City of Oakley
Planning Division

Stonecreek Subdivision 9647

Initial Study/Mitigated Negative Declaration

October 2024

Prepared by

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TABLE OF CONTENTS

A. BACKGROUND 1
B. SOURCES 2
C. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED 5
D. DETERMINATION 5
E. BACKGROUND AND INTRODUCTION 6
F. PROJECT DESCRIPTION 7
G. ENVIRONMENTAL CHECKLIST 16

I. AESTHETICS. 17
II. AGRICULTURE AND FOREST RESOURCES. 20
III. AIR QUALITY. 21
IV. BIOLOGICAL RESOURCES. 31
V. CULTURAL RESOURCES. 39
VI. ENERGY. 42
VII. GEOLOGY AND SOILS. 46
VIII. GREENHOUSE GAS EMISSIONS. 50
IX. HAZARDS AND HAZARDOUS MATERIALS. 54
X. HYDROLOGY AND WATER QUALITY. 57
XI. LAND USE AND PLANNING. 63
XII. MINERAL RESOURCES. 64
XIII. NOISE. 65
XIV. POPULATION AND HOUSING. 71
XV. PUBLIC SERVICES. 72
XVI. RECREATION. 75
XVII. TRANSPORTATION. 76
XVIII. TRIBAL CULTURAL RESOURCES. 80
XIX. UTILITIES AND SERVICE SYSTEMS. 82
XX. WILDFIRE. 86
XXI. MANDATORY FINDINGS OF SIGNIFICANCE. 87

Appendices

Appendix A – Air Quality and Greenhouse Gas Emissions – CalEEMod Results
Appendix B – Traffic Impact Study
Appendix C – Planning Survey Report
Appendix D – Peak Flow Control Modeling

INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

A. BACKGROUND

1. Project Title: Stonecreek Subdivision 9647

2. Lead Agency Name and Address: City of Oakley
Planning Division
3231 Main Street
Oakley, CA 94561

3. Contact Person and Phone Number: Ken Strelo
Community Development Director
(925) 625-7000

4. Project Location: South of the Kings Canyon Way/Sierra Trail Boulevard intersection
Oakley, CA 94561
Accessor's Parcel Numbers (APNs): 033-140-020, -021, and -028

5. Project Applicant Name and Address: Jeff Schroeder
Ponderosa Homes II, Inc.
5020 Franklin Drive, Suite 200
Pleasanton, CA 94588

6. Existing General Plan Designation: Residential Low (RL) and
Residential Very Low (RV)

7. Existing Zoning Designation: Planned Unit Development (P-1) District

8. Required Approvals from Other Public Agencies: None

9. Surrounding Land Uses and Setting:

The 50.44-acre project site, identified by APNs 033-140-020, -021, and -028, is located southwest of the intersection of Kings Canyon Way and Sierra Trail Boulevard in the City of Oakley, California. The project site is primarily undeveloped and was graded in 2006. A single-family residence and ancillary structures were previously located in the southeast corner. However, all structures have been demolished and only remnant building foundations remain on-site. The site also contains two palm trees located in the northwest corner of the site. Surrounding existing uses include single-family neighborhoods to the north; single-family residences and agricultural uses to the east across Sellers Avenue, as well as to the south; and a single-family residential neighborhood to the west. It should be noted that Marsh Creek and the associated Marsh Creek Regional Trail are located along the western project site boundary. The City of Oakley General Plan designates the site as RL and RV, and the site is zoned P-1.

10. Project Description Summary:

The Stonecreek Subdivision 9647 Project (proposed project) would subdivide the project site into 176 single-family residential lots. On-site improvements would include approximately one acre of open space within a 75-foot setback from Marsh Creek, a 2.43-acre park in the northwest corner of the project site, and a 2.7-acre stormwater detention basin in the northeast corner of the site. An internal roadway network would connect to existing roadways to provide site access, including Teton Road and Kings Canyon Way to the north of the site and Sellers Avenue to the east. Each lot would range in size from 6,000 square feet (sf) to 16,182 sf, and utility improvements would be included on-site and within the surrounding roadways. Frontage improvements would include a 26-foot-wide roadway dedication along the Sellers Avenue frontage to the east. The project would include removal of the existing remnant foundations and on-site trees would be removed. The proposed project would require approval of a Vesting Tentative Map.

11. Status of Native American Consultation Pursuant to Public Resources Code Section 21080.3.1:

In compliance with Assembly Bill (AB) 52 (Public Resources Code [PRC] Section 21080.3.1), a project notification letter was distributed to the chairpersons of the following tribes on August 23, 2024: Amah Mutsun Tribal Band of Mission San Juan Bautista, Muwekma Ohlone Indian Tribe of the SF Bay Area, Chicken Ranch Rancheria of Me-Wuk Indians, Muwekma Ohlone Indian Tribe of the SF Bay Area, Guidiville Indian Rancheria, Nashville Enterprise Miwok- Maidu-Nishinam Tribe, Indian Canyon Mutsun Band of Costanoan, North Valley Yokuts Tribe, Indian Canyon Mutsun Band of Costanoan, North Valley Yokuts Tribe, Tule River Indian Tribe, The Ohlone Indian Tribe, Wilton Rancheria, and The Confederated Villages of Lisjan. Three responses from the foregoing tribes were received within the consultation period, from the Amah Mutsun Tribal Band of Mission San Juan Bautista, the Confederated Villages of Lisjan Nation, and the Indian Canyon Band of Costanoan Ohlone People. The City consulted with all three tribes, including sending requested information and holding a meeting with the Confederated Villages of Lisjan Nation on September 25, 2024. Consultation with all three tribes has since been closed.

B. SOURCES

All technical reports and modeling results prepared for the project analysis are available at: https://www.ci.oakley.ca.us/ceqa-documents/. The following documents are referenced information sources used for the purposes of this Initial Study/Mitigated Negative Declaration (IS/MND):

1. Antioch Unified School District. *Facilities Master Plan* [pg. 284]. July 2018.
2. Association of Bay Area Governments. *Hazard Viewer.* Available at: https://abag.ca.gov/our-work/resilience/data-research/hazard-viewer/. Accessed June 2024.
3. ASTM International. *ASTM E1527, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.* 2013.
4. Balance Hydrologics, Inc. *Summary of Peak Flow Control Modeling for the Stonecreek Subdivision City of Oakley, Contra Costa County, California*. November 9, 2023.
5. Bay Area Air Quality Management District. *2022 California Environmental Quality Act Guidelines.* Available at: https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines. Accessed May 2024.

6. Bay Area Air Quality Management District. *Air Quality Summary Reports*. Available at: https://www.baaqmd.gov/about-air-quality/air-quality-measurement/air-quality-summaries. Accessed May 2024.
7. California Air Resources Board. *2022 Scoping Plan for Achieving Carbon Neutrality*. November 16, 2022.
8. California Air Resources Board. *Air Quality and Land Use Handbook: A Community Health Perspective*. April 2005.
9. California Building Standards Commission. *2022 California Green Building Standards Code*. 2023.
10. California Department of Conservation. *California Important Farmland Finder.* Available at: https://maps.conservation.ca.gov/dlrp/ciff/. Accessed May 2024.
11. California Department of Conservation. *California Tsunami Maps*. Available at: https://www.conservation.ca.gov/cgs/tsunami/maps. Accessed June 2024.
12. California Department of Conservation. *Earthquake Zones of Required Investigation.* Available at: https://maps.conservation.ca.gov/cgs/EQZApp/app/. Accessed June 2024.
13. California Department of Forestry and Fire Protection. *Fire Hazard Severity Zones*. Available at: https://calfire-forestry.maps.arcgis.com/apps/webappviewer/index.html. Accessed June 2024.
14. California Department of Resources Recycling and Recovery (CalRecycle). *Facility/Site Summary: Potrero Hill Landfill (48-AA-0075)*. Available at: https://www2.calrecycle.ca.gov/SolidWaste/Site/Summary/3591. Accessed June 2024.
15. California Department of Transportation. *California State Scenic Highway System Map.* Available at: https://www.arcgis.com/apps/webappviewer/index.html. Accessed May 2024.
16. City of Oakley. *City of Oakley 2020 General Plan Draft Environmental Impact Report*. September 2002.
17. City of Oakley. *City of Oakley General Plan*. Adopted January 11, 2022.
18. City of Oakley. *City of Oakley General Plan Focused General Plan Update.* Adopted January 11, 2022.
19. City of Oakley. *Parks, Trails, and Recreation Master Plan 2020.* Summer 2007.
20. City of Oakley. *Strategic Energy Plan*. Fall 2015.
21. Contra Costa Conservation and Development. *2016 Agricultural Preserves Map.* Available at: https://www.contracosta.ca.gov/DocumentCenter/View/882/Map-of-Properties-Under-Contract. Accessed May 2024.
22. Contra Costa County Fire Protection District. *2022 Annual Report*. Available at: https://www.cccfpd.org/2022-annual-report/. Accessed June 2024.
23. Department of Toxic Substances Control. *Hazardous Waste and Substances Site List*. Available at: https://www.envirostor.dtsc.ca.gov/public/search.asp. Accessed June 2024.
24. Diablo Water District. *2020 Urban Water Management Plan.* June 2021.
25. East Contra Costa County Habitat Conservation Plan Association. *Final East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan.* October 2006.
26. Federal Emergency Management Agency. *Flood Insurance Rate Map 06013C0360G.* Effective March 21, 2017.
27. H.T. Harvey & Associates. *East Contra Costa County Habitat Conservation Plan – Assessment of Plan Effects on CEQA Species.* February 17, 2015.
28. Ironhouse Sanitary District. *Sewer System Management Plan* [pg. I-3]. Updated April 2017.
29. Moore Biological Consultants. *Application Form and Planning Survey Report.* July 2015.
30. Northwest Information Center. *Records Search Results for the Proposed Stonecreek Subdivision 9647 Project.* June 10, 2024.

31. State Water Resources Control Board. *GeoTracker.* Available at: https://geotracker.waterboards.ca.gov/map/. Accessed June 2024.
32. TJKM. *Stonecreek Residential Development Oakley, CA Traffic Impact Study.* July 17, 2023. Revised November 20, 2023.
33. U.S. Census Bureau. *Quick Facts, City of Oakley, California.* Available at: https://www.census.gov/quickfacts/fact/table/oakleycitycalifornia#. Accessed June 2024.

C. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Less Than Significant with Mitigation Incorporated" or as indicated by the checklist on the following pages.

☐ **Aesthetics**	☐ **Agriculture and Forest 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**	☒ **Tribal Cultural Resources**
☐ **Utilities and Service Systems**	☐ **Wildfire**	☐ **Mandatory Findings of Significance**

D. DETERMINATION

On the basis of this initial study:

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

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the applicant. 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" 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 pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_____ _____

Signature Date

Ken Strelo, Community Development Director City of Oakley

Printed Name For

E. BACKGROUND AND INTRODUCTION

This IS/MND provides an environmental analysis pursuant to the California Environmental Quality Act (CEQA) for the proposed project. The applicant has submitted this application to the City of Oakley, which is the Lead Agency for the purposes of CEQA review. The IS/MND contains an analysis of the environmental effects of construction and operation of the proposed project.

In December 2002, the City of Oakley adopted the Oakley General Plan and the Oakley General Plan Environmental Impact Report (EIR). The General Plan EIR was a program-level EIR, prepared pursuant to Section 15168 of the CEQA Guidelines (Title 14, California Code of Regulations [CCR], Sections 15000 et seq.). The General Plan EIR analyzed full implementation of the Oakley General Plan and identified measures to mitigate the significant adverse project and cumulative impacts associated with the General Plan.

In January 2022, the City of Oakley adopted the Focused General Plan Update and the Focused General Plan Update Initial Study/Negative Declaration (IS/ND). The Focused General Plan Update IS/ND analyzed implementation of the Focused General Plan Update. The Focused General Plan Update amended the City's existing General Plan to bring it into compliance with State requirements related to environmental justice, mobility, and climate change and adaptation. The Focused General Plan Update also updated the setting information, and provided minor revisions to the goals, policies, and programs in the following elements: Land Use, Growth Management, Open Space and Conservation, Parks and Recreation, Noise, and Economic Development. All updates were applied to be consistent with current conditions, to remove policies and programs that have already been implemented or are no longer applicable, to update policies and programs to reflect current City practices, and to clarify the City's approach to achieving the vision and goals of the General Plan.

Pursuant to CEQA Guidelines Section 15150(a), the City of Oakley General Plan, Focused General Plan Update, General Plan EIR, and Focused General Plan Update IS/ND are incorporated by reference. The aforementioned documents are available online at:

- https://www.ci.oakley.ca.us/departments/planning-zoning/reference-documents/
- https://www.ci.oakley.ca.us/general-plan-update/

The impact discussions for each section of this IS/MND have been largely based on information in the Oakley General Plan, Focused General Plan Update, Oakley General Plan EIR, and Focused General Plan Update IS/ND, as well as the project-specific technical studies.

In addition, the project site was subject to previous evaluation under CEQA as part of a 2005 Initial Study (2005 IS) for the Bacchini Residential Project. Similar to the proposed project, the Bacchini Residential Project included development of 176 single-family residences on the same project site. As part of approval of the Bacchini Residential Project, the project site was rezoned from Heavy Agriculture (A-3) to P-1, the on-site structures were demolished and removed, and the project site was graded. It should be noted that the 2005 IS included mitigation to ensure all potentially significant impacts were reduced to a less-than-significant level. However, the Bacchini Residential Project did not move forward with vertical development, and the Tentative Map has since expired.

The mitigation measures prescribed for environmental effects described in this IS/MND would be implemented in conjunction with the project, as required by CEQA, and the mitigation measures

would be incorporated into the project. In addition, a project Mitigation Monitoring and Reporting Program (MMRP) would be adopted in conjunction with approval of the project.

F. PROJECT DESCRIPTION

The following section provides a comprehensive description of the proposed project in accordance with CEQA Guidelines, including the project location and setting, and project components.

Project Location and Setting

The 50.44-acre project site is located south of the intersection of Kings Canyon Way and Sierra Trail Boulevard in the City of Oakley, California (see Figure 1 and Figure 2).

The project site is currently undeveloped and was graded in 2006 as part of the Bacchini Residential Project. The southern portion of the site was formerly developed with a single-family residence and associated ancillary structures in the southeast corner. However, all structures have since been demolished, leaving only remnant foundations. In addition, two palm trees are located on-site in the northwestern corner.

Surrounding existing uses include single-family neighborhoods to the north; single-family residences and agricultural uses to the east across Sellers Avenue, as well as to the south; and single-family residential neighborhood to the west. It should be noted that Marsh Creek and the associated Marsh Creek Regional Trail are located along the western site boundary. The City of Oakley General Plan designates the site as RL and RV, and the site is zoned P-1.

Project Components

The proposed project would involve subdivision of the project site and development of the site with 176 single-family residential lots, one acre of open space within a 75-foot setback from Marsh Creek, a 2.43-acre park in the northwest corner of the project site, and a 2.7-acre stormwater detention basin in the northeast corner of the site, as well as associated utility improvements. The project would include removal of the remaining building foundations and on-site trees. The following sections provide additional details related to the proposed VTM and requested discretionary actions.

Vesting Tentative Map

The Vesting Tentative Map would divide the project site into a total of 179 lots comprised of 176 single-family residential lots, Parcels A, B, and C, as well as an internal roadway network that would connect to the surrounding roadways (see Figure 3). The single-family lots would range in size from 6,000 sf to 16,182 sf. Parcel A would function as a setback parcel adjacent to Marsh Creek and would be 75 feet long. Parcel B would be reserved in the northwestern corner of the project site for the future 2.43-acre park, and Parcel C would include the 2.7-acre stormwater detention basin in the northeast corner of the project site. Site access and circulation, landscaping, and utility infrastructure are discussed in further detail below.

Site Access and Circulation

An internal roadway system would be constructed throughout the project site to provide access to each unit. The internal roadways would be within a 56-foot right-of-way (ROW) and would include a five-foot sidewalk, five-foot landscape strip, eight-foot parking, and a 10-foot travel lane in each direction. Primary vehicular access to the site would be provided from Kings Canyon Lane and Sierra Trail Road north of the project site, and Sellers Avenue to the east. The other internal roadways would be stubbed to the south and west of the project site.

Figure 1
Regional Project Location

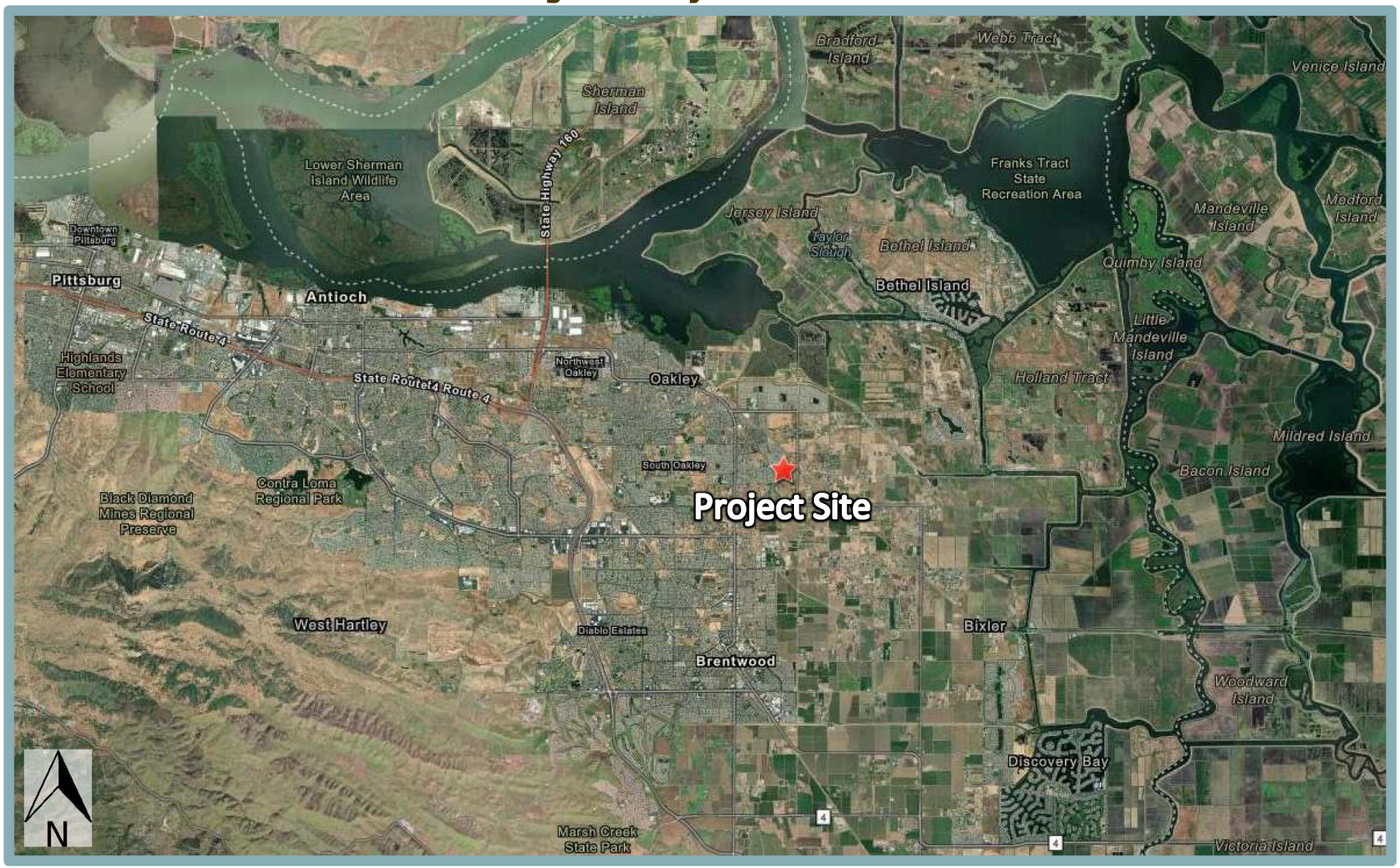
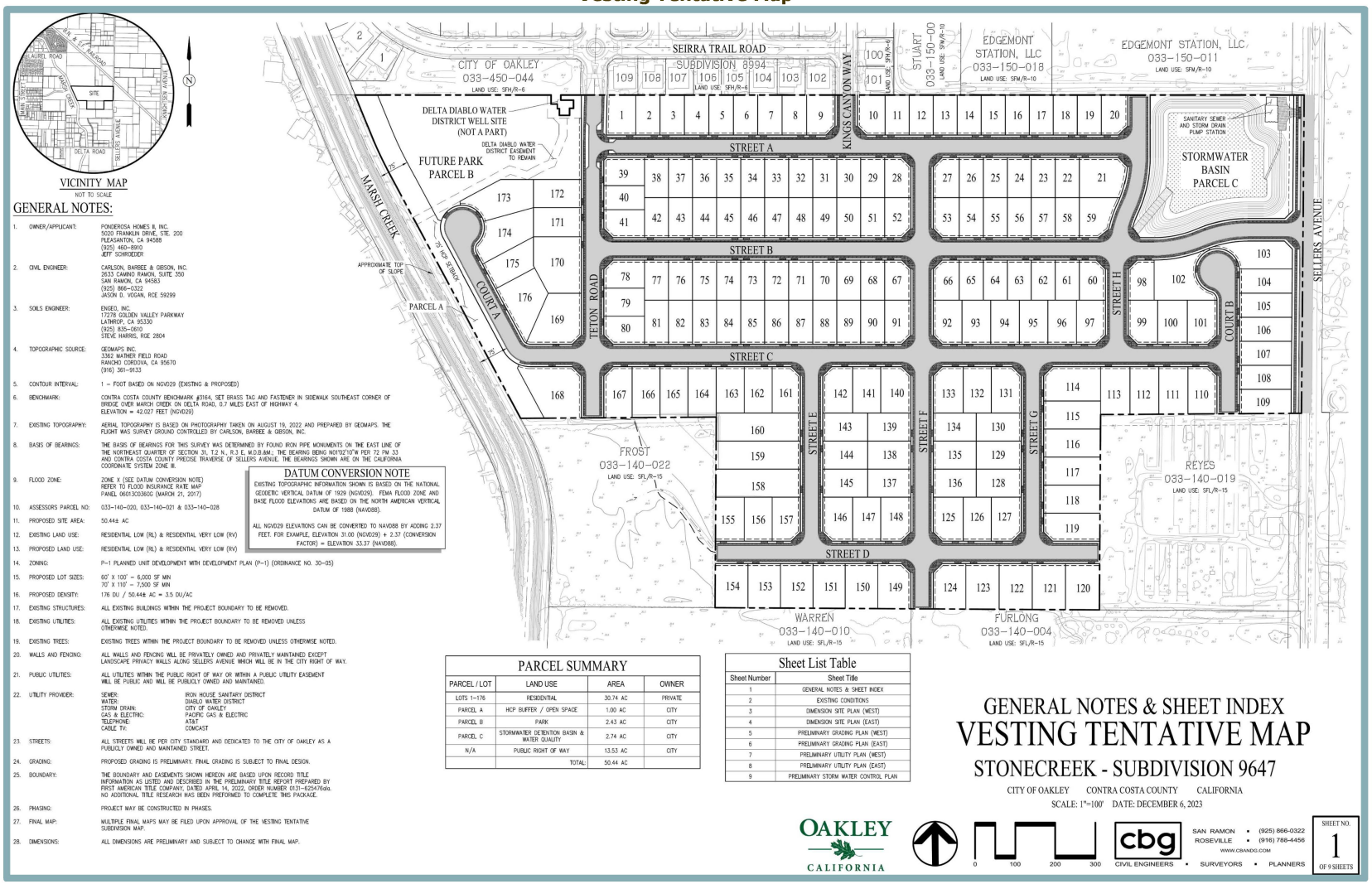


Figure 2
Project Site Boundaries



Figure 3
Vesting Tentative Map



Landscaping

As part of the proposed project, the two on-site palm trees would be removed, and landscaping improvements would be provided throughout the project site. A variety of trees and shrubs would be provided along the internal roadways, as well as the frontage of the residential lots. A six-foot landscape privacy wall would be included along the eastern boundary of the site to separate the proposed residences from Sellers Avenue. All landscaping would comply with the State's Model Water Efficient Landscape Ordinance (MWELO).

Utilities

Water service for the proposed project would be provided by the Diablo Water District (DWD). The proposed project would include construction of new eight-inch water lines throughout the project site within the internal roadway network, and would connect to the existing water main in Kings Canyon Way and Sierra Trail Road (see Figure 4 and Figure 5).

Sanitary sewer service for the proposed project would be provided by the Ironhouse Sanitary District (ISD). The proposed project would include construction of new eight-inch sanitary sewer lines throughout the project site within the internal roadway network, and would ultimately connect to the existing sanitary sewer system in Sellers Avenue.

Runoff from the new impervious surfaces on the project site would be collected in curbs, gutters, and a new network of 15- to 24-inch stormwater lines throughout the site. Stormwater would be directed towards the 2.7-acre detention area located on Parcel C (see Figure 6). Following treatment, the runoff would be discharged into the City's stormwater main in Sierra Trail Road.

Frontage Improvements

The proposed project would include frontage improvements within a 0.37-acre area along Sellers Avenue to the east, primarily comprised of a 26-foot-wide roadway widening and dedication (see Figure 7). The roadway widening area would include two six-foot-wide landscaping areas on either side of a six-foot-wide sidewalk. The proposed residences along the eastern site boundary (Lots 103 through 109) would be separated from the frontage improvement area by a landscape privacy wall.

In addition, the proposed frontage improvements would include eight feet of space as a buffer between the easternmost landscaping area and the existing roadway. It should be noted that the existing roadway includes a five-foot buffer. Following construction of the frontage improvements, the total roadway buffer would be 13 feet wide.

Discretionary Actions

The proposed project would require the following approvals from the City of Oakley:

- Adoption of the IS/MND;
- Adoption of the MMRP; and
- Approval of a Vesting Tentative Map.

Figure 4
Preliminary Utility Plan (West)

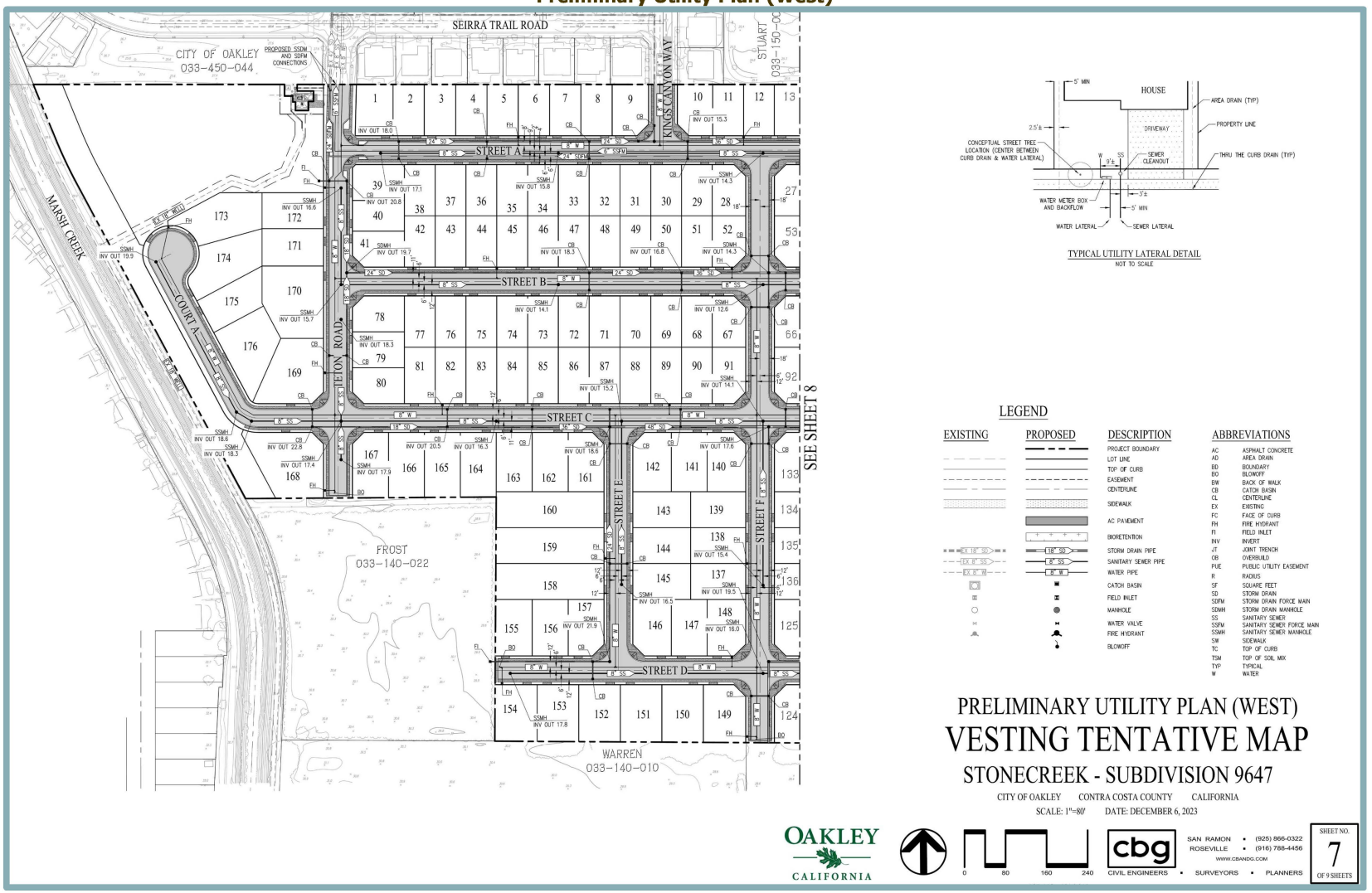


Figure 5
Preliminary Utility Plan (East)

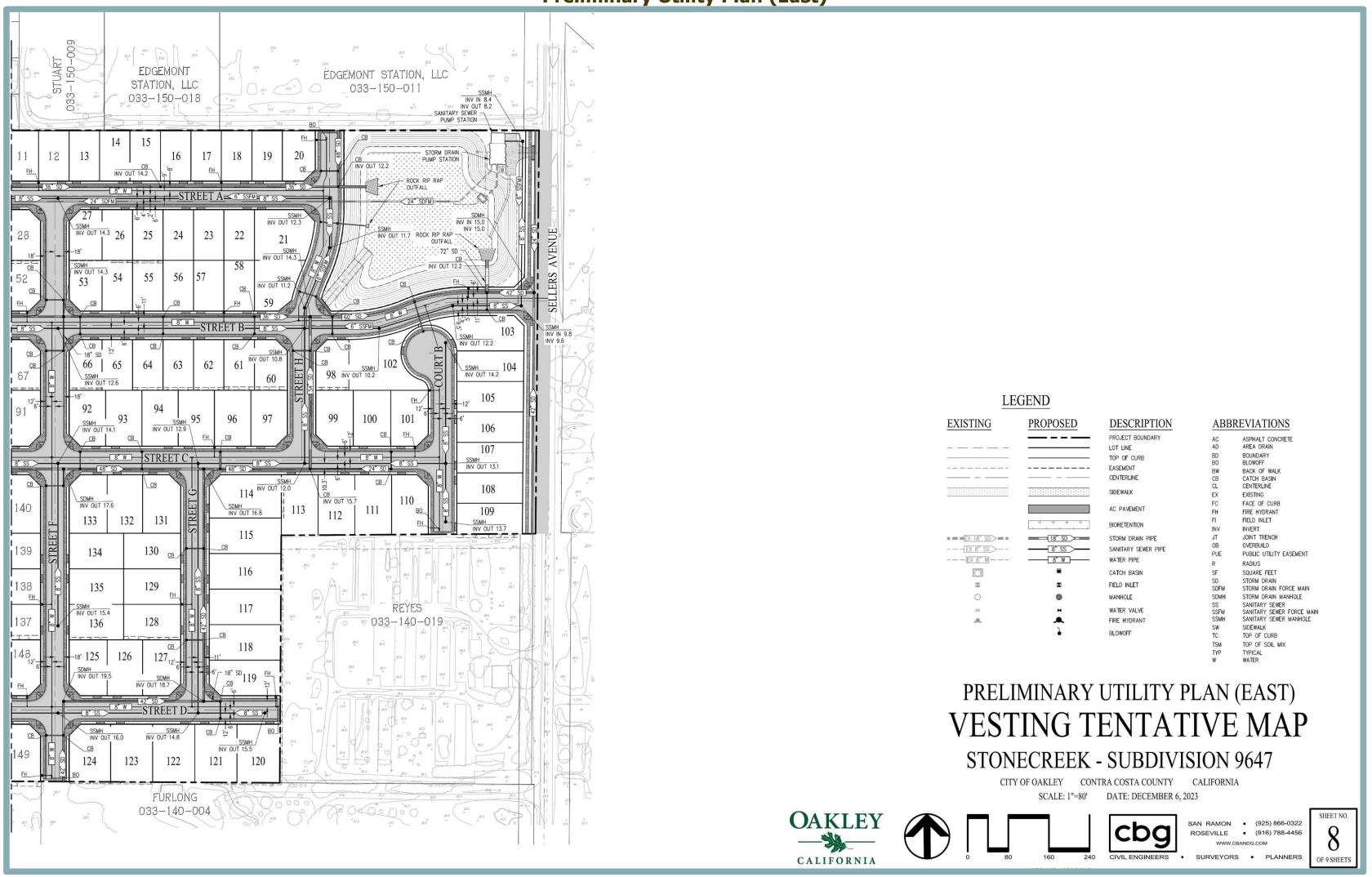


Figure 6
Preliminary Stormwater Control Plan

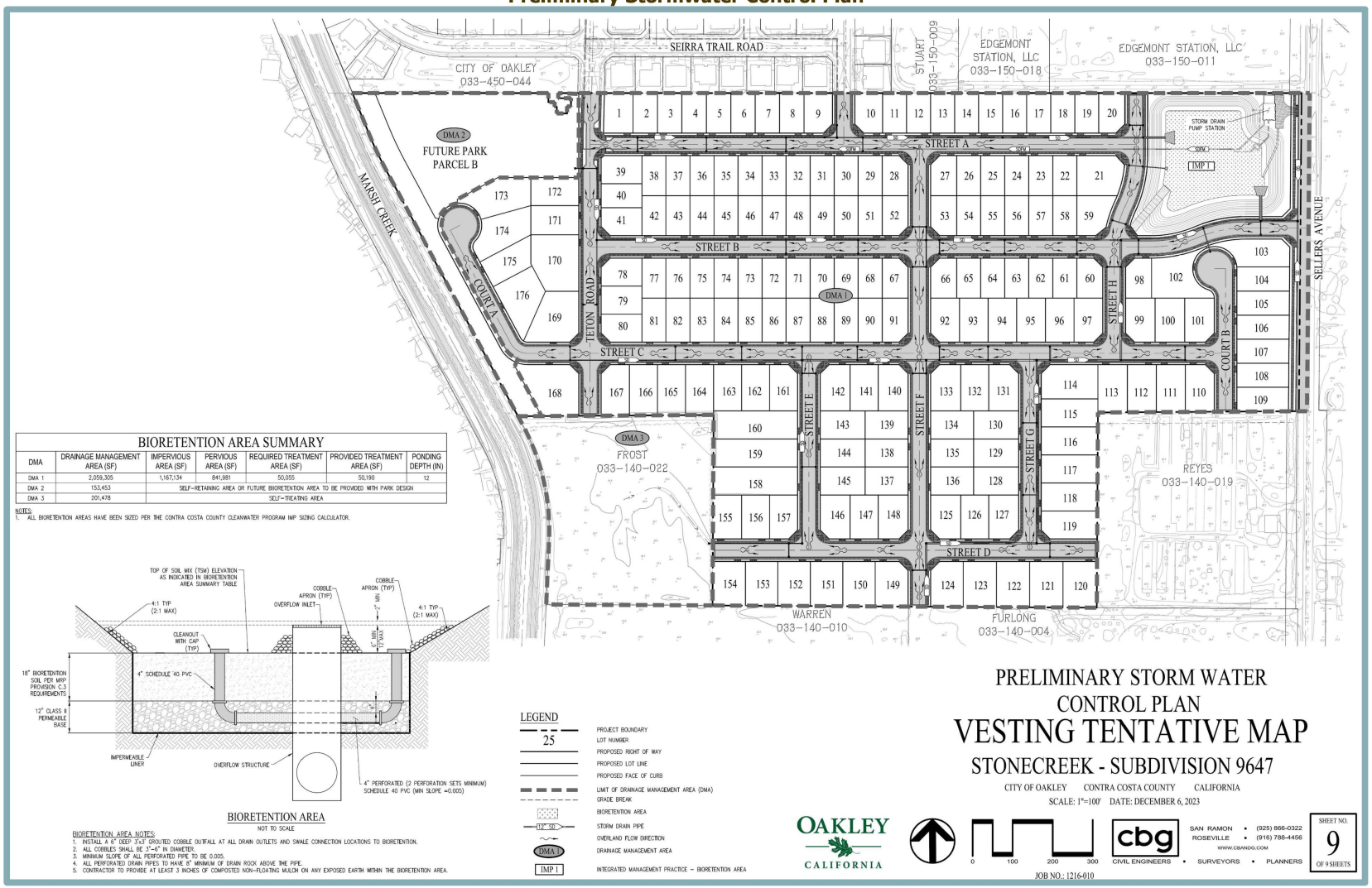
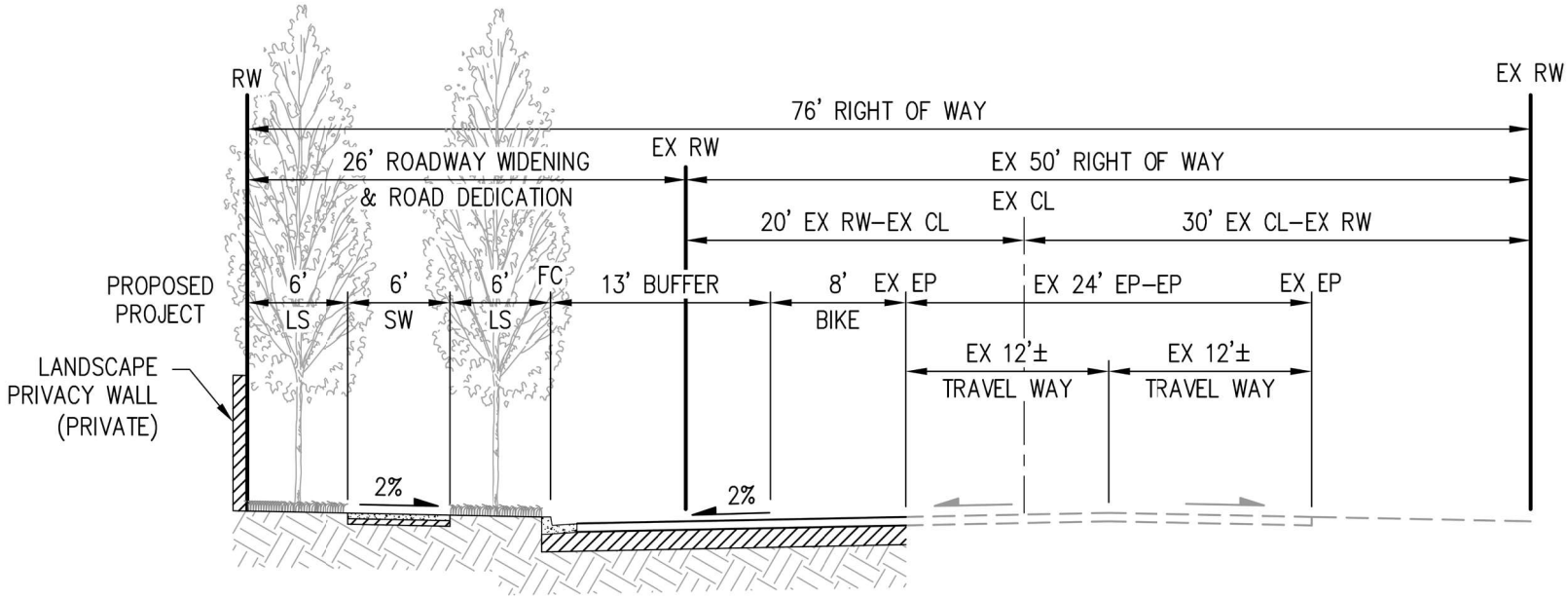


Figure 7
Proposed Frontage Improvements



SELLERS AVENUE ROADWAY WIDENING
(2-LANE COLLECTOR)
NOT TO SCALE

G. ENVIRONMENTAL CHECKLIST

The following checklist contains the environmental checklist form presented in Appendix G of the CEQA Guidelines. The checklist form is used to describe the impacts of the proposed project. A discussion follows each environmental issue identified in the checklist. For this checklist, the following designations are used:

Potentially Significant Impact: An impact that could be significant, and for which no mitigation has been identified. If any potentially significant impacts are identified, an EIR must be prepared.

Less Than Significant with Mitigation Incorporated: An impact that requires mitigation to reduce the impact to a less-than-significant level.

Less-Than-Significant Impact: Any impact that would not be considered significant under CEQA relative to existing standards.

No Impact: The project would not have any impact.

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

Discussion

a. Examples of typical scenic vistas include mountain ranges, ridgelines, or bodies of water as viewed from a highway, public space, or other area designated for the express purpose of viewing and sightseeing. In general, a project's impact to a scenic resource would occur if development of the project would substantially change or remove a scenic resource. A scenic resource includes any such areas designated by a federal, State, or local agency. The City's predominantly flat landscape is rich in scenic resources. Oakley's scenic resources include the waterways of the Delta, Dutch Slough, Marsh Creek, and Contra Costa Canal, habitat areas, and open space land. Other scenic resources include the view of Mount Diablo west of the City.[1] Views of the Delta, Dutch Slough, and the Contra Costa Canal are not available from the project site.

Marsh Creek can be viewed from the project site to the west. However, because the proposed project would not impact the Marsh Creek Regional Trail, public views of Marsh Creek would not be obstructed by development of the proposed project and implementation of the proposed project would not have a substantial adverse effect on a scenic vista.

Furthermore, because the proposed project would be consistent with the General Plan land use designation for the site, potential impacts to scenic vistas and visual character associated with future development of the project site were already evaluated and considered in the General Plan EIR analysis, which concluded that the General Plan's goals, policies, and programs would mitigate any potential impacts on the aesthetic qualities inherent in the Planning Area to a less-than-significant level.[2]

Based on the above, a ***less-than-significant*** impact would occur related to having a substantial adverse effect on a scenic vista.

b. According to the California Scenic Highway Mapping System, portions of Interstate 580 (I-580) and Interstate 680 (I-680) in the vicinity of the City are listed as Officially Designated State Scenic Highways, while State Route (SR) 4 and SR 160 are listed as "Eligible" for

[1] City of Oakley. *City of Oakley General Plan* [pg. 6-24]. Adopted January 11, 2022.
[2] City of Oakley. *City of Oakley 2020 General Plan Draft Environmental Impact Report* [pg. 3-24]. September 2002.

designation.[3] The project site is located approximately three miles east of SR 4 and approximately 4.15 miles southeast of SR 160. Views of the project site from either highway are not currently available due to the substantial distance and intervening urban development. Development of the proposed project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State Scenic Highway. Therefore, a ***less-than-significant*** impact would occur.

c. The project site is located within a partially urbanized area of the City. Undeveloped land and agricultural uses occur to the south and east of the project site; however, the site has been anticipated for residential development by the City. Therefore, the applicable CEQA consideration is whether the project would conflict with applicable zoning and other regulations related to scenic quality.

Development of the proposed project would also require Design Review, a City regulation related to scenic quality. The proposed project would ultimately be subject to the Design Review process. Design Review would be required prior to construction of the single-family units and would ensure that the aesthetic and architectural design of the development be compatible with surrounding development. For example, the proposed project would include landscaping features at the project site frontage and within the project site that would be similar to existing features in the development to the north and west of the site. To ensure the proposed residences would be designed in keeping with the surrounding residential land uses, the City of Oakley requires projects in the P-1 District to prepare a Final Development Plan including development standards. The proposed project would comply with the development standards in the Final Development Plan and would thereby ensure consistency with the surrounding residential development.

Based on the above, the proposed project would not conflict with applicable zoning and other regulations governing scenic qualities, and a ***less-than-significant*** impact would occur.

d. Sources of light do not currently exist on the project site. However, off-site light sources include streetlights and traffic along Kings Canyon Way and Sierra Trail Road, as well as from surrounding residential developments. Development of the project site with 176 single-family residences and the internal road system would add new sources of light and glare to the site where minimal sources currently exist. The proposed project is anticipated to include streetlights along internal roadways and the project frontage, as well as interior lights from windows of the proposed residences. Anticipated light sources are expected to be similar to that of the surrounding area.

Pursuant to Section 9.1.1604 of the City's Municipal Code, the project would be required to undergo a Design Review prior to final project approval to ensure that development of the project would be in compliance with the Residential Design Guidelines, which establish the City's standards for residential streetlights. For example, the Residential Design Guidelines limit residential lighting for security purposes, which would also reduce the amount of light and glare produced by the proposed residences. In addition, because the proposed project would be consistent with the General Plan land use designation for the site, the impacts of new sources of light or glare associated with future development of the

[3] California Department of Transportation. *California State Scenic Highway System Map.* Available at: https://www.arcgis.com/apps/webappviewer/index.html. Accessed May 2024.

project site were already evaluated and considered in the General Plan EIR analysis. The General Plan EIR notes under Impact 3.2-A the City's intent to preserve scenic views of Marsh Creek, but does not identify lighting and glare as a potential source of disturbance. Overall, the City's General Plan EIR concludes that compliance with City standards and policies would reduce any impacts to a less-than-significant level.

Based on the above, any new sources of light and glare by the proposed project are considered a ***less-than-significant*** impact.

II. AGRICULTURE AND FOREST 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 (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	✖	☐
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	✖
c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	✖
d. Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	✖
e. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	✖	☐

Discussion

a,e. Pursuant to the California Department of Conservation (DOC) Farmland Mapping and Monitoring Program, the project site is designated as "Farmland of Local Importance."[4] Therefore, the site does not contain, and is not located adjacent to, Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. In addition, the project site is not currently used for agricultural purposes.

Based on the above, development of the proposed project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use or result in the loss of forest land to non-forest use. Thus, a ***less-than-significant*** impact would occur as a result of the proposed project.

b. The project site is zoned P-1, which does not permit agricultural uses. Furthermore, the site is not under an active Williamson Act contract.[5] Therefore, the proposed project would not conflict with existing zoning for agricultural use or conflict with a Williamson Act contract, and ***no impact*** would occur.

c,d. The project site is not zoned forest land (as defined in PRC Section 12220[g]), timberland (as defined by PRC Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104[g]). Therefore, the proposed project would have ***no impact*** with regard to conversion of forest land or any potential conflict with forest land, timberland, or Timberland Production zoning.

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[4] California Department of Conservation. *California Important Farmland Finder.* Available at: https://maps.conservation.ca.gov/dlrp/ciff/. Accessed May 2024.

[5] Contra Costa Conservation and Development. *2016 Agricultural Preserves Map.* Available at: https://www.contracosta.ca.gov/DocumentCenter/View/882/Map-of-Properties-Under-Contract. Accessed May 2024.

III. AIR QUALITY. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	✖	☐
b. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	✖	☐
c. Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	✖	☐
d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	✖	☐

Discussion

a,b. The City of Oakley is located in the San Francisco Bay Area Air Basin (SFBAAB), which is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). The SFBAAB area is currently designated as a nonattainment area for State and federal ozone, State and federal fine particulate matter 2.5 microns in diameter ($PM_{2.5}$), and State respirable particulate matter 10 microns in diameter (PM_{10}) ambient air quality standards (AAQS). The SFBAAB is designated attainment or unclassified for all other AAQS. It should be noted that on January 9, 2013, the U.S. Environmental Protection Agency (USEPA) issued a final rule to determine that the Bay Area has attained the 24-hour $PM_{2.5}$ federal AAQS. Nonetheless, the Bay Area must continue to be designated as nonattainment for the federal $PM_{2.5}$ AAQS until such time as the BAAQMD submits a redesignation request and a maintenance plan to the USEPA, and the USEPA approves the proposed redesignation. The USEPA has not yet approved a request for redesignation of the SFBAAB; therefore, the SFBAAB remains in nonattainment for 24-hour $PM_{2.5}$.

In compliance with regulations, due to the nonattainment designations of the area, the BAAQMD periodically prepares and updates air quality plans that provide emission reduction strategies to achieve attainment of the AAQS, including control strategies to reduce air pollutant emissions through regulations, incentive programs, public education, and partnerships with other agencies. The current air quality plans are prepared in cooperation with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG).

The most recent federal ozone plan is the 2001 Ozone Attainment Plan, which was adopted on October 24, 2001, and approved by the California Air Resources Board (CARB) on November 1, 2001. The plan was submitted to the USEPA on November 30, 2001, for review and approval. The most recent State ozone plan is the 2017 Clean Air Plan, adopted on April 19, 2017. The 2017 Clean Air Plan was developed as a multi-pollutant plan that provides an integrated control strategy to reduce ozone, PM, toxic air contaminants (TACs), and greenhouse gases (GHGs). Although a plan for achieving the State PM_{10} standard is not required, the BAAQMD has prioritized measures to reduce PM in developing the control strategy for the 2017 Clean Air Plan. The control strategy serves as the backbone of the BAAQMD's current PM control program.

The aforementioned air quality plans contain mobile source controls, stationary source controls, and transportation control measures to be implemented in the region to attain the State and federal AAQS within the SFBAAB. Adopted BAAQMD rules and regulations, as well as the thresholds of significance, have been developed with the intent to ensure

continued attainment of AAQS, or to work towards attainment of AAQS for which the area is currently designated nonattainment, consistent with applicable air quality plans. For development projects, BAAQMD establishes significance thresholds for emissions of the ozone precursors reactive organic gases (ROG) and oxides of nitrogen (NO_X), as well as for PM_{10} and $PM_{2.5}$, expressed in pounds per day (lbs/day) and tons per year (tons/yr). The thresholds are listed in Table 1. Thus, by exceeding the BAAQMD's mass emission thresholds for construction and/or operational emissions of ROG, NO_X, or PM_{10}, a project would be considered to conflict with or obstruct implementation of the BAAQMD's air quality planning efforts.

Table 1
BAAQMD Thresholds of Significance

Pollutant	Construction	Operational	
	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/day)	Maximum Annual Emissions (tons/yr)
ROG	54	54	10
NO_x	54	54	10
PM_{10} (exhaust)	82	82	15
$PM_{2.5}$ (exhaust)	54	54	10

Source: BAAQMD, Air Quality Guidelines, April 2023.

Particulate matter can be split into two categories: fugitive and exhaust. The BAAQMD thresholds of significance for exhaust are presented in Table 1. It should be noted that BAAQMD does not maintain quantitative thresholds for fugitive emissions of PM_{10} or $PM_{2.5}$, rather, BAAQMD requires all projects within the district's jurisdiction to implement Basic Construction Mitigation Measures (BCMMs) related to dust suppression.

The proposed project's construction and operational emissions were quantified using the California Emissions Estimator Model (CalEEMod) software version 2022.1.1.25 – a Statewide model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify air quality emissions, including GHG emissions, from land use projects. The model applies inherent default values for various land uses, including construction data, vehicle mix, trip length, average speed, compliance with the 2022 California Building Standards Code (CBSC), etc. Where project-specific information is available, such information should be applied in the model. Accordingly, the proposed project's modeling assumed the following project and/or site-specific information:

- Construction would begin in March 2026 and occur over approximately three years;
- The project would comply with the MWELO; and
- The project would comply with all applicable provisions of the 2022 CBSC, including 100 percent of electricity generated by rooftop solar.

The proposed project's estimated emissions associated with construction and operations are presented and discussed in further detail below. A discussion of the proposed project's contribution to cumulative air quality conditions is provided below as well. All CalEEMod modeling results are included as Appendix A to this IS/MND.

Construction Emissions

During construction of the proposed project, various types of equipment and vehicles would temporarily operate on the project site. Construction exhaust emissions would be generated from construction equipment, vegetation clearing and earth movement activities, construction worker commutes, and construction material hauling for the entire construction period. The aforementioned activities would involve the use of diesel- and gasoline-powered equipment that would generate emissions of criteria pollutants. Project construction activities also represent sources of fugitive dust, which includes PM emissions. As construction of the proposed project would generate air pollutant emissions intermittently within the site and vicinity, until all construction has been completed, construction is a potential concern because the project is in a non-attainment area for ozone, PM_{10}, and $PM_{2.5}$.

According to the CalEEMod modeling results, buildout of the proposed project would result in maximum unmitigated construction criteria air pollutant emissions as shown in Table 2. As shown in the table, the proposed project's construction emissions would be below the applicable thresholds of significance for ROG, NO_X, PM_{10}, and $PM_{2.5}$.

Table 2
Maximum Unmitigated Construction Emissions (lbs/day)

Pollutant	Construction Emissions	Threshold of Significance	Exceeds Threshold?
ROG	11.50	54	**NO**
NO_X	29.2	54	**NO**
PM_{10}*	1.24	82	**NO**
$PM_{2.5}$*	1.14	54	**NO**

Notes:
* Denotes emissions from exhaust only. BAAQMD does not have adopted PM thresholds for fugitive emissions.

Sources: CalEEMod, June 2024 (see Appendix A).

All projects within the jurisdiction of the BAAQMD are required to implement all of the BAAQMD's BCMMs, which would be required by the City as conditions of approval:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
7. All trucks and equipment, including their tires, shall be washed off prior to leaving the site.

8. Unpaved roads providing access to sites located 100 feet or further from a paved road shall be treated with a six- to 12-inch layer of compacted layer of wood chips, mulch, or gravel.
9. Publicly visible signs shall be posted with the telephone number and name of the person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's General Air Pollution Complaints number shall also be visible to ensure compliance with applicable regulations.

The proposed project's required implementation of the BAAQMD's BCMMs listed above for the project's construction activities, would help to further minimize construction-related emissions.

Overall, because the proposed project would be below the applicable thresholds of significance for construction emissions, project construction would not result in a significant air quality impact.

Operational Emissions

Operational emissions of ROG, NO_X, and PM would be generated by the proposed project from both mobile and stationary sources. Day-to-day activities, such as the future vehicle trips to and from the project site, would make up the majority of the mobile emissions. Emissions would also occur from area sources, such as landscape maintenance equipment exhaust.

According to the CalEEMod results, buildout of the proposed project would result in maximum unmitigated operational criteria air pollutant emissions as shown in Table 3.

Table 3
Maximum Unmitigated Operational Emissions

Pollutant	Proposed Project Emissions		Threshold of Significance		Exceeds Threshold?
	lbs/day	tons/yr	lbs/day	tons/yr	
ROG	15.60	2.67	54	10	**NO**
NO_X	10.00	1.26	54	10	**NO**
PM_{10}*	0.49	0.05	82	15	**NO**
$PM_{2.5}$ *	0.48	0.05	54	10	**NO**

Note:
* Denotes emissions from exhaust only. BAAQMD does not have adopted PM thresholds for fugitive emissions.

Source: CalEEMod, June 2024 (see Appendix A).

As shown in the table, operations of the proposed project would be below the applicable thresholds of significance. Therefore, operations of the project would not be considered to conflict with air quality plans during project operations.

Cumulative Emissions

Past, present and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. By nature, air pollution is largely a cumulative impact. A single project is not sufficient in size to, by itself, result in nonattainment of AAQS. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air

quality impacts. If a project's contribution to the cumulative impact is considerable, then the project's impact on air quality would be considered significant. In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. The thresholds of significance presented in Table 1 represent the levels at which a project's individual emissions of criteria air pollutants or precursors would result in a cumulatively considerable contribution to the SFBAAB's existing air quality conditions. If a project exceeds the significance thresholds presented in Table 1, the proposed project's emissions would be cumulatively considerable, resulting in significant adverse cumulative air quality impacts to the region's existing air quality conditions.

Because the proposed project would result in both construction-related and operational emissions below the applicable thresholds of significance, construction and operations of the project would not be expected to result in a cumulatively considerable contribution to the region's existing air quality conditions.

Conclusion

As stated previously, the applicable regional air quality plans include the 2001 Ozone Attainment Plan and the 2017 Clean Air Plan. According to BAAQMD, if a project would not result in significant and unavoidable air quality impacts, after the application of all feasible mitigation, the project may be considered consistent with the air quality plans.

As discussed above, the proposed project would result in construction and operational emissions below the applicable thresholds of significance. Therefore, the proposed project would not conflict with or obstruct implementation of the applicable air quality plans, violate any air quality standards or contribute substantially to an existing or projected air quality violation, or result in a cumulatively considerable net increase in any criteria air pollutant, and impacts would be considered ***less than significant***.

c. Some land uses are considered more sensitive to air pollution than others, due to the types of population groups or activities involved. Heightened sensitivity may be caused by health problems, proximity to the emissions source, and/or duration of exposure to air pollutants. Children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the effects of air pollution.

Accordingly, land uses that are typically considered to be sensitive receptors include residences, schools, playgrounds, childcare centers, retirement homes, convalescent homes, hospitals, and medical clinics. The nearest sensitive uses include the single-family residences located approximately 20 feet from the project site's northern boundary.

The major pollutant concentrations of concern are localized carbon monoxide (CO) emissions and TACs, as well as regional effects of emissions of criteria pollutants, which are addressed in further detail below.

Localized CO Emissions

Localized concentrations of CO are related to the levels of traffic and congestion along streets and at intersections. High levels of localized CO concentrations are only expected where background levels are high, and traffic volumes and congestion levels are high. Emissions of CO are of potential concern, as the pollutant is a toxic gas that results from

the incomplete combustion of carbon-containing fuels such as gasoline or wood. CO emissions are particularly related to traffic levels.

In order to provide a conservative indication of whether a project would result in localized CO emissions that would exceed the applicable threshold of significance, BAAQMD has established screening criteria for localized CO emissions. According to BAAQMD, a proposed project would result in a less-than-significant impact related to localized CO emission concentrations if all of the following conditions are true for the project:

- The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans;
- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour; and
- The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway, etc.).

While BAAQMD has established the foregoing screening criteria for potential impacts, it should be noted that the SFBAAB has been in attainment of California AAQS (CAAQS) and National AAQS (NAAQS) for CO for more than 20 years.[6] Due to the continued attainment of CAAQS and NAAQS, and advances in vehicle emissions technologies, the likelihood that any single project would create a CO hotspot is minimal. With regard to the proposed project, according to the Traffic Impact Study prepared by TJKM, the proposed project is expected to generate 1,697 daily vehicle trips, 125 of which would be during the AM peak hour, and 169 during the PM peak hour (see Appendix B).[7] The addition of 294 total peak hour trips per day generated by the proposed project is not anticipated to significantly increase traffic volumes at any nearby intersections to more than 44,000 vehicles per hour. Furthermore, areas where vertical and/or horizontal mixing is limited due to tunnels, underpass, or similar features do not exist in the project area. Therefore, based on the BAAQMD's screen criteria for localized CO emissions, the proposed project would not be expected to result in substantial levels of localized CO at surrounding intersections or generate localized concentrations of CO that would exceed standards or cause health hazards.

