazard Risk Areas Outside the 1% and 0.2% Annual Chance Floodplain". Therefore, subject to the review of the project civil engineer, the potential for flooding at the site is generally considered to be low.

4.4.6 Compressible and Expansive Soils

Based on the presence of the upper soil layer which includes very loose and loose silty sands, it is recommended that the soils be overexcavated and properly compacted beneath proposed improvement areas as recommended herein and as determined to be necessary during construction. Based on the field data, site observations, and experience with similar soils in the vicinity of the site, after over-excavation and compaction of surficial soils is completed, the improvements are not expected to be subject to significant compressibility under the anticipated loads.

Based on the upper silty sand materials encountered in our study, the near-surface materials are non-plastic and generally anticipated to exhibit a very low expansion potential (Expansion Index of 20 or less).

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 General

NATS concludes that the proposed improvements on the site are feasible from a geotechnical standpoint, provided the preliminary recommendations in this report are incorporated into the design and construction of the project. Recommendations for the proposed earthwork and improvements are included in the following sections and Appendix D. However, recommendations in the text of this report supersede those presented in Appendix D should conflicts exist. These preliminary recommendations should either be confirmed as appropriate or updated following required excavations and observations during site preparation.

5.2 Site Preparation

Prior to grading, areas to receive distress sensitive improvements should be cleared of existing debris, and deleterious materials. Objectionable materials, such as debris and vegetation not suitable for structural backfill should be properly disposed of off-site.

In the areas of proposed structures, unsuitable surficial soils should be removed in their entirety. In addition, to limit the potential for settlement, over excavations should be conducted to remove existing very loose soils to a minimum depth of one foot below the bottom of all proposed foundations, two feet below existing grade, or to the depth of competent native materials, whichever is greatest. If loose or otherwise unsuitable materials are encountered at the base of overexcavations, additional excavation to the depth of suitable material may be necessary.

Remedial excavations should extend laterally at least five feet beyond the limits of the proposed improvements or the distance resulting from a 1:1 (horizontal: vertical) extended down to suitable material, where feasible. If overexcavations encroach upon property lines or adjacent structures the temporary excavation should generally be sloped at a 1:1 (horizontal to vertical) or flatter, to the prescribed overexcavation depth.

Overexcavations for proposed surface improvement areas, such as pavement or flatwork should be conducted to a minimum depth of two feet below existing or proposed subgrade or to the depth of suitable material, whichever is deeper.

If encountered, existing below-ground utilities should be redirected around the proposed structure. Existing utilities at an elevation to extend through the proposed footings should generally be sleeved and caulked to minimize the potential for moisture migration below the building slabs. Abandoned pipes exposed by grading should be securely capped or filled with minimum two-sack cement/sand slurry to help prevent moisture from migrating beneath foundation and slab soils.

A geotechnical representative from NATS should observe the exposed ground at the base of over-excavations prior to placement of compacted fill or improvements, to verify the competency of exposed subgrade materials. After approval by this office, the exposed subgrades to receive fill should be scarified a minimum of eight inches, moisture conditioned to at least 2% above optimum moisture content, and compacted to at least 90 percent (as evaluated by ASTM D 1557).

5.3 Site Excavation

Based on NAT's observations, shallow excavations at the site should generally be feasible using well-maintained heavy-duty construction equipment run by experienced operators.

5.4 Fill Placement and Compaction

Following the recommended overexcavation and removal of loose or disturbed soils, subgrade areas to receive fills should be scarified approximately eight inches; moisture conditioned to at least 2 percent above optimum moisture content, and compacted to at least 90 percent.

Fill and backfill should be compacted to a minimum relative compaction of 90 percent at a minimum of 2 percent above optimum moisture content as evaluated by ASTM D 1557. The optimum lift thickness for fill soil depends on the type of compaction equipment used. Generally, backfill should be placed in uniform, horizontal lifts not exceeding eight inches in loose thickness. Fill placement and compaction should be conducted in conformance with local ordinances, and should be observed and tested by a NATS geotechnical representative.

5.5 Fill Materials

Properly moisture conditioned low expansion potential, silty sand soils derived from the on-site over-excavations are considered suitable for reuse on the site as compacted fill. If used, these materials should be screened of organics and materials generally greater than three inches in maximum dimension and thoroughly mixed to achieve a consistent blend of material. Irreducible materials greater than three inches in maximum dimension should not be used in shallow fills (within three feet of proposed grades). In utility trenches, adequate bedding should surround pipes.

Imported fill, if necessary, beneath structures and flatwork should have an Expansion Index of 20 or less (per ASTM D 4829). Imported fill soils for use in structural or slope areas should be evaluated by the soils engineer before being transported to the site. For retaining walls, backfill located within a 45-degree wedge extending up from the bottom of the heel foundation of the wall should consist of soil having an Expansion Index of 20 or less (ASTM D 4829) with less than 30 percent passing the No. 200 sieve. The upper 12 to 18 inches of wall backfill should consist of lower permeability soils, in order to reduce surface water infiltration behind walls. The project structural engineer and/or architect should detail proper wall back-drains, including gravel drain zones, fills, filter fabric, and perforated drain pipes.

5.6 Temporary Construction Slopes

The following recommended slopes should be relatively stable against deep-seated failure, but may experience localized sloughing. On-site native soils are considered Type B, existing undocumented fill is not expected to be encountered, although, if present would be considered Type C soil; recommended slope ratios are provided in Table 5.6.

TABLE 5.6 RECOMMENDED TEMPORARY SLOPE RATIOS		
SOIL TYPE	SLOPE RATIO (Horizontal: vertical)	MAXIMUM HEIGHT
B (Riverbank Formation)	1:1 (OR FLATTER)	10 Feet
C (Undocumented Fill)	1.5:1 (OR FLATTER)	5 Feet

Actual field conditions and soil type designations must be verified by a "competent person" while excavations exist, according to Cal-OSHA regulations. In addition, the above sloping recommendations do not allow for surcharge loading at the top of slopes by vehicular traffic, equipment, or materials. Appropriate surcharge setbacks must be maintained from the top of all unshored slopes.

5.7 Foundation and Slab Recommendations

The following recommendations are for preliminary design purposes only. These foundation recommendations should be re-evaluated after review of the project grading and foundation plans, and after completion of rough grading of the building pad areas. Upon completion of rough pad grading, if clayey materials are present, Expansion Index of near surface soils should be verified, and these recommendations should be updated, if necessary.

5.7.1 Foundations

Recommendations presented below are based on foundations established within compacted engineered fill consisting of very low expansion potential near surface soils. Following the recommended preparatory grading, continuous and isolated spread footings are anticipated to be suitable for use at this site. Foundation dimensions and reinforcement should be based on allowable bearing values of 2,000 pounds per square foot (psf) for minimum 12-inch wide footings embedded a minimum of 12 inches below lowest adjacent subgrade elevation. Isolated footings should be at least 24 inches in minimum dimension. The allowable bearing value may be increased by one-third for short-duration loading, which includes the effects of wind or seismic forces. Based on the recommended preparatory grading, it is anticipated that all footings will be founded entirely in properly compacted engineered fill materials. Footings should not span cut to fill interfaces.

Minimum reinforcement for continuous footings should consist of four No. 5 reinforcing bars; two placed near the top and two placed near the bottom, or as per the project structural engineer. The structural engineer should design isolated footing reinforcement. The structural engineer should provide recommendations for reinforcement of any spread footings and footings with pipe penetrations. Footing excavations should generally be maintained at above optimum moisture content until concrete placement.

5.7.2 Foundation Settlement

The maximum total static settlement is expected to be on the order of 1.0 inch and the maximum differential settlement is expected to be on the order of 0.5 inch.

5.7.3 Foundation Setback

Footings for structures should be designed such that the horizontal distance from the face of adjacent slopes to the outer edge of the footing is at least 20 feet. In addition, footings should bear beneath a 1:1 plane extended up from the nearest bottom edge of adjacent trenches and/or excavations. Deepening of affected footings may be a suitable means of attaining the prescribed setbacks.

5.7.4 Interior Concrete Slabs

Lightly loaded interior concrete slabs for non-traffic areas should be a minimum of 5.0 inches thick. Minimum slab reinforcement should consist of #4 reinforcing bars placed on maximum 18-inch centers, each way, at or above mid-slab height, but with proper cover. More stringent recommendations based on traffic or other concentrated loading per the project structural engineer supersede these recommendations, as applicable.

In moisture-sensitive floor areas, a suitable vapor retarder of at least 15-mil thickness (with all laps or penetrations sealed or taped) overlying a four-inch layer of consolidated aggregate base or gravel (with SE of 30 or more) should be installed. An optional maximum two-inch layer of similar material may be placed above the vapor retarder to help protect the membrane during steel and concrete placement. This recommended protection is generally considered typical in the industry. If proposed floor areas or coverings are considered especially sensitive to moisture emissions, additional recommendations from a specialty consultant should be obtained. NATS is not an expert at preventing moisture penetration through slabs. A qualified architect or other experienced professional should be contacted if moisture penetration is a more significant concern.

Slabs subjected to heavier loads, racking, or vehicular traffic will require thicker structural slab sections and/or increased reinforcement. A 110-pci subgrade modulus is considered suitable for elastic design of minimally embedded improvements such as slabs-on-grade. Subgrade materials should be maintained or brought to a minimum of two percent or greater above optimum moisture content until slab underlayment and concrete are placed.

5.8 Seismic Design Criteria

The seismic ground motion values listed in the table below were derived in accordance with the ASCE 7-16 Standard that is in the 2022 California Building Code. This was accomplished by establishing the Site Class based on the soil properties at the site, and calculating site coefficients and parameters using the ASCE 7 online Hazard Tool. Seismic ground motion values are based on the approximate site coordinates of 37.911856° latitude and –120.614782° longitude which represent the approximate center of the project site. These values are intended for the design of structures to resist the effects of earthquake ground motions.

TABLE 5.8 SEISMIC GROUND MOTION VALUES 2022 CBC AND ASCE 7-16		
PARAMETER	VALUE	2022 CBC/ASCE 7-16 REFERENCE
Site Class	D (Stiff Soil)	ASCE 16, Chapter 20
Mapped Spectral Response Acceleration Parameter, S_S	0.533	Figure 1613.2.1 (1)
Mapped Spectral Response Acceleration Parameter, S_1	0.23	Figure 1613.2.1 (2)
Seismic Coefficient, F_a	1.374	Table 1613.2.3 (1)
Seismic Coefficient, F_v	--	Table 1613.2.3 (2)
MCE Spectral Response Acceleration Parameter, S_{MS}	0.732	Section 1613.2.3
MCE Spectral Response Acceleration Parameter, S_{M1}	--	Section 1613.2.3
Design Spectral Response Acceleration, Parameter S_{DS}	0.488	Section 1613.2.5(1)
Design Spectral Response Acceleration, Parameter S_{D1}	--	Section 1613.2.5 (2)
Peak Ground Acceleration PGA_M	0.308	ASCE 16, Section 11.8.3

It is anticipated that the project will meet the requirements provided in ASCE 11.4.8, Exception 2, which permits the use of code-based ground motion values if the seismic response coefficient Cs is amplified by 1.5 times for the period range T≥1.5Ts using equations 12.8-3 and 12.8-4. If the proposed improvements have a period in the range exceeding 1.5Ts, then the base shear coefficient must be increased as required by ASCE 7-16

5.9 Lateral Resistance and Earth Pressures

Lateral loads acting against structures may be resisted by friction between the footings and the supporting soil or passive pressure acting against structures. If frictional resistance is used, allowable coefficients of friction of 0.30 (total frictional resistance equals the coefficient of friction multiplied by the dead load) for concrete cast directly against compacted fill or native material is recommended. A design passive resistance value of 200 pounds per square foot per foot of depth (with a maximum value of 2,000 pounds per square foot) may be used. The allowable lateral resistance can be taken as the sum of the frictional resistance and the passive resistance, provided the passive resistance does not exceed two-thirds of the total allowable resistance.

If proposed, retaining walls backfilled using granular soils may be designed using the equivalent fluid unit weights given in Table 5.9 below.

TABLE 5.9 EQUIVALENT FLUID UNIT WEIGHTS (G_h) (pounds per cubic foot)		
WALL TYPE	LEVEL BACKFILL	SLOPE BACKFILL 2:1 (HORIZONTAL: VERTICAL)
CANTILEVER WALL (YIELDING)	45	55
RESTRAINED WALL	55	65

Lateral pressures on cantilever retaining walls (yielding walls) over six feet high due to earthquake motions may be calculated based on work by Seed and Whitman (1970). The total lateral earth pressure against a properly drained and backfilled cantilever retaining wall above the groundwater level can be expressed as:

$P_{AE} = P_A + \Delta P_{AE}$

For non-yielding (or "restrained") walls, the total lateral earth pressure may be similarly calculated based on work by Wood (1973):

$$P_{KE} = P_K + \Delta P_{KE}$$

Where P_A/b = Static Active Earth Pressure = $G_h H^2/2$

P_K/b = Static Restrained Wall Earth Pressure = $G_h H^2/2$

$\Delta P_{AE}/b$ = Dynamic Active Earth Pressure Increment = (3/8) k_h γH^2

$\Delta P_{KE}/b$ = Dynamic Restrained Earth Pressure Increment = k_h γH^2

b = unit length of wall (usually 1 foot)

k_h = 1/2* PGA_m (PGA_m given previously

G_h = Equivalent Fluid Unit Weight

H = Total Height of the retained soil

γ = Total Unit Weight of Soil ≈ 135 pounds per cubic foot

*It is anticipated that the 1/2 reduction factor will be appropriate for proposed walls that are not substantially sensitive to movement during the design seismic event. Proposed walls that are more sensitive to such movement could utilize a 2/3 reduction factor. If any proposed walls require minimal to no movement during the design seismic event, no reduction factor to the peak ground acceleration should be used. The project structural engineer of record should determine the appropriate reduction factor to use (if any) based on the specific proposed wall characteristics.

The static and increment of dynamic earth pressure in both cases may be applied with a line of action located at H/3 above the bottom of the wall (SEAOC, 2013).

These values assume non-expansive backfill and free-draining conditions. Measures should be taken to prevent moisture buildup behind all retaining walls. Drainage measures should include free-draining backfill materials and sloped, perforated drains. These drains should discharge to an appropriate off-site location. Waterproofing should be as specified by the project architect.

5.10 Exterior Flatwork

Flatwork should be installed with crack-control joints at appropriate spacing as designed by the project architect to reduce the potential for cracking in exterior flatwork caused by minor movement of subgrade soils and concrete shrinkage. Additionally, it is recommended that flatwork be installed with at least number 4 reinforcing bars at 18-inch centers, each way, at or above mid-height of slab, but with proper concrete cover, or with other reinforcement per the applicable project designer. Flatwork that should be installed with crack control joints includes driveways, sidewalks, and architectural features. All subgrades should be prepared according to the earthwork recommendations previously given before placing concrete. Positive drainage should be established and maintained next to all flatwork. Subgrade materials should be maintained at a minimum of two percent above optimum moisture content until the time of concrete placement.

5.11 Drainage

Surface runoff should be collected and directed away from improvements by means of appropriate erosion-reducing devices and positive drainage should be established around the proposed improvements. Positive drainage should be directed away from improvements at a gradient of at least two percent for a distance of at least five feet. However, the project civil engineers should evaluate the on-site drainage and make necessary provisions to keep surface water from affecting the site.

Generally, NATS recommends against allowing water to infiltrate building pads or adjacent to slopes. Some agencies are encouraging the use of storm-water cleansing devices. Use of such devices tends to increase the possibility of adverse effects associated with high groundwater including slope instability and liquefaction.

5.12 Slopes

Based on anticipated soil strength characteristics slopes, if proposed, should be constructed at ratios of 2:1 (horizontal: vertical) or flatter. These slope inclinations should exhibit factors of safety greater than 1.5. Although properly constructed slopes on this site should be grossly stable, the soils will be somewhat erodible. Therefore, runoff water should not be permitted to drain over the edges of slopes unless that water is confined to properly designed and constructed drainage facilities. Erosion-resistant vegetation should be maintained on the face of all slopes. Typically, soils along the top portion of a fill slope face will creep laterally. NATS recommends against building distress-sensitive hardscape improvements within five feet of slope crests.

5.13 Controlled Low Strength Materials (CLSM)

Controlled Low Strength Materials (CLSM) may be used in deepened footing excavation areas, building pads, and/or adjacent to retaining walls or other structures, provided the appropriate following recommendations are also incorporated. Minimum overexcavation depths recommended herein beneath slabs, flatwork, and other areas may be applicable beneath CLSM if/where CLSM is to be used, and excavation bottoms should be observed by NATS prior to placement of CLSM. Prior to CLSM placement, the excavation should be free of debris, loose soil materials, and water. Once specific areas to utilize CLSM have been determined, NATS should review the locations to determine if additional recommendations are appropriate.

CLSM should consist of a minimum three-sack cement/sand slurry with a minimum 28-day compressive strength of 100 psi (or equal to or greater than the maximum allowable short term soil bearing pressure provided herein, whichever is higher) as determined by ASTM D4832. If re-excavation is anticipated, the compressive strength of CLSM should generally be limited to a maximum of 150 psi per ACI 229R-99. Where re-excavation is required, two-sack cement/sand slurry may be used to help limit the compressive strength. The allowable soils bearing pressure and coefficient of friction provided herein should still govern foundation design. CLSM may not be used in lieu of structural concrete where required by the structural engineer.

5.14 Vehicular Pavements and Site Improvements

Recommended pavement sections for auto drive/parking and truck drive/loading areas are presented in the table below. Two options are presented below. Option 1 is for construction of asphaltic concrete pavements and Option 2 is for construction of concrete pavements. The pavement sections presented below are based on a laboratory determined Resistance "R"- Value. All Class II aggregate base should meet or exceed Caltrans Standard Specifications (including Minimum R-Value=78). For onsite design it is assumed that the upper 12 inches of subgrade and all base materials are properly compacted to 95% relative compaction at above optimum moisture content.

TABLE 5
RECOMMENDED PAVEMENT THICKNESS

Traffic Area	Assumed Traffic Index	Subgrade "R"-Value	Option 1: Asphalt Pavements		Option 2: PCC Concrete Pavements
			AC Thickness (inches)	Class II AB Thickness (inches)	PCC/CL2 AB (inches)
Auto Drive /Parking	5.0	44	3.0	4.0	5.5/6.0
Truck Drive /Loading	6.0	44	3.0	6.0	6.0/6.0

Please note that these pavement sections may not be acceptable for city or public street repair or improvements. The Traffic Indexes (TI's) used in the calculations of pavement sections were assumed, sections for other TI's can be provided if desired from data in-hand upon your request.

5.15 Plan Review

NATS should be authorized to review the project grading and foundation plans prior to commencement of earthwork in order to provide additional recommendations, if necessary.

5.16 Construction Observation

The recommendations provided in this report are based on preliminary design information for the proposed construction and the subsurface conditions observed in the soil borings. The interpolated subsurface conditions should be confirmed by NATS during construction with respect to anticipated conditions. Upon completion of precise grading, if necessary, soil samples will be collected to evaluate as-built Expansion Index. Foundation recommendations may be revised upon completion of grading, and as-built laboratory tests results. Additionally, soil samples should be taken in pavement subgrade areas upon rough grading to refine pavement recommendations as necessary.

Recommendations provided in this report are based on the understanding and assumption that NATS will provide the observation and testing services for the project. All earthworks should be observed and tested in accordance with recommendations contained within this report. NATS should evaluate footing excavations before reinforcing steel placement.

6.0 LIMITATIONS OF INVESTIGATION

The field evaluation, laboratory testing and geotechnical analysis presented in this report have been conducted according to current engineering practice and the standard of care exercised by reputable geotechnical consultants performing similar tasks in this area. No other warranty, expressed or implied, is made regarding the conclusions, recommendations and opinions expressed in this report. Variations may exist and conditions not observed or described in this report may be encountered during construction. This report is prepared for the project as described. It is not prepared for any other property or party.

The recommendations provided herein have been developed in order to reduce the post-construction movement of site improvements related to soil settlement. However, even with the design and construction recommendations presented herein, some post-construction movement and associated distress may occur.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside NATS's involvement. Therefore, this report is subject to review and should not be relied upon after a period of three years.

NATS's conclusions and recommendations are based on an analysis of the observed conditions. If conditions different from those described in this report are encountered, NATS should be notified and additional recommendations, if required, will be provided subject to NATS remaining as authorized geotechnical consultant of record. This report is for use of the project as described. It should not be utilized for any other project.

NATS appreciates this opportunity to be of service on this project. If you have any questions regarding this report, please do not hesitate to contact the underground.

Respectfully submitted,

NORTH AMERICAN TECHNICAL SERVICES, INC

Sergio Carrera, PE

T Alan Krause
Staff Geologist

REGISTERED PROFESSIONAL ENGINEER
SERGIO CARRERA
No. C67589
EXP. 6/30/25
CIVIL
STATE OF CALIFORNIA

APPENDIX A

REFERENCES

REFERENCES

1. American Society for Civil Engineers, 2016, "Minimum Design Loads for Buildings and Other Structures", ASCE/SEI 7-16.

2. ASTM, 2002, "Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort," Volume 04.08

3. Bryant, W.A., compiler, 2017, Fault number 723, Vernalis fault, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults, accessed 02/01/2021 01:58 PM.

4. California Building Code, 2019, "California Code of Regulations, Title 24, Part 2, Volume 2 of 2," California Building Standards Commission, published by ICBO, June.

5. FEMA, 2012, Flood Insurance Rate Map, Panel 200 of 1225 Map Number 06047C0200G, Merced County, California and Incorporated Areas

6. Frankel, A.D., Petersen, M.D., Mueller, C.S., Haller, K.M., Wheeler, R.L., Leyendecker, E.V., Wesson, R.L. Harmsen, S.C., Cramer, C.H., Perkins, D.M., and Rukstales, K.S., 2002, Documentation for the 2002 update of the National Seismic Hazard Maps: U.S. Geological Survey Open-File Report 02-420, 33 p.

7. Hart, Earl W., and Bryant, William A., Revised 2018, "Fault-Rupture Hazard Zones in California, Alquist Priolo, Special Studies Zones Act of 1972," California Division of Mines and Geology, Special Publication 42.

8. Jennings, Charles W., 1994, "Fault Activity Map of California and Adjacent Areas" with Locations and Ages of Recent Volcanic Eruptions.

9. SEAOC, Blue Book-Seismic Design Recommendations, "Seismically Induced Lateral Earth Pressures on Retaining Structures and Basement Walls", Article 09.10.010, October 2013.

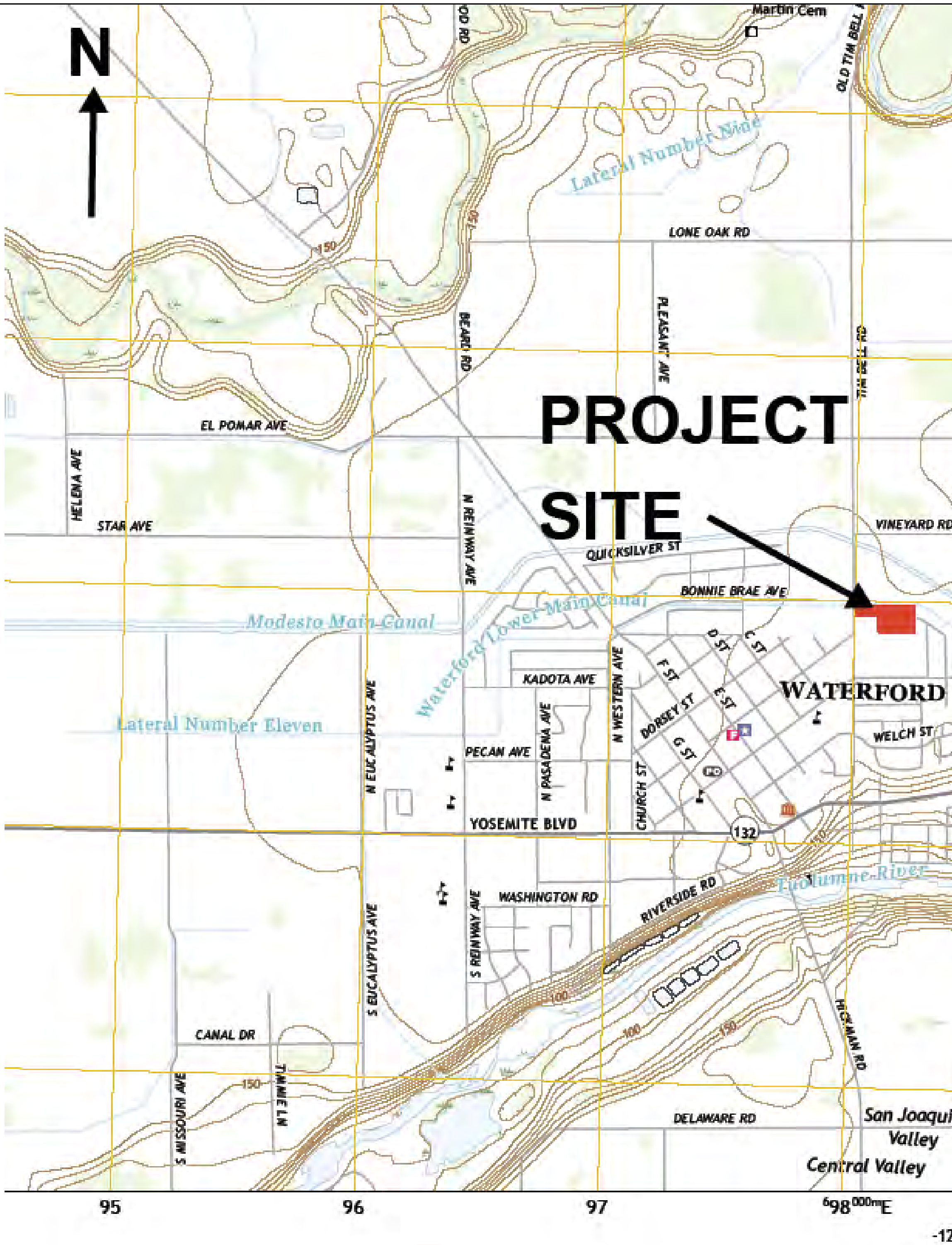
10. Seed, H.B., and R.V. Whitman, 1970, "Design of Earth Retaining Structures for Dynamic Loads", in Proceedings, ASCE Specialty Conference on Lateral Stresses in the Ground and Design of Earth-Retaining Structures, pp. 103-147, Ithaca, New York: Cornell University.

11. Wagner, E.J., Bortugno, E.J., and McJunkin, R.D., 1991, Geologic Map of San Francisco-San Jose Quadrangle, California 1:250,000, Map No. 5A, Sheet 1 of 5.

12. Wood, J.H. 1973, Earthquake-Induced Soil Pressures on Structures, Report EERL 73-05. Pasadena: California Institute of Technology.

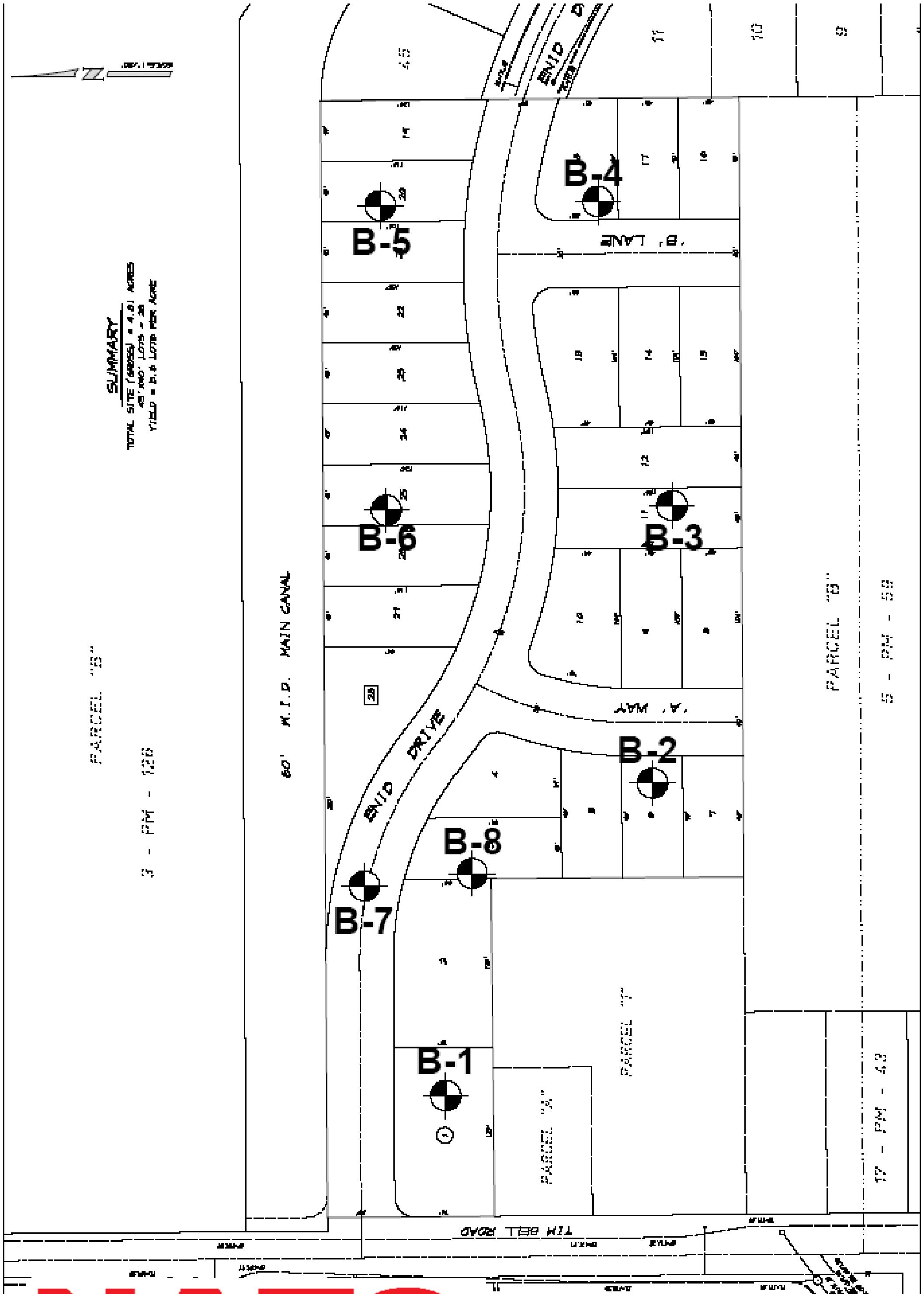
APPENDIX B

BORING LOGS



NATS

SITE INDEX MAP PROPOSED SUBDIVISION Waterford Site-2 Tim Bell Road Waterford, California	NATS JOB NO. 23-834G-B	
	SCALE NTS	
	DATE 1/4/24	FIGURE 1



NATS

EXPLORATION MAP PROPOSED SUBDIVISION Waterford Site-2 Tim Bell Road Waterford, California	NATS JOB NO. 23-834G-B	
	SCALE NTS	
	DATE 1/4/24	FIGURE 2

NATS

DEFINITION OF TERMS

PRIMARY DIVISIONS			SYMBOLS	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	**GRAVELS** MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS < 5% FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS OR GRAVEL SAND MIXTURES, LITTLE OF NO FINES
		GRAVELS WITH FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS < 5% FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES	SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	**SILTS AND CLAYS** LIQUID LIMIT IS LESS THAN 50		ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, SLIGHTLY PLASTIC CLAYEY SILTS
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY, SANDY, SILTS OR LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTY CLAYS
HIGHLY ORGANIC SOILS			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAIN SIZES

BOULDERS	COBBLES	GRAVEL		SAND			SILTS AND CLAYS
		COARSE	FINE	COARSE	MEDIUM	FINE	

12" 3" 3/4" 4 10 40 200

CLEAR SQUARE SIEVE OPENING U.S. STANDARD SIEVE SIZE

ADDITIONAL TESTS

(OTHER THAN TEST PIT AND BORING LOG COLUMN HEADINGS)

MAX- Maximum Dry Density
GS- Grain Size Distribution
SE- Sand Equivalent
EI- Expansion Index
CHM- Sulfate and Chloride Content , pH, Resistivity
COR - Corrosivity
SD- Sample Disturbed

PM- Permeability
SG- Specific Gravity
HA- Hydrometer Analysis
AL- Atterberg Limits
RV- R-Value
CN- Consolidation
CP- Collapse Potential
HC- Hydrocollapse
REM- Remolded

PP- Pocket Penetrometer
WA- Wash Analysis
DS- Direct Shear
UC- Unconfined Compression
MD- Moisture/Density
M- Moisture
SC- Swell Compression
OI- Organic Impurities

FIGURE: BL1

BORING LEGEND

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0								Block or Chunk Sample	
								Bulk Sample	
5									
								Standard Penetration Test	
10								Modified Split-Barrel Drive Sampler (Cal Sampler)	
								Thin Walled Army Corp. of Engineers Sample	
15								Groundwater Table	
								Soil Type or Classification Change	
20								? ——— ? ——— ? ——— ? ——— ? ——— ? ——— ? —	
								Formation Change [(Approximate boundaries queried (?)]	
25						"SM"		Quotes are placed around classifications where the soils exist in situ as bedrock	

FIGURE: BL2

NATS

PROJECT:	Site-2 Tim Bell Rd, Waterford	DRILLER:	NATS	SHEET:	1 of 3
JOB NO:	23-834G-B	DRILL METHOD:	4" Auger	DRILL DATE:	12/11/2023
LOGGED BY:	AK	SAMPLE METHOD:	Bulk from cuttings	ELEVATION:	EGS

BORING: B-1

Depth (Feet)	Bulk Sample	Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0									
			2 2 3			SM		Loose, brown, damp, silty fine SAND	
5						SM		As Above	
			2 7 20	81.8		CL		Hard, gray, dry, low plastic CLAY	PP=2.5 tsf
						SC		Very dense, orange brown, damp, clayey fine to coarse SAND with fine gravel	
10			50+						
								Total Depth = 10.5 ft, No free groundwater Encountered Boring Grout Backfilled 12/11/23	
15									
20									
25									

NATS

PROJECT:	Site-2 Tim Bell Rd, Waterford	DRILLER:	NATS	SHEET:	1	of	3
JOB NO:	23-834G-B	DRILL METHOD:	4" Auger	DRILL DATE:	12/11/2023		
LOGGED BY:	AK	SAMPLE METHOD:	Bulk from cuttings	ELEVATION:		EGS	

BORING: B-2

Depth (Feet)	Bulk Sample	Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0									
		X	4 6 7	85.4	2.3	SM		Medium dense, brown, damp, silty fine SAND	
5		X	3 3 5			SM		As Above, loose	
						SM		As Above	
						GC		Dense, brown, damp, clayey fine gravel w/sand	
10		X	13 20 25						
								Total Depth = 11.5 ft, No free groundwater Encountered Boring Grout Backfilled 12/11/23	
15									
20									
25									

NATS

PROJECT:	Site-2 Tim Bell Rd, Waterford	DRILLER:	NATS	SHEET:	1 of 3
JOB NO:	23-834G-B	DRILL METHOD:	4" Auger	DRILL DATE:	12/11/2023
LOGGED BY:	AK	SAMPLE METHOD:	Bulk from cuttings	ELEVATION:	EGS

BORING: B-3

Depth (Feet)	Bulk Sample	Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0									
		X	5 7 11			SM		Medium dense, brown, damp, silty fine SAND	
5		X	5 5 6			GM		Medium dense, orange brown, silty fine GRAVEL with sand	
10		X	10 20 18			GM		As Above, dense	
								Total Depth = 11.5 ft, No free groundwater Encountered Boring Grout Backfilled 12/11/23	
15									
20									
25									

NATS

PROJECT:	Site-2 Tim Bell Rd, Waterford	DRILLER:	NATS	SHEET:	1 of 3
JOB NO:	23-834G-B	DRILL METHOD:	4" Auger	DRILL DATE:	12/11/2023
LOGGED BY:	AK	SAMPLE METHOD:	Bulk from cuttings	ELEVATION:	EGS

BORING: B-5

Depth (Feet)	Bulk Sample	Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0									
			1 1 1			SM		Very loose, brown, damp, silty fine SAND	
5			9 25 30			GC		Very dense, light brown, damp, clayey fine GRAVEL w/ sand	
10			6 8 11			GC		As Above, Medium dense	
								Total Depth = 11.5 ft, No free groundwater Encountered Boring Grout Backfilled 12/11/23	
15									
20									
25									

NATS

PROJECT:	Site-2 Tim Bell Rd, Waterford	DRILLER:	NATS	SHEET:	1 of 3
JOB NO:	23-834G-B	DRILL METHOD:	4" Auger	DRILL DATE:	12/11/2023
LOGGED BY:	AK	SAMPLE METHOD:	Bulk from cuttings	ELEVATION:	EGS

BORING: B-4

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0									
		X	1 1 2			SM		Very loose, brown, damp, silty fine SAND	NP 39.8%<#200
5		X	2 12 24			SM		As Above	
						CL		Hard, orange brown, damp, fine gravelly CLAY	
		X	50+			GC		Very dense, orange brown, damp, clayey fine GRAVEL w/ sand	
10								Total Depth = 8.5 ft, Auger Refusal No free groundwater Encountered Boring Grout Backfilled 12/11/23	
15									
20									
25									

NATS

PROJECT:	Site-2 Tim Bell Rd, Waterford	DRILLER:	NATS	SHEET:	1 of 3
JOB NO:	23-834G-B	DRILL METHOD:	4" Auger	DRILL DATE:	12/11/2023
LOGGED BY:	AK	SAMPLE METHOD:	Bulk from cuttings	ELEVATION:	EGS

BORING: B-6

Depth (Feet)	Bulk Sample	Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0									
		X	1 1 2			SM		Very loose, brown, damp, silty fine SAND	NP 48.8%<#200
5		X	1 2 4			SM		As Above	
						CL		Stiff, gray, damp, low plastic CLAY	
10		X	11 17 30			GC		Dense, orange brown, damp, clayey fine GRAVEL w/ sand	
								Total Depth = 11.5 ft, No free groundwater Encountered Boring Grout Backfilled 12/11/23	
15									
20									
25									

PROJECT:	Site-2 Tim Bell Rd, Waterford	DRILLER:	NATS	SHEET:	1 of 3
JOB NO:	23-834G-B	DRILL METHOD:	4" Auger	DRILL DATE:	12/11/2023
LOGGED BY:	AK	SAMPLE METHOD:	Bulk from cuttings	ELEVATION:	EGS

BORING: B-7

Depth (Feet)	Bulk Sample	Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		Loose, brown, damp, silty fine SAND	RV=44
								Total Depth = 2.0 ft, No free groundwater Encountered Boring Grout Backfilled 12/11/23	
5									
10									
15									
20									
25									

PROJECT:	Site-2 Tim Bell Rd, Waterford	DRILLER:	H1 Drilling	SHEET:	1 of 3
JOB NO:	23-834G-B	DRILL METHOD:	4" Auger/CME-75	DRILL DATE:	11/28/2023
LOGGED BY:	AK	SAMPLE METHOD:	Bulk from cuttings	ELEVATION:	EGS

BORING: B-8

Depth (Feet)	Bulk Sample	Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0									
						SM		Medium dense, brown, damp, silty fine SAND	
5						CL		Hard, brown, damp, low plastic CLAY	
10						CL		As Above	
15						CL		As Above	
						GM		Dense, gray, dry, silty fine GRAVEL with sand	
20						CL		Very stiff, brown, damp, low plastic CLAY	
						CL		As Above	
25									

cont'd on p. 2

PROJECT:	Site-2 Tim Bell Rd, Waterford	DRILLER:	H1 Drilling	SHEET:	2 of 3
JOB NO:	23-834G-B	DRILL METHOD:	4" Auger/CME-75	DRILL DATE:	11/28/2023
LOGGED BY:	AK	SAMPLE METHOD:	Bulk from cuttings	ELEVATION:	EGS

BORING: B-8 (Cont'd)

Depth (Feet)	Bulk Sample	Driven Sample Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
25						CL		Very stiff, brown, damp, low plastic CLAY	
30						CL		As Above	
35						CL		As Above	
40						CL		As Above	
45						CL		As Above	
50						CL		As Above	

Cont'd on P. 3

NATS

PROJECT:	Site-2 Tim Bell Rd, Waterford	DRILLER:	H1 Drilling	SHEET:	3 of 3
JOB NO:	23-834G-B	DRILL METHOD:	4" Auger/CME-75	DRILL DATE:	11/28/2023
LOGGED BY:	AK	SAMPLE METHOD:	Bulk from cuttings	ELEVATION:	EGS

BORING: B-8 (Cont'd)

Depth (Feet)	Bulk Sample	Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
50						CL		Very stiff, brown, damp, low plastic CLAY	
55						Cl		As Above	
						CL		As Above	
60								Total Depth = 60.0 ft, No free groundwater Encountered Boring Grout Backfilled 11/28/23	
65									
70									
75									

APPENDIX C

LABORATORY TEST RESULTS AND METHODS

APPENDIX C
LABORATORY METHODS AND RESULTS

Laboratory Testing Program

Laboratory tests were performed on representative soil samples to detect their relative engineering properties. Tests were performed following test methods of the American Society for Testing Materials or other accepted standards. The following presents a brief description of the various test methods used.

Classification

Soils were classified visually according to the Unified Soil Classification System. Visual classifications were supplemented by laboratory testing of selected samples according to ASTM D2487. The soil classifications are shown on the Exploration Logs in Appendix B.

In-Place Moisture and Density

The in-place moisture content and densities of selected samples were determined using relatively undisturbed soil samples.

US Sieve No. 200 Wash Analysis

The amount of material finer than the No. 200 sieve in soil by washing was performed on selected representative samples according to ASTM D 1140-17.

Resistance “R”-value

A Resistance “R”-value was performed on a selected representative sample according to CTM 301.

Atterberg Limits

Atterberg Limits were performed on selected representative samples according to ASTM D 4318.

NATS

LABORATORY TEST RESULTS

MOISTURE & DENSITY

ASTM D 4829

LOCATION	DEPTH (feet)	MOISTURE %	DENSITY PCF
B-1/5'	5.0-5.5		81.8
B-2/1'	1.0-2.5	2.3	85.4

200 WASH ANALYSIS

LOCATION	DEPTH (feet)	PERCENT PASSING #200 SIEVE	CLASSIFICATION
B-4/1'	1.0-2.5	39.8	SM
B-6/1'	1.0-2.5	48.8	SM

ATTERBERG LIMITS

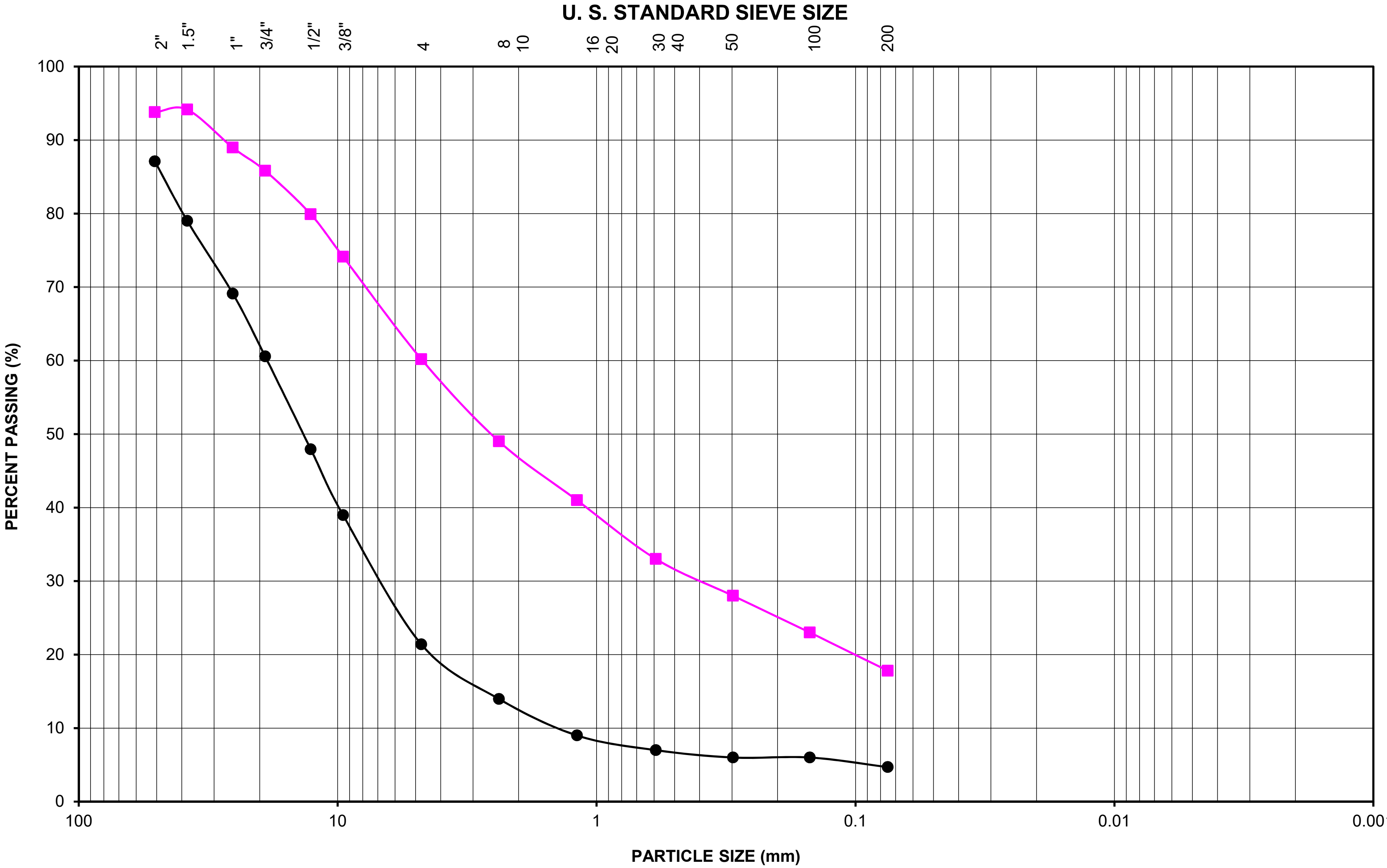
ASTM D4318

LOCATION	DEPTH (feet)	LIQUID LIMIT	PLASTIC INDEX
B-4/1'	1.0-2.5	--	NP
B-6/1'	1.0-2.5	--	NP

RESISTANCE "R"-VALUE

CALTEST 301

LOCATION	DEPTH (feet)	R-VALUE
B-7/ 0.0-2.0'	0.0-2.0	44



PARTICLE SIZE ANALYSIS

Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
0	0	●	-	-	0
0	0	■	-	-	0
NATS JOB NUMBER:		0		FIGURE:	C-1

APPENDIX D

STANDARD SPECIFICATIONS FOR GRADING

Section 1 - General

North American Technical Services, Inc. (NATS) presents the following standard recommendations for grading and other associated operations on construction projects. These guidelines should be considered a portion of the project specifications. Recommendations contained in the body of the previously presented soils report shall supersede the recommendations and or requirements as specified herein. The project geotechnical consultant shall interpret disputes arising out of interpretation of the recommendations contained in the soils report or specifications contained herein.

Section 2 - Responsibilities of Project Personnel

The geotechnical consultant should provide observation and testing services sufficient to general conformance with project specifications and standard grading practices. The geotechnical consultant should report any deviations to the client or his authorized representative.

The Client should be chiefly responsible for all aspects of the project. He or his authorized representative has the responsibility of reviewing the findings and recommendations of the geotechnical consultant. He shall authorize or cause to have authorized the Contractor and/or other consultants to perform work and/or provide services. During grading the Client or his authorized representative should remain on-site or should remain reasonably accessible to all concerned parties in order to make decisions necessary to maintain the flow of the project.

The Contractor is responsible for the safety of the project and satisfactory completion of all grading and other associated operations on construction projects, including, but not limited to, earth work in accordance with the project plans, specifications and controlling agency requirements.

Section 3 - Preconstruction Meeting

A preconstruction site meeting should be arranged by the owner and/or client and should include the grading contractor, design engineer, geotechnical consultant, owner's representative and representatives of the appropriate governing authorities.

Section 4 - Site Preparation

The client or contractor should obtain the required approvals from the controlling authorities for the project prior, during and/or after demolition, site preparation and removals, etc. The appropriate approvals should be obtained prior to proceeding with grading operations.

Clearing and grubbing should consist of the removal of vegetation such as brush, grass, woods, stumps, trees, root of trees and otherwise deleterious natural materials from the areas to be graded. Clearing and grubbing should extend to the outside of all proposed excavation and fill areas.

Demolition should include removal of buildings, structures, foundations, reservoirs, utilities (including underground pipelines, septic tanks, leach fields, seepage pits, cisterns, mining shafts, tunnels, etc.) and other man-made surface and subsurface improvements from the areas to be graded. Demolition of utilities should include proper capping and/or rerouting pipelines at the project perimeter and cutoff and capping of wells in accordance with the requirements of the governing authorities and the recommendations of the geotechnical consultant at the time of demolition.

Trees, plants or man-made improvements not planned to be removed or demolished should be protected by the contractor from damage or injury.

Debris generated during clearing, grubbing and/or demolition operations should be wasted from areas to be graded and disposed off-site. Clearing, grubbing and demolition operations should be performed under the observation of the geotechnical consultant.

Section 5 - Site Protection

Protection of the site during the period of grading should be the responsibility of the contractor. Unless other provisions are made in writing and agreed upon among the concerned parties, completion of a portion of the project should not be considered to preclude that portion or adjacent areas from the requirements for site protection until such time as the entire project is complete as identified by the geotechnical consultant, the client and the regulating agencies.

Precautions should be taken during the performance of site clearing, excavations and grading to protect the work site from flooding, ponding or inundation by poor or improper surface drainage. Temporary provisions should be made during the rainy season to adequately direct surface drainage away from and off the work site. Where low areas cannot be avoided, pumps should be kept on hand to continually remove water during periods of rainfall.

Rain related damage should be considered to include, but may not be limited to, erosion, silting, saturation, swelling, structural distress and other adverse conditions as determined by the geotechnical consultant. Soil adversely affected should be classified as unsuitable materials and should be subject to overexcavation and replacement with compacted fill or other remedial grading as recommended by the geotechnical consultant.

The contractor should be responsible for the stability of all temporary excavations. Recommendations by the geotechnical consultant pertaining to temporary excavations (e.g., backcuts) are made in consideration of stability of the completed project and, therefore, should not be considered to preclude the responsibilities of the contractor. Recommendations by the geotechnical consultant should not be considered to preclude requirements that are more restrictive by the regulating agencies. The contractor should provide during periods of extensive rainfall plastic sheeting to prevent unprotected slopes from becoming saturated and unstable. When deemed appropriate by the geotechnical consultant or governing agencies the contractor shall install checkdams, desilting basins, sand bags or other drainage control measures.

In relatively level areas and/or slope areas, where saturated soil and/or erosion gullies exist to depths of greater than 1.0 foot; they should be overexcavated and replaced as compacted fill in accordance with the applicable specifications. Where affected materials exist to depths of 1.0 foot or less below proposed finished grade, remedial grading by moisture conditioning in-place, followed by thorough recompaction in accordance with the applicable grading guidelines herein may be attempted. If the desired results are not achieved, all affected materials should be overexcavated and replaced as compacted fill in accordance with the slope repair recommendations herein. If field conditions dictate, the geotechnical consultant may recommend other slope repair procedures.

Section 6 - Excavations

6.1 Unsuitable Materials

Materials that are unsuitable should be excavated under observation and recommendations of the geotechnical consultant. Unsuitable materials include, but may not be limited to, dry, loose, soft, wet, organic compressible natural soils and fractured, weathered, soft bedrock and nonengineered or otherwise deleterious fill materials.

Material identified by the geotechnical consultant as unsatisfactory due to its moisture conditions should be overexcavated; moisture conditioned as needed, to a uniform at or above optimum moisture condition before placement as compacted fill.

If during the course of grading adverse geotechnical conditions are exposed which were not anticipated in the preliminary soil report as determined by the geotechnical consultant additional exploration, analysis, and treatment of these problems may be recommended.

6.2 Cut Slopes
Unless otherwise recommended by the geotechnical consultant and approved by the regulating agencies, permanent cut slopes should not be steeper than 2:1 (horizontal: vertical).

The geotechnical consultant should observe cut slope excavation and if these excavations expose loose cohesionless, significantly fractured or otherwise unsuitable material, the materials should be overexcavated and replaced with a compacted stabilization fill. If encountered specific cross section details should be obtained from the Geotechnical Consultant.

When extensive cut slopes are excavated or these cut slopes are made in the direction of the prevailing drainage, a non-erodible diversion swale (brow ditch) should be provided at the top of the slope.

6.3 Pad Areas
All lot pad areas, including side yard terrace containing both cut and fill materials, transitions, located less than 3 feet deep should be overexcavated to a depth of 3 feet and replaced with a uniform compacted fill blanket of 3 feet. Actual depth of overexcavation may vary and should be delineated by the geotechnical consultant during grading, especially where deep or drastic transitions are present.

For pad areas created above cut or natural slopes, positive drainage should be established away from the top-of-slope. This may be accomplished utilizing a berm drainage swale and/or an appropriate pad gradient. A gradient in soil areas away from the top-of-slopes of 2 percent or greater is recommended.

Section 7 - Compacted Fill

All fill materials should have fill quality, placement, conditioning and compaction as specified below or as approved by the geotechnical consultant.

7.1 Fill Material Quality
Excavated on-site or import materials which are acceptable to the geotechnical consultant may be utilized as compacted fill, provided trash, vegetation and other deleterious materials are removed prior to placement. All import materials anticipated for use on-site should be sampled tested and approved prior to and placement is in conformance with the requirements outlined.

Rocks 12 inches in maximum and smaller may be utilized within compacted fill provided sufficient fill material is placed and thoroughly compacted over and around all rock to effectively fill rock voids. The amount of rock should not exceed 40 percent by dry weight passing the 3/4-inch sieve. The geotechnical consultant may vary those requirements as field conditions dictate.

Where rocks greater than 12 inches but less than four feet of maximum dimension are generated during grading, or otherwise desired to be placed within an engineered fill, special handling in accordance with the recommendations below. Rocks greater than four feet should be broken down or disposed off-site.

7.2 Placement of Fill

Prior to placement of fill material, the geotechnical consultant should observe and approve the area to receive fill. After observation and approval, the exposed ground surface should be scarified to a depth of 6 to 8 inches. The scarified material should be conditioned (i.e. moisture added or air dried by continued discing) to achieve a moisture content at or slightly above optimum moisture conditions and compacted to a minimum of 90 percent of the maximum density or as otherwise recommended in the soils report or by appropriate government agencies.

Compacted fill should then be placed in thin horizontal lifts not exceeding eight inches in loose thickness prior to compaction. Each lift should be moisture conditioned as needed, thoroughly blended to achieve a consistent moisture content at or slightly above optimum and thoroughly compacted by mechanical methods to a minimum of 90 percent of laboratory maximum dry density. Each lift should be treated in a like manner until the desired finished grades are achieved.

The contractor should have suitable and sufficient mechanical compaction equipment and watering apparatus on the job site to handle the amount of fill being placed in consideration of moisture retention properties of the materials and weather conditions.

When placing fill in horizontal lifts adjacent to areas sloping steeper than 5:1 (horizontal: vertical), horizontal keys and vertical benches should be excavated into the adjacent slope area. Keying and benching should be sufficient to provide at least six-foot wide benches and a minimum of four feet of vertical bench height within the firm natural ground, firm bedrock or engineered compacted fill. No compacted fill should be placed in an area after keying and benching until the geotechnical consultant has reviewed the area. Material generated by the benching operation should be moved sufficiently away from the bench area to allow for the recommended review of the horizontal bench prior to placement of fill.

Within a single fill area where grading procedures dictate two or more separate fills, temporary slopes (false slopes) may be created. When placing fill adjacent to a false slope, benching should be conducted in the same manner as above described. At least a 3-foot vertical bench should be established within the firm core of adjacent approved compacted fill prior to placement of additional fill. Benching should proceed in at least 3-foot vertical increments until the desired finished grades are achieved.

Prior to placement of additional compacted fill following an overnight or other grading delay, the exposed surface or previously compacted fill should be processed by scarification, moisture conditioning as needed to at or slightly above optimum moisture content, thoroughly blended and recompacted to a minimum of 90 percent of laboratory maximum dry density. Where unsuitable materials exist to depths of greater than one foot, the unsuitable materials should be over-excavated.

Following a period of flooding, rainfall or overwatering by other means, no additional fill should be placed until damage assessments have been made and remedial grading performed as described herein.

Rocks 12 inch in maximum dimension and smaller may be utilized in the compacted fill provided the fill is placed and thoroughly compacted over and around all rock. No oversize material should be used within 3 feet of finished pad grade and within 1 foot of other compacted fill areas. Rocks 12 inches up to four feet maximum dimension should be placed below the upper 10 feet of any fill and should not be closer than 15 feet to any slope face. These recommendations could vary as locations of improvements dictate. Where practical, oversized material should not be placed below areas where structures or deep utilities are proposed. Oversized material should be placed in windrows on a clean, overexcavated or unyielding compacted fill or firm natural ground surface. Select native or imported granular soil (S.E. 30 or higher) should be placed and thoroughly flooded over and around all windrowed rock, such that voids are filled. Windrows of oversized material should be staggered so those successive strata of oversized material are not in the same vertical plane.

It may be possible to dispose of individual larger rock as field conditions dictate and as recommended by the geotechnical consultant at the time of placement.

The contractor should assist the geotechnical consultant and/or his representative by digging test pits for removal determinations and/or for testing compacted fill. The contractor should provide this work at no additional cost to the owner or contractor's client.

Fill should be tested by the geotechnical consultant for compliance with the recommended relative compaction and moisture conditions. Field density testing should conform to ASTM Method of Test D 1556-00, D 2922-04. Tests should be conducted at a minimum of approximately two vertical feet or approximately 1,000 to 2,000 cubic yards of fill placed. Actual test intervals may vary as field conditions dictate. Fill found not to be in conformance with the grading recommendations should be removed or otherwise handled as recommended by the geotechnical consultant.

7.3 Fill Slopes

Unless otherwise recommended by the geotechnical consultant and approved by the regulating agencies, permanent fill slopes should not be steeper than 2:1 (horizontal: vertical).

Except as specifically recommended in these grading guidelines compacted fill slopes should be over-built two to five feet and cut back to grade, exposing the firm, compacted fill inner core. The actual amount of overbuilding may vary as field conditions dictate. If the desired results are not achieved, the existing slopes should be overexcavated and reconstructed under the guidelines of the geotechnical consultant. The degree of overbuilding shall be increased until the desired compacted slope surface condition is achieved. Care should be taken by the contractor to provide thorough mechanical compaction to the outer edge of the overbuilt slope surface.

At the discretion of the geotechnical consultant, slope face compaction may be attempted by conventional construction procedures including backrolling. The procedure must create a firmly compacted material throughout the entire depth of the slope face to the surface of the previously compacted firm fill intercore.

During grading operations, care should be taken to extend compactive effort to the outer edge of the slope. Each lift should extend horizontally to the desired finished slope surface or more as needed to ultimately established desired grades. Grade during construction should not be allowed to roll off at the edge of the slope. It may be helpful to elevate slightly the outer edge of the slope. Slough resulting from the placement of individual lifts should not be allowed to drift down over previous lifts. At intervals not exceeding four feet in vertical slope height or the capability of available equipment, whichever is less, fill slopes should be thoroughly dozer trackrolled.

For pad areas above fill slopes, positive drainage should be established away from the top-of-slope. This may be accomplished using a berm and pad gradient of at least two percent.

Section 8 - Trench Backfill

Utility and/or other excavation of trench backfill should, unless otherwise recommended, be compacted by mechanical means. Unless otherwise recommended, the degree of compaction should be a minimum of 90 percent of the laboratory maximum density.

Within slab areas, but outside the influence of foundations, trenches up to one foot wide and two feet deep may be backfilled with sand and consolidated by jetting, flooding or by mechanical means. If on-site materials are utilized, they should be wheel-rolled, tamped or otherwise compacted to a firm condition. For minor interior trenches, density testing may be deleted or spot testing may be elected if deemed necessary, based on review of backfill operations during construction.

If utility contractors indicate that it is undesirable to use compaction equipment in close proximity to a buried conduit, the contractor may elect the utilization of light weight mechanical compaction equipment and/or shading of the conduit with clean, granular material, which should be thoroughly jetted in-place above the conduit, prior to initiating mechanical compaction procedures. Other methods of utility trench compaction may also be appropriate, upon review of the geotechnical consultant at the time of construction.

In cases where clean granular materials are proposed for use in lieu of native materials or where flooding or jetting is proposed, the procedures should be considered subject to review by the geotechnical consultant. Clean granular backfill and/or bedding are not recommended in slope areas.

Section 9 - Drainage

Where deemed appropriate by the geotechnical consultant, canyon subdrain systems should be installed in accordance with NATS recommendations during grading.

Typical subdrains for compacted fill buttresses, slope stabilization or sidehill masses, should be installed in accordance with the specifications.

Roof, pad and slope drainage should be directed away from slopes and areas of structures to suitable disposal areas via non-erodible devices (i.e., gutters, downspouts, and concrete swales).

For drainage in extensively landscaped areas near structures, (i.e., within four feet) a minimum of 5 percent gradient away from the structure should be maintained. Pad drainage of at least 2 percent should be maintained over the remainder of the site.

Drainage patterns established at the time of fine grading should be maintained throughout the life of the project. Property owners should be made aware that altering drainage patterns could be detrimental to slope stability and foundation performance.

Section 10 - Slope Maintenance

10.1 - Landscape Plants

To enhance surficial slope stability, slope planting should be accomplished at the completion of grading. Slope planting should consist of deep-rooting vegetation requiring little watering. Plants native to the southern California area and plants relative to native plants are generally desirable. Plants native to other semi-arid and arid areas may also be appropriate. A Landscape Architect should be the best party to consult regarding actual types of plants and planting configuration.

10.2 - Irrigation

Irrigation pipes should be anchored to slope faces, not placed in trenches excavated into slope faces.

Slope irrigation should be minimized. If automatic timing devices are utilized on irrigation systems, provisions should be made for interrupting normal irrigation during periods of rainfall.

10.3 - Repair

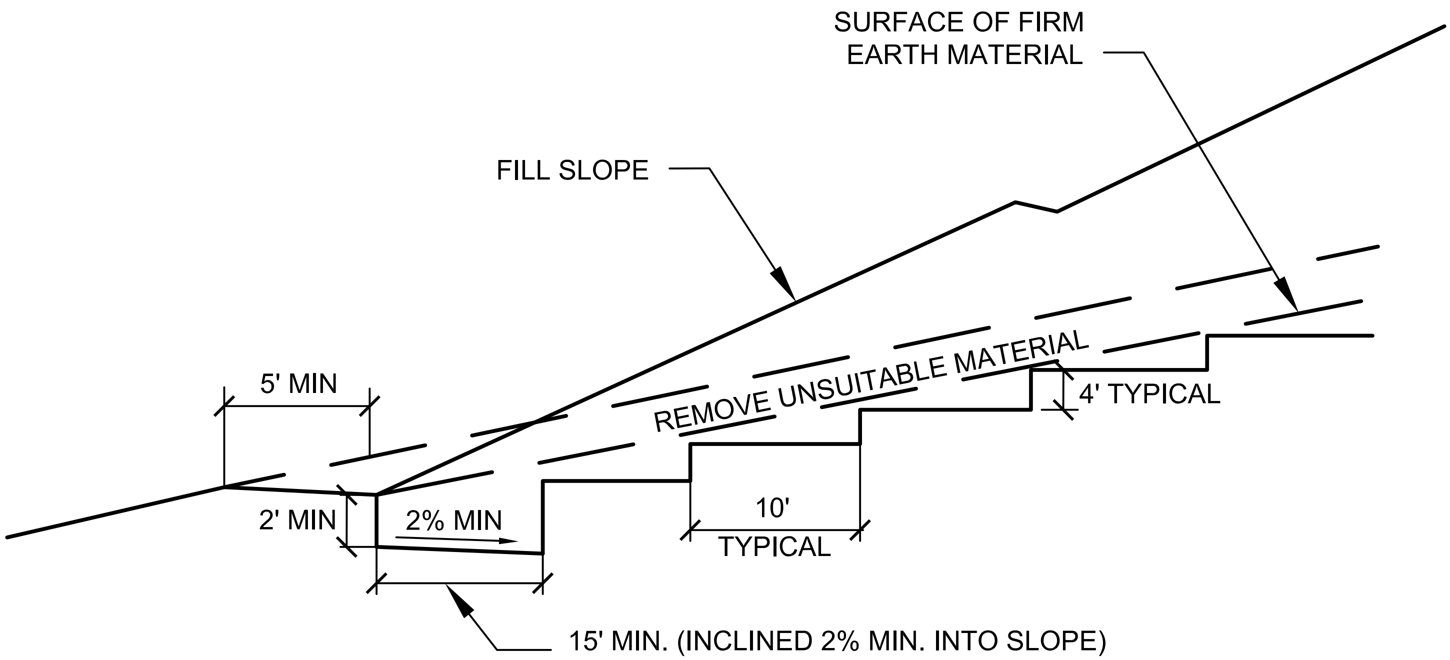
As a precautionary measure, plastic sheeting should be readily available, or kept on hand, to protect all slope areas from saturation by periods of heavy or prolonged rainfall. This measure is strongly recommended, beginning with the period prior to landscape planting.

If slope failures occur, the geotechnical consultant should be contacted for a field review of site conditions and development of recommendations for evaluation and repair.

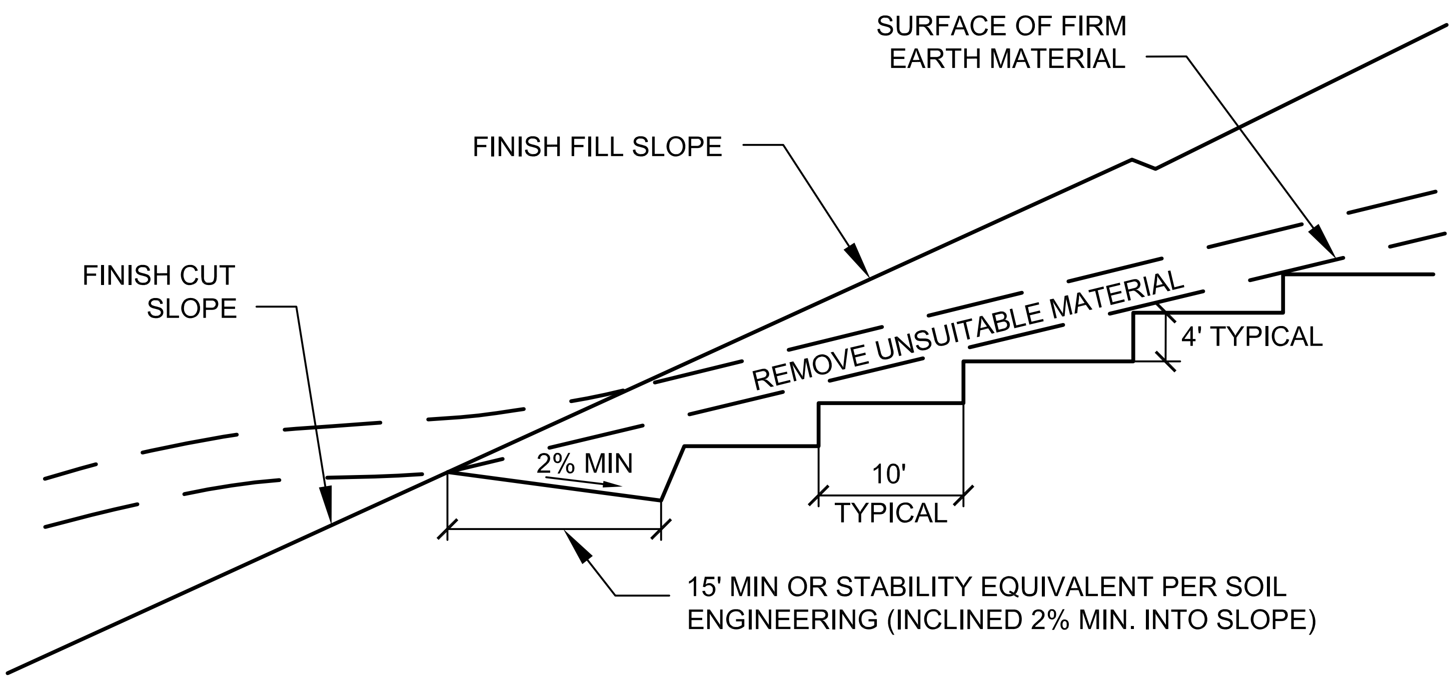
If slope failures occur as a result of exposure to period of heavy rainfall, the failure areas and currently unaffected areas should be covered with plastic sheeting to protect against additional saturation.

In the accompanying Standard Details, appropriate repair procedures are illustrated for superficial slope failures (i.e., occurring typically within the outer one foot to three feet of a slope face).

BENCHING FILL OVER NATURAL

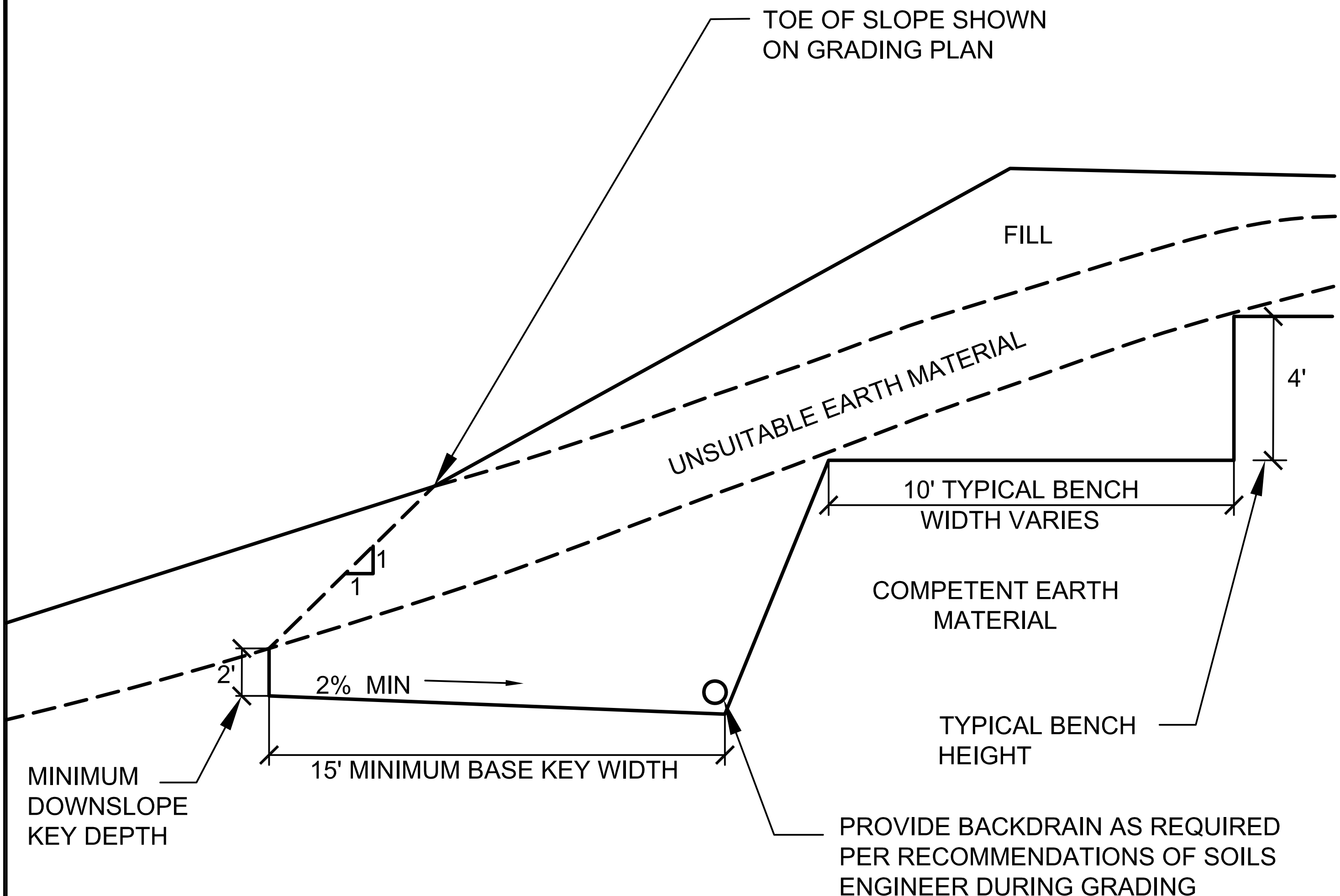


BENCHING FILL OVER CUT



NOT TO SCALE

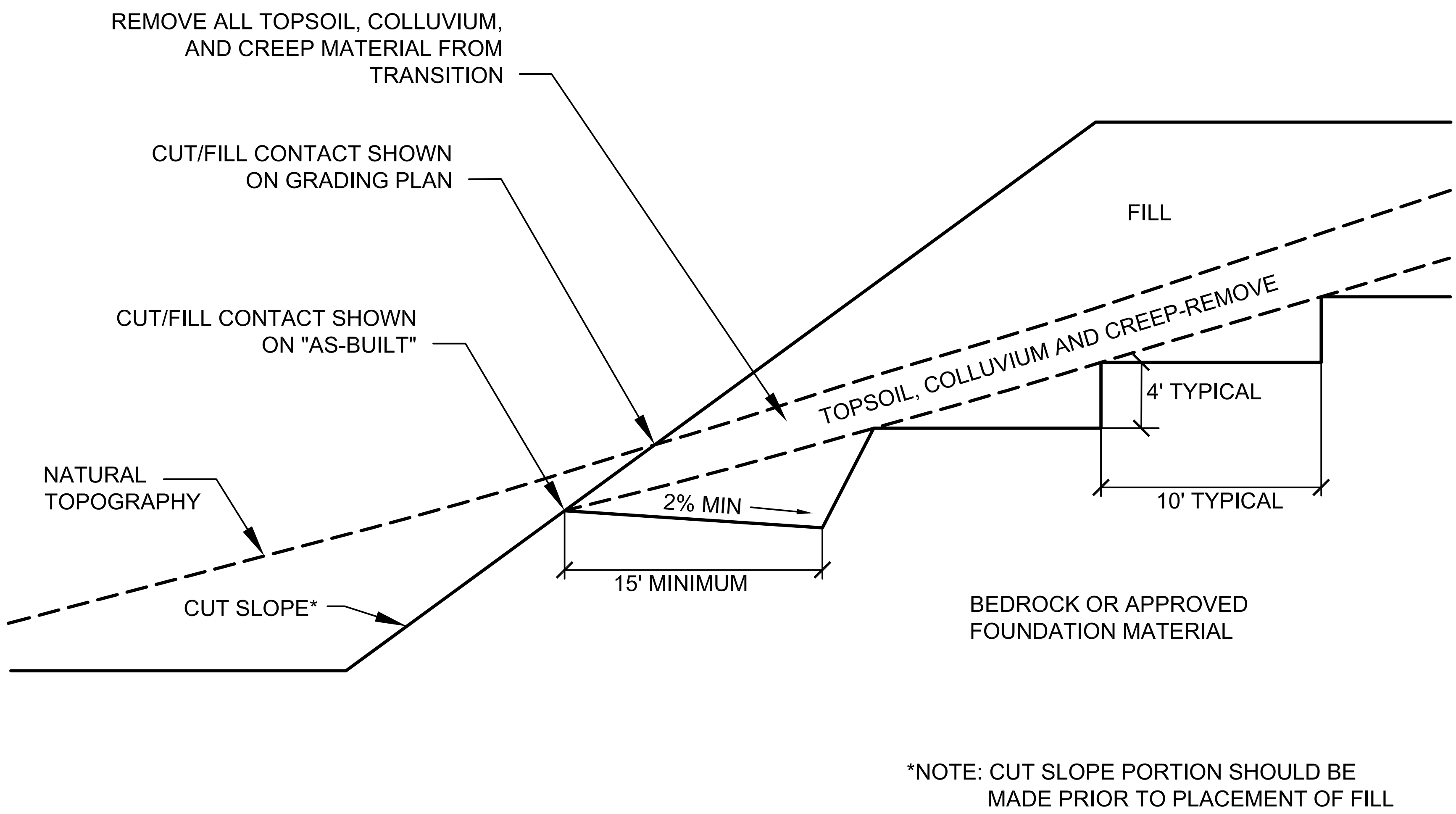
BENCHING FOR COMPACTED FILL DETAIL



WHERE NATURAL SLOPE GRADIENT IS 5:1 OR LESS, BENCHING IS NOT NECESSARY. FILL IS NOT TO BE PLACED ON COMPRESSIBLE OR UNSUITABLE MATERIAL.

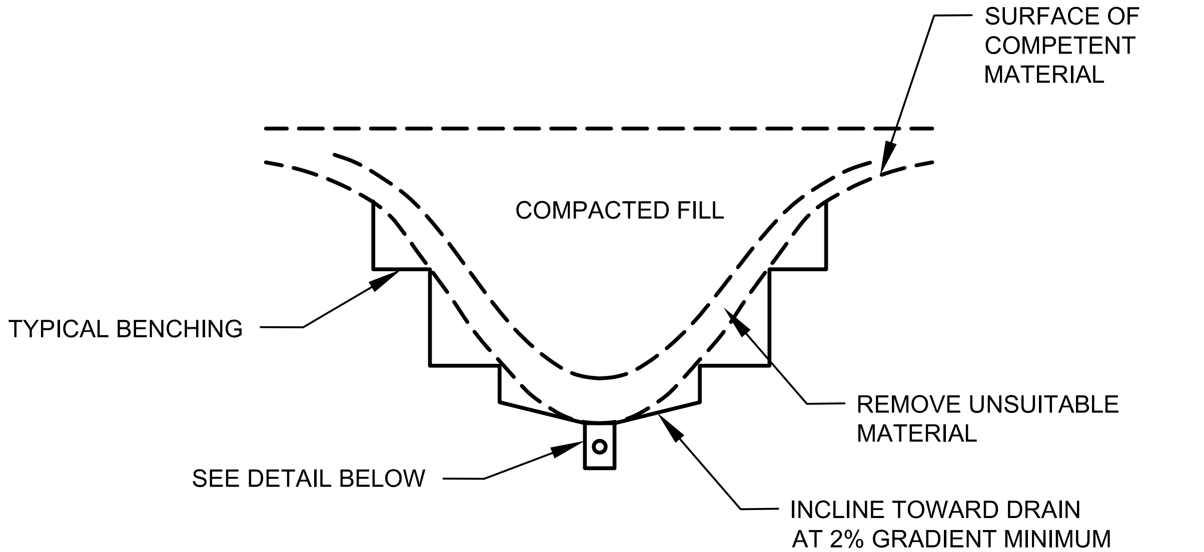
NOT TO SCALE

FILL SLOPE ABOVE NATURAL GROUND DETAIL

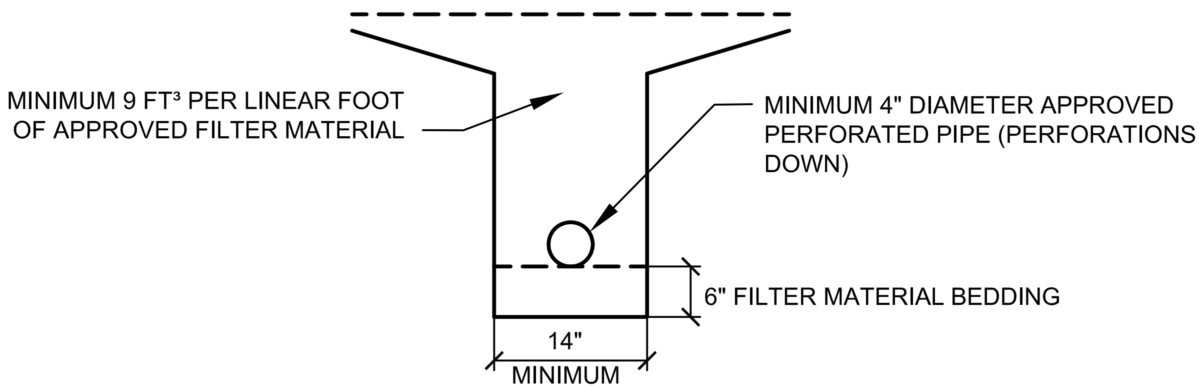


NOT TO SCALE

FILL SLOPE ABOVE CUT SLOPE DETAIL



DETAIL



FILTER MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1"	100
¾"	90-100
⅜"	40-100
NO. 4	25-40
NO. 30	18-33
NO. 8	5-15
NO. 50	0-7
NO. 200	0-3

APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYL-CHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 psi

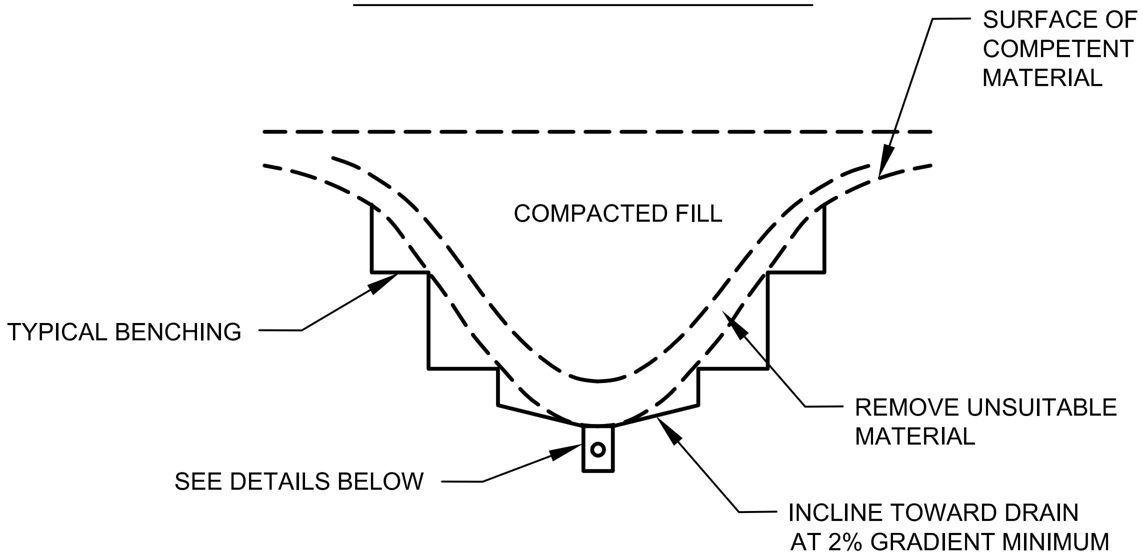
PIPE DIAMETER TO MEET THE FOLLOWING CRITERIA, SUBJECT TO FIELD REVIEW BASED ON ACTUAL GEOTECHNICAL CONDITIONS ENCOUNTERED DURING GRADING

LENGTH OF RUN	PIPE DIAMETER
INITIAL 500'	4"
500' TO 1500'	6"
> 1500'	8"

NOT TO SCALE

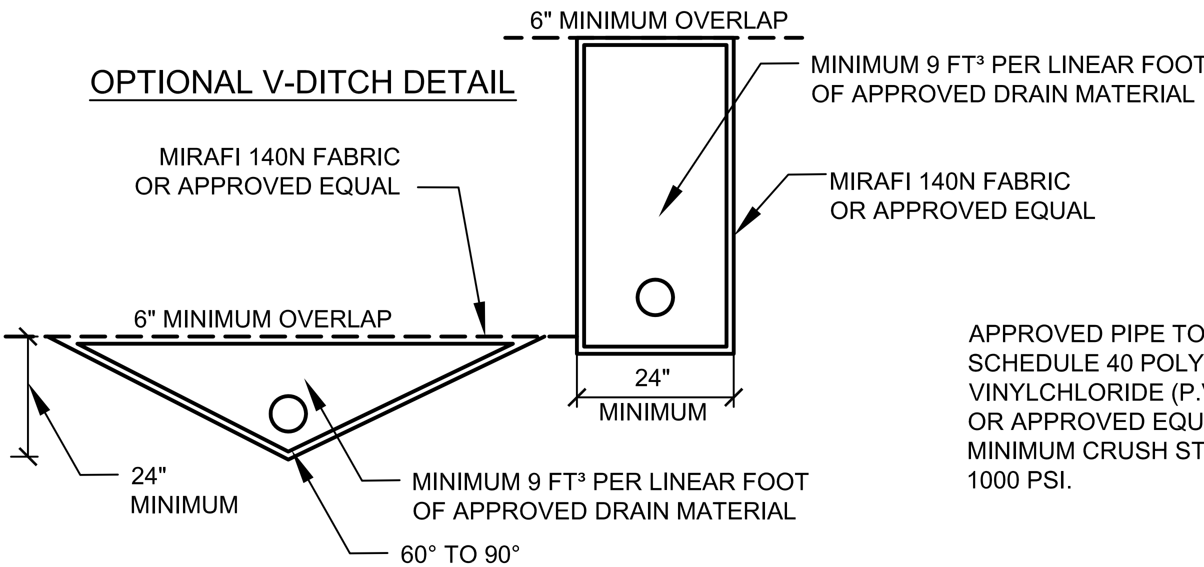
TYPICAL CANYON SUBDRAIN DETAIL

CANYON SUBDRAIN DETAILS



TRENCH DETAILS

OPTIONAL V-DITCH DETAIL



APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYLCHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 PSI.