TAC Emissions

Another category of environmental concern is TACs. CARB's Air Quality and Land Use Handbook: A Community Health Perspective (Handbook) provides recommended setback distances for sensitive land uses from major sources of TACs, including, but not limited to, freeways and high traffic roads, distribution centers, gas dispensing facilities, and rail yards. CARB has identified diesel particulate matter (DPM) from diesel-fueled engines as a TAC; thus, high volume freeways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic are identified as having the highest associated

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[6] Bay Area Air Quality Management District. *Air Quality Summary Reports*. Available at: https://www.baaqmd.gov/about-air-quality/air-quality-measurement/air-quality-summaries. Accessed May 2024.

[7] TJKM. *Stonecreek Residential Development Oakley, CA Traffic Impact Study.* July 17, 2023. Revised November 20, 2023.

health risks from DPM. Health risks associated with TACs are a function of both the concentration of emissions and the duration of exposure, where the higher the concentration and/or the longer the period of time that a sensitive receptor is exposed to pollutant concentrations would correlate to a higher health risk.

It should be noted that impacts of the environment on a project (as opposed to impacts of a project on the environment) are beyond the scope of required CEQA review.[8] Therefore, for the purposes of the CEQA analysis, the relevant inquiry is not whether residents at the proposed single-family homes would be exposed to pre-existing TAC emissions, but instead whether project-generated emissions would exacerbate pre-existing conditions. Although the analysis of a project's existing TAC emissions environment is not required for CEQA purposes, such analysis is included in this document for compliance with applicable CARB recommendations. Gasoline dispensing facilities (GDFs) are considered sources of various types of TACs, including benzene. As a result, in order to reduce adverse health effects, the CARB recommends that typical GDFs be sited at least 50 feet away from existing sensitive land uses, or that a detailed health risk assessment be performed if such land uses are within 50 feet from each other.[9] The project site is located approximately 160 feet west of an existing gas station. Therefore, the proposed residences would be sited outside of the CARB's recommended setback distance from GDFs, and, based on agency guidance, health risks would be less than significant.

As previously noted, the nearest sensitive uses include the single-family residences located approximately 20 feet from the project site's northern boundary. The proposed project does not include any operations that would be considered a substantial source of TACs. Accordingly, operation of the proposed project would not expose sensitive receptors to excess concentrations of TACs.

Short-term, construction-related activities could result in the generation of TACs, specifically DPM, from on-road haul trucks and off-road equipment exhaust emissions. However, construction is temporary and occurs over a relatively short duration in comparison to the operational lifetime of the proposed project. Health risks are typically associated with exposure to high concentrations of TACs over extended periods of time (e.g., 30 years or greater), whereas the construction period associated with the proposed project would likely be limited to approximately three years. All construction equipment and operation thereof would be regulated per the In-Use Off-Road Diesel Vehicle Regulation, which is intended to help reduce emissions associated with off-road diesel vehicles and equipment, including DPM. Project construction would also be required to

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[8] Impacts of the environment on a project (as opposed to impacts of a project on the environment) are beyond the scope of required CEQA review. "[T]he purpose of an EIR is to identify the significant effects of a project on the environment, not the significant effects of the environment on the project." (*Ballona Wetlands Land Trust v. City of Los Angeles*, (2011) 201 Cal.App.4th 455, 473 (*Ballona*).) The California Supreme Court recently held that "CEQA does not generally require an agency to consider the effects of existing environmental conditions on a proposed project's future users or residents. What CEQA does mandate… is an analysis of how a project might exacerbate existing environmental hazards." (*California Building Industry Assn. v. Bay Area Air Quality Management Dist*. (2015) 62 Cal.4th 369, 392; see also *Mission Bay Alliance v. Office of Community Investment & Infrastructure* (2016) 6 Cal.App.5th 160, 197 ["identifying the effects on the project and its users of locating the project in a particular environmental setting is neither consistent with CEQA's legislative purpose nor required by the CEQA statutes"], quoting *Ballona*, *supra*, 201 Cal.App.4th at p. 474.)

[9] California Air Resources Board. *Air Quality and Land Use Handbook: A Community Health Perspective* [pg. 32]. April 2005.

comply with all applicable BAAQMD rules and regulations, particularly associated with permitting of air pollutant sources.

During construction, only portions of the project site would be disturbed at a time. Operation of construction equipment would occur on such portions of the site intermittently throughout the course of a day over the overall construction period. Because construction equipment on-site would not operate for any long periods of time and would be used at varying locations within the site, associated emissions of DPM would not occur at the same location (or be evenly spread throughout the entire project site) for long periods of time. Due to the temporary nature of construction and the relatively short duration of potential exposure to associated emissions, sensitive receptors in the area would not be exposed to pollutants for a permanent or substantially extended period of time. Furthermore, any one nearby sensitive receptor would be exposed to varying concentrations of DPM emissions throughout the construction period. According to BAAQMD, research conducted by CARB indicates that DPM is highly dispersive in the atmosphere. Thus, emissions at the project site would be substantially dispersed at the nearest sensitive receptors, and the concentration of DPM at the nearest sensitive receptors would be lower than the concentration of DPM at the source of emissions.

Considering the limited nature of construction activities, the regulated and intermittent nature of the operation of construction equipment, the highly dispersive nature of DPM, and the distance of the nearest sensitive receptor from the project site, the likelihood that any one sensitive receptor would be exposed to high concentrations of DPM for any extended period of time, during development the project, would be low. For the aforementioned reasons, project construction would not be expected to expose sensitive receptors to substantial pollutant concentrations.

Criteria Pollutants

The BAAQMD thresholds of significance were established with consideration given to the health-based air quality standards established by the NAAQS and CAAQS, and are designed to aid the district in achieving attainment of the NAAQS and CAAQS.[10] Although the BAAQMD's thresholds of significance are intended to aid achievement of the NAAQS and CAAQS for which the SFBAAB is in nonattainment, the thresholds of significance do not represent a level above which individual project-level emissions would directly result in public health impacts. Nevertheless, a project's compliance with BAAQMD's thresholds of significance provides an indication that criteria pollutants released as a result of project implementation would not inhibit attainment of the health-based regional NAAQS and CAAQS. Because project-related emissions would not exceed the BAAQMD's thresholds, and, thus, would not inhibit attainment of regional NAAQS and CAAQS, the criteria pollutants emitted during project implementation would not be anticipated to result in measurable health impacts to sensitive receptors. Accordingly, the proposed project would not expose sensitive receptors to excess concentrations of criteria pollutants.

Conclusion

Based on the above discussion, the proposed project would not expose any sensitive receptors to substantial concentrations of pollutants, including localized CO, TACs, or criteria pollutants, during construction or operation. Therefore, the proposed project would

[10] Bay Area Air Quality Management District. *2022 California Environmental Quality Act Guidelines*. April 2022.

result in a ***less-than-significant*** impact related to the exposure of sensitive receptors to substantial pollutant concentrations.

d. Emissions of principal concern include emissions leading to odors, emission that have the potential to cause dust, or emissions considered to constitute air pollutants. Air pollutants have been discussed in questions 'a' through 'c' above. Therefore, the following discussion focuses on emissions of odors and dust.

Pursuant to the BAAQMD CEQA Guidelines, odors do not have a numerical threshold of significance, but are generally identified through confirmed complaints. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).[11] The presence of an odor impact is dependent on a number of variables including: the nature of the odor source; the frequency of odor generation; the intensity of odor; the distance of odor source to sensitive receptors; wind direction; and sensitivity of the receptor. Due to the subjective nature of odor impacts, the number of variables that can influence the potential for an odor impact, and the variety of odor sources, quantitative analysis to determine the presence of a significant odor impact is difficult. Typical odor-generating land uses include, but are not limited to, wastewater treatment plants, landfills, and composting facilities. The proposed project would not introduce any such land uses, and is not sited near any such land uses.

Construction activities often include diesel-fueled equipment and heavy-duty trucks, which could create odors associated with diesel fumes that may be considered objectionable. However, construction activities would be temporary, and hours of operation for construction equipment would be restricted to the hours of 7:30 AM to 7:00 PM on weekdays and 9:00 AM to 7:00 PM on weekends and holidays per Section 4.2.208 of the City of Oakley Municipal Code. Project construction would also be required to comply with all applicable BAAQMD rules and regulations, particularly associated with permitting of air pollutant sources. The aforementioned regulations would help to minimize emissions, including emissions leading to odors. Accordingly, substantial objectionable odors would not be expected to occur during construction activities.

BAAQMD regulates objectionable odors through Regulation 7, Odorous Substances, which does not become applicable until the Air Pollution Control Officer (APCO) receives odor complaints from ten or more complainants within a 90-day period. Once effective, Regulation 7 places general limitation on odorous substances and specific emission limitations on certain odorous compounds, which remain effective until such time that citizen complaints have not been received by the APCO for one year. The limits of Regulation 7 become applicable again when the APCO receives odor complaints from five or more complainants within a 90-day period. Thus, although not anticipated, if odor complaints are made after the proposed project is developed, the BAAQMD would ensure that such odors are addressed, and any potential odor effects are minimized or eliminated.

With respect to dust, as noted previously, all projects under the jurisdiction of BAAQMD are required to implement the BAAQMD's BCMMs. Such measures would act to reduce construction-related dust by ensuring that haul trucks with loose material are covered,

[11] Bay Area Air Quality Management District. *California Environmental Quality Act Air Quality Guidelines* [pg. 5-16]. April 20, 2022.

reducing vehicle dirt track-out, and limiting vehicle speeds within project site, among other methods, which would ensure that construction of the proposed project does not result in substantial emissions of dust. Following project construction, vehicles operating within the project site would be limited to paved areas of the site, and non-paved areas would be landscaped. In addition, as discussed in question 'a' above, emissions of particulate matter are anticipated to be below BAAQMD thresholds. Thus, project operations would not include sources of dust that could adversely affect a substantial number of people.

Based on the above, construction and operation of the proposed project would not result in emissions (such as those leading to odors) adversely affecting a substantial number of people, and a ***less-than-significant*** impact would occur.

IV. BIOLOGICAL RESOURCES. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife 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, and regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☐	✖	☐	☐
c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	✖	☐	☐
d. Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of 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?	☐	☐	✖	☐

Discussion

The following discussion based primarily on a Planning Survey Report (PSR), prepared by Moore Biological Consultants for the proposed project.[12] The PSR is included as Appendix C to this IS/MND.

a,f. Currently, the 50.44-acre project site consists of ruderal grassland and is primarily undeveloped. It should be noted that a single-family residence and associated ancillary structures used to be located in the southeast corner of the site; however, all structures have been demolished. As noted in the PSR, two trees are located in the northeast portion of the site, and several trees are located off-site, adjacent to the southern site boundary.

Special-status species include those plant and wildlife species that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing under the federal and State Endangered Species Acts. Both acts afford protection to listed and proposed species. In addition, California Department of Fish and Wildlife (CDFW) Species of Special Concern, which are species that face extirpation in California if current population and habitat trends continue, U.S. Fish and Wildlife Service (USFWS) Birds of Conservation Concern, sensitive species included in USFWS Recovery Plans, and CDFW special-status invertebrates are all considered special-status species. Although CDFW Species of Special Concern generally do not have special legal status, they are given special consideration under CEQA. In addition to regulations for special-status species,

[12] Moore Biological Consultants. *Application Form and Planning Survey Report.* July 2015.

most birds in the U.S., including non-status species, are protected by the Migratory Bird Treaty Act (MBTA) of 1918. Under the MBTA, destroying active nests, eggs, and young is illegal. Species that meet the definition of rare, threatened, or endangered under Section 15380 of the CEQA guidelines are also considered special-status species. In addition, plant species on California Native Plant Society (CNPS) categories 1A, 1B, 2B, 3, and 4 are considered special-status plant species and are protected under CEQA.

The project site is located within the boundaries of the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (ECCC HCP/NCCP), which is intended to provide an effective framework to protect natural resources in the County, including special-status species. Based on the PSR, nine special-status wildlife species have the potential to occur within the vicinity of the project site. It should be noted that special-status plant species were not identified on-site due to the previous mass grading activities associated with the Bacchini Residential Project. Of the nine special-status wildlife species that could occur within the vicinity of the project site, three species could be located within the project site: the western burrowing owl; Swainson's hawk; and golden eagle. All three species are covered under the ECCC HCP/NCCP.

In February 2015, the East Contra Costa County Habitat Conservancy prepared an ECCC HCP/NCCP Assessment of Plan Effects on CEQA Species.[13] The purpose of the assessment was to provide a programmatic, cumulative CEQA effects analysis for CEQA species not covered by the HCP/NCCP. The 2015 ECCC HCP/NCCP Assessment of Plan Effects on CEQA Species concluded that mitigation measures required in the ECCC HCP/NCCP also provide mitigation for non-covered species; therefore, projects consistent with the ECCC HCP/NCCP would have a less-than-significant impact on other potential special-status species.

According to the 2015 ECCC HCP/NCCP Assessment of Plan Effects on CEQA Species, for all but two of the potential special-status species addressed (Lime Ridge navarretia [*Navarretia gowenii*] and the Lime Ridge eriastrum [*Eriastrum ertterae]*), impacts would be less than significant under CEQA. Because of uncertainty regarding the distribution of the Lime Ridge navarretia and the Lime Ridge eriastrum, the 2015 ECCC HCP/NCCP Assessment of Plan Effects on CEQA Species concluded that a potentially significant impact could occur related to the two aforementioned species. According to the PSR, known occurrences of Lime Ridge navarretia or Lime Ridge eriastrum do not occur within the project site or the surrounding area area. Therefore, implementation of the proposed project would not impact the species.

Based on the conclusions of the 2015 ECCC HCP/NCCP Assessment of Plan Effects on CEQA Species and the absence of the Lime Ridge navarretia and Lime Ridge eriatrum in the vicinity of the project site, the proposed project would have a less-than-significant impact on any potential special-status species not covered by the ECCC HCP/NCCP.

In compliance with the ECCC HCP/NCCP, a PSR was prepared for the proposed project by Moore Biological Consultants, which included all species covered under the ECCC HCP/NCCP (see Appendix C). The study area of the PSR observed approximately 50.44 acres of both the project site and frontage improvement area. Approximately 50.43 acres

[13] H.T. Harvey & Associates. *East Contra Costa County Habitat Conservation Plan – Assessment of Plan Effects on CEQA Species.* February 17, 2015.

of the study area are categorized by the Grassland (Ruderal) land cover type, 0.008-acre as seasonal wetland, and 0.37-acre as the Developed (Urban) land cover (see Figure 8). Based on the land cover types found on-site, Moore Biological Consultants conducted on-site surveys for western burrowing owl, Swainson's hawk, and golden eagle.

Special-Status Wildlife

The on-site ruderal grassland and nearby trees could provide potential habitat for western burrowing owl (*Athene cunnicularia*), Swainson's hawk (*Buteo swainsoni*), and golden eagle (*Aquila chrysaetos*). In addition, other avian species protected by the MBTA could use the existing grassland as foraging and potential nesting habitat.

Western Burrowing Owl

The primary habitat requirement for western burrowing owls is small mammal burrows that the species uses for nesting. Typically, the species uses abandoned ground squirrel burrows, but has been known to dig burrows in softer soils. In urban areas, western burrowing owls may use pipes, culverts, and piles of material as artificial burrows. Western burrowing owls breed semi-colonially from March through August.

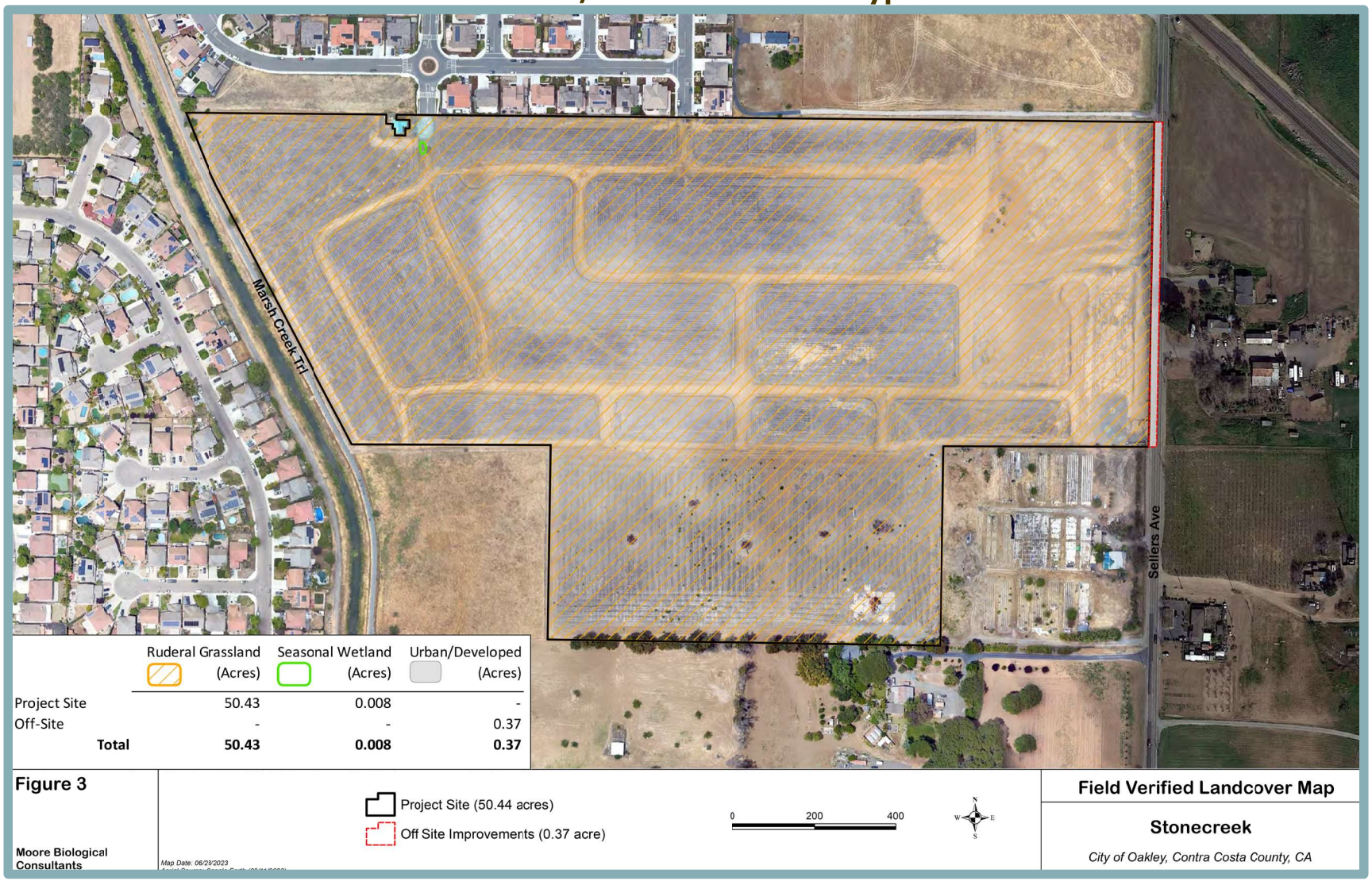
The project site contains ruderal grassland within the range of the western burrowing owl and the site was inspected for burrowing owls and ground squirrel burrows with evidence of burrowing owl occupancy (i.e., white wash, pellets, feathers) as part of the PSR. Ground squirrel burrows were observed during the survey. However, burrowing owls or burrows with evidence of burrowing owl occupancy were not observed during the survey. According to the PSR, most of the burrows appeared unoccupied, as cobwebs were seen at the entrance in a majority of the burrows. Nonetheless, because suitable habitat for western burrowing owl exists on the project site, pre-construction surveys for burrowing owls would be required by the ECCC HCP/NCCP to confirm presence or absence of the species. If burrowing owls are present on or near the project site, project construction could result in an adverse impact to the species.

Swainson's Hawk and Golden Eagle

Swainson's hawk is a summer resident and migrant in California's Central Valley and scattered portions of the southern California interior. Areas typically used for nesting include the edge of narrow bands of riparian vegetation, isolated patches of oak woodland, lone trees, planted and natural trees associated with roads, farmyards and sometimes adjacent residential areas. Foraging occurs in open habitats, including grasslands, open woodlands, and agricultural areas. Golden eagles are fairly adaptable in habitat but often reside in areas with few shared ecological characteristics, such as mountains and cliffs. In addition, golden eagles tend to avoid developed areas in favor of remote natural settings. The project site contains ruderal grassland that is located within the range of the golden eagle.

The two trees within the project site provide potentially suitable nesting habitat for Swainson's hawks and nesting golden eagles, as well as several potential nest trees near and visible from the project site (including a row of trees at the southern project site boundary). As part of the PSR, trees on the site and visible from the site were inspected for raptor stick nests. Raptor stick nests were not observed in the surveyed trees. Furthermore, Swainson's hawks were not observed during the survey, which was conducted within the species' nesting season. Golden eagles were not observed, as the species nests more often on cliffs in remote natural areas than in trees near urban areas.

Figure 8
ECCC HCP/NCCP Land Cover Types



The CNDDB search conducted as part of the PSR did not include any occurrences of Swainson's hawk within 1,000 feet of the project site or within the larger geographical area. Nonetheless, pre-construction surveys for Swainson's hawk would be required by the ECCC HCP/NCCP to confirm the presence or absence of the species. If the species were to occur on or near the project site, development of the proposed project could result in direct take or nest abandonment, which would be considered an adverse impact.

Similarly, the CNDDB search did not include any occurrences of golden eagles within 0.5-mile of the project site or within the larger geographical area, but pre-construction surveys for golden eagle would be required by the ECCC HCP/NCCP to confirm presence or absence of the species. If golden eagles are present on or near the project site, project construction could result in an adverse impact to the species.

Nesting Raptors and Migratory Birds

The trees on-site and nearby may be used by other migratory birds protected by the MBTA for nesting. Construction activities that adversely affect the nesting success of raptors and migratory birds (i.e., lead to the abandonment of active nests) or result in mortality of individual birds would constitute a violation of State and federal laws. In the event that such species occur on or near the project site during the breeding season, project construction could result in an adverse effect to species protected under the MBTA.

ECCC HCP/NCCP Requirements

Procedures for pre-construction surveys, best management practices (BMPs), and construction monitoring, as well as applicable Avoidance and Minimization Measures (AMMs) for species covered by the ECCC HCP/NCCP, are outlined in Section 6.3.3, Construction Monitoring, and Section 6.4.3, Species-Level Measures, of the ECCC HCP/NCCP.[14] The proposed project would be required to comply with all ECCC HCP/NCCP requirements, including pre-construction surveys. Conducting such surveys prior to ground disturbance activities would identify any on-site and nearby nests and establish whether such nests are occupied. If nests are occupied, the proposed project would be required to comply with the minimization requirements and construction monitoring in the ECCC HCP/NCCP. In addition, if nests are located within 1,000 feet of the project site, the proposed project would also follow all applicable AMMs.

All birds covered by the ECCC HCP/NCCP (including western burrowing owl, golden eagle, and Swainson's hawks) are also considered migratory birds and subject to the prohibitions of the MBTA. Therefore, actions conducted under the ECCC HCP/NCCP comply with the provisions of the MBTA. ECCC HCP/NCCP Conservation Measure 1.12, Implement Best Management Practices for Rural Road Maintenance and Conservation Measure, as well as Measure 1.14, Design Requirements for Covered Roads Outside of the UDA, incorporate avoidance guidelines for compliance with the MBTA. Because the project would comply with all ECCC HCP/NCCP requirements, the project would also comply with the provisions of the MBTA.

Additionally, the proposed project would be subject to pay all applicable fees according to the Fee Zone Map of the ECCC HCP/NCCP prior to construction and in compliance with Section 9.2.712 of the Oakley Municipal Code. The developer would be required to pay

[14] East Contra Costa County Habitat Conservation Plan Association. *Final East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan.* October 2006.

the appropriate fees based on the applicable fee calculator at the time of development. Payment of such fees would further reduce any adverse impacts to protected species.

Conclusion

Based on the above, western burrowing owls, Swainson's hawks, and golden eagles have the potential to occur on-site. However, the project would comply with ECCC HCP/NCCP requirements, and pre-construction surveys would be required for western burrowing owl, Swainson's hawk, and golden eagle. Although the site and surrounding area contains suitable nest trees for nesting raptors and migratory birds protected by the MBTA, the project would be required to comply with the ECCC HCP/NCCP's Avoidance and Minimization Measures for western burrowing owl, Swainson's hawk, golden eagle, and nesting and migratory birds. The proposed project would comply with all applicable ECCC HCP/NCCP requirements. Thus, the proposed project would not have an adverse effect, either directly or through habitat modifications, on species identified as special-status species in local or regional plans, policies, or regulations, or by the CDFW or the USFWS, and a ***less-than-significant*** impact would result.

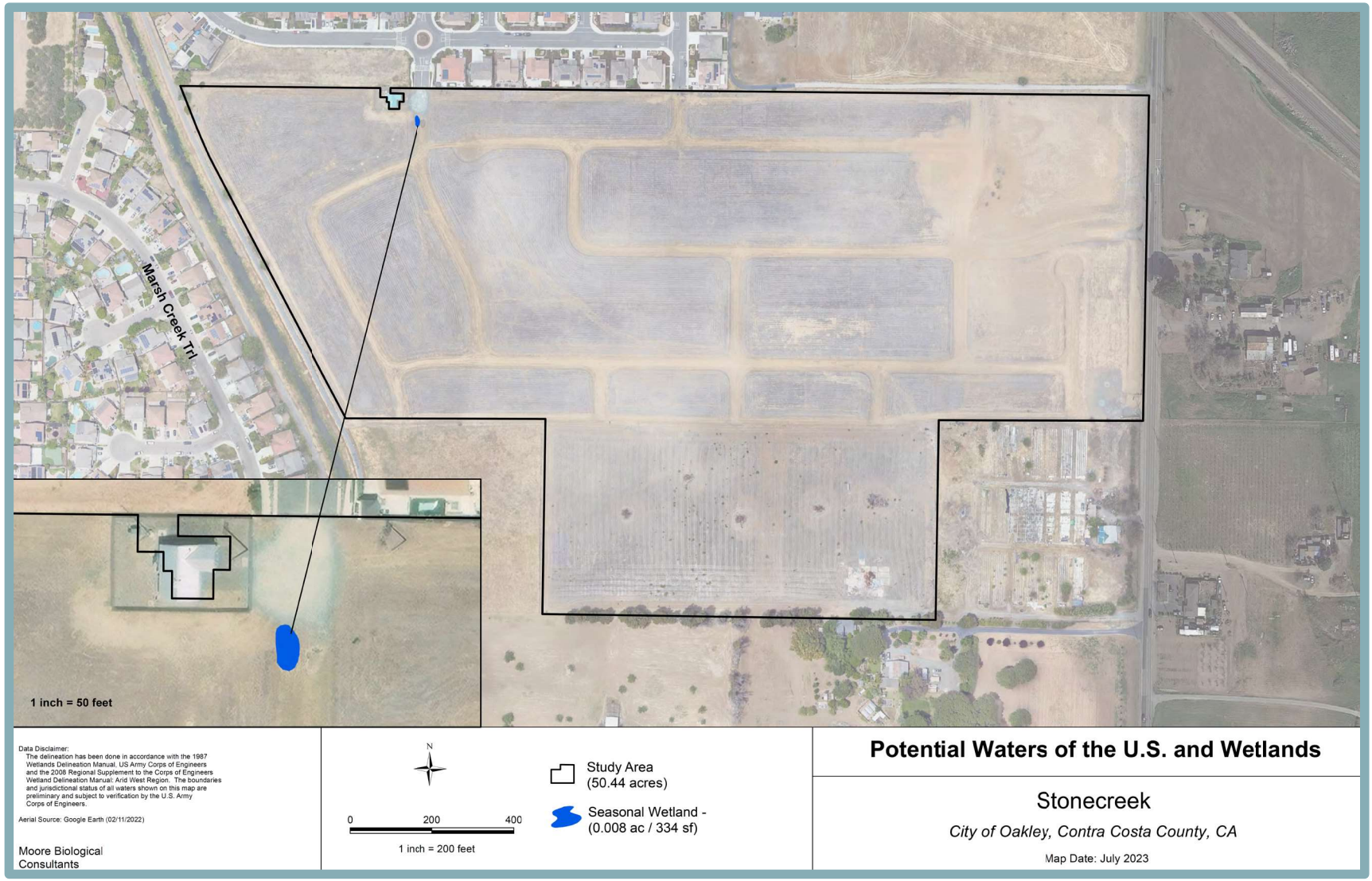
b,c. The U.S. Army Corps of Engineers (USACE), CDFW, and Regional Water Quality Control Board (RWQCB) have jurisdiction over modifications to stream channels, riverbanks, lakes, and other wetland features. The USACE's jurisdiction is established through the provisions of Section 404 of the Clean Water Act (CWA), which prohibits the discharge of dredged or fill material into waters of the U.S. without a permit, including certain wetlands and unvegetated "other waters of the U.S." The jurisdictional authority of the RWQCB is established pursuant to Section 401 of the CWA, which typically requires a water quality certification when an individual or nationwide permit is issued by the USACE. The RWQCB also has jurisdiction over waters of the State under the Porter-Cologne Water Quality Control Act.

An assessment of potentially jurisdictional Waters of the U.S. or wetlands in the site was undertaken on June 15, 2023. According to the PSR, potentially jurisdictional waters of the U.S. do not exist on-site, but 0.008-acre of seasonal wetlands is located in the northwestern area (see Figure 9). The wetland was created during initial grading of the site in 2006 and is not included in historical aerial photographs of the site. The wetland appears to be supported, or at least supplemented by, an underground water source, such as a leaking storm drain line or irrigation run-off from the landscaped areas to the north.

The 0.008-acre seasonal wetland is within the footprint of the proposed connection to Teton Road and would be filled as part of project construction. Filling the seasonal wetland would require obtaining a 401 Certification and/or Waste Discharge Requirements from the RWQCB. In addition, depending on project timing, the applicant may choose to request a Preliminary Jurisdictional Determination (PJD). Alternatively, the applicant may request an Approved Jurisdictional Determination (AJD). It should be noted that, due to a Supreme Court decision on May 26, 2023, USACE is now "on hold" in processing AJD requests. Regardless of the request, the PSR notes that USACE is highly unlikely to deem the wetland as jurisdictional.

Based on the above, without compliance with the RWQCB and USACE, the proposed project could have a substantial adverse effect on federally protected wetlands, and a ***potentially significant*** impact could occur.

Figure 9
Potential Waters of the U.S. and Wetlands



Mitigation Measure(s)

Implementation of the following mitigation measures would reduce the above potential impact to a *less-than-significant* level.

IV-1. *Prior to commencement of project construction activities, the applicant shall submit an application to the RWQCB for a 401 Certification and/or Waste Discharge Requirements. Proof of compliance shall be submitted to the City of Oakley Planning and Zoning Division.*

IV-2. *Prior to commencement of project construction activities, the applicant shall request either a Preliminary or an Approved Jurisdictional Determination from USACE. If USACE declares the on-site seasonal wetland as jurisdictional waters, the project applicant shall obtain authorization to fill the wetland under Regional General Permit 1. Proof of compliance shall be submitted to the City of Oakley Planning and Zoning Division.*

d. The project site is located in a developing area of the City. Surrounding existing uses include single-family neighborhoods to the north and west, as well as single-family residences and agricultural uses to the east across Sellers Avenue, and to the south. The developed nature of the surrounding area precludes the use of the project site as a migratory corridor. Wildlife movement could occur within Marsh Creek, which is located to the west of the project site. However, the proposed project includes a 75-foot-wide setback in Parcel A to provide a buffer between the creek and the development. As such, development of the proposed project would not interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of wildlife nursery sites, and a ***less-than-significant*** impact would occur.

e. Two palm trees currently exist on the project site. Section 9.1.1112 of the City's Municipal Code requires that any protected trees that are removed shall be replaced. The City defines a protected tree as any tree adjacent to or part of a riparian habitat, foothill woodland, or oak savanna that measures 20 inches or larger and an indigenous tree that measures 40 inches or larger or as a California native oak that measures at least 50 inches in circumference (15.6 inches diameter). Neither of the two on-site trees are part of an existing riparian, foothill woodland, or oak savanna habitat. As a result, the removal of the two trees would not conflict with Section 9.1.1112 of the City's Municipal Code.

Based on the above, the proposed project would not conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, and a ***less-than-significant*** impact would occur.

V. CULTURAL RESOURCES. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of a historical resource pursuant to 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 dedicated cemeteries.	☐	✖	☐	☐

Discussion

a. Historical resources are features that are associated with the lives of historically important persons and/or historically significant events, that embody the distinctive characteristics of a type, period, region or method of construction, or that have yielded, or may be likely to yield, information important to the pre-history or history of the local area, California, or the nation. Examples of typical historical resources include, but are not limited to, buildings, farmsteads, rail lines, bridges, and trash scatters containing objects such as colored glass and ceramics.

In order to determine whether the project site contains significant historical resources, a records search of the California Historic Resources Information System (CHRIS) was performed by the Northwest Information Center (NWIC) for cultural resource site records and survey reports within the project area.[15] The State Office of Historic Preservation (OHP) Built Environment Resources Directory, which includes listings of the California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and the National Register of Historic Places, does not list recorded buildings or structures within or adjacent to the project site. In addition to the OHP inventories, the NWIC base maps do not show recorded buildings or structures within the project site.

In addition, as previously discussed, the project site has been subject to mass grading activities associated with the Bacchini Residential Project. As part of grading, all structures were demolished and removed leaving the project site vacant. As such, the project site does not contain any structures that would qualify as historically significant.

Based on the above, development of the proposed project would not cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 and a ***less-than-significant*** impact would occur.

b,c. According to the NWIC, the project site has been included in the study areas of two previous archaeological studies (in 1998 and 2004). According to the previously conducted archaeological studies and the CHRIS records search conducted for the proposed project, the project site does not contain recorded archaeological resources. However, a review of historical literature and maps as part of the NWIC search indicated historic-period activity within the project area. Early maps, including the Byron U.S. Geological Survey (USGS) 15-minute topographic maps from 1916, 1940, and 1943,

[15] Northwest Information Center. *Records Search Results for the Proposed Stonecreek Subdivision 9647 Project.* June 10, 2024.

indicate two buildings within the project site that were unrecorded by the Built Environment Resources Directory. Therefore, the CHRIS search concluded that a moderate to high potential exists for unrecorded historic-period archaeological resources to be located within the project area.

In addition, pursuant to Impact 3.10-B within the Oakley General Plan EIR, "there have been few archaeological or paleontological finds in the City of Oakley." However, the City's General Plan EIR states that given the rich history of the Planning Area and region, the City continues to require site evaluation prior to the development of undeveloped areas, as well as requiring procedures if artifacts are unearthed during construction. While the project site has been subject to ground disturbance associated with site grading, unknown archaeological resources, including human remains, could be uncovered during ground-disturbing activities associated with project construction. If previously unknown resources are encountered during construction activities, the proposed project could cause a substantial adverse change in the significance of a unique archaeological resource pursuant to CEQA Guidelines Section 15064.5 and/or disturb human remains, including those interred outside of dedicated cemeteries. Therefore, a ***potentially significant*** impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measures would reduce the above potential impact to a *less-than-significant* level.

V-1. *If buried archaeological, paleontological, and/or cultural resources are encountered during site grading or other site work, all such work shall be halted immediately within 100 feet of the discovery and the developer shall immediately notify the City of Oakley Planning and Zoning Division of the discovery. In such case, the developer shall be required, at their own expense, to retain the services of a qualified archaeologist for the purpose of recording, protecting, or curating the discovery, as appropriate. The archaeologist shall be required to submit to the City of Oakley Planning and Zoning Division for review and approval a report of the findings and method of curation or protection of the resources. Further grading or site work within the area of discovery would not be allowed until the preceding work has occurred.*

The foregoing requirements shall be noted on the project improvement plans, subject to review and approval by the City of Oakley Planning and Zoning Division.

V-2. *Pursuant to State Health and Safety Code Section 7050.5 (c) State Public Resources Code Section 5097.98, if human bone or bone of unknown origin is found during construction, all work shall stop within 100 feet of the find and the Contra Costa County Coroner shall be contacted immediately. If the remains are determined to be Native American, the Coroner shall notify the Native American Heritage Commission, who shall notify the person believed to be the most likely descendant. The most likely descendant shall work with the contractor to develop a program for re-internment of the human remains and any associated artifacts. Additional work is not to take place within 100 feet of the find until the identified appropriate actions have been implemented.*

The foregoing requirements shall be noted on the project improvement plans, subject to review and approval of compliance by the City of Oakley Planning and Zoning Division.

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

Discussion

a,b. The main forms of available energy supply are electricity, natural gas, and oil. A description of the 2022 California Green Building Standards Code (CALGreen Code), the Building Energy Efficiency Standards, and the City's Strategic Energy Plan (SEP), with which the proposed project would be required to comply, as well as discussions regarding the proposed project's potential effects related to energy demand during construction and operations are provided below.

California Green Building Standards Code

The 2022 California Green Building Standards Code, otherwise known as the CALGreen Code (CCR Title 24, Part 11), is a portion of the CBSC, which became effective with the rest of the CBSC on January 1, 2023.[16] The purpose of the CALGreen Code is to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices. The provisions of the code apply to the planning, design, operation, construction, use, and occupancy of every newly constructed building or structure throughout California. Requirements of the CALGreen Code include, but are not limited to, the following measures:

- Compliance with relevant regulations related to future installation of electric vehicle (EV) charging infrastructure in residential and non-residential structures;
- Indoor water use consumption is reduced through the establishment of maximum fixture water use rates;
- Outdoor landscaping must comply with the California Department of Water Resources' MWELO, or a local ordinance, whichever is more stringent, to reduce outdoor water use;
- Diversion of 65 percent of construction and demolition waste from landfills;
- Incentives for installation of electric heat pumps, which use less energy than traditional heating, ventilation, and air conditioning (HVAC) systems and water heaters;
- Required solar PV system and battery storage standards for certain buildings; and
- Mandatory use of low-pollutant emitting interior finish materials such as paints, carpet, vinyl flooring, and particle board.

[16] California Building Standards Commission. *2022 California Green Building Standards Code*. 2023.

Building Energy Efficiency Standards

The 2022 Building Energy Efficiency Standards is a portion of the CBSC, which expands upon energy-efficiency measures from the 2019 Building Energy Efficiency Standards, went into effect starting January 1, 2023. The 2022 standards provide for additional efficiency improvements beyond the 2019 standards. The proposed project would be subject to all relevant provisions of the most recent update of the CBSC, including the Building Energy Efficiency Standards. Adherence to the most recent CALGreen Code and Building Energy Efficiency Standards would ensure that the proposed structure would consume energy efficiently.

Strategic Energy Plan

In the fall of 2015, the City of Oakley adopted a SEP to help meet State mandates for required energy use and GHG emission reductions.[17] The SEP included six energy planning goals and priorities, including, but not limited to, improving energy performance to exceed Title 24 requirements for new construction and major renovations of the City facilities; exploring opportunities for energy efficiency, demand reduction, and/or clean self-generation measures; and exploring existing economic and fiscal criteria commonly used for the evaluation and implementation of energy use reduction and energy generation strategies.

Construction Energy Use

Construction of the proposed project would involve on-site energy demand and consumption related to use of oil in the form of gasoline and diesel fuel for construction worker vehicle trips, hauling and materials delivery truck trips, and operation of off-road construction equipment. In addition, diesel-fueled portable generators may be necessary to provide additional electricity demands for temporary on-site lighting, welding, and for supplying energy to areas of the site where energy supply cannot be met via a hookup to the existing electricity grid. Even during the most intense period of construction, due to the different types of construction activities (e.g., site preparation, grading, building construction), only portions of the project site would be disturbed at a time, with operation of construction equipment occurring at different locations on the project site, rather than a single location. Project construction would not involve the use of natural gas appliances or equipment.

All construction equipment and operation thereof would be regulated per the CARB's In-Use Off-Road Diesel Vehicle Regulation. The In-Use Off-Road Diesel Vehicle Regulation is intended to reduce emissions from in-use, off-road, heavy-duty diesel vehicles in California by imposing limits on idling, requiring all vehicles to be reported to CARB, restricting the addition of older vehicles into fleets, and requiring fleets to reduce emissions by retiring, replacing, or repowering older engines, or installing exhaust retrofits. In addition, as a means of reducing emissions, construction vehicles are required to become cleaner through the use of renewable energy resources. The In-Use Off-Road Diesel Vehicle Regulation would therefore help to improve fuel efficiency for equipment used in construction of the proposed project. Technological innovations and more stringent standards are being researched, such as multi-function equipment, hybrid equipment, or other design changes, which could help to further reduce demand on oil and limit emissions associated with construction.

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[17] City of Oakley. *Strategic Energy Plan*. Fall 2015.

Based on the above, the temporary increase in energy use occurring during construction of the proposed project would not result in a significant increase in peak or base demands or require additional capacity from local or regional energy supplies. In addition, construction activities would be required to comply with all applicable regulations related to energy conservation and fuel efficiency, which would help to reduce the temporary increase in demand.

Operational Energy Use

Following implementation of the proposed project, the Pacific Gas and Electric Company (PG&E) would provide electricity to the project site. Energy use associated with operation of the proposed project would be typical of residential uses, requiring electricity for interior and exterior building lighting, HVAC, electronic equipment, machinery, refrigeration, appliances, security systems, and more. Maintenance activities during operations, such as landscape maintenance, would involve the use of electric or gas-powered equipment. In addition to on-site energy use, the proposed project would result in transportation energy use associated with vehicle trips generated by the proposed residential development.

The proposed residential project would be subject to all relevant provisions of the most recent update of the CBSC, including the Building Energy Efficiency Standards. Adherence to the most recent CALGreen Code and the Building Energy Efficiency Standards would ensure that the proposed structures would consume energy efficiently through the incorporation of such features as efficient water heating systems, high performance attics and walls, and high efficacy lighting. Required compliance with the CBSC would ensure that the building energy use associated with the proposed project would not be wasteful, inefficient, or unnecessary. In addition, electricity supplied to the project site by PG&E would comply with the State's Renewable Portfolio Standard (RPS), which requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020 and to 60 percent by 2030. Thus, a portion of the energy consumed during operation of the proposed project would originate from renewable sources.

The CARB prepared the 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan),[18] which builds upon previous efforts to reduce GHG emissions and is designed to continue to shift the California economy away from dependence on fossil fuels. Appendix D of the 2022 Scoping Plan provides suggestions for prioritizing various types of mitigation, such as on-site GHG-reducing design features and mitigation measures. Appendix D includes the methods to reduce vehicle miles traveled (VMT), support building decarbonization, and provide access to shared mobility services or transit, as well as EV charging. Appendix D provides further suggestions for prioritizing other mitigation types, including voluntary offsets issued by a recognized and reputable voluntary carbon registry. The regulation described above, with which the proposed project must comply, would be consistent with the intention of the 2022 Scoping Plan and the recommended actions included in Appendix D of the 2022 Scoping Plan.

Additionally, the proposed project would be consistent with the goals of the SEP, as the proposed project would comply with the latest CBSC standards regarding energy

[18] California Air Resources Board. *2022 Scoping Plan for Achieving Carbon Neutrality*. November 16, 2022.

conservation, renewable energy resources, and green building standards.

With regard to transportation energy use, the proposed project would comply with all applicable regulations associated with vehicle efficiency and fuel economy. In addition, as discussed in Section XVII, Transportation, of this IS/MND, the project site is not anticipated to substantially increase VMT.

Conclusion

Based on the above, construction and operations of the proposed project would not result in wasteful, inefficient, or unnecessary consumption of energy resources or conflict with or obstruct a State or local plan for renewable energy or energy efficiency. Thus, a ***less-than-significant*** impact would occur.

VII. GEOLOGY AND SOILS. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	✖	☐
ii. Strong seismic ground shaking?	☐	☐	✖	☐
iii. Seismic-related ground failure, including liquefaction?	☐	✖	☐	☐
iv. Landslides?	☐	✖	☐	☐
b. Result in substantial soil erosion or the loss of topsoil?	☐	☐	✖	☐
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	✖	☐	☐
d. Be located on expansive soil, as defined in Table 18-1B 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?	☐	✖	☐	☐

Discussion

ai-ii. The project site does not contain any active or potentially active faults, nor is the site located within a State-designated Alquist-Priolo Fault Zone.[19] However, according to the City's General Plan EIR, the City of Oakley is subject to seismic risk because the City is within the San Francisco Bay Area, an area of high seismicity.[20]

Proper engineering of the proposed buildings in compliance with the CBSC would ensure that the proposed project would not be subject to substantial risks related to seismic ground shaking. Projects designed in accordance with the CBSC should be able to: 1) resist minor earthquakes without damage, 2) resist moderate earthquakes without structural damage but with some nonstructural damage, and 3) resist major earthquakes without collapse but with some structural as well as nonstructural damage. Conformance with the CBSC design standards would be enforced through building plan review and require approval by the City.

Based on the above, the proposed project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of

[19] California Department of Conservation. *Earthquake Zones of Required Investigation.* Available at: https://maps.conservation.ca.gov/cgs/EQZApp/app/. Accessed June 2024.

[20] City of Oakley. *City of Oakley 2020 General Plan Draft Environmental Impact Report* [pg. 3-161]. September 2002.

a known earthquake fault or strong seismic ground shaking. Thus, a ***less-than-significant*** impact would occur.

aiii,aiv, c. The proposed project's potential effects related to liquefaction, subsidence/settlement, landslides, and lateral spreading are discussed in detail below.

Liquefaction and Subsidence/Settlement

Liquefaction is the temporary transformation of loose, saturated granular sediments from a solid state to a liquefied state as a result of seismic ground shaking. In the process, the soil undergoes transient loss of strength, which commonly causes ground displacement or ground failure to occur. Because saturated soils are a necessary condition for liquefaction, soil layers in areas where the groundwater table is near the surface have higher liquefaction potential than those in which the water table is located at greater depths. Additionally, loose unsaturated sandy soils have the potential to settle during strong seismic shaking. Liquefaction can often result in subsidence or settlement.

According to the MTC/ABAG Hazard Viewer Map, project site is located within a "high" Earthquake Liquefaction Susceptibility zone.[21] Oakley Municipal Code Section 6.9.328 requires that as part of obtaining a Grading Permit, an application must be accompanied, among other documents, with three copies of a geotechnical or engineering geology report to excavate and grade the project site. The project's Improvement Plans would be required to be signed by a State-certified civil engineer who prepared the geotechnical report and reviewed to ensure that the plans conform to all recommendations contained in the report. Furthermore, Oakley Municipal Code Section 6.9.702 provides that upon completion of rough grading work, but before the issuance of building permits, the City Engineer may require that a soil engineering report be prepared certifying the adequacy of the site for the intended use, as affected by soil engineering reports. While the proposed project would be required to comply with the requirements set forth in Oakley Municipal Code Sections 6.9.328 and 6.9.702, due to the potential for liquefaction to occur on-site, foundation subsidence or settlement may occur, and, without the implementation of mitigation, an impact could occur.

Landslides

Seismically-induced landslides are triggered by earthquake ground shaking. The risk of landslide hazard is greatest in areas with steep, unstable slopes. The project site is relatively flat and is not located near any slopes. Therefore, the proposed project would not be subject to landslide risks and would not expose people or structures to potential risk of loss, injury, or death involving landslides.

Lateral Spreading

Lateral spreading involves horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically, lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope. It should be noted that Marsh Creek is located west of the project site; however, the project site is relatively flat and is not located near any slopes. Given that the project site does not contain, and is not adjacent to, any free faces

[21] Association of Bay Area Governments. *Hazard Viewer.* Available at: https://abag.ca.gov/our-work/resilience/data-research/hazard-viewer/. Accessed June 2024.

including excavations, or channels or open bodies of water adjacent to slopes, lateral spreading would not present a likely hazard at the site.

Conclusion

Based on the above, the potential exists for liquefaction and associated subsidence/settlement to occur at the project site. Without implementation of mitigation, the proposed project could cause substantial adverse effects related to such. Thus, a ***potentially significant*** impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above impact to a *less-than-significant* level.

VII-1. *Prior to approval of any building permits, the project Civil Engineer shall show on the project plans that the project design adheres to all engineering recommendations provided in the site-specific Geotechnical Exploration prepared for the Bacchini Residential Project by ENGEO, Inc. pursuant to Oakley Municipal Code Section 6.9.702 in April 2005. Proof of compliance with all recommendations specified in the Geotechnical Exploration shall be subject to review and approval by the City Engineer.*

b. The proposed project would include further grading of the project site prior to construction. During construction activities, topsoil would be exposed. Following development of the site, all exposed soils would be covered with impervious surfaces or landscaping. Therefore, the potential for erosion to occur would not exist long-term.

As discussed further under questions ‘ci’ and ‘ciii’ in Section X, Hydrology and Water Quality, of this IS/MND, pursuant to the City of Oakley Municipal Code Sections 6.9.308 and 6.11.212, the proposed project would be required to prepare an Erosion Control Plan and Stormwater Pollution Prevention Plan (SWPPP) prior to construction activities. The erosion control measures and BMPs required by both the Erosion Control Plan and the SWPPP would ensure that the proposed project would not result in substantial erosion or the loss of topsoil. Therefore, the proposed project would not result in substantial soil erosion or the loss of topsoil, and a ***less-than-significant*** impact would occur.

d. Expansive soils can undergo significant volume changes with variations in moisture content. Specifically, such soils shrink and harden when dried and expand and soften when wetted. If structures are underlain by expansive soils, foundation systems must be capable of withstanding the potential damaging movements of the soil. Pursuant to the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey, the majority of the project site is comprised of Sorrento silty clay loam, which has a “somewhat limited” rating, with the remainer of the project site being a mix of Brentwood clay loam (very limited) and Delhi sand, 2 to 9 percent slopes (not limited). The somewhat and very limited ratings indicate the on-site soils have one or more features that are unfavorable for dwellings without basements. In addition, the on-site soils have a shrink-swell numerical rating of 1.00 and 0.50, according to the USDA NRCS Web Soil Survey. The numerical ratings indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00). Therefore, the potential exists for expansive soils to exist on site and adversely affect the proposed project.

However, as required by Mitigation Measure VII-1, the proposed project would be subject to Oakley Municipal Code Sections 6.9.328 and 6.9.792, which would ensure on-site expansive soils are identified and addressed in accordance with industry standard recommendations set forth by a State-certified civil engineer, prior to the issuance of a grading permit. Compliance with Mitigation Measure VII-1 would ensure that adverse effects do not occur within the project site.

As such, the project would not be located on expansive soil, as defined in Table 18-1B of the Uniform Building Code (1994) and the potential for substantial direct or indirect risks to life or property would not occur. Therefore, the impact would be ***less than significant***.

e. The proposed project would connect to existing City sewer services. Thus, the construction or operation of septic tanks or other alternative wastewater disposal systems would not be included as part of the project. Therefore, ***no impact*** regarding the capability of soil to adequately support the use of septic tanks or alternative wastewater disposal systems would occur.

f. The City's General Plan does not include a discussion of any existing unique geologic features within the City. Consequently, development of the proposed project is not anticipated to result in the direct or indirect destruction of unique geologic features.

With respect to paleontological resources, the City's General Plan indicates that few paleontological resources occur within the City Planning Area.[22] In addition, portions of the surrounding area are developed, and paleontological resources have not been encountered in the vicinity. Thus, existing paleontological resources are not expected to occur on the site. Nonetheless, the potential exists for previously unknown paleontological resources to exist within the project site. Ground-disturbing activity such as grading, trenching, or excavating associated with implementation of the proposed project would have the potential to disturb or destroy such resources if present. Therefore, the proposed project could result in the direct or indirect destruction of a unique paleontological resource, and a ***potentially significant*** impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above impact to a *less-than-significant* level.

VII-2. Implement Mitigation Measures V-1 and V-2.

[22] City of Oakley. *City of Oakley General Plan* [pg. 6-19]. Adopted January 11, 2022.

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

Discussion

a,b. Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. Therefore, the cumulative global emissions of GHGs contributing to global climate change can be attributed to every nation, region, and city, and virtually every individual on Earth. An individual project's GHG emissions are at a micro-scale level relative to global emissions and effects to global climate change; however, an individual project could result in a cumulatively considerable incremental contribution to a significant cumulative macro-scale impact. As such, impacts related to emissions of GHG are inherently considered cumulative impacts.

Implementation of the proposed project would cumulatively contribute to increases of GHG emissions. Estimated GHG emissions attributable to future development would be primarily associated with increases of carbon dioxide (CO_2) and, to a lesser extent, other GHG pollutants, such as methane (CH_4) and nitrous oxide (N_2O) associated with area sources, mobile sources or vehicles, utilities (electricity), water usage, wastewater generation, and the generation of solid waste. The primary source of GHG emissions for the project would be mobile source emissions. The common unit of measurement for GHG is expressed in terms of annual metric tons of CO_2 equivalents ($MTCO_2e$/yr).

The proposed project is located within the jurisdictional boundaries of BAAQMD. The most recent BAAQMD Air Quality Guidelines were released in April 2022.[23] The updated GHG thresholds address more recent climate change legislation, including Senate Bill (SB) 32, and provide qualitative thresholds related to buildings and transportation.

Construction GHG emissions are a one-time release, and thus, are not typically expected to generate a significant contribution to global climate change. Neither the City nor BAAQMD have an adopted threshold of significance for construction-related GHG emissions and do not require quantification of construction-related GHGs. Nonetheless, the proposed project's construction GHG emissions, as well as operational emissions, have been estimated using CalEEMod under the same assumptions discussed in Section III, Air Quality, of this IS/MND (see Appendix A). The emissions estimates prepared for the proposed project determined that the proposed project would result in total construction-related GHG emissions of 539 $MTCO_2e$ over the entire construction period.

[23] Bay Area Air Quality Management District. *2022 California Environmental Quality Act Guidelines.* April 2022.

Potential impacts related to operational GHG emissions resulting from implementation of the proposed project are considered in comparison with BAAQMD's adopted thresholds of significance below.

BAAQMD Thresholds of Significance

The BAAQMD's adopted thresholds of significance for GHG emissions are qualitative, and address recent climate change legislation, including SB 32. According to the new thresholds of significance, a project must either include specific project design elements (e.g., exclude use of natural gas, achieve a specific reduction in project-generated VMT below the regional average) or be consistent with a local GHG reduction strategy that meets the criteria under State CEQA Guidelines Section 15183.5(b).[24]

The City of Oakley does not have a GHG reduction strategy under CEQA Guidelines Section 15183.5(b). Therefore, the following analysis focuses on the new BAAQMD GHG thresholds related to specific project design elements.

According to the BAAQMD's thresholds of significance, in order to find a less-than-significant GHG impact, projects must include, at a minimum, the following project design elements:

1. The project will not include natural gas appliances or natural gas plumbing (in both residential and nonresidential development);
2. The project will not result in any wasteful, inefficient, or unnecessary energy usage as determined by the analysis required under CEQA Section 21100(b)(3) and Section 15126.2(b) of the State CEQA Guidelines;
3. The project will achieve a reduction in project-generated VMT below the regional average consistent with the current version of the California Climate Change Scoping Plan (currently 15 percent) or meet a locally adopted SB 743 VMT target, reflecting the recommendations provided in the Governor's Office of Planning and Research's (OPR's) Technical Advisory on Evaluating Transportation Impacts in CEQA; and
4. The project will achieve compliance with off-street EV requirements in the most recently adopted version of CALGreen Tier 2.

In order to be consistent with the first criterion, the proposed project would be required to include all electric appliances and plumbing. The 2022 Building Energy Efficiency Standards require that new development be built electric-ready (i.e., structures will be required to have electric supply panels and circuitry to support all-electric appliances and heating). However, the lack of natural gas appliances or natural gas plumbing, consistent with the first criterion, cannot be guaranteed.

Regarding the second criterion, as discussed in Section VI, Energy, of this IS/MND, the proposed project would comply with all applicable federal, State, and local regulations regarding energy use during both project construction and project operations. Therefore, as discussed therein, the proposed project would not result in any wasteful, inefficient, or unnecessary energy usage.

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[24] Bay Area Air Quality Management District. *2022 California Environmental Quality Act Guidelines*. Available at: https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines. Accessed May 2024.

With respect to the third criterion, as discussed in Section XVII, Transportation, of this IS/MND, the citywide VMT per capita was calculated to be 27.43. Therefore, the impact threshold of 15 percent below the Citywide average VMT per capita equates to 23.32 VMT per capita. With compliance with Mitigation Measure XVII-1 and XVII-2, the proposed project would generate VMT per capita of 22.62. Therefore, the project would achieve a 15 percent reduction in project-generated VMT below the regional average consistent with the current version of the California Climate Change Scoping Plan.

With respect to the fourth criterion, the proposed project would be subject to the single-family residential standards set forth in the current CALGreen Code. Pursuant to the 2022 CALGreen Code, single-family residential projects are required to install a listed raceway to accommodate a dedicated 208/240-volt branch circuit for each unit, which would be suitable for EV charging. Compliance with this requirement would be sufficient to comply with the Tier 2 CALGreen standards, as required by BAAQMD.

As previously noted, CARB prepared the 2022 Scoping Plan, which builds upon previous efforts to reduce GHG emissions and is designed to continue to shift the California economy away from dependence on fossil fuels. Appendix D of the 2022 Scoping Plan provides suggestions for prioritizing various types of mitigation, such as on-site, GHG-reducing design features and mitigation measures. Similar to the 2022 Scoping Plan, BAAQMD has identified the necessary design elements required of new land use projects and plans to achieve California's long-term climate goal of carbon neutrality by 2045. If such design elements are incorporated into the design and construction of a project, then the project would contribute a proportional portion of what is necessary to achieve the State's climate goals – a "fair share" portion – and a lead agency reviewing the project under CEQA can conclude that the project would not make a cumulatively considerable contribution to global climate change.

Based on the above, BAAQMD's thresholds of significance are consistent with the 2022 Scoping Plan. Therefore, if a development project is consistent with BAAQMD's thresholds of significance, it can be assumed that the project would also be consistent with the 2022 Scoping Plan. Given that the proposed project could be inconsistent with BAAQMD's standards related to natural gas without implementation of mitigation, the proposed project could conflict with the 2022 Scoping Plan.

Conclusion

Based on the above, without the implementation of mitigation, the project may not comply with the BAAQMD's required thresholds of significance. Therefore, the proposed project could generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, or could conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs. Thus, a ***potentially significant*** impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above potential impact to a *less-than-significant* level.

VIII-1. *Consistent with the BAAQMD's thresholds of significance, prior to issuance of building permits for the proposed project, the project applicant shall demonstrate via project design and/or notation included on project design*

that natural gas infrastructure shall be prohibited. Natural gas infrastructure may be allowed if the applicant implements alternative methods that reduce the project's greenhouse gas emissions in an equally effective or superior manner as would exist without natural gas emission infrastructure.

Conformance with the foregoing requirement shall be confirmed through review and approval of building permit plans by the City of Oakley Planning and Zoning Division.