DRAIN MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1 ½"	88-100
1"	5-40
¾"	0-17
⅜"	0-7
NO. 200	0-3

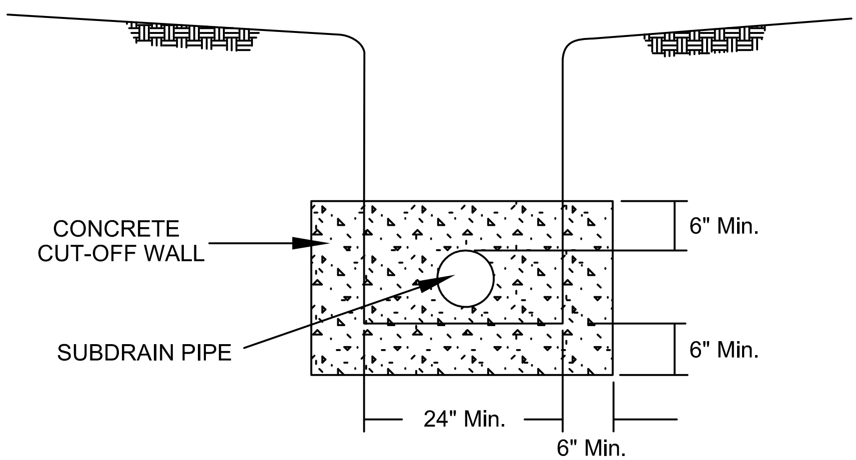
PIPE DIAMETER TO MEET THE FOLLOWING CRITERIA, SUBJECT TO FIELD REVIEW BASED ON ACTUAL GEOTECHNICAL CONDITIONS ENCOUNTERED DURING GRADING

LENGTH OF RUN	PIPE DIAMETER
INITIAL 500'	4"
500' TO 1500'	6"
> 1500'	8"

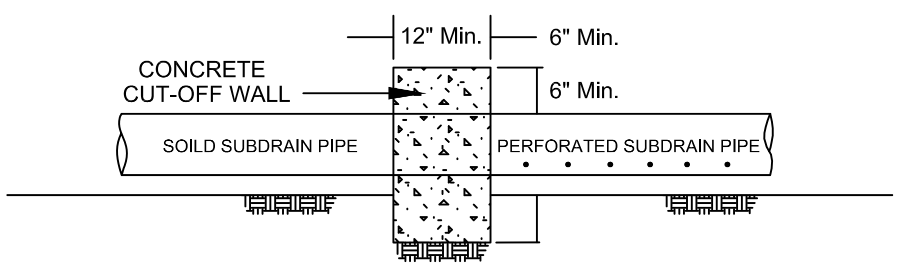
NOT TO SCALE

GEOFABRIC SUBDRAIN

FRONT VIEW



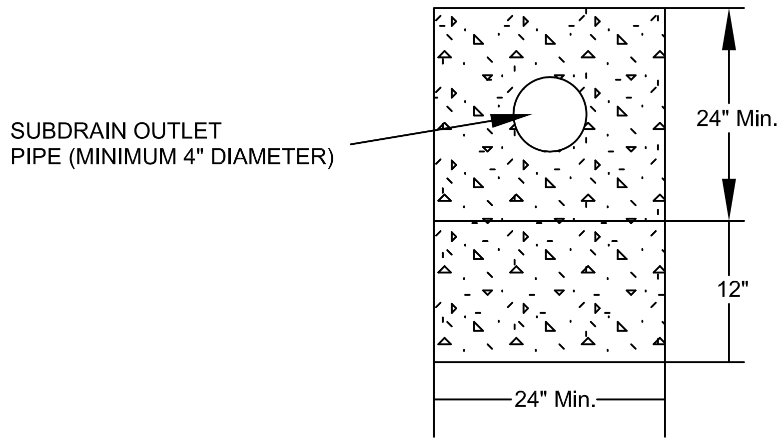
SIDE VIEW



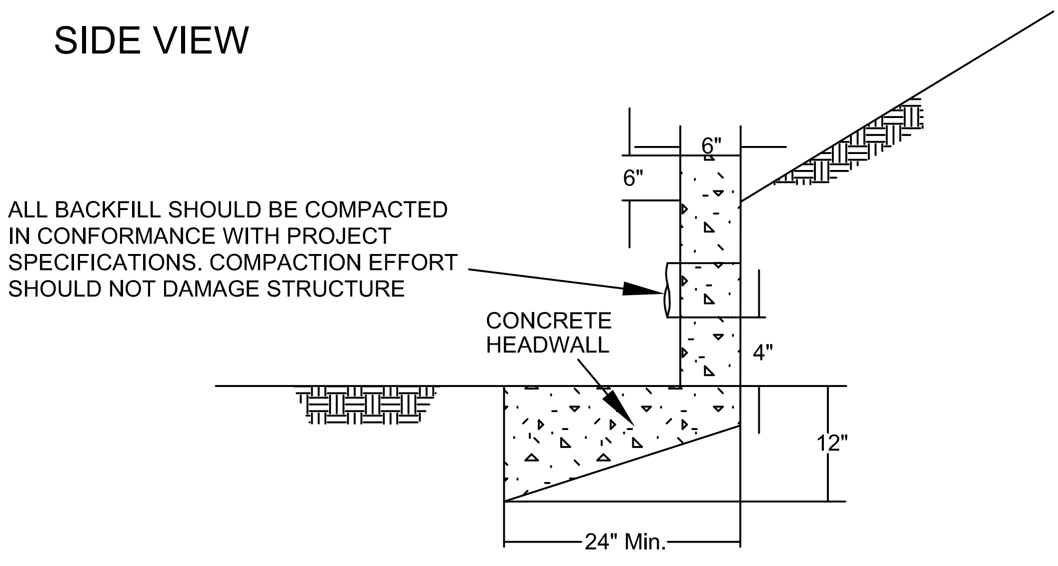
NOT TO SCALE

RECOMMENDED SUBDRAIN CUT-OFF WALL

FRONT VIEW



SIDE VIEW



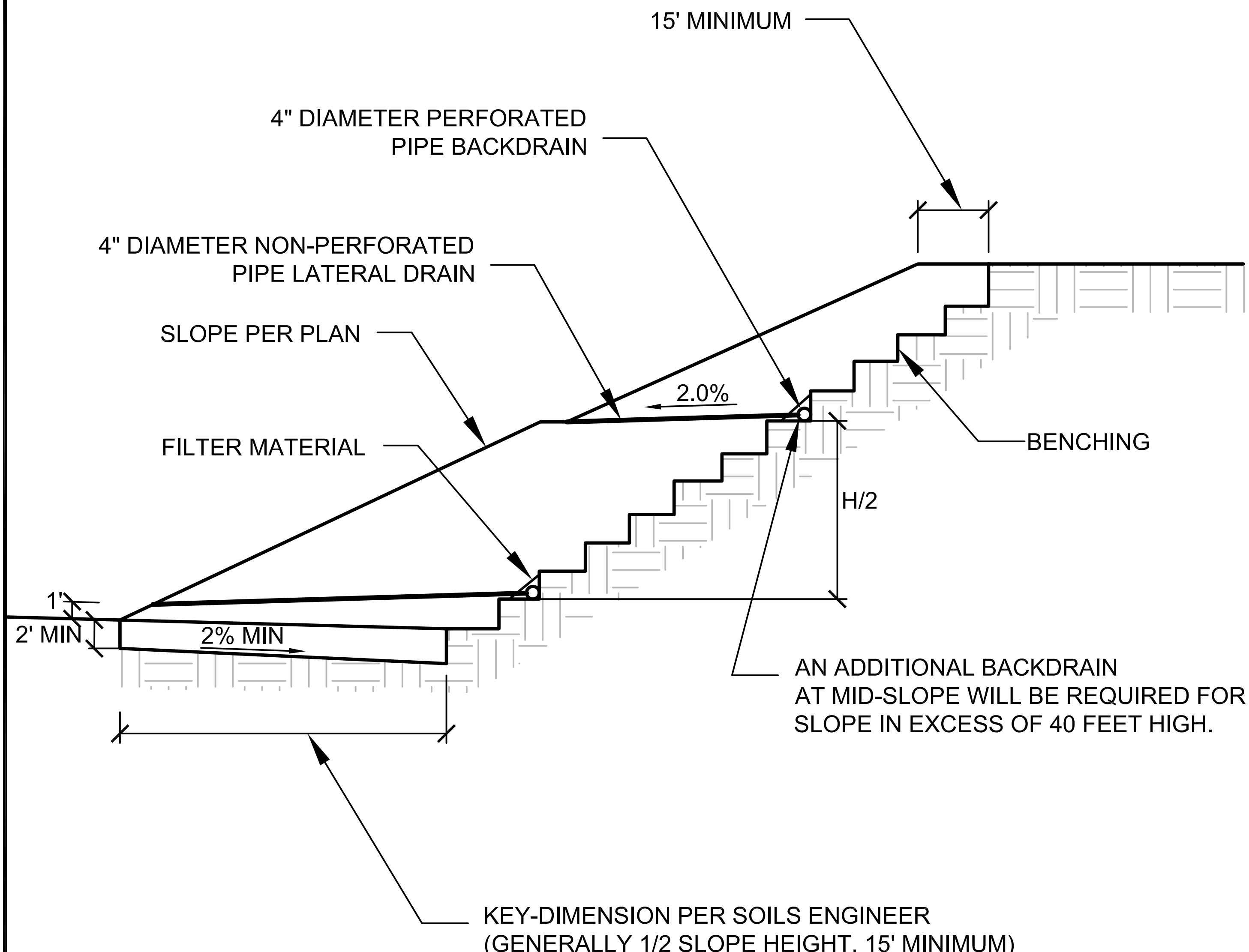
NOTE: HEADWALL SHOULD OUTLET AT TOE OF SLOPE OR INTO CONTROLLED SURFACE DRAINAGE DEVICE

ALL DISCHARGE SHOULD BE CONTROLLED

THIS DETAIL IS A MINIMUM DESIGN AND MAY BE MODIFIED DEPENDING UPON ENCOUNTERED CONDITIONS AND LOCAL REQUIREMENTS

NOT TO SCALE

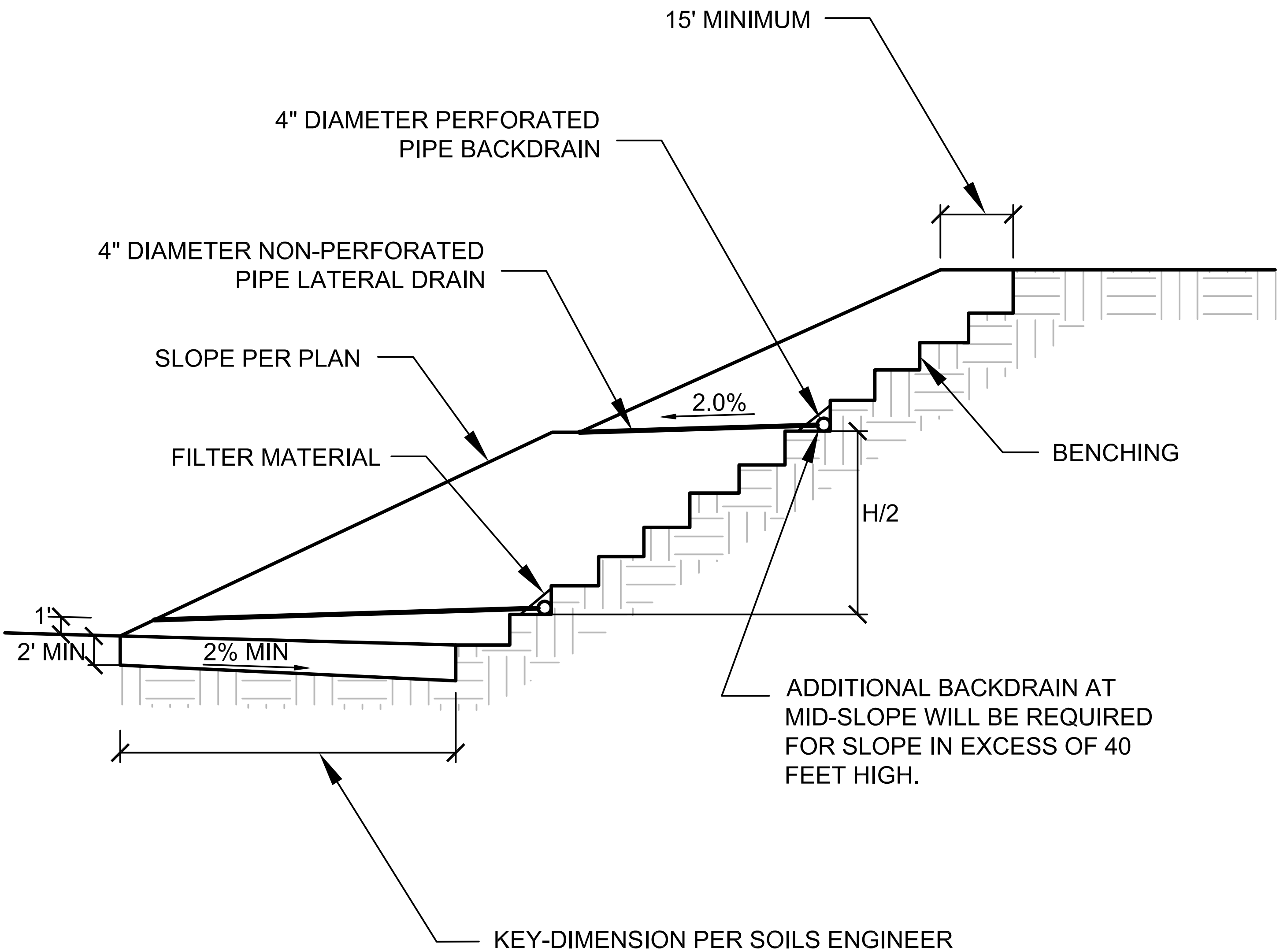
TYPICAL SUBDRAIN OUTLET HEADWALL DETAIL



DIMENSIONS ARE MINIMUM RECOMMENDED

NOT TO SCALE

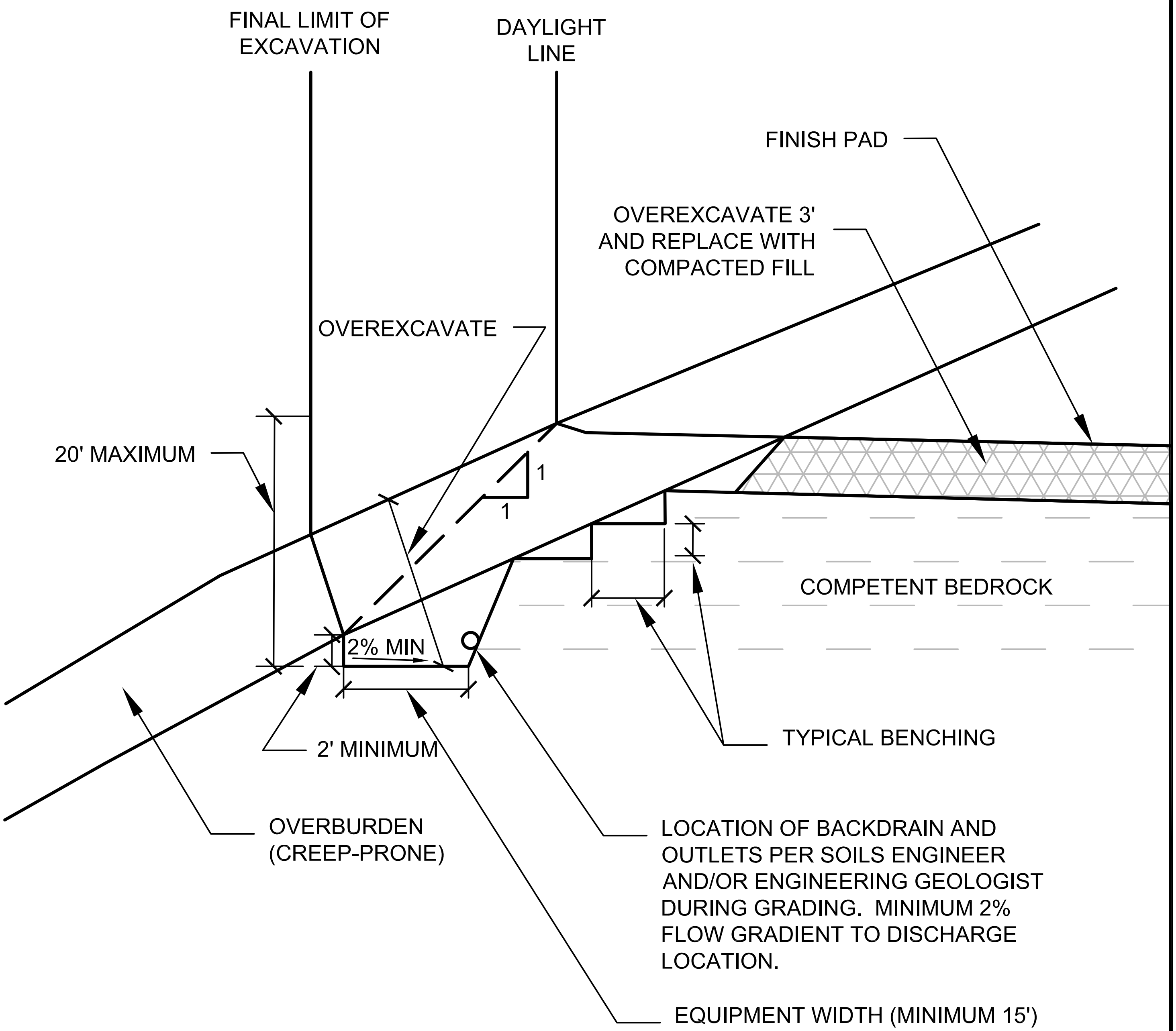
TYPICAL SLOPE STABILIZATION FILL DETAIL



DIMENSIONS ARE MINIMUM RECOMMENDED

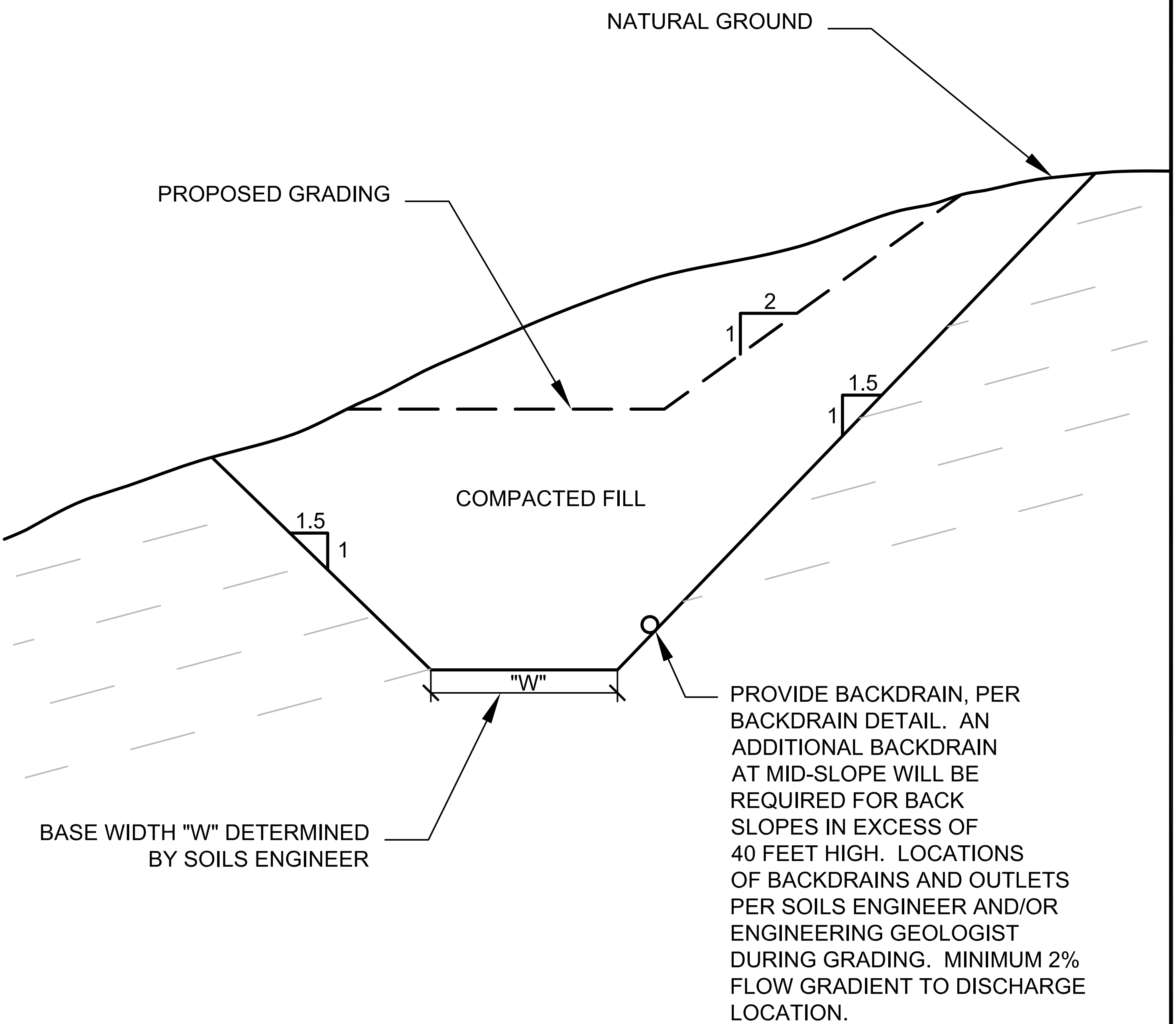
NOT TO SCALE

TYPICAL BUTTRESS FILL DETAIL



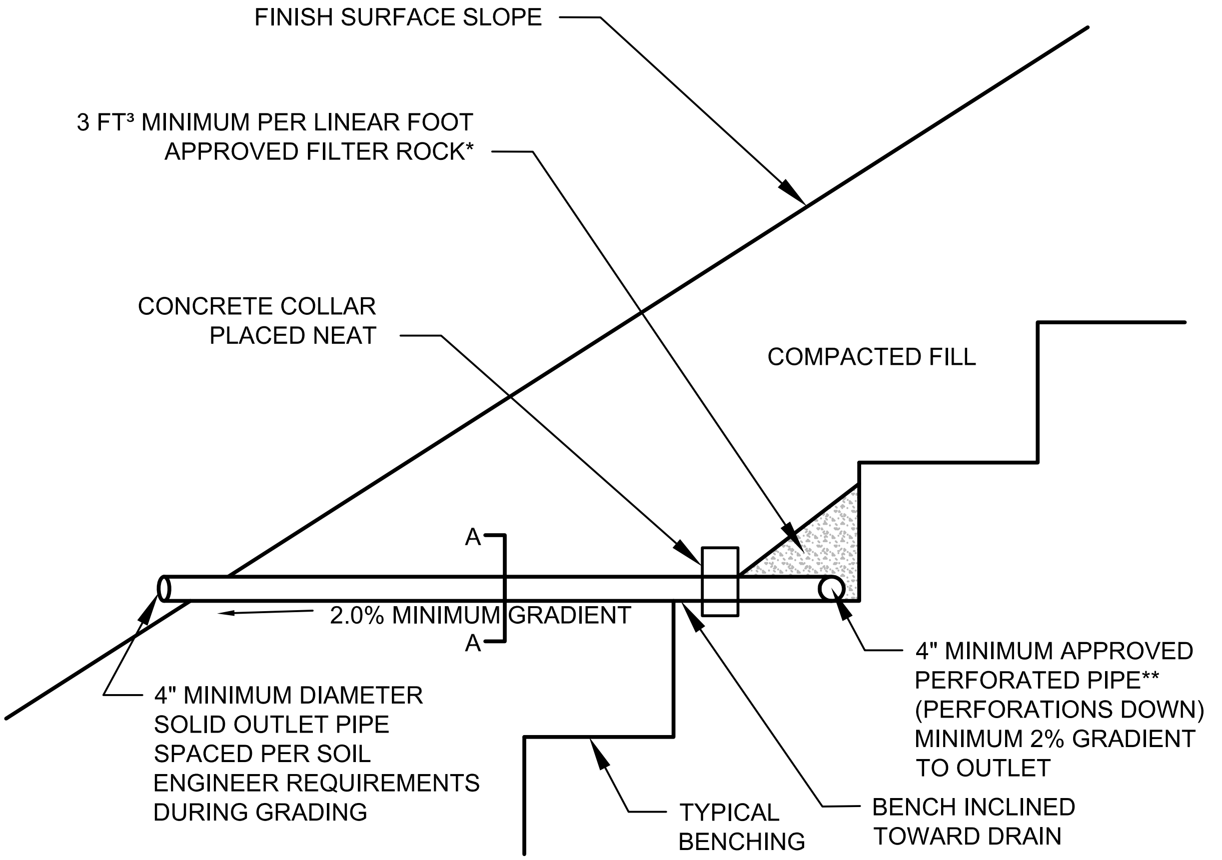
NOT TO SCALE

DAYLIGHT SHEAR KEY DETAIL

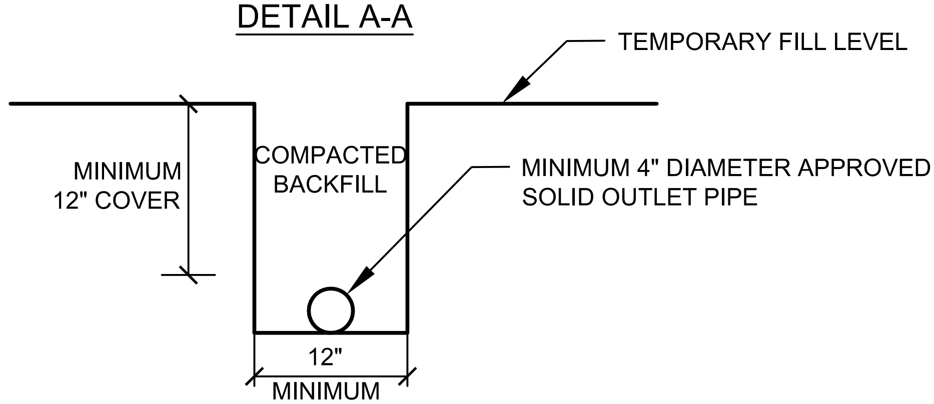


NOT TO SCALE

TYPICAL SHEAR KEY DETAIL



DETAIL A-A



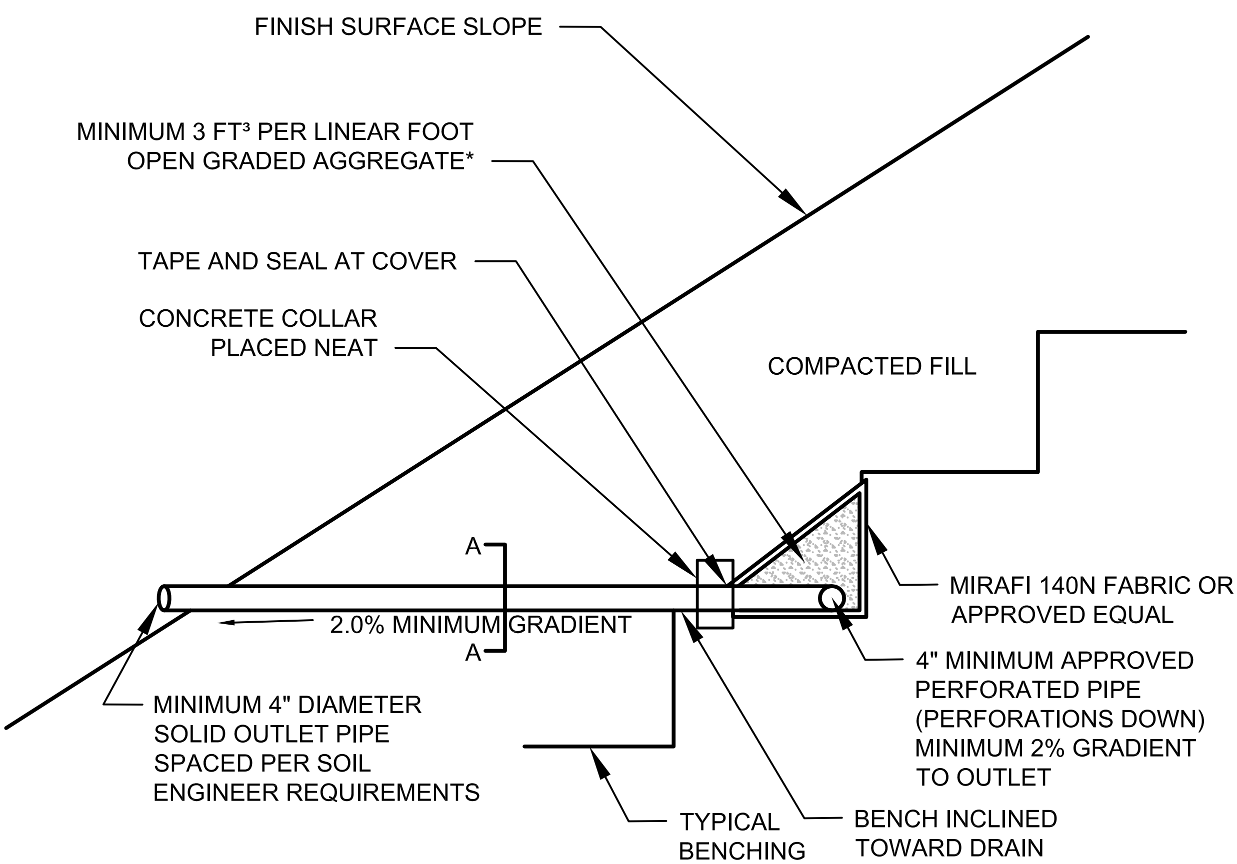
**APPROVED PIPE TYPE:
SCHEDULE 40 POLYVINYL CHLORIDE
(P.V.C.) OR APPROVED EQUAL.
MINIMUM CRUSH STRENGTH 1000 PSI

*FILTER ROCK TO MEET FOLLOWING
SPECIFICATIONS OR APPROVED EQUAL:

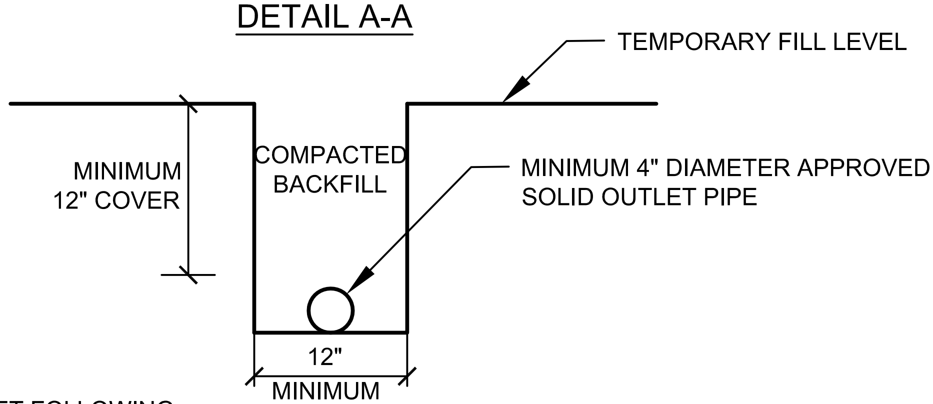
SIEVE SIZE	PERCENTAGE PASSING
1"	100
¾"	90-100
⅜"	40-100
NO. 4	25-40
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

NOT TO SCALE

TYPICAL BACKDRAIN DETAIL



DETAIL A-A

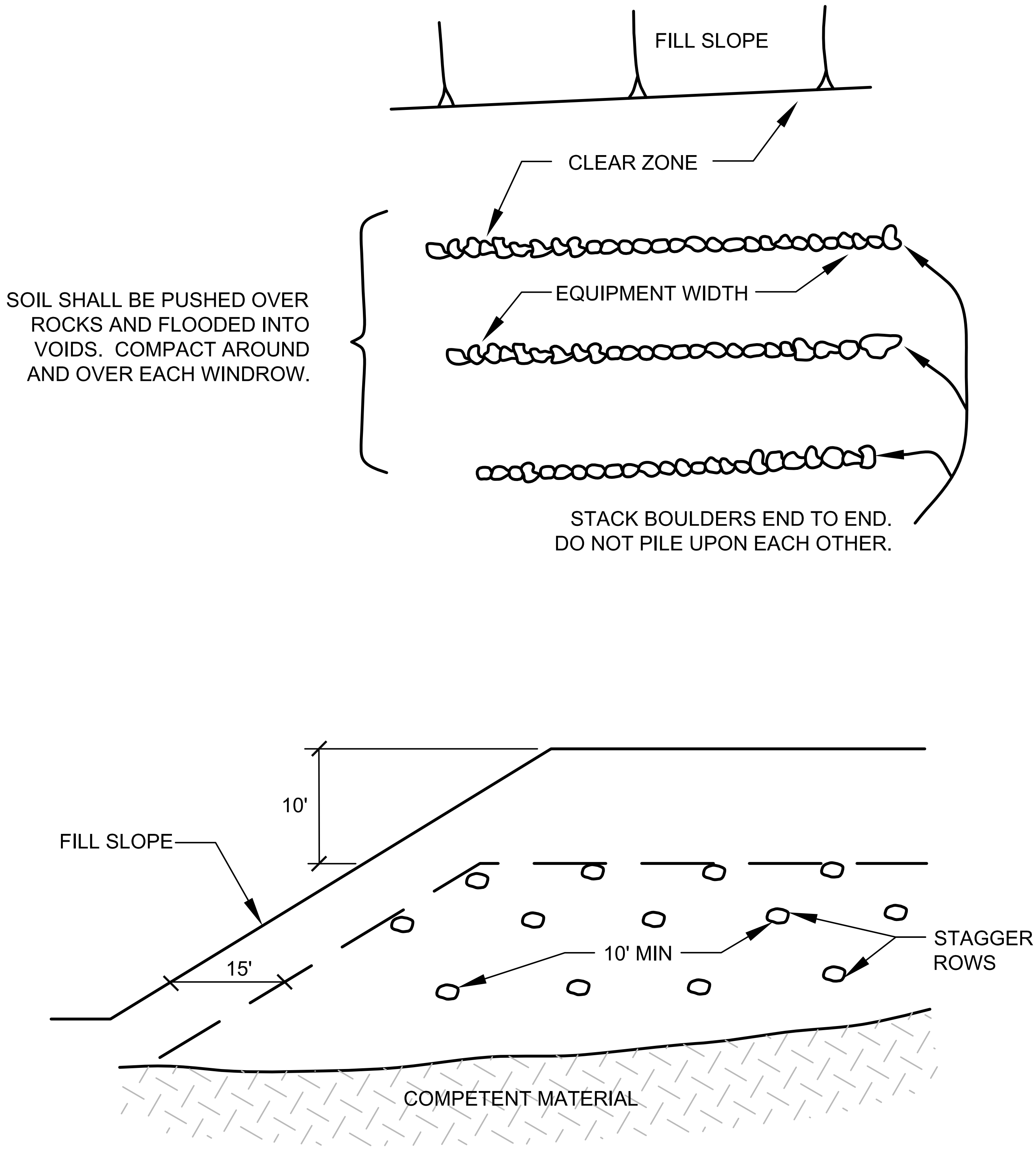


*NOTE: AGGREGATE TO MEET FOLLOWING SPECIFICATIONS OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1 ½"	100
1"	5-40
¾"	0-17
⅜"	0-7
NO. 200	0-3

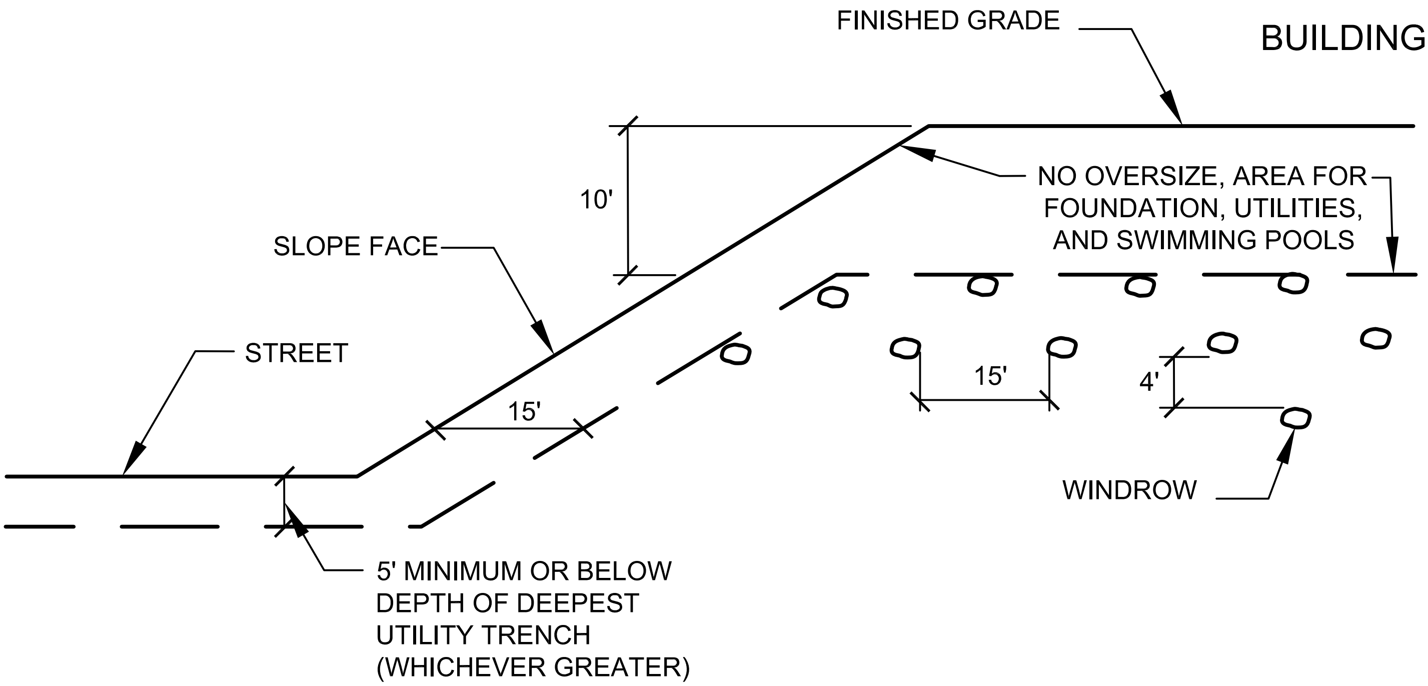
NOT TO SCALE

BACKDRAIN DETAIL (GEOFRABIC)

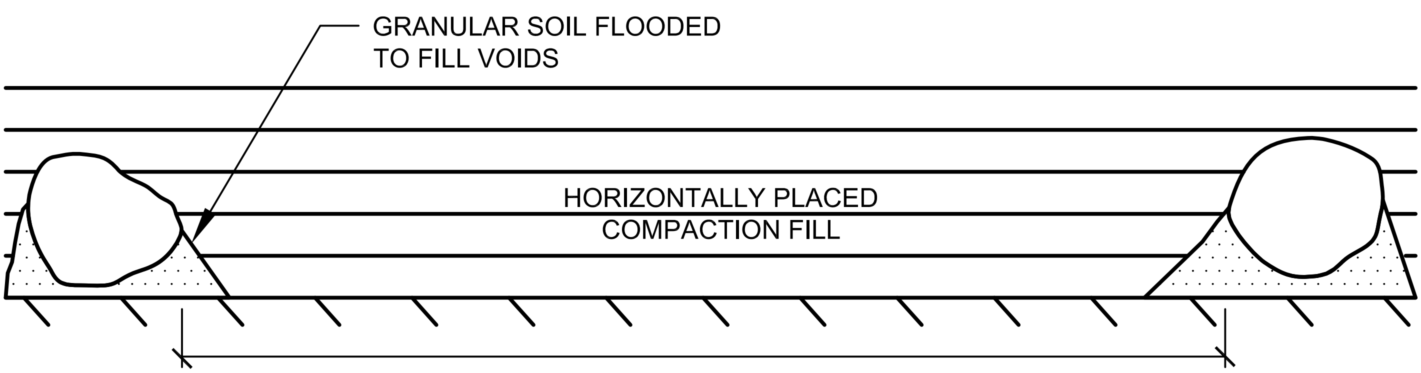


NOT TO SCALE

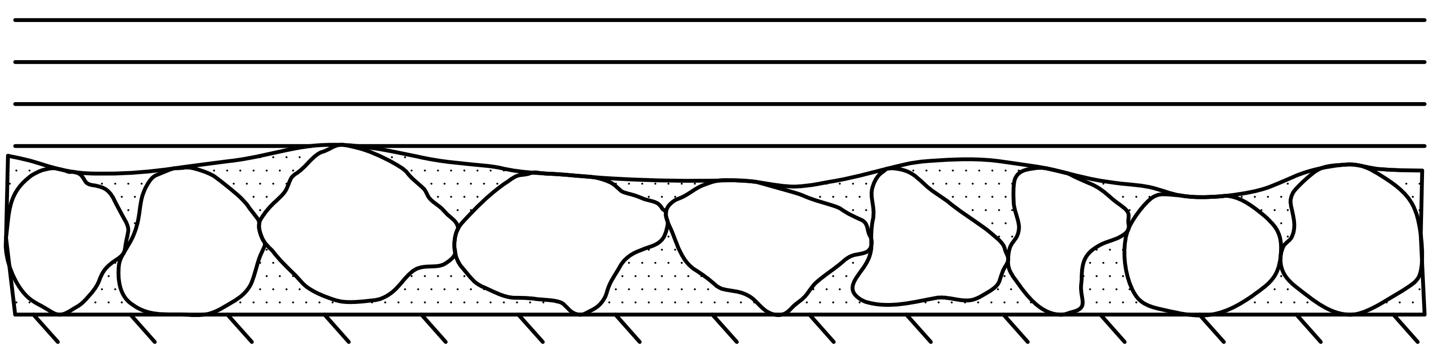
ROCK DISPOSAL DETAIL



TYPICAL WINDROW DETAIL (EDGE VIEW)



PROFILE VIEW

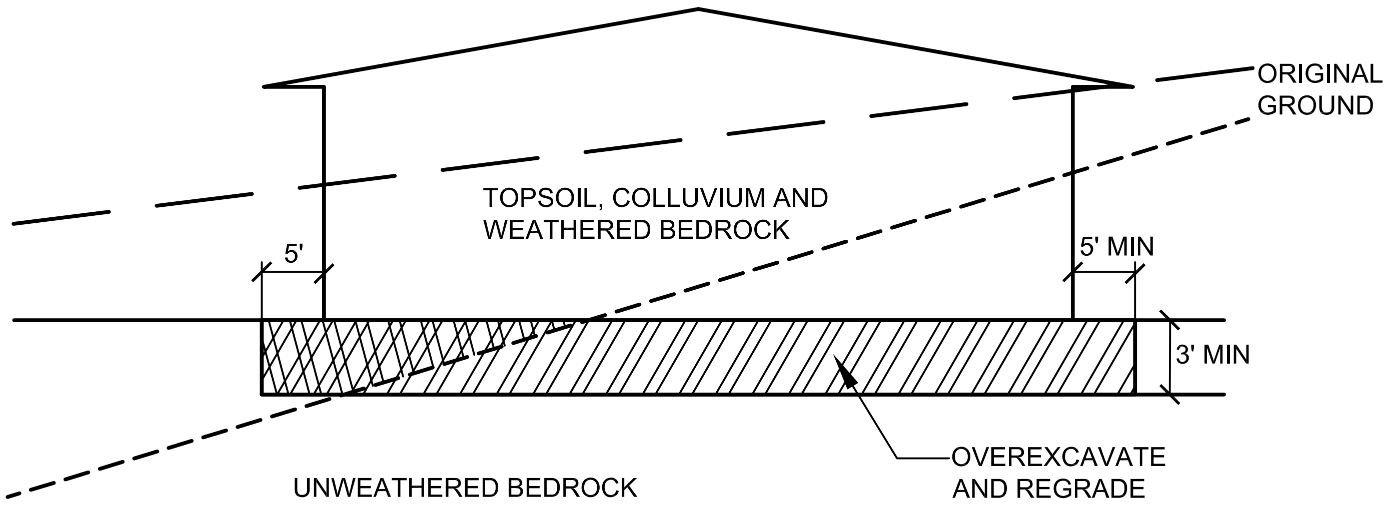


NOT TO SCALE

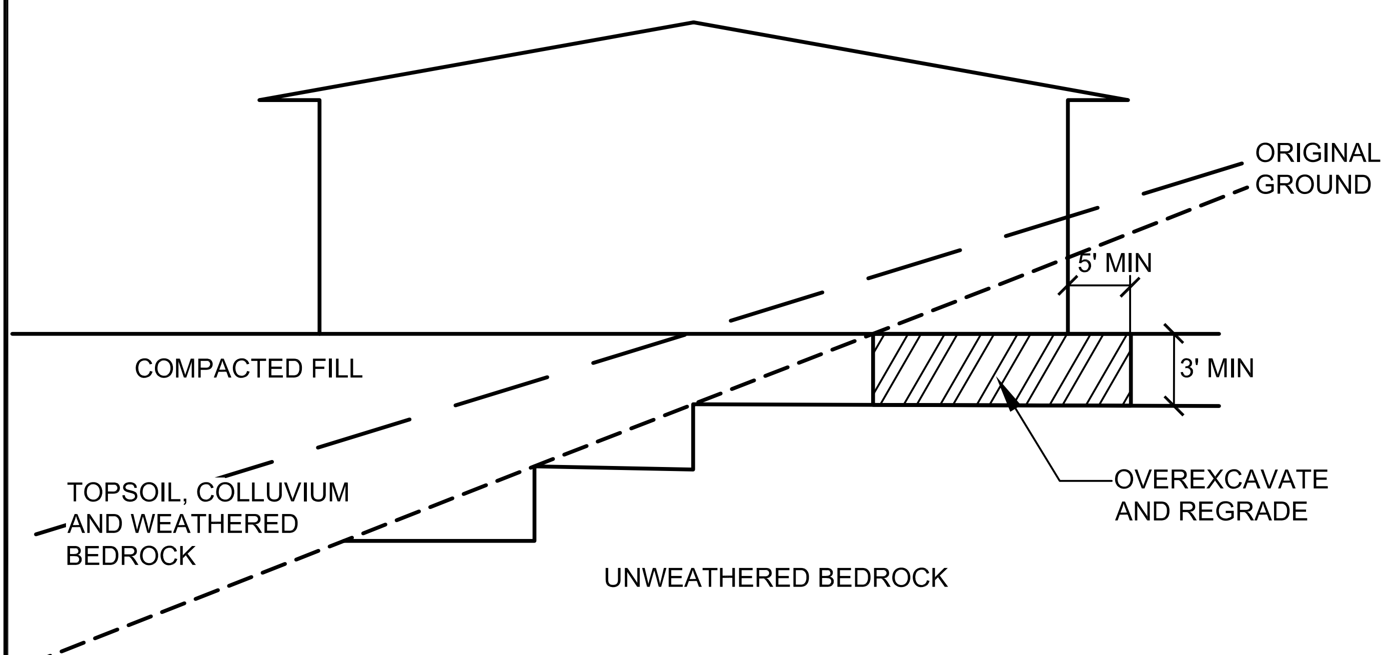
ROCK DISPOSAL DETAIL

GENERAL GRADING RECOMMENDATIONS

CUT LOT



CUT/FILL LOT (TRANSITION)



NOT TO SCALE

TRANSITION LOT DETAIL

APPENDIX E
TRANSPORTATION IMPACT ANALYSIS

Waterford Residential Development Projects

Transportation Impact Analysis Report

Prepared for:
Shawn Fitzpatrick
UC Construction

February 15, 2024

WC23-4051

FEHR PEERS

Table of Contents

List of Figures

List of Tables

Appendices

I. INTRODUCTION

PURPOSE

This study analyzes the transportation impacts associated with the proposed Waterford Residential Development Projects ("projects") located in the City of Waterford. This report includes an analysis for three separate residential projects being proposed concurrently, as described in greater detail later in the "Overview of Proposed Projects" section below. This report is separated into two analyses – one analysis intended to disclose any potential environmental impacts in compliance with CEQA, and one analysis intended to identify any potential impacts to the local transportation network.

For this study, vehicle miles traveled (VMT) is the primary travel-related metric used to identify the project's significant transportation impacts under CEQA. Impacts to the bicycle, pedestrian, and transit network, and safety are also evaluated.

The local transportation network analysis includes a traffic operations analysis under existing and existing plus project (for each individual project) conditions. Level of service (LOS) and delay are provided to help evaluate the project's consistency with General Plan policies and to understand how project trips would affect intersection operations. Due to Senate Bill (SB) 743, which is described in greater detail under the "Policy Background" section of this report, this report does not identify significant intersection LOS impacts and mitigation measures. Instead, it identifies intersection performance targets and then determines whether the intersection meets the performance target for all analysis scenarios.

The proposed projects impact analyses are presented in Section III and the intersection operations analyses are presented in Section V. All figures can be found at the end of the report.

OVERVIEW OF PROPOSED PROJECTS

This report summarizes the transportation impacts of three separate single-family residential developments proposed in the City of Waterford. Due to the location and planned construction of the three projects, all projects are being studied in one report. In general, each project is evaluated individually; however, the traffic operations analysis includes one "existing plus all projects" scenario to evaluate intersection operations with construction of all three projects. Each project is described in greater detail below. **Figure 1** displays the location of the three projects. **Figure 2** displays the proposed access for each project site.

Project Site 1

Project Site 1 proposes to subdivide approximately 7.2-acres for construction of 29 single-family residential homes. The proposed project site is bordered by the Modesto Irrigation District (M.I.D.) Main Canal to the north and single-family residential to the south, east, and west. Access to the proposed project site would be provided by connecting to the existing Quicksilver Street and Goldmine Avenue.

Project Site 2

Project Site 2 proposes to subdivide approximately 4.8-acres for construction of 28 single-family residential homes. The proposed project site is bordered by the Lower M.I.D. Canal to the north and single-family residential to the south, east, and west. Access to the proposed project site would be provided by extending the existing Enid Drive west to connect to Tim Bell Road.

Project Site 3

Project Site 3 proposes to subdivide approximately 8-acres for construction of 54 single-family residential homes. The proposed project site is bordered by the M.I.D. Main Canal to the north and east, the Lower M.I.D. Canal to the south, and Tim Bell Road to the west. Access to the proposed project site would be provided by two new streets ("B" Street and "A" Way on Figure 2) connecting to Tim Bell Road.

POLICY BACKGROUND

SENATE BILL 743

Senate Bill (SB) 743 was signed into law in 2013 and changed the focus of transportation impact analysis for CEQA purposes. Instead of analyzing the impact of land use projects on drivers using metrics like delay and level of service (LOS), transportation impacts are now based on the effects of driving as measured using VMT. The specific changes are codified in Section 15064.3 of the CEQA Guidelines, which states that generally, vehicle miles traveled is the most appropriate measure of transportation impacts. According to 15064.3(a), "*Except as provided in subdivision (b)(2) (regarding roadway capacity), a project's effect on automobile delay shall not constitute a significant environmental impact*." The provisions of 15064.3 have applied statewide since July 1, 2020. While the CEQA Guidelines do not contain detailed guidance for individual land uses, Section 1064.3(b)(1) recommends, "*Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be presumed to have a less than significant transportation impact.*"

Although not required for CEQA, both VMT and LOS are reported in this report. VMT is used to identify the project's potentially significant transportation impacts under CEQA. LOS results are reported to provide decision-makers and the public with a better understanding of the effects the proposed projects may have on the surrounding roadway network and the types of operational enhancements that could be considered to improve operations and safety. Presentation of LOS information also helps evaluate the project's consistency with the City's level of service performance targets.

VMT THRESHOLDS OF SIGNIFICANCE

CEQA Guidelines Section 15064(b)(1) allows lead agencies the discretion to select their own thresholds and allow for differences in thresholds based on context. The City of Waterford has not adopted VMT impact thresholds for general use so a project-specific threshold was developed based on direction from City staff. The City of Waterford has determined that a significant impact would occur if the proposed project's home-based VMT per capita would exceed the existing Citywide average home-based VMT per capita.

Key factors in determining this threshold included a review of the General Plan expectations for VMT reduction, and the projects' general consistency with the City's General Plan Land Use Element, Housing Element, and Urban Expansion Element. The General Plan Transportation and Circulation Chapter does not include a specific vehicle reduction target, however, it includes "Goal Area T-3: Vehicle Trip Reduction" which contains the following relevant goals, policies, and implementation measures that generally support reducing vehicle trips:

GOALS

- Living environments which encourage people to use a variety of transportation alternatives
- A compact urban design for new growth areas
- Self-sustaining, mixed-use, pedestrian-friendly urban centers

POLICIES

- 3.1 – Create land use patterns that will encourage people to walk, bicycle, or use public transit for an increased number of their daily trips.
- 3.2 – Encourage in-fill development and compact urban form.
- 3.3 – Promote site designs that encourage walking, cycling, and transit use.
- 3.4 – Locate and design new commercial developments to provide good access from adjacent neighborhoods and reduce congestion on major streets.

IMPLEMENTATION MEASURES

- 3.1.C – Plan areas for higher density development within ¼ mile of Waterford's "Downtown" and other locations identified as transit hubs and commercial centers
- 3.1.D – Encourage high housing densities in areas served by the full range of urban services.
- 3.2.A – Encourage in-fill of vacant parcels.

The City of Waterford's Housing Element (adopted in July 2018) includes a vacant site inventory list which identifies vacant or underutilized sites that may be appropriate for housing. Table 40 in the Housing Element identifies the site, acreage, zoning, anticipated realistic capacity, and anticipated income category, among many other things. It is important to note the realistic capacity is based on generic calculations that factor in the net acreage, gross acreage, anticipated right-of-way necessary for streets and public utility easements, etc. It is merely intended to provide estimates on where and how much development may occur but is not indicative of a minimum or maximum density allowed. The identified income category is strategically chosen to assist the City in complying with the State's Regional Housing Needs Allocation numbers and is intended to help guide development in a way that provides the necessary type and mix of housing for the City of Waterford, as deemed appropriate by the State and Stanislaus County.

Table 1 displays the project's consistency with anticipated development identified in the Housing Element Vacant Site Inventory List. The proposed projects are considered consistent if the proposed density is greater than or equal to the realistic capacity (as this ensures the proposed project is providing at least as many units as anticipated) and envisioned income category.

TABLE 1: HOUSING ELEMENT VACANT SITE INVENTORY CONSISTENCY CHECK

Site	Housing Element Site No.	Realistic Capacity	Income Category[1]	Proposed Units	Proposed Income Category	Project is Consistent?
1	V38/V39[2]	27	AM/M	29	AM/M	Yes
2	V35	18	AM/M	28	AM/M	Yes

TABLE 1: HOUSING ELEMENT VACANT SITE INVENTORY CONSISTENCY CHECK						
Site	**Housing Element Site No.**	**Realistic Capacity**	**Income Category[1]**	**Proposed Units**	**Proposed Income Category**	**Project is Consistent?**
3	V27	30	AM/M	54	AM/M	Yes

Notes:

[1] AM = Above Moderate, M = Moderate

[2] Site 1 consists of two separate parcels and therefore, is listed as two separate sties.

Additionally, the Urban Expansion Element describes the strategic growth plan for the City and includes various goals, policies, and implementation measures aimed at limiting leap-frog development, promoting in-fill development, and requiring new development be contiguous to existing urban areas and have reasonable access to public services and facilities. Minimizing urban sprawl and leap-frogging development is consistent with the overarching goal of SB 743 which is to reduce vehicle miles traveled (and ultimately greenhouse gas emissions) by encouraging infill development and focusing new housing development near existing services.

The City's land use plan and growth plan was strategically designed to allow the City to increase its housing supply (which is consistent with multiple state goals and policies) while minimizing impacts on city services and ensuring development is contiguous, while also protecting and preserving the existing local community and prime agricultural land. Although adoption of the City's General Plan predates VMT and SB 743, the growth plan is consistent with the overarching goal of SB 743 and statewide goals for increasing the housing supply as it allows for the addition of housing units but ensures those units are strategically placed to minimize negative impacts to the environment, city services, and the local community. For these various reasons, if the proposed projects' home-based VMT per capita would be less than or equal to the existing Citywide average home-based VMT per capita, the project would be deemed to have a less-than-significant transportation impact.

COVID-19

Transportation and mobility are being transformed through several forces ranging from new technologies, different personal preferences, and the unique effects of the coronavirus disease 2019 (COVID-19) pandemic, the combination of which could alter traditional travel demand relationships in the near- and long-term future.

Furthermore, the COVID-19 pandemic and subsequent actions by federal, state, and local governments to curtail mobility and encourage physical distancing (i.e., limit in-person economic and social interactions) temporarily but profoundly changed travel conditions. While travel activity is returning to more normal (i.e., pre-pandemic) conditions, it is possible that some of these temporary changes will influence people's travel choices into the future, including either accelerating or diminishing some of the emerging trends in transportation that were already underway prior to the pandemic.

While the traffic data used for the transportation analysis was collected in 2023, post the COVID-19 pandemic, it is noted as a potential limitation nonetheless.

PERFORMANCE TARGETS

The proposed project sites are located in the City of Waterford. The City's General Plan indicates the preferred level of service (LOS) target is LOS D; however, the General Plan recognizes that maintaining LOS D at existing intersections is not always feasible, appropriate, or necessary and indicates that necessary improvements to improve LOS (such as roadway widening) may not always be appropriate and greater delay may be acceptable.

Caltrans owns and operates Yosemite Boulevard (also known as SR 132). Per the Transportation Concept Report (TCR) for Yosemite Boulevard/SR 132, the performance target for the highway in the City is LOS D.

STUDY AREA AND PERIODS

Intersection operations were evaluated during the weekday AM and PM peak hour conditions at the following intersections:

1) Tim Bell Road/Bonnie Brae Avenue
2) Tim Bell Road/Bentley Street
3) Tim Bell Road/Welch Street
4) Tim Bell Road/Yosemite Boulevard
5) Tweed Street/Oakdale-Waterford Highway
6) Tim Bell Road/Enid Drive (future intersection)
7) Tim Bell Road/B Street (future intersection)
8) Tim Bell Road/A Way (future intersection)

The operations analysis was completed for the following scenarios:

- Existing Conditions – represents conditions in 2023.
- Existing Plus Project 1 Conditions – analyzes the study intersections with the addition of project trips generated by Site 1.

- Existing Plus Project Site 2 Conditions – analyzes the study intersections with the addition of project trips generated by Site 2.
- Existing Plus Project Site 3 Conditions – analyzes the study intersections with the addition of project trips generated by Site 3.
- Existing Plus All Projects Conditions – analyzes the study intersections with the addition of project trips generated by Site 1, 2, and 3.

II. EXISTING TRANSPORTATION SYSTEM

This section describes the existing transportation network, including roadways, and bicycle, pedestrian, and transit facilities, within the study area. Given the close proximity of the proposed project sites, the transportation system and nearby facilities are the same for each project and are described for the study area as a whole (rather than for each individual project).

EXISTING ROADWAY SYSTEM

The primary roadways in the study area are described below:

- Tim Bell Road is a two lane north-south collector that provides access between Yosemite Boulevard/SR 132 and residential homes to the north. In the study area, it has a posted speed limit of 25 miles per hour (mph). Notably, Tim Bell Road also connects to El Pomar Avenue to the north which is often used to access the Oakdale-Waterford Highway.
- Bonnie Brae Avenue is a two lane east-west collector that provides access between Tim Bell Road and the Oakdale-Waterford Highway. Bonnie Brae Avenue has a posted speed limit of 25 mph.
- Bentley Street is a two lane east-west collector that provides access between Yosemite Avenue/SR 132 and the commercial developments and Waterford Middle School on Bentley Street, as well as the residential homes west of Tim Bell Road. Bentley Street has a posted speed limit of 25 mph.
- Yosemite Boulevard is a two lane east-west arterial that provides a regional connection between Coulterville and communities/destinations to the east (including Yosemite National Park) and Modesto and ultimately I-580 to the west. Yosemite Boulevard is a Caltrans owned and operated facility and in the study area, it has a posted speed limit of 35 mph.
- Oakdale-Waterford Highway is a two lane north-south arterial that provides access between the City of Waterford and the City of Oakdale. Oakdale-Waterford Highway also provides connection to other arterial and collector streets north of Waterford that provide access to Modesto and SR 99. Although referred to as a "highway", Oakdale-Waterford Highway is not a Caltrans facility and it is owned and operated by the City of Waterford in the City limits and Stanislaus County in the Unincorporated County area. In the study area, Oakdale-Waterford Highway has a posted speed limit of 45 mph.

EXISTING BICYCLE AND PEDESTRIAN SYSTEM

The existing bicycle and pedestrian facilities adjacent to the proposed project sites are described below:

Tim Bell Road

Tim Bell Road is classified and signed as a Class III Bike Route; however, there is limited signage and no striping. The Stanislaus County Non-Motorized Transportation Plan (2021) classifies Tim Bell Road between Bonnie Brae Avenue and Baker Street as a high stress bicycle facility.

Monolithic sidewalks are present along both sides of Tim Bell Road between Welch Street and Main Street but a sidewalk gap exists between Main Street and Bonnie Brae Avenue and between C Street and Yosemite Boulevard. Between Welch Street and C Street, sidewalks are generally only present on the east side of the road. Sidewalks are present along the side streets adjacent to Tim Bell Road including Welch Street, Sunflower Drive, Heather Drive, Bentley Street, and Main Street. High visibility crosswalks are present on all legs of the Tim Bell Road/Bentley Road and Tim Bell Road/Welch Street intersections. A crosswalk is present on the west side of the Tim Bell Road/Main Street intersection.

Bonnie Brae Avenue

Bonnie Brae Avenue is classified and signed as a Class III Bike Route and sidewalks are present on the north side between Oakdale-Waterford Highway and approximately 175-feet east of Ranchwood Court. However, a sidewalk gap is present between Ranchwood Court and Tim Bell Road. The Lower M.I.D. Canal borders Bonnie Brae Avenue to the south and although it includes approximately 20 feet of flat, graded area between the roadway and the canal which could be used by pedestrians, it is signed to indicate trespassing and loitering is prohibit by law.

Additional Facilities Relevant to the Proposed Projects

There are no bicycle or pedestrian facilities on Yosemite Boulevard near the Yosemite Boulevard/Tim Bell Road intersection nor within 1,000 feet east or west of the intersection. Within the City limits, sidewalks are generally present along the Oakdale-Waterford Highway; however, a gap is present on the east side between Bonnie Brae Avenue and 1st Street. Within the City limits, Oakdale-Waterford Highway is classified, signed, and striped as a Class II Bike Lane; however, the striping is severely deteriorated and difficult to see.

EXISTING TRANSIT SYSTEM

Stanislaus Regional Transit Authority (StanRTA) provides bus service throughout Stanislaus County. Route 50 serves the Waterford area and provides a connection between the Modesto Transit Center and the City of Waterford. The bus stop closest to the proposed project sites is located at E Street and Bentley Avenue and is approximately one mile from Project Site 1 and a half-mile from Project Sites 2 and 3. Service is provided in one-hour intervals between 5:45 AM and 8:15 PM during weekdays, between 7:45 AM and 7:15 PM on Saturdays, and between 7:45 AM and 6:15 PM on Sundays.

III. CEQA COMPLIANCE

This section evaluates the proposed project's transportation system (VMT), bicycle, pedestrian, transit, and safety impacts.

EVALUATION OF TRANSPORTATION SYSTEM IMPACTS (VMT)

A proposed project would result in a significant transportation impact if it would conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)(1), which states for land use projects, "Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact." As previously noted, the City of Waterford has determined that the proposed project would result in a significant transportation impact if the home-based VMT per capita exceeds the existing Citywide average home-based VMT per capita.

Fehr & Peers' VMT+ tool was used to determine the Citywide average home-based VMT per capita and estimate project home-based VMT per capita. VMT+ utilizes a custom data set from StreetLight Data, which is based on anonymized locational records, passively collected from smart phones and connected vehicles, and it provides home-based VMT per resident and home-based VMT per worker estimates in California, down to the census block group (BG). Data from 2022 was used for this analysis.

The home-based VMT per resident estimates include all home-based automobile vehicle trips, which are traced back to the residence of the trip-maker (see **Image 1**); non-home-based trips (i.e. from the grocery store to the coffee shop) and commercial vehicle trips (trucks) are excluded.

There are four BGs within the City of Waterford.

Image 1: Home-Based VMT Graphic
Source: Fehr & Peers

TABLE 2: AVERAGE CITYWIDE HOME-BASED VMT PER CAPITA	
Census Block Group	**Home-Based VMT Per Capita**
60990028011	29.28
60990028012	26.18
60990028021	33.12
60990028022	24.78
Average Citywide	**28.34**
Notes: Home-based VMT per capita derived from 2022 Streetlight Data. Source: Fehr & Peers, 2023	

As displayed, the Citywide average home-based VMT per capita is 28.34.

Project Site 1 is in BG 60990028012 and Project Site's 2 and 3 are in BG 60990028011. The average home-based VMT per capita for these two BGs were used to evaluate project VMT. The three proposed project sites are close in proximity and are similar developments (i.e. all low-density, single-family homes with similar lot sizes) so the average home-based VMT per capita is anticipated to be similar for all three projects and one average home-based VMT per capita was calculated for the proposed projects. When feasible, it is desirable to have as many data points as possible when estimating project VMT and because BG 60990028011 and BG 60990028012 are so close and are similar in terms of land use (described in greater detail below), the average home-based VMT per resident of both BGs was used to estimate project home-based VMT per capita.

The following criteria were used to determine if the existing BGs were appropriate to use to estimate project home-based VMT per capita for each of the projects:

1) Land use characteristics: Almost all homes located in the BGs are single-family homes. These homes are similar in size and development type when compared to the proposed project (i.e. a BG with primarily high-density multi-family development would not be appropriate to use to estimate VMT for a low-density single-family home development).
2) Location of BGs compared to location of the proposed projects: Project Site 1 is located in BG 60990028012 and Project Site's 2 and 3 are located in BG 60990028011. Given that the proposed project sites are located within the BGs and the BGs are directly adjacent to each other with many shared access roads (such as Oakdale-Waterford Highway, Yosemite Road/SR 132, Tim Bell Road, Bentley Street, and Welch Street), it can be concluded that there are no geographical or circulation

differences that would result in a significantly different VMT per capita (i.e., a BG in a different part of the city with a very different circulation network and access locations may not be as reasonable of a proxy).

3) <u>Age of housing:</u> The age of housing stock can impact the demographics (and trip making characteristics) of a community. With the exception of the River Pointe development and newer single-family homes along Selby Way, most homes in the BGs are more than 20 years old. While this is a limitation, these two BGs still serve as the most reasonable proxy for the proposed projects and do include VMT generated by most of the new single-family homes constructed in Waterford. The primary exception to this is the newest subdivision located between Kadota Avenue and Pecan Avenue, approximately one-mile from the proposed project sites.

For these reasons, the existing BGs were determined to be generally representative of the proposed projects and it is anticipated that future residents of the proposed projects would have similar trip making characteristics as the existing residents in these BGs and produce similar home-based VMT per capita. Based on this data, the proposed projects are estimated to generate an average home-based VMT per capita of 27.73, which is lower than the Citywide average home-based VMT per capita of 28.34. Therefore, the proposed project would result in a **less than significant transportation impact**.

EVALUATION OF BICYCLE, PEDESTRIAN, AND TRANSIT IMPACTS

A proposed project would result in a significant bicycle, pedestrian, or transit impact if it would disrupt or interfere with any existing or planned, bicycle, pedestrian, or transit facilities, or if the proposed project would result in a physical change that would be inconsistent with policies in the City of Waterford General Plan.

PEDESTRIAN FACILITIES

The proposed projects would construct sidewalks along all interior streets and project frontages consistent with the City of Waterford requirements. For Project Site 1, this would result in contiguous sidewalks between the project site and Oakdale-Waterford Highway along Goldmine Avenue and Quicksilver Street. A contiguous connection to Bonnie Brae Avenue would also be provided via the existing sidewalks on Bronze Lane and Cinnibar Way.

For Project Site 2, a contiguous sidewalk would be provided on Enid Drive between Tim Bell Road and Tisdell Drive, which ultimately connects to Bentley Street. Sidewalks would also be constructed on Tim Bell Road along the project frontage and along the Lower M.I.D Canal to the north. It is noted that an approximately 195-foot gap in the pedestrian network would exist on Tim Bell Road south of the project frontage. The existing sidewalk on the east side of Tim Bell Road terminates just north of Main Street. Given that the proposed project does not have control of this parcel, this gap would be present post-construction of the project until the adjacent parcel redevelops or the City of Waterford closes the gap.

For Project Site 3, contiguous sidewalks along internal streets would provide a connection to Tim Bell Road, which would connect to the sidewalks being constructed to the south with Project Site 2. Together with Project Site 2, approximately 545 feet of sidewalks would be constructed along the eastern side of Tim Bell Road. However, if Project Site 2 is not approved but Project Site 3 is, an approximately 410-foot gap in the pedestrian network would exist between the project site and the existing sidewalk just north of Main Street.

The proposed projects would include sidewalks, curb, gutter, and lighting consistent with the City's General Plan, Municipal Code and Improvement Standards and the proposed projects would not disrupt or interfere with any existing or planned pedestrian improvements nor would they result in a physical change that is inconsistent with any policies in the City of Waterford General Plan. Therefore, the proposed projects would result in a **less than significant pedestrian impact**.

BICYCLE FACILITIES

The only existing bicycle facilities directly adjacent to the project site are on Tim Bell Road and Bonnie Brae Avenue, which are both classified and signed as a Class III Bike Route. The proposed projects would not disrupt or interfere with the existing facilities and would not result in any physical change that is inconsistent with policies in the City of Waterford General Plan. Therefore, the proposed projects would result in a **less than significant bicycle impact**.

TRANSIT FACILITIES

As previously mentioned, the City of Waterford does not operate their own internal public transit service but Stanislaus Regional Transit Authority (StanRTA) provides bus service throughout Stanislaus County. Route 50 serves the Waterford area and provides a connection between the Modesto Transit Center and the City of Waterford. The bus stop closest to the project sites is located at E Street and Bentley Avenue and is approximately one mile from Project Site 1 and a half-mile from Project Sites 2 and 3. The proposed projects would not disrupt or interfere with these existing facilities. The City of Waterford General Plan nor Stanislaus County Draft Fiscal Year 2024/2025 Unmet Transit Needs Analysis Report identify any planned or necessary transit improvements near the study area and the project is not inconsistent with transit related goals or policies in the General Plan. Therefore, the proposed projects would result in a **less than significant transit impact**.

EVALUATION OF SAFETY IMPACTS

A proposed project would result in a significant impact if it would be inconsistent with an applicable design standard.

The proposed projects would create new intersections and roadways which would be designed to comply with City of Waterford Improvement Standards (2013) and the City of Waterford Municipal Code. City improvement standards and the Municipal Code include design criteria to ensure residential subdivisions are designed to meet or exceed uniform levels of sound engineering practices. The design criteria address speed, sight distance and clear zones, roadway grade, curve radius, intersection spacing and lighting and more. Applicable to Project Sites 2 and 3, Section 16.03.110 of the City of Waterford Municipal Code requires that when local street intersections are off-set, the off-set must be a minimum 100 feet centerline to centerline. Bonnie Brae Avenue and Tim Bell Road are classified as collector streets, however, the City of Waterford has not established a minimum off-set necessary for collectors. Due to a posted speed limit of 25 mph, low volumes on Bonnie Brae Avenue and anticipated low volumes on the proposed projects side-streets (including Enid Way, B Street and A Way), the City of Waterford has confirmed the proposed intersection spacing for Project Sites 2 and 3 is acceptable.

Intersection signing and striping would be designed to meet applicable industry standards from the California Manual on Uniform Traffic Control Devices (CAMUTCD) and The American Associations of State Highway and Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets.

Each development application would be subject to review and approval by the City, including the Fire Department, which would include a review of the projects' consistency with City design criteria to ensure safe vehicle access is provided, including for emergency vehicles. Specifically, Section 16.03.120 of the Municipal Code requires each tentative tract or parcel map provide at least two different routes for ingress and egress. All three proposed projects have two access routes. Therefore, implementation of the proposed projects would not be inconsistent with an applicable design standard and the proposed projects would result in a **less than significant impact**.

IV. ANALYSIS METHODOLOGY

This section describes the methodology and inputs used for the traffic operations analysis.

INTERSECTION OPERATIONS

The study intersections were analyzed using procedures and methodologies contained in the *Highway Capacity Manual – 7th Edition* (Transportation Research Board, 2022). These methodologies were applied using Synchro 11 software, which considers traffic volumes, lane configurations, signal timings, signal coordination and other pertinent parameters of intersection operations.

The following describes specific inputs, model parameters, and other aspects of the Synchro modeling, based on data collection efforts.

- Peak hour volumes collected at the study intersections on December 21, 2023 were used for the analysis. Local schools were in session and weather conditions were clear when the data was collected; however, it is noted that, Tim Bell Road near the M.I.D. Main Canal was closed due to construction activity. Streetlight Data collected between March and May 2023 was used to evaluate average roadway volumes on Tim Bell Road without construction. The count data collected on December 21, 2023 was then adjusted to more closely reflect through volumes on Tim Bell Road.
- Existing roadway geometrics and intersection lane configurations.
- The peak hour factor (PHF) observed at each intersection during the AM and PM peak hours was used. The PHF, which is a measure of peaking (lower values represent more peaking) during the busiest 15-minutes of the hour, ranges from 0.79 to 0.89 during the AM peak hour and 0.89 to 0.95 during the PM peak hour. The lower PHF during the AM peak hour occurs at intersections near the middle school and is due to school starting at 8:00 AM.
- Heavy vehicles are prohibited on Tim Bell Road so the heavy vehicle percentage used was zero. Observed heavy vehicle percentages were used for through movements on Yosemite Boulevard and the Oakdale-Waterford Highway.
- Observed bicycle and pedestrian volumes were used.

LEVEL OF SERVICE DEFINITION

Each study intersection was analyzed using the concept of Level of Service (LOS). LOS is a quantitative measure of traffic operating conditions whereby a letter grade from A (the best) to F (the worst) is assigned.

In general, LOS A represents free-flow conditions with no congestion and LOS F represents severe congestion and delay under stop-and-go conditions.

A LOS grade is assigned to each intersection based on the methodologies contained in the *Highway Capacity Manual 7th Edition (HCM)*, Transportation Research Board, 2022. The *HCM* methodology determines the LOS at all-way stop controlled intersections by comparing the weighted average control delay per vehicle at the intersection. At side-street stop-controlled intersections, LOS is calculated for each movement in addition to the intersection as a whole. **Table 3** presents delay ranges for each LOS for stop-controlled intersections.

TABLE 3: LEVEL OF SERVICE DEFINITIONS FOR STUDY INTERSECTIONS	
Level of Service	Average Control Delay (seconds/vehicle)
	Unsignalized
A	≤ 10
B	> 10 to 15
C	> 15 to 25
D	> 25 to 35
E	> 35 to 50
F	> 50
Source: *Highway Capacity Manual*, Transportation Research Board, 2022	

INTERSECTION PERFORMANCE TARGETS

As previously mentioned, all study intersections have an established performance target of LOS D.

PROJECT TRIP GENERATION

Project trips were estimated using trip rates published in the *Trip Generation Manual 11th Edition* (Institute of Transportation Engineers, 2021). **Table 4** displays the estimated number of daily, AM peak hour, and PM peak hour vehicle trips for each proposed project.

TABLE 4: PROJECT TRIP GENERATION								
Project Site	Quantity (DU)	Daily	AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out	Total
1	29	323	6	18	24	20	11	31
2	28	313	6	17	23	19	11	30
3	54	572	11	32	43	35	21	56
All	111	1,208	23	67	90	74	43	117

Notes:
Trip generation estimate is based on trip rates published in the *Trip Generation Manual, 11th Edition* (Institute of Transportation Engineers, 2021) for detached single-family units (ITE Code 210). The fitted curve equation was used.
Source: Fehr & Peers, 2023

PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

Project trips were distributed based on existing travel patterns, the location of schools and commercial land uses in the City of Waterford, and output from the US Census On-the-Map database. Work locations for City of Waterford residents were used to determine typical daily commute patterns which were then used to inform trip distribution. **Figures 3, 4, and 5** display trip distribution for each project. Overall distribution is the same for each project, however, assignment to City streets varies due to the specific location of each project and anticipated travel patterns.

V. INTERSECTION OPERATIONS ANALYSIS

This section presents the results of the peak hour intersection operations analysis under the following scenarios:

- Existing
- Existing Plus Project Site 1
- Existing Plus Project Site 2
- Existing Plus Project Site 3
- Existing Plus All Project Sites

Peak hour turning movements and lane configurations are provided in **Appendix A**. Technical information for all scenarios are provided in **Appendix B**.

INTERSECTION OPERATIONS

Intersection operations were analyzed following the analysis methodologies presented in Section IV.
For existing plus project conditions, project trips for each individual project were added to existing traffic counts based on the trip generation and distribution previously described. For existing plus all project sites, trips associated with all three development projects were added to existing volumes. **Table 5** displays the AM and PM peak hour operations at the study intersections under all scenarios.

TABLE 5: INTERSECTION OPERATIONS ANALYSIS												
Intersection	**Control Type**	**Peak Hour**	**Existing**		**Existing Plus Project 1**		**Existing Plus Project 2**		**Existing Plus Project 3**		**Existing Plus All Projects**	
			Delay[1]	**LOS**	**Delay[1]**	**LOS**	**Delay[1]**	**LOS**	**Delay[1]**	**LOS**	**Delay[1]**	**LOS**
1. Tim Bell Rd/ Bonnie Brae Ave	SSSC	AM PM	1 (9) 2 (9)	A (A) A (A)	1 (9) 2 (9)	A (A) A (A)	1 (9) 3 (9)	A (A) A (A)	1 (9) 2 (10)	A (A) A (A)	1 (9) 3 (10)	A (A) A (A)
2. Tim Bell Rd/ Bentley St	AWSC	AM PM	8 8	A A	8 8	A A	8 8	A A	8 8	A A	8 8	A A
3. Tim Bell Rd/Welch St	AWSC	AM PM	8 8	A A	8 8	A A	8 8	A A	8 8	A A	8 8	A A
4. Tim Bell Rd/ Yosemite Blvd	SSSC	AM PM	3 (16) 3 (20)	A (C) A (C)	3 (16) 3 (20)	A (C) A (C)	3 (16) 3 (21)	A (C) A (C)	3 (17) 3 (21)	A (C) A (C)	3 (17) 3 (22)	A (C) A (C)
5. Oakdale Waterford Highway/Tweed St	SSSC	AM PM	2 (11) 2 (13)	A (B) A (B)	2 (11) 2 (13)	A (B) A (B)	2 (11) 2 (14)	A (B) A (B)	2 (11) 2 (14)	A (B) A (B)	2 (11) 2 (13)	A (B) A (B)
6. Tim Bell Rd/Enid Dr	SSSC	AM PM	N/A		N/A		1 (9) 1 (9)	A (A) A (A)	N/A		1 (9) 1 (9)	A (A) A (A)
7. Tim Bell Rd/"B" St	SSSC	AM PM	N/A		N/A		N/A		1 (10) 1 (10)	A (A) A (A)	1 (10) 1 (10)	A (A) A (A)
8. Tim Bell Rd/"A" Way	SSSC	AM PM	N/A		N/A		N/A		1 (10) 1 (9)	A (A) A (A)	1 (10) 1 (10)	A (A) A (A)

Notes:
SSSC = Side-Street Stop Control; AWSC = All-Way Stop Control; LOS = Level of Service
[1] For all-way stop-controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side-street stop-controlled intersections, intersection delay is reported seconds per vehicle for the overall intersection and (worst-case) movement. Intersection delay is calculated based on the procedures and methodology contained in the Highway Capacity Manual 7th Edition (Transportation Research, 2022).
Source: Fehr & Peers, 2024

As displayed, all intersections would operate acceptably at LOS C or better during the AM and PM peak hours under all study scenarios. Under the existing plus all projects scenario, there would be a total addition of 90 trips during the AM peak hour and 117 trips during the PM peak hour, resulting in no or minimal increase in delay at the study intersections. Therefore, no intersection improvements are necessary.

It is noted that the General Plan indicates that at some point in the future, a two-way left turn lane on Tim Bell Road between Yosemite Boulevard and El Pomar Avenue may be necessary. This is heavily dependent upon development occurring to the north in the City's Urban Growth Boundary and Sphere of Influence. This improvement is not necessary with the proposed projects and it is unknown if or when development north of the City of Waterford may occur. However, the City may wish to preserve necessary right-of-way for this future improvement if a two-way left turn lane will ultimately be constructed on Tim Bell Road.