IX. HAZARDS AND HAZARDOUS MATERIALS. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	✖	☐
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely 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 the risk of loss, injury or death involving wildland fires?	☐	☐	✖	☐

Discussion

a. Residential operations are not typically associated with the routine transport of hazardous materials. Future operations of the proposed residences on the project site could involve the use of common household cleaning products, fertilizers, and herbicides on-site, any of which could contain potentially hazardous chemicals; however, such products would be expected to be used in accordance with label instructions. Due to the regulations governing use of such products and the amount that could reasonably be used on the site, routine use and/or disposal of such products would not represent a substantial risk to public health or the environment. Therefore, the proposed project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, and a ***less-than-significant*** impact would occur.

b. Construction activities associated with the proposed project would involve the use of heavy equipment, which would contain fuels and oils, and the use of other products such as concrete, paints, and adhesives. Small quantities of potentially toxic substances (e.g., petroleum and other chemicals used to operate and maintain construction equipment) would be used at the project site and transported to and from the site during construction. However, the project contractor would be required to comply with all California Health and Safety Codes and local City ordinances regulating the handling, storage, and transportation of hazardous and toxic materials. Thus, construction of the proposed project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment.

A development project could create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment should a site contain potential Recognized Environmental Conditions (RECs) that are not properly addressed prior to project implementation. A REC indicates the presence or likely presence of any hazardous substances in, on, or at a property due to any release into the environment, under conditions indicative of a release to the environment, or under conditions that pose a material threat of a future release to the environment.[25]

Various materials historically used in building construction, such as asbestos, lead, and polychlorinated biphenyl (PCB)-containing materials, have been proven to be hazardous to human health upon substantial exposure. If such materials were encountered during project construction, construction workers could be exposed to unsafe materials and/or hazardous materials could be released into the environment. As discussed in Section V, Cultural Resources, of this IS/MND, the CHRIS records search conducted for the proposed project identified a pair of potentially historic buildings on-site. If either building contained hazardous materials, a potentially significant impact could occur.

However, as discussed throughout this IS/MND, the project site has been subject to mass disturbance through site grading activities. As part of the grading activities associated with the Bacchini Residential Project, all structures were demolished and removed from the project site. Demolition and grading activities were subject to previous mitigation in the 2005 IS to ensure hazardous building materials, such as lead-based paint or asbestos, were removed pursuant to State and local regulations. The project site is currently vacant, and the remnant building foundations would not include hazardous materials. Therefore, because buildings are not currently located within the project site, project construction would not encounter any RECs associated with hazardous building construction materials.

Based on the above, the proposed project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment, and a ***less-than-significant*** impact would occur.

c. The nearest school relative to the project site is Gehringer Elementary School, which is located approximately 0.80-mile west of the site. Therefore, the proposed project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school, and ***no impact*** would occur.

d. Pursuant to the State Water Resources Control Board's (SWRCB) GeoTracker data management system, hazardous materials sites, including leaking underground storage tank (LUST) sites and DTSC cleanup sites, do not occur within or adjacent to the project site.[26] In addition, the DTSC's portion of the Cortese List does not identify hazardous waste sites within or adjacent to the project site.[27]

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[25] ASTM International. *ASTM E1527, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.* 2013.

[26] State Water Resources Control Board. *GeoTracker.* Available at: https://geotracker.waterboards.ca.gov/map/. Accessed June 2024.

[27] Department of Toxic Substances Control. *Hazardous Waste and Substances Site List*. Available at: https://www.envirostor.dtsc.ca.gov/public/search.asp. Accessed June 2024.

Based on the above, the proposed project would not be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. As such, ***no impact*** would occur.

e. The nearest airport to the project site is the Byron Airport, located approximately 9.95 miles south of the project site. Therefore, the project site is not located within two miles of any public airports and does not fall within an airport land use Planning Area. Accordingly, ***no impact*** would occur related to a safety hazard or excessive noise for people residing or working in the project area.

f. During operation, the proposed project would provide adequate access for emergency vehicles and would not interfere with potential evacuation or response routes used by emergency response teams. During construction of the proposed project, all construction equipment would be staged on-site so as to prevent obstruction of local and regional travel routes in the City that could be used as evacuation routes during emergency events. In addition, all proposed internal roadways would accommodate emergency vehicles. The proposed project would not substantially alter the existing circulation system in the surrounding area. As a result, the proposed project would have a ***less-than-significant*** impact with respect to impairing the implementation of or physically interfering with an adopted emergency response plan or emergency evacuation plan.

g. According to the California Department of Forestry and Fire Protection (CALFIRE) Fire and Resource Assessment Program (FRAP), the project site is not located within a Very High or High Fire Hazard Severity Zone (FHSZ).[28] In addition, the site is located adjacent to urbanized areas of the City, which precludes the uncontrolled spread of wildland fires. Therefore, the proposed project would not expose people or structures to the risk of loss, injury or death involving wildland fires, and a ***less-than-significant*** impact would occur.

[28] California Department of Forestry and Fire Protection. *Fire Hazard Severity Zones*. Available at: https://calfire-forestry.maps.arcgis.com/apps/webappviewer/index.html. Accessed June 2024.

X. HYDROLOGY AND WATER QUALITY. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	✖	☐
b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	✖	☐
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i. Result in substantial erosion or siltation on- or off-site;	☐	☐	✖	☐
ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	✖	☐
iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	✖	☐
iv. Impede or redirect flood flows?	☐	☐	✖	☐
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?	☐	☐	✖	☐

Discussion

a, ci-ciii. The following discussion provides a summary of the proposed project's potential to violate water quality standards/waste discharge requirements, alter the drainage pattern of the site resulting in erosion or siltation, increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site, contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems, or otherwise degrade water quality during construction and operation.

Construction

During the early stages of construction activities, topsoil would be exposed due to grading and excavation of the site. Prior to overlaying the ground with impervious surfaces and structures, the potential exists for wind and water to transport sediment and/or urban pollutants into stormwater runoff, which could adversely affect water quality.

The SWRCB regulates stormwater discharges associated with construction activities where clearing, grading, or excavation results in land disturbance of one or more acres. The City's National Pollutant Discharge Elimination System (NPDES) permit requires applicants to show proof of coverage under the State's Construction General Permit prior to receipt of any construction permits. The State's Construction General Permit requires a SWPPP to be prepared for the site. A SWPPP describes BMPs to control or minimize pollutants from entering stormwater and must address both grading and erosion impacts,

as well as non-point source pollution impacts. Because the proposed project would disturb an area of land greater than one acre, the proposed project would be subject to the requirements of the State's Construction General Permit and, with implementation of the required SWPPP and BMPs included therein, the proposed project would not result in a violation of water quality standards and/or degradation of water quality.

Furthermore, pursuant to Oakley Municipal Code Sections 6.9.306 and 6.9.404, the proposed project would be required to submit an Erosion and Sediment Control Plan concurrent with submittal of the grading permit application to ensure that water quality is not degraded during construction. The Erosion and Sediment Control plan would include measures to be implemented during grading and would be approved by the City Engineer. Based on the required submittal and approval of a SWPPP, as well as an erosion and sediment control plan, the proposed project would not violate water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality during construction.

Operations

Following completion of project buildout, the site would be largely covered with impervious surfaces and landscaped areas, and topsoil would not be exposed. As such, the potential for on-site erosion and the associated impacts to water quality would be reduced. However, the addition of impervious surfaces would result in the generation of urban runoff during project operations, which could contain pollutants if the runoff encounters vehicle fluids on parking surfaces and/or landscape fertilizers and herbicides. All municipalities within Contra Costa County (including the County itself) are required to develop more restrictive surface water control standards for new development projects as part of the renewal of the Countywide NPDES permit.

The City of Oakley has adopted the County C.3 Stormwater Standards, which require new development projects that create or alter 10,000 sf or more of impervious area to contain and treat all stormwater runoff from the project site. The proposed project would create 1,167,134 sf of new impervious area. Therefore, the proposed project would be subject to the County C.3 Stormwater Standards, as well as the requirements of the SWRCB and the RWQCB included in the City's NPDES General Permit. In addition, the proposed project would adhere to Title 6, Chapter 11, of the City's Municipal Code, which establishes standards for stormwater management and discharge control. Prior to issuance of a building permit, the applicant would submit a Stormwater Control Plan (SWCP) that meets the criteria in the most recent version of the Contra Costa Clean Water Program Stormwater C.3 Guidebook. Compliance with such requirements would ensure that impacts to water quality standards or waste discharge requirements would not occur during operation of the proposed project.

A preliminary stormwater management plan has been prepared for the proposed project (see Figure 6). In order to evaluate the efficacy of the proposed stormwater management plan, the peak flow for the 10-year and 100-year 24-hour storm events was modeled for the proposed project (see Appendix D).[29] The modeling used the USACE Hydrologic Engineering Center Hydrologic Modeling Software (HEC-HMS) program. In addition, various hydrologic, regulatory, and site constraints were considered when designing the stormwater basin. For example, the peak flow modeling included parameters related to

[29] Balance Hydrologics, Inc. *Summary of Peak Flow Control Modeling for the Stonecreek Subdivision City of Oakley, Contra Costa County, California*. November 9, 2023.

groundwater depth and a permanent dewatering pump to meet County guidelines, as well as basin grading, bioretention, and pump configuration.

In compliance with the Contra Costa County Clean Water Program Stormwater C.3 Guidebook, the project site and adjacent properties were divided into five drainage management areas (DMAs 1 through 5) (see Figure 10). Runoff from impervious surfaces within DMA 1, which encompasses the project site, would be directed to new inlets within the internal roads. From the inlets, new storm drain lines ranging in diameters of 18 to 60 inches would convey flows to discharge through two new outfalls in the new stormwater basin in the northeast portion of the project site. Following treatment in the stormwater basin, flows would be pumped through a new 24-inch storm drain force main to the existing 42-inch storm drain currently stubbed at the northern site boundary. DMAs 2 through 5 are off-site areas included in the model to ensure the on-site stormwater basin design is sufficient for accommodating future residential development in the area, as anticipated by the City's General Plan.

The modeling output provided peak discharge, runoff volumes, and basin water surface elevations (WSEs) for the 10-year and 100-year 24-hour storms, as summarized in Table 4. The proposed basin storage capacity was optimized to be just below the WSE constraints for area buildout of 17.5 feet for the 10-year storm and 21 feet for the 100-year storm. As shown in the table, the WSEs anticipated following project construction are below the applicable thresholds at 16.72 feet and 19.24 feet for the 10-year and 100-year storms, respectively. In addition, the maximum basin WSEs of 17.40 feet and 20.32 feet for stormwater flows following development pursuant to the City's General Plan would also fall beneath the applicable 17.5-foot and 21-foot thresholds. Therefore, the stormwater drainage system would have sufficient storage capacity to handle the modeled storms.

Table 4
HEC-HMS Model Summary, 10- and 100-Year Design Storms

	Pre-Project		Post-Project		Area Buildout	
	10-Year	100 Year	10 Year	100 Year	10 Year	100 Year
Peak Inflow (cfs)	37.9	78.1	55.3	99.7	71.3	117.2
Total Runoff (AFY)	2.42	6.65	4.2	10.0	5.7	13.1
Max Basin WSE (ft)	N/A	N/A	16.72	19.24	17.40	20.32

Source: Balance Hydrologics, Inc. November 2023.

Conclusion

Based on the above, because the proposed project would comply with the NPDES Construction General Permit and applicable requirements set forth in the Oakley Municipal Code, the proposed project would not violate water quality standards or waste discharge requirements, alter the drainage pattern of the site resulting in erosion or siltation, increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site, contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems, or otherwise degrade water quality during construction. Thus, a ***less-than-significant*** impact could occur.

Figure 10
Modeled Drainage Management Areas



b,e. Potable water service for the proposed project would be provided by DWD, which operates a groundwater supply system comprised of two wells in the City. Groundwater is then conveyed in a dedicated well supply pipeline to a blending facility.

According to the DWD 2020 Urban Water Management Plan (UWMP), the wells are connected to the East Contra Costa Subbasin. The Department of Water Resources has designated the East Contra Costa Subbasin as a medium-priority basin that is not in overdraft conditions.[30]

The project site represents a relatively small area compared to the overall surface area of the East Contra Costa Subbasin. In addition, runoff from the proposed impervious surfaces would be directed to the on-site stormwater drainage management facilities and ultimately into the City's storm drain system. At both locations, runoff water would percolate and recharge the East Contra Costa Subbasin. Therefore, any new impervious surfaces associated with the proposed project would not interfere substantially with groundwater recharge within the East Contra Costa Subbasin.

It should be noted that, according to the DWD's 2020 UWMP, the primary water supply for distribution is treated surface water.[31] As a result, any increase in water demand associated with the proposed project would be primarily met through surface water supply, rather than groundwater. Therefore, the proposed project's impacts to groundwater would be further reduced.

Based on the above, the proposed project would result in a ***less-than-significant*** impact with respect to substantially decreasing groundwater supplies, interfering substantially with groundwater recharge, or conflicting with or obstructing implementation of a water quality control plan or sustainable groundwater management plan.

civ. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the project site, the project site is located within an Area of Minimal Flood Hazard (Zone X), which is not identified as a Special Flood Hazard Area (SFHA).[32] Additionally, pursuant to Section 6.12.138(e) of the City's Municipal Code, the proposed project would be required to provide adequate drainage to reduce flood hazards. Thus, development of the proposed project would not impede or redirect flood flows and a ***less-than-significant*** impact would occur.

d. Tsunamis are defined as sea waves created by undersea fault movement, whereas a seiche is a long-wavelength, large-scale wave action set up in a closed body of water such as a lake or reservoir. The project site is located approximately 48 miles from the California coastline and approximately 2.20 miles south of the San Francisco Bay tributaries. According to the Department of Conservation's California Tsunami Maps, the project site is not located within a tsunami hazard area.[33] Therefore, it is not anticipated that the project would be affected by flooding risks associated with tsunamis. Furthermore, seiches do not pose a risk to the proposed project because the tributaries are not closed. As such, the project site is not located adjacent to a large, closed body of water.

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30 Diablo Water District. *2020 Urban Water Management Plan.* June 2021.
31 Diablo Water District. *2020 Urban Water Management Plan.* June 2021.
32 Federal Emergency Management Agency. *Flood Insurance Rate Map 06013C0360G.* Effective March 21, 2017.
33 California Department of Conservation. *California Tsunami Maps*. Available at: https://www.conservation.ca.gov/cgs/tsunami/maps. Accessed June 2024.

Overall, the proposed project would not result in a risk related to the release of pollutants due to project inundation flooding, tsunami, or seiche, and ***no impact*** would occur.

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

Discussion

a. A project risks dividing an established community if the project would introduce infrastructure or alter land uses so as to change the land use conditions in the surrounding community, or isolate an existing land use. Currently, the 50.44-acre project site is undeveloped, given that the on-site single-family residence and ancillary structures in the southern portion of the site have been demolished.

Surrounding existing uses include single-family neighborhoods to the north; single-family residences and agricultural uses to the east across Sellers Avenue, as well as to the south; and single-family residential neighborhood to the west. The City of Oakley General Plan designates the site as RL and RV, and the site is zoned P-1. Therefore, development of the site with the proposed residential uses was anticipated by the City and would not divide an established community. In addition, the proposed project would function as a continuation of the surrounding development and would improve connectivity by providing roadway connections to adjacent parcels.

Overall, the project would not isolate an existing land use nor physically divide an established community, and a ***less-than-significant*** impact would occur.

b. The project site has two General Plan designations: RL and RV. The RL land use designation allows for a density range of 2.3 to 3.8 dwelling units per gross acre (du/ac), and the RV land use designation allows for a density range of 0.8 to 2.3 du/ac. Based on 39.83 acres of the project site being designated RL and 10.61 acres being designated RV, the combined density of the two land use designations would allow a minimum of 101 units and a maximum of 176 units for the 50.44-acre project site. As proposed, the 176-unit project would fall within the allowed density range. Therefore, the proposed project would be consistent with the site's RL and RV land use designations, and thus, would not conflict with the City's General Plan. As demonstrated throughout this IS/MND, the proposed project would not conflict with City policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect. For example, in compliance with the ECCC HCP/NCCP, the proposed project would be subject to pay all applicable fees prior to construction, and would be required to complete pre-construction surveys for western burrowing owl, Swainson's hawk, golden eagle, and migratory birds.

Based on the above, the proposed project would not 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, and a ***less-than-significant*** impact would occur.

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

Discussion

a,b. The City of Oakley General Plan EIR states that the only viable mineral resource currently mined in the City of Oakley is sand.[34] In addition, the General Plan does not identify any known mineral resource areas within the Planning Area, including the project site. Furthermore, because the site is located near residential development, the site would not be suitable for mining operations. Thus, the proposed project would not result in the loss of availability of a known mineral resource or a locally important mineral recovery site, and the proposed project would result in ***no impact*** related to mineral resources.

[34] City of Oakley. *City of Oakley 2020 General Plan Draft Environmental Impact Report* [pg. 278]. September 2002.

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

Discussion

a. The following discussion presents information regarding noise standards and criteria applicable to various land uses, as well as sensitive noise receptors in proximity to the project site and the potential for the proposed project to result in impacts during project construction and operation. The following terms are referenced in the sections below:

- Decibel (dB): A unit of sound energy intensity. An A-weighted decibel (dBA) is a decibel corrected for the variation in frequency response to the typical human ear at commonly encountered noise levels. All references to dB in this report will be A-weighted unless noted otherwise.
- Day-Night Average Level (L_{dn}): The average sound level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 PM to 7:00 AM) hours.
- Equivalent Sound Level (L_{eq}): The average sound level over a given time-period.
- Maximum Sound Level (L_{max}): The maximum sound level over a given time-period.
- Median Sound Level (L_{50}): The sound level exceeded 50 percent of the time over a given time-period.
- Community Noise Equivalent Level (CNEL): The 24-hour average noise level with noise occurring during evening (7:00 PM to 10:00 PM) hours weighted by a factor of three and nighttime hours weighted by a factor of ten prior to averaging.

It should be noted that the existing noise environment in the project vicinity is primarily defined by vehicle traffic along nearby roads, including Sellers Avenue to the east and Sierra Trail Road to the north.

Sensitive Noise Receptors

Some land uses are considered more sensitive to noise than others, and thus, are referred to as sensitive noise receptors. Land uses often associated with sensitive noise receptors generally include residential uses, schools, libraries, hospitals, and passive recreational areas. The nearest sensitive uses include the existing scattered single-family residential uses located north of the project site, approximately 20 feet from the project site boundaries. In addition, a single-family residence is located approximately 50 feet from the southern project site boundary.

Standards of Significance

The City of Oakley General Plan Noise Element establishes a noise level standard of 60 dB as normally acceptable at residential land uses. In addition, General Plan Policy 9.1.6 establishes levels of significance for changes in noise exposure, which are summarized in Table 5.

Table 5
Significance of Changes in Noise Exposure

Ambient Noise Level Without Project, L_{dn}	Increase Required for Significant Impact
<60 dB	+5.0 dB or more
60-65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

Source: City of Oakley General Plan Noise Element, 2002.

Pursuant to the City's General Plan's discussion on non-transportation noise, exterior noise levels at residences should not exceed 55 dBA during daytime hours (7:00 AM to 10:00 PM) and 45 dBA during nighttime hours (10:00 PM to 7:00 AM).

The following sections use the aforementioned thresholds of significance to determine if noise impacts associated with the construction and operation of the proposed project would occur.

Construction Noise

During construction of the proposed project, heavy-duty equipment would be used for demolition, grading, excavation, paving, and building construction, which would result in temporary noise level increases. Project haul truck traffic on local roadways would also result in a temporary traffic noise level increase during construction activities. Noise levels would vary depending on the type of equipment used, how the equipment is operated, and how well the equipment is maintained.

In addition, noise exposure at any single point outside the project site would vary depending on the proximity of construction activities to that point. Construction activities would be temporary in nature and are anticipated to occur during normal daytime hours. Section 4.2.208 of the City's Municipal Code restricts noise-producing construction activities to weekday hours between 7:30 AM and 7:00 PM Monday through Friday, and from 9:00 AM to 7:00 PM on weekends.

Table 6 shows the predicted construction noise levels for development of the proposed project. Based on the table, activities involved in typical construction would generate maximum noise levels up to 90 dB at a distance of 50 feet. The nearest single-family residences are located an average of 400 feet from the proposed construction noise-generating activities. Typical construction noise sources include exhaust and engine noise from construction vehicles, idling equipment, and power generators. However, because a number of single-family residences abut the project site boundaries and project construction would take place throughout the construction site, maximum noise levels experienced by sensitive receptors during construction would vary day by day and could exceed the City's applicable 55 dBA threshold.

Table 6
Construction Equipment Noise

Type of Equipment	Maximum Level, dB 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: Federal Highway Administration, Roadway Construction Noise Model User's Guide, January 2006.

Although construction activities are temporary in nature and would likely occur during normal daytime working hours, construction-related noise could result in sleep interference at existing noise-sensitive land uses in the vicinity of the construction if construction activities were to occur outside the normal daytime hours. Therefore, impacts resulting from noise levels temporarily exceeding the threshold of significance due to construction would be considered potentially significant.

Operational Noise

Residences are not typically associated with the generation of substantial noise. Operation of the proposed project would include typical residential noise, which would be compatible with the surrounding existing uses. The proposed project is not anticipated to contribute a measurable operational noise level sufficient enough to increase the existing ambient noise environment at any sensitive receptor locations. Therefore, a less-than-significant impact would occur related to operational noise.

Based upon the Table 5 criteria, where existing traffic noise levels are less than 60 dB L_{dn}, at the outdoor activity areas of noise-sensitive uses, a +5 dB L_{dn} increase in roadway noise levels would be considered significant. Table 3-1 of the General Plan anticipated 15,000 daily trips on the portion of Sellers Avenue south of Laurel Road, which abuts the project site's eastern project boundary. Generally, a doubling in traffic volumes is required to increase traffic noise levels by 5.0 dB. As discussed in Section XVII, Transportation, of this IS/MND, the proposed project would be expected to generate an average of 1,697 trips per day. Accordingly, the proposed project would not double traffic volumes on local roadways, and thus, would not substantially increase traffic noise in the project vicinity. Additionally, the project site is located adjacent to existing residential uses, and the proposed project is consistent with the site's current land use designations. Therefore, traffic noise level increases associated with the development of single-family residences on the project site have been previously anticipated by the City.

Conclusion

Based on the above, operation of the proposed project would not result in the generation of a substantial permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the City's General Plan and the Municipal Code. However, because project construction activities could result in temporary increases in

noise levels in the project area in excess of standards established in the local general plan, a ***potentially significant*** impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above potential impact to a *less-than-significant* level.

XIII-1. *Prior to approval of grading permits, the following criteria shall be established and noted on graded plans, subject to review and approval by the City of Oakley Planning and Zoning Division:*

- *Construction activities shall be limited to between the daytime hours of 7:30 AM to 7:00 PM Monday through Friday, and 9:00 AM to 7:00 PM on Saturdays, Sundays, and holidays.*
- *Construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.*
- *When not in use, motorized construction equipment shall not be left idling for more than five minutes.*
- *Stationary equipment (power generators, compressors, etc.) shall be located at the furthest practical distance from nearby noise-sensitive land uses or sufficiently shielded to reduce noise-related impacts.*

b. Similar to noise, vibration involves a source, a transmission path, and a receiver. However, while noise is generally considered to be pressure waves transmitted through air, vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception of the vibration depends on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration is measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration in terms of peak particle velocities (PPV) in inches per second (in/sec). Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of PPV. Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 7, which was developed by the California Department of Transportation (Caltrans), shows the vibration levels that would normally be required to result in damage to structures. As shown in the table, the threshold for architectural damage to structures is 0.20 in/sec PPV, and continuous vibrations of 0.10 in/sec PPV or greater would likely cause annoyance to sensitive receptors.

The primary vibration-generating activities associated with the proposed project would occur during construction when activities, such as grading, utilities placement, and paving. Table 8 shows the typical vibration levels produced by construction equipment at various distances. The most substantial source of groundborne vibrations associated with project construction would be the use of vibratory compactors. Based on Table 8, construction

vibration levels anticipated for the project would be less than the 0.2 in/sec PPV threshold at distances of 26 feet or more.

Table 7
Effects of Vibration on People and Buildings

PPV		Human Reaction	Effect on Buildings
mm/sec	in/sec		
0.15 to 0.30	0.006 to 0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of "architectural" damage to normal dwelling - houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
10 to 15	0.4 to 0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage

Source: Caltrans. Transportation Related Earthborne Vibrations. TAV-02-01-R9601. February 20, 2002.

Table 8
Vibration Levels for Various Construction Equipment

Type of Equipment	PPV at 25 feet (in/sec)	PPV at 50 feet (in/sec)
Large Bulldozer	0.089	0.031
Loaded Trucks	0.076	0.027
Small Bulldozer	0.003	0.001
Auger/drill Rigs	0.089	0.031
Jackhammer	0.035	0.012
Vibratory Hammer	0.070	0.025
Vibratory Compactor/roller	0.210 (less than 0.20 at 26 feet)	0.074

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Guidelines, May 2006.

As previously discussed, the nearest sensitive uses include the single-family residences located north of the project site, approximately 20 feet from the project site boundaries. Therefore, use of vibratory compactors within 26 feet of the adjacent residential buildings could cause vibrations in excess of 0.2 in/sec PPV.

Because construction activities could expose people to or generate excessive groundbourne vibrations or groundborne noise levels, a ***potentially significant*** impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above potential impact to a *less-than-significant* level.

XIII-2. *Throughout the duration of construction, any compaction required within 26 feet from the adjacent residential structures to the north shall be accomplished by using static drum rollers, which use weight instead of vibrations to achieve soil compaction. As an alternative to this requirement, preconstruction crack documentation and construction vibration monitoring could be conducted to ensure that construction vibrations do not cause damage to any adjacent structures. Proof of compliance with this measure shall be submitted to the City of Oakley Planning and Zoning Division for review and approval.*

c. The nearest airport to the site is the Byron Airport, located approximately 9.95 miles south of the site. The site is not covered by an existing airport land use plan. Given that the project site is not located within two miles of a public or private airport, the proposed project would not expose people residing or working in the project area to excessive noise levels associated with airports. Thus, ***no impact*** would occur.

XIV. POPULATION AND HOUSING. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (e.g., through projects in an undeveloped area or extension of major infrastructure)?	☐	☐	✖	☐
b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	✖	☐

Discussion

a. The proposed project would include the development of 176 single-family residential units. Using the City of Oakley General Plan's average person per household value for single-family uses of 3.41, the proposed project would generate approximately 601 additional residents (176 x 3.41 = 600.16).[35] The 2023 U.S. Census estimated the population of Oakley to be approximately 45,761.[36] An increase in population of 601 residents would constitute an approximately 1.31 percent increase in the City's population, which is not considered substantial growth. Furthermore, as discussed in Section XIX, Utilities and Service Systems, of this IS/MND, adequate utility infrastructure would be available to support the proposed project. Finally, the population growth generated by the proposed project would not be unplanned, because the proposed project is consistent with the City of Oakley General Plan, which anticipated such development on the project site.

Based on the above, the project would have a ***less-than-significant*** impact related to inducing substantial unplanned population growth in an area, either directly or indirectly.

b. As discussed throughout this IS/MND, the proposed project contained a single-family residence and associated ancillary structures. However, all structures have been demolished and removed. In addition, a single residence would not constitute a substantial number of people or housing. As such, the proposed project would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere, and a ***less-than-significant*** impact would occur.

[35] City of Oakley. *City of Oakley General Plan Focused General Plan Update* [pg. 2-7]. Adopted January 11, 2022.
[36] U.S. Census Bureau. *Quick Facts, City of Oakley, California.* Available at: https://www.census.gov/quickfacts/fact/table/oakleycitycalifornia#. Accessed June 2024.

XV. PUBLIC SERVICES. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Fire protection?	☐	☐	✖	☐
b. Police protection?	☐	☐	✖	☐
c. Schools?	☐	☐	✖	☐
d. Parks?	☐	☐	✖	☐
e. Other Public Facilities?	☐	☐	✖	☐

Discussion

a. The City of Oakley is located within the former East County Fire Protection District, which was annexed into the Contra Costa County Fire Protection District (CCCFPD) in July 2022. The CCCFPD provides fire suppression and prevention, emergency medical, rescue, ambulance transport, and public education services.[37] Services are provided from 24 fully staffed fire stations and two additional stations staffed with on-call reserve firefighters. The closest station to the project site is Station 93, located approximately 1.85 miles to the northwest. It should be noted that the CCCFPD plans to reopen Station 94, located 0.73-mile southeast of the project site, as a future fire station.

In addition, the proposed project would be subject to participation in a Community Facilities District (CFD) prepared and administered by CCCFPD. Participation in the CFD would mitigate for any increased demands on fire services that may result from the proposed project. Participation in the CFD would also ensure that the project conforms with the City of Oakley's General Plan Policy 4.4.2, which requires new developments to pay a fair share of costs for new fire protection facilities and services. Additionally, the proposed project would not include any alterations to the circulation system of the surrounding area which could conflict with the City of Oakley's General Plan Policy 4.4.4, related to emergency service access, or lead to a failure to achieve response time goals.

Because the proposed project is consistent with the General Plan, the increased demand for fire services due to on-site residential development was anticipated by the CCCFPD's planning efforts. In addition, the project would be required to pay development fees in accordance with Chapter 9.2, Article 5 of the Oakley Municipal Code, which would further reduce any impacts related to fire protection services.

Based on the above, the proposed project would not cause significant degradation to response times or service ratios for the CCCFPD that would induce the need for physically altered or expanded governmental facilities for fire protection services, the project would result in a ***less-than-significant*** impact.

[37] Contra Costa County Fire Protection District. *2022 Annual Report*. Available at: https://www.cccfpd.org/2022-annual-report/. Accessed June 2024.

b. Police protection is provided to the City of Oakley by the Oakley Police Department, which employs various personnel, including a Chief of Police, lieutenants, sergeants, and field officers, such as detectives and patrol officers. Administrative personnel include both part- and full-time positions, such as police records assistants, records supervisor, property and evidence technician, and a police services assistant. As previously discussed, the proposed project would result in the development of 176 single-family residences. New residences typically generate a demand for police services; as such, an increase in demand for police services would likely occur with development of the proposed project. Nevertheless, because the proposed project would be consistent with the existing land use designations, the increase in police service demand was included in City's demand predictions. In addition, the proposed project would be subject to the City's development impact fees, which would provide funds to the Oakley Police Department. Such funds would mitigate any financial impact on the City's police protection services.

Based on the above, the proposed project would not create an increase demand beyond what has already been anticipated for the site and would not induce the need for physically altered or expanded governmental facilities for police protection services, the construction of which could cause significant environmental impacts. Therefore, the proposed project would result in a ***less-than-significant*** impact.

c. The Oakley Union Elementary School District and Liberty Union High School District provide public educational services to the project site. Given that the proposed project would include development of the project site with 176 single-family residences, the proposed project could increase the demand for schools in the area. Using a standard student generation rate of 0.53 students per dwelling unit, the proposed project's addition of 176 single-family residences would result in approximately 94 new K-12 students (176 x 0.53 = 93.28).[38] The City of Oakley General Plan includes goals and policies set forth to ensure adequate primary and secondary schools are developed in response to population growth. The City expects the General Plan to assist in the goal of providing an efficient and complete educational system for the citizens of Oakley. For example, General Plan Policy 4.6.6 requires the collection of school facility impact fees and further requires that the City shall work with developers and school districts to ensure the availability of adequate school facilities.

The proposed project would be subject to payment of school impact mitigation development fees to fund local school services. Proposition 1A/SB 50 prohibits local agencies from using the inadequacy of school facilities as a basis for denying or conditioning approvals of any "[…] legislative or adjudicative act…involving …the planning, use, or development of real property" (Government Code Section 65996[b]). Satisfaction of the Proposition 1A/SB 50 statutory requirements by a developer are deemed to be "full and complete mitigation." Therefore, payment of applicable development fees would be sufficient in reducing any impacts associated with an increase in students from the project.

Overall, the proposed project would result in a ***less-than-significant*** impact regarding an increase in demand for schools.

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[38] Antioch Unified School District. *Facilities Master Plan* [pg. 284]. July 2018.

d,e. Section 9.2.208 of the City's Municipal Code requires five acres of parkland per 1,000 residents. As previously discussed, implementation of the proposed project would result in an increase of approximately 601 new residents to the City. As a result, 3.005 acres of parkland would be required (0.005 acres of parkland per resident x 601 new residents = 3.005 acres of parkland). Oakley Resolution 19-03 requires subdividers of City land to dedicate park land and/or pay fees in lieu of the dedication for the neighborhood and community parks. The proposed project would include a 2.43-acre parcel reserved for development of a future park (Parcel B), and a one-acre open space parcel that would function as a setback from Marsh Creek (Parcel A). However, because Parcel B would not be developed as a park as part of the proposed project, the two parcels would not be sufficient to achieve the parkland requirement established by Section 9.2.208. As such, payment of an in-lieu fee, as determined by the City, would be required.

The Oakley 2020 General Plan EIR also analyzed impacts of buildout of the General Plan on other public facilities, such as libraries. The Oakley Branch Library is located on the Freedom High School campus at 1050 Neroly Road and is open Tuesday through Saturday. Other libraries in close proximity to the City of Oakley include the Antioch Library and the Brentwood Branch Library. Future residents of the proposed project would have access to the foregoing facilities. The Oakley 2020 General Plan EIR concluded that with implementation of the necessary General Plan policies, impacts related to public services would be reduced to a less-than-significant level.

Because the proposed project would be required to pay the applicable park in-lieu fee, and the development of the site was anticipated by the City and would be consistent with the General Plan, the project would result in a ***less-than-significant*** impact related to parks and other public facilities.

XVI. RECREATION. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	✖	☐
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	✖	☐

Discussion

a,b. As discussed in Section XIV, Population and Housing, the proposed project would involve the development of 176 single-family residences, which are anticipated to serve approximately 601 residents. As such, an increase in demand on recreational facilities is anticipated. As previously discussed, Section 9.2.204 of the City's Municipal Code mandates developments that include subdivision of land to either dedicate parkland or pay fees in lieu of the dedication for the neighborhood and community parks and recreation programs. Three acres of parkland would be required to accommodate the anticipated population increase associated with the proposed project. However, because the proposed project would only develop two acres of parkland, payment of all applicable fees would be required. The park impact fees imposed by the City are used to generate revenue to provide park and recreational services to the City and the general project vicinity.

Based on the above, development of the proposed project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of facilities would occur or be accelerated. Furthermore, the project does not require the construction or expansion of recreational facilities which might have an adverse effect on the environment. Therefore, a ***less-than-significant*** impact related to recreation would occur.

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

Discussion

a. Level of Service (LOS) is still currently used by the City of Oakley for purposes of determining consistency with adopted General Plan goals and policies related to LOS. However, the law has changed with respect to how transportation-related impacts may be addressed under CEQA. Pursuant to SB 743, VMT is the most appropriate measure of transportation impacts, and LOS is no longer used for determining significant impacts under CEQA. Please refer to Question "b" for a discussion of VMT.

With respect to General Plan consistency, the proposed project is consistent with the RL and RV General Plan land use designations. Therefore, single-family residential development, such as the proposed project, was considered during the General Plan EIR, and the proposed project would be consistent with the LOS findings contained within. More specifically, Tables 3-3 and 3-4 of the General Plan identified specific roads and intersections that need further attention from the City in order to maintain an LOS of "D" or better. The proposed project would not result in substantial alterations to the existing roadway network in the immediate project vicinity, and the streets within the vicinity of the project site were not identified at an existing LOS of F in either table. In addition, the proposed project would be subject to all applicable transportation policies and programs as amended pursuant to the mitigation measures identified in the General Plan EIR. Overall, the proposed project would not conflict with any General Plan policies related to LOS. The proposed project's consistency with policies related to transit, roadway, bicycle, and pedestrian facilities is discussed in further detail below.

Project Trip Generation

The Traffic Impact Study (TIS) was prepared by TJKM to identify the proposed project's potential trip generation and any transportation related impacts associated with such (see Appendix B).[39] Project vehicle trip generation rates were obtained from the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition). Based on the ITE rates, the proposed project is estimated to generate approximately 1,697 daily vehicle trips, including 125 AM peak hour and 169 PM peak hour trips.

Pedestrian, Bicycle, and Transit Facilities

The proposed project's potential impacts related to pedestrian, bicycle, and transit facilities are discussed below.

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[39] TJKM. *Stonecreek Residential Development Oakley, CA Traffic Impact Study.* July 17, 2023. Revised November 20, 2023.

Pedestrian Facilities

Pedestrian facilities are comprised of crosswalks, sidewalks, pedestrian signals, and off-street paths, which provide safe and convenient routes for pedestrians to access destinations such as institutions, businesses, public transportation, and recreation facilities. Sidewalks currently do not exist along the Sellers Avenue frontage to the east. The closest sidewalk network is located on the termini of Kings Canyon Way and Teton Road at the northern project site boundary.

The proposed project would include the construction of sidewalks within the project site, as well as within the improvement area along the Sellers Avenue frontage east of the site. All proposed sidewalks within the project site would be five feet in width; the sidewalk constructed as part of the proposed frontage improvements would be six feet wide. All new sidewalks would be required to comply with the Americans with Disabilities Act (ADA), which would require adequate curb ramps at all sidewalk corners and roadway intersections to provide accessible paths of travel to each residence.

The new sidewalks and curb ramps would enhance the existing pedestrian infrastructure and would comply with all applicable City and ADA standards. Therefore, the proposed project would not result in the creation of a conflict with any adopted programs, plans, ordinances, or policies addressing pedestrian facilities. Overall, a less-than-significant impact would occur related to pedestrian facilities.

Bicycle Facilities

Approximately 29 miles of bicycle facilities are installed throughout the City of Oakley, including 15 miles of Class II on-street bicycle lanes and 12.4 miles of Class I multi-use paths.[40] The nearest existing bicycle facilities to the project site is the Class I bicycle facility provided along Marsh Creek as part of the Marsh Creek Regional Trail, which can be accessed through Laurel Road approximately 0.43-mile north of the project site. Class II bicycle facilities are also located on Laurel Road between Harvest Drive and Main Street, as well as on Main Street between Laurel Road and Simoni Ranch Road (approximately 0.73-mile northwest of the project site). Additionally, the City's General Plan and the City of Oakley Parks, Recreation, and Trails Master Plan 2020[41] indicate that several new bicycle facilities are planned to be constructed in the project vicinity.

Based on the above, bicycle facilities would be accessible from the project site, and development of the project would not interfere with the future construction of any planned bicycle trails. Therefore, the proposed project would not result in the creation of a conflict with any adopted programs, plans, ordinances, or policies addressing bicycle facilities, and a less-than-significant impact would occur related to bicycle facilities.

Transit Facilities

Tri-Delta Transit provides transit services in the City of Oakley and operates three lines connecting Brentwood and the Pittsburg/Bay Point Bay Area Rapid Transit (BART) station. The following Tri-Delta Transit Routes currently operate in the project vicinity:

- Route 300: the Antioch BART/Brentwood Park & Ride route is a weekday express route connecting Brentwood to the Antioch BART station through the City of

[40] City of Oakley. *City of Oakley General Plan Focused General Plan Update* [pg. 3-18]. Adopted January 11, 2022.
[41] City of Oakley. *Parks, Trails, and Recreation Master Plan 2020.* Summer 2007.

Oakley. The route travels along Main Street and operates from 4:00 AM to approximately 8:00 PM with 15 to 30-minute headways.

- Route 383: the Blue Goose Park/Antioch BART route, connects the City of Oakley to the City of Antioch, as well as connecting to Blue Goose Park on Adams Lane in the City of Brentwood. The route provides weekday service on both clockwise and counterclockwise directions. The counterclockwise route runs with approximate one-hour headways, and the clockwise route runs twice during the AM peak hour period only.
- Route 391: the BART/Pittsburg/Antioch/Oakley/Brentwood route provides weekday service to most East County cities. Route 391 operates from 4:06 AM to 1:28 AM with headways that range between 30 and 74 minutes.

The project is located approximately 0.66-mile from the closest bus stops, which are located west of the project site on Main Street. The bus stops are accessible by way of existing sidewalks and Class II bike lanes provided on Main Street. The proposed project is not anticipated to add a significant number of passengers to the existing bus services capacity. Furthermore, the proposed project is consistent with the General Plan land use designation for the site; therefore, potential impacts related to transit were already anticipated by the City.

Overall, the proposed project would not conflict with a program, plan, ordinance, or policy addressing transit service and a less-than-significant impact would occur.

Conclusion

Based on the above, a ***less-than-significant*** impact would occur related to conflicting with a program, plan, ordinance, or policy addressing the circulation system, including transit, bicycle, and pedestrian facilities.

b. Section 15064.3 of the CEQA Guidelines provides specific considerations for evaluating a project's transportation impacts. Pursuant to Section 15064.3, analysis of VMT attributable to a project is the most appropriate measure of transportation impacts. Other relevant considerations may include the effects of the project on transit and non-motorized travel. Although the City of Oakley has not yet established any standards or thresholds regarding VMT, pursuant to Section 15064.3(b)(3), a lead agency may analyze a project's VMT qualitatively based on the availability of transit, proximity to destinations, etc. While changes to driving conditions that increase intersection delay are an important consideration for traffic operations and management, the most appropriate method of analysis does not fully describe environmental effects associated with fuel consumption, emissions, and public health. Rather, Section 15064.3(3) changes the focus of CEQA transportation impact analysis from measuring impact to drivers to measuring the physical impact of driving.

The Contra Costa Transportation Authority (CCTA) considers residential projects to have a significant impact on VMT if the project generated home-based VMT per resident is higher than the following:

- 85 percent of the home-based VMT per resident; or
- 85 percent of the existing County-wide average home-based VMT per resident.

As part of the TIS prepared for the proposed project, TJKM used the CCTA model to conduct a VMT analysis for the project. Two model runs were performed in accordance

with the CCTA VMT methodology. The first model run was for Baseline Conditions, which represents the Year 2018 traffic conditions for the City, and the second model run was for Baseline Plus Project Conditions.

Under Baseline conditions, the home-based VMT per capita for the City was 27.43 VMT per capita. Therefore, in order for the proposed project to have a less-than-significant impact, the project must produce VMT within the 85 percent threshold, which equates to 23.32 (0.85 x 27.43) VMT per capita. Under Baseline Plus Project Conditions, the VMT per capita for the project is 24.43, which exceeds the 23.32 VMT threshold.

According to the TIS, creating a pedestrian network within the project connecting to nearby destinations allows for a maximum VMT reduction of 5.7 percent, and creating networks more conducive to walking and bicycling allows for a maximum VMT reduction of 1.7 percent. Consistent with the foregoing reduction measures, the proposed project includes full sidewalks and direct connections to the Marsh Creek Regional Trail through Court A and the setback within Parcel A. With a total 7.4 percent reduction in VMT, the proposed project is anticipated to produce 22.62 VMT per capita, which is below the 23.32 VMT threshold.

Based on the above, the proposed project would not conflict or be inconsistent with CEQA Guidelines Section 15064.3(b), and a ***less-than-significant*** impact would occur.

c,d. Primary access to the project site is proposed from Sellers Avenue, with additional connections to Teton Road and Kings Canyon Way to the north. According to the site plan, each street within the proposed internal roadway network would be 36 feet wide. The proposed roadway widths would adequately accommodate emergency vehicle access.

The proposed project would not alter the existing transportation network nor increase hazards due to a geometrical design feature. Oncoming traffic travelling northbound and southbound on Sellers Avenue would have a clear line of sight to vehicles exiting the project site for at least 150 feet, and obstructions to sight distance are not anticipated.

During project construction, public roads in the vicinity would remain open and available for use by emergency vehicles and other traffic. In addition, the new internal roadways would provide three points of access to the project site, which would be sufficient for emergency vehicle access. All interior drive aisles and parking stalls would comply with City design standards. Therefore, on-site circulation would be expected to function acceptably for emergency response vehicles and would not impede current response times to the project site.

Implementation of the proposed project would introduce additional vehicle traffic along Sellers Avenue. However, because the proposed project would be consistent with the General Plan land use designations for the site, impacts related to hazards and emergency access have already been anticipated by the City. In addition, the proposed improvements to the Sellers Avenue frontage would not obstruct the existing sight distance, ensuring drivers would have sufficient views of traffic.

Based on the above, the proposed project would not substantially increase hazards due to a geometric design feature or incompatible uses, or result in inadequate emergency access, and a ***less-than-significant*** impact would occur.

XVIII. 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).	☐	✖	☐	☐
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.	☐	✖	☐	☐

Discussion

a,b. As discussed in Section V, Cultural Resources, of this IS/MND, a records search of the CHRIS, was completed on June 10, 2024, by the NWIC for cultural resource site records and survey reports within the project site. The CHRIS search indicated that the project site does not contain recorded archaeological resources. In addition, the Native American Heritage Commission (NAHC) conducted a records search of the Sacred Land File (SLF) on June 12, 2024. Based on the results of the NAHC SLF search, the project site does not contain known tribal cultural resources. Although a moderate to high potential exists for unrecorded tribal cultural resources to be found within the site due to the project site's proximity to local aquatic resources, where such tribal cultural resources have been found throughout the County, surface artifacts would not occur on-site due to the mass disturbance associated with the 2006 site grading.

In compliance with AB 52 (PRC Section 21080.3.1), a project notification letter was distributed to the chairpersons of the following tribes on August 23, 2024: Amah Mutsun Tribal Band of Mission San Juan Bautista, Muwekma Ohlone Indian Tribe of the SF Bay Area, Chicken Ranch Rancheria of Me-Wuk Indians, Muwekma Ohlone Indian Tribe of the SF Bay Area, Guidiville Indian Rancheria, Nashville Enterprise Miwok- Maidu-Nishinam Tribe, Indian Canyon Mutsun Band of Costanoan, North Valley Yokuts Tribe, Indian Canyon Mutsun Band of Costanoan, North Valley Yokuts Tribe, Tule River Indian Tribe, The Ohlone Indian Tribe, Wilton Rancheria, and The Confederated Villages of Lisjan. Three responses from the foregoing tribes were received within the consultation period: one from the Amah Mutsun Tribal Band of Mission San Juan Bautista, the Confederated Villages of Lisjan Nation, and the Indian Canyon Band of Costanoan Ohlone People. The City consulted with all three tribes, including sending the requested information and meeting with the Confederated Villages of Lisjan Nation on September 25, 2024. Consultation with all tribes has since been closed.

Based on the history of disturbance and the lack of previously recorded tribal cultural resources at the project site, tribal cultural resources are not expected to occur within the site. Nevertheless, the possibility exists that development of the proposed project could

result in a substantial adverse change in the significance of a tribal cultural resource if previously unknown tribal cultural resources are uncovered during grading or other ground-disturbing activities. Thus, a ***potentially significant*** impact related to tribal cultural resources could occur.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above potential impact to a *less-than-significant* level.

XVIII-1. Implement Mitigation Measures V-1 and V-2.

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

Discussion

a-c. Electricity, telecommunications, water, and sanitary sewer services would be provided to the project site by way of new connections to existing infrastructure in the immediate project area. Brief discussions of water, sewer service, stormwater drainage, electrical, natural gas, and telecommunications that would serve the proposed project are included below.

Water

The proposed project would include construction of new eight-inch water lines throughout the project site within the internal roadway network, and would connect to the existing water main in Sierra Trail Road to the north.

Water service for the proposed project would be provided by DWD. Pursuant to the DWD's 2020 UWMP, DWD's primary water supply for the distribution system is treated surface water from the United States Bureau of Reclamation's Central Valley Project (CVP), which is purchased from the Contra Costa Water District (CCWD). Water is conveyed through the Contra Costa Canal and Los Vaqueros systems, and treated at the Randall-Bold Water Treatment Plant in the City of Oakley, which is jointly owned by DWD and CCWD.[42] According to the DWD 2020 UWMP, the DWD has a baseline demand of 177 gallons per capita per day (gpcd).[43] Thus, the project is projected to increase water demand by 106,377 gallons per day (177 gallons per capita x 601 residents), or 119.16 AFY.

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42 Diablo Water District. *2020 Urban Water Management Plan.* June 2021.
43 Diablo Water District. *2020 Urban Water Management Plan* [pg. 3-5]. June 2021.

According to the DWD 2020 UWMP, the DWD's projected water supply exceeds the anticipated water demand for normal, single-dry, and multiple-dry years until at least the year 2040.[44] For example, during a normal year in 2025, the anticipated supply exceeds the anticipated demand by 4,965 AFY. Therefore, the DWD would have sufficient water supply to accommodate the 119.16 AFY increase associated with the proposed project.

Furthermore, because the proposed project would be consistent with the existing land use designations, the project site has been anticipated for single-family residential development by the City. Because the DWD's demand estimates included the increases in demand related to buildout of the City's General Plan, the DWD has anticipated an increased water demand due to development of the project site compared to existing conditions.[45]

Wastewater

The proposed project would include construction of new eight-inch sanitary sewer lines throughout the project site, as well as six-inch and 24-inch sanitary sewer force mains in the northern portion of the project site within Street A. The proposed sanitary sewer system would direct wastewater from the proposed residences to the existing eight-inch sanitary sewer main within Sierra Trail Road, to the north of the project site.

Sanitary sewer services would be provided to the project site by ISD, which operates and maintains a sewer system comprised of collection, treatment, and effluent recycling facilities. The existing sewer system collects wastewater flows from individual developments within the City and conveys them to ISD's Water Recycling Facility. Wastewater is ultimately treated and stored either at the facility in a 76 million gallon holding pond, or the treated water outfalls in the San Joaquin River. The Water Recycling Facility has an average daily flow of 2.3 million gallons per day (MGD) and a treatment capacity of approximately 4.3 MGD.[46]

Using standard industry assumptions, where domestic water use represents 40 percent of consumption and wastewater generation represents 90 percent of domestic water use, the proposed project would generate approximately 38,232 gallons of wastewater per day (106,200 gallons x 0.4 x 0.9). The addition of wastewater from the proposed project would represent approximately 0.89 percent of the Water Recycling Facility's available capacity. Therefore, the Water Recycling Facility would have adequate capacity to serve the proposed project.

Furthermore, given that the project is consistent with the site's current General Plan land use designation, the type and intensity of growth and associated wastewater generation has already been analyzed in the General Plan EIR. The General Plan EIR determined that impacts related to wastewater treatment capacity would be less than significant.

Therefore, given the available capacity within the wastewater facility, development of the proposed project would not require the construction of new or expansion of existing wastewater treatment facilities, and the existing facilities would have the capacity to serve the project's projected demand in addition to the existing commitments.

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44 Diablo Water District. *2020 Urban Water Management Plan* [pg. 5-5 to 5-6]. June 2021.
45 Diablo Water District. *2020 Urban Water Management Plan* [pg. 2-2]. June 2021.
46 Ironhouse Sanitary District. *Sewer System Management Plan* [pg. I-3]. Updated April 2017.

Stormwater

As discussed in Section X, Hydrology and Water Quality, of this IS/MND, stormwater runoff from impervious surfaces would be directed towards the on-site detention basin. The proposed on-site drainage systems would be required to comply with the City's SWPPP and Erosion and Sediment Control Plan, as well as the County C.3 standards. Additionally, because the site has been anticipated for development by the City's General Plan, impacts to stormwater systems resulting from development of the site have been anticipated by the City. Therefore, the proposed project would not significantly increase stormwater flows into ISD's existing system such that the construction of new or expansion of existing stormwater facilities would be required.

Electricity and Telecommunications

Electricity and telecommunications utilities would be provided by way of connections to existing infrastructure located within the immediate project vicinity. PG&E would provide electricity services to the project site, while AT&T would provide telecommunication services. The proposed project would not require major upgrades to, or extension of, existing infrastructure. Thus, impacts related to electricity and telecommunications infrastructure would be less than significant.

Conclusion

Based on the above, the proposed project would not require or result in the relocation or construction of new or expanded water, wastewater treatment, stormwater, electric power, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects. Sufficient water supplies would be available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years. Furthermore, adequate wastewater capacity would also be available to serve the project's projected demand in addition to ISD's existing commitments. Thus, a ***less-than-significant*** impact would occur.

d,e. Solid waste, recyclable materials, and compostable material from the City of Oakley is hauled to Potrero Hills Landfill, located in Solano County. The landfill has a maximum permitted throughput of 4,330 tons per day. According to the California Department of Resources Recycling and Recovery (CalRecycle), the Potrero Hills Landfill has a remaining capacity of 13,872,000 cubic yards out of a total permitted capacity of 83,100,000 cubic yards.[47] Due to the substantial amount of available capacity remaining at Potrero Hills Landfill (83.3 percent of total capacity), sufficient capacity would be available to accommodate the project's solid waste disposal needs. Additionally, because the proposed project would be consistent with the General Plan land use designations, impacts related to solid waste resulting from development of the site have already been anticipated by the City. Furthermore, pursuant to the CALGreen Code, all projects are required to divert at least 65 percent diversion of construction waste, thereby further reducing the amount of solid waste the proposed project would create.

[47] California Department of Resources Recycling and Recovery (CalRecycle). *Facility/Site Summary: Potrero Hill Landfill (48-AA-0075)*. Available at: https://www2.calrecycle.ca.gov/SolidWaste/Site/Summary/3591. Accessed June 2024.

Based on the above, the proposed project would comply with applicable federal, State, and local statutes and regulations related to solid waste. Therefore, the proposed project would have a ***less-than-significant*** impact related to solid waste.

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

Discussion

a-d. According to the CALFIRE FRAP, the project site is not located within a Very High or High FHSZ.[48] In addition, the project site is located near existing development and roadways. The presence of urban development and paved areas would preclude the uncontrolled spread of wildfire. Thus, the proposed project would not result in substantial risks or hazards related to wildfires, and a ***less-than-significant*** impact would occur.

[48] California Department of Forestry and Fire Protection. *Fire Hazard Severity Zones*. Available at: https://calfire-forestry.maps.arcgis.com/apps/webappviewer/index.html. Accessed June 2024.

XXI. 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 will cause substantial adverse effects on human beings, either directly or indirectly?	☐	✖	☐	☐

Discussion

a. As discussed in Section IV, Biological Resources, of this IS/MND, while a limited potential exists for the western burrowing owl as well as nesting raptors and migratory birds protected by the MBTA to occur on-site, the proposed project would comply with all applicable ECCC HCP/NCCP requirements, which would reduce impacts to biological resources to a less-than-significant level. In addition, the project site does not contain any historical structures or known cultural resources. As a result, implementation of the proposed project is not anticipated to result in impacts related to historic or archaeological resources. Nevertheless, Mitigation Measures V-1 and V-2 would ensure that, in the event that cultural resources are discovered within the project site, such resources would be protected in compliance with the requirements of CEQA and other State standards.

Based on the above, the proposed project would not degrade the quality of the environment, substantially reduce or impact the habitat of fish or wildlife species, cause fish or wildlife populations to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory. Therefore, with implementation of the mitigation measures identified herein, a ***less-than-significant*** impact would occur.

b. In conjunction with other development within the City of Oakley, the proposed project could incrementally contribute to cumulative impacts in the area. However, as demonstrated in this IS/MND, all potential environmental impacts that could occur as a result of project development would be reduced to a less-than-significant level through compliance with the mitigation measures included herein, as well as applicable General Plan policies, Municipal Code standards, and other State and local regulations.

All cumulative impacts related to air quality, noise, and transportation are either less than significant after mitigation or less than significant and do not require mitigation. Given the scope of the project in comparison to buildout of the City's planning area, any incremental

effects would not be considerable relative to the effects of all past, current, and probably future projects. In addition, based on the existing land use designations, development of the project site with residential uses and the associated potential impacts have already been anticipated by the City. Therefore, when viewed in conjunction with other closely related past, present, or reasonably foreseeable future projects, with the implementation of mitigation, development of the proposed project would not result in a cumulatively considerable contribution to cumulative impacts, and the project's incremental contribution to cumulative impacts would be ***less than significant***.

c. As described in this IS/MND, the proposed project would comply with all applicable General Plan policies, Municipal Code standards, other applicable State and local regulations, and mitigation measures included herein. In addition, as discussed in Section VII, Geology and Soils, Section IX, Hazards and Hazardous Materials, and Section XIII, Noise, of this IS/MND, the proposed project would not cause substantial effects to human beings, including effects related to exposure to hazardous materials and noise. Therefore, with implementation of the required mitigation measures, the proposed project would result in a ***less-than-significant*** impact.