Project Sites

Parks

Figure 1

Project Location

Parks

Canals

Figure 2

Site Access

XX%(XX%) AM(PM) Trip Distribution Percentages

Figure 3

Trip Distribution-
Site 1

\\fpgisdevApp01\DevGISLibrary\ServiceMXDs\WC\WC234051_Waterford_Residential\WC234051_Waterford_Residential.aprx

XX%(XX%) AM(PM) Trip Distribution Percentages

Figure 4

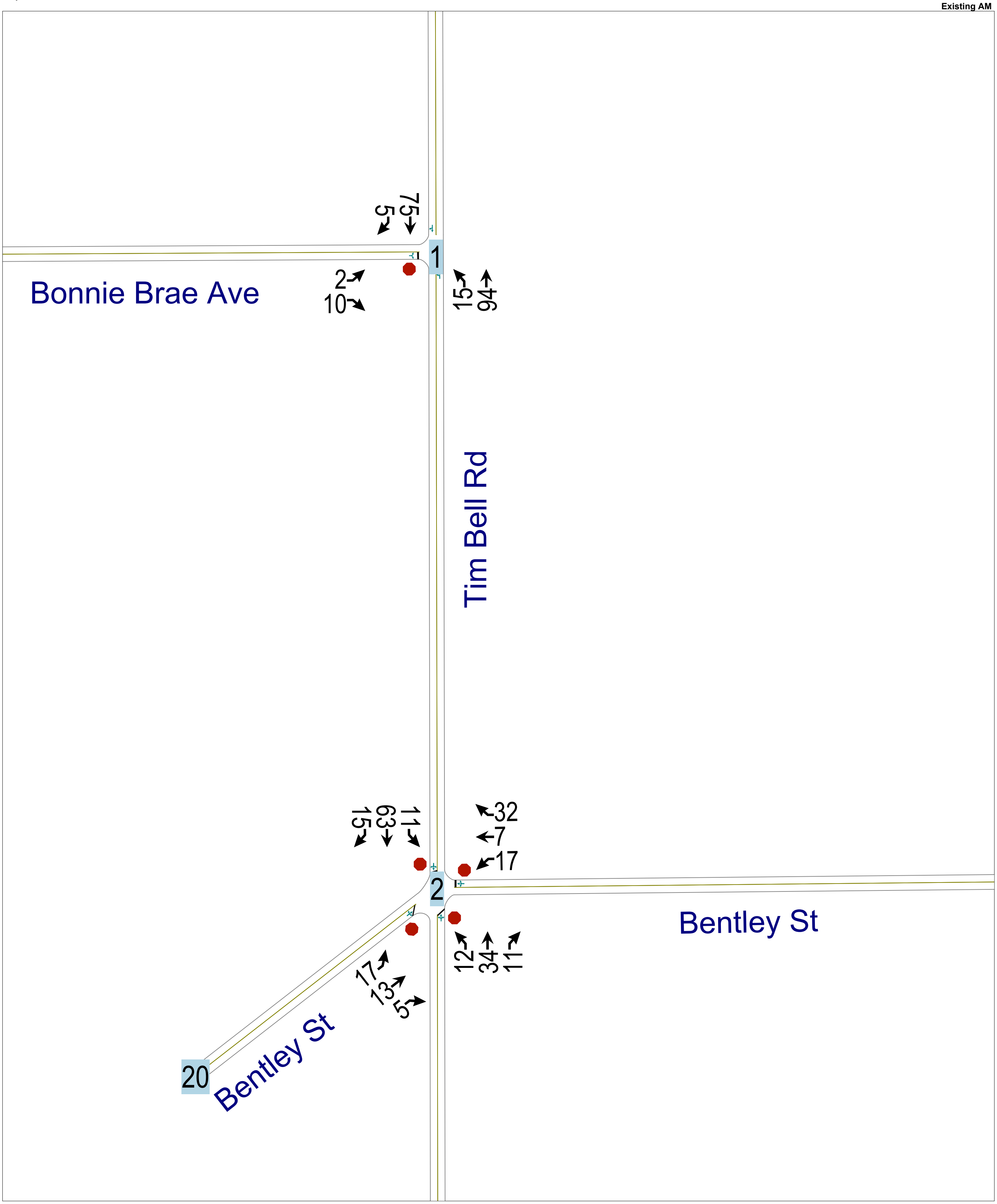
Trip Distribution-
Site 2

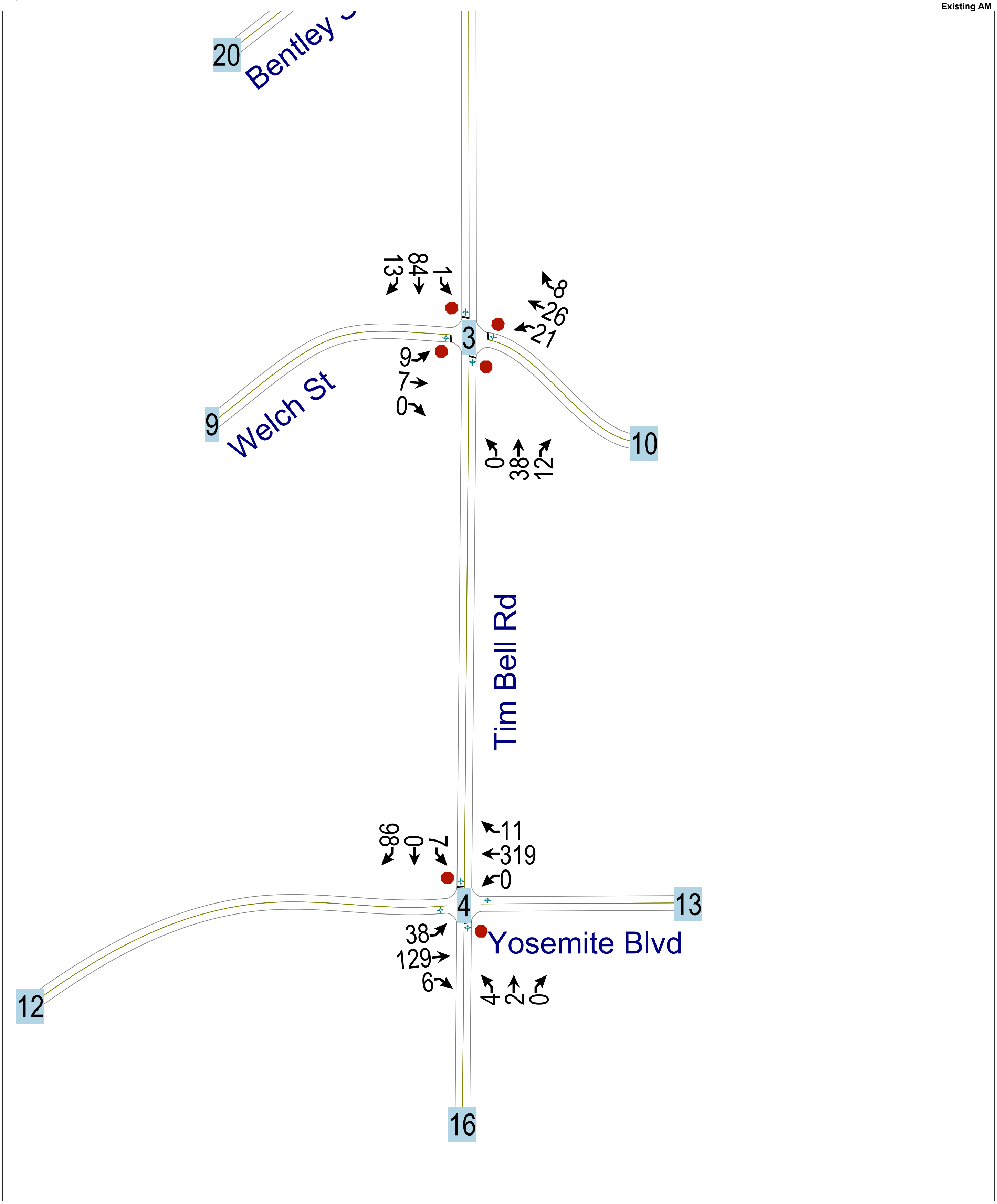
XX%(XX%) AM(PM) Trip Distribution Percentages

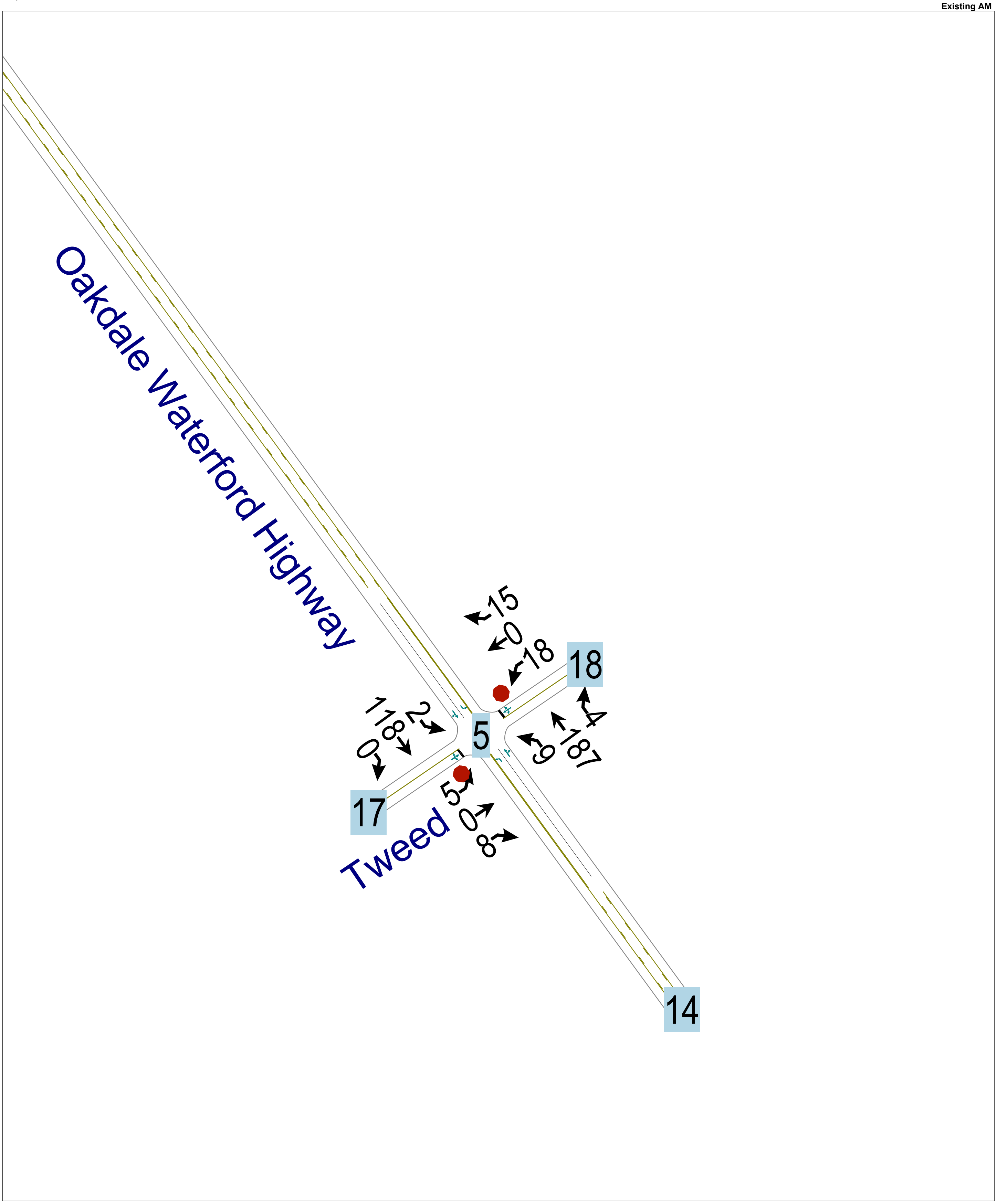
Figure 5

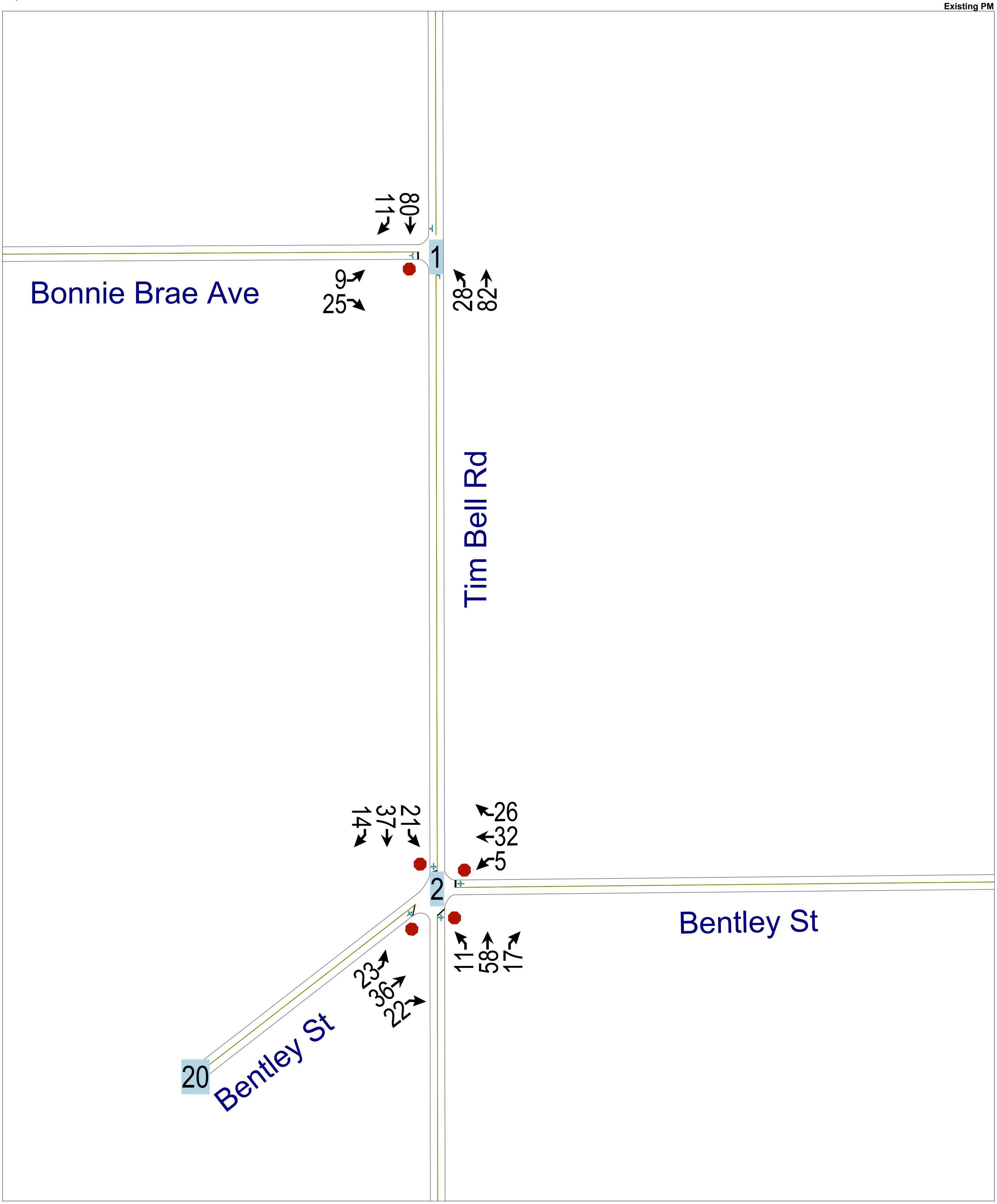
Trip Distribution-
Site 3

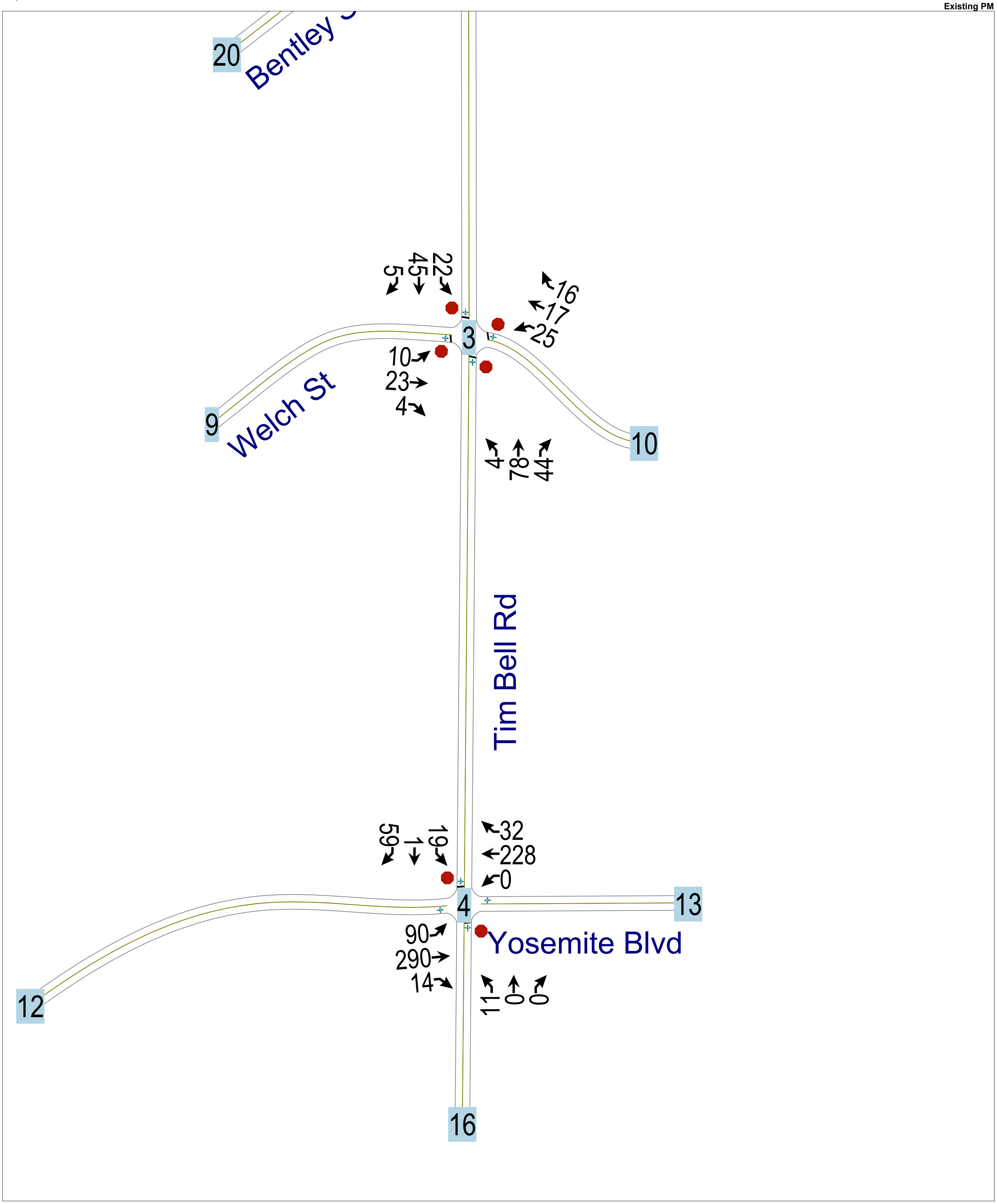
APPENDIX A: VOLUMES AND LANE CONFIGURATIONS

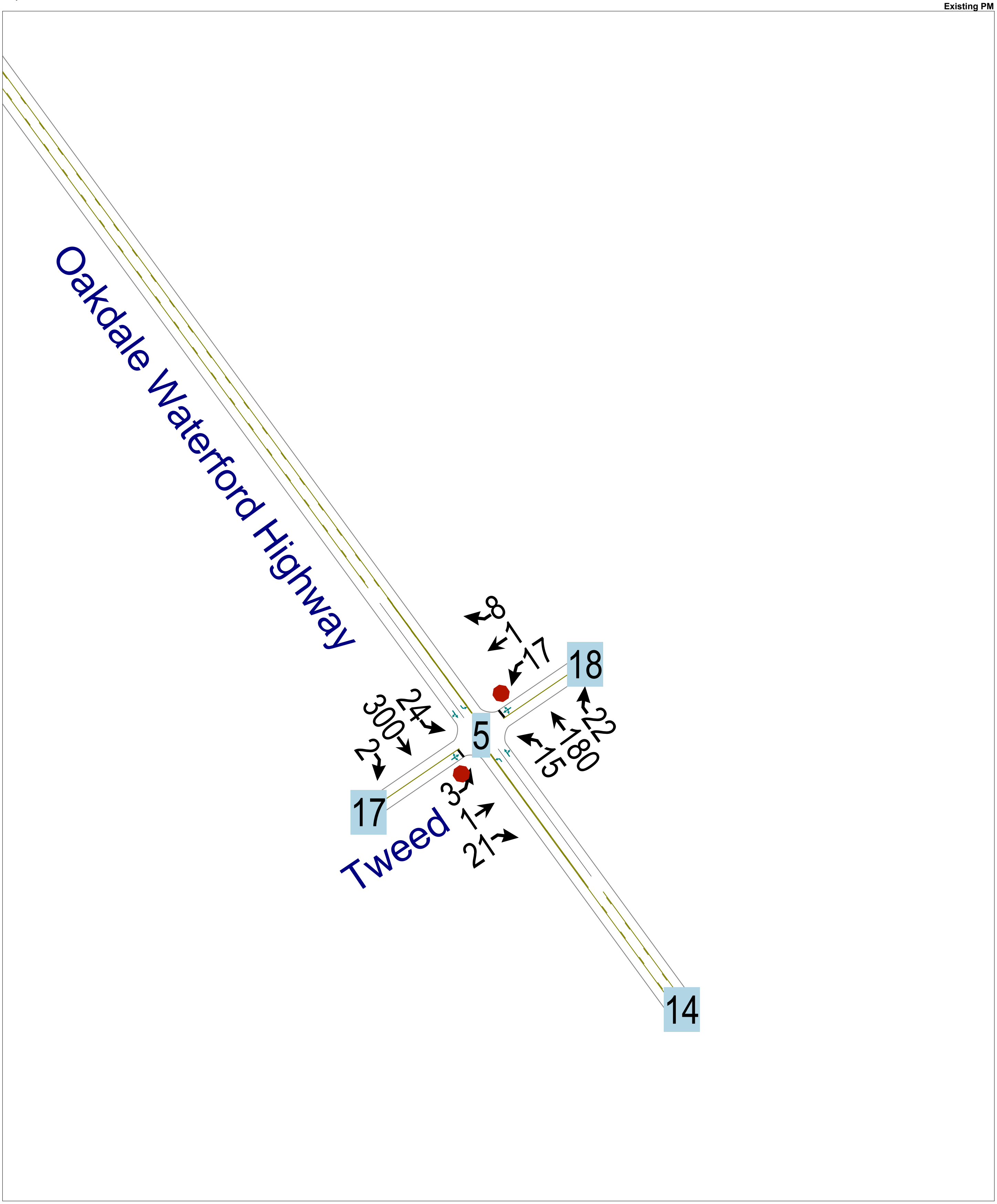

Bonnie Brae Ave
Tim Bell Rd
Bentley St
Bentley St
1
2
20
75
5
2
10
15
94
15
63
11
32
7
17
12
34
11
17
13
5

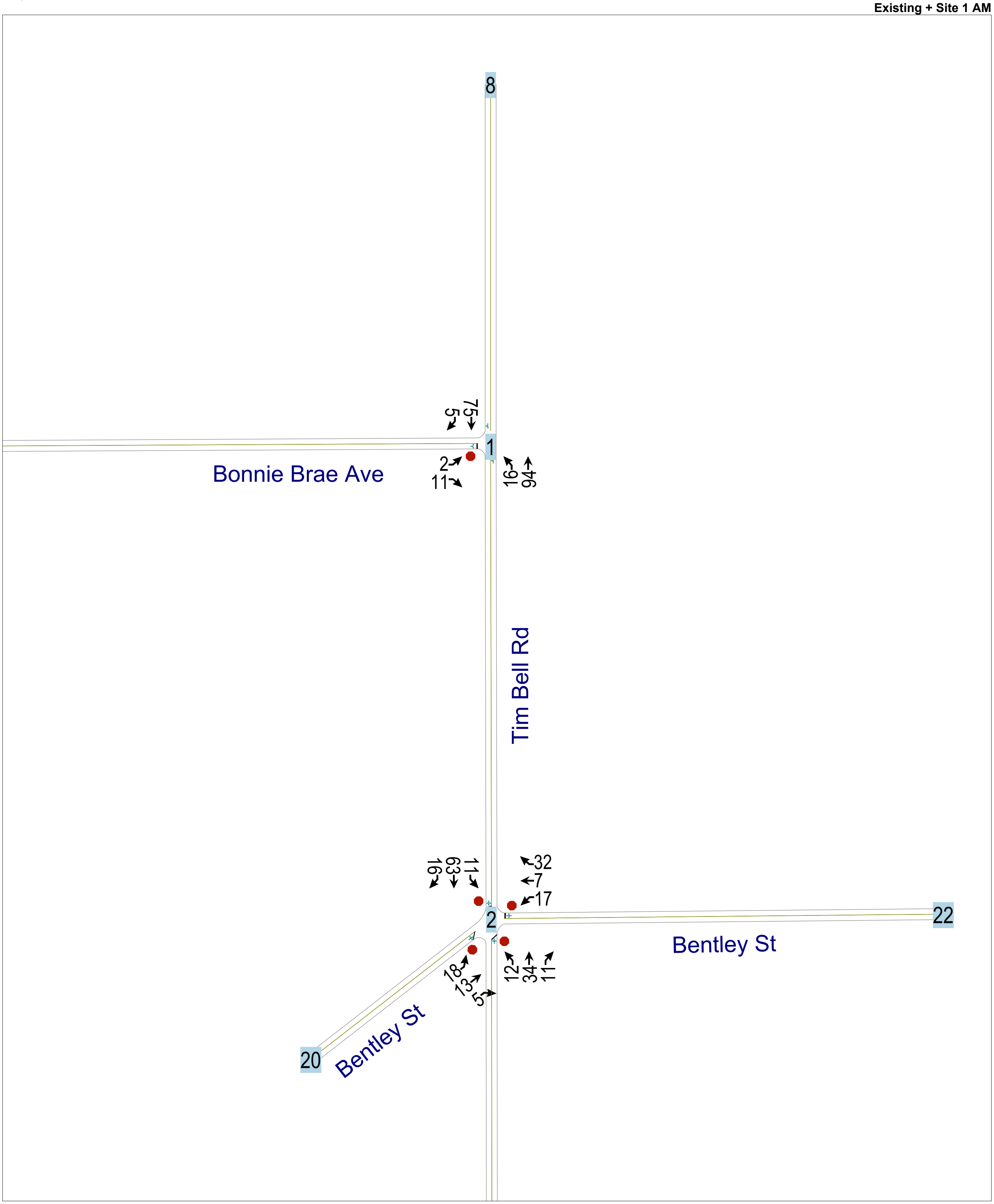

20
Bentley S
3
Welch St
9
10
Tim Bell Rd
4
13
Yosemite Blvd
12
16
13
84
1
8
26
21
9
7
0
0
38
12
98
0
7
11
319
0
38
129
6
4
2
0

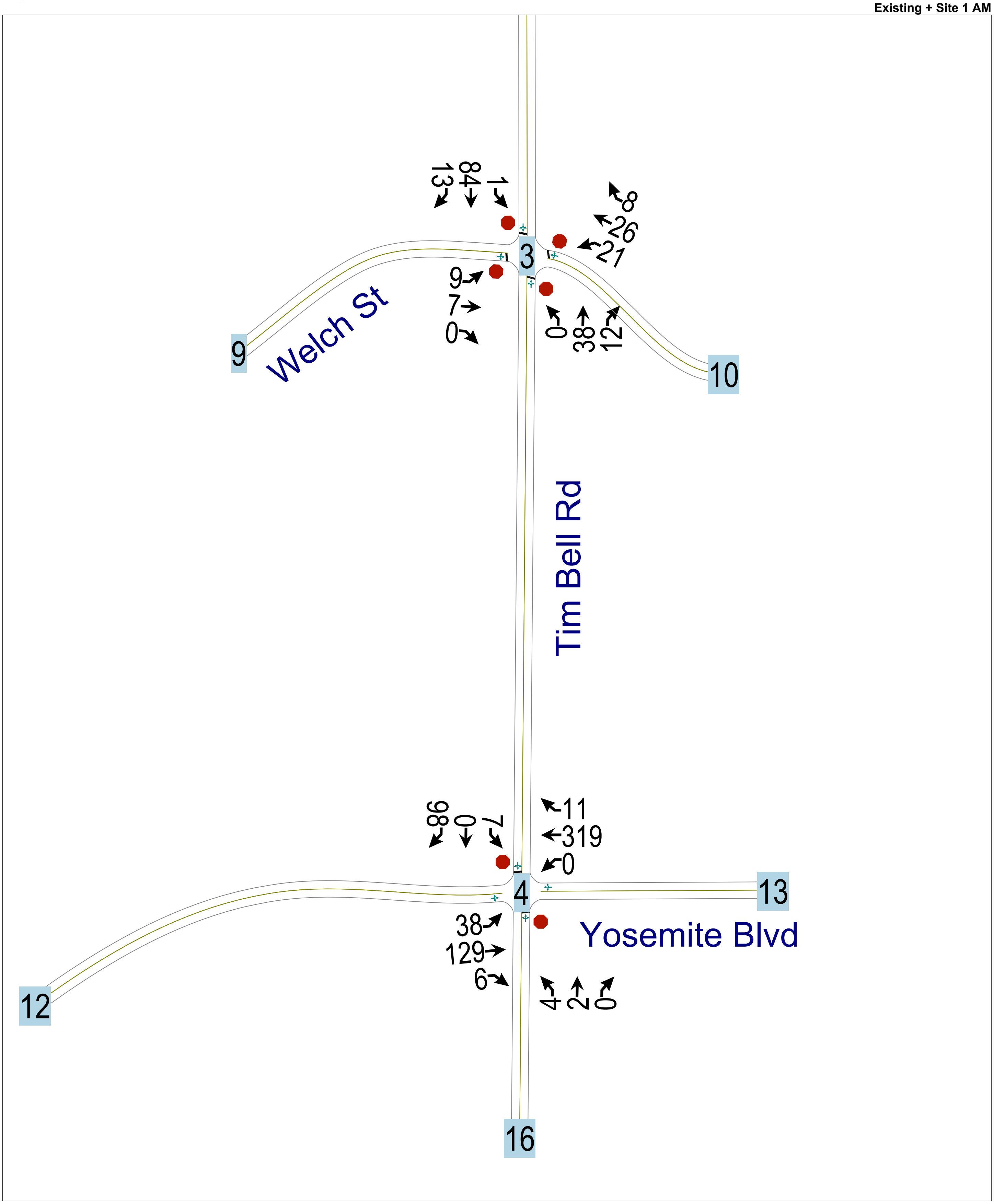

Oakdale Waterford Highway
Tweed
15
0
18
18
5
118
2
0
17
4
187
9
5
0
8
14

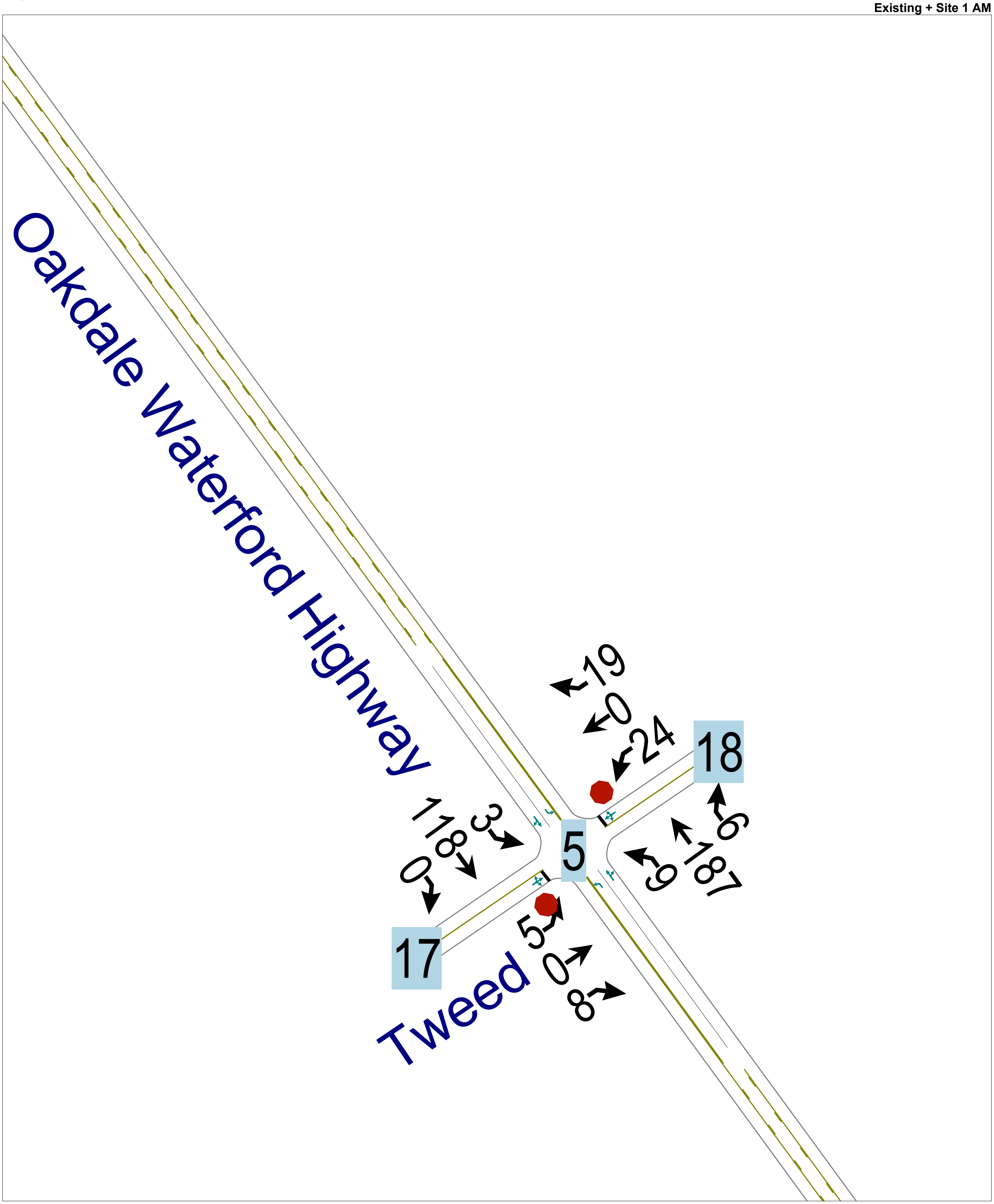

Bonnie Brae Ave
Tim Bell Rd
Bentley St
Bentley St
1
2
20
11
80
9
25
28
82
14
37
21
26
32
5
23
36
22
11
58
17

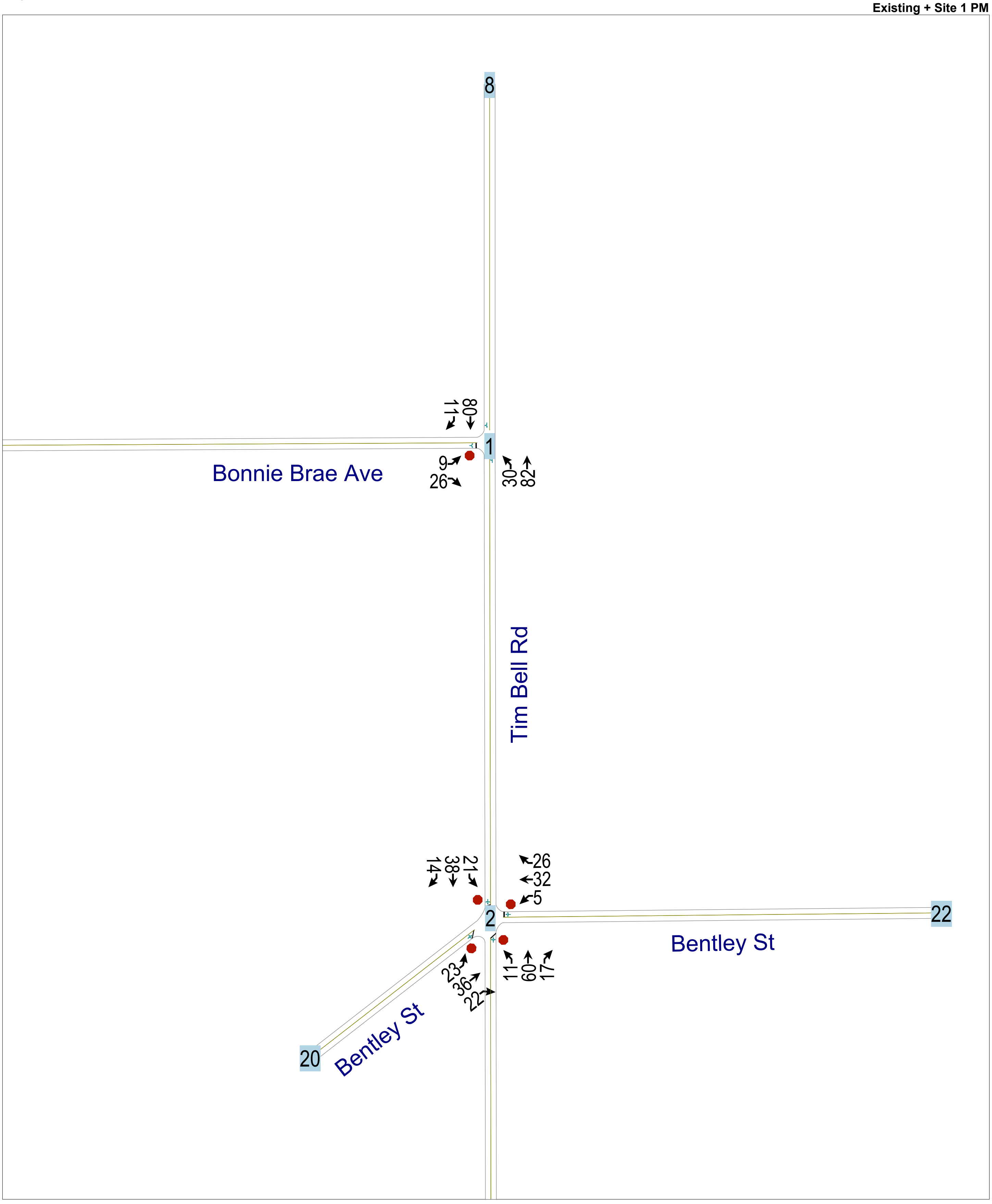

20
Bentley S
22
45
5
16
17
25
3
10
23
4
9
Welch St
10
4
78
44
Tim Bell Rd
59
1
19
32
228
0
4
13
12
90
290
14
Yosemite Blvd
11
0
0
16

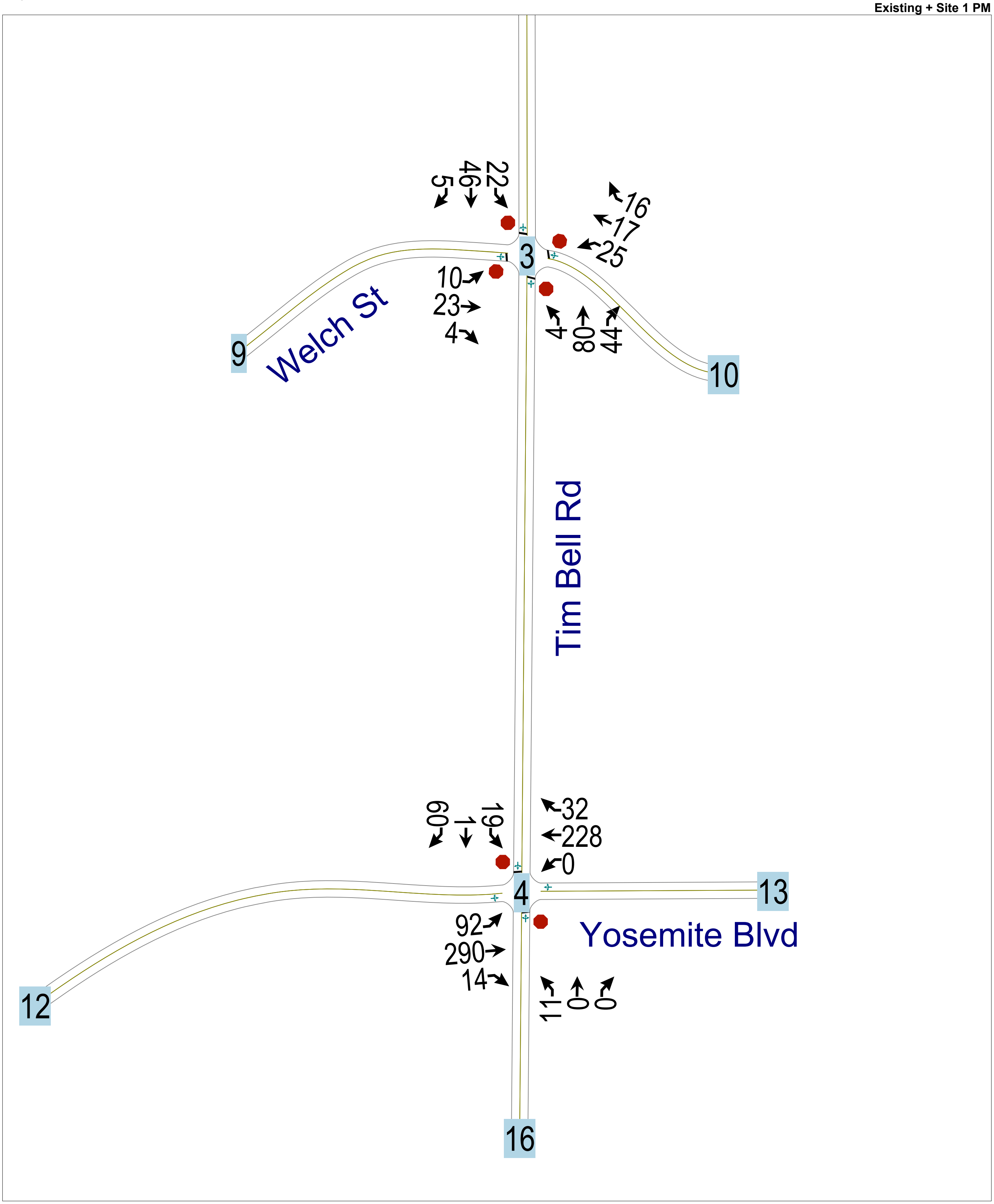

Oakdale Waterford Highway
Tweed
5
14
17
18
8
1
17
22
180
15
24
300
2
3
1
21

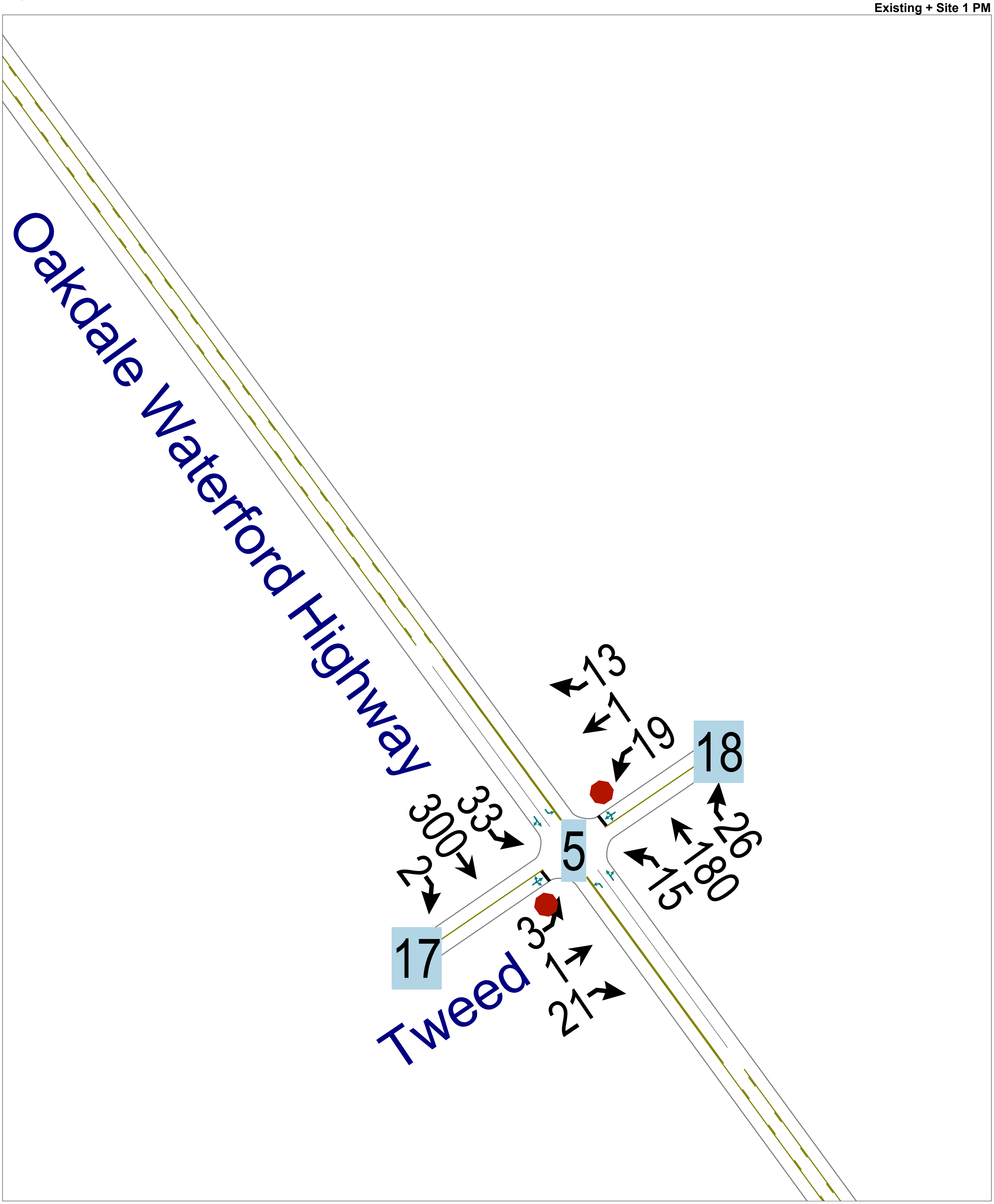

8
75
5
1
2
11
16
94
Bonnie Brae Ave
Tim Bell Rd
16
63
11
32
7
17
2
22
Bentley St
18
13
5
12
34
11
20
Bentley St

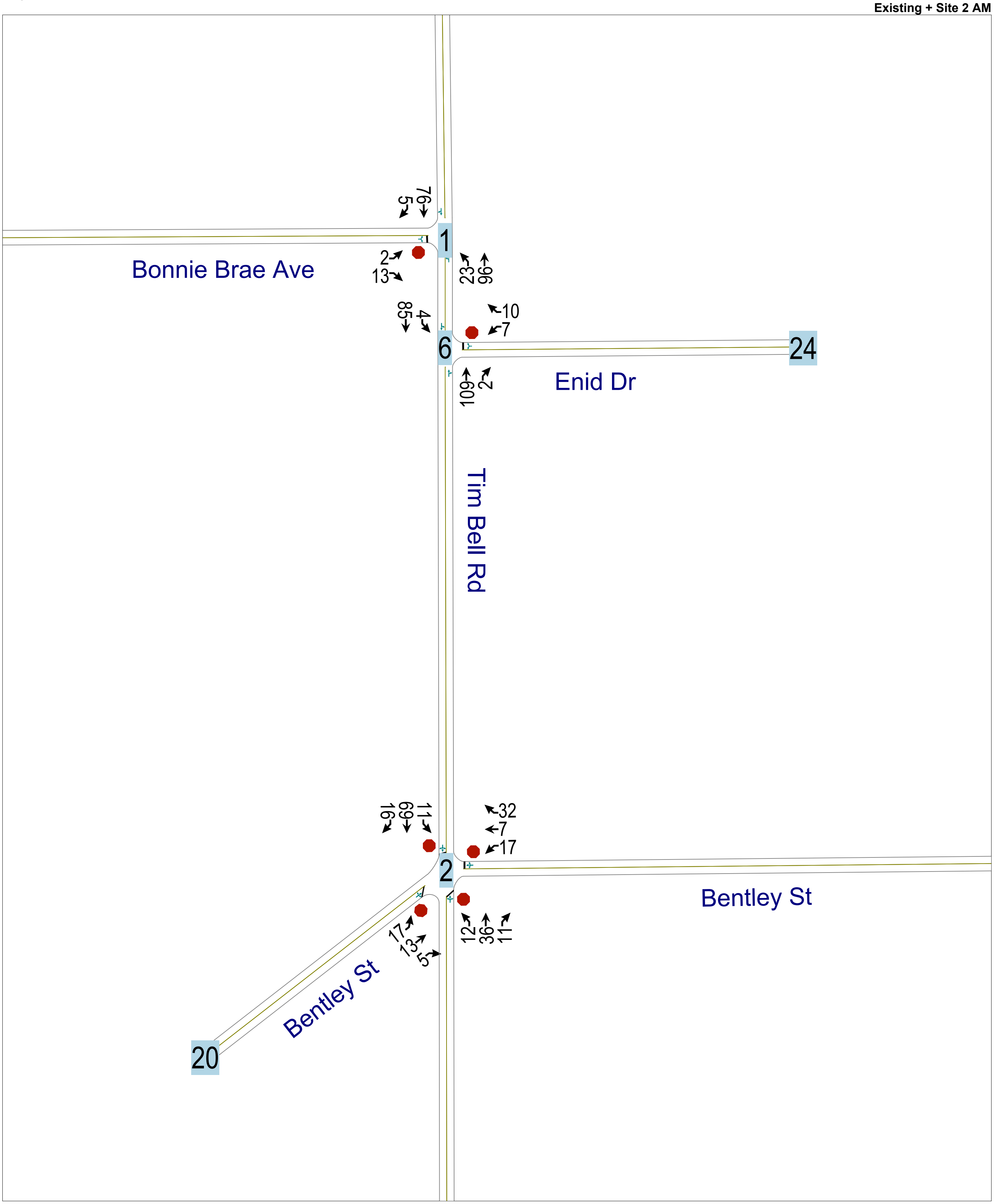

Welch St
Tim Bell Rd
Yosemite Blvd
3
4
9
10
12
13
16
13
84
1
8
26
21
9
7
0
0
38
12
98
0
7
11
319
0
38
129
6
4
2
0

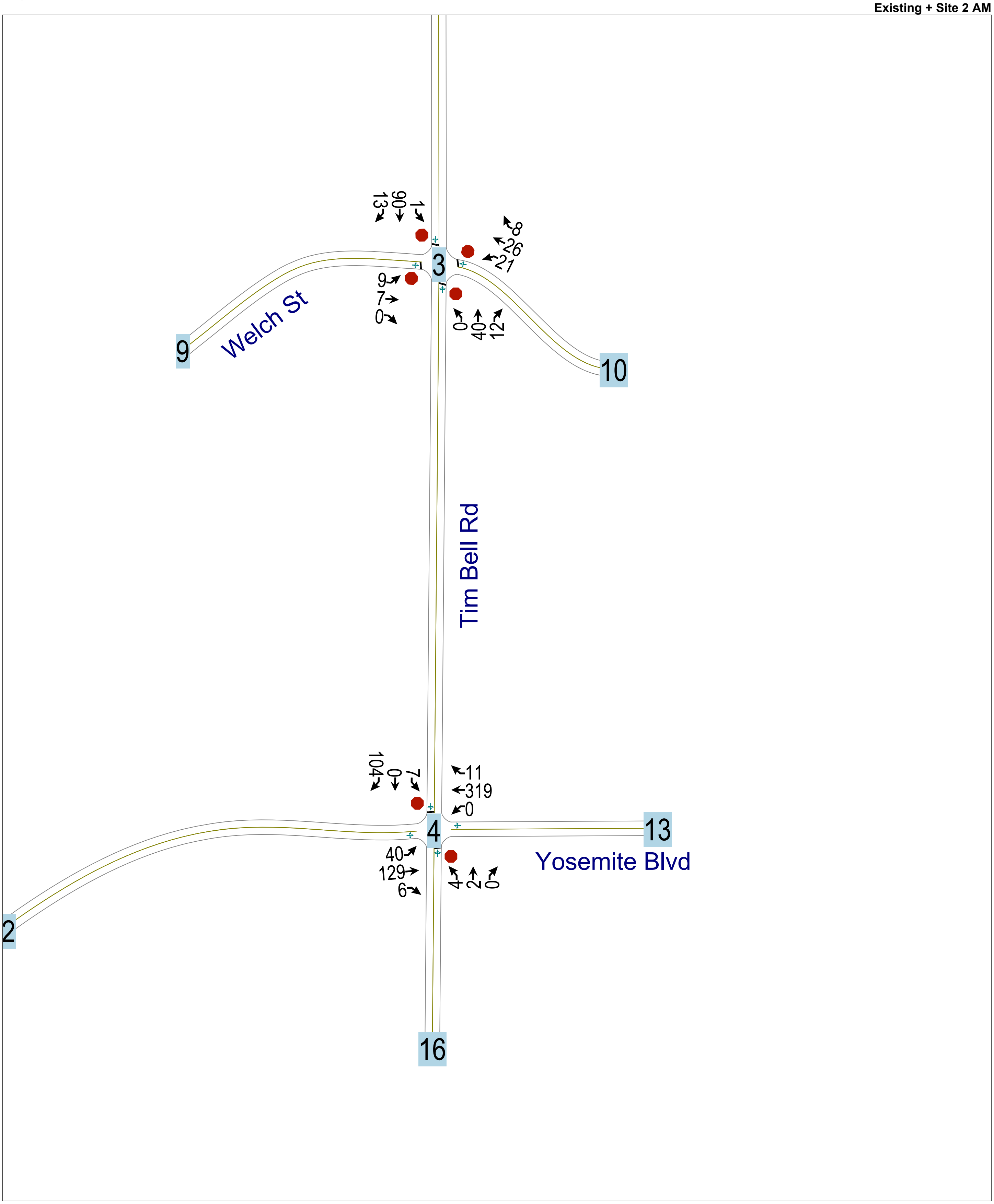

Oakdale Waterford Highway
Tweed
5
17
18
19
0
24
6
187
9
118
3
0
5
0
8

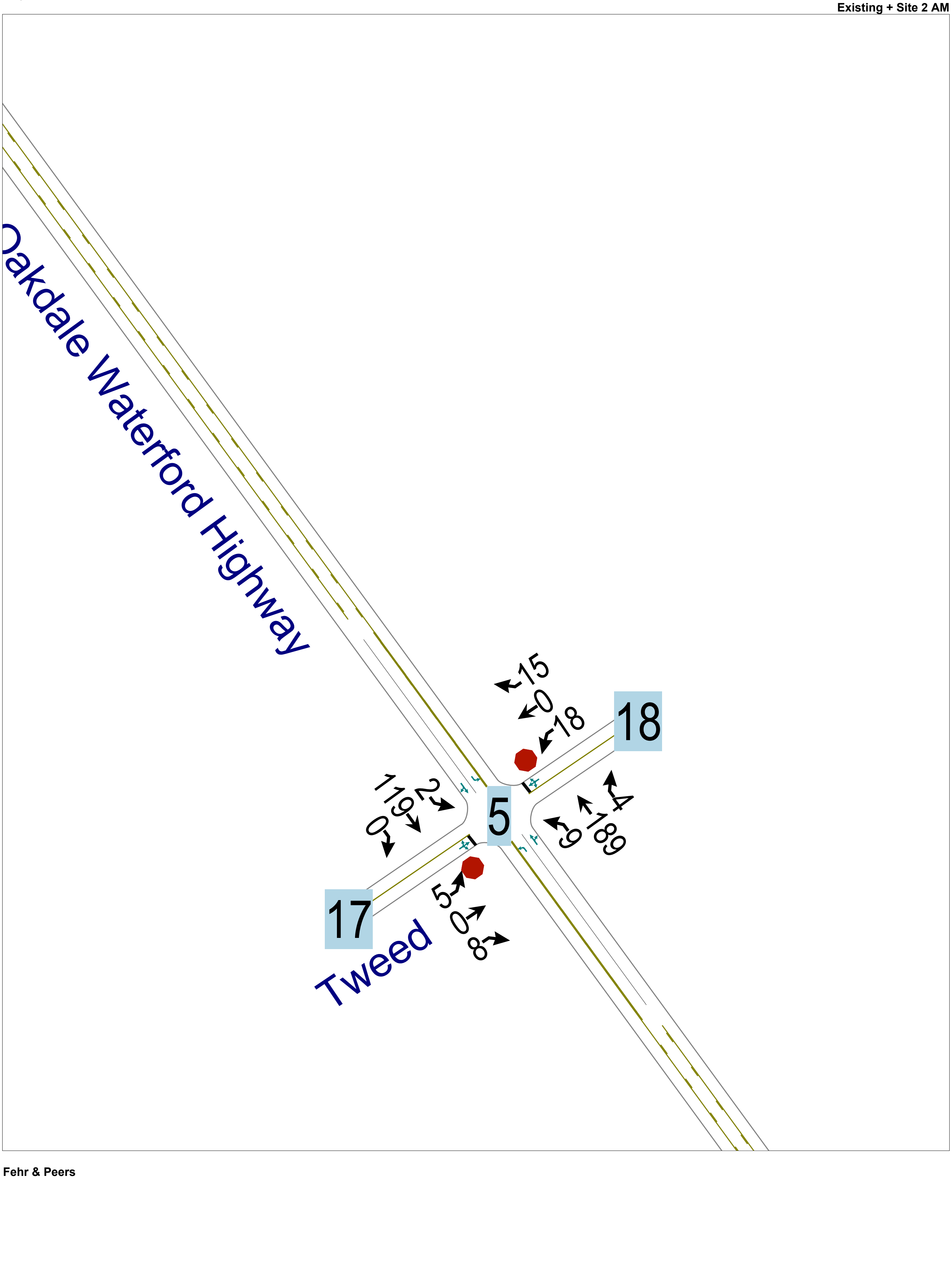

8
1
80
11
9
26
30
82
Bonnie Brae Ave
Tim Bell Rd
2
14
38
21
26
32
5
22
23
36
22
11
60
17
Bentley St
20
Bentley St

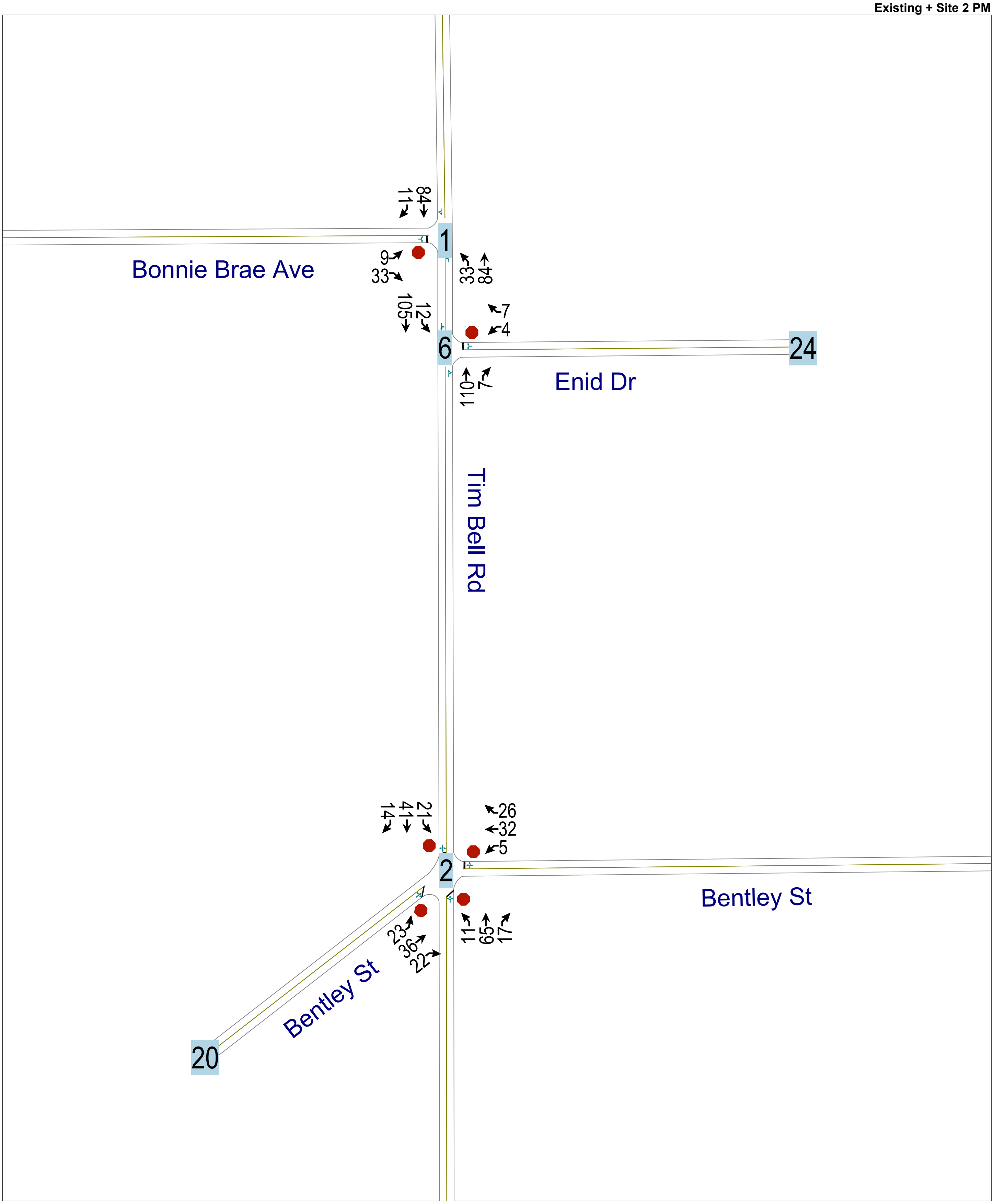

22
46
5
16
17
25
3
10
23
4
4
80
44
9
Welch St
10
Tim Bell Rd
19
1
60
32
228
0
4
13
92
290
14
Yosemite Blvd
11
0
0
12
16

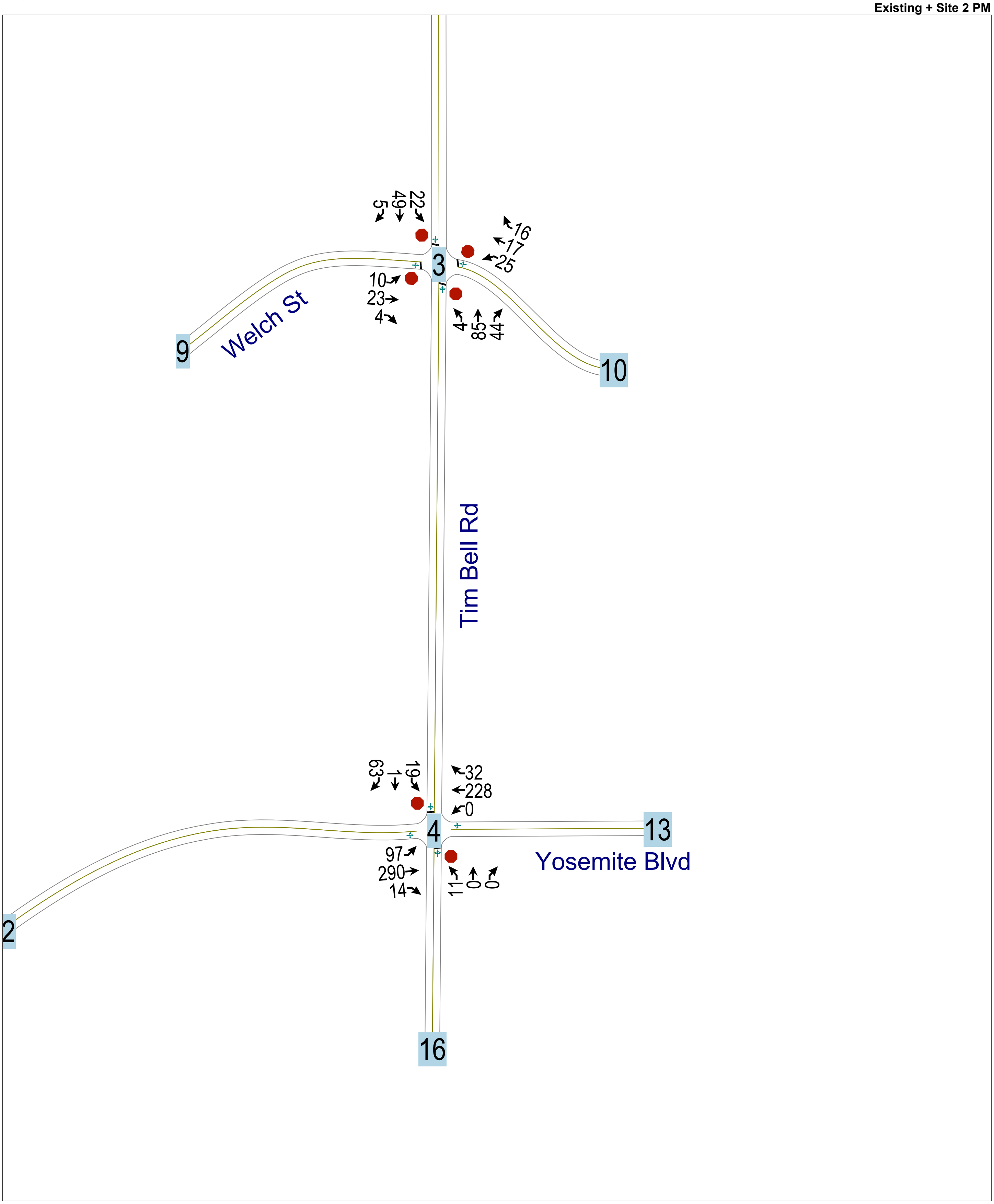

Oakdale Waterford Highway
Tweed
5
17
18
13
1
19
26
180
15
33
300
2
3
1
21

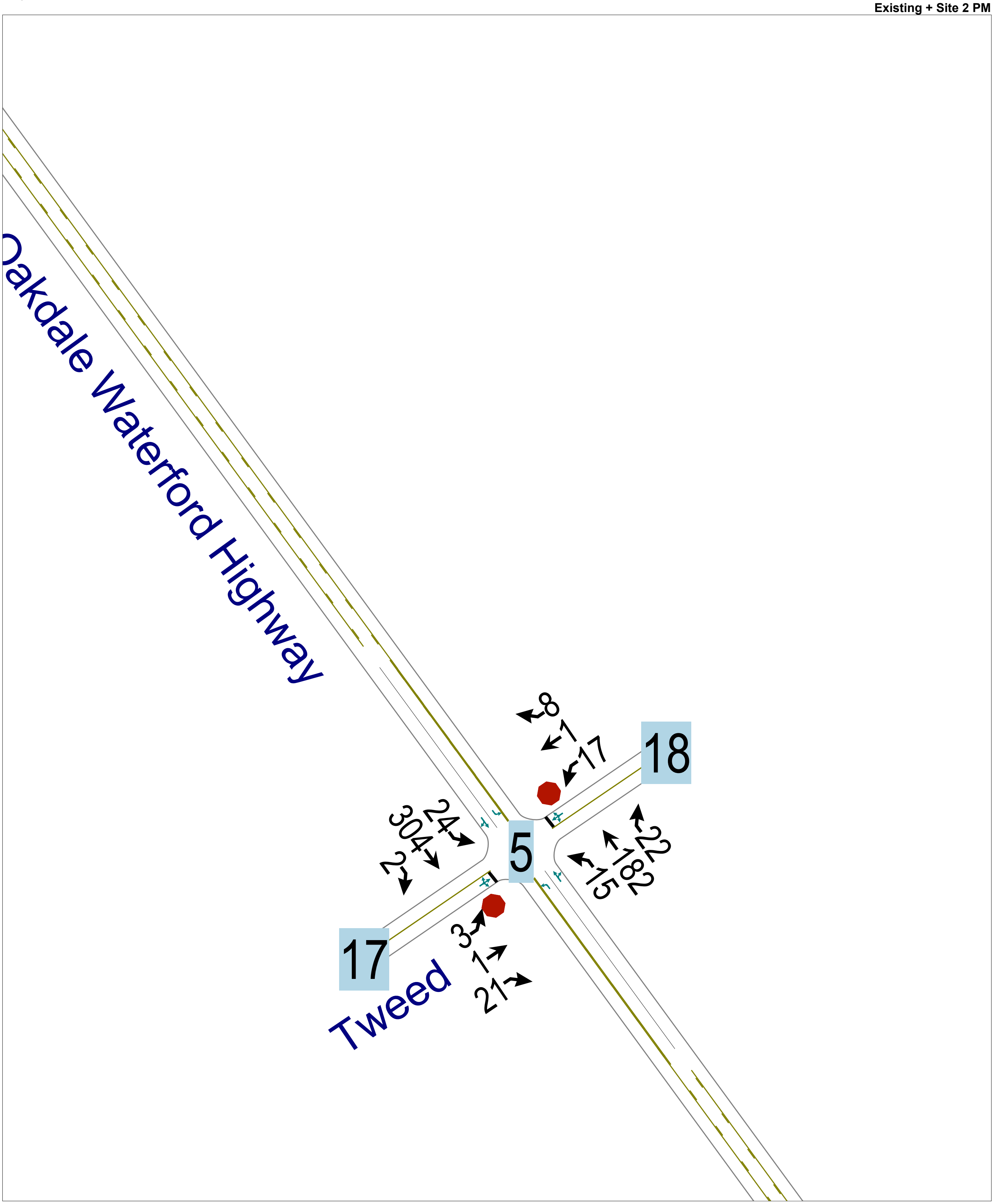

1
2
13
76
5
23
96
6
85
4
10
7
24
109
2
Bonnie Brae Ave
Enid Dr
Tim Bell Rd
2
16
69
11
32
7
17
17
13
5
12
36
11
Bentley St
Bentley St
20

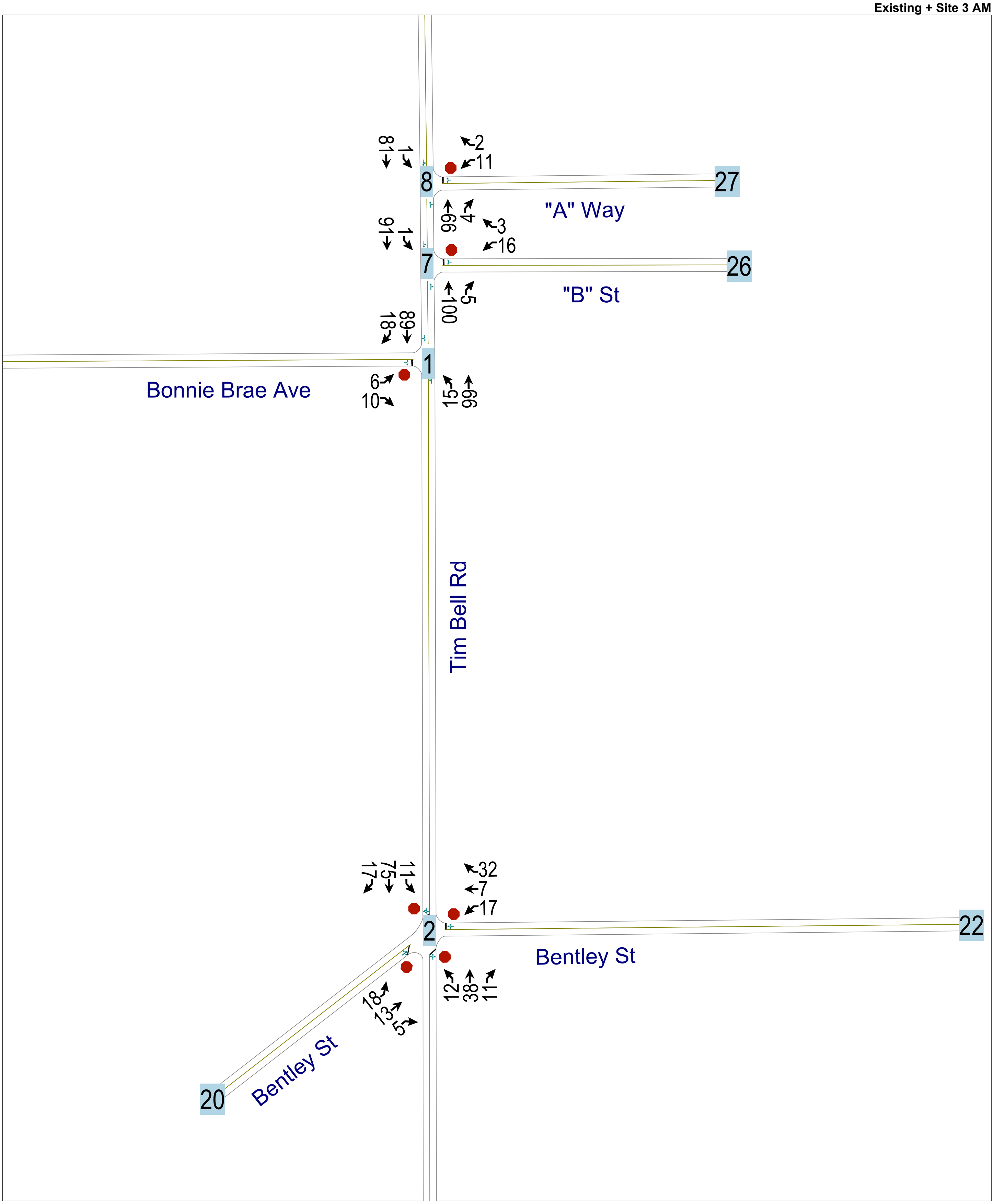

Welch St
Tim Bell Rd
Yosemite Blvd
3
4
9
10
13
2
16
1
90
13
8
26
21
9
7
0
0
40
12
104
0
7
11
319
0
40
129
6
4
2
0

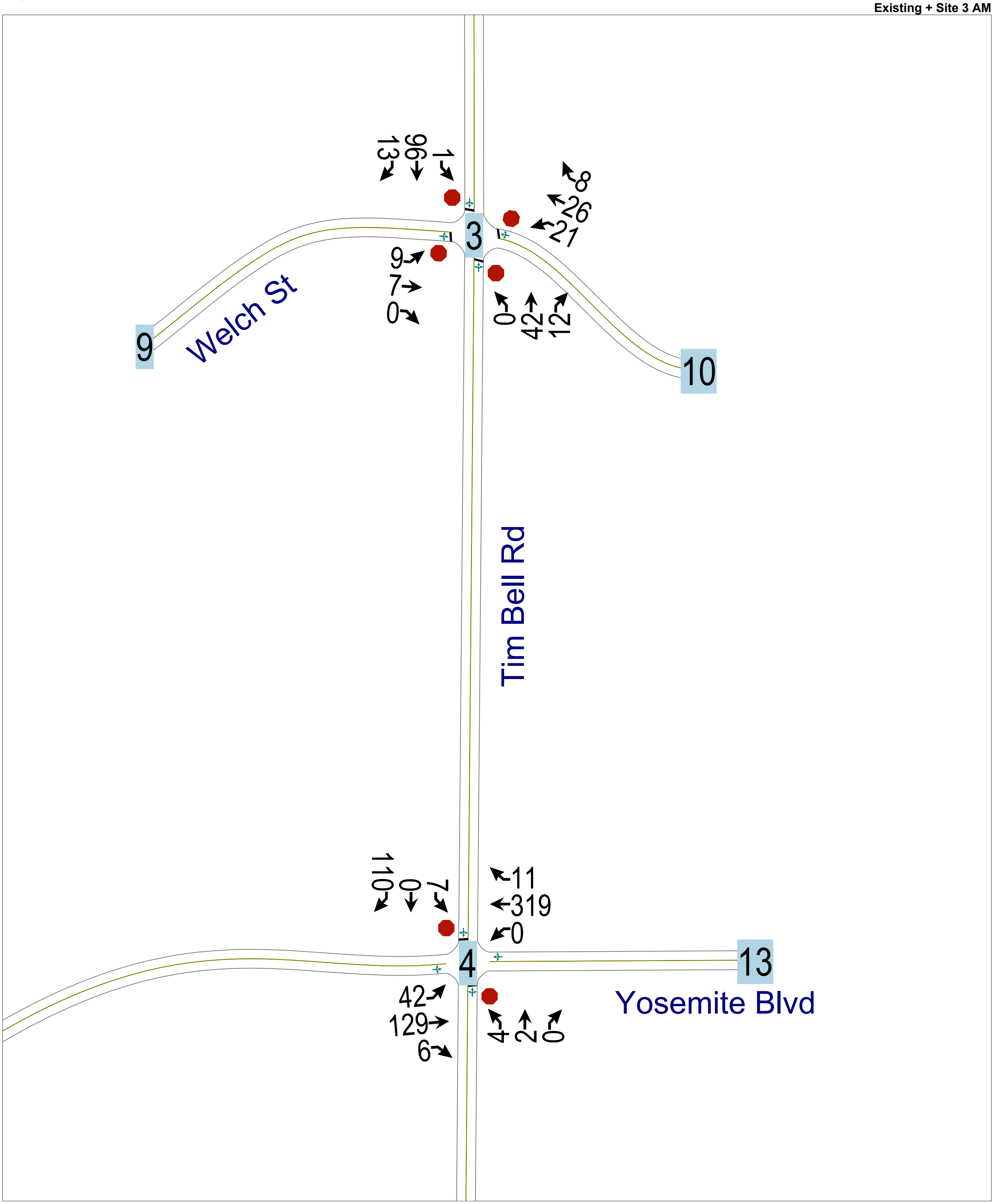

Oakdale Waterford Highway
Tweed
5
17
18
15
0
18
4
189
9
2
119
0
5
0
8

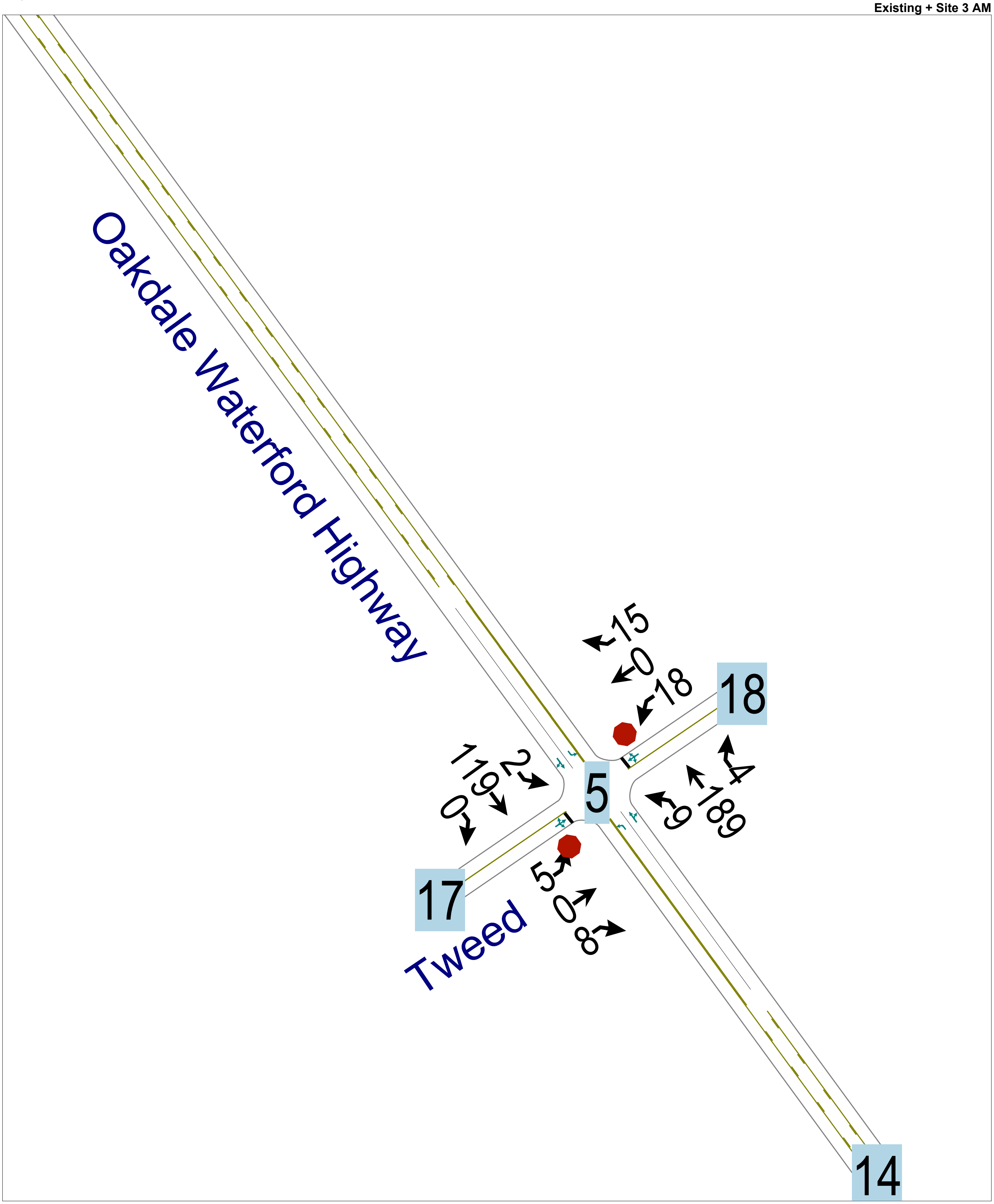

Bonnie Brae Ave
Enid Dr
Tim Bell Rd
Bentley St
Bentley St
1
6
2
24
20
84
11
9
33
33
84
12
105
7
4
110
7
21
41
14
26
32
5
23
36
22
11
65
17

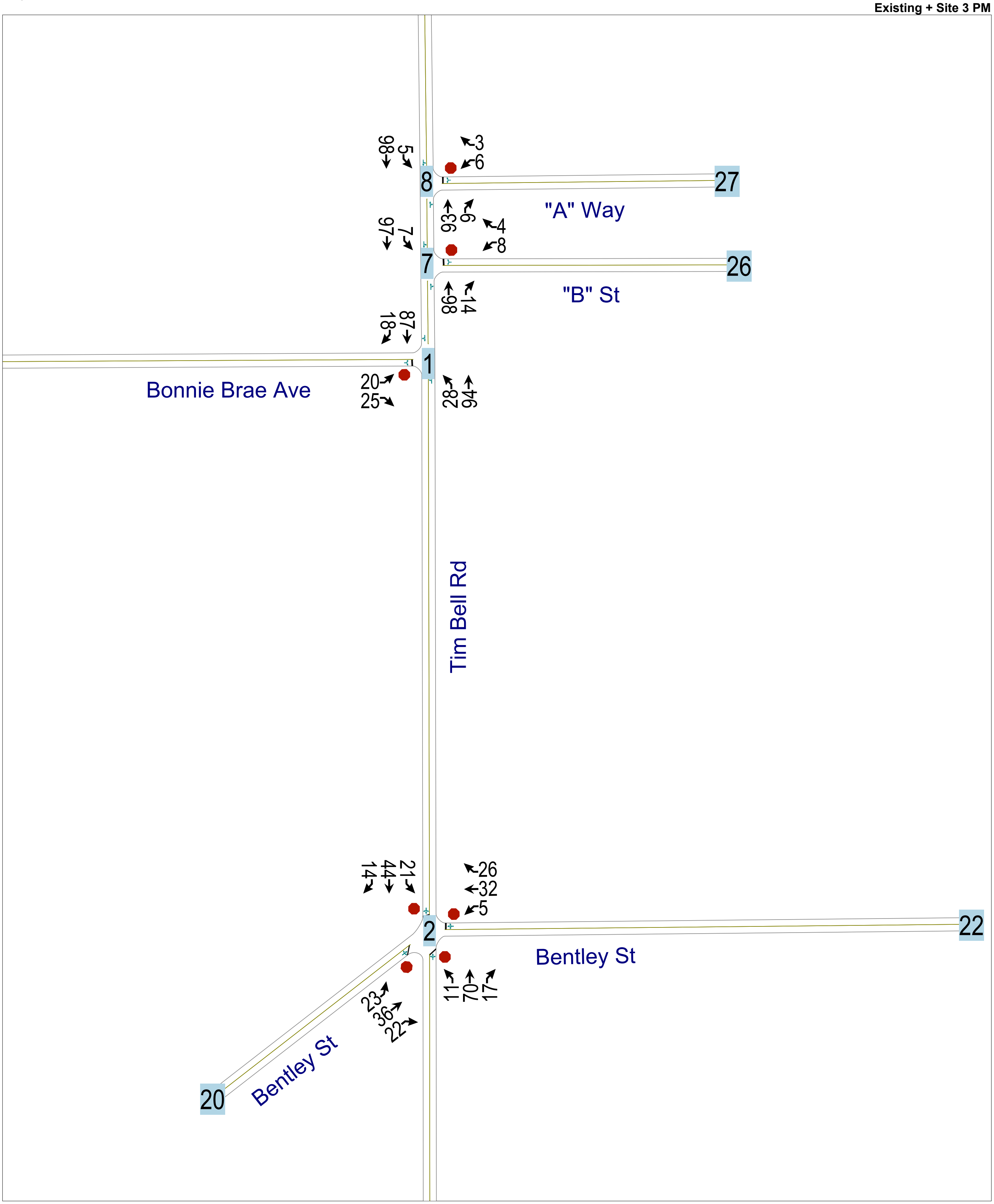

22
49
5
16
17
25
3
10
23
4
4
85
44
9
Welch St
10
Tim Bell Rd
63
1
19
32
228
0
4
13
97
290
14
11
0
0
Yosemite Blvd
2
16