Appendix A
Air Quality and Greenhouse Gas Emissions – CalEEMod Results

Stonecreek Subdivision 9647 Custom Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

1.2. Land Use Types

1.3. User-Selected Emission Reduction Measures by Emissions Sector

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

2.2. Construction Emissions by Year, Unmitigated

2.3. Construction Emissions by Year, Mitigated

2.4. Operations Emissions Compared Against Thresholds

2.5. Operations Emissions by Sector, Unmitigated

2.6. Operations Emissions by Sector, Mitigated

3. Construction Emissions Details

3.1. Site Preparation (2026) - Unmitigated

3.2. Site Preparation (2026) - Mitigated

3.3. Site Preparation (2027) - Unmitigated

3.4. Site Preparation (2027) - Mitigated

3.5. Grading (2027) - Unmitigated

3.6. Grading (2027) - Mitigated

3.7. Building Construction (2027) - Unmitigated

3.8. Building Construction (2027) - Mitigated

3.9. Building Construction (2028) - Unmitigated

3.10. Building Construction (2028) - Mitigated

3.11. Building Construction (2029) - Unmitigated

3.12. Building Construction (2029) - Mitigated

3.13. Paving (2027) - Unmitigated

3.14. Paving (2027) - Mitigated

3.15. Architectural Coating (2027) - Unmitigated

3.16. Architectural Coating (2027) - Mitigated

3.17. Architectural Coating (2028) - Unmitigated

3.18. Architectural Coating (2028) - Mitigated

3.19. Architectural Coating (2029) - Unmitigated

3.20. Architectural Coating (2029) - Mitigated

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

4.1.2. Mitigated

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

4.2.2. Electricity Emissions By Land Use - Mitigated

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

4.2.4. Natural Gas Emissions By Land Use - Mitigated

4.3. Area Emissions by Source

4.3.1. Unmitigated

4.3.2. Mitigated

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

4.4.2. Mitigated

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

4.5.2. Mitigated

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

4.6.2. Mitigated

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

4.7.2. Mitigated

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

4.8.2. Mitigated

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

4.9.2. Mitigated

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

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

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

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

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

5. Activity Data

5.1. Construction Schedule

5.2. Off-Road Equipment

5.2.1. Unmitigated

5.2.2. Mitigated

5.3. Construction Vehicles

5.3.1. Unmitigated

5.3.2. Mitigated

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

5.5. Architectural Coatings

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

5.6.2. Construction Earthmoving Control Strategies

5.7. Construction Paving

5.8. Construction Electricity Consumption and Emissions Factors

5.9. Operational Mobile Sources

5.9.1. Unmitigated

5.9.2. Mitigated

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

5.10.3. Landscape Equipment

5.10.4. Landscape Equipment - Mitigated

5.11. Operational Energy Consumption

5.11.1. Unmitigated

5.11.2. Mitigated

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

5.12.2. Mitigated

5.13. Operational Waste Generation

5.13.1. Unmitigated

5.13.2. Mitigated

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

5.14.2. Mitigated

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

5.15.2. Mitigated

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

5.16.2. Process Boilers

5.17. User Defined

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

5.18.1.2. Mitigated

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

5.18.1.2. Mitigated

5.18.2. Sequestration

5.18.2.1. Unmitigated

5.18.2.2. Mitigated

8. User Changes to Default Data

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Stonecreek Subdivision 9647
Construction Start Date	3/1/2026
Operational Year	2029
Lead Agency	City of Oakley
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.60
Precipitation (days)	20.6
Location	37.9773681063306, -121.68147736624323
County	Contra Costa
City	Oakley
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	1362
EDFZ	1
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.25

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	176	Dwelling Unit	50.4	343,200	925,500	—	509	—
Other Asphalt Surfaces	0.37	Acre	0.37	0.00	8,058	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Energy	E-10-B	Establish Onsite Renewable Energy Systems: Solar Power

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

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

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	11.7	11.5	29.2	29.5	0.05	1.24	19.8	21.0	1.14	10.1	11.3	—	5,449	5,449	0.22	0.12	3.25	5,470
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	11.7	11.5	29.2	29.4	0.06	1.24	19.8	21.0	1.14	10.1	11.3	—	6,753	6,753	0.27	0.12	0.08	6,778
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	8.36	8.17	17.4	17.5	0.03	0.74	11.8	12.6	0.68	6.05	6.73	—	3,246	3,246	0.13	0.08	0.90	3,258
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.53	1.49	3.18	3.20	0.01	0.14	2.16	2.29	0.12	1.10	1.23	—	537	537	0.02	0.01	0.15	539

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	3.80	3.20	29.2	29.5	0.05	1.24	19.8	21.0	1.14	10.1	11.3	—	5,449	5,449	0.22	0.05	0.56	5,470
2027	11.7	11.5	11.0	17.2	0.03	0.36	0.76	1.12	0.33	0.18	0.52	—	3,664	3,664	0.14	0.12	3.25	3,706
2028	11.7	11.4	10.5	17.0	0.03	0.32	0.76	1.08	0.30	0.18	0.48	—	3,641	3,641	0.14	0.09	2.92	3,676
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	3.80	3.20	29.2	29.4	0.05	1.24	19.8	21.0	1.14	10.1	11.3	—	5,436	5,436	0.22	0.05	0.01	5,456
2027	11.7	11.5	28.0	28.8	0.06	1.17	19.8	21.0	1.08	10.1	11.2	—	6,753	6,753	0.27	0.12	0.08	6,778
2028	11.7	11.4	10.5	16.6	0.03	0.32	0.76	1.08	0.30	0.18	0.48	—	3,588	3,588	0.14	0.12	0.08	3,626
2029	11.6	11.4	10.1	16.4	0.03	0.30	0.76	1.06	0.27	0.18	0.45	—	3,564	3,564	0.14	0.12	0.07	3,602
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	2.27	1.91	17.4	17.5	0.03	0.74	11.8	12.6	0.68	6.05	6.73	—	3,246	3,246	0.13	0.03	0.14	3,258
2027	6.41	6.17	10.3	13.5	0.02	0.38	2.54	2.91	0.35	1.07	1.42	—	2,955	2,955	0.12	0.07	0.77	2,980
2028	8.36	8.17	7.52	11.8	0.02	0.23	0.54	0.77	0.21	0.13	0.34	—	2,574	2,574	0.10	0.08	0.90	2,602
2029	1.19	1.17	0.81	1.32	< 0.005	0.02	0.06	0.09	0.02	0.01	0.04	—	286	286	0.01	0.01	0.09	289
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.41	0.35	3.18	3.20	0.01	0.14	2.16	2.29	0.12	1.10	1.23	—	537	537	0.02	< 0.005	0.02	539
2027	1.17	1.13	1.87	2.47	< 0.005	0.07	0.46	0.53	0.06	0.20	0.26	—	489	489	0.02	0.01	0.13	493
2028	1.53	1.49	1.37	2.16	< 0.005	0.04	0.10	0.14	0.04	0.02	0.06	—	426	426	0.02	0.01	0.15	431
2029	0.22	0.21	0.15	0.24	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	0.01	—	47.3	47.3	< 0.005	< 0.005	0.02	47.8

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	3.80	3.20	29.2	29.5	0.05	1.24	19.8	21.0	1.14	10.1	11.3	—	5,449	5,449	0.22	0.05	0.56	5,470
2027	11.7	11.5	11.0	17.2	0.03	0.36	0.76	1.12	0.33	0.18	0.52	—	3,664	3,664	0.14	0.12	3.25	3,706
2028	11.7	11.4	10.5	17.0	0.03	0.32	0.76	1.08	0.30	0.18	0.48	—	3,641	3,641	0.14	0.09	2.92	3,676
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	3.80	3.20	29.2	29.4	0.05	1.24	19.8	21.0	1.14	10.1	11.3	—	5,436	5,436	0.22	0.05	0.01	5,456
2027	11.7	11.5	28.0	28.8	0.06	1.17	19.8	21.0	1.08	10.1	11.2	—	6,753	6,753	0.27	0.12	0.08	6,778
2028	11.7	11.4	10.5	16.6	0.03	0.32	0.76	1.08	0.30	0.18	0.48	—	3,588	3,588	0.14	0.12	0.08	3,626
2029	11.6	11.4	10.1	16.4	0.03	0.30	0.76	1.06	0.27	0.18	0.45	—	3,564	3,564	0.14	0.12	0.07	3,602
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	2.27	1.91	17.4	17.5	0.03	0.74	11.8	12.6	0.68	6.05	6.73	—	3,246	3,246	0.13	0.03	0.14	3,258
2027	6.41	6.17	10.3	13.5	0.02	0.38	2.54	2.91	0.35	1.07	1.42	—	2,955	2,955	0.12	0.07	0.77	2,980
2028	8.36	8.17	7.52	11.8	0.02	0.23	0.54	0.77	0.21	0.13	0.34	—	2,574	2,574	0.10	0.08	0.90	2,602
2029	1.19	1.17	0.81	1.32	< 0.005	0.02	0.06	0.09	0.02	0.01	0.04	—	286	286	0.01	0.01	0.09	289
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.41	0.35	3.18	3.20	0.01	0.14	2.16	2.29	0.12	1.10	1.23	—	537	537	0.02	< 0.005	0.02	539
2027	1.17	1.13	1.87	2.47	< 0.005	0.07	0.46	0.53	0.06	0.20	0.26	—	489	489	0.02	0.01	0.13	493
2028	1.53	1.49	1.37	2.16	< 0.005	0.04	0.10	0.14	0.04	0.02	0.06	—	426	426	0.02	0.01	0.15	431
2029	0.22	0.21	0.15	0.24	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	0.01	—	47.3	47.3	< 0.005	< 0.005	0.02	47.8

2.4. Operations Emissions Compared Against Thresholds

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

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	16.4	15.6	9.38	62.4	0.16	0.49	12.5	13.0	0.48	3.17	3.65	78.0	20,278	20,356	8.70	0.54	37.5	20,772
Mit.	16.4	15.6	9.38	62.4	0.16	0.49	12.5	13.0	0.48	3.17	3.65	78.0	19,669	19,747	8.61	0.53	37.5	20,158
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	3%	3%	1%	2%	—	3%
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	15.2	14.4	10.0	47.8	0.15	0.48	12.5	13.0	0.48	3.17	3.65	78.0	19,343	19,421	8.76	0.59	3.37	19,820
Mit.	15.2	14.4	10.0	47.8	0.15	0.48	12.5	13.0	0.48	3.17	3.65	78.0	18,735	18,813	8.67	0.58	3.37	19,205
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	3%	3%	1%	2%	—	3%
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	15.2	14.6	6.93	50.2	0.14	0.25	12.4	12.6	0.25	3.13	3.38	78.0	15,847	15,925	8.67	0.56	17.6	16,328
Mit.	15.2	14.6	6.93	50.2	0.14	0.25	12.4	12.6	0.25	3.13	3.38	78.0	15,239	15,317	8.57	0.55	17.6	15,713
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	4%	4%	1%	2%	—	4%
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.78	2.67	1.26	9.16	0.02	0.05	2.25	2.30	0.05	0.57	0.62	12.9	2,624	2,637	1.44	0.09	2.91	2,703
Mit.	2.78	2.67	1.26	9.16	0.02	0.05	2.25	2.30	0.05	0.57	0.62	12.9	2,523	2,536	1.42	0.09	2.91	2,602
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	4%	4%	1%	2%	—	4%

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	6.23	5.75	4.31	50.2	0.13	0.08	12.5	12.6	0.07	3.17	3.25	—	13,269	13,269	0.47	0.49	35.0	13,461
Area	9.93	9.71	3.01	11.3	0.02	0.24	—	0.24	0.24	—	0.24	0.00	3,733	3,733	0.07	0.01	—	3,736
Energy	0.24	0.12	2.05	0.87	0.01	0.17	—	0.17	0.17	—	0.17	—	3,216	3,216	0.33	0.02	—	3,229
Water	—	—	—	—	—	—	—	—	—	—	—	12.3	60.7	72.9	1.27	0.03	—	114
Waste	—	—	—	—	—	—	—	—	—	—	—	65.7	0.00	65.7	6.57	0.00	—	230
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.46	2.46
Total	16.4	15.6	9.38	62.4	0.16	0.49	12.5	13.0	0.48	3.17	3.65	78.0	20,278	20,356	8.70	0.54	37.5	20,772
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	5.94	5.44	5.07	45.7	0.12	0.08	12.5	12.6	0.07	3.17	3.25	—	12,361	12,361	0.53	0.54	0.91	12,535
Area	9.01	8.84	2.92	1.24	0.02	0.24	—	0.24	0.24	—	0.24	0.00	3,706	3,706	0.07	0.01	—	3,710
Energy	0.24	0.12	2.05	0.87	0.01	0.17	—	0.17	0.17	—	0.17	—	3,216	3,216	0.33	0.02	—	3,229
Water	—	—	—	—	—	—	—	—	—	—	—	12.3	60.7	72.9	1.27	0.03	—	114
Waste	—	—	—	—	—	—	—	—	—	—	—	65.7	0.00	65.7	6.57	0.00	—	230
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.46	2.46
Total	15.2	14.4	10.0	47.8	0.15	0.48	12.5	13.0	0.48	3.17	3.65	78.0	19,343	19,421	8.76	0.59	3.37	19,820
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	5.88	5.39	4.76	44.4	0.12	0.08	12.4	12.4	0.07	3.13	3.21	—	12,467	12,467	0.50	0.52	15.1	12,648
Area	9.13	9.10	0.12	4.97	< 0.005	0.01	—	0.01	0.01	—	0.01	0.00	105	105	< 0.005	< 0.005	—	105
Energy	0.24	0.12	2.05	0.87	0.01	0.17	—	0.17	0.17	—	0.17	—	3,216	3,216	0.33	0.02	—	3,229
Water	—	—	—	—	—	—	—	—	—	—	—	12.3	60.7	72.9	1.27	0.03	—	114

Waste	—	—	—	—	—	—	—	—	—	—	—	65.7	0.00	65.7	6.57	0.00	—	230
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.46	2.46
Total	15.2	14.6	6.93	50.2	0.14	0.25	12.4	12.6	0.25	3.13	3.38	78.0	15,847	15,925	8.67	0.56	17.6	16,328
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.07	0.98	0.87	8.09	0.02	0.01	2.25	2.27	0.01	0.57	0.59	—	2,064	2,064	0.08	0.09	2.51	2,094
Area	1.67	1.66	0.02	0.91	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	17.3	17.3	< 0.005	< 0.005	—	17.3
Energy	0.04	0.02	0.37	0.16	< 0.005	0.03	—	0.03	0.03	—	0.03	—	532	532	0.05	< 0.005	—	535
Water	—	—	—	—	—	—	—	—	—	—	—	2.03	10.0	12.1	0.21	0.01	—	18.9
Waste	—	—	—	—	—	—	—	—	—	—	—	10.9	0.00	10.9	1.09	0.00	—	38.1
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.41	0.41
Total	2.78	2.67	1.26	9.16	0.02	0.05	2.25	2.30	0.05	0.57	0.62	12.9	2,624	2,637	1.44	0.09	2.91	2,703

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	6.23	5.75	4.31	50.2	0.13	0.08	12.5	12.6	0.07	3.17	3.25	—	13,269	13,269	0.47	0.49	35.0	13,461
Area	9.93	9.71	3.01	11.3	0.02	0.24	—	0.24	0.24	—	0.24	0.00	3,733	3,733	0.07	0.01	—	3,736
Energy	0.24	0.12	2.05	0.87	0.01	0.17	—	0.17	0.17	—	0.17	—	2,607	2,607	0.23	< 0.005	—	2,614
Water	—	—	—	—	—	—	—	—	—	—	—	12.3	60.7	72.9	1.27	0.03	—	114
Waste	—	—	—	—	—	—	—	—	—	—	—	65.7	0.00	65.7	6.57	0.00	—	230
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.46	2.46
Total	16.4	15.6	9.38	62.4	0.16	0.49	12.5	13.0	0.48	3.17	3.65	78.0	19,669	19,747	8.61	0.53	37.5	20,158
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	5.94	5.44	5.07	45.7	0.12	0.08	12.5	12.6	0.07	3.17	3.25	—	12,361	12,361	0.53	0.54	0.91	12,535

Area	9.01	8.84	2.92	1.24	0.02	0.24	—	0.24	0.24	—	0.24	0.00	3,706	3,706	0.07	0.01	—	3,710
Energy	0.24	0.12	2.05	0.87	0.01	0.17	—	0.17	0.17	—	0.17	—	2,607	2,607	0.23	< 0.005	—	2,614
Water	—	—	—	—	—	—	—	—	—	—	—	12.3	60.7	72.9	1.27	0.03	—	114
Waste	—	—	—	—	—	—	—	—	—	—	—	65.7	0.00	65.7	6.57	0.00	—	230
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.46	2.46
Total	15.2	14.4	10.0	47.8	0.15	0.48	12.5	13.0	0.48	3.17	3.65	78.0	18,735	18,813	8.67	0.58	3.37	19,205
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	5.88	5.39	4.76	44.4	0.12	0.08	12.4	12.4	0.07	3.13	3.21	—	12,467	12,467	0.50	0.52	15.1	12,648
Area	9.13	9.10	0.12	4.97	< 0.005	0.01	—	0.01	0.01	—	0.01	0.00	105	105	< 0.005	< 0.005	—	105
Energy	0.24	0.12	2.05	0.87	0.01	0.17	—	0.17	0.17	—	0.17	—	2,607	2,607	0.23	< 0.005	—	2,614
Water	—	—	—	—	—	—	—	—	—	—	—	12.3	60.7	72.9	1.27	0.03	—	114
Waste	—	—	—	—	—	—	—	—	—	—	—	65.7	0.00	65.7	6.57	0.00	—	230
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.46	2.46
Total	15.2	14.6	6.93	50.2	0.14	0.25	12.4	12.6	0.25	3.13	3.38	78.0	15,239	15,317	8.57	0.55	17.6	15,713
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.07	0.98	0.87	8.09	0.02	0.01	2.25	2.27	0.01	0.57	0.59	—	2,064	2,064	0.08	0.09	2.51	2,094
Area	1.67	1.66	0.02	0.91	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	17.3	17.3	< 0.005	< 0.005	—	17.3
Energy	0.04	0.02	0.37	0.16	< 0.005	0.03	—	0.03	0.03	—	0.03	—	432	432	0.04	< 0.005	—	433
Water	—	—	—	—	—	—	—	—	—	—	—	2.03	10.0	12.1	0.21	0.01	—	18.9
Waste	—	—	—	—	—	—	—	—	—	—	—	10.9	0.00	10.9	1.09	0.00	—	38.1
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.41	0.41
Total	2.78	2.67	1.26	9.16	0.02	0.05	2.25	2.30	0.05	0.57	0.62	12.9	2,523	2,536	1.42	0.09	2.91	2,602

3. Construction Emissions Details

3.1. Site Preparation (2026) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.74	3.14	29.2	28.8	0.05	1.24	—	1.24	1.14	—	1.14	—	5,298	5,298	0.21	0.04	—	5,316
Dust From Material Movemen	—	—	—	—	—	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.74	3.14	29.2	28.8	0.05	1.24	—	1.24	1.14	—	1.14	—	5,298	5,298	0.21	0.04	—	5,316
Dust From Material Movemen	—	—	—	—	—	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.23	1.88	17.4	17.2	0.03	0.74	—	0.74	0.68	—	0.68	—	3,162	3,162	0.13	0.03	—	3,173
Dust From Material Movemen	—	—	—	—	—	—	11.7	11.7	—	6.03	6.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.41	0.34	3.18	3.14	0.01	0.14	—	0.14	0.12	—	0.12	—	524	524	0.02	< 0.005	—	525
Dust From Material Movemen:	—	—	—	—	—	—	2.14	2.14	—	1.10	1.10	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.04	0.69	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	151	151	< 0.005	0.01	0.56	154
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.05	0.58	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	138	138	< 0.005	0.01	0.01	140
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.34	0.00	0.00	0.09	0.09	0.00	0.02	0.02	—	83.5	83.5	< 0.005	< 0.005	0.14	84.8
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	< 0.005	0.06	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	13.8	13.8	< 0.005	< 0.005	0.02	14.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00

3.2. Site Preparation (2026) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.74	3.14	29.2	28.8	0.05	1.24	—	1.24	1.14	—	1.14	—	5,298	5,298	0.21	0.04	—	5,316
Dust From Material Movemen:	—	—	—	—	—	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.74	3.14	29.2	28.8	0.05	1.24	—	1.24	1.14	—	1.14	—	5,298	5,298	0.21	0.04	—	5,316
Dust From Material Movemen:	—	—	—	—	—	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.23	1.88	17.4	17.2	0.03	0.74	—	0.74	0.68	—	0.68	—	3,162	3,162	0.13	0.03	—	3,173
Dust From Material Movemen:	—	—	—	—	—	—	11.7	11.7	—	6.03	6.03	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.41	0.34	3.18	3.14	0.01	0.14	—	0.14	0.12	—	0.12	—	524	524	0.02	< 0.005	—	525
Dust From Material Movemen:	—	—	—	—	—	—	2.14	2.14	—	1.10	1.10	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.04	0.69	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	151	151	< 0.005	0.01	0.56	154
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.05	0.58	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	138	138	< 0.005	0.01	0.01	140
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.34	0.00	0.00	0.09	0.09	0.00	0.02	0.02	—	83.5	83.5	< 0.005	< 0.005	0.14	84.8
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	< 0.005	0.06	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	13.8	13.8	< 0.005	< 0.005	0.02	14.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Site Preparation (2027) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.63	3.05	28.0	28.3	0.05	1.17	—	1.17	1.08	—	1.08	—	5,298	5,298	0.21	0.04	—	5,316
Dust From Material Movemen	—	—	—	—	—	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	0.17	1.59	1.60	< 0.005	0.07	—	0.07	0.06	—	0.06	—	301	301	0.01	< 0.005	—	302
Dust From Material Movemen	—	—	—	—	—	—	1.12	1.12	—	0.57	0.57	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.29	0.29	< 0.005	0.01	—	0.01	0.01	—	0.01	—	49.8	49.8	< 0.005	< 0.005	—	49.9

Dust From Material Movemen:	—	—	—	—	—	—	0.20	0.20	—	0.10	0.10	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.04	0.54	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	136	136	< 0.005	0.01	0.01	138
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.79	7.79	< 0.005	< 0.005	0.01	7.90
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.29	1.29	< 0.005	< 0.005	< 0.005	1.31
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00

3.4. Site Preparation (2027) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.63	3.05	28.0	28.3	0.05	1.17	—	1.17	1.08	—	1.08	—	5,298	5,298	0.21	0.04	—	5,316
Dust From Material Movemen:	—	—	—	—	—	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	0.17	1.59	1.60	< 0.005	0.07	—	0.07	0.06	—	0.06	—	301	301	0.01	< 0.005	—	302
Dust From Material Movemen:	—	—	—	—	—	—	1.12	1.12	—	0.57	0.57	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.29	0.29	< 0.005	0.01	—	0.01	0.01	—	0.01	—	49.8	49.8	< 0.005	< 0.005	—	49.9
Dust From Material Movemen:	—	—	—	—	—	—	0.20	0.20	—	0.10	0.10	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.04	0.54	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	136	136	< 0.005	0.01	0.01	138
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.79	7.79	< 0.005	< 0.005	0.01	7.90
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.29	1.29	< 0.005	< 0.005	< 0.005	1.31
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Grading (2027) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.51	2.95	25.6	27.3	0.06	1.04	—	1.04	0.96	—	0.96	—	6,598	6,598	0.27	0.05	—	6,621

Dust From Material Movemen	—	—	—	—	—	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.38	0.32	2.80	2.99	0.01	0.11	—	0.11	0.11	—	0.11	—	723	723	0.03	0.01	—	726
Dust From Material Movemen	—	—	—	—	—	—	1.01	1.01	—	0.40	0.40	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.51	0.55	< 0.005	0.02	—	0.02	0.02	—	0.02	—	120	120	< 0.005	< 0.005	—	120
Dust From Material Movemen	—	—	—	—	—	—	0.18	0.18	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.05	0.62	0.00	0.00	0.17	0.17	0.00	0.04	0.04	—	155	155	< 0.005	0.01	0.01	157
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	17.2	17.2	< 0.005	< 0.005	0.03	17.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.85	2.85	< 0.005	< 0.005	< 0.005	2.89
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00

3.6. Grading (2027) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.51	2.95	25.6	27.3	0.06	1.04	—	1.04	0.96	—	0.96	—	6,598	6,598	0.27	0.05	—	6,621
Dust From Material Movemen	—	—	—	—	—	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.38	0.32	2.80	2.99	0.01	0.11	—	0.11	0.11	—	0.11	—	723	723	0.03	0.01	—	726

Dust From Material Movemen:	—	—	—	—	—	—	1.01	1.01	—	0.40	0.40	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.51	0.55	< 0.005	0.02	—	0.02	0.02	—	0.02	—	120	120	< 0.005	< 0.005	—	120
Dust From Material Movemen:	—	—	—	—	—	—	0.18	0.18	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.05	0.62	0.00	0.00	0.17	0.17	0.00	0.04	0.04	—	155	155	< 0.005	0.01	0.01	157
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	17.2	17.2	< 0.005	< 0.005	0.03	17.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.85	2.85	< 0.005	< 0.005	< 0.005	2.89
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00

3.7. 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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.64	0.53	4.85	6.68	0.01	0.17	—	0.17	0.16	—	0.16	—	1,238	1,238	0.05	0.01	—	1,243
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.89	1.22	< 0.005	0.03	—	0.03	0.03	—	0.03	—	205	205	0.01	< 0.005	—	206
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.21	0.19	0.13	2.33	0.00	0.00	0.52	0.52	0.00	0.12	0.12	—	537	537	0.01	0.02	1.83	546
Vendor	0.04	0.02	0.61	0.30	< 0.005	0.01	0.13	0.14	0.01	0.04	0.04	—	489	489	0.03	0.07	1.06	512
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.20	0.18	0.16	1.97	0.00	0.00	0.52	0.52	0.00	0.12	0.12	—	492	492	0.01	0.02	0.05	499
Vendor	0.04	0.01	0.64	0.30	< 0.005	0.01	0.13	0.14	0.01	0.04	0.04	—	489	489	0.03	0.07	0.03	512
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.08	0.99	0.00	0.00	0.27	0.27	0.00	0.06	0.06	—	257	257	0.01	0.01	0.41	261
Vendor	0.02	0.01	0.32	0.15	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	253	253	0.01	0.04	0.24	264
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.01	0.18	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	42.5	42.5	< 0.005	< 0.005	0.07	43.1
Vendor	< 0.005	< 0.005	0.06	0.03	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	41.8	41.8	< 0.005	0.01	0.04	43.8
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.8. 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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.64	0.53	4.85	6.68	0.01	0.17	—	0.17	0.16	—	0.16	—	1,238	1,238	0.05	0.01	—	1,243
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.89	1.22	< 0.005	0.03	—	0.03	0.03	—	0.03	—	205	205	0.01	< 0.005	—	206
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.21	0.19	0.13	2.33	0.00	0.00	0.52	0.52	0.00	0.12	0.12	—	537	537	0.01	0.02	1.83	546
Vendor	0.04	0.02	0.61	0.30	< 0.005	0.01	0.13	0.14	0.01	0.04	0.04	—	489	489	0.03	0.07	1.06	512
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.20	0.18	0.16	1.97	0.00	0.00	0.52	0.52	0.00	0.12	0.12	—	492	492	0.01	0.02	0.05	499

Vendor	0.04	0.01	0.64	0.30	< 0.005	0.01	0.13	0.14	0.01	0.04	0.04	—	489	489	0.03	0.07	0.03	512
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.08	0.99	0.00	0.00	0.27	0.27	0.00	0.06	0.06	—	257	257	0.01	0.01	0.41	261
Vendor	0.02	0.01	0.32	0.15	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	253	253	0.01	0.04	0.24	264
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.01	0.18	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	42.5	42.5	< 0.005	< 0.005	0.07	43.1
Vendor	< 0.005	< 0.005	0.06	0.03	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	41.8	41.8	< 0.005	0.01	0.04	43.8
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. 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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.18	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.18	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.85	0.71	6.39	9.26	0.02	0.22	—	0.22	0.20	—	0.20	—	1,717	1,717	0.07	0.01	—	1,723
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	1.17	1.69	< 0.005	0.04	—	0.04	0.04	—	0.04	—	284	284	0.01	< 0.005	—	285
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.21	0.19	0.12	2.19	0.00	0.00	0.52	0.52	0.00	0.12	0.12	—	528	528	0.01	< 0.005	1.65	531
Vendor	0.04	0.02	0.58	0.28	< 0.005	0.01	0.13	0.14	0.01	0.04	0.04	—	477	477	0.02	0.07	0.94	499
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.20	0.18	0.16	1.85	0.00	0.00	0.52	0.52	0.00	0.12	0.12	—	483	483	0.01	0.02	0.04	490
Vendor	0.04	0.01	0.61	0.29	< 0.005	0.01	0.13	0.14	0.01	0.04	0.04	—	477	477	0.02	0.07	0.02	499
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.13	0.10	1.29	0.00	0.00	0.37	0.37	0.00	0.09	0.09	—	350	350	0.01	0.01	0.51	355
Vendor	0.03	0.01	0.43	0.21	< 0.005	< 0.005	0.09	0.10	< 0.005	0.03	0.03	—	342	342	0.02	0.05	0.29	357
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.02	0.24	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	57.9	57.9	< 0.005	< 0.005	0.08	58.7

Vendor	0.01	< 0.005	0.08	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	56.6	56.6	< 0.005	0.01	0.05	59.1
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.10. 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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.18	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.18	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.85	0.71	6.39	9.26	0.02	0.22	—	0.22	0.20	—	0.20	—	1,717	1,717	0.07	0.01	—	1,723
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	1.17	1.69	< 0.005	0.04	—	0.04	0.04	—	0.04	—	284	284	0.01	< 0.005	—	285
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.21	0.19	0.12	2.19	0.00	0.00	0.52	0.52	0.00	0.12	0.12	—	528	528	0.01	< 0.005	1.65	531
Vendor	0.04	0.02	0.58	0.28	< 0.005	0.01	0.13	0.14	0.01	0.04	0.04	—	477	477	0.02	0.07	0.94	499
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.20	0.18	0.16	1.85	0.00	0.00	0.52	0.52	0.00	0.12	0.12	—	483	483	0.01	0.02	0.04	490
Vendor	0.04	0.01	0.61	0.29	< 0.005	0.01	0.13	0.14	0.01	0.04	0.04	—	477	477	0.02	0.07	0.02	499
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.13	0.10	1.29	0.00	0.00	0.37	0.37	0.00	0.09	0.09	—	350	350	0.01	0.01	0.51	355
Vendor	0.03	0.01	0.43	0.21	< 0.005	< 0.005	0.09	0.10	< 0.005	0.03	0.03	—	342	342	0.02	0.05	0.29	357
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.02	0.24	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	57.9	57.9	< 0.005	< 0.005	0.08	58.7
Vendor	0.01	< 0.005	0.08	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	56.6	56.6	< 0.005	0.01	0.05	59.1
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Building Construction (2029) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.15	0.97	8.58	12.9	0.02	0.28	—	0.28	0.25	—	0.25	—	2,397	2,397	0.10	0.02	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.08	0.67	1.01	< 0.005	0.02	—	0.02	0.02	—	0.02	—	188	188	0.01	< 0.005	—	188
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.01	0.12	0.18	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	31.1	31.1	< 0.005	< 0.005	—	31.2
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.17	0.14	1.74	0.00	0.00	0.52	0.52	0.00	0.12	0.12	—	474	474	0.01	0.02	0.04	481
Vendor	0.04	0.01	0.58	0.28	< 0.005	0.01	0.13	0.14	< 0.005	0.04	0.04	—	464	464	0.02	0.07	0.02	485
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.13	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	37.5	37.5	< 0.005	< 0.005	0.05	38.1
Vendor	< 0.005	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	36.3	36.3	< 0.005	0.01	0.03	38.0
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.22	6.22	< 0.005	< 0.005	0.01	6.31
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.01	6.01	< 0.005	< 0.005	< 0.005	6.29
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.12. Building Construction (2029) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.15	0.97	8.58	12.9	0.02	0.28	—	0.28	0.25	—	0.25	—	2,397	2,397	0.10	0.02	—	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.08	0.67	1.01	< 0.005	0.02	—	0.02	0.02	—	0.02	—	188	188	0.01	< 0.005	—	188
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.01	0.12	0.18	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	31.1	31.1	< 0.005	< 0.005	—	31.2
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.17	0.14	1.74	0.00	0.00	0.52	0.52	0.00	0.12	0.12	—	474	474	0.01	0.02	0.04	481
Vendor	0.04	0.01	0.58	0.28	< 0.005	0.01	0.13	0.14	< 0.005	0.04	0.04	—	464	464	0.02	0.07	0.02	485
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.13	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	37.5	37.5	< 0.005	< 0.005	0.05	38.1
Vendor	< 0.005	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	36.3	36.3	< 0.005	0.01	0.03	38.0
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.22	6.22	< 0.005	< 0.005	0.01	6.31
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.01	6.01	< 0.005	< 0.005	< 0.005	6.29
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Paving (2027) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.88	0.74	6.94	9.95	0.01	0.30	—	0.30	0.27	—	0.27	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.10	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.88	0.74	6.94	9.95	0.01	0.30	—	0.30	0.27	—	0.27	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.10	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.19	0.27	< 0.005	0.01	—	0.01	0.01	—	0.01	—	41.4	41.4	< 0.005	< 0.005	—	41.5
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.85	6.85	< 0.005	< 0.005	—	6.88
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.03	0.55	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	127	127	< 0.005	< 0.005	0.43	129
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.05	0.04	0.04	0.47	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	116	116	< 0.005	0.01	0.01	118
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.22	3.22	< 0.005	< 0.005	0.01	3.27
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.53	0.53	< 0.005	< 0.005	< 0.005	0.54
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00

3.14. Paving (2027) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.88	0.74	6.94	9.95	0.01	0.30	—	0.30	0.27	—	0.27	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.10	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.88	0.74	6.94	9.95	0.01	0.30	—	0.30	0.27	—	0.27	—	1,511	1,511	0.06	0.01	—	1,516

Paving	0.10	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.19	0.27	< 0.005	0.01	—	0.01	0.01	—	0.01	—	41.4	41.4	< 0.005	< 0.005	—	41.5
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.85	6.85	< 0.005	< 0.005	—	6.88
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.03	0.55	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	127	127	< 0.005	< 0.005	0.43	129
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.04	0.47	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	116	116	< 0.005	0.01	0.01	118
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.22	3.22	< 0.005	< 0.005	0.01	3.27

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.53	0.53	< 0.005	< 0.005	< 0.005	0.54
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Architectural Coating (2027) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	0.11	0.83	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	0.11	0.83	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	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	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.41	0.55	< 0.005	0.01	—	0.01	0.01	—	0.01	—	65.3	65.3	< 0.005	< 0.005	—	65.5
Architectural Coatings	4.93	4.93	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.10	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	10.8	10.8	< 0.005	< 0.005	—	10.9
Architectural Coatings	0.90	0.90	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.03	0.47	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	107	107	< 0.005	< 0.005	0.37	109
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.03	0.39	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	98.3	98.3	< 0.005	< 0.005	0.01	99.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.19	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	48.6	48.6	< 0.005	< 0.005	0.08	49.3

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.05	8.05	< 0.005	< 0.005	0.01	8.17
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00

3.16. Architectural Coating (2027) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	0.11	0.83	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	0.11	0.83	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	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	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.41	0.55	< 0.005	0.01	—	0.01	0.01	—	0.01	—	65.3	65.3	< 0.005	< 0.005	—	65.5
Architectural Coatings	4.93	4.93	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.10	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	10.8	10.8	< 0.005	< 0.005	—	10.9
Architectural Coatings	0.90	0.90	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.03	0.47	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	107	107	< 0.005	< 0.005	0.37	109
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.03	0.39	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	98.3	98.3	< 0.005	< 0.005	0.01	99.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.19	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	48.6	48.6	< 0.005	< 0.005	0.08	49.3

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.05	8.05	< 0.005	< 0.005	0.01	8.17
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	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	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.08	0.58	0.80	< 0.005	0.01	—	0.01	0.01	—	0.01	—	95.6	95.6	< 0.005	< 0.005	—	96.0
Architectural Coatings	7.22	7.22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.01	0.11	0.15	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.9
Architectural Coatings	1.32	1.32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.02	0.44	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	106	106	< 0.005	< 0.005	0.33	106
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.03	0.37	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	96.6	96.6	< 0.005	< 0.005	0.01	97.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.02	0.26	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	69.9	69.9	< 0.005	< 0.005	0.10	70.9

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.6	11.6	< 0.005	< 0.005	0.02	11.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	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	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.08	0.58	0.80	< 0.005	0.01	—	0.01	0.01	—	0.01	—	95.6	95.6	< 0.005	< 0.005	—	96.0
Architectural Coatings	7.22	7.22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.01	0.11	0.15	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.9
Architectural Coatings	1.32	1.32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.02	0.44	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	106	106	< 0.005	< 0.005	0.33	106
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.03	0.37	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	96.6	96.6	< 0.005	< 0.005	0.01	97.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.02	0.26	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	69.9	69.9	< 0.005	< 0.005	0.10	70.9

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.6	11.6	< 0.005	< 0.005	0.02	11.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.79	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.08	0.12	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	14.1	14.1	< 0.005	< 0.005	—	14.2
Architectural Coatings	1.07	1.07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.34	2.34	< 0.005	< 0.005	—	2.34
Architectural Coatings	0.19	0.19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.35	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	94.9	94.9	< 0.005	< 0.005	0.01	96.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.1	10.1	< 0.005	< 0.005	0.01	10.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.68	1.68	< 0.005	< 0.005	< 0.005	1.70
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.79	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.08	0.12	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	14.1	14.1	< 0.005	< 0.005	—	14.2
Architectural Coatings	1.07	1.07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.34	2.34	< 0.005	< 0.005	—	2.34
Architectural Coatings	0.19	0.19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.35	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	94.9	94.9	< 0.005	< 0.005	0.01	96.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.1	10.1	< 0.005	< 0.005	0.01	10.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.68	1.68	< 0.005	< 0.005	< 0.005	1.70
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	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	—	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	6.23	5.75	4.31	50.2	0.13	0.08	12.5	12.6	0.07	3.17	3.25	—	13,269	13,269	0.47	0.49	35.0	13,461
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	6.23	5.75	4.31	50.2	0.13	0.08	12.5	12.6	0.07	3.17	3.25	—	13,269	13,269	0.47	0.49	35.0	13,461
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	5.94	5.44	5.07	45.7	0.12	0.08	12.5	12.6	0.07	3.17	3.25	—	12,361	12,361	0.53	0.54	0.91	12,535
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	5.94	5.44	5.07	45.7	0.12	0.08	12.5	12.6	0.07	3.17	3.25	—	12,361	12,361	0.53	0.54	0.91	12,535
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	1.07	0.98	0.87	8.09	0.02	0.01	2.25	2.27	0.01	0.57	0.59	—	2,064	2,064	0.08	0.09	2.51	2,094
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.07	0.98	0.87	8.09	0.02	0.01	2.25	2.27	0.01	0.57	0.59	—	2,064	2,064	0.08	0.09	2.51	2,094

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	6.23	5.75	4.31	50.2	0.13	0.08	12.5	12.6	0.07	3.17	3.25	—	13,269	13,269	0.47	0.49	35.0	13,461
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	6.23	5.75	4.31	50.2	0.13	0.08	12.5	12.6	0.07	3.17	3.25	—	13,269	13,269	0.47	0.49	35.0	13,461
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	5.94	5.44	5.07	45.7	0.12	0.08	12.5	12.6	0.07	3.17	3.25	—	12,361	12,361	0.53	0.54	0.91	12,535
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	5.94	5.44	5.07	45.7	0.12	0.08	12.5	12.6	0.07	3.17	3.25	—	12,361	12,361	0.53	0.54	0.91	12,535
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	1.07	0.98	0.87	8.09	0.02	0.01	2.25	2.27	0.01	0.57	0.59	—	2,064	2,064	0.08	0.09	2.51	2,094
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.07	0.98	0.87	8.09	0.02	0.01	2.25	2.27	0.01	0.57	0.59	—	2,064	2,064	0.08	0.09	2.51	2,094

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	608	608	0.10	0.01	—	614
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	608	608	0.10	0.01	—	614
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	608	608	0.10	0.01	—	614
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	608	608	0.10	0.01	—	614
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	101	101	0.02	< 0.005	—	102
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	101	101	0.02	< 0.005	—	102

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.24	0.12	2.05	0.87	0.01	0.17	—	0.17	0.17	—	0.17	—	2,607	2,607	0.23	< 0.005	—	2,614
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.24	0.12	2.05	0.87	0.01	0.17	—	0.17	0.17	—	0.17	—	2,607	2,607	0.23	< 0.005	—	2,614
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.24	0.12	2.05	0.87	0.01	0.17	—	0.17	0.17	—	0.17	—	2,607	2,607	0.23	< 0.005	—	2,614
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.24	0.12	2.05	0.87	0.01	0.17	—	0.17	0.17	—	0.17	—	2,607	2,607	0.23	< 0.005	—	2,614
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.04	0.02	0.37	0.16	< 0.005	0.03	—	0.03	0.03	—	0.03	—	432	432	0.04	< 0.005	—	433
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.04	0.02	0.37	0.16	< 0.005	0.03	—	0.03	0.03	—	0.03	—	432	432	0.04	< 0.005	—	433

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.24	0.12	2.05	0.87	0.01	0.17	—	0.17	0.17	—	0.17	—	2,607	2,607	0.23	< 0.005	—	2,614
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.24	0.12	2.05	0.87	0.01	0.17	—	0.17	0.17	—	0.17	—	2,607	2,607	0.23	< 0.005	—	2,614
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.24	0.12	2.05	0.87	0.01	0.17	—	0.17	0.17	—	0.17	—	2,607	2,607	0.23	< 0.005	—	2,614
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.24	0.12	2.05	0.87	0.01	0.17	—	0.17	0.17	—	0.17	—	2,607	2,607	0.23	< 0.005	—	2,614
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.04	0.02	0.37	0.16	< 0.005	0.03	—	0.03	0.03	—	0.03	—	432	432	0.04	< 0.005	—	433
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.04	0.02	0.37	0.16	< 0.005	0.03	—	0.03	0.03	—	0.03	—	432	432	0.04	< 0.005	—	433

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.34	0.17	2.92	1.24	0.02	0.24	—	0.24	0.24	—	0.24	0.00	3,706	3,706	0.07	0.01	—	3,710
Consumer Products	7.35	7.35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.33	1.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.91	0.87	0.09	10.0	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	26.7	26.7	< 0.005	< 0.005	—	26.8
Total	9.93	9.71	3.01	11.3	0.02	0.24	—	0.24	0.24	—	0.24	0.00	3,733	3,733	0.07	0.01	—	3,736
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.34	0.17	2.92	1.24	0.02	0.24	—	0.24	0.24	—	0.24	0.00	3,706	3,706	0.07	0.01	—	3,710
Consumer Products	7.35	7.35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.33	1.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	9.01	8.84	2.92	1.24	0.02	0.24	—	0.24	0.24	—	0.24	0.00	3,706	3,706	0.07	0.01	—	3,710
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	15.1	15.1	< 0.005	< 0.005	—	15.1
Consumer Products	1.34	1.34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Architectural Coatings	0.24	0.24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.08	0.08	0.01	0.90	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.18	2.18	< 0.005	< 0.005	—	2.19
Total	1.67	1.66	0.02	0.91	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	17.3	17.3	< 0.005	< 0.005	—	17.3

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.34	0.17	2.92	1.24	0.02	0.24	—	0.24	0.24	—	0.24	0.00	3,706	3,706	0.07	0.01	—	3,710
Consumer Products	7.35	7.35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.33	1.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.91	0.87	0.09	10.0	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	26.7	26.7	< 0.005	< 0.005	—	26.8
Total	9.93	9.71	3.01	11.3	0.02	0.24	—	0.24	0.24	—	0.24	0.00	3,733	3,733	0.07	0.01	—	3,736
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.34	0.17	2.92	1.24	0.02	0.24	—	0.24	0.24	—	0.24	0.00	3,706	3,706	0.07	0.01	—	3,710
Consumer Products	7.35	7.35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Architect Coatings	1.33	1.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	9.01	8.84	2.92	1.24	0.02	0.24	—	0.24	0.24	—	0.24	0.00	3,706	3,706	0.07	0.01	—	3,710
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	15.1	15.1	< 0.005	< 0.005	—	15.1
Consumer Products	1.34	1.34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.24	0.24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.08	0.08	0.01	0.90	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.18	2.18	< 0.005	< 0.005	—	2.19
Total	1.67	1.66	0.02	0.91	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	17.3	17.3	< 0.005	< 0.005	—	17.3

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	12.3	60.4	72.7	1.27	0.03	—	114
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.27	0.27	< 0.005	< 0.005	—	0.27
Total	—	—	—	—	—	—	—	—	—	—	—	12.3	60.7	72.9	1.27	0.03	—	114

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	12.3	60.4	72.7	1.27	0.03	—	114
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.27	0.27	< 0.005	< 0.005	—	0.27
Total	—	—	—	—	—	—	—	—	—	—	—	12.3	60.7	72.9	1.27	0.03	—	114
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	2.03	10.0	12.0	0.21	0.01	—	18.8
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.04	0.04	< 0.005	< 0.005	—	0.04
Total	—	—	—	—	—	—	—	—	—	—	—	2.03	10.0	12.1	0.21	0.01	—	18.9

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	12.3	60.4	72.7	1.27	0.03	—	114
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.27	0.27	< 0.005	< 0.005	—	0.27
Total	—	—	—	—	—	—	—	—	—	—	—	12.3	60.7	72.9	1.27	0.03	—	114

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	12.3	60.4	72.7	1.27	0.03	—	114
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.27	0.27	< 0.005	< 0.005	—	0.27
Total	—	—	—	—	—	—	—	—	—	—	—	12.3	60.7	72.9	1.27	0.03	—	114
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	2.03	10.0	12.0	0.21	0.01	—	18.8
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.04	0.04	< 0.005	< 0.005	—	0.04
Total	—	—	—	—	—	—	—	—	—	—	—	2.03	10.0	12.1	0.21	0.01	—	18.9

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	65.7	0.00	65.7	6.57	0.00	—	230
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Total	—	—	—	—	—	—	—	—	—	—	—	65.7	0.00	65.7	6.57	0.00	—	230
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	65.7	0.00	65.7	6.57	0.00	—	230
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	65.7	0.00	65.7	6.57	0.00	—	230
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	10.9	0.00	10.9	1.09	0.00	—	38.1
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	10.9	0.00	10.9	1.09	0.00	—	38.1

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	65.7	0.00	65.7	6.57	0.00	—	230
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	65.7	0.00	65.7	6.57	0.00	—	230

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	65.7	0.00	65.7	6.57	0.00	—	230
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	65.7	0.00	65.7	6.57	0.00	—	230
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	10.9	0.00	10.9	1.09	0.00	—	38.1
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	10.9	0.00	10.9	1.09	0.00	—	38.1

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.46	2.46
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.46	2.46

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.46	2.46
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.46	2.46
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.41	0.41
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.41	0.41

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.46	2.46
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.46	2.46
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.46	2.46
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.46	2.46
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.41	0.41
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.41	0.41

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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	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	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Sequest	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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
Site Preparation	Site Preparation	3/2/2026	1/29/2027	5.00	240	—
Grading	Grading	2/1/2027	3/26/2027	5.00	40.0	—
Building Construction	Building Construction	4/12/2027	2/9/2029	5.00	480	—
Paving	Paving	3/29/2027	4/9/2027	5.00	10.0	—
Architectural Coating	Architectural Coating	4/26/2027	2/23/2029	5.00	480	—

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
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/Backh	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
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

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	11.7	LDA,LDT1,LDT2
Site Preparation	Vendor	—	8.40	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	11.7	LDA,LDT1,LDT2
Grading	Vendor	—	8.40	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	63.4	11.7	LDA,LDT1,LDT2
Building Construction	Vendor	18.8	8.40	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	11.7	LDA,LDT1,LDT2
Paving	Vendor	—	8.40	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	12.7	11.7	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	8.40	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
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	11.7	LDA,LDT1,LDT2
Site Preparation	Vendor	—	8.40	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	11.7	LDA,LDT1,LDT2
Grading	Vendor	—	8.40	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	63.4	11.7	LDA,LDT1,LDT2
Building Construction	Vendor	18.8	8.40	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	11.7	LDA,LDT1,LDT2
Paving	Vendor	—	8.40	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	12.7	11.7	LDA,LDT1,LDT2

Architectural Coating	Vendor	—	8.40	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	694,980	231,660	0.00	0.00	967

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Preparation	0.00	0.00	360	0.00	—
Grading	0.00	0.00	120	0.00	—
Paving	0.00	0.00	0.00	0.00	2.31

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	1.94	0%

Other Asphalt Surfaces	0.37	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2026	0.00	204	0.03	< 0.005
2027	0.00	204	0.03	< 0.005
2028	0.00	204	0.03	< 0.005
2029	0.00	204	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	1,697	1,697	1,697	619,274	17,734	17,734	17,734	6,472,945
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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	1,697	1,697	1,697	619,274	17,734	17,734	17,734	6,472,945
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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	176
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	0
Conventional Wood Stoves	0
Catalytic Wood Stoves	0
Non-Catalytic Wood Stoves	0
Pellet Wood Stoves	0

5.10.1.2. Mitigated

Hearth Type	Unmitigated (number)
Single Family Housing	—
Wood Fireplaces	0
Gas Fireplaces	176
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	0
Conventional Wood Stoves	0
Catalytic Wood Stoves	0
Non-Catalytic Wood Stoves	0
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)
694980	231,660	0.00	0.00	967

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	1,088,535	204	0.0330	0.0040	8,135,058
Other Asphalt Surfaces	0.00	204	0.0330	0.0040	0.00

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	< 0.005	204	0.0330	0.0040	8,135,058
Other Asphalt Surfaces	0.00	204	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Single Family Housing	6,405,049	13,500,639
Other Asphalt Surfaces	0.00	96,173

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Single Family Housing	6,405,049	13,500,639
Other Asphalt Surfaces	0.00	96,173

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Single Family Housing	122	—
Other Asphalt Surfaces	0.00	—

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Single Family Housing	122	—
Other Asphalt Surfaces	0.00	—

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)

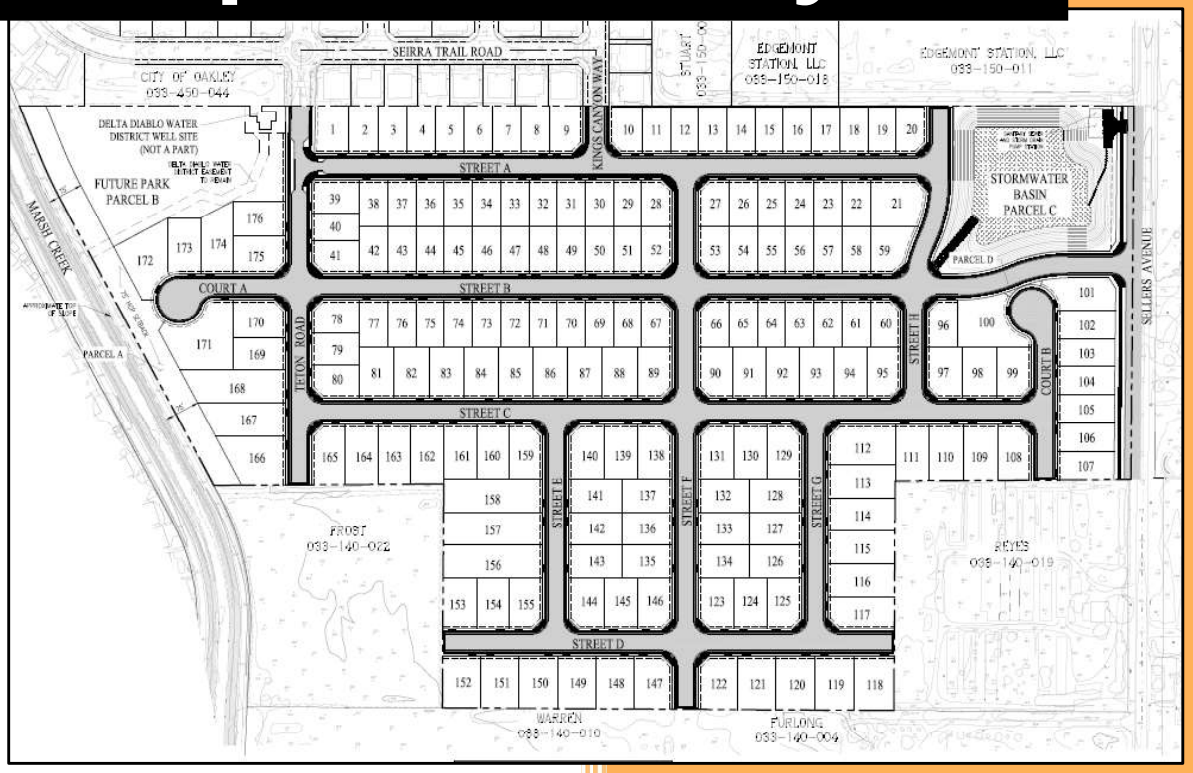
8. User Changes to Default Data

Screen	Justification
Land Use	Changes made based on project-specific information. It should be noted that "Other Asphalt Surfaces" refers to the off-site roadway dedication area.
Construction: Construction Phases	Changes made based on applicant-provided information. Based on typical construction practices, architectural coating assumed to start two weeks after the start of building construction and last for the same number of days.
Construction: Dust From Material Movement	—
Construction: Paving	Changes based on project-specific information
Operations: Vehicle Data	Changes to trip generation rates made to be consistent with TJKM's project-specific TIS
Operations: Hearths	Changes based on every household opting to have a hearth, which provides a conservative analysis.

Appendix B
Traffic Impact Study

Traffic Impact Study

Stonecreek Residential Development Oakley, CA



TJKM

July 17, 2023

Revised: November 20, 2023

Traffic Impact Study

Stonecreek Residential Development

City of Oakley, California

November 20, 2023

TJKM

TABLE OF CONTENTS

Table of Contents ..... **i**
List of Tables ..... **ii**
List of Figures ..... **iii**
List of Appendices ..... **iii**
Executive Summary **4**
Project Overview 4
Vehicle Miles Traveled 4
Project Trips 5
Level of Service 5
Existing Conditions 5
Existing plus Project Conditions 5
Background Conditions 5
Background plus Project Conditions 5
Additional Transportation Analyses 5
Pedestrian Impacts 5
Bicycle Impacts 5
Transit Impacts 6
Vehicular Site Access 6
On-Site Circulation 6
Parking 6
Recommendations 6
1.0 Introduction **7**
1.1 Study Purpose 7
1.2 Study Locations 7
1.3 Study Scenarios 7
2.0 Study Methodology **11**
2.1 Vehicle Miles Traveled Methodology 11
2.2 Level of Service Methodology 12
2.2.1 Signalized Intersections 12
2.2.2 Stop-Controlled Intersections 13
2.2.3 Level of Service Standards 14
3.0 Existing Conditions **16**
3.1 Existing Setting and Roadway System 16
3.2 Existing Pedestrian Facilities 17
3.3 Existing Bicycle Facilities 17

3.4 Existing Transit Facilities 18
3.5 Existing Traffic Volumes and Lane Configuration 23
3.6 Intersection Level of Service Analysis 26
4.0 Existing plus Project Conditions 27
4.1 Vehicle Miles Traveled 27
4.2 Project Trip Generation 28
4.3 Project Trip Distribution and Assignment 30
4.4 Intersection Level of Service Analysis 33
5.0 Background Condtitions 34
5.1 Background Traffic Growth 34
5.2 Intersection Level of Service Analysis 39
6.0 Background plus Project Conditions 40
6.1 Project Trip Reassignment 40
6.2 Intersection Level of Service Analysis 40
7.0 Additional Analysis 44
7.1 Alternative Modes of Transportation 44
7.1.1 Pedestrian Impacts 44
7.1.2 Bicycle Impacts 44
7.1.3 Transit Impacts 44
7.2 Vehicular Site Access 45
7.3 On-Site Circulation 45
7.4 Parking 45
7.5 Recommendations 45

LIST OF TABLES

Table 1: Level of Service Definitions for Signalized Intersections 13
Table 2: Level of Service Definitions for Stop Controlled Intersections 14
Table 3: Existing Bus Services 19
Table 4: Existing Conditions – Intersection Level of Service Analysis Results 26
Table 5: Project Trip Generation (ITE TGM 11th Ed.; Peak Hour of the Adjacent Street) 29
Table 6: Existing plus Project Conditions – Intersection Level of Service Analysis Results 33
Table 7: Background Conditions – Intersection Level of Service Analysis Results 39
Table 8: Background plus Project Conditions – Intersection Level of Service Analysis Results 41

LIST OF FIGURES

Figure 1: Vicinity Map 9
Figure 2: Site Plan 10
Figure 3: Existing Conditions – Pedestrian Network 20
Figure 4: Existing Conditions – Bike Network 21
Figure 5: Existing Conditions – Transit Network 22
Figure 6: Existing Conditions - Lane Configuration and Control 24
Figure 7: Existing Conditions – Intersection Peak Hour Traffic Volumes 25
Figure 8: Trip Distribution and Assignment 31
Figure 9: Existing plus Project Conditions – Intersection Peak Hour Traffic Volumes 32
Figure 10: Redistribution of Existing Trips for Background Conditions 36
Figure 11: Background Conditions – Lane Configuration and Control 37
Figure 12: Background Conditions – Intersection Peak Hour Traffic Volumes 38
Figure 13: Background plus Project Conditions – Project Trip Assignment 42
Figure 14: Background plus Project Conditions – Intersection Peak Hour Traffic Volumes 43

LIST OF APPENDICES

Appendix A: HCM Methodology

Appendix B: Existing Conditions Capacity Analysis Worksheets

Appendix C: Existing plus Project Conditions Capacity Analysis Worksheets

Appendix D: Background Conditions Capacity Analysis Worksheets

Appendix E: Background plus Project Conditions Capacity Analysis Worksheets

EXECUTIVE SUMMARY

This report summarizes the results of a Traffic Impact Study (TIS) that was conducted for a proposed residential development (Project) on Sellers Avenue in the City of Oakley (City), California.

This TIS was conducted consistent with State and City of Oakley guidelines and standards. This document was prepared in accordance with best professional practices and standards that assess the impacts of a proposed development on the transportation system, and as appropriate, recommends improvements to lessen or negate those impacts. Transportation analyses, as presented in this TIS, involve the evaluation of existing and anticipated future roadway conditions, including with and without the proposed development, and recommend transportation improvements to offset both the impacts of the increase in future traffic volumes and the changes in traffic operations due to the development.

Project Overview

The Project would construct 176 single family homes on a site that is currently vacant.

The purpose of this TIS is to evaluate the impacts on the transportation infrastructure due to the addition of traffic from the proposed project. The report includes a vehicle miles travelled (VMT) analysis, intersection level of service (LOS) capacity analyses of key intersections, and evaluations and recommendations concerning project site access, on-site circulation, and connectivity for vehicles, bicycles, transit, and pedestrians.

To evaluate the impacts on the transportation infrastructure due to the addition of traffic from the proposed project, six study intersections were identified with input from City staff (five existing intersections and one future site entrance) and were evaluated during the weekday morning (a.m.) peak hour and weekday afternoon (p.m.) peak hour under four study scenarios. The study intersections were evaluated under:

- Existing Conditions, with and without the proposed development; and
- Background Conditions, with and without the proposed development.

Existing and Background conditions were based on the most recent approved City of Oakley Citywide Model for the a.m. and p.m. peak hours.

Vehicle Miles Traveled

The proposed development is expected to add 176 homes to the project's Traffic Analysis Zone (TAZ), a land use category that is considered non-exempt under the Governor's Office of Planning and Research (OPR) SB-743 Technical Advisory, adopted on December 2018. The project is not screened out from detailed analysis. From the 2018 Base Year run, the home based VMT per capita for the City of Oakley is **27.43**. For a project to not be significant, the 85% threshold is set at 0.85 x 27.43 which is **23.32**. The 2018 Base Year plus Project model run added 176 Single Family Dwelling Units into TAZ #30263. The resultant home based VMT per capita for the project TAZ is **24.43**. Consistent with recommended mitigation measures the project includes full sidewalks within the project and would provide connections to the Marsh Creek Regional Trail.

A total of 7.4% reduction in VMT for the project reduces the value from 24.43 to **22.62.** With mitigation, the Stonecreek residential project is found to have a **less than significant** impact on VMT for the base year.

Project Trips

Using the methodology presented in the Institute of Transportation Engineers' (ITE) Trip Generation Manual 11th Edition (TGM), the proposed development is expected to generate approximately 1,697 new trips during a typical weekday, with 125 new trips (31 inbound, 94 outbound) occurring during the a.m. peak hour and 169 new trips (106 inbound, 63 outbound) occurring during the p.m. peak hour.

Level of Service

Existing Conditions

Under this scenario, all but one of the study intersections operate at acceptable LOS D/E or better during both peak hours. The intersection of Main Street & Delta Road (Study Intersection 6) operates at LOS F in the a.m. peak hour.

Existing plus Project Conditions

Under this scenario, all but one of the study intersections would continue to operate at acceptable LOS D or better during both peak hours. The intersection of Main Street & Delta Road (Study Intersection 6) would operate at LOS F during both peak hours. This inconsistency with the City of Oakley General Plan can be eliminated by signalizing this intersection, improving operations to LOS C or better during both peak hours. It should be noted that signalization of Main Street & Delta Road is planned for the future and included under Background conditions. With this improvement, the project would be **consistent** with City standards.

Background Conditions

Under this scenario, all of the study intersections would operate at LOS D or better during both peak hours.

Background plus Project Conditions

Under this scenario, all of the study intersections would continue to operate at acceptable LOS D or better during both peak hours. The project would be **consistent** with City standards.

Additional Transportation Analyses

Pedestrian Impacts

The proposed Project would not result in any conflicts with applicable or adopted policies, plans, or programs related to pedestrian facilities. The proposed Project would not decrease the performance or safety of existing pedestrian facilities. Pedestrian access to the site would continue to be **adequate** with the proposed Project.