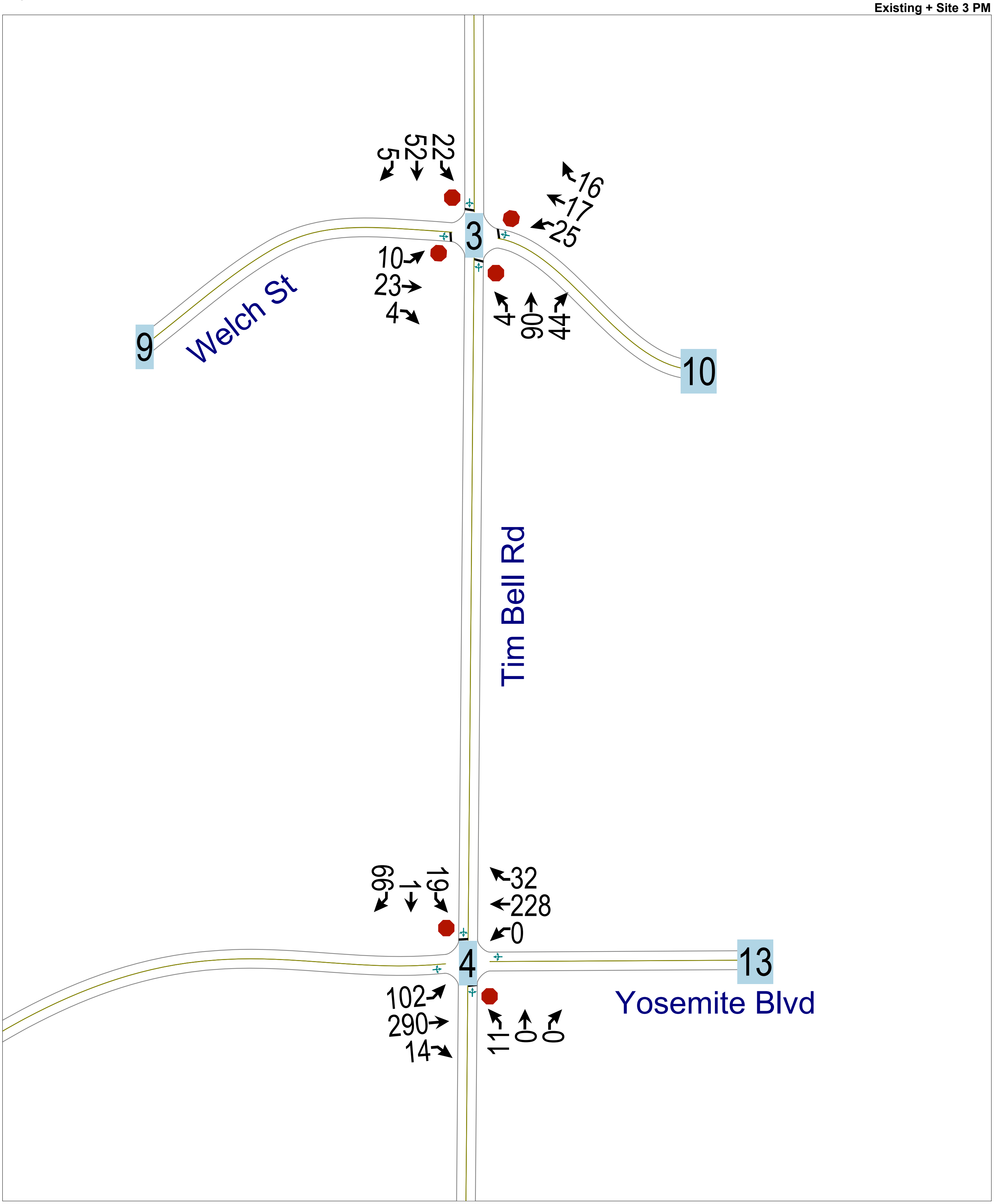

Oakdale Waterford Highway
Tweed
5
17
18
8
1
17
24
304
2
3
1
21
15
182
22

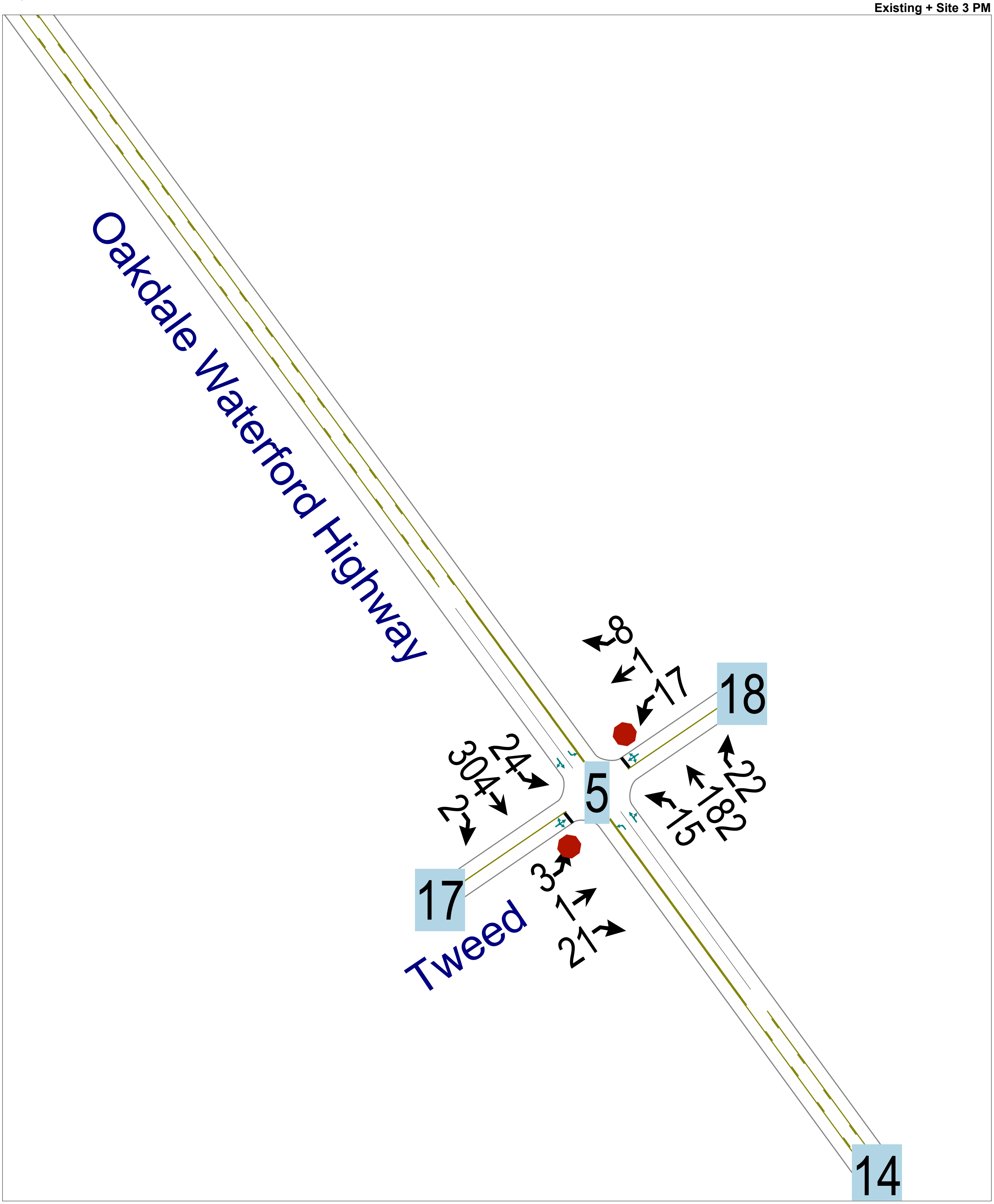

8
27
"A" Way
7
26
"B" St
1
Bonnie Brae Ave
Tim Bell Rd
2
22
Bentley St
20
Bentley St

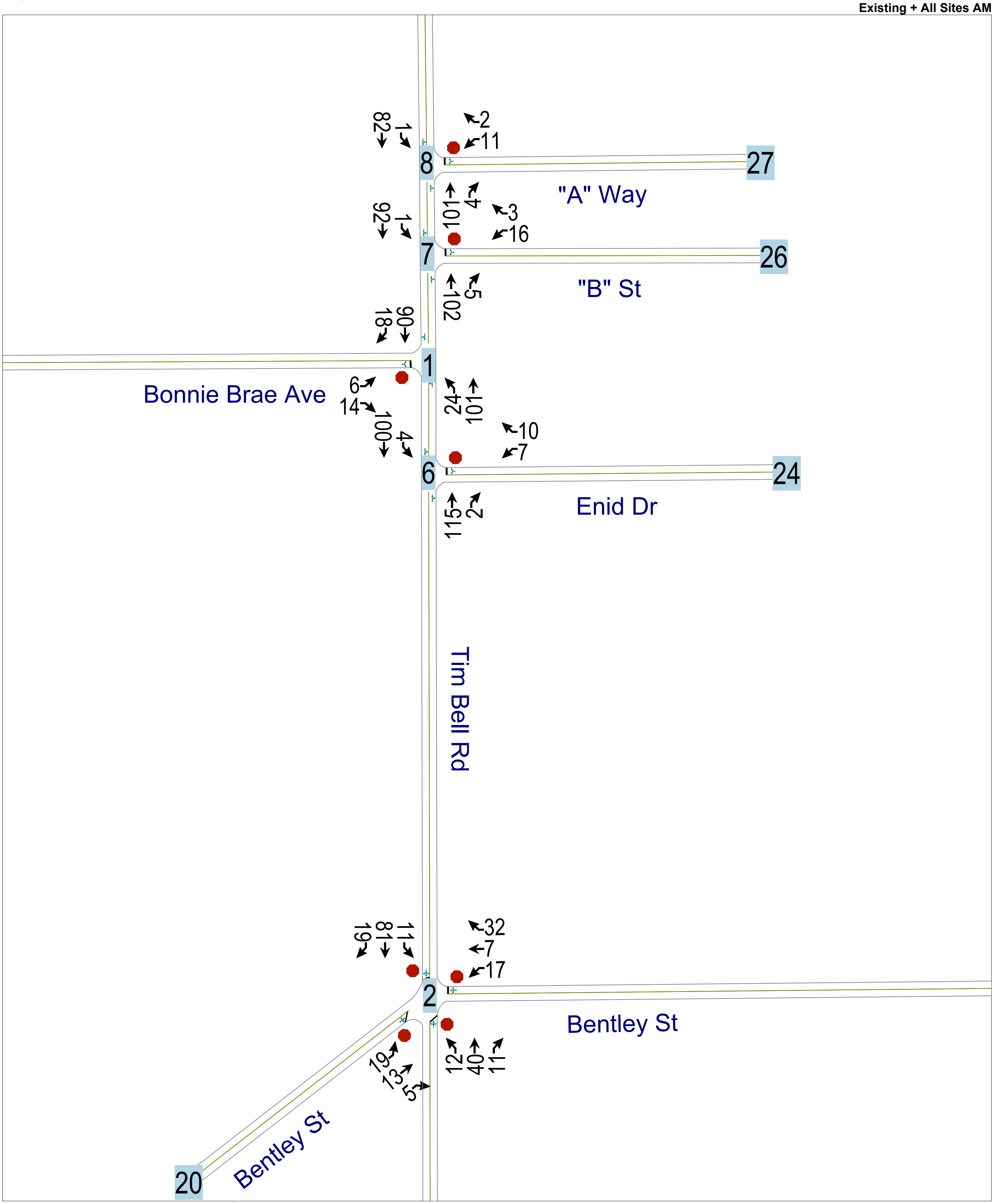

13
96
1
8
26
21
3
9
7
0
0
42
12
9
Welch St
10
Tim Bell Rd
110
0
7
11
319
0
4
13
42
129
6
4
2
0
Yosemite Blvd

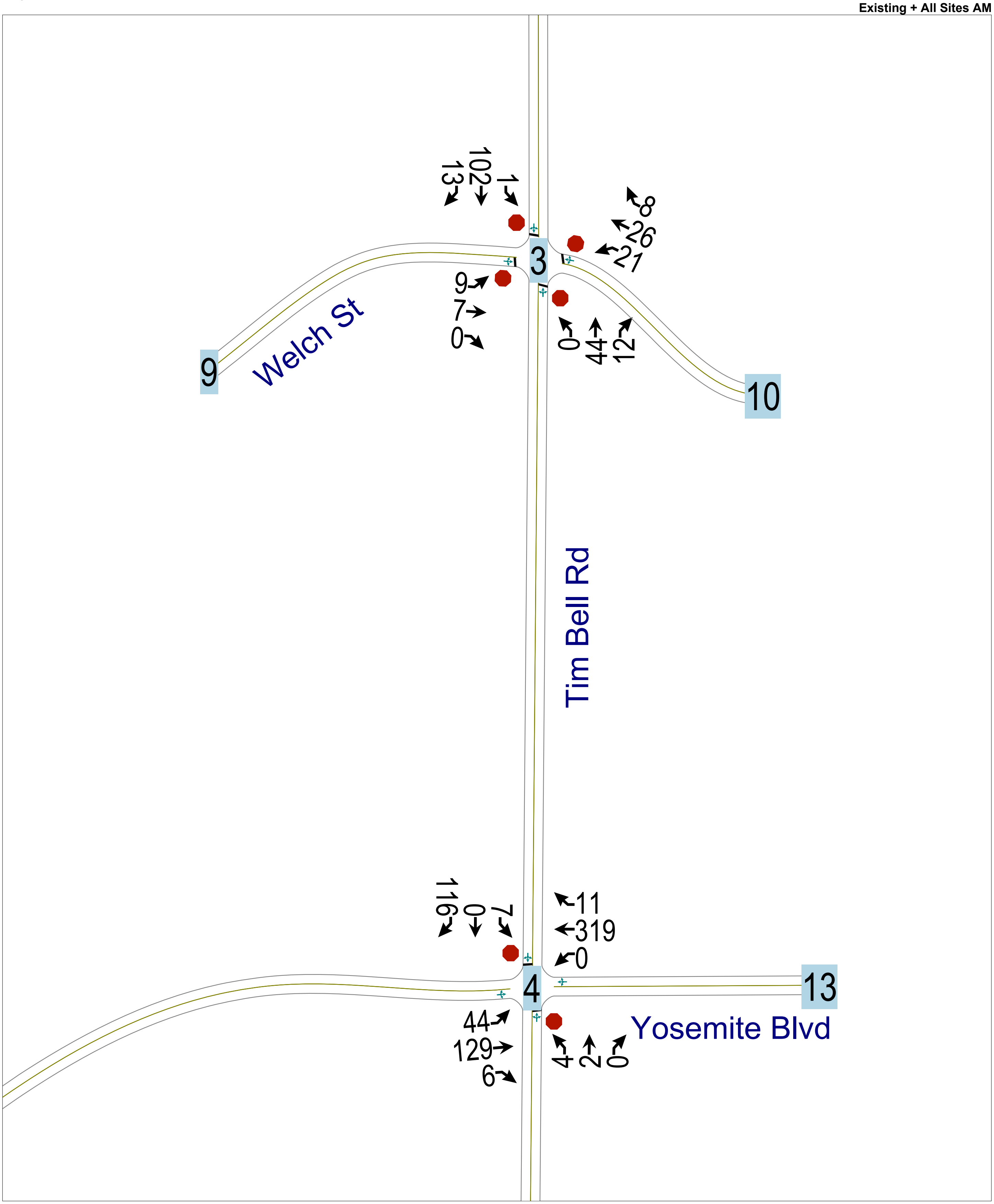

Oakdale Waterford Highway
Tweed
18
17
14
5
15
0
18
4
189
9
2
119
0
5
0
8

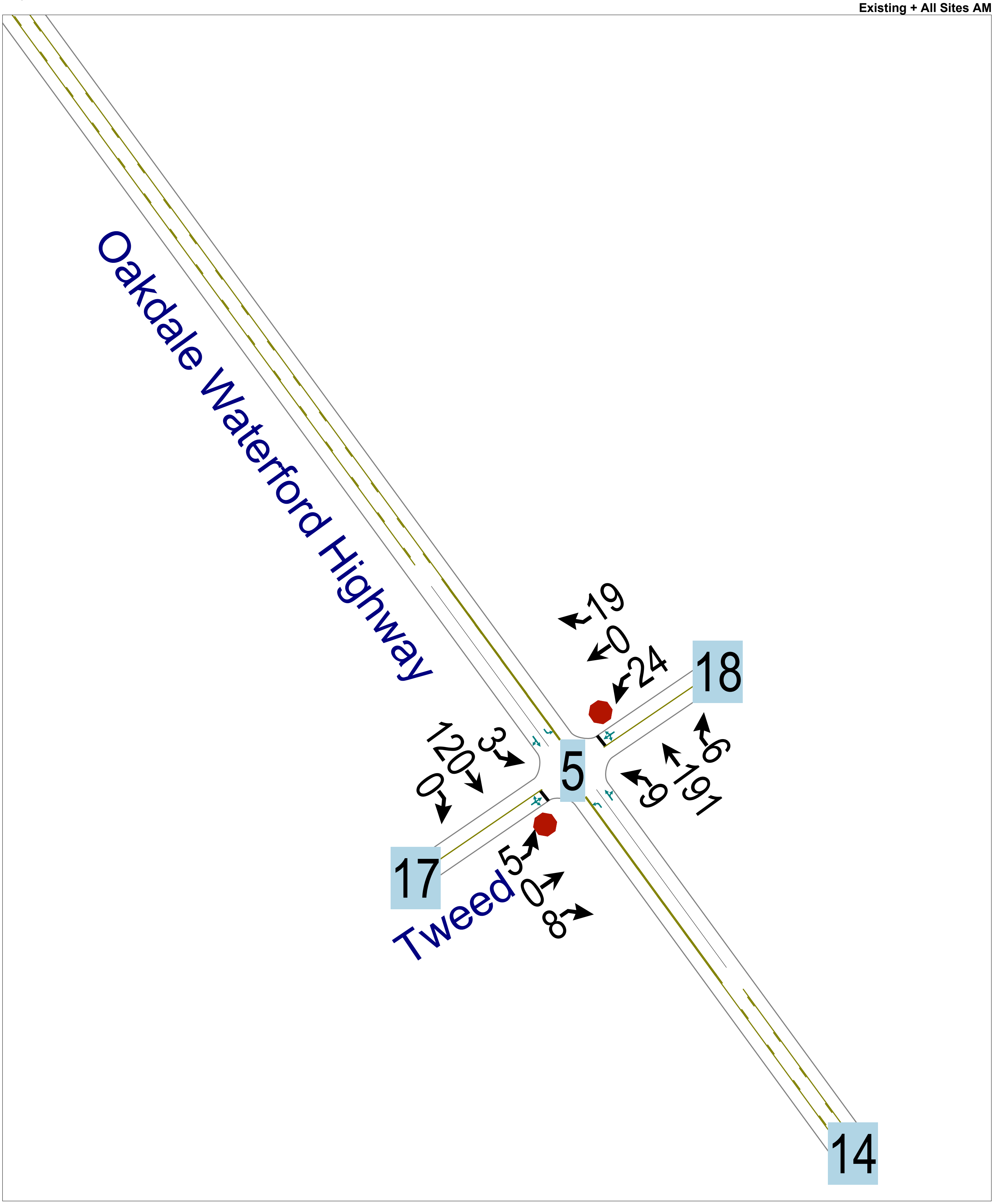

27
"A" Way
26
"B" St
Bonnie Brae Ave
Tim Bell Rd
22
Bentley St
20
Bentley St
8
7
1
2
3
6
98
5
93
9
4
8
97
7
98
14
87
18
20
25
28
94
21
44
14
26
32
5
11
70
17
23
36
22

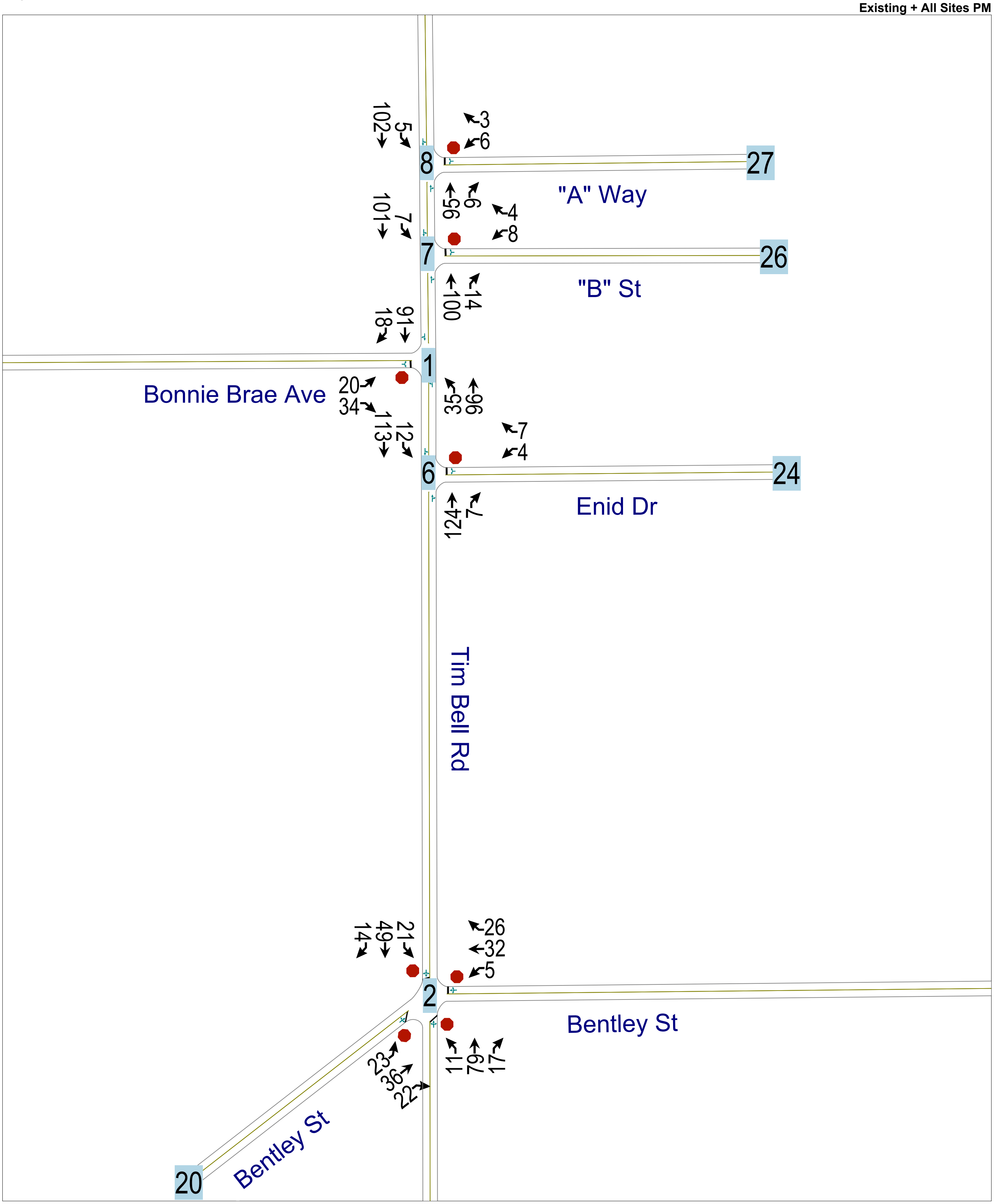

Welch St
Tim Bell Rd
Yosemite Blvd
3
4
9
10
13
22
52
5
16
17
25
10
23
4
4
90
44
19
1
66
32
228
0
102
290
14
11
0
0

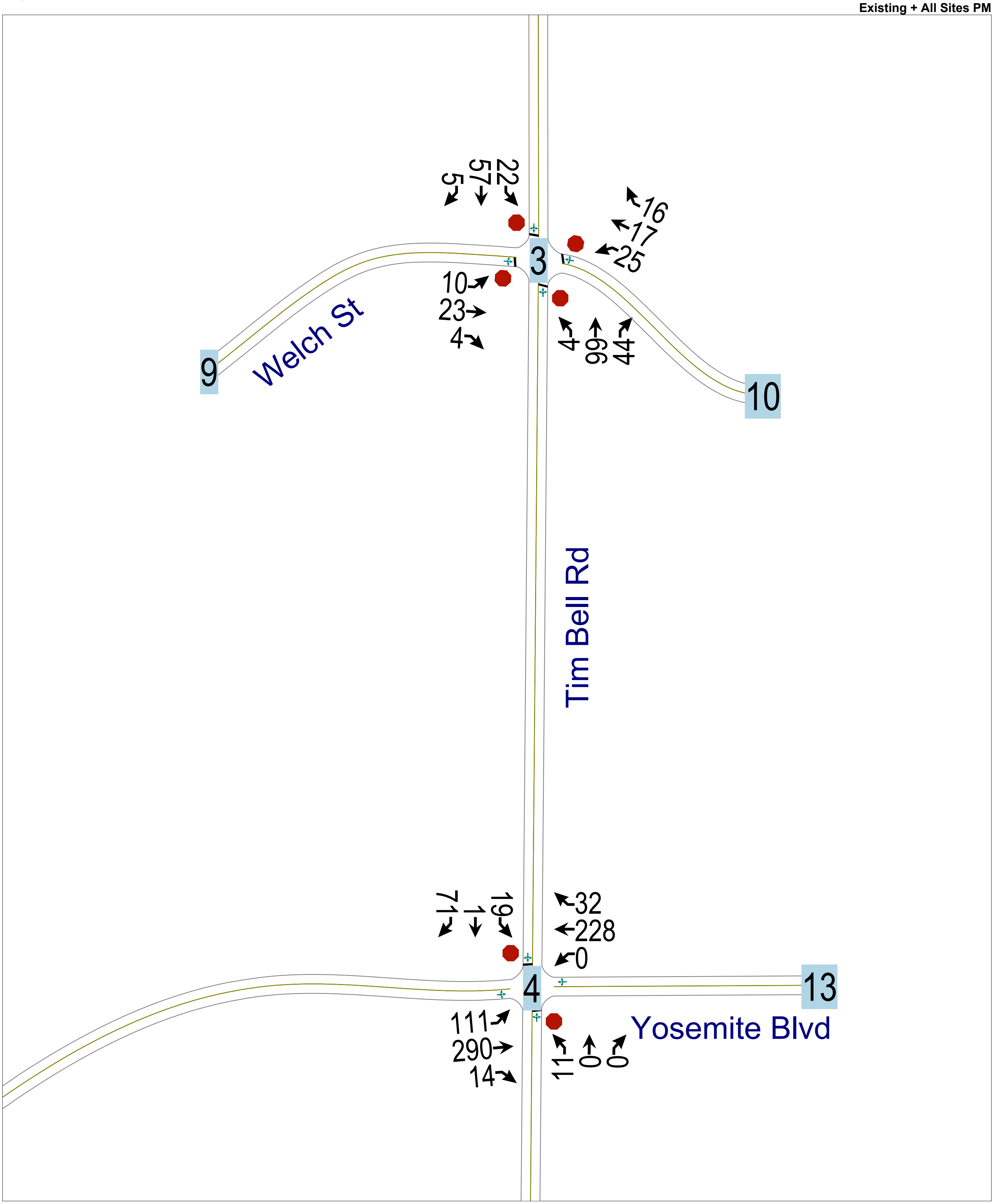

Oakdale Waterford Highway
Tweed
5
17
18
14
8
1
17
24
304
2
22
182
15
3
1
21

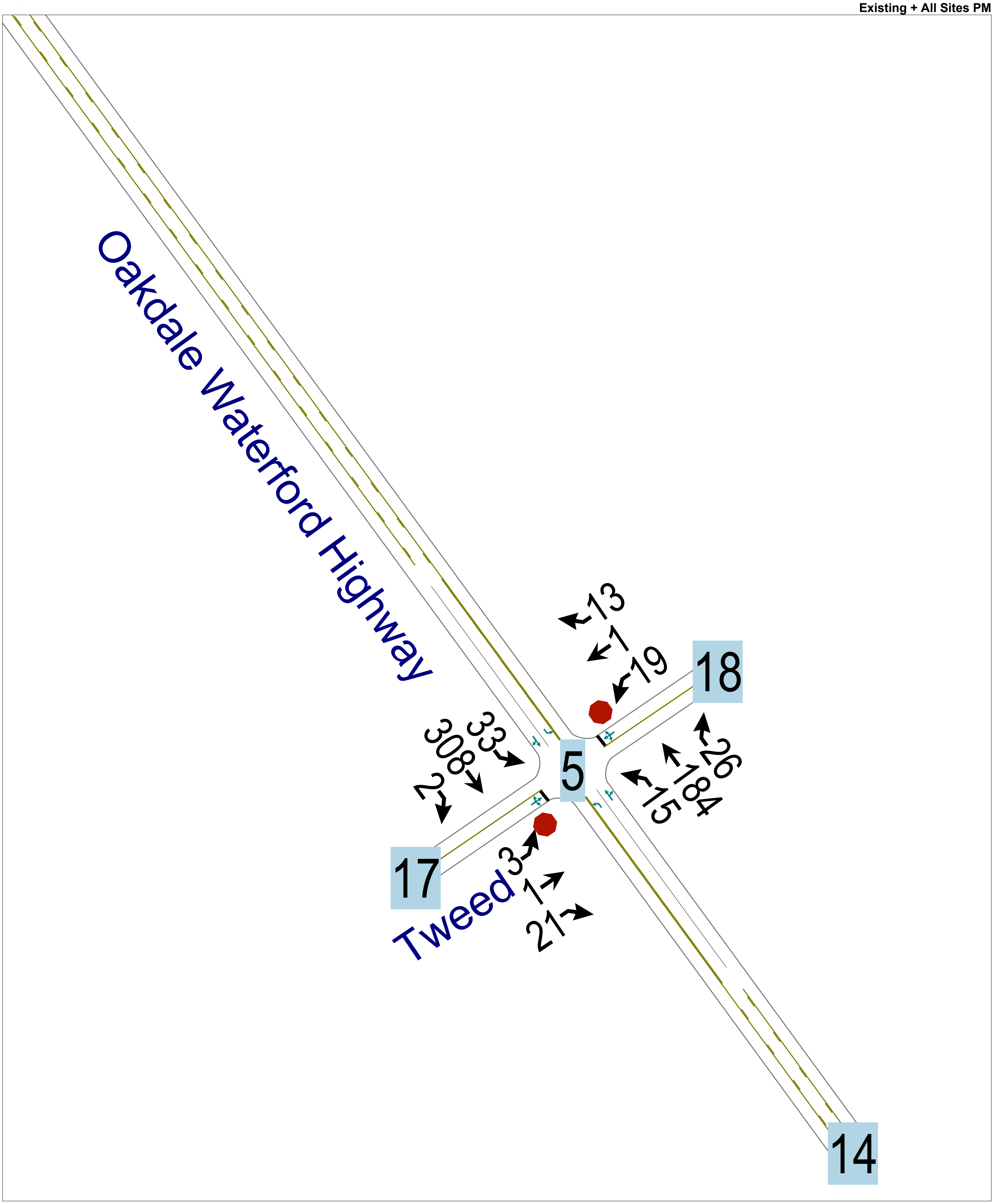

"A" Way
"B" St
Bonnie Brae Ave
Enid Dr
Tim Bell Rd
Bentley St
Bentley St
8
27
7
26
1
6
24
2
20


Welch St
Tim Bell Rd
Yosemite Blvd
3
4
9
10
13
13
102
1
8
26
21
9
7
0
0
44
12
116
0
7
11
319
0
44
129
6
4
2
0


Oakdale Waterford Highway
Tweed
5
17
18
14
19
0
24
3
120
0
5
0
8
6
191
9


27
"A" Way
26
"B" St
Bonnie Brae Ave
24
Enid Dr
Tim Bell Rd
Bentley St
Bentley St
20
8
7
1
6
2


22
57
5
16
17
25
3
10
23
4
4
99
44
9
Welch St
10
Tim Bell Rd
71
1
19
32
228
0
4
13
111
290
14
11
0
0
Yosemite Blvd


Oakdale Waterford Highway
Tweed
5
14
17
18
13
1
19
33
308
2
26
184
15
3
1
21

APPENDIX B: TECHNICAL CALCULATIONS

Intersection						
Int Delay, s/veh	1.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	10	15	94	75	5
Future Vol, veh/h	2	10	15	94	75	5
Conflicting Peds, #/hr	0	2	4	0	0	4
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	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	2	11	17	106	84	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	231	93	94	0	-	0
Stage 1	91	-	-	-	-	-
Stage 2	140	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	762	970	1513	-	-	-
Stage 1	938	-	-	-	-	-
Stage 2	892	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	747	964	1507	-	-	-
Mov Cap-2 Maneuver	747	-	-	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	888	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1507	-	919	-	-
HCM Lane V/C Ratio	0.011	-	0.015	-	-
HCM Control Delay (s)	7.4	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	17	13	5	17	7	32	12	34	11	11	63	15
Future Vol, veh/h	17	13	5	17	7	32	12	34	11	11	63	15
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	22	16	6	22	9	41	15	43	14	14	80	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	7.6	7.4	7.6	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	21%	49%	30%	12%
Vol Thru, %	60%	37%	12%	71%
Vol Right, %	19%	14%	57%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	57	35	56	89
LT Vol	12	17	17	11
Through Vol	34	13	7	63
RT Vol	11	5	32	15
Lane Flow Rate	72	44	71	113
Geometry Grp	1	1	1	1
Degree of Util (X)	0.082	0.054	0.08	0.128
Departure Headway (Hd)	4.112	4.389	4.071	4.078
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	858	821	885	867
Service Time	2.2	2.391	2.071	2.156
HCM Lane V/C Ratio	0.084	0.054	0.08	0.13
HCM Control Delay	7.6	7.6	7.4	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.2	0.3	0.4

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	9	7	0	21	26	8	0	38	12	1	84	13
Future Vol, veh/h	9	7	0	21	26	8	0	38	12	1	84	13
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	9	0	27	33	10	0	49	15	1	108	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	7.6	7.7	7.4	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	56%	38%	1%
Vol Thru, %	76%	44%	47%	86%
Vol Right, %	24%	0%	15%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	16	55	98
LT Vol	0	9	21	1
Through Vol	38	7	26	84
RT Vol	12	0	8	13
Lane Flow Rate	64	21	71	126
Geometry Grp	1	1	1	1
Degree of Util (X)	0.071	0.026	0.083	0.141
Departure Headway (Hd)	4.011	4.499	4.232	4.03
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	881	800	834	881
Service Time	2.092	2.499	2.322	2.097
HCM Lane V/C Ratio	0.073	0.026	0.085	0.143
HCM Control Delay	7.4	7.6	7.7	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.3	0.5

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	38	129	6	0	319	11	4	2	0	7	0	98
Future Vol, veh/h	38	129	6	0	319	11	4	2	0	7	0	98
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	7	0	0	7	0	0	0	0	0	0	0
Mvmt Flow	43	147	7	0	363	13	5	2	0	8	0	111

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	378	0	0	155	0	0	663	616	153	611	613	372
Stage 1	-	-	-	-	-	-	238	238	-	372	372	-
Stage 2	-	-	-	-	-	-	425	378	-	239	241	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1192	-	-	1438	-	-	377	409	898	409	410	678
Stage 1	-	-	-	-	-	-	770	712	-	653	622	-
Stage 2	-	-	-	-	-	-	611	619	-	769	710	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1190	-	-	1437	-	-	305	391	896	393	392	677
Mov Cap-2 Maneuver	-	-	-	-	-	-	305	391	-	393	392	-
Stage 1	-	-	-	-	-	-	738	683	-	626	621	-
Stage 2	-	-	-	-	-	-	510	618	-	735	681	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0	16.2	11.8
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	329	1190	-	-	1437	-	-	646
HCM Lane V/C Ratio	0.021	0.036	-	-	-	-	-	0.185
HCM Control Delay (s)	16.2	8.1	0	-	0	-	-	11.8
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.7

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	8	18	0	15	9	187	4	2	118	0
Future Vol, veh/h	5	0	8	18	0	15	9	187	4	2	118	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	180	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	0	6	0	0	6	0
Mvmt Flow	6	0	9	21	0	17	10	215	5	2	136	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	388	382	138	385	380	220	137	0	0	221	0	0
Stage 1	141	141	-	239	239	-	-	-	-	-	-	-
Stage 2	247	241	-	146	141	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	574	554	916	577	556	825	1459	-	-	1360	-	-
Stage 1	867	784	-	769	711	-	-	-	-	-	-	-
Stage 2	761	710	-	861	784	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	557	548	914	567	550	823	1458	-	-	1359	-	-
Mov Cap-2 Maneuver	557	548	-	567	550	-	-	-	-	-	-	-
Stage 1	860	782	-	763	705	-	-	-	-	-	-	-
Stage 2	739	704	-	850	782	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10	10.8	0.3	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1458	-	-	733	660	1359	-	-
HCM Lane V/C Ratio	0.007	-	-	0.02	0.057	0.002	-	-
HCM Control Delay (s)	7.5	-	-	10	10.8	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	25	28	82	80	11
Future Vol, veh/h	9	25	28	82	80	11
Conflicting Peds, #/hr	0	2	2	0	0	2
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	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	10	28	31	92	90	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	252	100	104	0	-	0
Stage 1	98	-	-	-	-	-
Stage 2	154	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	741	961	1500	-	-	-
Stage 1	931	-	-	-	-	-
Stage 2	879	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	722	957	1497	-	-	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	909	-	-	-	-	-
Stage 2	877	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.3	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1497	-	881	-	-
HCM Lane V/C Ratio	0.021	-	0.043	-	-
HCM Control Delay (s)	7.5	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

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	23	36	22	5	32	26	11	58	17	21	37	14
Future Vol, veh/h	23	36	22	5	32	26	11	58	17	21	37	14
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	26	40	25	6	36	29	12	65	19	24	42	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	7.8	7.5	7.8	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	13%	28%	8%	29%
Vol Thru, %	67%	44%	51%	51%
Vol Right, %	20%	27%	41%	19%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	86	81	63	72
LT Vol	11	23	5	21
Through Vol	58	36	32	37
RT Vol	17	22	26	14
Lane Flow Rate	97	91	71	81
Geometry Grp	1	1	1	1
Degree of Util (X)	0.114	0.108	0.082	0.097
Departure Headway (Hd)	4.262	4.263	4.16	4.3
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	846	844	864	836
Service Time	2.262	2.276	2.174	2.313
HCM Lane V/C Ratio	0.115	0.108	0.082	0.097
HCM Control Delay	7.8	7.8	7.5	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.4	0.3	0.3

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	10	23	4	25	17	16	4	78	44	22	45	5
Future Vol, veh/h	10	23	4	25	17	16	4	78	44	22	45	5
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, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	11	24	4	26	18	17	4	82	46	23	47	5
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	7.7	7.7	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	27%	43%	31%
Vol Thru, %	62%	62%	29%	62%
Vol Right, %	35%	11%	28%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	126	37	58	72
LT Vol	4	10	25	22
Through Vol	78	23	17	45
RT Vol	44	4	16	5
Lane Flow Rate	133	39	61	76
Geometry Grp	1	1	1	1
Degree of Util (X)	0.145	0.048	0.073	0.088
Departure Headway (Hd)	3.928	4.404	4.312	4.196
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	901	818	835	842
Service Time	2.009	2.406	2.314	2.283
HCM Lane V/C Ratio	0.148	0.048	0.073	0.09
HCM Control Delay	7.7	7.6	7.7	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.2	0.2	0.3

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	90	290	14	0	228	32	11	0	0	19	1	59
Future Vol, veh/h	90	290	14	0	228	32	11	0	0	19	1	59
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	3	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	99	319	15	0	251	35	12	0	0	21	1	65

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	286	0	0	335	0	0	828	812	329	795	802	269
Stage 1	-	-	-	-	-	-	526	526	-	269	269	-
Stage 2	-	-	-	-	-	-	302	286	-	526	533	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1288	-	-	1236	-	-	293	315	717	308	320	775
Stage 1	-	-	-	-	-	-	539	532	-	741	690	-
Stage 2	-	-	-	-	-	-	712	679	-	539	528	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1288	-	-	1235	-	-	248	285	716	285	289	775
Mov Cap-2 Maneuver	-	-	-	-	-	-	248	285	-	285	289	-
Stage 1	-	-	-	-	-	-	487	481	-	671	690	-
Stage 2	-	-	-	-	-	-	651	679	-	487	477	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0	20.3	12.9
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	248	1288	-	-	1235	-	-	540
HCM Lane V/C Ratio	0.049	0.077	-	-	-	-	-	0.161
HCM Control Delay (s)	20.3	8	0	-	0	-	-	12.9
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.2	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	1	21	17	1	8	15	180	22	24	300	2
Future Vol, veh/h	3	1	21	17	1	8	15	180	22	24	300	2
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	2	2	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	180	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	4	0
Mvmt Flow	3	1	22	18	1	9	16	191	23	26	319	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	616	622	322	621	612	207	323	0	0	216	0	0
Stage 1	374	374	-	237	237	-	-	-	-	-	-	-
Stage 2	242	248	-	384	375	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	406	405	724	403	411	839	1248	-	-	1366	-	-
Stage 1	651	621	-	771	713	-	-	-	-	-	-	-
Stage 2	766	705	-	643	621	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	390	390	723	380	396	836	1246	-	-	1363	-	-
Mov Cap-2 Maneuver	390	390	-	380	396	-	-	-	-	-	-	-
Stage 1	641	608	-	759	702	-	-	-	-	-	-	-
Stage 2	746	694	-	610	608	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	13.4	0.5	0.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1246	-	-	636	457	1363	-	-
HCM Lane V/C Ratio	0.013	-	-	0.042	0.061	0.019	-	-
HCM Control Delay (s)	7.9	-	-	10.9	13.4	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	11	16	94	75	5
Future Vol, veh/h	2	11	16	94	75	5
Conflicting Peds, #/hr	0	2	4	0	0	4
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	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	2	12	18	106	84	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	233	93	94	0	-	0
Stage 1	91	-	-	-	-	-
Stage 2	142	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	760	970	1513	-	-	-
Stage 1	938	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	744	964	1507	-	-	-
Mov Cap-2 Maneuver	744	-	-	-	-	-
Stage 1	922	-	-	-	-	-
Stage 2	886	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	1.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1507	-	922	-	-
HCM Lane V/C Ratio	0.012	-	0.016	-	-
HCM Control Delay (s)	7.4	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	13	5	17	7	32	12	34	11	11	63	16
Future Vol, veh/h	18	13	5	17	7	32	12	34	11	11	63	16
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	23	16	6	22	9	41	15	43	14	14	80	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	7.7	7.4	7.6	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	21%	50%	30%	12%
Vol Thru, %	60%	36%	12%	70%
Vol Right, %	19%	14%	57%	18%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	57	36	56	90
LT Vol	12	18	17	11
Through Vol	34	13	7	63
RT Vol	11	5	32	16
Lane Flow Rate	72	46	71	114
Geometry Grp	1	1	1	1
Degree of Util (X)	0.083	0.056	0.08	0.129
Departure Headway (Hd)	4.117	4.398	4.075	4.076
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	857	819	884	868
Service Time	2.205	2.4	2.077	2.155
HCM Lane V/C Ratio	0.084	0.056	0.08	0.131
HCM Control Delay	7.6	7.7	7.4	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.2	0.3	0.4

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	9	7	0	21	26	8	0	38	12	1	84	13
Future Vol, veh/h	9	7	0	21	26	8	0	38	12	1	84	13
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	9	0	27	33	10	0	49	15	1	108	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	7.6	7.7	7.4	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	56%	38%	1%
Vol Thru, %	76%	44%	47%	86%
Vol Right, %	24%	0%	15%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	16	55	98
LT Vol	0	9	21	1
Through Vol	38	7	26	84
RT Vol	12	0	8	13
Lane Flow Rate	64	21	71	126
Geometry Grp	1	1	1	1
Degree of Util (X)	0.071	0.026	0.083	0.141
Departure Headway (Hd)	4.011	4.499	4.232	4.03
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	881	800	834	881
Service Time	2.092	2.499	2.322	2.097
HCM Lane V/C Ratio	0.073	0.026	0.085	0.143
HCM Control Delay	7.4	7.6	7.7	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.3	0.5

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	129	6	0	319	11	4	2	0	7	0	98
Future Vol, veh/h	38	129	6	0	319	11	4	2	0	7	0	98
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	7	0	0	7	0	0	0	0	0	0	0
Mvmt Flow	43	147	7	0	363	13	5	2	0	8	0	111

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	378	0	0	155	0	0	663	616	153	611	613	372
Stage 1	-	-	-	-	-	-	238	238	-	372	372	-
Stage 2	-	-	-	-	-	-	425	378	-	239	241	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1192	-	-	1438	-	-	377	409	898	409	410	678
Stage 1	-	-	-	-	-	-	770	712	-	653	622	-
Stage 2	-	-	-	-	-	-	611	619	-	769	710	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1190	-	-	1437	-	-	305	391	896	393	392	677
Mov Cap-2 Maneuver	-	-	-	-	-	-	305	391	-	393	392	-
Stage 1	-	-	-	-	-	-	738	683	-	626	621	-
Stage 2	-	-	-	-	-	-	510	618	-	735	681	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0	16.2	11.8
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	329	1190	-	-	1437	-	-	646
HCM Lane V/C Ratio	0.021	0.036	-	-	-	-	-	0.185
HCM Control Delay (s)	16.2	8.1	0	-	0	-	-	11.8
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.7