Bicycle Impacts

The proposed Project would not result in any conflicts or inconsistencies with existing bicycle facilities or with adopted bicycle system plans, policies, or programs related to bicycle facilities. The proposed Project

would not decrease the performance or safety of bicycle facilities. Bicycle access to the site would continue to be **adequate** with the proposed Project.

Transit Impacts

The proposed Project would not conflict with existing or planned transit facilities, nor is it expected to create inconsistencies between additional transit trips and adequate levels of pedestrian and bicycle facilities along transit routes and at transit stops. Transit access would continue to be **adequate** with the proposed Project.

Vehicular Site Access

Access to the project site would be via one new street (Street B) connected to Sellers Avenue and via connections to Teton Road and Kings Canyon Way to the north. Access to the proposed project would be **adequate.**

On-Site Circulation

Circulation on the project site is via internal streets that are generally 36 feet wide, with 30-foot corner radii. Pedestrian access and circulation are provided via new sidewalks on all internal streets and connecting to the Marsh Creek Regional Trail. On-site circulation is considered **adequate**.

Parking

Under the City of Oakley Municipal Code, single family homes are required to provide two covered off-street parking spaces on the same lot. It is expected that the proposed single family homes would include two car garages, satisfying this requirement. In addition, internal streets would typically permit on-street parking on both sides. The proposed parking supply is expected to be **adequate**.

Recommendations

The following are recommended:

- Ensure that an accessible connection is provided for bicyclists and pedestrians to the Marsh Creek Regional Trail.

1.0 INTRODUCTION

This report summarizes the results of a Traffic Impact Study (TIS) that was conducted for a proposed residential development (Project) on Sellers Avenue in the City of Oakley in Contra Costa County. The Project would construct 176 single family homes on a site that is currently vacant.

This chapter discusses the TIS purpose, the Project study area, and the scenarios analyzed. **Figure 1** shows the Project study area and the Project site location. **Figure 2** shows the Project's site plan, dated May 2, 2023.

1.1 Study Purpose

The purpose of this report is to provide summaries of changes in vehicle miles traveled (VMT) and traffic impacts on the surrounding roadway network as a result of the proposed Project. The City of Oakley has not formally adopted VMT standards yet, so the Governor's Office of Planning and Research (OPR) Technical Advisory guidance (December 2018) was used for VMT significance analysis. A level-of-service (LOS) analysis was conducted to determine the proposed Project's impacts on the surrounding roadway network and consistency with the City of Oakley's guidelines and standards.

1.2 Study Locations

TJKM evaluated traffic conditions at six study intersections (five existing intersections and one future entrance) during the a.m. and p.m. peak hours for a typical weekday. The study intersections were selected based on TJKM's working knowledge of the area and with input and approval from City of Oakley staff.

The peak periods observed were between 7 and 9 a.m. and between 4 and 6 p.m. The study intersections and their corresponding traffic controls are listed below:

Study Intersection 1: Sellers Avenue & E. Cypress Road (Signal)
Study Intersection 2: Sellers Avenue & Laurel Road (Signal, future intersection)
Study Intersection 3: Sellers Avenue & Delta Road (All-Way Stop)
Study Intersection 4: Sellers Avenue & Street B (Two-Way Stop, project conditions only)
Study Intersection 5: Main Street & Laurel Road (Signal)*
Study Intersection 6: Main Street & Delta Road (Two-Way Stop)*

* indicates that intersection is in a Priority Development Area

Figure 1 shows the location of the study intersections.

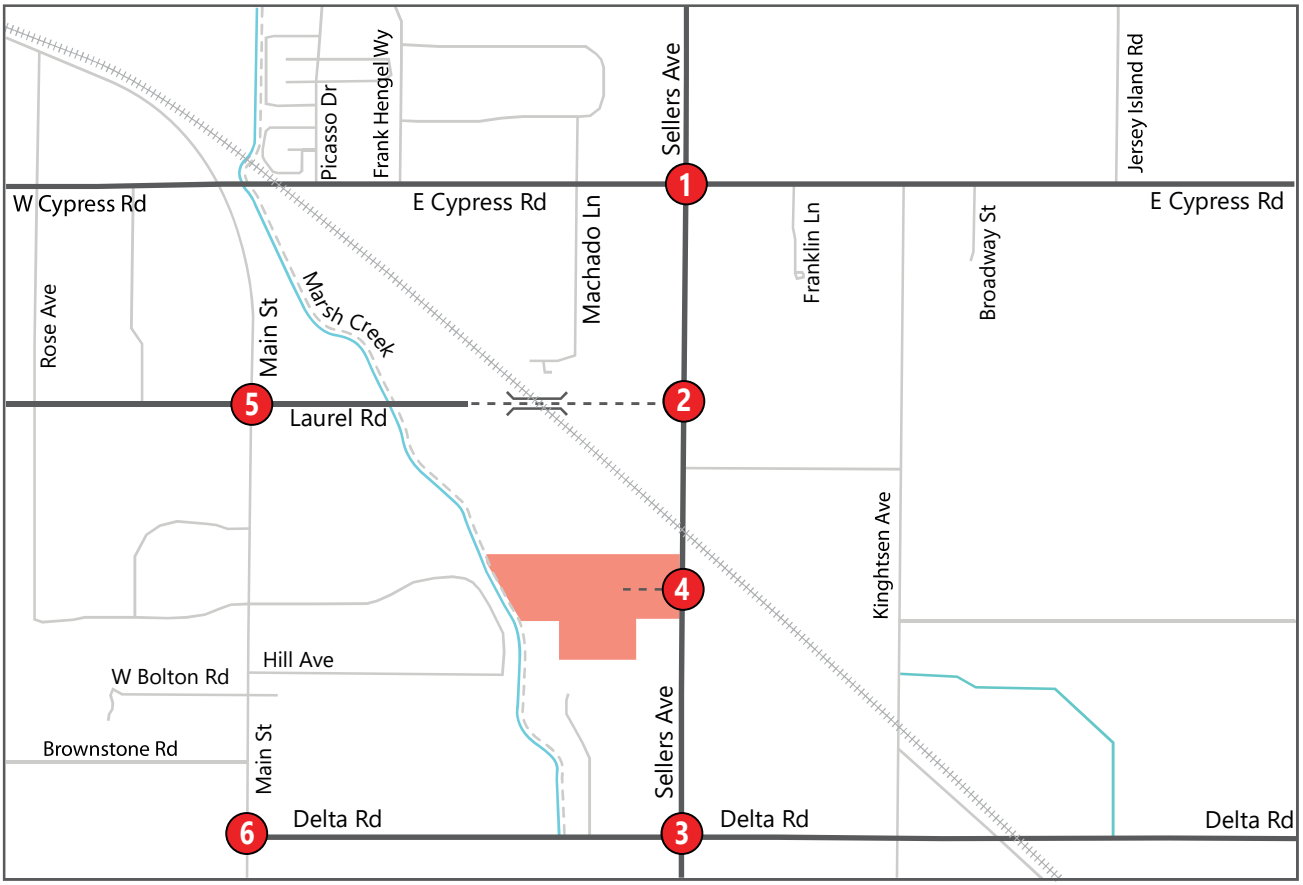
1.3 Study Scenarios

The roadway network operations within the Project study area were analyzed under the following scenarios:

- **Existing Conditions** – This scenario describes existing transportation conditions in the study area based on the current roadway and sidewalk network characteristics, transit service, and the existing Oakley Citywide Traffic Model.

- **Existing plus Project Conditions** – This scenario is similar to Existing Conditions but with the addition of new trips that would be generated by the project.
- **Background Conditions** –This scenario describes the projected peak hour traffic operations based on the net change to travel patterns anticipated from approved (but not yet constructed) or fully/partially occupied developments in the City at the time of the Existing Conditions assessment. This includes additional trips that would be generated if the proposed approved developments were to operate at full occupancy. The conditions in this scenario were developed using the Updated Citywide Traffic Model and include the proposed Laurel Avenue extension.
- **Background plus Project Conditions** – This scenario is similar to Background Conditions but with the inclusion of vehicle trips that would be generated by the project.

Figure 1: Vicinity Map

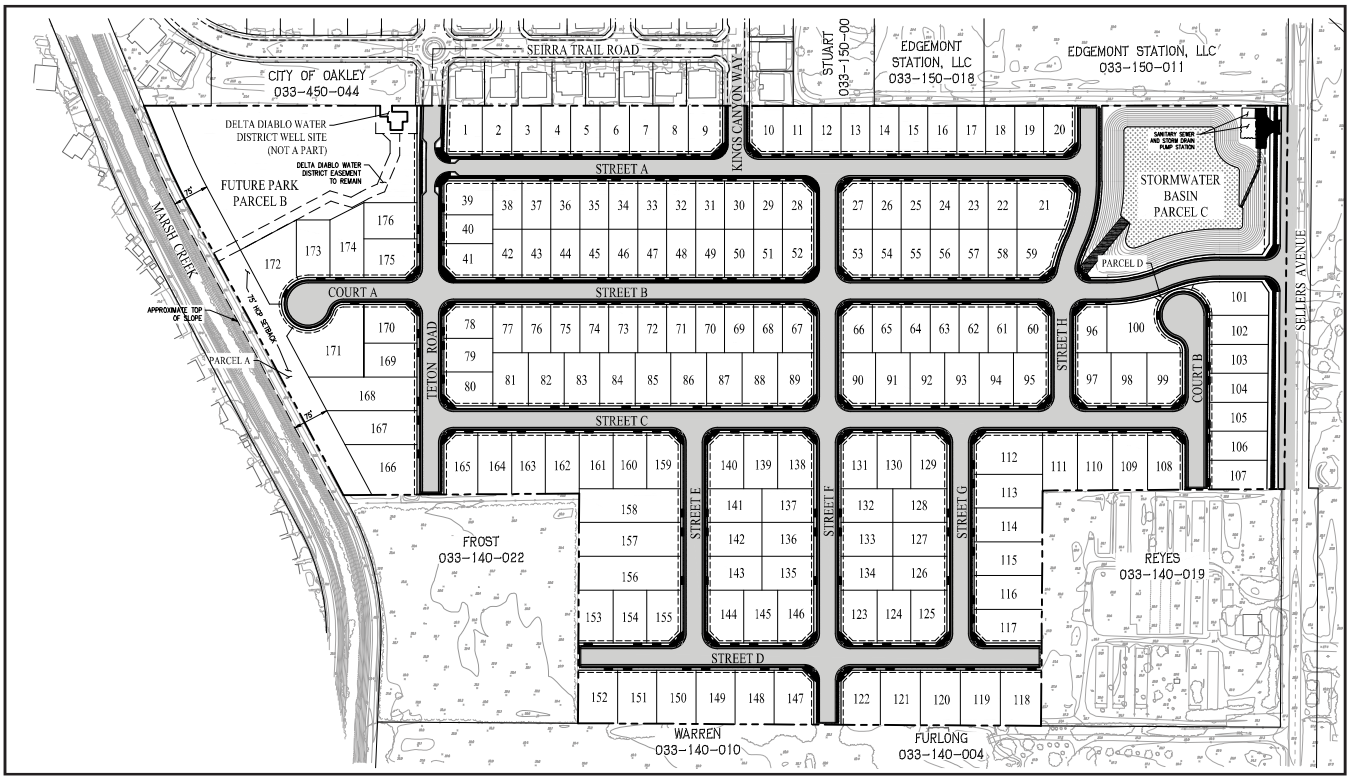


LEGEND

Project Site

Study Intersection

Figure 2: Site Map



2.0 STUDY METHODOLOGY

Traffic impacts related to the proposed Project were evaluated for both compliance with applicable regulatory documents and environmental significance as defined in the California Environmental Quality Act (CEQA). In accordance with the *Technical Advisory* published by the Governor's Office of Planning and Research (OPR), a quantitative Vehicle Miles Traveled (VMT) assessment forms the basis of the CEQA analysis for the proposed project. Effective as of July 1, 2020, intersection Level of Service (LOS) can no longer be used to determine significant impacts for CEQA purposes. However, the CEQA guidelines do not exclude the use of LOS analyses when determining consistency with plans and standards for jurisdictions or agencies, such as with the City of Oakley.

2.1 Vehicle Miles Traveled Methodology

The City of Oakley has not yet established standards of significance for VMT, which is now a mandatory CEQA component of traffic studies. The *Technical Advisory* provides guidance to analysts and local jurisdictions for implementing VMT as a metric for determining the transportation impact for land use projects. The OPR guidelines state that for analysis purposes, "VMT" refers to automobile VMT, specifically passenger vehicles and light trucks. Heavy truck traffic is typically excluded. This study evaluates project-related VMT as outlined in the adopted CCTA VMT methodology. The methodology and implementation guidelines were adopted by CCTA in July 2020.

The CCTA guidelines include a screening process that describes five scenarios in which a project would be exempted from a VMT analysis requirement: 1) projects exempt from CEQA analysis, 2) small projects, 3) local serving projects, 4) projects in transit priority areas, and 5) projects in low VMT areas. It should be noted that even if a project satisfies one or more of the screening criteria, lead agencies may still require a VMT analysis if there is evidence that the project has characteristics that might lead to a significant amount of VMT. The project does not satisfy the requirements for screening criteria 1-4.

Under the CCTA VMT methodology, a low VMT area is defined as a city or unincorporated portion within one of the CCTA subregions where home-based VMT per resident is at least 15 percent below the countywide or where the commute VMT per employee is at least 15 percent below the regional average. A conservative reading of the methodology would indicate that when the citywide average VMT per resident is above the countywide average, projects cannot be screened out based on location, and a VMT analysis must be completed. In such cases, the appropriate significance thresholds based on countywide or regional average would be applied. The methodology also permits the applicable average VMT for the subject municipality or unincorporated CCTA subregion to be utilized instead of the countywide or regional average, if it is less stringent.

Under CCTA guidelines, a residential project would have a significant impact on VMT if it would generate residential VMT per capita higher than 85 percent of the City of Oakley average.

2.2 Level of Service Methodology

Level of Service (LOS) is a qualitative measure that describes operational conditions as they relate to the traffic stream and perceptions by motorists and passengers. The LOS generally describes these conditions in terms of such factors as speed and travel time, delays, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. The operational LOS are given letter designations from A to F, with A representing the free-flow operating conditions and F representing the severely congested flow with high delays. Typically, LOS C is considered as an ideal condition as it represents stable flow and efficient use of the transportation facility. Intersections generally are the capacity-controlling locations with respect to traffic operations on arterial and collector streets. The following sections provide detailed study methodology based on the type of intersections.

Each of the study intersections was analyzed using *Synchro,* Version 11, software using methodology outlined in the Transportation Research Board's (TRB) Highway Capacity Manual, 6th Edition (HCM 6). The LOS assessment under all scenarios is based on current traffic controls unless otherwise noted. HCM 6 methodology was used for consistency with agency standard requirements as described in Section 2.3.

2.2.1 Signalized Intersections

The study intersections under traffic signal control are analyzed using the HCM 6 methodology described in Chapter 19. This methodology determines LOS based on average control delay per vehicle for the overall intersection and by approach and a combination of control delay per vehicle and volume-to-capacity (v/c) for lane groups during the peak hour operating conditions.

Delay quantifies the increase in travel time due to traffic signal control; it is also a surrogate measure of driver discomfort and fuel consumption. The v/c ratio quantifies the degree to which a phase's capacity is utilized by a lane group. A v/c ratio of 1.0 or more indicates cycle capacity is fully utilized and represents failure from a capacity perspective (just as delay in excess of 80 seconds per vehicle represents failure from a delay perspective).

Table 1 summarizes the relationship between the control delay and LOS for signalized intersections. The LOS assessments under all scenarios are based on current traffic controls and signal timings unless otherwise noted.

The LOS methodology for signalized intersections is described in detail in **Appendix A**.

Table 1: Level of Service Definitions for Signalized Intersections

LOS	Definition	Control Delay Range (s/veh)	v/c Range
A	Very low control delay. This level is typically assigned when the v/c ratio is low and either progression is exceptionally favorable or the cycle length is short. Most vehicles arrive during the green phase. Many vehicles do not stop at all.	≤ 10	≤ 1.0
B	The v/c ratio is low. There is good progression, short cycle lengths, or both. More vehicles stop, causing higher levels of delay.	≤ 20	≤ 1.0
C	Higher delays occur in favorable progression or a due to a moderate cycle length, or both. Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during a given cycle) may begin to appear. The number of vehicles stopping is still considered low-to-moderate, though many vehicles still pass through the intersection without stopping.	≤ 35	≤ 1.0
D	The influence of congestion becomes more apparent. Longer delays may result from some combination of a high v/c ratio, ineffective progression, long cycle length, or high volumes. Many vehicles stop, the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	≤ 55	≤ 1.0
E	Typically considered the limit of acceptable delay. High delays usually indicate a very high v/c ratio, poor progression, long cycle lengths, and high volumes. Most cycles fail to clear the queue.	≤ 80	≤ 1.0
F	Delays are unacceptable to most drivers. Conditions are considered oversaturated. Arrival flow rates exceed the capacity of the intersection (v/c in excess of 1.0). Many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to higher delay.	> 80	> 1.0

Source: Transportation Research Board's (TRB) Highway Capacity Manual, 6th Edition

2.2.2 Stop-Controlled Intersections

The study intersections under one/two-way stop control (OWSC / TWSC) and all-way stop control (AWSC) are analyzed using the HCM 6 methodology described in Chapters 20 and 21, respectively. LOS ratings for stop-sign controlled intersections are based on the average control delay expressed in seconds per vehicle. At one- or two-way stop-controlled intersections, the control delay is calculated for each movement, not for the intersection as a whole. For approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. The weighted average delay for the entire intersections is presented for all-way stop controlled intersections.

Table 2 summarizes the relationship between delay and LOS for stop-controlled intersections. The delay ranges for stop-controlled intersections are lower than for signalized intersections, as drivers expect less delay at stop-controlled intersections.

The LOS methodology for stop-controlled intersections is described in detail in **Appendix A**.

Table 2: Level of Service Definitions for Stop Controlled Intersections

LOS	Definition	Control Delay Range (s/veh)	v/c Range
A	Usually no conflicting traffic. Drivers can easily find gaps in traffic to maneuver. v/c is low.	≤ 10	≤ 1.0
B	Occasionally some delay due to conflicting traffic. Drivers can find gaps in traffic. v/c is low.	≤ 15	≤ 1.0
C	There is some noticeable delay due to conflicting traffic. Drivers are still able to find gaps in traffic.	≤ 25	≤ 1.0
D	Drivers experience delay due to less gaps in traffic to maneuver. Lane group v/c creeps closer to 1.0.	≤ 35	≤ 1.0
E	Delay approaches driver tolerance levels. Drivers will occasionally find gaps in traffic to maneuver. Lane group v/c approaches 1.0.	≤ 50	≤ 1.0
F	Delay exceed driver tolerance levels or v/c exceeds 1.0 or both.	> 50	> 1.0

Source: Transportation Research Board's (TRB) Highway Capacity Manual, 6th Edition

2.2.3 Level of Service Standards

Although level of service is no longer used for identifying impacts under CEQA, level of service analysis is still used for determining consistency with adopted agency plans and standards. Where standards refer to significant environmental impacts, this analysis instead identifies these as significant inconsistencies with adopted plans. In most cases, in this report LOS exceedances are characterized as *substantial*.

Per the City of Oakley General Plan, LOS D or a volume-to-capacity (V/C) ratio of 0.90 are the thresholds of acceptability for signalized intersections. Any signalized intersection operating worse than LOS D would be considered inconsistent with this standard. The intersection of Main Street and E. Cypress Road, which is a CMP intersection (Contra Costa County 2019 Congestion Management Program, CCTA, 2019), and the intersections along Main Street at Laurel Road and Delta Road, which are within Priority Development Areas (Plan Bay Area 2040, Metropolitan Transportation Commission, 2017), have standards of LOS E or better. For this study, the study intersections were analyzed using HCM 6th Edition Methodology as per the City's guidance. Average control delay is reported in seconds per vehicle for signalized and all-way-stop-control intersections and critical delay for minor approaches is reported for two-way-stop-control intersections. Intersections operating worse than LOS D are considered inconsistent with the City's standard.

Appendix G of the State CEQA Guidelines includes criteria for potential transportation impacts. Although no longer applicable for CEQA, they are still relevant issues for consideration by Oakley. These include whether a project would result in one of the following:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, bicycle and pedestrian paths, and mass transit.
- Conflict with an applicable congestion management program, including, but not limited to LOS standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.
- Section 4B of the Contra Costa County Transportation Analysis Guidelines identifies significance criteria based on level of service analysis results. Significant impacts occur if:
- The addition of project traffic results in the degradation of intersection operations from acceptable LOS D or better to unacceptable operations (LOS E or LOS F), except for intersections in Priority Development Areas ("PDA") where the minimum acceptable operational standard is LOS E. This document refers to these exceedances as "substantial".
- The addition of project traffic to an intersection operating unacceptably before the addition of project trips results in an increase in average controlled delay (for signalized and all-way stop-controlled intersections) or worst movement/approach delay (for side-street stop-controlled intersections) at the intersection by 5.0 seconds or more.

3.0 EXISTING CONDITIONS

This section describes existing conditions in the immediate project site vicinity, including roadway facilities, bicycle and pedestrian facilities, and available transit service. In addition, existing traffic volumes and operations are presented for the study intersections.

3.1 Existing Setting and Roadway System

Relevant roadways in the project vicinity are discussed below and shown in **Figure 1.**

E. Cypress Road – E. Cypress Road is a two to four lane major arterial roadway. E. Cypress Road extends east-west between Main Street and Sandmound Boulevard. Residential, school, and agricultural uses, along with vacant land, characterize the lands along both sides of E. Cypress Road. Posted speed limits on E. Cypress Road are 35 miles per hour (mph) between Main Street and Frank Hengel Way and east of Summer Lake Drive, 45 mph between Frank Hengel Way and Sellers Avenue and between Bethel Island Road and Summer Lake Drive, and 50 mph between Sellers Avenue and Bethel Island Road.

Sellers Avenue – Sellers Avenue is a two lane, north-south collector roadway north of E. Cypress Road, and minor arterial south of E. Cypress Road. Residential and agricultural uses characterize the lands along both sides of Sellers Avenue. The maximum posted speed limit on Sellers Avenue is 50 mph between E. Cypress Road and Delta Road.

Laurel Road – Laurel Road is a two- to four-lane, east-west divided roadway. Currently, Laurel Road extends to Teton Road in the east and terminates at SR 4 to the west. Laurel Road mainly serves to collect and distribute traffic to/from residential streets and SR 4. In the future Laurel Road will extend to Sellers Avenue in the east and will be widened to four lanes for the portion east of Main Street. The posted speed limit on Laurel Road ranges between 35 to 40 mph near the project site.

Main Street – Main Street is a two to four lane major arterial roadway. Main Street is currently the major north-south transportation corridor in the City of Oakley. Mixed residential, commercial, and agricultural uses characterize the lands along both sides of Main Street between Rose Avenue and Laurel Avenue. Maximum speeds posted on Main Street are 35 mph west of Rose Avenue, 45 mph between Rose Avenue and Bernard Road, and 40 mph south of Bernard Road.

Delta Road – Delta Road is a two-lane, east-west rural road that extends east from Main Street providing connection to the north end of the planned Byron Highway. Delta Road mainly provides access to residential and agricultural land uses. The posted speed limit on Delta Road is 40 mph.

Teton Road – Teton Road is a two-lane north-south collector that connects the subdivisions to the north of the project site to Laurel Road. The proposed project would extend Teton Road. There is no posted speed on Teton Road.

Kings Canyon Way – Kings Canyon Way is a two-lane north-south local street located to the north of the project site. The proposed project would connect to Kings Canyon Way. There is no posted speed on Kings Canyon Way.

3.2 Existing Pedestrian Facilities

Walkability is defined as the ability to travel easily and safely between various origins and destinations without having to rely on automobiles or other motorized travel. The ideal "walkable" community includes wider sidewalks, a mix of land uses such as residential, employment, and shopping opportunities, a limited number of conflict points with vehicle traffic, and easy access to transit facilities and services.

Pedestrian facilities consist of marked crosswalks, concrete sidewalks, pedestrian signals, and off-street paths that provide safe and convenient routes for pedestrians to access the destinations such as institutions, businesses, public transportation, and recreational facilities.

There are no existing sidewalks provided along the project frontage on Sellers Avenue. The closest sidewalk network is located in the existing subdivision to the north of the project site. There are also sections of sidewalk on the north side of E. Cypress Road at the intersection of E. Cypress Road and Sellers Avenue; on both sides of Main Street, south of Laurel Road; and on the south side of Laurel Road, east and west of Main Street. Although sidewalks are provided on at least one side along much of Laurel Road between Teton Road and Main Street, there is a notable gap with no sidewalk, forcing pedestrians to walk in the road or on the unpaved shoulder.

A graphic illustrating existing pedestrian facilities in the immediate project vicinity is provided in **Figure 4**.

3.3 Existing Bicycle Facilities

Bicycle paths, lanes, and routes are typical examples of bicycle transportation facilities, which are defined by Caltrans as being in one of the following four classes:

- **Class I (Multiuse Trail)**: A completely separated facility designed for the exclusive use of bicyclists and pedestrians with crossing points minimized.
- **Class II (Bike Lane)**: A designated lane for the exclusive use or semi-exclusive use of bicycles with through travel by motor vehicles or pedestrians prohibited but with vehicle parking and cross-flows by pedestrians and motorists permitted.
- **Class III (Bike Route)**: A route designated by signs or pavement markings and shared with pedestrians and motorists.
- **Class IV (Separated Bikeway)**: An on-street facility reserved for use by bicyclists with physical separation between the bikeway and travel lanes. Physical separation consists of vertical elements that may include curbs, landscaping, bollards, or parking lanes.

The City of Oakley General Plan (September 2002), City of Oakley Parks, Recreation, and Trails Master Plan 2020 (Summer 2007), and the Contra Costa County Bicycle and Pedestrian Plan (October 2009) propose that several new bicycle facilities be constructed in the future which includes trunk line bikeway network

passing through Main Street and Laurel Road and a local multi-use trail on E. Cypress Road and Sellers Avenue in the vicinity of the project area.

The existing bicycle facilities are at the following locations:

- **East Cypress Road** – Class II bicycle facilities are provided on the north side between Knightsen Avenue and Main Street, and on the south side between Main Street and 790 feet east of Frank Hengel Way.
- **Main Street**- Class II bicycle facilities are provided between Cypress Road and Simoni Ranch Road on both sides.
- **Sellers Avenue** – Class II bicycle facilities are provided north of E. Cypress Road.
- **Laurel Road**- Class II bicycle facilities are provided between Harvest Drive and Main Street on both sides.
- **Teton Road** – Class II bicycle facilities are provided south of Tuolumne Way.
- **Marsh Creek Regional Trail**- Class I bicycle facility provided along Marsh Creek which can be accessed through Delta road approximately 1.5 miles west of the project site.
- **Via Delta de Anza Trail**- Class I bicycle facility provided along Contra Costa Canal which can be accessed through Cypress Road and O' Hara Avenue approximately two miles west of the project site.

A graphic illustrating existing bicycle facilities in the immediate project vicinity is provided in **Figure 4**.

3.4 Existing Transit Facilities

Tri-Delta Transit provides transit services in the City of Oakley, with three lines connecting Brentwood and the Pittsburg/Bay Point Bay Area Rapid Transit (BART) station. Via Teton Road, the project is located approximately 1.4 miles from the Oakley Park & Ride lot on Main Street near Cypress Road and 0.9 miles from the nearest bus stops on Main Street at Laurel Road.

- *Route 300X,* the Pittsburg BART/Brentwood Park & Ride route, is a weekday express route connecting Brentwood to the Pittsburg/Bay Point BART station via Oakley and Antioch. This bus travels along Main Street, operating from approximately 4:00 a.m. to 10:00 p.m. with 15 to 60-minute headways on weekdays only.
- *Route 383,* the Antioch BART/Blue Goose Park route, connects Oakley to the Antioch BART station and Brentwood. This bus route operates from approximately 5:00 a.m. to 6:45 p.m., with 60-120 minute headways on weekdays only.
- *Route 391,* the BART/Pittsburg/Antioch/Oakley/Brentwood route, provides weekday and weekend service to most East County Cities. On weekdays, the route operates from approximately 4:00 a.m. to 1:30 a.m. with 30 to 60-minute headways. On weekends, the route operates on more limited hours with 60 minute headways.

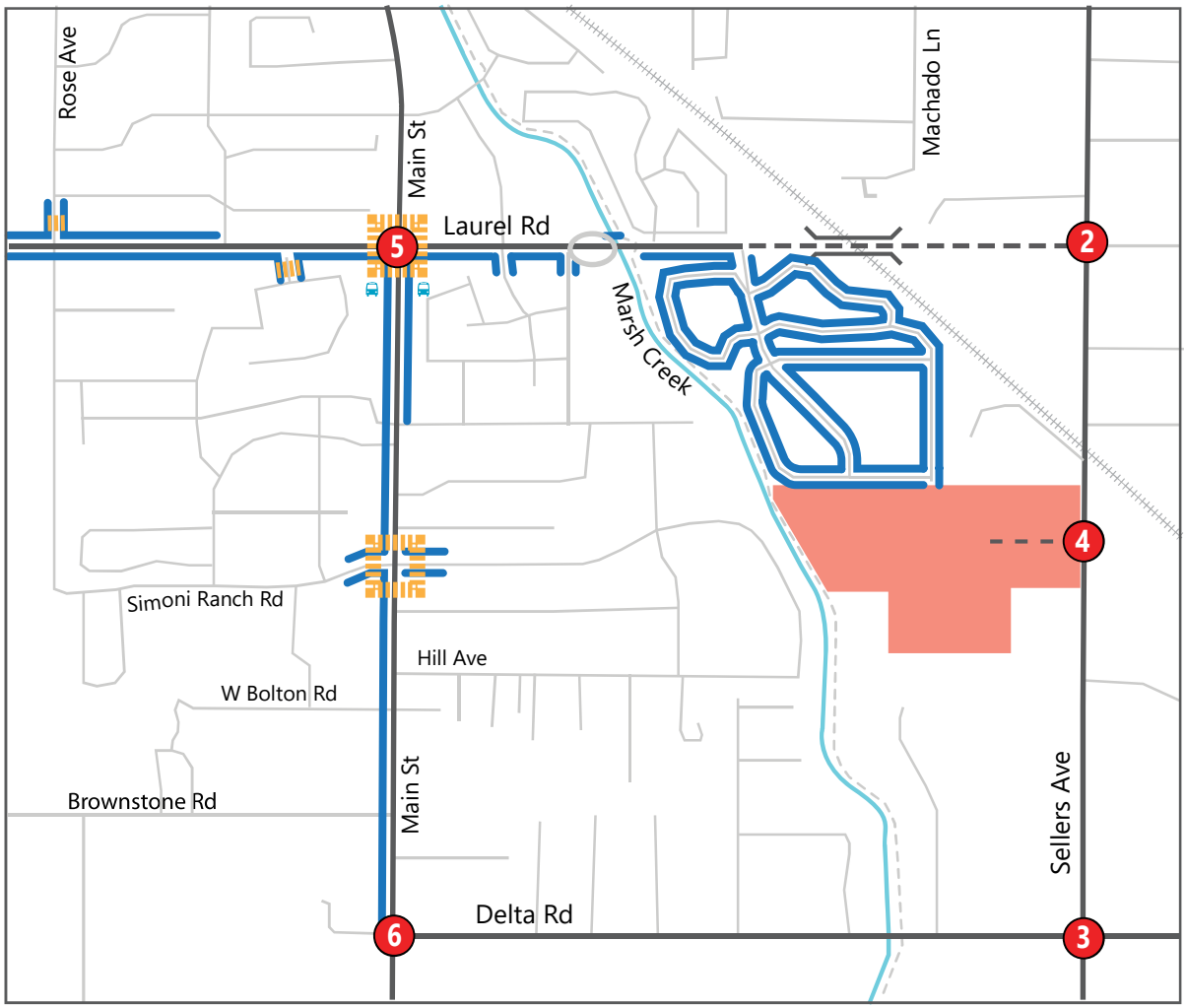
Table 3 summarizes the services and frequency during the weekday and on weekends for transit in the City of Oakley. **Figure 5** shows a map of transit routes operated by Tri-Delta Transit.

Table 3: Existing Bus Services

Route #	From	To	Weekdays		Saturday		Sunday	
			Operating Hours	Headway (minutes)	Operating Hours	Headway (minutes)	Operating Hours	Headway (minutes)
300X	Pittsburg/ Bay Point BART Station	Brentwood Park & Ride	4:00 a.m. – 10:00 p.m.	15-60	....	....	....	....
383	Antioch BART Station	Blue Goose Park	5:00 a.m. – 6:45 p.m.	60-120	....	....	....	....
391	Pittsburg/ Bay Point BART Station	Brentwood Park & Ride	4:00 a.m. – 1:30 a.m.	30-60	6:15 a.m. – 9:30 p.m.	60	7:15 a.m. – 9:15 p.m.	60

Source: www.trideltatransit.com

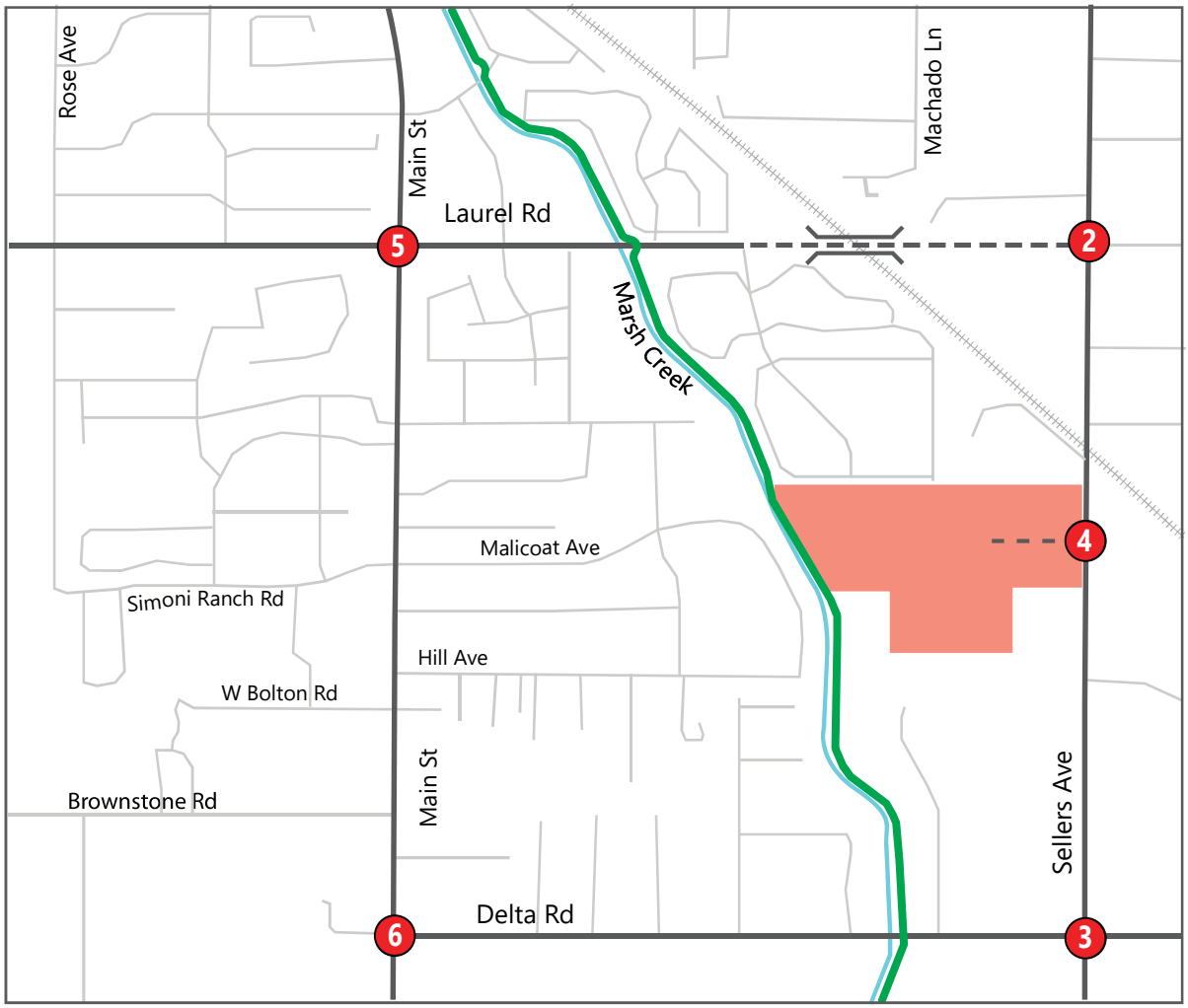
Figure 3: Existing Conditions - Pedestrian Facilities



LEGEND

- Project Site
- Concrete Sidewalk
- Gap
- Study Intersection
- Marked Crosswalk
- Multi Use Trail
- Bus Stop

Figure 4: Existing Conditions - Bicycle Facilities



LEGEND

Project Site

Study Intersection

Class I Multi Use Trail

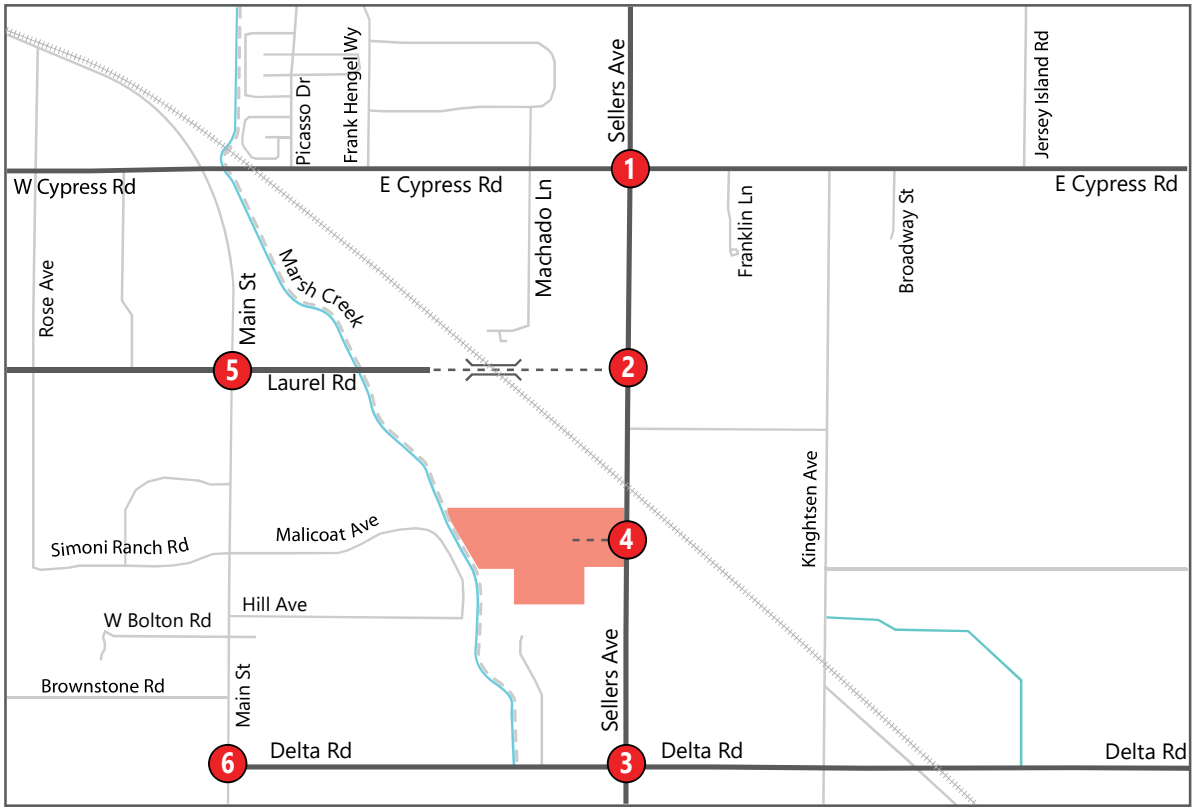
Figure 5: Existing Conditions - Transit Facilities

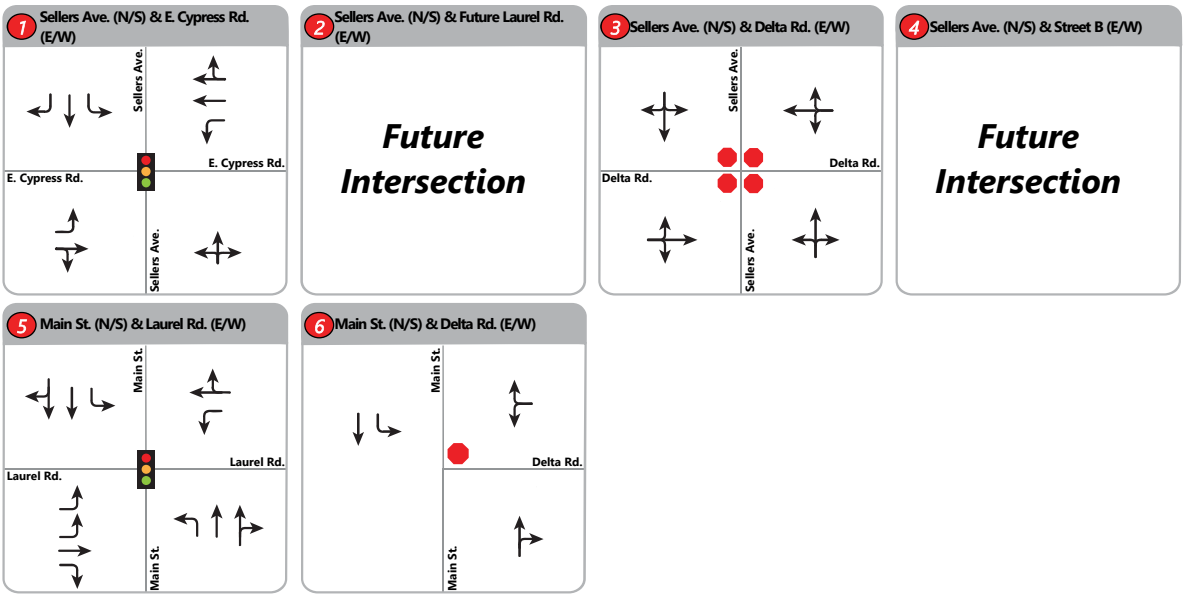


3.5 Existing Traffic Volumes and Lane Configuration

The Existing Conditions turning movement volumes for vehicles, bicycles and pedestrians at all study intersections reflect those of the most recently approved City of Oakley Citywide Model for the a.m. and p.m. peak hours. Since the City of Oakley is currently in the process of updating the model, the analysis may be updated with current counts at all intersections. The existing lane geometries and traffic control at each study intersection are illustrated on **Figure 6**, and the peak hour intersection turning movement volumes at each study intersection are illustrated on **Figure 7**.

Figure 6: Existing Conditions – Lane Configuration and Control

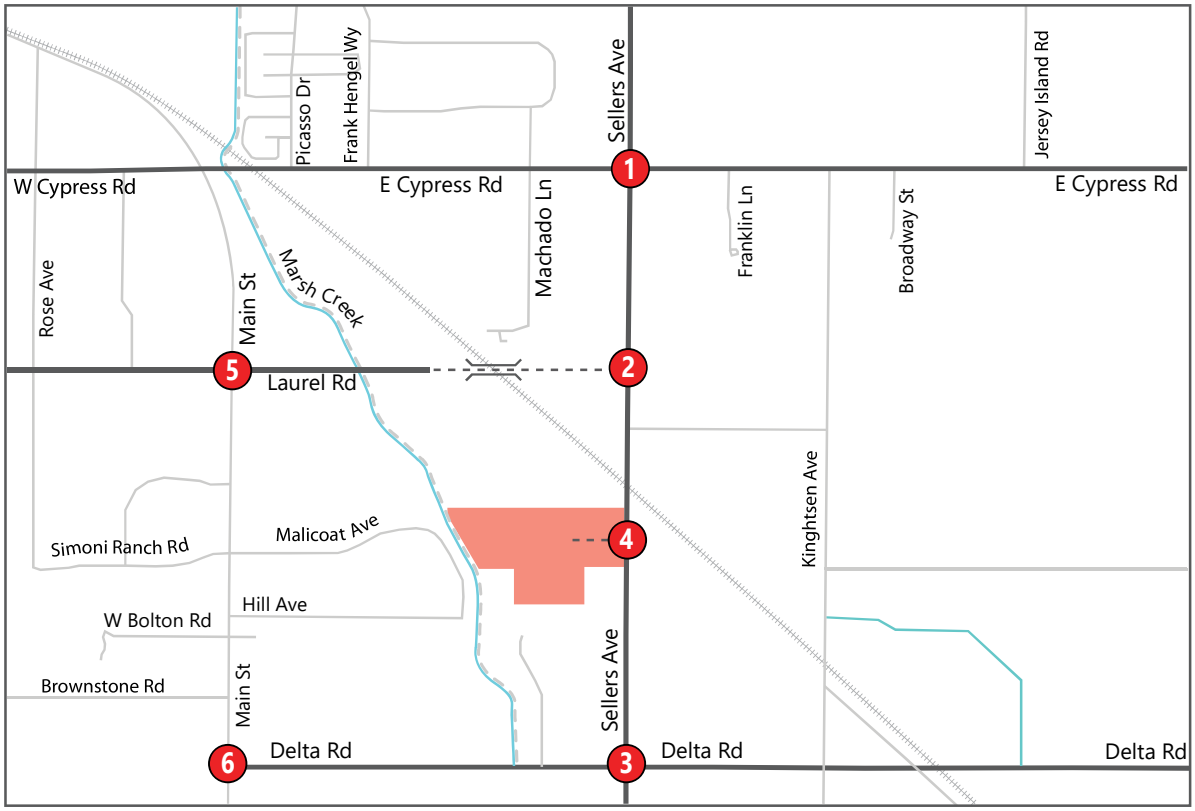


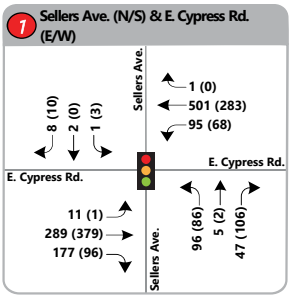


LEGEND

- Project Site
- Stop Sign
- Study Intersection
- Traffic Signal

Figure 7: Existing Conditions – Intersection Peak Hour Traffic Volumes

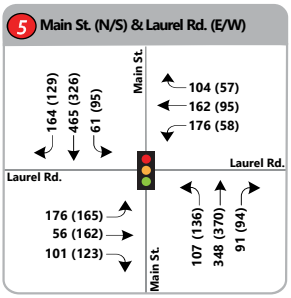


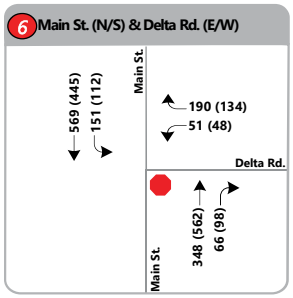












LEGEND

Project Site	Study Intersection	XX	AM Peak Hour Volumes
Stop Sign	Traffic Signal	(XX)	PM Peak Hour Volumes

3.6 Intersection Level of Service Analysis

Under Existing Conditions, intersections were analyzed based on lane geometries and traffic controls provided by the Existing Conditions scenario of the Citywide Traffic Model, with minor corrections to reflect actual Existing Conditions. The results of the level of service analysis for Existing Conditions are summarized in **Table 4**. Intersections that operated at unacceptable LOS are shown in red. Detailed calculation sheets for the Existing Conditions scenario are contained in **Appendix B.**

As illustrated in the table below, all but one of the existing study intersections operate at LOS D or better during both peak hours. The intersection of Main Street & Delta Road (Study Intersection 6) operates at unacceptable LOS F in the a.m. peak hour and acceptable LOS E in the p.m. peak hour. As this intersection is located in a priority development area, the applicable LOS threshold is LOS E.

Table 4: Existing Conditions – Intersection Level of Service Analysis Results

No.	Intersection	Control Type[1]	Peak Hour[2]	Delay[3] (Sec/Veh)	LOS[4]
1	Sellers Ave. & E. Cypress Rd.	Signal	AM	16	B
			PM	16.3	B
2	Sellers Ave. & Laurel Rd.	-	AM	-	-
			PM	-	-
3	Delta Rd. & Sellers Rd.	AWSC	AM	9.4	A
			PM	13.0	B
4	Sellers Ave. & Street B	-	AM	-	-
			PM	-	-
5	Main St. & Laurel Rd.[5]	Signal	AM	40.7	D
			PM	32.8	C
6	Main St. & Delta Rd.[5]	TWSC	AM	**70.2**	**F**
			PM	40.5	E

Notes:
1. Signal = Signalized; OWSC = One-Way Stop Control
2. a.m. = a.m. Peak Hour; p.m. = p.m. Peak Hour
3. Delay measured in seconds per vehicle. For signalized and all-way stop controlled intersections, the delay represents the average control delay for all turning movements. For one- and two-way stop-controlled intersections, the delay represents the worse average control delay for a given approach.
4. LOS = Level of Service
5. Priority Development Area (Plan Bay Area 2050)
Red indicates unacceptable LOS.
"-" indicates not applicable.

4.0 EXISTING PLUS PROJECT CONDITIONS

This section describes the impacts of the proposed project at the study intersections and surrounding roadway system. Existing plus Project Conditions consist of existing traffic volumes and roadway facilities plus new traffic generated by the proposed project.

This section consists of two analysis components:

- A vehicle-miles traveled (VMT) assessment of the proposed project (Section 4.1), and
- A level-of-service (LOS) assessment of study intersections (Sections 4.2 to 4.4).

The amount of traffic added to the roadway system by the proposed development is estimated using a three-step process:

- Trip Generation (Section 4.2) – Estimates the amount of traffic added to the roadway network,
- Trip Distribution (Section 4.3)– Estimates the direction of travel to and from the project site, and
- Trip Assignment (Section 4.3) – The new trips are assigned to specific street segments and intersection turning movements.

Lane geometry and traffic control for Existing plus Project Conditions are identical to Existing Conditions, with the exception of the new intersection at Sellers Avenue & Street B (Intersection #4).

4.1 Vehicle Miles Traveled

TJKM conducted Vehicle Miles Travelled (VMT) analysis for the project in compliance with Senate Bill 743 (SB 743) via the Contra Costa Transportation Authority's (CCTA) recommended VMT analysis methodology. The CCTA VMT analysis methodology provides different screening criteria and significance thresholds based on the project land use type. CCTA considers residential projects to have a significant impact on VMT if the project generated home-based VMT per resident is higher than the less stringent of the following:

- 85% of the home-based VMT per resident in the municipality or
- 85% of the existing County-wide average home-based VMT per resident.

TJKM conducted a VMT (Vehicle Miles Traveled) analysis for the proposed housing project located on Sellers Road in Oakley, CA. The project proposes build 176 single family units in a residential subdivision.

The VMT Analysis was performed for this project in the Contra Costa Transportation Authority (CCTA) Model. The Travel Analysis Zone (TAZ) for this project in the model is #30263. The 176 single family dwelling units were added into the TAZ for the base year to see if the project creates significant VMT impacts.

As this project is not screened out from VMT analysis, two full model runs were performed for this project in accordance to CCTA VMT methodology. The first one is a base year 2018 run to analyze existing VMT per capita numbers for the City of Oakley. The second run is a base year 2018 plus project run with the housing units added in to see if its impact on VMT is significant. For the 2018 Base Year model, the Laurel Avenue

extension to Sellers Avenue was added in to reflect the latest Oakley General Plan's Circulation Element and also to connect the project to major destination centers within Oakley.

From the 2018 Base Year run, the home based VMT per capita for the City of Oakley is **27.43**. For a project to not be significant, the 85% threshold is set at 0.85 x 27.43 which is **23.32**. This value is the less stringent home-based VMT per capita number as mentioned in the CCTA VMT methodology guidelines.

The 2018 Base Year plus Project model run added 176 Single Family Dwelling Units into TAZ #30263. The resultant home based VMT per capita for the project TAZ is **24.43**. Since this value is higher than the threshold, some mitigation is required for this project to have an insignificant impact on VMT.

Mitigation measures that this project may attempt include:

1. Improve the pedestrian network – this strategy focuses on creating a pedestrian network within the project and connecting to nearby destinations. Sidewalk improvements count as part of this strategy and the maximum VMT reduction allowed is **5.7%.**
2. Implement traffic calming and low-street bicycle facilities – this strategy focuses are creating roadway networks of low vehicle speeds and volumes that are more conducive to walking and bicycling. Maximum VMT reduction allowed with this strategy is **1.7%**.

Consistent with these recommended mitigation measures, the project includes full sidewalks within the project, and would provide direct connections to the Marsh Creek Regional Trail. A total of 7.4% reduction in VMT for the project reduces the value from 24.43 to **22.62.** With mitigation, the Stonecreek residential project is found to have a **less than significant** impact on VMT for the base year.

4.2 Project Trip Generation

In order to estimate trips generated by the proposed development for the weekday morning (a.m.) and weekday afternoon (p.m.) peak periods as well as for weekday daily trips, TJKM utilized the published trip generation rates from the Institute of Transportation Engineers' (ITE) Trip Generation Manual 11th Edition (TGM), and consistent with the methodology published in ITE's Trip Generation Handbook 3rd Edition (TGH).

TJKM used published trip rates for the ITE Land Use Code (LUC) 210 (Single Family Detached Housing) .The trip generation is shown in **Table 5**. The proposed development is anticipated to generate an estimated 1,697 new trips during a typical weekday, with 125 new trips (31 inbound, 94 outbound) occurring during the a.m. peak hour and 169 new trips (106 inbound, 63 outbound) occurring during the p.m. peak hour.

Table 5: Project Trip Generation (ITE TGM 11th Ed.; Peak Hour of the Adjacent Street)

Land Use (ITE Code)	Size	Daily		A.M. Peak					P.M. Peak				
		Rate	Trips	Rate	In:Out	In	Out	Total	Rate	In:Out	In	Out	Total
Single-Family Detached Housing (210)	176.00 DU	EQ	1,697	EQ	25:75	31	94	125	EQ	63:37	106	63	169
Total Trips			**1,697**			**31**	**94**	**125**			**106**	**63**	**169**

Notes:

Multiple ITE land use codes (LUC) have fitted curve equations (EQ) for various analysis periods in addition to rates. The methodology in the ITE's TGH was utilized to determine which was used.

4.3 Project Trip Distribution and Assignment

Trip distribution is a process of developing study assumptions that estimates the direction vehicular trips will arrive and depart the study site. Trip assignment estimates specific streets and turning movements at study intersections for project-related or site traffic.

Trip distribution and assignment assumptions for the proposed project were developed based on existing travel patterns, knowledge of the study area, and engineering judgment.

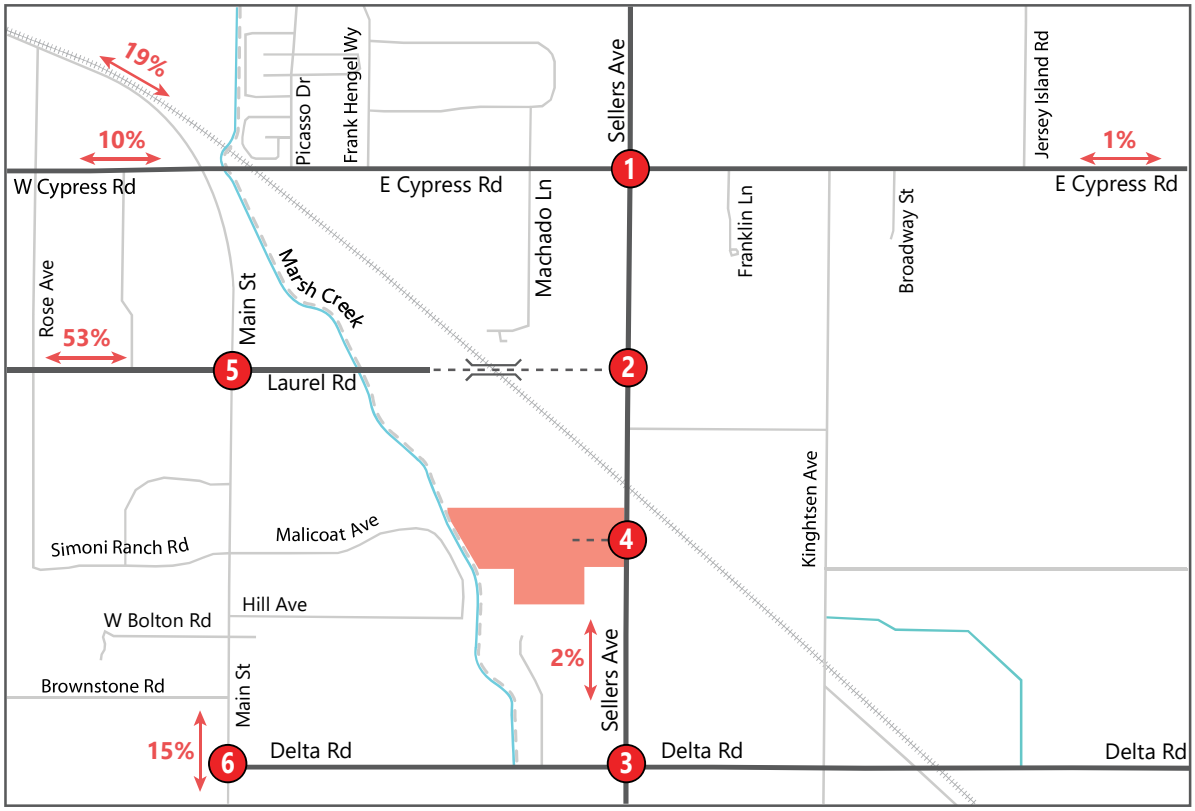
The assumed trip distribution for vehicles is as follows:

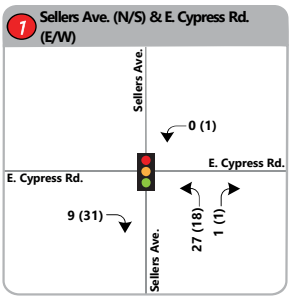
- 19 percent to/from Main Street North
- 53 percent to/from Laurel Road west of Main Street
- 10 percent to/from W. Cypress Road West
- 15 percent to/from Main Street South
- 2 percent to/from Sellers Road South
- 1 percent to/from E. Cypress Road East

Figure 8 illustrates the trip distribution and assignment for project trips and pass-by trip reductions.

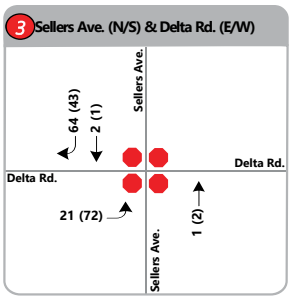
The Existing plus Project Conditions peak hour traffic volumes were estimated by combining the existing peak hour traffic volumes and the project's total trip assignment, as illustrated in **Figure 9**.