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	8	24	0	19	9	187	6	3	118	0
Future Vol, veh/h	5	0	8	24	0	19	9	187	6	3	118	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	180	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	0	6	0	0	6	0
Mvmt Flow	6	0	9	28	0	22	10	215	7	3	136	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	394	386	138	388	383	221	137	0	0	223	0	0
Stage 1	143	143	-	240	240	-	-	-	-	-	-	-
Stage 2	251	243	-	148	143	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	569	551	916	574	553	824	1459	-	-	1358	-	-
Stage 1	865	782	-	768	711	-	-	-	-	-	-	-
Stage 2	758	708	-	859	782	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	549	545	914	563	547	822	1458	-	-	1357	-	-
Mov Cap-2 Maneuver	549	545	-	563	547	-	-	-	-	-	-	-
Stage 1	858	780	-	762	705	-	-	-	-	-	-	-
Stage 2	732	702	-	848	780	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10	11	0.3	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1458	-	-	728	654	1357	-	-
HCM Lane V/C Ratio	0.007	-	-	0.021	0.076	0.003	-	-
HCM Control Delay (s)	7.5	-	-	10	11	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Intersection						
Int Delay, s/veh	2.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	26	30	82	80	11
Future Vol, veh/h	9	26	30	82	80	11
Conflicting Peds, #/hr	0	2	2	0	0	2
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	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	10	29	34	92	90	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	258	100	104	0	-	0
Stage 1	98	-	-	-	-	-
Stage 2	160	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	735	961	1500	-	-	-
Stage 1	931	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	714	957	1497	-	-	-
Mov Cap-2 Maneuver	714	-	-	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	872	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.3	2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1497	-	880	-	-
HCM Lane V/C Ratio	0.023	-	0.045	-	-
HCM Control Delay (s)	7.5	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

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	23	36	22	5	32	26	11	60	17	21	38	14
Future Vol, veh/h	23	36	22	5	32	26	11	60	17	21	38	14
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	26	40	25	6	36	29	12	67	19	24	43	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	7.8	7.6	7.8	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	12%	28%	8%	29%
Vol Thru, %	68%	44%	51%	52%
Vol Right, %	19%	27%	41%	19%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	88	81	63	73
LT Vol	11	23	5	21
Through Vol	60	36	32	38
RT Vol	17	22	26	14
Lane Flow Rate	99	91	71	82
Geometry Grp	1	1	1	1
Degree of Util (X)	0.117	0.108	0.082	0.098
Departure Headway (Hd)	4.254	4.272	4.169	4.304
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	845	842	862	835
Service Time	2.266	2.284	2.182	2.317
HCM Lane V/C Ratio	0.117	0.108	0.082	0.098
HCM Control Delay	7.8	7.8	7.6	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.4	0.3	0.3

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	10	23	4	25	17	16	4	80	44	22	46	5
Future Vol, veh/h	10	23	4	25	17	16	4	80	44	22	46	5
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, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	11	24	4	26	18	17	4	84	46	23	48	5
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	7.7	7.7	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	27%	43%	30%
Vol Thru, %	62%	62%	29%	63%
Vol Right, %	34%	11%	28%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	128	37	58	73
LT Vol	4	10	25	22
Through Vol	80	23	17	46
RT Vol	44	4	16	5
Lane Flow Rate	135	39	61	77
Geometry Grp	1	1	1	1
Degree of Util (X)	0.147	0.048	0.073	0.09
Departure Headway (Hd)	3.932	4.412	4.32	4.197
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	899	816	834	841
Service Time	2.014	2.414	2.321	2.285
HCM Lane V/C Ratio	0.15	0.048	0.073	0.092
HCM Control Delay	7.7	7.6	7.7	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.2	0.2	0.3

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	92	290	14	0	228	32	11	0	0	19	1	60
Future Vol, veh/h	92	290	14	0	228	32	11	0	0	19	1	60
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	3	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	101	319	15	0	251	35	12	0	0	21	1	66

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	286	0	0	335	0	0	832	816	329	799	806	269
Stage 1	-	-	-	-	-	-	530	530	-	269	269	-
Stage 2	-	-	-	-	-	-	302	286	-	530	537	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1288	-	-	1236	-	-	291	314	717	306	318	775
Stage 1	-	-	-	-	-	-	536	530	-	741	690	-
Stage 2	-	-	-	-	-	-	712	679	-	536	526	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1288	-	-	1235	-	-	246	284	716	283	287	775
Mov Cap-2 Maneuver	-	-	-	-	-	-	246	284	-	283	287	-
Stage 1	-	-	-	-	-	-	484	479	-	670	690	-
Stage 2	-	-	-	-	-	-	650	679	-	484	475	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	0	20.4	13
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	246	1288	-	-	1235	-	-	540
HCM Lane V/C Ratio	0.049	0.078	-	-	-	-	-	0.163
HCM Control Delay (s)	20.4	8	0	-	0	-	-	13
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.3	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	1	21	19	1	13	15	180	26	33	300	2
Future Vol, veh/h	3	1	21	19	1	13	15	180	26	33	300	2
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	2	2	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	180	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	4	0
Mvmt Flow	3	1	22	20	1	14	16	191	28	35	319	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	639	645	322	641	632	209	323	0	0	221	0	0
Stage 1	392	392	-	239	239	-	-	-	-	-	-	-
Stage 2	247	253	-	402	393	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	392	393	724	390	400	836	1248	-	-	1360	-	-
Stage 1	637	610	-	769	711	-	-	-	-	-	-	-
Stage 2	761	701	-	629	609	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	372	376	723	365	383	833	1246	-	-	1357	-	-
Mov Cap-2 Maneuver	372	376	-	365	383	-	-	-	-	-	-	-
Stage 1	627	593	-	757	700	-	-	-	-	-	-	-
Stage 2	736	690	-	593	592	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11	13.3	0.5	0.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1246	-	-	629	470	1357	-	-
HCM Lane V/C Ratio	0.013	-	-	0.042	0.075	0.026	-	-
HCM Control Delay (s)	7.9	-	-	11	13.3	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0.1	-	-

Intersection						
Int Delay, s/veh	1.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	13	23	96	76	5
Future Vol, veh/h	2	13	23	96	76	5
Conflicting Peds, #/hr	0	2	4	0	0	4
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	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	2	15	26	108	85	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	252	94	95	0	-	0
Stage 1	92	-	-	-	-	-
Stage 2	160	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	741	968	1512	-	-	-
Stage 1	937	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	722	962	1506	-	-	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	916	-	-	-	-	-
Stage 2	871	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	1.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1506	-	921	-	-
HCM Lane V/C Ratio	0.017	-	0.018	-	-
HCM Control Delay (s)	7.4	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

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	17	13	5	17	7	32	12	36	11	11	69	16
Future Vol, veh/h	17	13	5	17	7	32	12	36	11	11	69	16
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	22	16	6	22	9	41	15	46	14	14	87	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	7.7	7.5	7.6	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	20%	49%	30%	11%
Vol Thru, %	61%	37%	12%	72%
Vol Right, %	19%	14%	57%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	59	35	56	96
LT Vol	12	17	17	11
Through Vol	36	13	7	69
RT Vol	11	5	32	16
Lane Flow Rate	75	44	71	122
Geometry Grp	1	1	1	1
Degree of Util (X)	0.086	0.054	0.081	0.138
Departure Headway (Hd)	4.122	4.417	4.097	4.079
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	855	815	880	866
Service Time	2.214	2.419	2.098	2.161
HCM Lane V/C Ratio	0.088	0.054	0.081	0.141
HCM Control Delay	7.6	7.7	7.5	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.2	0.3	0.5

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	9	7	0	21	26	8	0	40	12	1	90	13
Future Vol, veh/h	9	7	0	21	26	8	0	40	12	1	90	13
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	9	0	27	33	10	0	51	15	1	115	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	7.6	7.7	7.4	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	56%	38%	1%
Vol Thru, %	77%	44%	47%	87%
Vol Right, %	23%	0%	15%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	52	16	55	104
LT Vol	0	9	21	1
Through Vol	40	7	26	90
RT Vol	12	0	8	13
Lane Flow Rate	67	21	71	133
Geometry Grp	1	1	1	1
Degree of Util (X)	0.074	0.026	0.083	0.149
Departure Headway (Hd)	4.023	4.521	4.25	4.036
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	878	797	830	879
Service Time	2.105	2.521	2.343	2.104
HCM Lane V/C Ratio	0.076	0.026	0.086	0.151
HCM Control Delay	7.4	7.6	7.7	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.3	0.5

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	129	6	0	319	11	4	2	0	7	0	104
Future Vol, veh/h	40	129	6	0	319	11	4	2	0	7	0	104
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	7	0	0	7	0	0	0	0	0	0	0
Mvmt Flow	45	147	7	0	363	13	5	2	0	8	0	118

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	378	0	0	155	0	0	671	620	153	615	617	372
Stage 1	-	-	-	-	-	-	242	242	-	372	372	-
Stage 2	-	-	-	-	-	-	429	378	-	243	245	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1192	-	-	1438	-	-	373	407	898	406	408	678
Stage 1	-	-	-	-	-	-	766	709	-	653	622	-
Stage 2	-	-	-	-	-	-	608	619	-	765	707	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1190	-	-	1437	-	-	298	389	896	391	390	677
Mov Cap-2 Maneuver	-	-	-	-	-	-	298	389	-	391	390	-
Stage 1	-	-	-	-	-	-	734	679	-	625	621	-
Stage 2	-	-	-	-	-	-	502	618	-	730	677	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	0	16.4	11.9
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	323	1190	-	-	1437	-	-	647
HCM Lane V/C Ratio	0.021	0.038	-	-	-	-	-	0.195
HCM Control Delay (s)	16.4	8.1	0	-	0	-	-	11.9
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.7

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	8	18	0	15	9	189	4	2	119	0
Future Vol, veh/h	5	0	8	18	0	15	9	189	4	2	119	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	180	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	0	6	0	0	6	0
Mvmt Flow	6	0	9	21	0	17	10	217	5	2	137	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	391	385	139	388	383	222	138	0	0	223	0	0
Stage 1	142	142	-	241	241	-	-	-	-	-	-	-
Stage 2	249	243	-	147	142	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	572	552	915	574	553	823	1458	-	-	1358	-	-
Stage 1	866	783	-	767	710	-	-	-	-	-	-	-
Stage 2	759	708	-	860	783	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	555	546	913	564	547	821	1457	-	-	1357	-	-
Mov Cap-2 Maneuver	555	546	-	564	547	-	-	-	-	-	-	-
Stage 1	859	781	-	761	704	-	-	-	-	-	-	-
Stage 2	737	702	-	849	781	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10	10.8	0.3	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1457	-	-	732	658	1357	-	-
HCM Lane V/C Ratio	0.007	-	-	0.02	0.058	0.002	-	-
HCM Control Delay (s)	7.5	-	-	10	10.8	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Intersection						
Int Delay, s/veh	0.9					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	10	109	2	4	85
Future Vol, veh/h	7	10	109	2	4	85
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, %	0	0	0	0	0	0
Mvmt Flow	8	11	118	2	4	92

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	219	119	0	0	120	0
Stage 1	119	-	-	-	-	-
Stage 2	100	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	774	938	-	-	1480	-
Stage 1	911	-	-	-	-	-
Stage 2	929	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	772	938	-	-	1480	-
Mov Cap-2 Maneuver	772	-	-	-	-	-
Stage 1	911	-	-	-	-	-
Stage 2	926	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	862	1480	-
HCM Lane V/C Ratio	-	-	0.021	0.003	-
HCM Control Delay (s)	-	-	9.3	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection						
Int Delay, s/veh	2.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	33	33	84	84	11
Future Vol, veh/h	9	33	33	84	84	11
Conflicting Peds, #/hr	0	2	2	0	0	2
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	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	10	37	37	94	94	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	270	104	108	0	-	0
Stage 1	102	-	-	-	-	-
Stage 2	168	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	724	956	1495	-	-	-
Stage 1	927	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	702	952	1492	-	-	-
Mov Cap-2 Maneuver	702	-	-	-	-	-
Stage 1	901	-	-	-	-	-
Stage 2	865	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.3	2.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1492	-	885	-	-
HCM Lane V/C Ratio	0.025	-	0.053	-	-
HCM Control Delay (s)	7.5	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

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	23	36	22	5	32	26	11	65	17	21	41	14
Future Vol, veh/h	23	36	22	5	32	26	11	65	17	21	41	14
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	26	40	25	6	36	29	12	73	19	24	46	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	7.8	7.6	7.9	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	12%	28%	8%	28%
Vol Thru, %	70%	44%	51%	54%
Vol Right, %	18%	27%	41%	18%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	93	81	63	76
LT Vol	11	23	5	21
Through Vol	65	36	32	41
RT Vol	17	22	26	14
Lane Flow Rate	104	91	71	85
Geometry Grp	1	1	1	1
Degree of Util (X)	0.124	0.109	0.082	0.102
Departure Headway (Hd)	4.264	4.293	4.192	4.315
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	843	837	857	833
Service Time	2.276	2.305	2.204	2.327
HCM Lane V/C Ratio	0.123	0.109	0.083	0.102
HCM Control Delay	7.9	7.8	7.6	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.4	0.3	0.3

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	10	23	4	25	17	16	4	85	44	22	49	5
Future Vol, veh/h	10	23	4	25	17	16	4	85	44	22	49	5
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, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	11	24	4	26	18	17	4	89	46	23	52	5
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	7.8	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	27%	43%	29%
Vol Thru, %	64%	62%	29%	64%
Vol Right, %	33%	11%	28%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	133	37	58	76
LT Vol	4	10	25	22
Through Vol	85	23	17	49
RT Vol	44	4	16	5
Lane Flow Rate	140	39	61	80
Geometry Grp	1	1	1	1
Degree of Util (X)	0.153	0.048	0.074	0.093
Departure Headway (Hd)	3.942	4.43	4.337	4.2
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	896	813	831	840
Service Time	2.026	2.432	2.338	2.291
HCM Lane V/C Ratio	0.156	0.048	0.073	0.095
HCM Control Delay	7.8	7.7	7.7	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.2	0.2	0.3

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	97	290	14	0	228	32	11	0	0	19	1	63
Future Vol, veh/h	97	290	14	0	228	32	11	0	0	19	1	63
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	3	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	107	319	15	0	251	35	12	0	0	21	1	69

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	286	0	0	335	0	0	846	828	329	811	818	269
Stage 1	-	-	-	-	-	-	542	542	-	269	269	-
Stage 2	-	-	-	-	-	-	304	286	-	542	549	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1288	-	-	1236	-	-	284	309	717	300	313	775
Stage 1	-	-	-	-	-	-	528	523	-	741	690	-
Stage 2	-	-	-	-	-	-	710	679	-	528	520	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1288	-	-	1235	-	-	237	277	716	276	281	775
Mov Cap-2 Maneuver	-	-	-	-	-	-	237	277	-	276	281	-
Stage 1	-	-	-	-	-	-	474	469	-	665	690	-
Stage 2	-	-	-	-	-	-	646	679	-	474	466	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	0	21	13
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	237	1288	-	-	1235	-	-	540
HCM Lane V/C Ratio	0.051	0.083	-	-	-	-	-	0.169
HCM Control Delay (s)	21	8	0	-	0	-	-	13
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.3	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	1	21	17	1	8	15	182	22	24	304	2
Future Vol, veh/h	3	1	21	17	1	8	15	182	22	24	304	2
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	2	2	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	180	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	4	0
Mvmt Flow	3	1	22	18	1	9	16	194	23	26	323	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	623	629	326	628	619	210	327	0	0	219	0	0
Stage 1	378	378	-	240	240	-	-	-	-	-	-	-
Stage 2	245	251	-	388	379	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	401	402	720	398	407	835	1244	-	-	1362	-	-
Stage 1	648	619	-	768	711	-	-	-	-	-	-	-
Stage 2	763	703	-	640	618	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	385	388	719	375	392	832	1242	-	-	1359	-	-
Mov Cap-2 Maneuver	385	388	-	375	392	-	-	-	-	-	-	-
Stage 1	638	606	-	756	700	-	-	-	-	-	-	-
Stage 2	743	692	-	607	605	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	13.5	0.5	0.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1242	-	-	632	452	1359	-	-
HCM Lane V/C Ratio	0.013	-	-	0.042	0.061	0.019	-	-
HCM Control Delay (s)	7.9	-	-	10.9	13.5	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0.1	-	-

Intersection						
Int Delay, s/veh	0.8					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	7	110	7	12	105
Future Vol, veh/h	4	7	110	7	12	105
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, %	0	0	0	0	0	0
Mvmt Flow	4	8	120	8	13	114

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	264	124	0	0	128	0
Stage 1	124	-	-	-	-	-
Stage 2	140	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	729	932	-	-	1470	-
Stage 1	907	-	-	-	-	-
Stage 2	892	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	722	932	-	-	1470	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	884	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	843	1470	-
HCM Lane V/C Ratio	-	-	0.014	0.009	-
HCM Control Delay (s)	-	-	9.3	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection						
Int Delay, s/veh	1.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	10	15	99	89	18
Future Vol, veh/h	6	10	15	99	89	18
Conflicting Peds, #/hr	0	2	4	0	0	4
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	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	7	11	17	111	100	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	259	116	124	0	-	0
Stage 1	114	-	-	-	-	-
Stage 2	145	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	734	942	1475	-	-	-
Stage 1	916	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	719	937	1469	-	-	-
Mov Cap-2 Maneuver	719	-	-	-	-	-
Stage 1	901	-	-	-	-	-
Stage 2	883	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1469	-	841	-	-
HCM Lane V/C Ratio	0.011	-	0.021	-	-
HCM Control Delay (s)	7.5	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

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	18	13	5	17	7	32	12	38	11	11	75	17
Future Vol, veh/h	18	13	5	17	7	32	12	38	11	11	75	17
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	23	16	6	22	9	41	15	48	14	14	95	22
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	7.5	7.6	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	20%	50%	30%	11%
Vol Thru, %	62%	36%	12%	73%
Vol Right, %	18%	14%	57%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	61	36	56	103
LT Vol	12	18	17	11
Through Vol	38	13	7	75
RT Vol	11	5	32	17
Lane Flow Rate	77	46	71	130
Geometry Grp	1	1	1	1
Degree of Util (X)	0.089	0.056	0.081	0.148
Departure Headway (Hd)	4.135	4.447	4.124	4.085
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	852	810	874	866
Service Time	2.229	2.449	2.125	2.167
HCM Lane V/C Ratio	0.09	0.057	0.081	0.15
HCM Control Delay	7.6	7.7	7.5	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.2	0.3	0.5

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	9	7	0	21	26	8	0	42	12	1	96	13
Future Vol, veh/h	9	7	0	21	26	8	0	42	12	1	96	13
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	9	0	27	33	10	0	54	15	1	123	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	7.7	7.8	7.5	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	56%	38%	1%
Vol Thru, %	78%	44%	47%	87%
Vol Right, %	22%	0%	15%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	54	16	55	110
LT Vol	0	9	21	1
Through Vol	42	7	26	96
RT Vol	12	0	8	13
Lane Flow Rate	69	21	71	141
Geometry Grp	1	1	1	1
Degree of Util (X)	0.078	0.026	0.086	0.158
Departure Headway (Hd)	4.033	4.547	4.368	4.043
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	874	792	825	876
Service Time	2.124	2.549	2.368	2.118
HCM Lane V/C Ratio	0.079	0.027	0.086	0.161
HCM Control Delay	7.5	7.7	7.8	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.1	0.3	0.6

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	129	6	0	319	11	4	2	0	7	0	110
Future Vol, veh/h	42	129	6	0	319	11	4	2	0	7	0	110
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	7	0	0	7	0	0	0	0	0	0	0
Mvmt Flow	48	147	7	0	363	13	5	2	0	8	0	125

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	378	0	0	155	0	0	680	626	153	621	623	372
Stage 1	-	-	-	-	-	-	248	248	-	372	372	-
Stage 2	-	-	-	-	-	-	432	378	-	249	251	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1192	-	-	1438	-	-	368	403	898	403	405	678
Stage 1	-	-	-	-	-	-	760	705	-	653	622	-
Stage 2	-	-	-	-	-	-	606	619	-	759	703	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1190	-	-	1437	-	-	290	384	896	386	386	677
Mov Cap-2 Maneuver	-	-	-	-	-	-	290	384	-	386	386	-
Stage 1	-	-	-	-	-	-	726	673	-	623	621	-
Stage 2	-	-	-	-	-	-	494	618	-	722	671	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	0	16.6	12
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	316	1190	-	-	1437	-	-	648
HCM Lane V/C Ratio	0.022	0.04	-	-	-	-	-	0.205
HCM Control Delay (s)	16.6	8.2	0	-	0	-	-	12
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.8

Intersection												
Int Delay, s/veh	1.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	8	18	0	15	9	189	4	2	119	0
Future Vol, veh/h	5	0	8	18	0	15	9	189	4	2	119	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	180	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	0	6	0	0	6	0
Mvmt Flow	6	0	9	21	0	17	10	217	5	2	137	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	391	385	139	388	383	222	138	0	0	223	0	0
Stage 1	142	142	-	241	241	-	-	-	-	-	-	-
Stage 2	249	243	-	147	142	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	572	552	915	574	553	823	1458	-	-	1358	-	-
Stage 1	866	783	-	767	710	-	-	-	-	-	-	-
Stage 2	759	708	-	860	783	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	555	546	913	564	547	821	1457	-	-	1357	-	-
Mov Cap-2 Maneuver	555	546	-	564	547	-	-	-	-	-	-	-
Stage 1	859	781	-	761	704	-	-	-	-	-	-	-
Stage 2	737	702	-	849	781	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10	10.8	0.3	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1457	-	-	732	658	1357	-	-
HCM Lane V/C Ratio	0.007	-	-	0.02	0.058	0.002	-	-
HCM Control Delay (s)	7.5	-	-	10	10.8	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Intersection						
Int Delay, s/veh	0.9					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	3	100	5	1	91
Future Vol, veh/h	16	3	100	5	1	91
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, %	0	0	0	0	0	0
Mvmt Flow	17	3	109	5	1	99

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	213	112	0	0	114	0
Stage 1	112	-	-	-	-	-
Stage 2	101	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	780	947	-	-	1488	-
Stage 1	918	-	-	-	-	-
Stage 2	928	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	779	947	-	-	1488	-
Mov Cap-2 Maneuver	779	-	-	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	927	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	801	1488	-
HCM Lane V/C Ratio	-	-	0.026	0.001	-
HCM Control Delay (s)	-	-	9.6	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection						
Int Delay, s/veh	0.7					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	2	99	4	1	81
Future Vol, veh/h	11	2	99	4	1	81
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, %	0	0	0	0	0	0
Mvmt Flow	12	2	108	4	1	88

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	200	110	0	0	112	0
Stage 1	110	-	-	-	-	-
Stage 2	90	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	793	949	-	-	1490	-
Stage 1	920	-	-	-	-	-
Stage 2	939	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	792	949	-	-	1490	-
Mov Cap-2 Maneuver	792	-	-	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	938	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	813	1490	-
HCM Lane V/C Ratio	-	-	0.017	0.001	-
HCM Control Delay (s)	-	-	9.5	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	25	28	94	87	18
Future Vol, veh/h	20	25	28	94	87	18
Conflicting Peds, #/hr	0	2	2	0	0	2
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	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	22	28	31	106	98	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	278	112	120	0	-	0
Stage 1	110	-	-	-	-	-
Stage 2	168	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	716	947	1480	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	697	943	1477	-	-	-
Mov Cap-2 Maneuver	697	-	-	-	-	-
Stage 1	898	-	-	-	-	-
Stage 2	865	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.7	1.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1477	-	815	-	-
HCM Lane V/C Ratio	0.021	-	0.062	-	-
HCM Control Delay (s)	7.5	0	9.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

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	23	36	22	5	32	26	11	70	17	21	44	14
Future Vol, veh/h	23	36	22	5	32	26	11	70	17	21	44	14
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	26	40	25	6	36	29	12	79	19	24	49	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	7.9	7.6	7.9	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	28%	8%	27%
Vol Thru, %	71%	44%	51%	56%
Vol Right, %	17%	27%	41%	18%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	98	81	63	79
LT Vol	11	23	5	21
Through Vol	70	36	32	44
RT Vol	17	22	26	14
Lane Flow Rate	110	91	71	89
Geometry Grp	1	1	1	1
Degree of Util (X)	0.131	0.109	0.083	0.107
Departure Headway (Hd)	4.273	4.313	4.211	4.322
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	841	833	853	831
Service Time	2.287	2.329	2.227	2.338
HCM Lane V/C Ratio	0.131	0.109	0.083	0.107
HCM Control Delay	7.9	7.9	7.6	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.4	0.3	0.4

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	10	23	4	25	17	16	4	90	44	22	52	5
Future Vol, veh/h	10	23	4	25	17	16	4	90	44	22	52	5
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, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	11	24	4	26	18	17	4	95	46	23	55	5
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	7.8	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	27%	43%	28%
Vol Thru, %	65%	62%	29%	66%
Vol Right, %	32%	11%	28%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	138	37	58	79
LT Vol	4	10	25	22
Through Vol	90	23	17	52
RT Vol	44	4	16	5
Lane Flow Rate	145	39	61	83
Geometry Grp	1	1	1	1
Degree of Util (X)	0.159	0.048	0.074	0.097
Departure Headway (Hd)	3.952	4.449	4.356	4.204
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	893	809	827	839
Service Time	2.037	2.451	2.357	2.296
HCM Lane V/C Ratio	0.162	0.048	0.074	0.099
HCM Control Delay	7.8	7.7	7.7	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.2	0.2	0.3

Intersection												
Int Delay, s/veh	2.8											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	102	290	14	0	228	32	11	0	0	19	1	66
Future Vol, veh/h	102	290	14	0	228	32	11	0	0	19	1	66
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	3	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	112	319	15	0	251	35	12	0	0	21	1	73

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	286	0	0	335	0	0	858	838	329	821	828	269
Stage 1	-	-	-	-	-	-	552	552	-	269	269	-
Stage 2	-	-	-	-	-	-	306	286	-	552	559	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1288	-	-	1236	-	-	279	305	717	296	309	775
Stage 1	-	-	-	-	-	-	522	518	-	741	690	-
Stage 2	-	-	-	-	-	-	708	679	-	522	514	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1288	-	-	1235	-	-	231	272	716	271	276	775
Mov Cap-2 Maneuver	-	-	-	-	-	-	231	272	-	271	276	-
Stage 1	-	-	-	-	-	-	466	462	-	662	690	-
Stage 2	-	-	-	-	-	-	641	679	-	466	458	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2	0	21.4	13.1
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	231	1288	-	-	1235	-	-	541
HCM Lane V/C Ratio	0.052	0.087	-	-	-	-	-	0.175
HCM Control Delay (s)	21.4	8.1	0	-	0	-	-	13.1
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.3	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	1	21	17	1	8	15	182	22	24	304	2
Future Vol, veh/h	3	1	21	17	1	8	15	182	22	24	304	2
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	2	2	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	180	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	4	0
Mvmt Flow	3	1	22	18	1	9	16	194	23	26	323	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	623	629	326	628	619	210	327	0	0	219	0	0
Stage 1	378	378	-	240	240	-	-	-	-	-	-	-
Stage 2	245	251	-	388	379	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	401	402	720	398	407	835	1244	-	-	1362	-	-
Stage 1	648	619	-	768	711	-	-	-	-	-	-	-
Stage 2	763	703	-	640	618	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	385	388	719	375	392	832	1242	-	-	1359	-	-
Mov Cap-2 Maneuver	385	388	-	375	392	-	-	-	-	-	-	-
Stage 1	638	606	-	756	700	-	-	-	-	-	-	-
Stage 2	743	692	-	607	605	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	13.5	0.5	0.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1242	-	-	632	452	1359	-	-
HCM Lane V/C Ratio	0.013	-	-	0.042	0.061	0.019	-	-
HCM Control Delay (s)	7.9	-	-	10.9	13.5	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	4	98	14	7	97
Future Vol, veh/h	8	4	98	14	7	97
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, %	0	0	0	0	0	0
Mvmt Flow	9	4	107	15	8	105

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	236	115	0	0	122	0
Stage 1	115	-	-	-	-	-
Stage 2	121	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	757	943	-	-	1478	-
Stage 1	915	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	752	943	-	-	1478	-
Mov Cap-2 Maneuver	752	-	-	-	-	-
Stage 1	915	-	-	-	-	-
Stage 2	904	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	806	1478	-
HCM Lane V/C Ratio	-	-	0.016	0.005	-
HCM Control Delay (s)	-	-	9.5	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection						
Int Delay, s/veh	0.6					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	3	93	9	5	98
Future Vol, veh/h	6	3	93	9	5	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, %	0	0	0	0	0	0
Mvmt Flow	7	3	101	10	5	107

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	223	106	0	0	111	0
Stage 1	106	-	-	-	-	-
Stage 2	117	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	770	954	-	-	1492	-
Stage 1	923	-	-	-	-	-
Stage 2	913	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	767	954	-	-	1492	-
Mov Cap-2 Maneuver	767	-	-	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	909	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	821	1492	-
HCM Lane V/C Ratio	-	-	0.012	0.004	-
HCM Control Delay (s)	-	-	9.4	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection						
Int Delay, s/veh	1.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	14	24	101	90	18
Future Vol, veh/h	6	14	24	101	90	18
Conflicting Peds, #/hr	0	2	4	0	0	4
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	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	7	16	27	113	101	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	282	117	125	0	-	0
Stage 1	115	-	-	-	-	-
Stage 2	167	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	712	941	1474	-	-	-
Stage 1	915	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	692	936	1468	-	-	-
Mov Cap-2 Maneuver	692	-	-	-	-	-
Stage 1	893	-	-	-	-	-
Stage 2	864	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	1.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1468	-	846	-	-
HCM Lane V/C Ratio	0.018	-	0.027	-	-
HCM Control Delay (s)	7.5	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

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	13	5	17	7	32	12	40	11	11	81	19
Future Vol, veh/h	19	13	5	17	7	32	12	40	11	11	81	19
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	24	16	6	22	9	41	15	51	14	14	103	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	7.8	7.5	7.7	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	51%	30%	10%
Vol Thru, %	63%	35%	12%	73%
Vol Right, %	17%	14%	57%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	63	37	56	111
LT Vol	12	19	17	11
Through Vol	40	13	7	81
RT Vol	11	5	32	19
Lane Flow Rate	80	47	71	141
Geometry Grp	1	1	1	1
Degree of Util (X)	0.092	0.058	0.082	0.159
Departure Headway (Hd)	4.147	4.479	4.153	4.083
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	849	804	868	866
Service Time	2.247	2.482	2.154	2.171
HCM Lane V/C Ratio	0.094	0.058	0.082	0.163
HCM Control Delay	7.7	7.8	7.5	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.2	0.3	0.6

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	9	7	0	21	26	8	0	44	12	1	102	13
Future Vol, veh/h	9	7	0	21	26	8	0	44	12	1	102	13
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	9	0	27	33	10	0	56	15	1	131	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	7.7	7.8	7.5	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	56%	38%	1%
Vol Thru, %	79%	44%	47%	88%
Vol Right, %	21%	0%	15%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	56	16	55	116
LT Vol	0	9	21	1
Through Vol	44	7	26	102
RT Vol	12	0	8	13
Lane Flow Rate	72	21	71	149
Geometry Grp	1	1	1	1
Degree of Util (X)	0.081	0.026	0.086	0.167
Departure Headway (Hd)	4.044	4.57	4.39	4.048
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	872	788	821	874
Service Time	2.136	2.572	2.391	2.124
HCM Lane V/C Ratio	0.083	0.027	0.086	0.17
HCM Control Delay	7.5	7.7	7.8	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.1	0.3	0.6

Intersection												
Int Delay, s/veh	3.1											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	129	6	0	319	11	4	2	0	7	0	116
Future Vol, veh/h	44	129	6	0	319	11	4	2	0	7	0	116
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	7	0	0	7	0	0	0	0	0	0	0
Mvmt Flow	50	147	7	0	363	13	5	2	0	8	0	132

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	378	0	0	155	0	0	688	630	153	625	627	372
Stage 1	-	-	-	-	-	-	252	252	-	372	372	-
Stage 2	-	-	-	-	-	-	436	378	-	253	255	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1192	-	-	1438	-	-	363	401	898	400	403	678
Stage 1	-	-	-	-	-	-	757	702	-	653	622	-
Stage 2	-	-	-	-	-	-	603	619	-	756	700	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1190	-	-	1437	-	-	282	381	896	383	383	677
Mov Cap-2 Maneuver	-	-	-	-	-	-	282	381	-	383	383	-
Stage 1	-	-	-	-	-	-	721	669	-	622	621	-
Stage 2	-	-	-	-	-	-	486	618	-	718	667	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2	0	16.9	12.1
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	309	1190	-	-	1437	-	-	649
HCM Lane V/C Ratio	0.022	0.042	-	-	-	-	-	0.215
HCM Control Delay (s)	16.9	8.2	0	-	0	-	-	12.1
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.8

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	8	24	0	19	9	191	6	3	120	0
Future Vol, veh/h	5	0	8	24	0	19	9	191	6	3	120	0
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	180	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	0	6	0	0	6	0
Mvmt Flow	6	0	9	28	0	22	10	220	7	3	138	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	401	393	140	395	390	226	139	0	0	228	0	0
Stage 1	145	145	-	245	245	-	-	-	-	-	-	-
Stage 2	256	248	-	150	145	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	563	546	913	568	548	818	1457	-	-	1352	-	-
Stage 1	863	781	-	763	707	-	-	-	-	-	-	-
Stage 2	753	705	-	857	781	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	543	540	911	557	542	816	1456	-	-	1351	-	-
Mov Cap-2 Maneuver	543	540	-	557	542	-	-	-	-	-	-	-
Stage 1	856	779	-	757	701	-	-	-	-	-	-	-
Stage 2	727	699	-	846	779	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.1	11	0.3	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1456	-	-	723	648	1351	-	-
HCM Lane V/C Ratio	0.007	-	-	0.021	0.076	0.003	-	-
HCM Control Delay (s)	7.5	-	-	10.1	11	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Intersection						
Int Delay, s/veh	0.8					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	10	115	2	4	100
Future Vol, veh/h	7	10	115	2	4	100
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, %	0	0	0	0	0	0
Mvmt Flow	8	11	125	2	4	109

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	243	126	0	0	127	0
Stage 1	126	-	-	-	-	-
Stage 2	117	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	750	930	-	-	1472	-
Stage 1	905	-	-	-	-	-
Stage 2	913	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	748	930	-	-	1472	-
Mov Cap-2 Maneuver	748	-	-	-	-	-
Stage 1	905	-	-	-	-	-
Stage 2	910	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	845	1472	-
HCM Lane V/C Ratio	-	-	0.022	0.003	-
HCM Control Delay (s)	-	-	9.4	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection						
Int Delay, s/veh	0.9					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	3	102	5	1	92
Future Vol, veh/h	16	3	102	5	1	92
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, %	0	0	0	0	0	0
Mvmt Flow	17	3	111	5	1	100

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	216	114	0	0	116	0
Stage 1	114	-	-	-	-	-
Stage 2	102	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	777	944	-	-	1485	-
Stage 1	916	-	-	-	-	-
Stage 2	927	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	776	944	-	-	1485	-
Mov Cap-2 Maneuver	776	-	-	-	-	-
Stage 1	916	-	-	-	-	-
Stage 2	926	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	798	1485	-
HCM Lane V/C Ratio	-	-	0.026	0.001	-
HCM Control Delay (s)	-	-	9.6	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection						
Int Delay, s/veh	0.7					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	2	101	4	1	82
Future Vol, veh/h	11	2	101	4	1	82
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, %	0	0	0	0	0	0
Mvmt Flow	12	2	110	4	1	89

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	203	112	0	0	114	0
Stage 1	112	-	-	-	-	-
Stage 2	91	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	790	947	-	-	1488	-
Stage 1	918	-	-	-	-	-
Stage 2	938	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	789	947	-	-	1488	-
Mov Cap-2 Maneuver	789	-	-	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	937	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	810	1488	-
HCM Lane V/C Ratio	-	-	0.017	0.001	-
HCM Control Delay (s)	-	-	9.5	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection						
Int Delay, s/veh	2.7					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	34	35	96	91	18
Future Vol, veh/h	20	34	35	96	91	18
Conflicting Peds, #/hr	0	2	2	0	0	2
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	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	22	38	39	108	102	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	300	116	124	0	-	0
Stage 1	114	-	-	-	-	-
Stage 2	186	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	696	942	1475	-	-	-
Stage 1	916	-	-	-	-	-
Stage 2	851	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	674	938	1472	-	-	-
Mov Cap-2 Maneuver	674	-	-	-	-	-
Stage 1	889	-	-	-	-	-
Stage 2	849	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.7	2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1472	-	819	-	-
HCM Lane V/C Ratio	0.027	-	0.074	-	-
HCM Control Delay (s)	7.5	0	9.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	23	36	22	5	32	26	11	79	17	21	49	14
Future Vol, veh/h	23	36	22	5	32	26	11	79	17	21	49	14
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	26	40	25	6	36	29	12	89	19	24	55	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	7.9	7.7	8	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	28%	8%	25%
Vol Thru, %	74%	44%	51%	58%
Vol Right, %	16%	27%	41%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	107	81	63	84
LT Vol	11	23	5	21
Through Vol	79	36	32	49
RT Vol	17	22	26	14
Lane Flow Rate	120	91	71	94
Geometry Grp	1	1	1	1
Degree of Util (X)	0.143	0.11	0.084	0.114
Departure Headway (Hd)	4.29	4.352	4.251	4.341
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	838	825	845	828
Service Time	2.304	2.366	2.265	2.356
HCM Lane V/C Ratio	0.143	0.11	0.084	0.114
HCM Control Delay	8	7.9	7.7	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.4	0.3	0.4

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	10	23	4	25	17	16	4	99	44	22	57	5
Future Vol, veh/h	10	23	4	25	17	16	4	99	44	22	57	5
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, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	11	24	4	26	18	17	4	104	46	23	60	5
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	7.9	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	27%	43%	26%
Vol Thru, %	67%	62%	29%	68%
Vol Right, %	30%	11%	28%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	147	37	58	84
LT Vol	4	10	25	22
Through Vol	99	23	17	57
RT Vol	44	4	16	5
Lane Flow Rate	155	39	61	88
Geometry Grp	1	1	1	1
Degree of Util (X)	0.171	0.049	0.074	0.103
Departure Headway (Hd)	3.968	4.484	4.391	4.21
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	890	803	821	837
Service Time	2.056	2.486	2.393	2.307
HCM Lane V/C Ratio	0.174	0.049	0.074	0.105
HCM Control Delay	7.9	7.7	7.7	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.2	0.2	0.3

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	111	290	14	0	228	32	11	0	0	19	1	71
Future Vol, veh/h	111	290	14	0	228	32	11	0	0	19	1	71
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	3	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	122	319	15	0	251	35	12	0	0	21	1	78

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	286	0	0	335	0	0	880	858	329	841	848	269
Stage 1	-	-	-	-	-	-	572	572	-	269	269	-
Stage 2	-	-	-	-	-	-	308	286	-	572	579	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1288	-	-	1236	-	-	270	297	717	287	301	775
Stage 1	-	-	-	-	-	-	509	508	-	741	690	-
Stage 2	-	-	-	-	-	-	706	679	-	509	504	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1288	-	-	1235	-	-	220	262	716	261	265	775
Mov Cap-2 Maneuver	-	-	-	-	-	-	220	262	-	261	265	-
Stage 1	-	-	-	-	-	-	449	448	-	654	690	-
Stage 2	-	-	-	-	-	-	634	679	-	449	445	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.2	0	22.3	13.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	220	1288	-	-	1235	-	-	541
HCM Lane V/C Ratio	0.055	0.095	-	-	-	-	-	0.185
HCM Control Delay (s)	22.3	8.1	0	-	0	-	-	13.2
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.3	-	-	0	-	-	0.7

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	1	21	19	1	13	15	184	26	33	308	2
Future Vol, veh/h	3	1	21	19	1	13	15	184	26	33	308	2
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	2	2	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	180	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	4	0
Mvmt Flow	3	1	22	20	1	14	16	196	28	35	328	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	653	659	331	655	646	214	332	0	0	226	0	0
Stage 1	401	401	-	244	244	-	-	-	-	-	-	-
Stage 2	252	258	-	411	402	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	383	386	715	382	393	831	1239	-	-	1354	-	-
Stage 1	630	604	-	764	708	-	-	-	-	-	-	-
Stage 2	757	698	-	622	604	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	363	369	714	358	376	828	1237	-	-	1351	-	-
Mov Cap-2 Maneuver	363	369	-	358	376	-	-	-	-	-	-	-
Stage 1	621	587	-	753	697	-	-	-	-	-	-	-
Stage 2	732	688	-	586	587	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.1	13.4	0.5	0.7
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1237	-	-	619	462	1351	-	-
HCM Lane V/C Ratio	0.013	-	-	0.043	0.076	0.026	-	-
HCM Control Delay (s)	7.9	-	-	11.1	13.4	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0.1	-	-

Intersection						
Int Delay, s/veh	0.7					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	7	124	7	12	113
Future Vol, veh/h	4	7	124	7	12	113
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, %	0	0	0	0	0	0
Mvmt Flow	4	8	135	8	13	123

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	288	139	0	0	143	0
Stage 1	139	-	-	-	-	-
Stage 2	149	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	707	915	-	-	1452	-
Stage 1	893	-	-	-	-	-
Stage 2	884	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	700	915	-	-	1452	-
Mov Cap-2 Maneuver	700	-	-	-	-	-
Stage 1	893	-	-	-	-	-
Stage 2	875	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	823	1452	-
HCM Lane V/C Ratio	-	-	0.015	0.009	-
HCM Control Delay (s)	-	-	9.4	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection						
Int Delay, s/veh	0.7					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	4	100	14	7	101
Future Vol, veh/h	8	4	100	14	7	101
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, %	0	0	0	0	0	0
Mvmt Flow	9	4	109	15	8	110

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	243	117	0	0	124	0
Stage 1	117	-	-	-	-	-
Stage 2	126	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	750	941	-	-	1475	-
Stage 1	913	-	-	-	-	-
Stage 2	905	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	746	941	-	-	1475	-
Mov Cap-2 Maneuver	746	-	-	-	-	-
Stage 1	913	-	-	-	-	-
Stage 2	900	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	801	1475	-
HCM Lane V/C Ratio	-	-	0.016	0.005	-
HCM Control Delay (s)	-	-	9.6	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	3	95	9	5	102
Future Vol, veh/h	6	3	95	9	5	102
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, %	0	0	0	0	0	0
Mvmt Flow	7	3	103	10	5	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	229	108	0	0	113	0
Stage 1	108	-	-	-	-	-
Stage 2	121	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	764	951	-	-	1489	-
Stage 1	921	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	761	951	-	-	1489	-
Mov Cap-2 Maneuver	761	-	-	-	-	-
Stage 1	921	-	-	-	-	-
Stage 2	905	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	815	1489	-
HCM Lane V/C Ratio	-	-	0.012	0.004	-
HCM Control Delay (s)	-	-	9.5	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-