Figure 8: Trip Distribution and Assignment

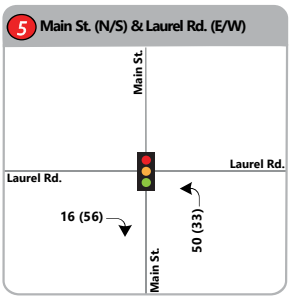


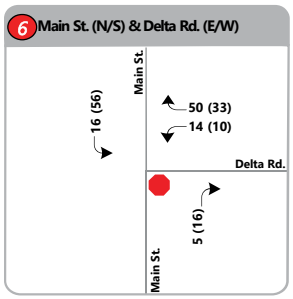








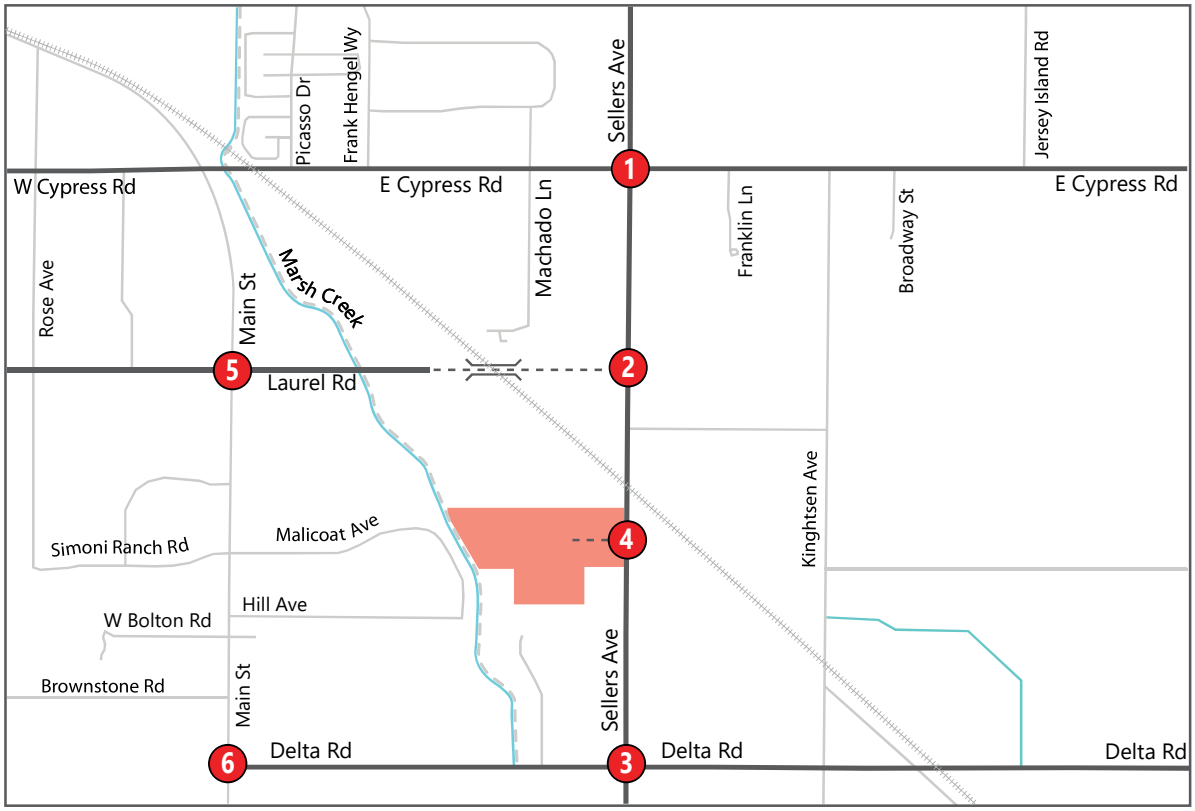


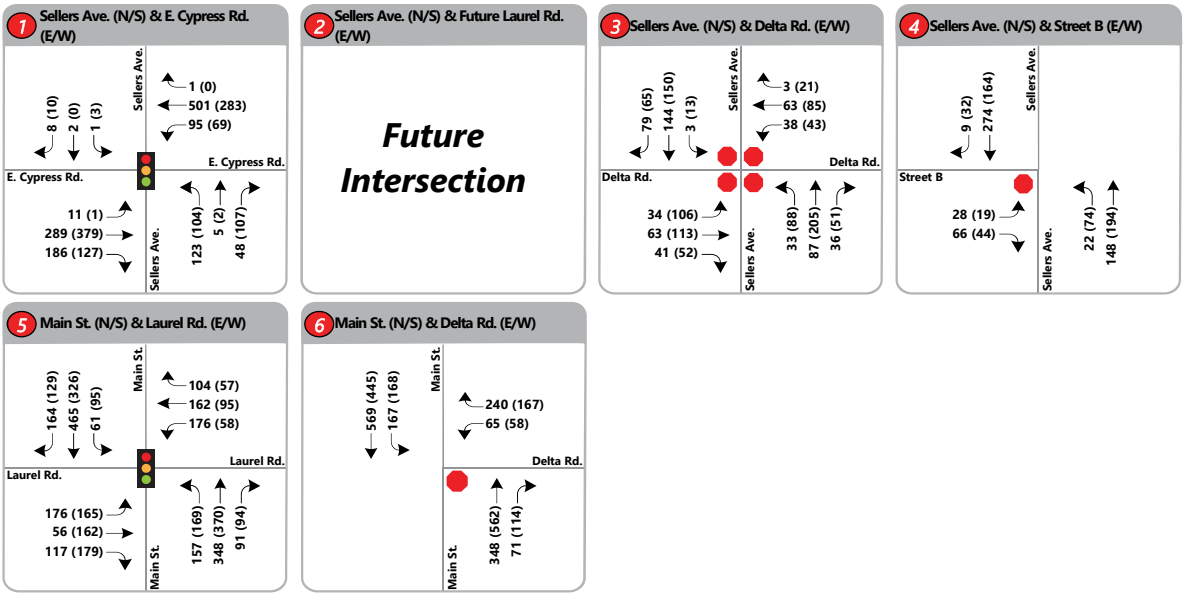


LEGEND

Project Site	Study Intersection	(XX)	PM Peak Hour Trips
Stop Sign	Traffic Signal	XX	AM Peak Hour Trips
XX Trip Distribution			

Figure 9: Existing plus Project Conditions – Intersection Peak Hour Traffic Volumes





LEGEND

Project Site	Study Intersection	(XX)	PM Peak Hour Volumes
Stop Sign	Traffic Signal	XX	AM Peak Hour Volumes

4.4 Intersection Level of Service Analysis

The intersection level of service analysis results for the Existing plus Project Conditions scenario are summarized in **Table 8**. The results for Existing Conditions are included for comparison purposes. Intersections that operated at unacceptable thresholds are shown in red, and intersections that degraded between "No Project" conditions to "Plus Project" conditions per the applicable thresholds are likewise shown in red. Detailed calculation sheets for Existing plus Project Conditions are contained in **Appendix C**.

As illustrated in the table below, all but one of the existing study intersections would continue to operate at LOS D or better during both peak hours. The intersection of Main Street & Delta Road (Study Intersection 6) operates at unacceptable LOS F in both peak hours. As this intersection is located in a priority development area, the applicable LOS threshold is LOS E. The increase in delay and degradation in LOS would be a substantial inconsistency with existing General Plan standards, requiring mitigation. TJKM performed a peak hour signal warrant analysis, based on the California Manual on Uniform Traffic Control Devices (CA MUTCD) standards, at the intersection for existing peak hour traffic volumes. A signal is warranted in the a.m. and p.m. peak hour, based on the peak hour signal warrant (Warrant #3). Installing a signal control at this intersection improves intersection operations to LOS C or better during both a.m. and p.m. peak hours.

With mitigation, the proposed development would have a **less-than-substantial** impact on the surrounding road network under Existing plus Project Conditions.

Table 6: Existing plus Project Conditions – Intersection Level of Service Analysis Results

No.	Intersection	Control Type[1]	Peak Hour[2]	Delay[3] (Sec/Veh)	LOS[4]	Delay[3] (Sec/Veh)	LOS[4]	Change in Delay
1	Sellers Ave. & E. Cypress Rd.	Signal	AM	16	B	17.2	B	1.2
			PM	16.3	B	17.4	B	1.1
2	Sellers Ave. & Laurel Rd.	-	AM	-	-	-	-	-
			PM	-	-	-	-	-
3	Delta Rd. & Sellers Rd.	AWSC	AM	9.4	A	10.1	B	0.7
			PM	13.0	B	15.3	C	2.3
4	Sellers Ave. & Street B	OWSC	AM	-	-	11.4	B	11.4
			PM	-	-	10.9	B	10.9
5	Main St. & Laurel Rd.[5]	Signal	AM	40.7	D	47.2	D	6.5
			PM	32.8	C	39.6	D	6.8
6	Main St. & Delta Rd.[5]	TWSC	AM	**70.2**	**F**	**170.3**	**F**	**100.1**
			PM	40.5	E	**93.4**	**F**	**52.89**
	Mitigation: Signalize	*Signal*	*AM*	-	-	*18.9*	*B*	*-51.3*
			PM	-	-	*24.4*	*C*	*-16.1*

Notes:
1. Signal = Signalized; OWSC = One-Way Stop Control
2. a.m. = a.m. Peak Hour; p.m. = p.m. Peak Hour
3. Delay measured in seconds per vehicle. For signalized and all-way stop controlled intersections, the delay represents the average control delay for all turning movements. For one- and two-way stop controlled intersections, the delay represents the worse average control delay for a given approach.
4. LOS = Level of Service
5. Priority Development Area (Plan Bay Area 2050)
Red indicates unacceptable LOS.
"-" indicates not applicable.

5.0 BACKGROUND CONDTITIONS

This section presents the results of the level of service calculations under Background Conditions. Future impacts were evaluated taking into account key planned improvements in the City of Oakley. The most notable project is the completion of the Laurel Road extension between Main Street and Sellers Avenue. This includes a railroad grade separation and widening/construction of Laurel Road to four lanes in this section. In addition, Sellers Avenue is planned to be widened to four lanes between Laurel Road and E. Cypress Road. Cypress Road is planned to be fully improved to six lanes east of Sellers Avenue and to four lanes west of Sellers Avenue. Other roads and intersections are scheduled to be improved as well.

5.1 Background Traffic Growth

Using the calibrated and validated updated Citywide Traffic Model, additional traffic projected to be generated from approved developments was forecasted for Background Conditions. The Background Conditions scenario includes additional traffic that would be generated by various approved projects completed within the City of Oakley and redistribution of traffic due to the Laurel Road extension. The approved projects include the Acacia Residential, Emerson Ranch Commercial, Burroughs/WestGate Ventures Residential, and Sellers Residential projects previously studied by TJKM.

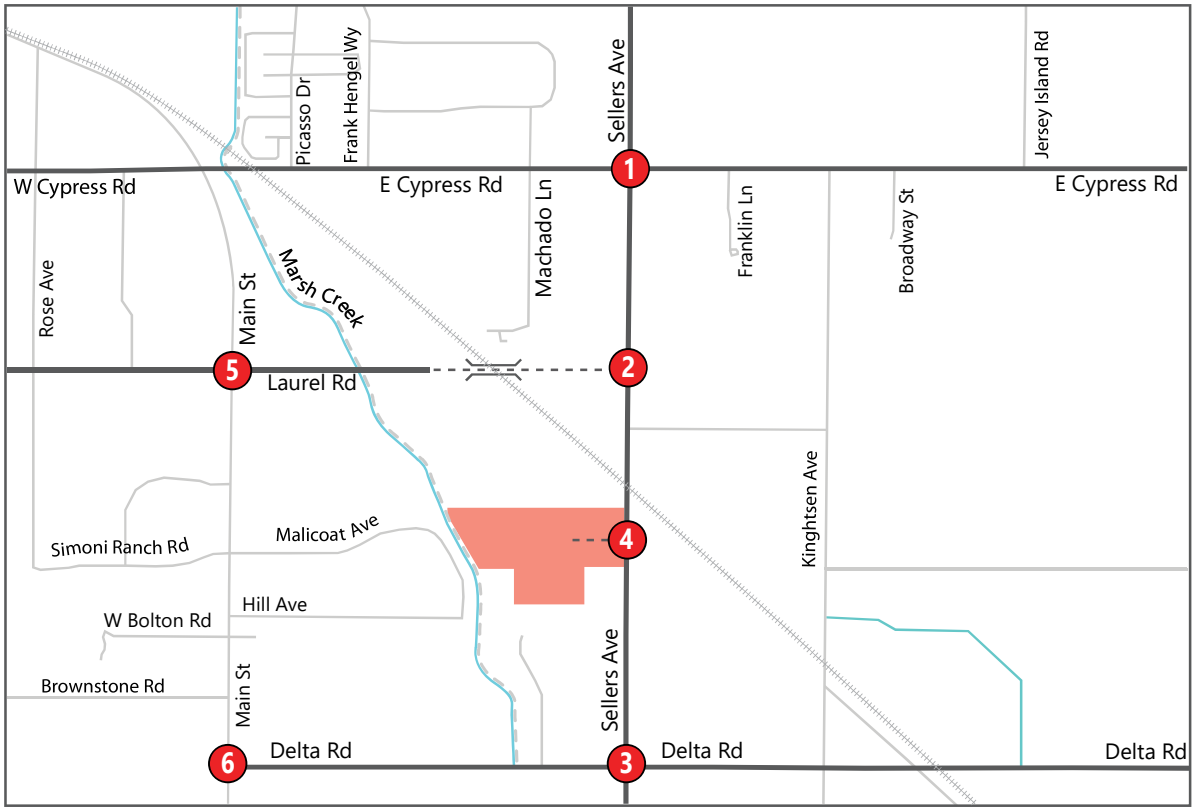
Additionally, he following planned improvements, as per the Capital Improvement Program, are considered at the study intersections with and without the proposed project:

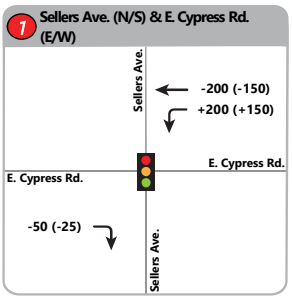
- Sellers Avenue/E. Cypress Road is analyzed with the recent upgrade to lane geometry and signal timing. Additionally, the intersection considers planned widenings of Sellers Avenue and E. Cypress Road segments. The intersection is analyzed with one shared through-left lane and two right-turn lanes at the southbound approach; one exclusive left-turn lane, one shared through-right lane and two right-turn lanes at the northbound approach; one left-turn lane, two through lanes and one shared through-right lane at the eastbound approach; and two exclusive left-turn lanes, one through lane and one shared through-right lane at the westbound approach.
- Main Street/Laurel Road is analyzed with future planned upgrade to striping at the northbound, eastbound and westbound approaches under Background Conditions. The intersection is analyzed with one exclusive left-turn lane, two through lanes and one exclusive right-turn lane at the northbound approach; one exclusive left-turn lane, two through lanes and one exclusive right-turn lane at the eastbound approach; and one exclusive left-turn lane, three through lanes and one exclusive right-turn lane at the westbound approach.
- Main Street/Delta Road is analyzed as a signalized intersection with updated lane geometry under Background Conditions. The intersection is analyzed with exclusive left-turn and right-turn lanes at the westbound approach, one through lane and one shared through-right lane at the northbound approach, and one exclusive left-turn lane and two through lanes at the southbound approach.
- Sellers Avenue/Laurel Road is a new intersection analyzed under Background Conditions. This intersection is formed due to the extension of Laurel Road. The intersection is analyzed as a signalized

intersection with two left-turn lanes and one right-turn lane at the eastbound approach, one exclusive left-turn lane and two through lanes at the northbound approach, and one through lane and two right-turn lanes at the southbound approach.

Figure 10 shows the redistribution of existing traffic as depicted in the Updated Oakley Traffic Model with the Laurel Road extension. The updated lane geometry is illustrated in **Figure 12**, and Background traffic volumes are illustrated in **Figure 12**.

Figure 10: Redistribution of Existing Trips

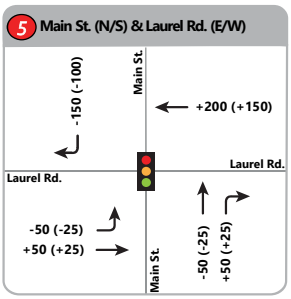


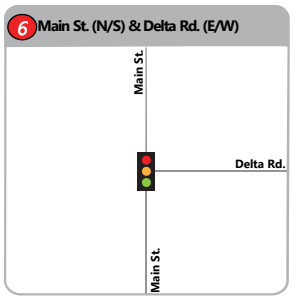








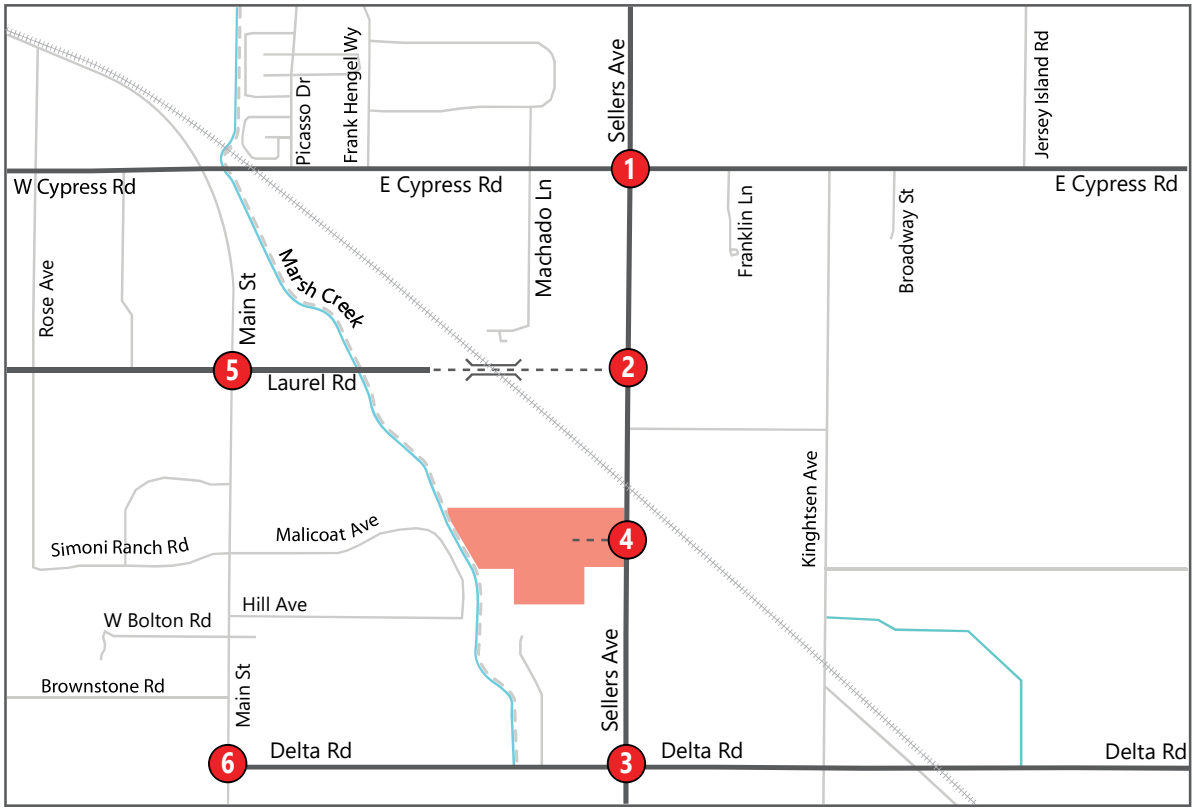


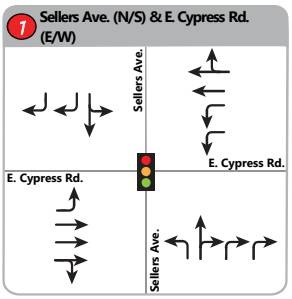


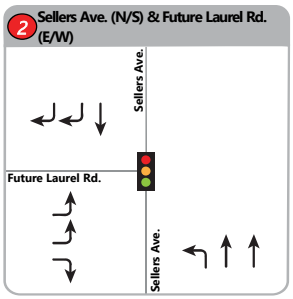
LEGEND

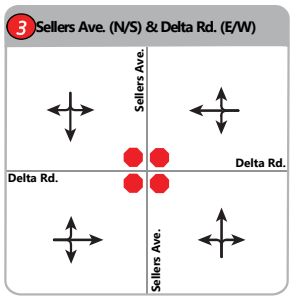
	Project Site	X	Study Intersection	(XX)	PM Peak Hour Trips
	Stop Sign		Traffic Signal	XX	AM Peak Hour Trips

Figure 11: Background Conditions - Lane Geometry and Control

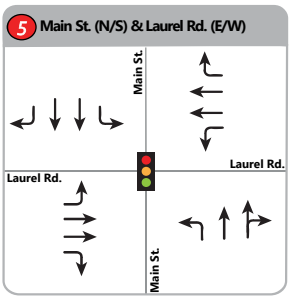


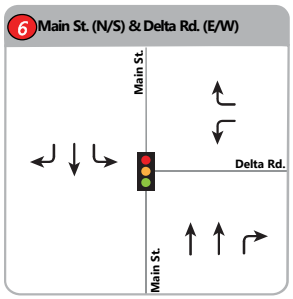








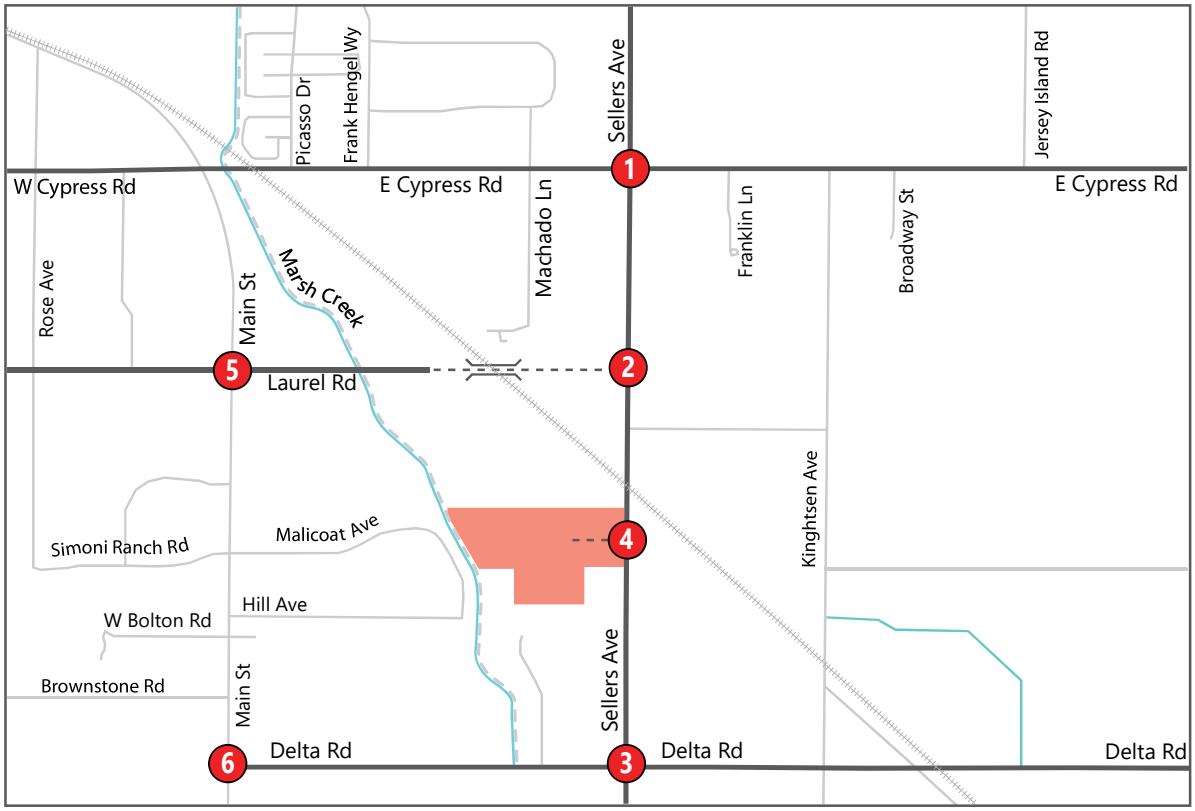


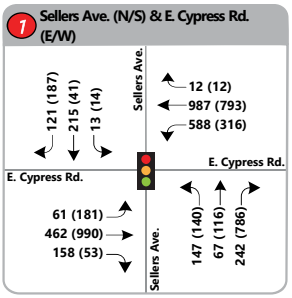


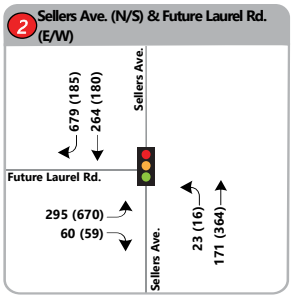
LEGEND

- Project Site
- Stop Sign
- Study Intersection
- Traffic Signal

Figure 12: Background Conditions – Intersection Peak Hour Traffic Volumes

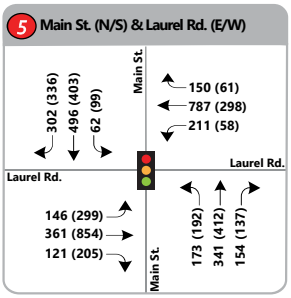


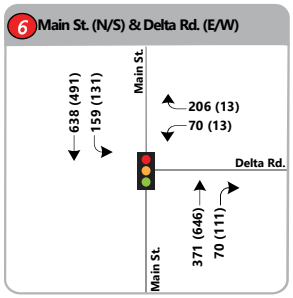












LEGEND

Project Site	Study Intersection	(XX)	PM Peak Hour Volumes
Stop Sign	Traffic Signal	XX	AM Peak Hour Volumes

5.2 Intersection Level of Service Analysis

The intersection LOS analysis results for Background Conditions are summarized in **Table 7**. Intersections that operated at unacceptable LOS are shown in red. Detailed calculation sheets for 2030 Background Conditions are contained in **Appendix D**.

As illustrated in the table below, all of the study intersections would operate at acceptable LOS D or better during both peak hours.

Table 7: Background Conditions – Intersection Level of Service Analysis Results

No.	Intersection	Control Type[1]	Peak Hour[2]	Delay[3] (Sec/Veh)	LOS[4]
1	Sellers Ave. & E. Cypress Rd.	Signal	AM	40.2	D
			PM	36.0	D
2	Sellers Ave. & Laurel Rd.	Signal	AM	48.3	D
			PM	49.6	D
3	Delta Rd. & Sellers Rd.	AWSC	AM	10.2	B
			PM	18.5	C
4	Sellers Ave. & Street B	-	AM	-	-
			PM	-	-
5	Main St. & Laurel Rd.[5]	Signal	AM	52.3	D
			PM	51.5	D
6	Main St. & Delta Rd.[5]	Signal	AM	11.7	B
			PM	7.7	A

Notes:
1. Signal = Signalized; OWSC = One-Way Stop Control
2. a.m. = a.m. Peak Hour; p.m. = p.m. Peak Hour
3. Delay measured in seconds per vehicle. For signalized and all-way stop controlled intersections, the delay represents the average control delay for all turning movements. For one- and two-way stop-controlled intersections, the delay represents the worse average control delay for a given approach.
4. LOS = Level of Service
5. Priority Development Area (Plan Bay Area 2050)
Red indicates unacceptable LOS.
"-" indicates not applicable.

6.0 BACKGROUND PLUS PROJECT CONDITIONS

This section describes the impacts of the proposed project at the study intersections and surrounding roadway system under Background plus Project Conditions. Background plus Project Conditions consist of existing and background traffic volumes (existing plus approved and pending projects) and roadway facilities plus new traffic generated by the proposed project. Lane geometry and traffic control for Background plus Project Conditions are identical to Background Conditions.

6.1 Project Trip Reassignment

Due to the extension of Laurel Road under Background Conditions, some project trips were rerouted for Background plus Project Conditions. **Figure 13** illustrates the distribution and assignment of project trips to origins/destinations, and the assignment of project trips to study intersections based on the anticipated paths of travel under Background plus Project Conditions. Background plus Project traffic volumes are illustrated in **Figure 14**.

6.2 Intersection Level of Service Analysis

The intersection level of service analysis results for Background plus Project Conditions are summarized in **Table 8**. The results for Background Conditions are included for comparison purposes. Intersections that operated at unacceptable thresholds are shown in red, and intersections that degraded between "No Project" conditions to "Plus Project" conditions per the applicable thresholds are likewise shown in red. Detailed calculation sheets for Background plus Project Conditions are contained in **Appendix E**.

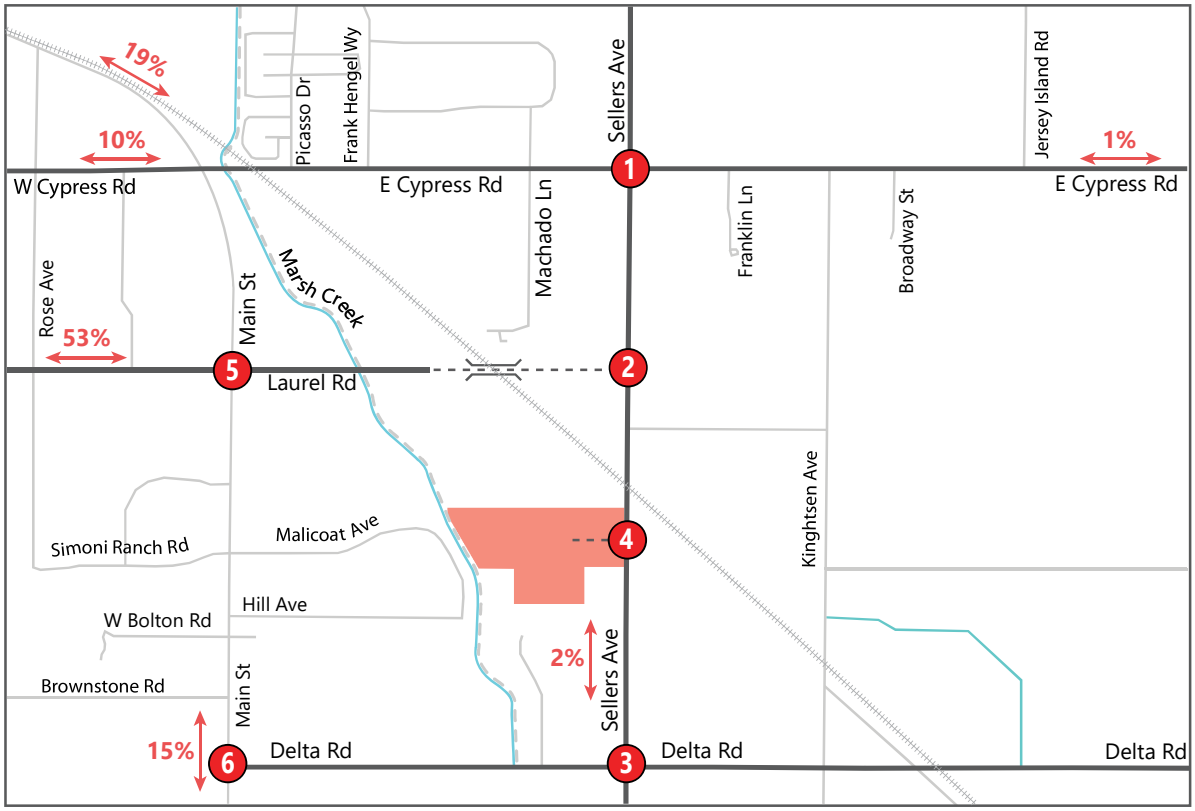
As illustrated in the table below, all of the study intersections would continue to operate at acceptable LOS D or better during both peak hours. Thus, the proposed development would have a **less-than-substantial** impact on the surrounding road network under the Background plus Project Conditions scenario.

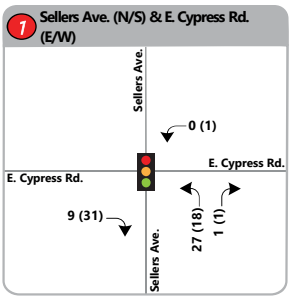
Table 8: Background plus Project Conditions – Intersection Level of Service Analysis Results

No.	Intersection	Control Type[1]	Peak Hour[2]	Delay[3] (Sec/Veh)	LOS[4]	Delay[3] (Sec/Veh)	LOS[4]	Change in Delay
1	Sellers Ave. & E. Cypress Rd.	Signal	AM	40.2	D	43.8	D	3.6
			PM	36.0	D	36.8	D	0.8
2	Sellers Ave. & Laurel Rd.	Signal	AM	48.3	D	49.3	D	1
			PM	49.6	D	50.2	D	0.6
3	Delta Rd. & Sellers Rd.	AWSC	AM	10.2	B	10.4	B	0.2
			PM	18.5	C	19.6	C	1.1
4	Sellers Ave. & Street B	OWSC	AM	-	-	9.3	A	-
			PM	-	-	11.2	B	-
5	Main St. & Laurel Rd.[5]	Signal	AM	52.3	D	53.2	D	0.9
			PM	51.5	D	51.6	D	0.1
6	Main St. & Delta Rd.[5]	Signal	AM	11.7	B	11.8	B	0.1
			PM	7.7	A	7.9	A	0.2

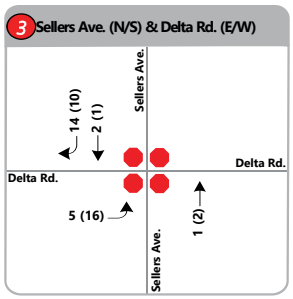
Notes:
1. Signal = Signalized; OWSC = One-Way Stop Control
2. a.m. = a.m. Peak Hour; p.m. = p.m. Peak Hour
3. Delay measured in seconds per vehicle. For signalized and all-way stop controlled intersections, the delay represents the average control delay for all turning movements. For one- and two-way stop controlled intersections, the delay represents the worse average control delay for a given approach.
4. LOS = Level of Service
5. Priority Development Area (Plan Bay Area 2050)
Red indicates unacceptable LOS.
"-" indicates not applicable.

Figure 13: Background plus Project Conditions – Project Trip Assignment

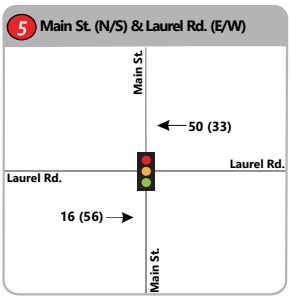


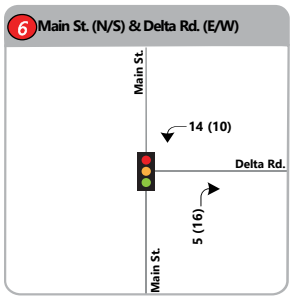








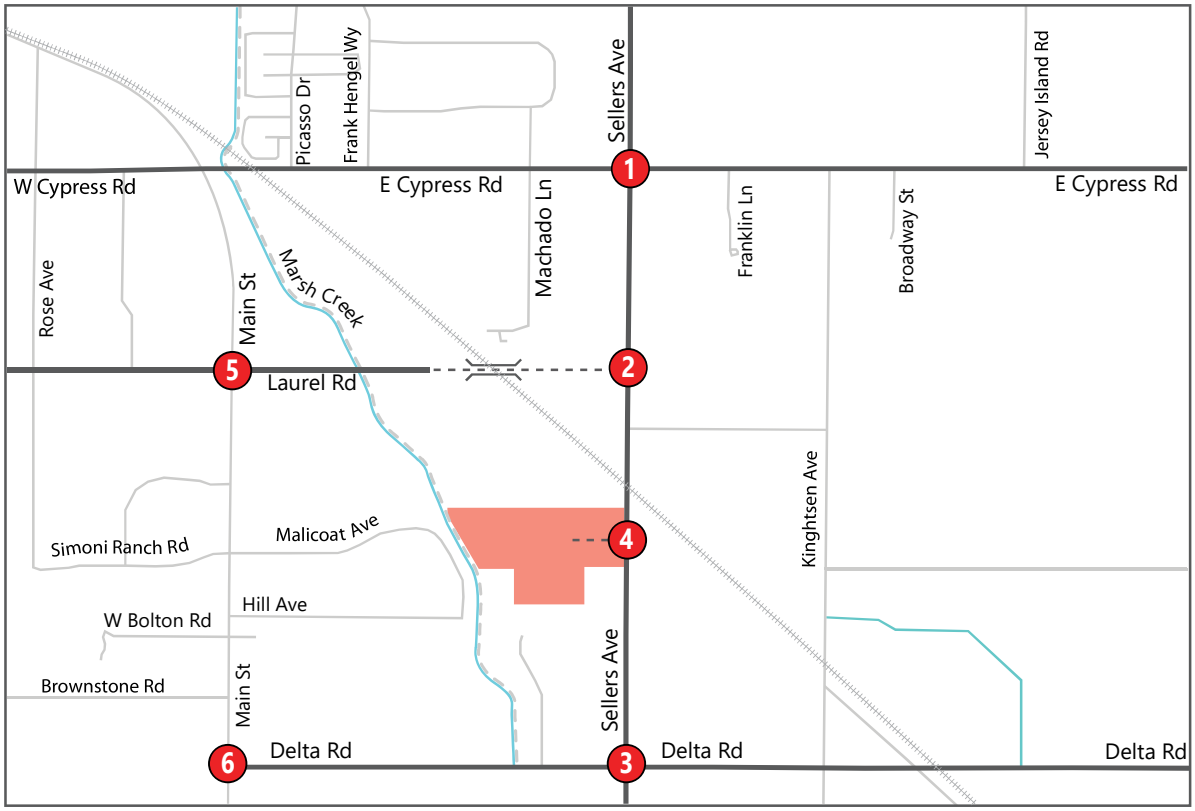


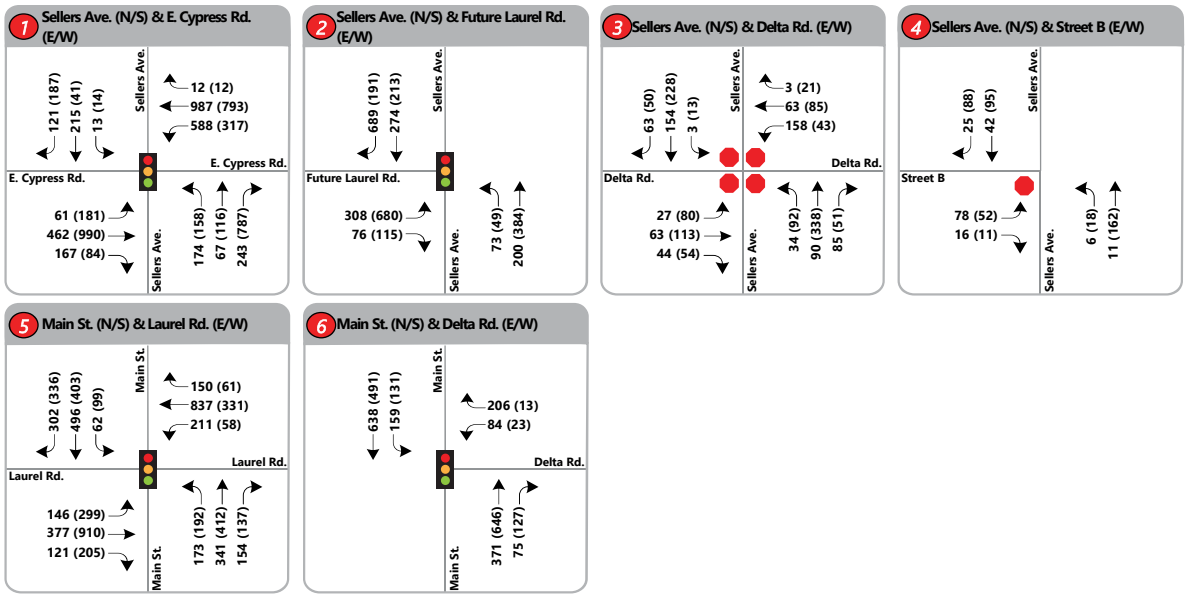


LEGEND

Project Site	Study Intersection	(XX)	PM Peak Hour Trips
Stop Sign	Traffic Signal	XX	AM Peak Hour Trips
XX Trip Distribution			

Figure 14: Background plus Project Conditions – Intersection Peak Hour Traffic Volumes





LEGEND

Project Site	Study Intersection	(XX)	PM Peak Hour Volumes
Stop Sign	Traffic Signal	XX	AM Peak Hour Volumes

7.0 ADDITIONAL ANALYSIS

The following sections provide additional analyses of other transportation issues associated with the project site, including:

- Alternative Modes of Transportation;
- Vehicular Site Access;
- On-Site Circulation; and
- Parking.

Unlike the VMT or LOS impact methodology, the analyses in these sections are generally based on professional judgment in accordance with the standards and methods employed by traffic engineers and planners. This analysis references the site plan shown in **Figure 2**, dated May 2, 2023.

7.1 Alternative Modes of Transportation

7.1.1 Pedestrian Impacts

The proposed project would add a new sidewalk along the project frontage on Sellers Avenue, improving pedestrian facilities relative to existing conditions. Internal sidewalks would be provided on all internal streets and connect to existing sidewalks on Teton Road and Kings Canyon Way. The project would also connect to the adjacent Marsh Creek Regional Trail through the proposed park. A significant impact occurs if a proposed project conflicts with applicable or adopted policies, plans, or programs related to pedestrian facilities or otherwise decreases the performance or safety of pedestrian facilities. The proposed Project would not result in any such conflicts; therefore, the impact to pedestrian facilities is expected to be **less-than-significant**.

7.1.2 Bicycle Impacts

The proposed project can be accessed via existing bike lanes on Teton Road and the new connection to the Marsh Creek Regional Trail. An impact to bicyclists occurs if a proposed project disrupts existing bicycle facilities, or conflicts with or creates inconsistencies with adopted bicycle system plans, guidelines, and policies. A significant impact occurs if a proposed project conflicts with applicable or adopted policies, plans, or programs related to bicycle facilities or otherwise decreases the performance or safety of bicycle facilities. The proposed Project would not result in any such conflicts; therefore, the impact to bicycle facilities is expected to be **less-than-significant**.

7.1.3 Transit Impacts

A proposed project is considered to have a significant impact on transit if it conflicts with existing or planned transit facilities, or if it is expected to generate additional transit trips and it does not provide adequate facilities for additional pedestrians and bicyclists to access transit routes and stops. The proposed Project is located approximately 0.9 miles from the nearest bus stops. While the Project is not expected to generate any substantial increases in transit ridership, any increases resulting from the Project could easily be

accommodated by the surrounding bus services. Therefore, the impact to transit facilities is expected to be **less-than-significant**.

7.2 Vehicular Site Access

Access to the project site would be via one new street (Street B) connected to Sellers Avenue and via connections to Teton Road and Kings Canyon Way to the north. Access to the proposed project would be **adequate.**

7.3 On-Site Circulation

Circulation on the project site is via internal streets that are generally 36 feet wide, with 30-foot corner radii. Pedestrian access and circulation are provided via new sidewalks on all internal streets and connecting to the Marsh Creek Regional Trail. On-site circulation is considered **adequate**.

7.4 Parking

Under the City of Oakley Municipal Code, single family homes are required to provide two covered off-street parking spaces on the same lot. It is expected that the proposed single family homes would include two car garages, satisfying this requirement. In addition, internal streets would typically permit on-street parking on both sides. The proposed parking supply is expected to be **adequate**.

7.5 Recommendations

TJKM makes the following recommendations:

- Ensure that an accessible connection is provided for bicyclists and pedestrians to the Marsh Creek Regional Trail.

Appendix A: HCM Methodology

TECHNICAL MEMORANDUM

Subject: Highway Capacity Manual – Level of Service Definitions

The purpose of this memorandum is to define level of service (LOS) and the procedures for its calculation.

LOS is commonly used as a measure of effectiveness (MOE) / quality of service (QOS) for traffic. The procedures for LOS determination and calculation are found within the Transportation Research Board's (TRB) *Highway Capacity Manual* (HCM), 6th Edition. MOE / QOS generally consist of quantitative metrics to characterize operational conditions within a traffic stream. LOS is a measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

Six levels of service are defined for each facility type that has procedures available. Alphabetical letters designated each grade from A to F. LOS A represents the best operating conditions; LOS F represents the worst operating conditions. Each LOS represents a range of operating conditions and drivers' perceptions of those conditions. Safety is not included in the measure to establish service level.

A general description of LOS for every types of roadway facilities is shown in **Table 1**.

Table 1: General LOS by Facility Type

	Uninterrupted Flow	Interrupted Flow
Facility Example Types		
	Freeways	Signalized intersections
	Multi-lane highways	Two-way stop controlled intersections
	Two-lane highways	All-way stop controlled intersections
	Urban Streets	Roundabouts
LOS Character		
A	Free flow.	Very low delay.
B	Stable flow. Presence of other users noticeable.	Low delay.
C	Stable flow. Comfort and convenience starts to decline.	Moderate delay
D	High density stable flow.	Acceptable delay
E	Unstable flow.	Limit of acceptable delay,
F	Forced or breakdown flow.	Unacceptable delay.

Signalized Intersections

Signalized intersection LOS is based upon the traffic volume present in each lane on the roadway, the capacity of each lane at the intersection, and control delay experienced by each vehicle. LOS can be characterized for the entire intersection, each intersection approach, and each lane group. Control delay alone is used to characterize LOS for the entire intersection or an approach; control delay and volume-to-capacity (v/c) ratio are used to characterize LOS for a lane group. Delay quantifies the increase in travel time due to traffic signal control; it is also a surrogate measure of driver discomfort and fuel consumption. The v/c ratio quantifies the degree to which a phase's capacity is utilized by a lane group. A v/c ratio of 1.0 or more indicates cycle capacity is fully utilized and represents failure from a capacity perspective (just as delay in excess of 80 sec/veh represents failure from a delay perspective). The detailed methodology for determining LOS at signalized intersection is presented in Chapter 19 of the HCM. The LOS for signalized intersections are defined in **Table 2**.

Table 2: Signalized LOS Summary

LOS	Definition	Control Delay Range (s/veh)	v/c Range
A	Very low control delay. This level is typically assigned when the v/c ratio is low and either progression is exceptionally favorable or the cycle length is short. Most vehicles arrive during the green phase. Many vehicles do not stop at all.	≤ 10	≤ 1.0
B	The v/c ratio is low. There is good progression, short cycle lengths, or both. More vehicles stop, causing higher levels of delay.	≤ 20	≤ 1.0
C	Higher delays occur in favorable progression or a due to a moderate cycle length, or both. Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during a given cycle) may begin to appear. The number of vehicles stopping is still considered low-to-moderate, though many vehicles still pass through the intersection without stopping.	≤ 35	≤ 1.0
D	The influence of congestion becomes more apparent. Longer delays may result from some combination of a high v/c ratio, ineffective progression, long cycle length, or high volumes. Many vehicles stop, the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	≤ 55	≤ 1.0
E	Typically considered the limit of acceptable delay. High delays usually indicate a very high v/c ratio, poor progression, long cycle lengths, and high volumes. Most cycles fail to clear the queue.	≤ 80	≤ 1.0
F	Delays are unacceptable to most drivers. Conditions are considered oversaturated. Arrival flow rates exceed the capacity of the intersection (v/c in excess of 1.0). Many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to higher delay.	> 80	> 1.0

Two-Way Stop Controlled Intersections

At two-way stopped controlled (TWSC) intersections, LOS is not defined for the intersection as a whole or for major-street approaches for three primary reasons:

1. The major-street through and right-turning traffic are assumed to experience zero delay as traffic progression operates unimpeded;
2. The disproportionate number of major-street through traffic at a typical TWSC intersection skews the weighted average of all movements, resulting in very low overall average delay for all vehicles, and
3. The resulting low delay can mask LOS deficiencies for minor movements.

The LOS for the minor street and the mainline left-turn traffic are dependent on the volume and capacity of the available lanes, and the number and frequency of acceptable gaps in the major street traffic to make a conflicting turn. The LOS grade is provided for all conflicting movements at an intersection and is based on the total average control delay experienced by each vehicle and the lane group volume-to-capacity (v/c) ratios. The delay includes the time it takes a vehicle to move from the back of a queue through the intersection. The detailed methodology for determining LOS at TWSC intersection is presented in Chapter 20 of the HCM. The TWSC LOS descriptions are provided in **Table 3.**

Table 3: TWSC LOS Summary

LOS	Definition	Control Delay Range (s/veh)	v/c Range
A	Usually no conflicting traffic. Drivers can easily find gaps in traffic to maneuver. v/c is low.	≤ 10	≤ 1.0
B	Occasionally some delay due to conflicting traffic. Drivers can find gaps in traffic. v/c is low.	≤ 15	≤ 1.0
C	There is some noticeable delay due to conflicting traffic. Drivers are still able to find gaps in traffic.	≤ 25	≤ 1.0
D	Drivers experience delay due to less gaps in traffic to maneuver. Lane group v/c creeps closer to 1.0.	≤ 35	≤ 1.0
E	Delay approaches driver tolerance levels. Drivers will occasionally find gaps in traffic to maneuver. Lane group v/c approaches 1.0.	≤ 50	≤ 1.0
F	Delay exceed driver tolerance levels or v/c exceeds 1.0 or both.	> 50	> 1.0

All-Way Stop Controlled and Roundabout Intersections

All-way stopped controlled (AWSC) intersections and roundabout intersections are based upon the traffic volume present in each lane on the roadway, the capacity of each lane at the intersection, and control delay. LOS can be characterized for the entire intersection, each intersection approach, and each lane group. Control delay alone is used to characterize LOS for the entire intersection or an approach; control delay and volume-to-capacity (v/c) ratio are used to characterize LOS for a lane group. The delay includes the time it takes a vehicle to move from the back of a queue through the intersection. A v/c ratio of 1.0 represents failure from a capacity perspective (just as delay in excess of 80 sec/veh represents failure from a delay perspective).

The detailed methodology for determining LOS at AWSC and roundabout intersection are presented in Chapter 21 and Chapter 22 respectively in the HCM. The AWSC and roundabout LOS descriptions are shared and are provided in **Table 4**.

Table 4: AWSC and Roundabout LOS Summary

LOS	Definition	Control Delay Range (s/veh)	v/c Range
A	Usually no conflicting traffic. Drivers can easily find gaps in traffic to maneuver. v/c is low.	≤ 10	≤ 1.0
B	Occasionally some delay due to conflicting traffic. Drivers can find gaps in traffic. v/c is low.	≤ 15	≤ 1.0
C	There is some noticeable delay due to conflicting traffic. Drivers are still able to find gaps in traffic.	≤ 25	≤ 1.0
D	Drivers experience delay due to less gaps in traffic to maneuver. Lane group v/c creeps closer to 1.0.	≤ 35	≤ 1.0
E	Delay approaches driver tolerance levels. Drivers will occasionally find gaps in traffic to maneuver. Lane group v/c approaches 1.0.	≤ 50	≤ 1.0
F	Delay exceed driver tolerance levels or v/c exceeds 1.0 or both.	> 50	> 1.0

Appendix B: Existing Conditions Capacity Analysis Worksheets

Intersection Level Of Service Report
Intersection 1: Sellers Rd/E Cypress Rd

Control Type:	Signalized	Delay (sec / veh):	16.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.533

Intersection Setup

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	185.00	100.00	100.00	250.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			45.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Base Volume Input [veh/h]	96	5	47	1	2	8	11	289	177	95	501	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	96	5	47	1	2	8	11	289	177	95	501	1
Peak Hour Factor	0.7700	0.7700	0.7700	0.6900	0.6900	0.6900	0.8100	0.8100	0.8100	0.7000	0.7000	0.7000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	2	15	0	1	3	3	89	55	34	179	0
Total Analysis Volume [veh/h]	125	6	61	1	3	12	14	357	219	136	716	1
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	2	0	0	2	0	2	2	0	2	2	0
Maximum Green [s]	0	30	0	0	30	0	30	60	0	30	60	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	4.0	0.0	2.0	4.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	4.0	0.0	2.0	4.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	L	C	R	L	C	L	C	C
C, Cycle Length [s]	52	52	52	52	52	52	52	52	52
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	6.00	4.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	4.00	2.00	4.00	4.00
g_i, Effective Green Time [s]	7	0	0	0	0	21	5	25	25
g / C, Green / Cycle	0.14	0.01	0.01	0.01	0.01	0.40	0.10	0.49	0.49
(v / s)_i Volume / Saturation Flow Rate	0.11	0.00	0.00	0.01	0.01	0.33	0.08	0.19	0.19
s, saturation flow rate [veh/h]	1690	1752	1840	1564	1752	1724	1752	1840	1839
c, Capacity [veh/h]	243	17	18	15	15	688	177	905	904
d1, Uniform Delay [s]	21.49	25.49	25.52	25.67	25.73	14.08	22.76	8.34	8.34
k, delay calibration	0.04	0.04	0.04	0.04	0.04	0.15	0.04	0.15	0.15
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.21	0.53	1.64	28.15	48.41	3.92	2.64	0.40	0.40
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.79	0.06	0.17	0.79	0.93	0.84	0.77	0.40	0.40
d, Delay for Lane Group [s/veh]	23.70	26.02	27.15	53.82	74.14	17.99	25.40	8.74	8.74
Lane Group LOS	C	C	C	D	E	B	C	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.00	0.01	0.04	0.24	0.35	5.15	1.48	1.67	1.67
50th-Percentile Queue Length [ft/ln]	49.94	0.32	0.99	6.12	8.86	128.68	36.96	41.84	41.82
95th-Percentile Queue Length [veh/ln]	3.60	0.02	0.07	0.44	0.64	8.87	2.66	3.01	3.01
95th-Percentile Queue Length [ft/ln]	89.89	0.58	1.78	11.01	15.95	221.69	66.53	75.31	75.28

Movement, Approach, & Intersection Results

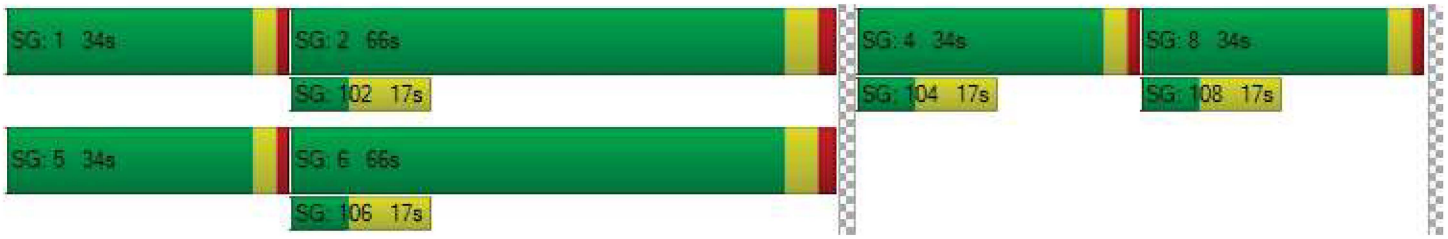
d_M, Delay for Movement [s/veh]	23.70	23.70	23.70	26.02	27.15	53.82	74.14	17.99	17.99	25.40	8.74	8.74
Movement LOS	C	C	C	C	C	D	E	B	B	C	A	A
d_A, Approach Delay [s/veh]	23.70			47.08			19.33			11.39		
Approach LOS	C			D			B			B		
d_I, Intersection Delay [s/veh]	16.01											
Intersection LOS	B											
Intersection V/C	0.533											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
l_p,int, Pedestrian LOS Score for Intersection	2.161	2.146	2.658	2.647
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	667	1333	1333
d_b, Bicycle Delay [s]	20.00	20.00	5.00	5.00
l_b,int, Bicycle LOS Score for Intersection	1.876	1.586	2.533	2.263
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Sellers Rd/Delta Rd

Control Type:	All-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.249

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	33	86	36	3	142	15	13	63	41	38	63	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	86	36	3	142	15	13	63	41	38	63	3
Peak Hour Factor	0.8400	0.8400	0.8400	0.8700	0.8700	0.8700	0.7700	0.7700	0.7700	0.8100	0.8100	0.8100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	26	11	1	41	4	4	20	13	12	19	1
Total Analysis Volume [veh/h]	39	102	43	3	163	17	17	82	53	47	78	4
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	743	736	736	698
Degree of Utilization, x	0.25	0.25	0.21	0.18

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.97	0.98	0.77	0.67
95th-Percentile Queue Length [ft]	24.36	24.48	19.32	16.85
Approach Delay [s/veh]	9.44	9.50	9.16	9.32
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	9.37			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 5: Main St/Laurel Rd

Control Type:	Signalized	Delay (sec / veh):	40.7
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.585

Intersection Setup

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	2	0	0	1	0	0
Entry Pocket Length [ft]	305.00	100.00	100.00	215.00	100.00	215.00	160.00	100.00	100.00	300.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	480.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Base Volume Input [veh/h]	107	348	91	61	465	164	176	56	101	176	162	104
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	107	348	91	61	465	164	176	56	101	176	162	104
Peak Hour Factor	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.9000	0.9000	0.9000	0.6700	0.6700	0.6700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	109	28	19	145	51	49	16	28	66	60	39
Total Analysis Volume [veh/h]	134	435	114	76	581	205	196	62	112	263	242	155
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	2			0			2			0		
v_di, Inbound Pedestrian Volume crossing m	2			0			2			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			1			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	108.0
Offset Reference	Lagging Force-Off
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	10	0	6	10	0	6	6	0	6	6	0
Maximum Green [s]	20	40	0	16	40	0	16	20	0	16	20	0
Amber [s]	3.0	4.5	0.0	3.0	4.5	0.0	3.0	4.4	0.0	3.0	4.1	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	38	0	15	38	0	18	40	0	22	44	0
Vehicle Extension [s]	2.0	3.0	0.0	2.0	3.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	0	0	24	0	0	26	0	0	30	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.5	0.0	2.0	3.5	0.0	2.0	3.4	0.0	2.0	3.1	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	Yes		No	Yes		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	5.50	5.50	4.00	5.50	5.50	4.00	5.40	5.40	4.00	5.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	3.50	3.50	2.00	3.50	3.50	2.00	3.40	3.40	2.00	3.10
g_i, Effective Green Time [s]	10	53	53	6	49	49	9	18	18	18	28
g / C, Green / Cycle	0.09	0.46	0.46	0.05	0.43	0.43	0.07	0.16	0.16	0.16	0.24
(v / s)_i Volume / Saturation Flow Rate	0.08	0.15	0.15	0.04	0.22	0.22	0.06	0.03	0.07	0.15	0.23
s, saturation flow rate [veh/h]	1767	1855	1724	1767	1855	1679	3431	1855	1565	1767	1735
c, Capacity [veh/h]	161	861	801	98	795	719	256	296	250	276	423
d1, Uniform Delay [s]	51.39	19.48	19.50	53.63	24.14	24.20	52.21	42.00	43.70	48.08	42.61
k, delay calibration	0.04	0.50	0.50	0.04	0.50	0.50	0.04	0.04	0.04	0.37	0.09
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.20	1.02	1.11	4.96	2.40	2.69	1.80	0.13	0.47	35.75	8.85
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.83	0.33	0.33	0.78	0.52	0.52	0.76	0.21	0.45	0.95	0.94
d, Delay for Lane Group [s/veh]	55.59	20.50	20.61	58.59	26.54	26.89	54.00	42.13	44.17	83.83	51.46
Lane Group LOS	E	C	C	E	C	C	D	D	D	F	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	3.91	4.86	4.57	2.27	8.41	7.75	2.79	1.52	2.87	10.11	11.86
50th-Percentile Queue Length [ft/ln]	97.87	121.47	114.19	56.67	210.19	193.73	69.74	37.94	71.63	252.73	296.56
95th-Percentile Queue Length [veh/ln]	7.05	8.47	8.07	4.08	13.16	12.31	5.02	2.73	5.16	15.32	17.51
95th-Percentile Queue Length [ft/ln]	176.16	211.84	201.82	102.01	329.07	307.87	125.54	68.29	128.93	383.09	437.78

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	55.59	20.54	20.61	58.59	26.64	26.89	54.00	42.13	44.17	83.83	51.46	51.46
Movement LOS	E	C	C	E	C	C	D	D	D	F	D	D
d_A, Approach Delay [s/veh]	27.43			29.52			49.04			64.36		
Approach LOS	C			C			D			E		
d_I, Intersection Delay [s/veh]	40.70											
Intersection LOS	D											
Intersection V/C	0.585											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	2019.95	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.03	47.03	47.03	47.03
l_p,int, Pedestrian LOS Score for Intersection	2.738	2.740	2.671	2.298
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	565	565	602	677
d_b, Bicycle Delay [s]	29.59	29.61	28.11	25.18
l_b,int, Bicycle LOS Score for Intersection	2.123	2.271	2.170	2.649
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Main St/Delta Rd

Control Type:	Two-way stop	Delay (sec / veh):	93.0
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.566

Intersection Setup

Name	Brentwood Blvd		Main S		Delta Rd	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	95.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Brentwood Blvd		Main S		Delta Rd	
Base Volume Input [veh/h]	348	66	151	569	51	190
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	2.30	2.30	2.30	2.30	2.30
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	348	66	151	569	51	190
Peak Hour Factor	0.9000	0.9000	0.7800	0.7800	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	97	18	48	182	15	55
Total Analysis Volume [veh/h]	387	73	194	729	59	221
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.18	0.01	0.57	0.35
d_M, Delay for Movement [s/veh]	0.00	0.00	8.97	0.00	92.97	64.16
Movement LOS	A	A	A	A	F	F
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.64	0.00	8.78	8.78
95th-Percentile Queue Length [ft/ln]	0.00	0.00	15.98	0.00	219.46	219.46
d_A, Approach Delay [s/veh]	0.00		1.89		70.23	
Approach LOS	A		A		F	
d_I, Intersection Delay [s/veh]	12.87					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 1: Sellers Rd/E Cypress Rd

Control Type:	Signalized	Delay (sec / veh):	16.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.484

Intersection Setup

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	185.00	100.00	100.00	250.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			45.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Base Volume Input [veh/h]	86	2	106	3	0	10	1	379	96	68	283	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	86	2	106	3	0	10	1	379	96	68	283	0
Peak Hour Factor	0.8400	0.8400	0.8400	0.6500	0.6500	0.6500	0.9200	0.9200	0.9200	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	1	32	1	0	4	0	103	26	19	78	0
Total Analysis Volume [veh/h]	102	2	126	5	0	15	1	412	104	75	311	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			1			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	2	0	0	2	0	2	2	0	2	2	0
Maximum Green [s]	0	30	0	0	30	0	30	60	0	30	60	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	4.0	0.0	2.0	4.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	4.0	0.0	2.0	4.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	L	C	R	L	C	L	C	C
C, Cycle Length [s]	45	45	45	45	45	45	45	45	45
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	6.00	4.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	4.00	2.00	4.00	4.00
g_i, Effective Green Time [s]	8	1	1	1	0	16	2	19	19
g / C, Green / Cycle	0.17	0.01	0.01	0.01	0.00	0.36	0.05	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.14	0.00	0.00	0.01	0.00	0.29	0.04	0.08	0.08
s, saturation flow rate [veh/h]	1645	1752	1840	1564	1752	1768	1752	1840	1840
c, Capacity [veh/h]	288	21	22	19	1	642	95	767	767
d1, Uniform Delay [s]	18.02	22.29	0.00	22.44	22.77	13.04	21.28	8.46	8.46
k, delay calibration	0.04	0.04	0.04	0.04	0.04	0.15	0.04	0.15	0.15
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.95	2.05	0.00	22.52	249.23	3.40	5.30	0.18	0.18
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.23	0.00	0.79	0.99	0.80	0.79	0.20	0.20
d, Delay for Lane Group [s/veh]	19.97	24.34	0.00	44.96	272.00	16.44	26.58	8.64	8.64
Lane Group LOS	B	C	A	D	F	B	C	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.93	0.06	0.00	0.25	0.08	3.87	0.78	0.65	0.65
50th-Percentile Queue Length [ft/ln]	48.16	1.39	0.00	6.27	1.98	96.66	19.46	16.14	16.14
95th-Percentile Queue Length [veh/ln]	3.47	0.10	0.00	0.45	0.14	6.96	1.40	1.16	1.16
95th-Percentile Queue Length [ft/ln]	86.69	2.50	0.00	11.28	3.56	173.99	35.02	29.05	29.05

Movement, Approach, & Intersection Results

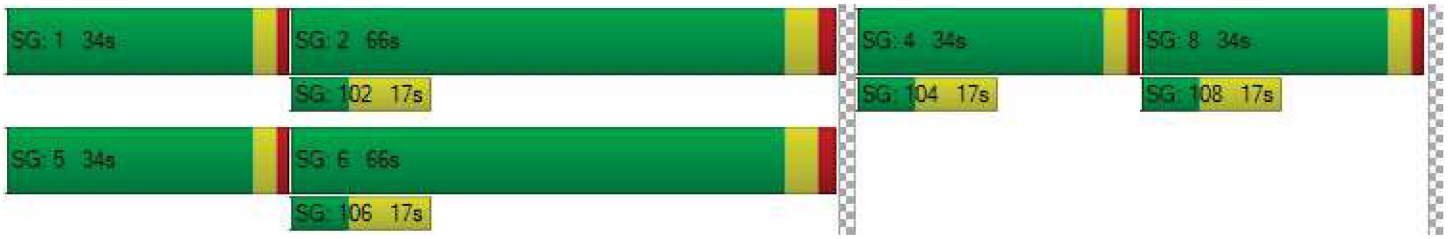
d_M, Delay for Movement [s/veh]	19.97	19.97	19.97	24.34	0.00	44.96	272.00	16.44	16.44	26.58	8.64	8.64
Movement LOS	B	B	B	C	A	D	F	B	B	C	A	A
d_A, Approach Delay [s/veh]	19.97			39.81			16.93			12.13		
Approach LOS	B			D			B			B		
d_I, Intersection Delay [s/veh]	16.33											
Intersection LOS	B											
Intersection V/C	0.484											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
l_p,int, Pedestrian LOS Score for Intersection	2.047	2.140	2.476	2.508
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	667	1333	1333
d_b, Bicycle Delay [s]	20.00	20.00	5.00	5.00
l_b,int, Bicycle LOS Score for Intersection	1.939	1.593	2.413	1.878
Bicycle LOS	A	A	B	A

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Sellers Rd/Delta Rd

Control Type:	All-way stop	Delay (sec / veh):	13.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.575

Intersection Setup

Name	Sellers Rd			Sellers Rd			Delta Rd			Delta Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sellers Rd			Sellers Rd			Delta Rd			Delta Rd		
Base Volume Input [veh/h]	88	203	51	13	149	22	34	113	52	43	85	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	88	203	51	13	149	22	34	113	52	43	85	21
Peak Hour Factor	0.8900	0.8900	0.8900	0.9200	0.9200	0.9200	0.9800	0.9800	0.9800	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	57	14	4	40	6	9	29	13	13	25	6
Total Analysis Volume [veh/h]	99	228	57	14	162	24	35	115	53	51	100	25
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	668	634	620	605
Degree of Utilization, x	0.57	0.32	0.33	0.29

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	3.68	1.35	1.42	1.20
95th-Percentile Queue Length [ft]	91.94	33.71	35.50	30.08
Approach Delay [s/veh]	15.42	11.27	11.60	11.37
Approach LOS	C	B	B	B
Intersection Delay [s/veh]	13.01			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 5: Main St/Laurel Rd

Control Type:	Signalized	Delay (sec / veh):	32.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.386

Intersection Setup

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	2	0	0	1	0	0
Entry Pocket Length [ft]	305.00	100.00	100.00	215.00	100.00	215.00	160.00	100.00	100.00	300.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	480.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Base Volume Input [veh/h]	136	370	94	95	326	129	165	162	123	58	95	57
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	136	370	94	95	326	129	165	162	123	58	95	57
Peak Hour Factor	0.8900	0.8900	0.8900	0.8800	0.8800	0.8800	0.9600	0.9600	0.9600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	104	26	27	93	37	43	42	32	17	28	17
Total Analysis Volume [veh/h]	153	416	106	108	370	147	172	169	128	67	110	66
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	1			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			1			0		
v_co, Outbound Pedestrian Volume crossing	1			0			0			1		
v_ci, Inbound Pedestrian Volume crossing mi	1			0			0			1		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	108.0
Offset Reference	Lagging Force-Off
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	10	0	6	10	0	6	6	0	6	6	0
Maximum Green [s]	20	40	0	16	40	0	16	20	0	16	20	0
Amber [s]	3.0	4.5	0.0	3.0	4.5	0.0	3.0	4.4	0.0	3.0	4.1	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	38	0	15	38	0	18	40	0	22	44	0
Vehicle Extension [s]	2.0	3.0	0.0	2.0	3.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	0	0	24	0	0	26	0	0	30	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.5	0.0	2.0	3.5	0.0	2.0	3.4	0.0	2.0	3.1	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	Yes		No	Yes		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	5.50	5.50	4.00	5.50	5.50	4.00	5.40	5.40	4.00	5.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	3.50	3.50	2.00	3.50	3.50	2.00	3.40	3.40	2.00	3.10
g_i, Effective Green Time [s]	11	66	66	9	64	64	8	15	15	6	14
g / C, Green / Cycle	0.10	0.58	0.58	0.08	0.56	0.56	0.07	0.13	0.13	0.05	0.12
(v / s)_i Volume / Saturation Flow Rate	0.09	0.15	0.15	0.06	0.15	0.15	0.05	0.09	0.08	0.04	0.10
s, saturation flow rate [veh/h]	1767	1855	1726	1767	1855	1679	3431	1855	1573	1767	1730
c, Capacity [veh/h]	170	1069	995	134	1031	933	232	249	211	87	205
d1, Uniform Delay [s]	51.41	12.07	12.08	52.33	13.27	13.30	52.61	47.41	46.90	54.03	49.75
k, delay calibration	0.04	0.50	0.50	0.04	0.50	0.50	0.04	0.04	0.04	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.64	0.57	0.61	4.35	0.62	0.69	1.75	1.21	1.04	5.30	4.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.90	0.25	0.25	0.81	0.26	0.26	0.74	0.68	0.61	0.77	0.86
d, Delay for Lane Group [s/veh]	58.05	12.63	12.69	56.68	13.89	14.00	54.36	48.62	47.94	59.32	53.79
Lane Group LOS	E	B	B	E	B	B	D	D	D	E	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	4.59	3.38	3.18	3.17	3.60	3.32	2.45	4.61	3.45	2.03	5.14
50th-Percentile Queue Length [ft/ln]	114.80	84.41	79.50	79.37	89.92	82.99	61.28	115.13	86.22	50.68	128.47
95th-Percentile Queue Length [veh/ln]	8.11	6.08	5.72	5.71	6.47	5.98	4.41	8.12	6.21	3.65	8.86
95th-Percentile Queue Length [ft/ln]	202.66	151.94	143.10	142.87	161.86	149.39	110.30	203.12	155.19	91.22	221.41

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	58.05	12.65	12.69	56.68	13.92	14.00	54.36	48.62	47.94	59.32	53.79	53.79
Movement LOS	E	B	B	E	B	B	D	D	D	E	D	D
d_A, Approach Delay [s/veh]	22.95			21.33			50.54			55.31		
Approach LOS	C			C			D			E		
d_I, Intersection Delay [s/veh]	32.79											
Intersection LOS	C											
Intersection V/C	0.386											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	7881.94	0.00	0.00	3329.98
d_p, Pedestrian Delay [s]	47.03	47.03	47.03	47.03
l_p,int, Pedestrian LOS Score for Intersection	2.634	2.644	2.655	2.189
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	565	565	602	677
d_b, Bicycle Delay [s]	29.59	29.59	28.11	25.19
l_b,int, Bicycle LOS Score for Intersection	2.116	2.075	2.333	1.961
Bicycle LOS	B	B	B	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Main St/Delta Rd

Control Type:	Two-way stop	Delay (sec / veh):	54.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.375

Intersection Setup

Name	Brentwood Blvd		Main S		Delta Rd	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	95.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Brentwood Blvd		Main S		Delta Rd	
Base Volume Input [veh/h]	562	98	112	445	48	134
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	2.30	2.30	2.30	2.30	2.30
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	562	98	112	445	48	134
Peak Hour Factor	0.9400	0.9400	0.9100	0.9100	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	149	26	31	122	13	35
Total Analysis Volume [veh/h]	598	104	123	489	51	141
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.14	0.00	0.37	0.30
d_M, Delay for Movement [s/veh]	0.00	0.00	9.67	0.00	54.31	35.52
Movement LOS	A	A	A	A	F	E
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.48	0.00	4.50	4.50
95th-Percentile Queue Length [ft/ln]	0.00	0.00	11.91	0.00	112.44	112.44
d_A, Approach Delay [s/veh]	0.00		1.94		40.51	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	5.95					
Intersection LOS	F					

Appendix C: Existing plus Project Conditions Capacity Analysis Worksheets

Intersection Level Of Service Report
Intersection 1: Sellers Rd/E Cypress Rd

Control Type:	Signalized	Delay (sec / veh):	17.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.561

Intersection Setup

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	185.00	100.00	100.00	250.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			45.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Base Volume Input [veh/h]	96	5	47	1	2	8	11	289	177	95	501	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	27	0	1	0	0	0	0	0	9	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	123	5	48	1	2	8	11	289	186	95	501	1
Peak Hour Factor	0.7700	0.7700	0.7700	0.6900	0.6900	0.6900	0.8100	0.8100	0.8100	0.7000	0.7000	0.7000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	40	2	16	0	1	3	3	89	57	34	179	0
Total Analysis Volume [veh/h]	160	6	62	1	3	12	14	357	230	136	716	1
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	2	0	0	2	0	2	2	0	2	2	0
Maximum Green [s]	0	30	0	0	30	0	30	60	0	30	60	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	4.0	0.0	2.0	4.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	4.0	0.0	2.0	4.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	L	C	R	L	C	L	C	C
C, Cycle Length [s]	56	56	56	56	56	56	56	56	56
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	6.00	4.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	4.00	2.00	4.00	4.00
g_i, Effective Green Time [s]	9	1	1	1	0	22	6	27	27
g / C, Green / Cycle	0.17	0.01	0.01	0.01	0.01	0.40	0.10	0.49	0.49
(v / s)_i Volume / Saturation Flow Rate	0.13	0.00	0.00	0.01	0.01	0.34	0.08	0.19	0.19
s, saturation flow rate [veh/h]	1699	1752	1840	1564	1752	1721	1752	1840	1839
c, Capacity [veh/h]	281	17	18	15	15	692	176	909	908
d1, Uniform Delay [s]	22.45	27.38	27.40	27.57	27.64	15.15	24.47	8.88	8.88
k, delay calibration	0.04	0.04	0.04	0.04	0.04	0.15	0.04	0.15	0.15
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.17	0.53	1.63	28.03	47.89	4.23	2.70	0.40	0.40
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.06	0.17	0.79	0.92	0.85	0.77	0.39	0.39
d, Delay for Lane Group [s/veh]	24.62	27.91	29.04	55.60	75.53	19.38	27.17	9.28	9.28
Lane Group LOS	C	C	C	E	E	B	C	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.57	0.01	0.04	0.26	0.37	5.88	1.62	1.90	1.90
50th-Percentile Queue Length [ft/ln]	64.26	0.35	1.07	6.43	9.20	147.02	40.60	47.51	47.49
95th-Percentile Queue Length [veh/ln]	4.63	0.03	0.08	0.46	0.66	9.86	2.92	3.42	3.42
95th-Percentile Queue Length [ft/ln]	115.67	0.63	1.92	11.57	16.55	246.45	73.09	85.53	85.49

Movement, Approach, & Intersection Results

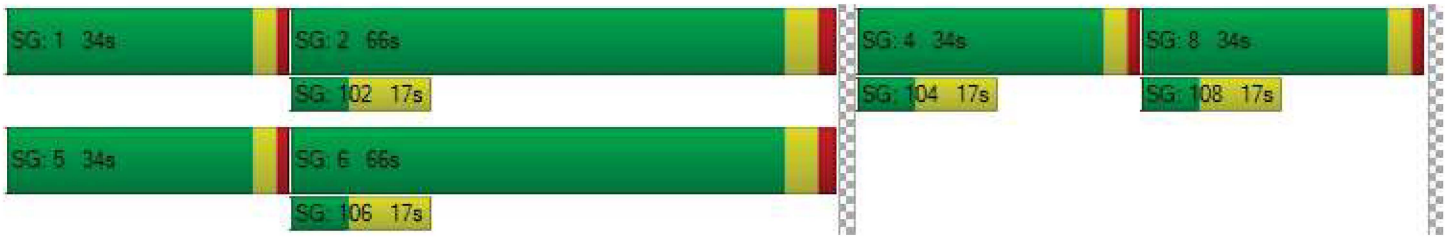
d_M, Delay for Movement [s/veh]	24.62	24.62	24.62	27.91	29.04	55.60	75.53	19.38	19.38	27.17	9.28	9.28
Movement LOS	C	C	C	C	C	E	E	B	B	C	A	A
d_A, Approach Delay [s/veh]	24.62			48.89			20.69			12.13		
Approach LOS	C			D			C			B		
d_I, Intersection Delay [s/veh]	17.18											
Intersection LOS	B											
Intersection V/C	0.561											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
l_p,int, Pedestrian LOS Score for Intersection	2.199	2.146	2.675	2.648
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	667	1333	1333
d_b, Bicycle Delay [s]	20.00	20.00	5.00	5.00
l_b,int, Bicycle LOS Score for Intersection	1.936	1.586	2.551	2.263
Bicycle LOS	A	A	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Sellers Rd/Delta Rd

Control Type:	All-way stop	Delay (sec / veh):	10.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.353

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	33	86	36	3	142	15	13	63	41	38	63	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	1	0	0	2	64	21	0	0	0	0	0
Total Hourly Volume [veh/h]	33	87	36	3	144	79	34	63	41	38	63	3
Peak Hour Factor	0.8400	0.8400	0.8400	0.8700	0.8700	0.8700	0.7700	0.7700	0.7700	0.8100	0.8100	0.8100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	26	11	1	41	23	11	20	13	12	19	1
Total Analysis Volume [veh/h]	39	104	43	3	166	91	44	82	53	47	78	4
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	707	737	692	659
Degree of Utilization, x	0.26	0.35	0.26	0.20

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.05	1.59	1.03	0.72
95th-Percentile Queue Length [ft]	26.35	39.80	25.73	18.04
Approach Delay [s/veh]	9.90	10.52	10.00	9.78
Approach LOS	A	B	A	A
Intersection Delay [s/veh]	10.12			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 4: Sellers Rd/Street B

Control Type:	Two-way stop	Delay (sec / veh):	13.2
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.056

Intersection Setup

Name	Sellers Rd			Sellers Rd			Street B					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sellers Rd			Sellers Rd			Street B					
Base Volume Input [veh/h]	0	148	0	0	274	0	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	22	0	0	0	0	9	28	0	66	0	0	0
Total Hourly Volume [veh/h]	22	148	0	0	274	9	28	0	66	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	37	0	0	69	2	7	0	17	0	0	0
Total Analysis Volume [veh/h]	22	148	0	0	274	9	28	0	66	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.09	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.86	0.00	0.00	7.51	0.00	0.00	13.17	13.38	10.65	13.36	12.51	9.01
Movement LOS	A	A	A	A	A	A	B	B	B	B	B	A
95th-Percentile Queue Length [veh/ln]	0.05	0.05	0.05	0.00	0.00	0.00	0.50	0.50	0.50	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.31	1.31	1.31	0.00	0.00	0.00	12.45	12.45	12.45	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	1.02			0.00			11.40			11.62		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	2.28											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 5: Main St/Laurel Rd

Control Type:	Signalized	Delay (sec / veh):	47.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.620

Intersection Setup

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	2	0	0	1	0	0
Entry Pocket Length [ft]	305.00	100.00	100.00	215.00	100.00	215.00	160.00	100.00	100.00	300.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	480.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Base Volume Input [veh/h]	107	348	91	61	465	164	176	56	101	176	162	104
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	50	0	0	0	0	0	0	0	16	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	157	348	91	61	465	164	176	56	117	176	162	104
Peak Hour Factor	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.9000	0.9000	0.9000	0.6700	0.6700	0.6700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	49	109	28	19	145	51	49	16	33	66	60	39
Total Analysis Volume [veh/h]	196	435	114	76	581	205	196	62	130	263	242	155
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	2			0			2			0		
v_di, Inbound Pedestrian Volume crossing m	2			0			2			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			1			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	108.0
Offset Reference	Lagging Force-Off
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	10	0	6	10	0	6	6	0	6	6	0
Maximum Green [s]	20	40	0	16	40	0	16	20	0	16	20	0
Amber [s]	3.0	4.5	0.0	3.0	4.5	0.0	3.0	4.4	0.0	3.0	4.1	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	38	0	15	38	0	18	40	0	22	44	0
Vehicle Extension [s]	2.0	3.0	0.0	2.0	3.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	0	0	24	0	0	26	0	0	30	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.5	0.0	2.0	3.5	0.0	2.0	3.4	0.0	2.0	3.1	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	Yes		No	Yes		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	5.50	5.50	4.00	5.50	5.50	4.00	5.40	5.40	4.00	5.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	3.50	3.50	2.00	3.50	3.50	2.00	3.40	3.40	2.00	3.10
g_i, Effective Green Time [s]	11	53	53	6	49	49	9	18	18	18	28
g / C, Green / Cycle	0.10	0.46	0.46	0.05	0.42	0.42	0.07	0.16	0.16	0.16	0.24
(v / s)_i Volume / Saturation Flow Rate	0.11	0.15	0.15	0.04	0.22	0.22	0.06	0.03	0.08	0.15	0.23
s, saturation flow rate [veh/h]	1767	1855	1724	1767	1855	1679	3431	1855	1565	1767	1735
c, Capacity [veh/h]	170	861	800	98	785	711	256	296	250	276	423
d1, Uniform Delay [s]	51.96	19.49	19.50	53.63	24.57	24.63	52.21	42.00	44.24	48.08	42.61
k, delay calibration	0.11	0.50	0.50	0.04	0.50	0.50	0.04	0.04	0.04	0.37	0.09
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	83.56	1.02	1.11	4.96	2.49	2.79	1.80	0.13	0.62	35.75	8.85
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.15	0.33	0.33	0.78	0.52	0.53	0.76	0.21	0.52	0.95	0.94
d, Delay for Lane Group [s/veh]	135.52	20.51	20.61	58.59	27.06	27.42	54.00	42.13	44.87	83.83	51.46
Lane Group LOS	F	C	C	E	C	C	D	D	D	F	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	8.75	4.87	4.56	2.27	8.50	7.84	2.79	1.52	3.37	10.11	11.86
50th-Percentile Queue Length [ft/ln]	218.84	121.64	114.02	56.67	212.62	195.99	69.74	37.94	84.30	252.73	296.56
95th-Percentile Queue Length [veh/ln]	14.32	8.48	8.06	4.08	13.29	12.43	5.02	2.73	6.07	15.32	17.51
95th-Percentile Queue Length [ft/ln]	358.08	212.08	201.58	102.01	332.19	310.79	125.54	68.29	151.74	383.09	437.78

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	135.52	20.54	20.61	58.59	27.16	27.42	54.00	42.13	44.87	83.83	51.46	51.46
Movement LOS	F	C	C	E	C	C	D	D	D	F	D	D
d_A, Approach Delay [s/veh]	50.80			30.00			49.05			64.36		
Approach LOS	D			C			D			E		
d_I, Intersection Delay [s/veh]	47.16											
Intersection LOS	D											
Intersection V/C	0.620											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	1963.63	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.03	47.03	47.03	47.03
l_p,int, Pedestrian LOS Score for Intersection	2.759	2.740	2.688	2.298
Crosswalk LOS	C	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	565	565	602	677
d_b, Bicycle Delay [s]	29.59	29.61	28.11	25.18
l_b,int, Bicycle LOS Score for Intersection	2.174	2.271	2.200	2.649
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Main St/Delta Rd

Control Type:	Two-way stop	Delay (sec / veh):	195.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.793

Intersection Setup

Name	Brentwood Blvd		Main S		Delta Rd	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	95.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Brentwood Blvd		Main S		Delta Rd	
Base Volume Input [veh/h]	348	66	151	569	51	190
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	2.30	2.30	2.30	2.30	2.30
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	5	16	0	14	50
Total Hourly Volume [veh/h]	348	71	167	569	65	240
Peak Hour Factor	0.9000	0.9000	0.7800	0.7800	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	97	20	54	182	19	70
Total Analysis Volume [veh/h]	387	79	214	729	76	279
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.20	0.01	0.79	0.44
d_M, Delay for Movement [s/veh]	0.00	0.00	9.09	0.00	195.31	163.49
Movement LOS	A	A	A	A	F	F
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.72	0.00	16.56	16.56
95th-Percentile Queue Length [ft/ln]	0.00	0.00	18.12	0.00	414.04	414.04
d_A, Approach Delay [s/veh]	0.00		2.06		170.30	
Approach LOS	A		A		F	
d_I, Intersection Delay [s/veh]	35.38					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 1: Sellers Rd/E Cypress Rd

Control Type:	Signalized	Delay (sec / veh):	17.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.520

Intersection Setup

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	185.00	100.00	100.00	250.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			45.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Base Volume Input [veh/h]	86	2	106	3	0	10	1	379	96	68	283	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	18	0	1	0	0	0	0	0	31	1	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	104	2	107	3	0	10	1	379	127	69	283	0
Peak Hour Factor	0.8400	0.8400	0.8400	0.6500	0.6500	0.6500	0.9200	0.9200	0.9200	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	1	32	1	0	4	0	103	35	19	78	0
Total Analysis Volume [veh/h]	124	2	127	5	0	15	1	412	138	76	311	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			1			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	2	0	0	2	0	2	2	0	2	2	0
Maximum Green [s]	0	30	0	0	30	0	30	60	0	30	60	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	4.0	0.0	2.0	4.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	4.0	0.0	2.0	4.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	L	C	R	L	C	L	C	C
C, Cycle Length [s]	49	49	49	49	49	49	49	49	49
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	6.00	4.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	4.00	2.00	4.00	4.00
g_i, Effective Green Time [s]	9	1	1	1	0	19	3	22	22
g / C, Green / Cycle	0.19	0.01	0.01	0.01	0.00	0.38	0.06	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.15	0.00	0.00	0.01	0.00	0.31	0.04	0.08	0.08
s, saturation flow rate [veh/h]	1653	1752	1840	1564	1752	1751	1752	1840	1840
c, Capacity [veh/h]	311	21	22	19	1	667	97	802	802
d1, Uniform Delay [s]	19.28	24.23	0.00	24.39	24.75	13.83	23.10	8.61	8.61
k, delay calibration	0.04	0.04	0.04	0.04	0.04	0.15	0.04	0.15	0.15
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.99	2.04	0.00	22.41	254.95	3.72	5.12	0.17	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.23	0.00	0.79	1.00	0.82	0.78	0.19	0.19
d, Delay for Lane Group [s/veh]	21.27	26.27	0.00	46.81	279.69	17.55	28.22	8.77	8.77
Lane Group LOS	C	C	A	D	F	B	C	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.37	0.06	0.00	0.27	0.08	4.64	0.87	0.71	0.71
50th-Percentile Queue Length [ft/ln]	59.23	1.53	0.00	6.67	2.02	116.10	21.67	17.72	17.72
95th-Percentile Queue Length [veh/ln]	4.26	0.11	0.00	0.48	0.15	8.18	1.56	1.28	1.28
95th-Percentile Queue Length [ft/ln]	106.61	2.75	0.00	12.01	3.64	204.46	39.00	31.90	31.90

Movement, Approach, & Intersection Results

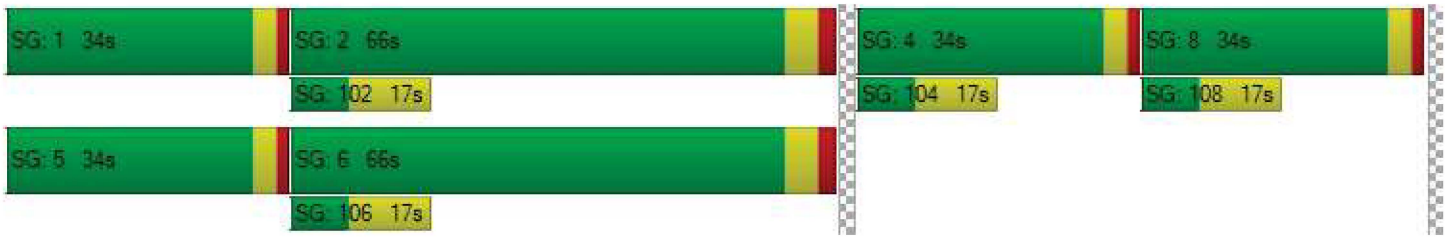
d_M, Delay for Movement [s/veh]	21.27	21.27	21.27	26.27	0.00	46.81	279.69	17.55	17.55	28.22	8.77	8.77
Movement LOS	C	C	C	C	A	D	F	B	B	C	A	A
d_A, Approach Delay [s/veh]	21.27			41.67			18.02			12.59		
Approach LOS	C			D			B			B		
d_I, Intersection Delay [s/veh]	17.36											
Intersection LOS	B											
Intersection V/C	0.520											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
l_p,int, Pedestrian LOS Score for Intersection	2.094	2.140	2.497	2.509
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	667	1333	1333
d_b, Bicycle Delay [s]	20.00	20.00	5.00	5.00
l_b,int, Bicycle LOS Score for Intersection	1.977	1.593	2.469	1.879
Bicycle LOS	A	A	B	A

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Sellers Rd/Delta Rd

Control Type:	All-way stop	Delay (sec / veh):	15.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.630

Intersection Setup

Name	Sellers Rd			Sellers Rd			Delta Rd			Delta Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sellers Rd			Sellers Rd			Delta Rd			Delta Rd		
Base Volume Input [veh/h]	88	203	51	13	149	22	34	113	52	43	85	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	2	0	0	1	43	72	0	0	0	0	0
Total Hourly Volume [veh/h]	88	205	51	13	150	65	106	113	52	43	85	21
Peak Hour Factor	0.8900	0.8900	0.8900	0.9200	0.9200	0.9200	0.9800	0.9800	0.9800	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	58	14	4	41	18	27	29	13	13	25	6
Total Analysis Volume [veh/h]	99	230	57	14	163	71	108	115	53	51	100	25
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	613	597	578	555
Degree of Utilization, x	0.63	0.42	0.48	0.32

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	4.42	2.04	2.56	1.35
95th-Percentile Queue Length [ft]	110.39	50.93	64.11	33.82
Approach Delay [s/veh]	18.33	13.25	14.78	12.46
Approach LOS	C	B	B	B
Intersection Delay [s/veh]	15.31			
Intersection LOS	C			

Intersection Level Of Service Report
Intersection 4: Sellers Rd/Street B

Control Type:	Two-way stop	Delay (sec / veh):	13.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.043

Intersection Setup

Name	Sellers Rd			Sellers Rd			Street B					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sellers Rd			Sellers Rd			Street B					
Base Volume Input [veh/h]	0	194	0	0	164	0	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	74	0	0	0	0	32	19	0	44	0	0	0
Total Hourly Volume [veh/h]	74	194	0	0	164	32	19	0	44	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	49	0	0	41	8	5	0	11	0	0	0
Total Analysis Volume [veh/h]	74	194	0	0	164	32	19	0	44	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.05	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.76	0.00	0.00	7.61	0.00	0.00	13.66	13.89	9.73	13.84	13.52	9.25
Movement LOS	A	A	A	A	A	A	B	B	A	B	B	A
95th-Percentile Queue Length [veh/ln]	0.17	0.17	0.17	0.00	0.00	0.00	0.31	0.31	0.31	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	4.26	4.26	4.26	0.00	0.00	0.00	7.73	7.73	7.73	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	2.14			0.00			10.91			12.20		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	2.39											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 5: Main St/Laurel Rd

Control Type:	Signalized	Delay (sec / veh):	39.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.411

Intersection Setup

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	2	0	0	1	0	0
Entry Pocket Length [ft]	305.00	100.00	100.00	215.00	100.00	215.00	160.00	100.00	100.00	300.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	480.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Base Volume Input [veh/h]	136	370	94	95	326	129	165	162	123	58	95	57
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	33	0	0	0	0	0	0	0	56	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	169	370	94	95	326	129	165	162	179	58	95	57
Peak Hour Factor	0.8900	0.8900	0.8900	0.8800	0.8800	0.8800	0.9600	0.9600	0.9600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	104	26	27	93	37	43	42	47	17	28	17
Total Analysis Volume [veh/h]	190	416	106	108	370	147	172	169	186	67	110	66
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	1			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			1			0		
v_co, Outbound Pedestrian Volume crossing	1			0			0			1		
v_ci, Inbound Pedestrian Volume crossing mi	1			0			0			1		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	108.0
Offset Reference	Lagging Force-Off
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	10	0	6	10	0	6	6	0	6	6	0
Maximum Green [s]	20	40	0	16	40	0	16	20	0	16	20	0
Amber [s]	3.0	4.5	0.0	3.0	4.5	0.0	3.0	4.4	0.0	3.0	4.1	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	38	0	15	38	0	18	40	0	22	44	0
Vehicle Extension [s]	2.0	3.0	0.0	2.0	3.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	0	0	24	0	0	26	0	0	30	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.5	0.0	2.0	3.5	0.0	2.0	3.4	0.0	2.0	3.1	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	Yes		No	Yes		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C
C, Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	5.50	5.50	4.00	5.50	5.50	4.00	5.40	5.40	4.00	5.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	3.50	3.50	2.00	3.50	3.50	2.00	3.40	3.40	2.00	3.10
g_i, Effective Green Time [s]	11	66	66	9	64	64	8	16	16	6	14
g / C, Green / Cycle	0.10	0.57	0.57	0.08	0.55	0.55	0.07	0.14	0.14	0.05	0.12
(v / s)_i Volume / Saturation Flow Rate	0.11	0.15	0.15	0.06	0.15	0.15	0.05	0.09	0.12	0.04	0.10
s, saturation flow rate [veh/h]	1767	1855	1726	1767	1855	1679	3431	1855	1573	1767	1730
c, Capacity [veh/h]	170	1062	988	134	1024	926	232	256	218	87	212
d1, Uniform Delay [s]	51.96	12.29	12.31	52.33	13.51	13.54	52.61	46.98	48.41	54.03	49.30
k, delay calibration	0.10	0.50	0.50	0.04	0.50	0.50	0.04	0.04	0.04	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	67.99	0.58	0.62	4.35	0.63	0.71	1.75	1.08	3.70	5.30	3.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.12	0.25	0.26	0.81	0.26	0.27	0.74	0.66	0.86	0.77	0.83
d, Delay for Lane Group [s/veh]	119.95	12.87	12.93	56.68	14.14	14.25	54.36	48.06	52.11	59.32	52.52
Lane Group LOS	F	B	B	E	B	B	D	D	D	E	D
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	8.02	3.42	3.22	3.17	3.64	3.36	2.45	4.57	5.33	2.03	5.07
50th-Percentile Queue Length [ft/ln]	200.45	85.52	80.39	79.37	90.96	83.94	61.28	114.37	133.13	50.68	126.84
95th-Percentile Queue Length [veh/ln]	13.18	6.16	5.79	5.71	6.55	6.04	4.41	8.08	9.11	3.65	8.77
95th-Percentile Queue Length [ft/ln]	329.60	153.93	144.71	142.87	163.72	151.10	110.30	202.07	227.74	91.22	219.19

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	119.95	12.89	12.93	56.68	14.17	14.25	54.36	48.06	52.11	59.32	52.52	52.52
Movement LOS	F	B	B	E	B	B	D	D	D	E	D	D
d_A, Approach Delay [s/veh]	41.47			21.53			51.55			54.40		
Approach LOS	D			C			D			D		
d_I, Intersection Delay [s/veh]	39.57											
Intersection LOS	D											
Intersection V/C	0.411											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	7155.80	0.00	0.00	3329.98
d_p, Pedestrian Delay [s]	47.03	47.03	47.03	47.03
l_p,int, Pedestrian LOS Score for Intersection	2.659	2.644	2.676	2.189
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	565	565	602	677
d_b, Bicycle Delay [s]	29.59	29.59	28.11	25.19
l_b,int, Bicycle LOS Score for Intersection	2.147	2.075	2.429	1.961
Bicycle LOS	B	B	B	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Main St/Delta Rd

Control Type:	Two-way stop	Delay (sec / veh):	113.5
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.590

Intersection Setup

Name	Brentwood Blvd		Main S		Delta Rd	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	95.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Brentwood Blvd		Main S		Delta Rd	
Base Volume Input [veh/h]	562	98	112	445	48	134
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	2.30	2.30	2.30	2.30	2.30
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	16	56	0	10	33
Total Hourly Volume [veh/h]	562	114	168	445	58	167
Peak Hour Factor	0.9400	0.9400	0.9100	0.9100	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	149	30	46	122	15	44
Total Analysis Volume [veh/h]	598	121	185	489	61	176
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.21	0.00	0.59	0.38
d_M, Delay for Movement [s/veh]	0.00	0.00	10.17	0.00	113.46	86.42
Movement LOS	A	A	B	A	F	F
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.79	0.00	8.98	8.98
95th-Percentile Queue Length [ft/ln]	0.00	0.00	19.76	0.00	224.40	224.40
d_A, Approach Delay [s/veh]	0.00		2.79		93.38	
Approach LOS	A		A		F	
d_I, Intersection Delay [s/veh]	14.73					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 6: Main St/Delta Rd

Control Type:	Signalized	Delay (sec / veh):	18.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.677

Intersection Setup

Name	Brentwood Blvd		Main S		Delta Rd	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	95.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

Volumes

Name	Brentwood Blvd		Main S		Delta Rd	
Base Volume Input [veh/h]	348	66	151	569	51	190
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	2.30	2.30	2.30	2.30	2.30
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	5	16	0	14	50
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	348	71	167	569	65	240
Peak Hour Factor	0.9000	0.9000	0.7800	0.7800	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	97	20	54	182	19	70
Total Analysis Volume [veh/h]	387	79	214	729	76	279
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	6	0	5	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	5	0	5	5	5	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	10	0	0	10	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	L	C	C
C, Cycle Length [s]	54	54	54	54
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	18	9	31	15
g / C, Green / Cycle	0.33	0.17	0.57	0.28
(v / s)_i Volume / Saturation Flow Rate	0.29	0.13	0.43	0.24
s, saturation flow rate [veh/h]	1630	1599	1679	1461
c, Capacity [veh/h]	532	269	955	414
d1, Uniform Delay [s]	17.15	21.59	8.89	18.33
k, delay calibration	0.11	0.11	0.29	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.73	5.37	3.43	5.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.80	0.76	0.86
d, Delay for Lane Group [s/veh]	21.88	26.95	12.32	23.57
Lane Group LOS	C	C	B	C
Critical Lane Group	No	No	Yes	Yes
50th-Percentile Queue Length [veh/ln]	5.10	2.65	4.93	4.07
50th-Percentile Queue Length [ft/ln]	127.52	66.33	123.32	101.72
95th-Percentile Queue Length [veh/ln]	8.80	4.78	8.58	7.32
95th-Percentile Queue Length [ft/ln]	220.12	119.39	214.38	183.10

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	21.88	21.88	26.95	12.32	23.57	23.57
Movement LOS	C	C	C	B	C	C
d_A, Approach Delay [s/veh]	21.88		15.64		23.57	
Approach LOS	C		B		C	
d_I, Intersection Delay [s/veh]	18.88					
Intersection LOS	B					
Intersection V/C	0.677					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	667	667
d_b, Bicycle Delay [s]	20.00	20.00	20.00
l_b,int, Bicycle LOS Score for Intersection	2.329	3.116	2.145
Bicycle LOS	B	C	B

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Main St/Delta Rd

Control Type:	Signalized	Delay (sec / veh):	24.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.718

Intersection Setup

Name	Brentwood Blvd		Main S		Delta Rd	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	95.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

Volumes

Name	Brentwood Blvd		Main S		Delta Rd	
Base Volume Input [veh/h]	562	98	112	445	48	134
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	2.30	2.30	2.30	2.30	2.30
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	16	56	0	10	33
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	562	114	168	445	58	167
Peak Hour Factor	0.9400	0.9400	0.9100	0.9100	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	149	30	46	122	15	44
Total Analysis Volume [veh/h]	598	121	185	489	61	176
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	6	0	5	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	5	0	5	5	5	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	10	0	0	10	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	L	C	C
C, Cycle Length [s]	61	61	61	61
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	29	9	41	12
g / C, Green / Cycle	0.47	0.14	0.68	0.19
(v / s)_i Volume / Saturation Flow Rate	0.44	0.12	0.29	0.16
s, saturation flow rate [veh/h]	1631	1599	1679	1468
c, Capacity [veh/h]	759	232	1134	285
d1, Uniform Delay [s]	15.70	25.39	4.56	23.78
k, delay calibration	0.38	0.11	0.15	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	18.31	6.21	0.37	6.21
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.95	0.80	0.43	0.83
d, Delay for Lane Group [s/veh]	34.01	31.60	4.93	29.99
Lane Group LOS	C	C	A	C
Critical Lane Group	Yes	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	11.27	2.75	1.63	3.43
50th-Percentile Queue Length [ft/ln]	281.87	68.69	40.68	85.67
95th-Percentile Queue Length [veh/ln]	16.78	4.95	2.93	6.17
95th-Percentile Queue Length [ft/ln]	419.54	123.64	73.22	154.20

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	34.01	34.01	31.60	4.93	29.99	29.99
Movement LOS	C	C	C	A	C	C
d_A, Approach Delay [s/veh]	34.01		12.25		29.99	
Approach LOS	C		B		C	
d_I, Intersection Delay [s/veh]	24.43					
Intersection LOS	C					
Intersection V/C	0.718					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	667	667
d_b, Bicycle Delay [s]	20.00	20.00	20.00
l_b,int, Bicycle LOS Score for Intersection	2.746	2.672	1.951
Bicycle LOS	B	B	A

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Appendix D: Background Conditions Capacity Analysis Worksheets

Intersection Level Of Service Report
Intersection 1: Sellers Rd/E Cypress Rd

Control Type:	Signalized	Delay (sec / veh):	40.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.722

Intersection Setup

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	150.00	100.00	150.00	110.00	100.00	100.00	185.00	100.00	185.00	250.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			45.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Base Volume Input [veh/h]	96	5	47	1	2	8	11	289	127	295	301	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	12	0	1	0	0	0	0	0	5	0	0	0
Site-Generated Trips [veh/h]	30	52	167	7	205	85	21	152	18	214	640	5
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	9	10	27	5	8	28	29	21	8	79	46	6
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	147	67	242	13	215	121	61	462	158	588	987	12
Peak Hour Factor	0.7700	0.7700	0.7700	0.6900	0.6900	0.6900	0.8100	0.8100	0.8100	0.7000	0.7000	0.7000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	48	22	79	5	78	44	19	143	49	210	353	4
Total Analysis Volume [veh/h]	191	87	314	19	312	175	75	570	195	840	1410	17
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	0
Maximum Green [s]	0	30	0	0	30	0	30	60	0	30	60	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Split [s]	0	21	0	0	21	0	11	24	0	14	27	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	4.0	0.0	2.0	4.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	C	R	L	C	C	L	C	C
C, Cycle Length [s]	102	102	102	102	102	102	102	102	102	102	102
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	6.00	6.00	4.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	4.00	4.00	2.00	4.00	4.00
g_i, Effective Green Time [s]	14	14	14	21	21	6	22	22	28	43	43
g / C, Green / Cycle	0.14	0.14	0.14	0.20	0.20	0.06	0.21	0.21	0.27	0.43	0.43
(v / s)_i Volume / Saturation Flow Rate	0.11	0.09	0.09	0.18	0.06	0.04	0.15	0.15	0.25	0.39	0.39
s, saturation flow rate [veh/h]	1752	1710	2768	1835	2768	1752	3503	1613	3403	1840	1832
c, Capacity [veh/h]	243	237	383	375	566	98	739	340	920	783	779
d1, Uniform Delay [s]	42.66	41.74	41.76	39.54	34.59	47.70	37.44	37.59	36.22	27.62	27.70
k, delay calibration	0.11	0.11	0.11	0.17	0.11	0.11	0.11	0.11	0.11	0.20	0.20
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.59	2.93	1.84	10.16	0.31	11.75	1.24	2.87	4.04	8.00	8.38
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.79	0.65	0.65	0.88	0.31	0.77	0.70	0.72	0.91	0.91	0.92
d, Delay for Lane Group [s/veh]	48.26	44.67	43.60	49.70	34.90	59.45	38.68	40.46	40.26	35.62	36.08
Lane Group LOS	D	D	D	D	C	E	D	D	D	D	D
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	4.81	3.66	2.92	8.65	1.78	2.14	5.88	5.71	9.96	16.34	16.46
50th-Percentile Queue Length [ft/ln]	120.23	91.53	72.92	216.29	44.51	53.52	147.06	142.84	248.98	408.55	411.42
95th-Percentile Queue Length [veh/ln]	8.41	6.59	5.25	13.48	3.20	3.85	9.86	9.63	15.13	22.97	23.11
95th-Percentile Queue Length [ft/ln]	210.14	164.75	131.26	336.89	80.11	96.34	246.50	240.84	378.37	574.29	577.74

Movement, Approach, & Intersection Results

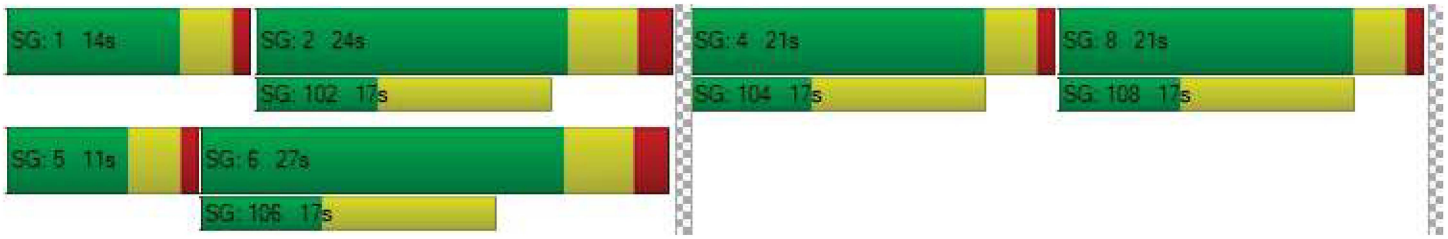
d_M, Delay for Movement [s/veh]	48.26	44.67	43.79	49.70	49.70	34.90	59.45	38.84	40.46	40.26	35.85	36.08
Movement LOS	D	D	D	D	D	C	E	D	D	D	D	D
d_A, Approach Delay [s/veh]	45.38			44.58			41.05			37.48		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	40.16											
Intersection LOS	D											
Intersection V/C	0.722											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	29.76	29.76	29.76	29.76
l_p,int, Pedestrian LOS Score for Intersection	2.971	2.516	3.084	3.323
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	425	425	450	525
d_b, Bicycle Delay [s]	24.81	24.81	24.03	21.76
l_b,int, Bicycle LOS Score for Intersection	2.536	2.395	2.022	3.430
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Sellers Ave/Laurel Rd

Control Type:	Signalized	Delay (sec / veh):	48.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.377

Intersection Setup

Name	Sellers Ave		Sellers Ave		Laurel Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00		50.00		35.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Sellers Ave		Sellers Ave		Laurel Rd	
Base Volume Input [veh/h]	0	148	224	200	50	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	23	13	5	0	0	10
Site-Generated Trips [veh/h]	0	10	34	401	218	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	1	78	27	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	171	264	679	295	60
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	43	66	170	74	15
Total Analysis Volume [veh/h]	23	171	264	679	295	60
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	5	2	6	0	4	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	5	5	5	0	5	0
Maximum Green [s]	30	30	30	0	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	35	31	65	0	69	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	5	5	0	5	0
Pedestrian Clearance [s]	0	10	10	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall	No	No	No		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	R
C, Cycle Length [s]	169	169	169	169	169	169
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	27	61	61	65	65
g / C, Green / Cycle	0.18	0.16	0.36	0.36	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.01	0.05	0.16	0.27	0.09	0.04
s, saturation flow rate [veh/h]	1603	3204	1683	2532	3113	1431
c, Capacity [veh/h]	294	512	607	914	1197	550
d1, Uniform Delay [s]	57.16	63.02	40.93	47.15	35.35	33.40
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.52	1.75	2.26	5.44	0.49	0.40
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.08	0.33	0.43	0.74	0.25	0.11
d, Delay for Lane Group [s/veh]	57.68	64.77	43.19	52.59	35.84	33.80
Lane Group LOS	E	E	D	D	D	C
Critical Lane Group	Yes	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	0.85	3.34	8.59	12.85	4.28	1.68
50th-Percentile Queue Length [ft/ln]	21.21	83.62	214.67	321.19	107.05	41.89
95th-Percentile Queue Length [veh/ln]	1.53	6.02	13.39	18.73	7.68	3.02
95th-Percentile Queue Length [ft/ln]	38.18	150.51	334.82	468.15	191.89	75.40

Movement, Approach, & Intersection Results

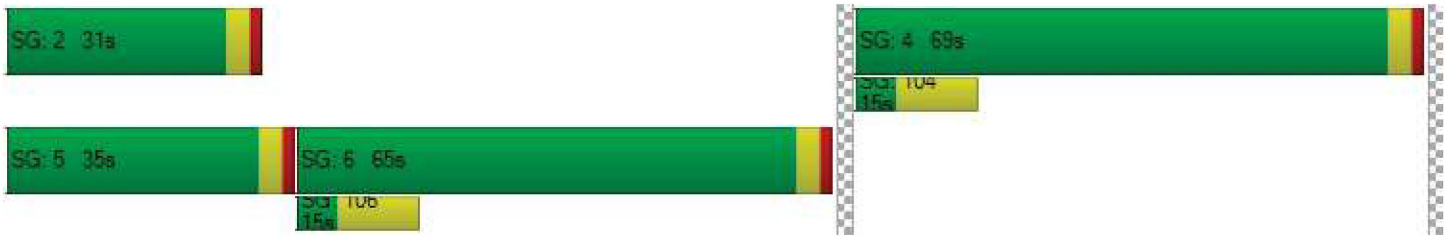
d_M, Delay for Movement [s/veh]	57.68	64.77	43.19	52.59	35.84	33.80
Movement LOS	E	E	D	D	D	C
d_A, Approach Delay [s/veh]	63.93		49.96		35.50	
Approach LOS	E		D		D	
d_I, Intersection Delay [s/veh]	48.33					
Intersection LOS	D					
Intersection V/C	0.377					

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	41.41	41.41	41.41
l_p,int, Pedestrian LOS Score for Intersection	2.348	2.764	2.547
Crosswalk LOS	B	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	540	1220	1300
d_b, Bicycle Delay [s]	26.65	7.61	6.13
l_b,int, Bicycle LOS Score for Intersection	1.720	3.116	1.560
Bicycle LOS	A	C	A

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Sellers Rd/Delta Rd

Control Type:	All-way stop	Delay (sec / veh):	10.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.332

Intersection Setup

Name											
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	33	86	36	3	142	15	13	63	41	38	63	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	1	0	0	1	7	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	1	49	0	7	27	9	0	3	120	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	1	0	0	2	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	34	89	85	3	152	49	22	63	44	158	63	3
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	22	21	1	38	12	6	16	11	40	16	1
Total Analysis Volume [veh/h]	34	89	85	3	152	49	22	63	44	158	63	3
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	720	710	692	674
Degree of Utilization, x	0.29	0.29	0.19	0.33

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.20	1.19	0.68	1.46
95th-Percentile Queue Length [ft]	29.90	29.70	17.03	36.39
Approach Delay [s/veh]	10.02	10.11	9.39	10.98
Approach LOS	B	B	A	B
Intersection Delay [s/veh]	10.22			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 5: Main St/Laurel Rd

Control Type:	Signalized	Delay (sec / veh):	52.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.789

Intersection Setup

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	305.00	100.00	1150.00	215.00	100.00	215.00	160.00	100.00	160.00	240.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	49.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Base Volume Input [veh/h]	107	298	141	61	465	14	126	106	101	176	362	104
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	2	0	0	0	0	8	0	0	23	0
Site-Generated Trips [veh/h]	30	39	5	0	29	288	18	214	20	18	338	39
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	36	4	6	1	2	0	2	33	0	17	64	7
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	173	341	154	62	496	302	146	361	121	211	787	150
Peak Hour Factor	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.9000	0.9000	0.9000	0.6700	0.6700	0.6700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	54	107	48	19	155	94	41	100	34	79	294	56
Total Analysis Volume [veh/h]	216	426	193	78	620	378	162	401	134	315	1175	224
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	2			0			2			0		
v_di, Inbound Pedestrian Volume crossing m	2			0			2			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			1			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	108.0
Offset Reference	Lagging Force-Off
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	10	0	6	10	0	6	6	0	6	6	0
Maximum Green [s]	11	33	0	11	33	0	14	35	0	18	39	0
Amber [s]	3.0	4.5	0.0	3.0	4.5	0.0	3.0	4.4	0.0	3.0	4.1	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	22	40	0	22	40	0	22	39	0	39	56	0
Vehicle Extension [s]	2.0	3.0	0.0	2.0	3.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	0	0	24	0	0	26	0	0	30	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.5	0.0	2.0	3.5	0.0	2.0	3.4	0.0	2.0	3.1	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	Yes		No	Yes		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	140	140	140	140	140	140	140	140	140	140	140	140
L, Total Lost Time per Cycle [s]	4.00	5.50	5.50	4.00	5.50	5.50	4.00	5.40	5.40	4.00	5.10	5.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	3.50	3.50	2.00	3.50	3.50	2.00	3.40	3.40	2.00	3.10	3.10
g_i, Effective Green Time [s]	18	50	50	8	40	40	15	36	36	27	49	49
g / C, Green / Cycle	0.13	0.36	0.36	0.06	0.29	0.29	0.10	0.26	0.26	0.19	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.12	0.18	0.18	0.04	0.18	0.24	0.09	0.11	0.09	0.18	0.33	0.14
s, saturation flow rate [veh/h]	1767	1855	1662	1767	3532	1557	1767	3532	1569	1767	3532	1577
c, Capacity [veh/h]	227	666	597	98	1010	445	185	917	408	337	1230	549
d1, Uniform Delay [s]	60.56	34.86	34.88	65.32	43.25	46.90	61.76	43.24	41.89	55.75	44.54	34.64
k, delay calibration	0.37	0.50	0.50	0.04	0.50	0.50	0.17	0.04	0.04	0.20	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	40.47	2.56	2.87	5.55	2.79	17.97	17.93	0.12	0.17	18.70	2.27	0.18
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.95	0.49	0.49	0.80	0.61	0.85	0.88	0.44	0.33	0.93	0.96	0.41
d, Delay for Lane Group [s/veh]	101.03	37.43	37.75	70.87	46.04	64.87	79.69	43.36	42.06	74.45	46.80	34.82
Lane Group LOS	F	D	D	E	D	E	E	D	D	E	D	C
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	10.07	9.02	8.15	2.87	9.58	14.37	6.53	5.77	3.75	12.61	19.95	5.83
50th-Percentile Queue Length [ft/ln]	251.63	225.48	203.75	71.87	239.45	359.28	163.31	144.24	93.63	315.33	498.78	145.74
95th-Percentile Queue Length [veh/ln]	15.27	13.94	12.83	5.17	14.65	20.59	10.72	9.71	6.74	18.44	27.28	9.79
95th-Percentile Queue Length [ft/ln]	381.71	348.62	320.79	129.37	366.34	514.71	268.10	242.72	168.53	460.95	681.91	244.73

Movement, Approach, & Intersection Results

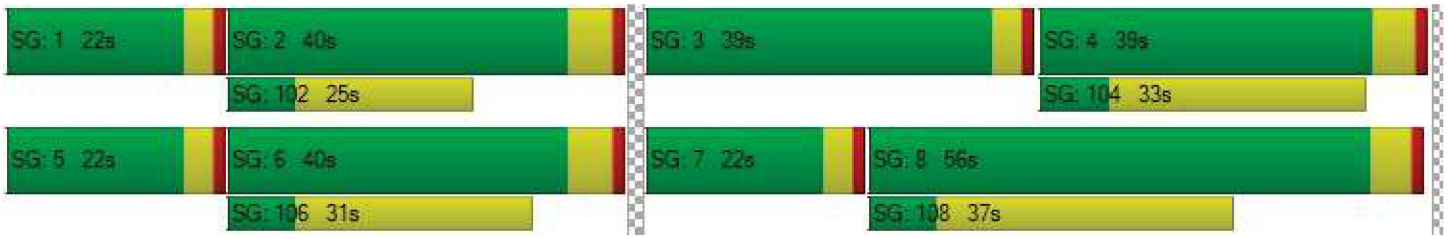
d_M, Delay for Movement [s/veh]	101.03	37.50	37.75	70.87	46.04	64.87	79.69	43.36	42.06	74.45	46.80	34.82
Movement LOS	F	D	D	E	D	E	E	D	D	E	D	C
d_A, Approach Delay [s/veh]	53.99			54.45			51.56			50.32		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	52.26											
Intersection LOS	D											
Intersection V/C	0.789											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	1527.60	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	59.43	59.43	59.43	59.43
l_p,int, Pedestrian LOS Score for Intersection	2.816	2.883	3.008	2.926
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	493	493	480	727
d_b, Bicycle Delay [s]	39.75	39.77	40.43	28.35
l_b,int, Bicycle LOS Score for Intersection	2.248	2.447	2.135	2.974
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Main St/Delta Rd

Control Type:	Signalized	Delay (sec / veh):	11.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.425

Intersection Setup

Name	Brentwood Blvd		Main S		Delta Rd	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	95.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

Volumes

Name	Brentwood Blvd		Main S		Delta Rd	
Base Volume Input [veh/h]	348	66	151	569	51	190
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	2.30	2.30	2.30	2.30	2.30
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	2	0	0	0	7	0
Site-Generated Trips [veh/h]	13	4	8	45	12	16
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	8	0	0	24	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	371	70	159	638	70	206
Peak Hour Factor	0.9000	0.9000	0.7800	0.7800	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	103	19	51	204	20	60
Total Analysis Volume [veh/h]	412	78	204	818	81	240
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	6	0	5	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	5	0	5	5	5	0
Maximum Green [s]	30	0	30	60	30	0
Amber [s]	4.4	0.0	3.0	4.4	4.4	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	10	0	0	10	17	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	3.4	0.0	2.0	3.4	3.4	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	36	36	36	36	36	36
L, Total Lost Time per Cycle [s]	5.40	5.40	4.00	5.40	5.40	5.40
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.40	3.40	2.00	3.40	3.40	3.40
g_i, Effective Green Time [s]	7	7	6	17	8	8
g / C, Green / Cycle	0.20	0.20	0.17	0.48	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.13	0.05	0.13	0.26	0.05	0.17
s, saturation flow rate [veh/h]	3197	1427	1599	3197	1599	1427
c, Capacity [veh/h]	645	288	267	1528	362	323
d1, Uniform Delay [s]	13.35	12.31	14.54	6.69	11.52	13.15
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.06	0.50	4.56	0.29	0.31	3.39
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.64	0.27	0.77	0.54	0.22	0.74
d, Delay for Lane Group [s/veh]	14.41	12.81	19.10	6.98	11.83	16.54
Lane Group LOS	B	B	B	A	B	B
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.22	0.43	1.53	1.13	0.41	1.60
50th-Percentile Queue Length [ft/ln]	30.38	10.77	38.24	28.29	10.36	40.02
95th-Percentile Queue Length [veh/ln]	2.19	0.78	2.75	2.04	0.75	2.88
95th-Percentile Queue Length [ft/ln]	54.68	19.39	68.82	50.92	18.66	72.03

Movement, Approach, & Intersection Results

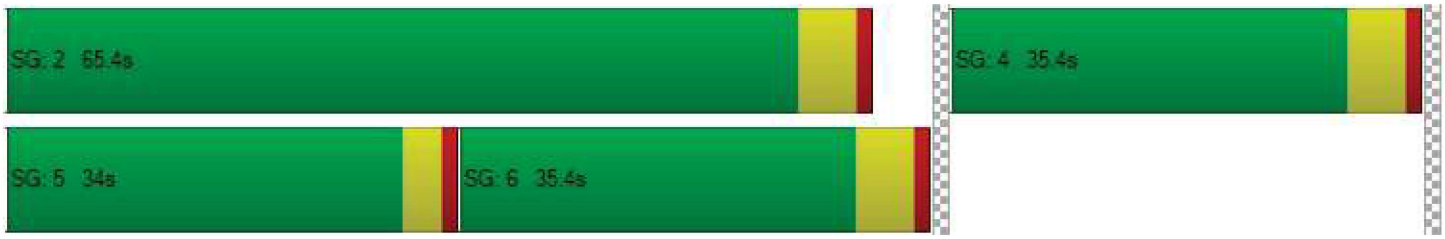
d_M, Delay for Movement [s/veh]	14.41	12.81	19.10	6.98	11.83	16.54
Movement LOS	B	B	B	A	B	B
d_A, Approach Delay [s/veh]	14.16		9.40		15.35	
Approach LOS	B		A		B	
d_I, Intersection Delay [s/veh]	11.71					
Intersection LOS	B					
Intersection V/C	0.425					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	1333	667
d_b, Bicycle Delay [s]	20.00	5.00	20.00
l_b,int, Bicycle LOS Score for Intersection	1.964	2.403	1.560
Bicycle LOS	A	B	A

Sequence

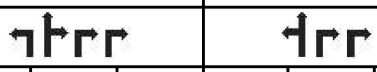
Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: Sellers Rd/E Cypress Rd

Control Type:	Signalized	Delay (sec / veh):	36.0
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.669

Intersection Setup

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	2	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	150.00	100.00	150.00	110.00	100.00	100.00	185.00	100.00	185.00	250.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			45.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Base Volume Input [veh/h]	86	2	106	3	0	10	1	379	7	218	133	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	9	0	0	0	0	0	0	0	14	0	0	0
Site-Generated Trips [veh/h]	29	98	679	1	25	125	127	463	17	97	566	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	16	16	1	10	16	52	53	148	15	1	94	11
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	140	116	786	14	41	187	181	990	53	316	793	12
Peak Hour Factor	0.8400	0.8400	0.8400	0.6500	0.6500	0.6500	0.9200	0.9200	0.9200	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	35	234	5	16	72	49	269	14	87	218	3
Total Analysis Volume [veh/h]	167	138	936	22	63	288	197	1076	58	347	871	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			1			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	0
Maximum Green [s]	0	30	0	0	30	0	30	60	0	30	60	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Split [s]	0	43	0	0	21	0	12	32	0	24	44	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	4.0	0.0	2.0	4.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	C	R	L	C	C	L	C	C
C, Cycle Length [s]	92	92	92	92	92	92	92	92	92	92	92
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	6.00	6.00	4.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	4.00	4.00	2.00	4.00	4.00
g_i, Effective Green Time [s]	26	26	26	12	12	12	24	24	12	23	23
g / C, Green / Cycle	0.28	0.28	0.28	0.13	0.13	0.14	0.26	0.26	0.13	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.10	0.23	0.25	0.05	0.10	0.11	0.21	0.21	0.10	0.17	0.17
s, saturation flow rate [veh/h]	1752	1652	2768	1816	2768	1752	3503	1788	3403	3503	1826
c, Capacity [veh/h]	497	469	785	240	366	237	904	461	446	888	463
d1, Uniform Delay [s]	26.17	30.94	31.48	36.43	38.76	38.85	32.32	32.34	38.80	30.82	30.82
k, delay calibration	0.11	0.25	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.40	8.22	3.26	0.88	3.75	7.32	2.05	3.97	2.98	0.82	1.57
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.34	0.83	0.87	0.35	0.79	0.83	0.83	0.83	0.78	0.65	0.65
d, Delay for Lane Group [s/veh]	26.57	39.16	34.74	37.31	42.51	46.17	34.37	36.32	41.77	31.64	32.39
Lane Group LOS	C	D	C	D	D	D	C	D	D	C	C
Critical Lane Group	No	No	Yes	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.74	8.43	6.98	1.70	3.15	4.60	7.61	8.04	3.74	5.43	5.76
50th-Percentile Queue Length [ft/ln]	68.39	210.70	174.54	42.47	78.66	114.94	190.30	201.01	93.61	135.72	143.93
95th-Percentile Queue Length [veh/ln]	4.92	13.19	11.32	3.06	5.66	8.11	12.14	12.69	6.74	9.25	9.69
95th-Percentile Queue Length [ft/ln]	123.11	329.72	282.88	76.45	141.59	202.86	303.41	317.27	168.50	231.24	242.31

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	26.57	39.16	35.88	37.31	37.31	42.51	46.17	34.96	36.32	41.77	31.89	32.39
Movement LOS	C	D	D	D	D	D	D	C	D	D	C	C
d_A, Approach Delay [s/veh]	35.02			41.32			36.68			34.68		
Approach LOS	D			D			D			C		
d_I, Intersection Delay [s/veh]	36.01											
Intersection LOS	D											
Intersection V/C	0.669											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
l_p,int, Pedestrian LOS Score for Intersection	2.930	2.548	3.163	3.402
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	650	283	433	633
d_b, Bicycle Delay [s]	27.34	44.20	36.84	28.02
l_b,int, Bicycle LOS Score for Intersection	3.607	2.175	2.292	2.237
Bicycle LOS	D	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Sellers Ave/Laurel Rd

Control Type:	Signalized	Delay (sec / veh):	49.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.332

Intersection Setup

Name	Sellers Ave		Sellers Ave		Laurel Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00		50.00		35.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Sellers Ave		Sellers Ave		Laurel Rd	
Base Volume Input [veh/h]	0	194	75	150	25	25
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	16	9	15	0	0	34
Site-Generated Trips [veh/h]	0	161	90	35	645	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	16	364	180	185	670	59
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	91	45	46	168	15
Total Analysis Volume [veh/h]	16	364	180	185	670	59
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	5	2	6	0	4	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	5	5	5	0	5	0
Maximum Green [s]	30	30	30	0	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	35	31	65	0	69	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	5	5	0	5	0
Pedestrian Clearance [s]	0	10	10	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall	No	No	No		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	R
C, Cycle Length [s]	169	169	169	169	169	169
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	27	61	61	65	65
g / C, Green / Cycle	0.18	0.16	0.36	0.36	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.01	0.11	0.11	0.07	0.22	0.04
s, saturation flow rate [veh/h]	1603	3204	1683	2532	3113	1431
c, Capacity [veh/h]	294	512	607	914	1197	550
d1, Uniform Delay [s]	56.91	67.30	38.64	37.23	40.78	33.38
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.35	8.14	1.24	0.50	1.89	0.39
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.05	0.71	0.30	0.20	0.56	0.11
d, Delay for Lane Group [s/veh]	57.26	75.44	39.88	37.73	42.67	33.77
Lane Group LOS	E	E	D	D	D	C
Critical Lane Group	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.59	7.90	5.49	2.68	11.32	1.65
50th-Percentile Queue Length [ft/ln]	14.67	197.47	137.30	66.97	282.98	41.16
95th-Percentile Queue Length [veh/ln]	1.06	12.51	9.34	4.82	16.84	2.96
95th-Percentile Queue Length [ft/ln]	26.41	312.71	233.38	120.54	420.92	74.09

Movement, Approach, & Intersection Results

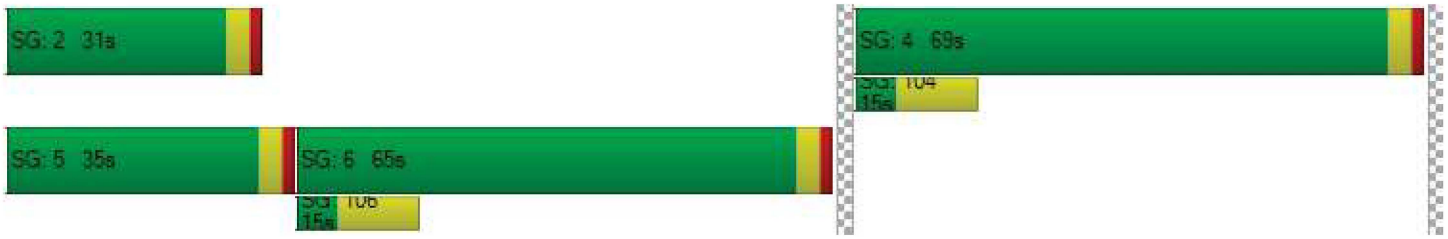
d_M, Delay for Movement [s/veh]	57.26	75.44	39.88	37.73	42.67	33.77
Movement LOS	E	E	D	D	D	C
d_A, Approach Delay [s/veh]	74.68		38.79		41.95	
Approach LOS	E		D		D	
d_I, Intersection Delay [s/veh]	49.60					
Intersection LOS	D					
Intersection V/C	0.332					

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	51.34	51.34	51.34
I_p,int, Pedestrian LOS Score for Intersection	2.398	2.770	2.527
Crosswalk LOS	B	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	450	1017	1083
d_b, Bicycle Delay [s]	36.04	14.50	12.60
I_b,int, Bicycle LOS Score for Intersection	1.873	2.162	1.560
Bicycle LOS	A	B	A

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Sellers Rd/Delta Rd

Control Type:	All-way stop	Delay (sec / veh):	18.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.766

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	88	203	51	13	149	22	34	113	52	43	85	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	1	0	0	1	4	0	0	0	0	0	0
Site-Generated Trips [veh/h]	4	131	0	0	76	14	30	0	2	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	1	0	0	1	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	92	336	51	13	227	40	64	113	54	43	85	21
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	84	13	3	57	10	16	28	14	11	21	5
Total Analysis Volume [veh/h]	92	336	51	13	227	40	64	113	54	43	85	21
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	625	593	556	532
Degree of Utilization, x	0.77	0.47	0.42	0.28

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	7.08	2.52	2.03	1.14
95th-Percentile Queue Length [ft]	176.91	63.00	50.78	28.50
Approach Delay [s/veh]	25.06	14.38	14.00	12.38
Approach LOS	D	B	B	B
Intersection Delay [s/veh]	18.53			
Intersection LOS	C			

Intersection Level Of Service Report
Intersection 5: Main St/Laurel Rd

Control Type:	Signalized	Delay (sec / veh):	51.5
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.654

Intersection Setup

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	305.00	100.00	1150.00	215.00	100.00	215.00	160.00	100.00	160.00	240.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	1	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	49.21	0.00	0.00	49.21	0.00	0.00	49.21	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Base Volume Input [veh/h]	136	345	119	95	326	29	140	187	123	58	245	57
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	7	0	0	0	0	27	0	0	16	0
Site-Generated Trips [veh/h]	32	45	11	0	59	260	76	634	42	0	35	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	24	22	0	4	18	47	83	6	40	0	2	4
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	192	412	137	99	403	336	299	854	205	58	298	61
Peak Hour Factor	0.8900	0.8900	0.8900	0.8800	0.8800	0.8800	0.9600	0.9600	0.9600	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	54	116	38	28	114	95	78	222	53	16	85	17
Total Analysis Volume [veh/h]	216	463	154	113	458	382	311	890	214	66	339	69
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	1			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			1			0		
v_co, Outbound Pedestrian Volume crossing	1			0			0			1		
v_ci, Inbound Pedestrian Volume crossing mi	1			0			0			1		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	108.0
Offset Reference	Lagging Force-Off
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	10	0	6	10	0	6	6	0	6	6	0
Maximum Green [s]	11	33	0	11	33	0	14	35	0	18	39	0
Amber [s]	3.0	4.5	0.0	3.0	4.5	0.0	3.0	4.4	0.0	3.0	4.1	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	33	33	0	37	37	0	27	59	0	11	43	0
Vehicle Extension [s]	2.0	3.0	0.0	2.0	3.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	0	0	24	0	0	26	0	0	30	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.5	0.0	2.0	3.5	0.0	2.0	3.4	0.0	2.0	3.1	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	Yes		No	Yes		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	140	140	140	140	140	140	140	140	140	140	140	140
L, Total Lost Time per Cycle [s]	4.00	5.50	5.50	4.00	5.50	5.50	4.00	5.40	5.40	4.00	5.10	5.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	3.50	3.50	2.00	3.50	3.50	2.00	3.40	3.40	2.00	3.10	3.10
g_i, Effective Green Time [s]	19	66	66	11	58	58	23	37	37	7	22	22
g / C, Green / Cycle	0.14	0.47	0.47	0.08	0.41	0.41	0.16	0.27	0.27	0.05	0.15	0.15
(v / s)_i Volume / Saturation Flow Rate	0.12	0.17	0.17	0.06	0.13	0.24	0.18	0.25	0.14	0.04	0.10	0.04
s, saturation flow rate [veh/h]	1767	1855	1697	1767	3532	1577	1767	3532	1575	1767	3532	1556
c, Capacity [veh/h]	238	878	803	135	1466	655	288	945	421	84	544	240
d1, Uniform Delay [s]	59.65	23.48	23.49	63.68	27.47	31.56	58.49	50.14	43.40	65.88	55.35	52.32
k, delay calibration	0.09	0.50	0.50	0.04	0.50	0.50	0.49	0.04	0.04	0.04	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.48	1.18	1.30	5.06	0.56	3.78	74.67	2.28	0.35	5.93	0.44	0.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.91	0.37	0.37	0.84	0.31	0.58	1.08	0.94	0.51	0.79	0.62	0.29
d, Delay for Lane Group [s/veh]	70.12	24.66	24.79	68.74	28.03	35.33	133.16	52.42	43.75	71.81	55.79	52.57
Lane Group LOS	E	C	C	E	C	D	F	D	D	E	E	D
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	8.14	6.97	6.42	4.12	5.22	10.48	16.03	15.24	6.26	2.46	5.62	2.16
50th-Percentile Queue Length [ft/ln]	203.54	174.17	160.47	102.96	130.59	261.94	400.81	380.95	156.47	61.58	140.40	54.12
95th-Percentile Queue Length [veh/ln]	12.82	11.30	10.57	7.41	8.97	15.79	23.46	21.64	10.36	4.43	9.50	3.90
95th-Percentile Queue Length [ft/ln]	320.53	282.39	264.34	185.33	224.29	394.66	586.60	541.00	259.05	110.85	237.57	97.42

Movement, Approach, & Intersection Results

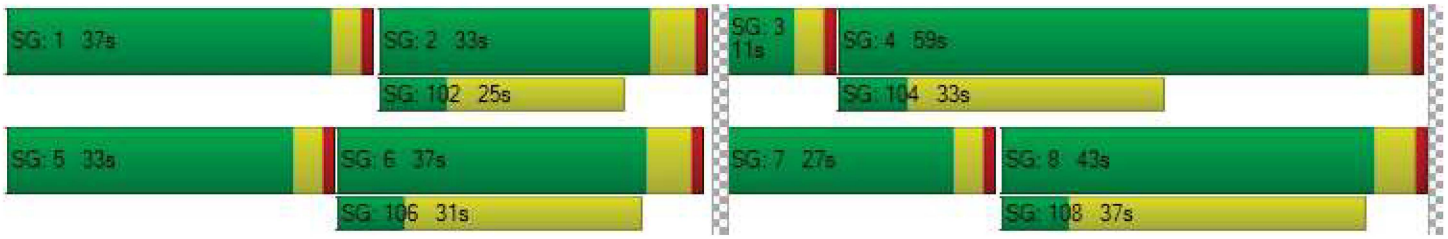
d_M, Delay for Movement [s/veh]	70.12	24.70	24.79	68.74	28.03	35.33	133.16	52.42	43.75	71.81	55.79	52.57
Movement LOS	E	C	C	E	C	D	F	D	D	E	E	D
d_A, Approach Delay [s/veh]	36.49			35.78			68.86			57.55		
Approach LOS	D			D			E			E		
d_I, Intersection Delay [s/veh]	51.49											
Intersection LOS	D											
Intersection V/C	0.654											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	5111.22	0.00	0.00	2643.21
d_p, Pedestrian Delay [s]	59.43	59.43	59.43	59.43
l_p,int, Pedestrian LOS Score for Intersection	2.729	2.863	2.984	2.783
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	393	450	766	541
d_b, Bicycle Delay [s]	45.20	42.04	26.66	37.25
l_b,int, Bicycle LOS Score for Intersection	2.247	2.346	2.727	1.951
Bicycle LOS	B	B	B	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Main St/Delta Rd

Control Type:	Signalized	Delay (sec / veh):	7.7
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.315

Intersection Setup

Name	Brentwood Blvd		Main S		Delta Rd	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	95.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	1	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	100.00	0.00	0.00
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

Volumes

Name	Brentwood Blvd		Main S		Delta Rd	
Base Volume Input [veh/h]	562	98	112	445	1	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	2.30	2.30	2.30	2.30	2.30
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	7	0	0	0	4	0
Site-Generated Trips [veh/h]	51	13	19	30	8	11
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	26	0	0	16	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	646	111	131	491	13	13
Peak Hour Factor	0.9400	0.9400	0.9100	0.9100	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	172	30	36	135	3	3
Total Analysis Volume [veh/h]	687	118	144	540	14	14
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	6	0	5	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	5	0	5	5	5	0
Maximum Green [s]	30	0	30	60	30	0
Amber [s]	4.4	0.0	3.0	4.4	4.4	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	10	0	0	10	17	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	3.4	0.0	2.0	3.4	3.4	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	29	29	29	29	29	29
L, Total Lost Time per Cycle [s]	5.40	5.40	4.00	5.40	5.40	5.40
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.40	3.40	2.00	3.40	3.40	3.40
g_i, Effective Green Time [s]	9	9	3	17	1	1
g / C, Green / Cycle	0.33	0.33	0.12	0.59	0.04	0.04
(v / s)_i Volume / Saturation Flow Rate	0.21	0.08	0.09	0.17	0.01	0.01
s, saturation flow rate [veh/h]	3197	1427	1599	3197	1599	1427
c, Capacity [veh/h]	1044	466	194	1877	57	51
d1, Uniform Delay [s]	8.28	7.09	12.16	2.94	13.44	13.45
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.71	0.28	5.53	0.08	2.16	2.82
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.66	0.25	0.74	0.29	0.24	0.27
d, Delay for Lane Group [s/veh]	8.99	7.37	17.70	3.02	15.60	16.27
Lane Group LOS	A	A	B	A	B	B
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.98	0.30	0.87	0.02	0.10	0.10
50th-Percentile Queue Length [ft/ln]	24.59	7.38	21.85	0.55	2.39	2.53
95th-Percentile Queue Length [veh/ln]	1.77	0.53	1.57	0.04	0.17	0.18
95th-Percentile Queue Length [ft/ln]	44.27	13.29	39.32	0.98	4.30	4.55

Movement, Approach, & Intersection Results

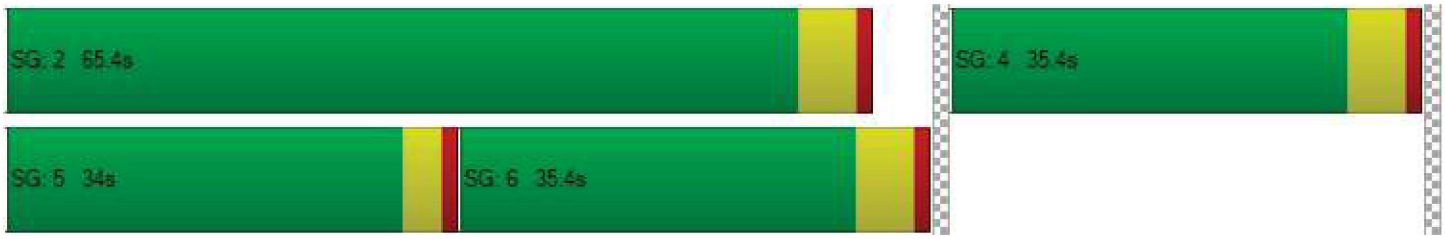
d_M, Delay for Movement [s/veh]	8.99	7.37	17.70	3.02	15.60	16.27
Movement LOS	A	A	B	A	B	B
d_A, Approach Delay [s/veh]	8.76		6.11		15.94	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	7.70					
Intersection LOS	A					
Intersection V/C	0.315					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	1333	667
d_b, Bicycle Delay [s]	20.00	5.00	20.00
l_b,int, Bicycle LOS Score for Intersection	2.224	2.124	1.560
Bicycle LOS	B	B	A

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

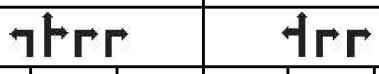


Appendix E: Background plus Project Conditions Capacity Analysis Worksheets

Intersection Level Of Service Report
Intersection 1: Sellers Rd/E Cypress Rd

Control Type:	Signalized	Delay (sec / veh):	43.8
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.742

Intersection Setup

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	150.00	100.00	150.00	110.00	100.00	100.00	185.00	100.00	185.00	250.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			45.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Base Volume Input [veh/h]	96	5	47	1	2	8	11	289	127	295	301	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	12	0	1	0	0	0	0	0	5	0	0	0
Site-Generated Trips [veh/h]	30	52	167	7	205	85	21	152	18	214	640	5
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	9	10	27	5	8	28	29	21	8	79	46	6
Other Volume [veh/h]	27	0	1	0	0	0	0	0	9	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	174	67	243	13	215	121	61	462	167	588	987	12
Peak Hour Factor	0.7700	0.7700	0.7700	0.6900	0.6900	0.6900	0.8100	0.8100	0.8100	0.7000	0.7000	0.7000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	56	22	79	5	78	44	19	143	52	210	353	4
Total Analysis Volume [veh/h]	226	87	316	19	312	175	75	570	206	840	1410	17
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	0
Maximum Green [s]	0	30	0	0	30	0	30	60	0	30	60	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Split [s]	0	21	0	0	21	0	11	24	0	14	27	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	4.0	0.0	2.0	4.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	C	R	L	C	C	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	6.00	6.00	4.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	4.00	4.00	2.00	4.00	4.00
g_i, Effective Green Time [s]	17	17	17	22	22	6	23	23	29	46	46
g / C, Green / Cycle	0.16	0.16	0.16	0.20	0.20	0.06	0.21	0.21	0.26	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.13	0.09	0.09	0.18	0.06	0.04	0.15	0.15	0.25	0.39	0.39
s, saturation flow rate [veh/h]	1752	1710	2768	1835	2768	1752	3503	1604	3403	1840	1832
c, Capacity [veh/h]	274	267	432	371	560	97	746	342	901	777	774
d1, Uniform Delay [s]	44.95	43.01	43.04	42.68	37.34	51.24	40.11	40.27	39.46	29.99	30.07
k, delay calibration	0.11	0.11	0.11	0.20	0.11	0.11	0.11	0.11	0.11	0.24	0.24
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.25	1.94	1.22	12.75	0.31	11.98	1.25	2.92	5.09	9.82	10.28
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.83	0.57	0.58	0.89	0.31	0.77	0.71	0.72	0.93	0.92	0.92
d, Delay for Lane Group [s/veh]	51.21	44.95	44.26	55.43	37.66	63.21	41.36	43.19	44.55	39.81	40.34
Lane Group LOS	D	D	D	E	D	E	D	D	D	D	D
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	6.17	3.84	3.09	9.61	1.94	2.30	6.49	6.26	11.02	18.24	18.37
50th-Percentile Queue Length [ft/ln]	154.21	95.93	77.15	240.19	48.56	57.54	162.26	156.50	275.61	455.97	459.28
95th-Percentile Queue Length [veh/ln]	10.24	6.91	5.55	14.69	3.50	4.14	10.67	10.36	16.47	25.24	25.40
95th-Percentile Queue Length [ft/ln]	256.05	172.67	138.87	367.27	87.41	103.57	266.72	259.08	411.75	631.06	635.01

Movement, Approach, & Intersection Results

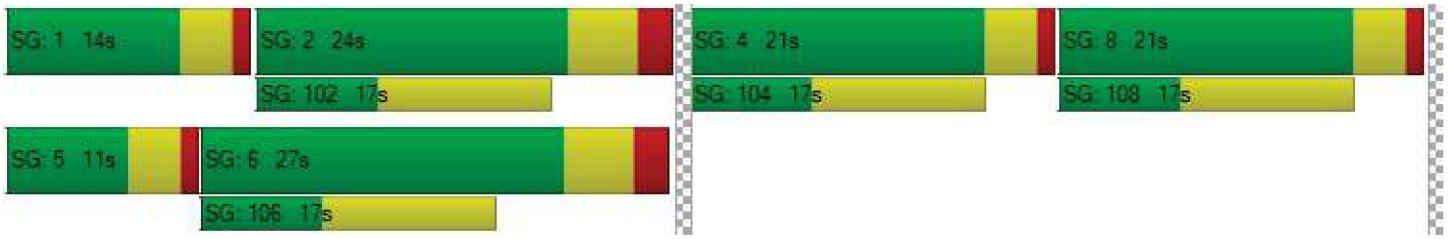
d_M, Delay for Movement [s/veh]	51.21	44.95	44.39	55.43	55.43	37.66	63.21	41.49	43.19	44.55	40.07	40.34
Movement LOS	D	D	D	E	E	D	E	D	D	D	D	D
d_A, Approach Delay [s/veh]	46.93			49.28			43.82			41.73		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	43.82											
Intersection LOS	D											
Intersection V/C	0.742											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	29.76	29.76	29.76	29.76
l_p,int, Pedestrian LOS Score for Intersection	2.984	2.516	3.095	3.324
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	425	425	450	525
d_b, Bicycle Delay [s]	24.81	24.81	24.03	21.76
l_b,int, Bicycle LOS Score for Intersection	2.597	2.395	2.028	3.430
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Sellers Ave/Laurel Rd

Control Type:	Signalized	Delay (sec / veh):	49.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.417

Intersection Setup

Name	Sellers Rd		Sellers Ave		Laurel Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00		50.00		35.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Sellers Rd		Sellers Ave		Laurel Rd	
Base Volume Input [veh/h]	0	148	224	200	50	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	23	13	5	0	0	10
Site-Generated Trips [veh/h]	0	10	34	401	218	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	1	2	88	40	0
Other Volume [veh/h]	50	28	9	0	0	16
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	73	200	274	689	308	76
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	50	69	172	77	19
Total Analysis Volume [veh/h]	73	200	274	689	308	76
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	5	2	6	0	4	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	5	5	5	0	5	0
Maximum Green [s]	30	30	30	0	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	35	31	65	0	69	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	5	5	0	5	0
Pedestrian Clearance [s]	0	10	10	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall	No	No	No		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	R
C, Cycle Length [s]	169	169	169	169	169	169
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	27	61	61	65	65
g / C, Green / Cycle	0.18	0.16	0.36	0.36	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.05	0.06	0.16	0.27	0.10	0.05
s, saturation flow rate [veh/h]	1603	3204	1683	2532	3113	1431
c, Capacity [veh/h]	294	512	607	914	1197	550
d1, Uniform Delay [s]	59.03	63.63	41.22	47.41	35.51	33.80
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.01	2.24	2.41	5.74	0.52	0.52
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.25	0.39	0.45	0.75	0.26	0.14
d, Delay for Lane Group [s/veh]	61.04	65.86	43.63	53.15	36.03	34.32
Lane Group LOS	E	E	D	D	D	C
Critical Lane Group	Yes	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	2.81	3.96	8.98	13.13	4.49	2.15
50th-Percentile Queue Length [ft/ln]	70.15	99.04	224.60	328.29	112.31	53.73
95th-Percentile Queue Length [veh/ln]	5.05	7.13	13.90	19.07	7.97	3.87
95th-Percentile Queue Length [ft/ln]	126.27	178.27	347.49	476.86	199.21	96.71

Movement, Approach, & Intersection Results

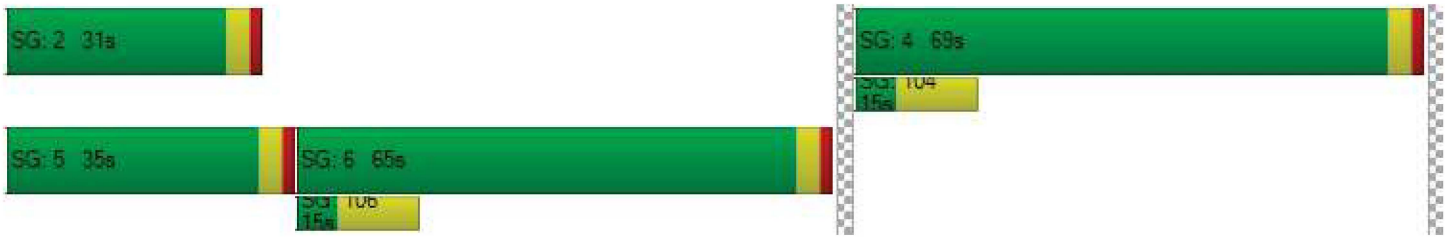
d_M, Delay for Movement [s/veh]	61.04	65.86	43.63	53.15	36.03	34.32
Movement LOS	E	E	D	D	D	C
d_A, Approach Delay [s/veh]	64.57		50.44		35.69	
Approach LOS	E		D		D	
d_I, Intersection Delay [s/veh]	49.33					
Intersection LOS	D					
Intersection V/C	0.417					

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	41.41	41.41	41.41
l_p,int, Pedestrian LOS Score for Intersection	2.391	2.785	2.567
Crosswalk LOS	B	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	540	1220	1300
d_b, Bicycle Delay [s]	26.65	7.61	6.13
l_b,int, Bicycle LOS Score for Intersection	1.785	3.149	1.560
Bicycle LOS	A	C	A

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Sellers Rd/Delta Rd

Control Type:	All-way stop	Delay (sec / veh):	10.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.336

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	33	86	36	3	142	15	13	63	41	38	63	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	1	0	0	1	7	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	1	49	0	7	27	9	0	3	120	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	1	0	0	2	0	0	0	0	0	0	0
Other Volume [veh/h]	0	1	0	0	2	14	5	0	0	0	0	0
Total Hourly Volume [veh/h]	34	90	85	3	154	63	27	63	44	158	63	3
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	23	21	1	39	16	7	16	11	40	16	1
Total Analysis Volume [veh/h]	34	90	85	3	154	63	27	63	44	158	63	3
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	713	710	682	666
Degree of Utilization, x	0.29	0.31	0.20	0.34

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.22	1.32	0.73	1.48
95th-Percentile Queue Length [ft]	30.53	33.01	18.13	37.00
Approach Delay [s/veh]	10.13	10.34	9.56	11.12
Approach LOS	B	B	A	B
Intersection Delay [s/veh]	10.37			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 4: Sellers Ave/Street B

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.086

Intersection Setup

Name	Sellers Ave			Sellers Ave			Street B					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sellers Ave			Sellers Ave			Street B					
Base Volume Input [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	1	0	0	8	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	10	0	0	34	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	6	0	0	0	0	25	78	0	16	0	0	0
Total Hourly Volume [veh/h]	6	11	0	0	42	25	78	0	16	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	3	0	0	11	6	20	0	4	0	0	0
Total Analysis Volume [veh/h]	6	11	0	0	42	25	78	0	16	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.02	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.36	0.00	0.00	7.24	0.00	0.00	9.40	9.89	9.00	9.07	9.52	8.36
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.01	0.01	0.01	0.00	0.00	0.00	0.34	0.34	0.34	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.29	0.29	0.29	0.00	0.00	0.00	8.46	8.46	8.46	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	2.60			0.00			9.33			8.99		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	5.18											
Intersection LOS	A											

Intersection Level Of Service Report
Intersection 5: Main St/Laurel Rd

Control Type:	Signalized	Delay (sec / veh):	53.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.810

Intersection Setup

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	305.00	100.00	1150.00	215.00	100.00	215.00	160.00	100.00	160.00	240.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	49.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Base Volume Input [veh/h]	107	298	141	61	465	14	126	106	101	176	362	104
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	2	0	0	0	0	8	0	0	23	0
Site-Generated Trips [veh/h]	30	39	5	0	29	288	18	214	20	18	338	39
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	36	4	6	1	2	0	2	33	0	17	64	7
Other Volume [veh/h]	0	0	0	0	0	0	0	16	0	0	50	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	173	341	154	62	496	302	146	377	121	211	837	150
Peak Hour Factor	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.9000	0.9000	0.9000	0.6700	0.6700	0.6700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	54	107	48	19	155	94	41	105	34	79	312	56
Total Analysis Volume [veh/h]	216	426	193	78	620	378	162	419	134	315	1249	224
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	2			0			2			0		
v_di, Inbound Pedestrian Volume crossing m	2			0			2			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			1			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	108.0
Offset Reference	Lagging Force-Off
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	10	0	6	10	0	6	6	0	6	6	0
Maximum Green [s]	11	33	0	11	33	0	14	35	0	18	39	0
Amber [s]	3.0	4.5	0.0	3.0	4.5	0.0	3.0	4.4	0.0	3.0	4.1	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	22	40	0	22	40	0	22	39	0	39	56	0
Vehicle Extension [s]	2.0	3.0	0.0	2.0	3.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	0	0	24	0	0	26	0	0	30	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.5	0.0	2.0	3.5	0.0	2.0	3.4	0.0	2.0	3.1	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	Yes		No	Yes		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	140	140	140	140	140	140	140	140	140	140	140	140
L, Total Lost Time per Cycle [s]	4.00	5.50	5.50	4.00	5.50	5.50	4.00	5.40	5.40	4.00	5.10	5.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	3.50	3.50	2.00	3.50	3.50	2.00	3.40	3.40	2.00	3.10	3.10
g_i, Effective Green Time [s]	18	48	48	8	37	37	15	39	39	27	51	51
g / C, Green / Cycle	0.13	0.34	0.34	0.06	0.27	0.27	0.10	0.28	0.28	0.19	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.12	0.18	0.18	0.04	0.18	0.24	0.09	0.12	0.09	0.18	0.35	0.14
s, saturation flow rate [veh/h]	1767	1855	1662	1767	3532	1556	1767	3532	1570	1767	3532	1577
c, Capacity [veh/h]	227	630	565	98	942	415	185	986	438	337	1298	580
d1, Uniform Delay [s]	60.56	37.00	37.02	65.32	45.63	49.48	61.76	41.24	39.73	55.75	43.29	32.61
k, delay calibration	0.37	0.50	0.50	0.04	0.50	0.50	0.17	0.04	0.04	0.20	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	40.47	3.02	3.38	5.55	3.60	26.61	17.93	0.11	0.15	18.70	2.47	0.16
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.95	0.52	0.52	0.80	0.66	0.91	0.88	0.43	0.31	0.93	0.96	0.39
d, Delay for Lane Group [s/veh]	101.03	40.02	40.40	70.87	49.23	76.09	79.69	41.35	39.87	74.45	45.76	32.77
Lane Group LOS	F	D	D	E	D	E	E	D	D	E	D	C
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	10.07	9.37	8.47	2.87	9.94	15.59	6.53	5.88	3.63	12.61	21.19	5.63
50th-Percentile Queue Length [ft/ln]	251.63	234.29	211.80	71.87	248.52	389.76	163.31	147.07	90.82	315.33	529.72	140.77
95th-Percentile Queue Length [veh/ln]	15.27	14.39	13.25	5.17	15.11	22.07	10.72	9.86	6.54	18.44	28.74	9.52
95th-Percentile Queue Length [ft/ln]	381.71	359.81	331.14	129.37	377.79	551.65	268.10	246.52	163.48	460.95	718.45	238.06

Movement, Approach, & Intersection Results

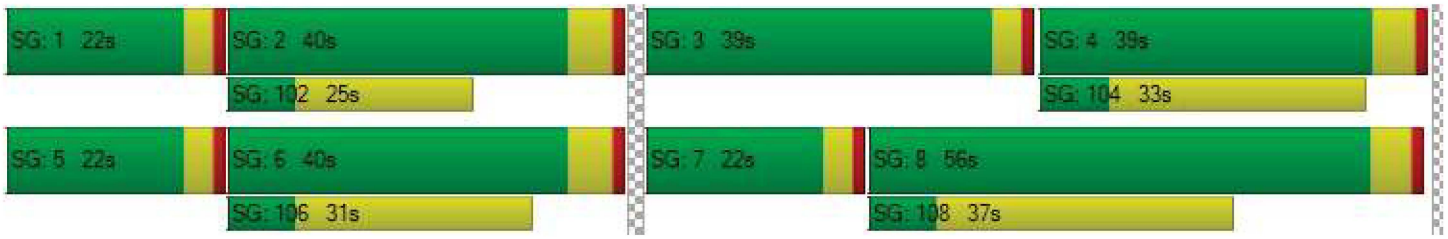
d_M, Delay for Movement [s/veh]	101.03	40.11	40.40	70.87	49.23	76.09	79.69	41.35	39.87	74.45	45.76	32.77
Movement LOS	F	D	D	E	D	E	E	D	D	E	D	C
d_A, Approach Delay [s/veh]	55.94			60.23			49.76			49.19		
Approach LOS	E			E			D			D		
d_I, Intersection Delay [s/veh]	53.25											
Intersection LOS	D											
Intersection V/C	0.810											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	1527.60	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	59.43	59.43	59.43	59.43
l_p,int, Pedestrian LOS Score for Intersection	2.816	2.883	3.028	2.944
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	493	493	480	727
d_b, Bicycle Delay [s]	39.75	39.77	40.43	28.35
l_b,int, Bicycle LOS Score for Intersection	2.248	2.447	2.149	3.035
Bicycle LOS	B	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Main St/Delta Rd

Control Type:	Signalized	Delay (sec / veh):	11.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.425

Intersection Setup

Name	Brentwood Blvd		Main S		Delta Rd	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	95.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

Volumes

Name	Brentwood Blvd		Main S		Delta Rd	
Base Volume Input [veh/h]	348	66	151	569	51	190
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	2.30	2.30	2.30	2.30	2.30
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	2	0	0	0	7	0
Site-Generated Trips [veh/h]	13	4	8	45	12	16
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	8	0	0	24	0	0
Other Volume [veh/h]	0	5	0	0	14	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	371	75	159	638	84	206
Peak Hour Factor	0.9000	0.9000	0.7800	0.7800	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	103	21	51	204	24	60
Total Analysis Volume [veh/h]	412	83	204	818	98	240
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	6	0	5	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	5	0	5	5	5	0
Maximum Green [s]	30	0	30	60	30	0
Amber [s]	4.4	0.0	3.0	4.4	4.4	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	10	0	0	10	17	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	3.4	0.0	2.0	3.4	3.4	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	37	37	37	37	37	37
L, Total Lost Time per Cycle [s]	5.40	5.40	4.00	5.40	5.40	5.40
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.40	3.40	2.00	3.40	3.40	3.40
g_i, Effective Green Time [s]	7	7	6	17	8	8
g / C, Green / Cycle	0.20	0.20	0.17	0.48	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.13	0.06	0.13	0.26	0.06	0.17
s, saturation flow rate [veh/h]	3197	1427	1599	3197	1599	1427
c, Capacity [veh/h]	646	288	266	1527	365	325
d1, Uniform Delay [s]	13.41	12.41	14.60	6.73	11.65	13.14
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.06	0.54	4.57	0.29	0.39	3.27
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.64	0.29	0.77	0.54	0.27	0.74
d, Delay for Lane Group [s/veh]	14.47	12.95	19.18	7.02	12.04	16.41
Lane Group LOS	B	B	B	A	B	B
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.22	0.46	1.54	1.15	0.51	1.60
50th-Percentile Queue Length [ft/ln]	30.59	11.61	38.48	28.69	12.76	39.92
95th-Percentile Queue Length [veh/ln]	2.20	0.84	2.77	2.07	0.92	2.87
95th-Percentile Queue Length [ft/ln]	55.06	20.89	69.26	51.65	22.98	71.85

Movement, Approach, & Intersection Results

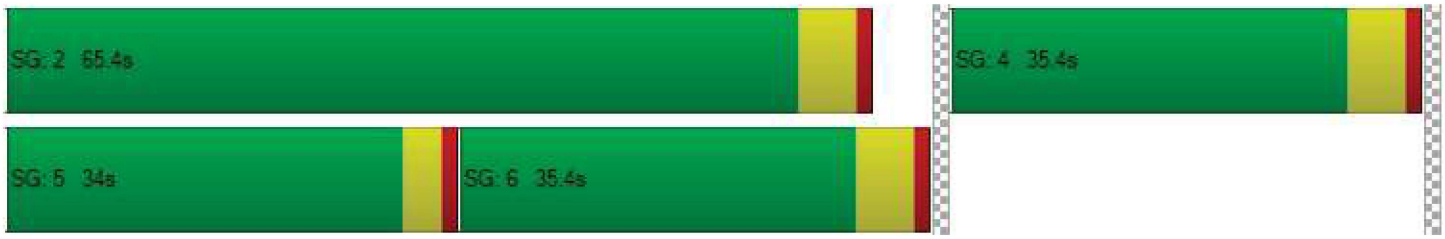
d_M, Delay for Movement [s/veh]	14.47	12.95	19.18	7.02	12.04	16.41
Movement LOS	B	B	B	A	B	B
d_A, Approach Delay [s/veh]	14.21		9.45		15.14	
Approach LOS	B		A		B	
d_I, Intersection Delay [s/veh]	11.76					
Intersection LOS	B					
Intersection V/C	0.425					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	1333	667
d_b, Bicycle Delay [s]	20.00	5.00	20.00
l_b,int, Bicycle LOS Score for Intersection	1.968	2.403	1.560
Bicycle LOS	A	B	A

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: Sellers Rd/E Cypress Rd

Control Type:	Signalized	Delay (sec / veh):	36.8
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.677

Intersection Setup

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	2	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	150.00	100.00	150.00	110.00	100.00	100.00	185.00	100.00	185.00	250.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			45.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sellers Rd			Sellers Rd			E Cypress Rd			E Cypress Rd		
Base Volume Input [veh/h]	86	2	106	3	0	10	1	379	7	218	133	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	9	0	0	0	0	0	0	0	14	0	0	0
Site-Generated Trips [veh/h]	29	98	679	1	25	125	127	463	17	97	566	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	16	16	1	10	16	52	53	148	15	1	94	11
Other Volume [veh/h]	18	0	1	0	0	0	0	0	31	1	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	158	116	787	14	41	187	181	990	84	317	793	12
Peak Hour Factor	0.8400	0.8400	0.8400	0.6500	0.6500	0.6500	0.9200	0.9200	0.9200	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	35	234	5	16	72	49	269	23	87	218	3
Total Analysis Volume [veh/h]	188	138	937	22	63	288	197	1076	91	348	871	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			1			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	0
Maximum Green [s]	0	30	0	0	30	0	30	60	0	30	60	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Split [s]	0	43	0	0	21	0	12	32	0	24	44	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	4.0	0.0	2.0	4.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	C	R	L	C	C	L	C	C
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	6.00	6.00	4.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	4.00	4.00	2.00	4.00	4.00
g_i, Effective Green Time [s]	27	27	27	12	12	13	25	25	12	25	25
g / C, Green / Cycle	0.28	0.28	0.28	0.13	0.13	0.13	0.27	0.27	0.13	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.11	0.23	0.25	0.05	0.10	0.11	0.22	0.22	0.10	0.17	0.17
s, saturation flow rate [veh/h]	1752	1652	2768	1816	2768	1752	3503	1761	3403	3503	1826
c, Capacity [veh/h]	494	466	781	239	365	237	930	468	445	915	477
d1, Uniform Delay [s]	27.36	31.93	32.49	37.48	39.88	39.95	32.83	32.87	39.90	31.02	31.02
k, delay calibration	0.11	0.26	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.48	8.99	3.42	0.89	3.84	7.43	2.04	4.04	3.05	0.74	1.41
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.38	0.83	0.88	0.36	0.79	0.83	0.83	0.84	0.78	0.64	0.64
d, Delay for Lane Group [s/veh]	27.85	40.92	35.91	38.37	43.72	47.39	34.87	36.90	42.95	31.75	32.42
Lane Group LOS	C	D	D	D	D	D	C	D	D	C	C
Critical Lane Group	No	No	Yes	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.24	8.80	7.25	1.75	3.25	4.74	8.09	8.44	3.88	5.53	5.85
50th-Percentile Queue Length [ft/ln]	80.92	220.01	181.23	43.85	81.22	118.46	202.35	210.88	96.94	138.24	146.37
95th-Percentile Queue Length [veh/ln]	5.83	13.67	11.66	3.16	5.85	8.31	12.76	13.20	6.98	9.39	9.82
95th-Percentile Queue Length [ft/ln]	145.66	341.64	291.62	78.92	146.20	207.70	319.00	329.96	174.49	234.65	245.58

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	27.85	40.92	37.20	38.37	38.37	43.72	47.39	35.44	36.90	42.95	31.98	32.42
Movement LOS	C	D	D	D	D	D	D	D	D	D	C	C
d_A, Approach Delay [s/veh]	36.25			42.50			37.26			35.08		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	36.79											
Intersection LOS	D											
Intersection V/C	0.677											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
l_p,int, Pedestrian LOS Score for Intersection	2.945	2.548	3.174	3.403
Crosswalk LOS	C	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	650	283	433	633
d_b, Bicycle Delay [s]	27.34	44.20	36.84	28.02
l_b,int, Bicycle LOS Score for Intersection	3.644	2.175	2.310	2.237
Bicycle LOS	D	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Sellers Ave/Laurel Rd

Control Type:	Signalized	Delay (sec / veh):	50.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.376

Intersection Setup

Name	Sellers Rd		Sellers Ave		Laurel Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00		50.00		35.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Sellers Rd		Sellers Ave		Laurel Rd	
Base Volume Input [veh/h]	0	194	75	150	25	25
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	16	9	15	0	0	34
Site-Generated Trips [veh/h]	0	161	90	35	645	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	1	1	6	10	0
Other Volume [veh/h]	33	19	32	0	0	56
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	49	384	213	191	680	115
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	96	53	48	170	29
Total Analysis Volume [veh/h]	49	384	213	191	680	115
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	5	2	6	0	4	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	5	5	5	0	5	0
Maximum Green [s]	30	30	30	0	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	35	31	65	0	69	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	5	5	0	5	0
Pedestrian Clearance [s]	0	10	10	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall	No	No	No		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	R
C, Cycle Length [s]	169	169	169	169	169	169
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	27	61	61	65	65
g / C, Green / Cycle	0.18	0.16	0.36	0.36	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.03	0.12	0.13	0.08	0.22	0.08
s, saturation flow rate [veh/h]	1603	3204	1683	2532	3113	1431
c, Capacity [veh/h]	294	512	607	914	1197	550
d1, Uniform Delay [s]	58.12	67.78	39.51	37.32	40.94	34.80
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.22	9.71	1.59	0.52	1.96	0.86
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.17	0.75	0.35	0.21	0.57	0.21
d, Delay for Lane Group [s/veh]	59.34	77.49	41.10	37.84	42.90	35.66
Lane Group LOS	E	E	D	D	D	D
Critical Lane Group	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.85	8.47	6.66	2.77	11.54	3.36
50th-Percentile Queue Length [ft/ln]	46.14	211.69	166.49	69.32	288.50	83.89
95th-Percentile Queue Length [veh/ln]	3.32	13.24	10.89	4.99	17.11	6.04
95th-Percentile Queue Length [ft/ln]	83.05	331.00	272.29	124.78	427.78	150.99

Movement, Approach, & Intersection Results

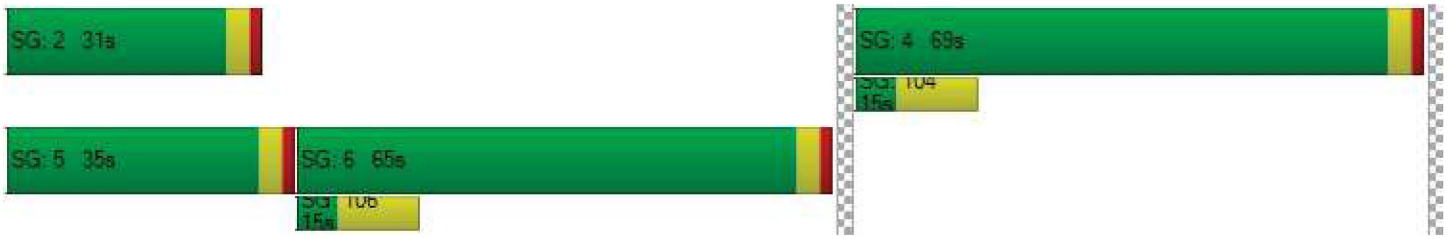
d_M, Delay for Movement [s/veh]	59.34	77.49	41.10	37.84	42.90	35.66
Movement LOS	E	E	D	D	D	D
d_A, Approach Delay [s/veh]	75.44		39.56		41.85	
Approach LOS	E		D		D	
d_I, Intersection Delay [s/veh]	50.20					
Intersection LOS	D					
Intersection V/C	0.376					

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	51.34	51.34	51.34
l_p,int, Pedestrian LOS Score for Intersection	2.455	2.792	2.551
Crosswalk LOS	B	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	450	1017	1083
d_b, Bicycle Delay [s]	36.04	14.50	12.60
l_b,int, Bicycle LOS Score for Intersection	1.917	2.226	1.560
Bicycle LOS	A	B	A

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Sellers Rd/Delta Rd

Control Type:	All-way stop	Delay (sec / veh):	19.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.785

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	88	203	51	13	149	22	34	113	52	43	85	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	1	0	0	1	4	0	0	0	0	0	0
Site-Generated Trips [veh/h]	4	131	0	0	76	14	30	0	2	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	1	0	0	1	0	0	0	0	0	0	0
Other Volume [veh/h]	0	2	0	0	1	10	16	0	0	0	0	0
Total Hourly Volume [veh/h]	92	338	51	13	228	50	80	113	54	43	85	21
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	85	13	3	57	13	20	28	14	11	21	5
Total Analysis Volume [veh/h]	92	338	51	13	228	50	80	113	54	43	85	21
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	613	584	547	521
Degree of Utilization, x	0.78	0.50	0.45	0.29

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	7.52	2.77	2.33	1.17
95th-Percentile Queue Length [ft]	187.98	69.35	58.18	29.34
Approach Delay [s/veh]	26.95	15.15	14.89	12.67
Approach LOS	D	C	B	B
Intersection Delay [s/veh]	19.64			
Intersection LOS	C			

Intersection Level Of Service Report
Intersection 4: Sellers Ave/Street B

Control Type:	Two-way stop	Delay (sec / veh):	11.5
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.085

Intersection Setup

Name	Sellers Ave			Sellers Ave			Street B					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sellers Ave			Sellers Ave			Street B					
Base Volume Input [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	1	0	0	5	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	161	0	0	90	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	18	0	0	0	0	88	52	0	11	0	0	0
Total Hourly Volume [veh/h]	18	162	0	0	95	88	52	0	11	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	41	0	0	24	22	13	0	3	0	0	0
Total Analysis Volume [veh/h]	18	162	0	0	95	88	52	0	11	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.62	0.00	0.00	7.54	0.00	0.00	11.50	11.85	9.56	11.02	11.62	9.08
Movement LOS	A	A	A	A	A	A	B	B	A	B	B	A
95th-Percentile Queue Length [veh/ln]	0.04	0.04	0.04	0.00	0.00	0.00	0.32	0.32	0.32	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.98	0.98	0.98	0.00	0.00	0.00	8.05	8.05	8.05	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.76			0.00			11.16			10.57		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	1.97											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 5: Main St/Laurel Rd

Control Type:	Signalized	Delay (sec / veh):	51.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.670

Intersection Setup

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	305.00	100.00	1150.00	215.00	100.00	215.00	160.00	100.00	160.00	240.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	1	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	49.21	0.00	0.00	49.21	0.00	0.00	49.21	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Main St			Main St			Laurel Rd			Laurel Rd		
Base Volume Input [veh/h]	136	345	119	95	326	29	140	187	123	58	245	57
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	7	0	0	0	0	27	0	0	16	0
Site-Generated Trips [veh/h]	32	45	11	0	59	260	76	634	42	0	35	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	24	22	0	4	18	47	83	6	40	0	2	4
Other Volume [veh/h]	0	0	0	0	0	0	0	56	0	0	33	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	192	412	137	99	403	336	299	910	205	58	331	61
Peak Hour Factor	0.8900	0.8900	0.8900	0.8800	0.8800	0.8800	0.9600	0.9600	0.9600	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	54	116	38	28	114	95	78	237	53	16	94	17
Total Analysis Volume [veh/h]	216	463	154	113	458	382	311	948	214	66	376	69
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	1			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			1			0		
v_co, Outbound Pedestrian Volume crossing	1			0			0			1		
v_ci, Inbound Pedestrian Volume crossing mi	1			0			0			1		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	108.0
Offset Reference	Lagging Force-Off
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	10	0	6	10	0	6	6	0	6	6	0
Maximum Green [s]	11	33	0	11	33	0	14	35	0	18	39	0
Amber [s]	3.0	4.5	0.0	3.0	4.5	0.0	3.0	4.4	0.0	3.0	4.1	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	33	33	0	37	37	0	27	59	0	11	43	0
Vehicle Extension [s]	2.0	3.0	0.0	2.0	3.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	0	0	24	0	0	26	0	0	30	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.5	0.0	2.0	3.5	0.0	2.0	3.4	0.0	2.0	3.1	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	Yes		No	Yes		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	140	140	140	140	140	140	140	140	140	140	140	140
L, Total Lost Time per Cycle [s]	4.00	5.50	5.50	4.00	5.50	5.50	4.00	5.40	5.40	4.00	5.10	5.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	3.50	3.50	2.00	3.50	3.50	2.00	3.40	3.40	2.00	3.10	3.10
g_i, Effective Green Time [s]	19	64	64	11	56	56	23	40	40	7	24	24
g / C, Green / Cycle	0.14	0.46	0.46	0.08	0.40	0.40	0.16	0.28	0.28	0.05	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.12	0.17	0.17	0.06	0.13	0.24	0.18	0.27	0.14	0.04	0.11	0.04
s, saturation flow rate [veh/h]	1767	1855	1697	1767	3532	1577	1767	3532	1575	1767	3532	1556
c, Capacity [veh/h]	238	847	775	135	1408	629	288	1003	447	84	602	265
d1, Uniform Delay [s]	59.65	24.97	24.98	63.68	29.04	33.36	58.49	48.99	41.47	65.88	53.84	50.31
k, delay calibration	0.09	0.50	0.50	0.04	0.50	0.50	0.49	0.04	0.04	0.04	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.48	1.30	1.42	5.06	0.61	4.33	74.67	2.27	0.30	5.93	0.40	0.19
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.91	0.38	0.38	0.84	0.33	0.61	1.08	0.95	0.48	0.79	0.62	0.26
d, Delay for Lane Group [s/veh]	70.12	26.26	26.40	68.74	29.66	37.69	133.16	51.26	41.76	71.81	54.24	50.50
Lane Group LOS	E	C	C	E	C	D	F	D	D	E	D	D
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	8.14	7.23	6.66	4.12	5.40	10.87	16.03	16.17	6.10	2.46	6.16	2.12
50th-Percentile Queue Length [ft/ln]	203.54	180.81	166.60	102.96	134.97	271.73	400.81	404.30	152.40	61.58	154.09	52.91
95th-Percentile Queue Length [veh/ln]	12.82	11.64	10.90	7.41	9.21	16.28	23.46	22.77	10.15	4.43	10.24	3.81
95th-Percentile Queue Length [ft/ln]	320.53	291.07	272.44	185.33	230.23	406.90	586.60	569.18	253.63	110.85	255.88	95.25

Movement, Approach, & Intersection Results

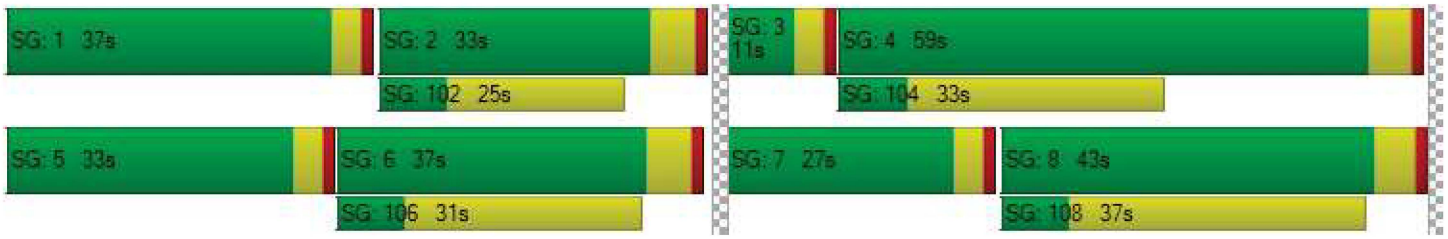
d_M, Delay for Movement [s/veh]	70.12	26.30	26.40	68.74	29.66	37.69	133.16	51.26	41.76	71.81	54.24	50.50
Movement LOS	E	C	C	E	C	D	F	D	D	E	D	D
d_A, Approach Delay [s/veh]	37.69			37.51			67.17			56.00		
Approach LOS	D			D			E			E		
d_I, Intersection Delay [s/veh]	51.65											
Intersection LOS	D											
Intersection V/C	0.670											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	5111.22	0.00	0.00	2643.21
d_p, Pedestrian Delay [s]	59.43	59.43	59.43	59.43
l_p,int, Pedestrian LOS Score for Intersection	2.729	2.863	3.004	2.801
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	393	450	766	541
d_b, Bicycle Delay [s]	45.20	42.04	26.66	37.25
l_b,int, Bicycle LOS Score for Intersection	2.247	2.346	2.775	1.981
Bicycle LOS	B	B	C	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Main St/Delta Rd

Control Type:	Signalized	Delay (sec / veh):	7.9
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.320

Intersection Setup

Name	Brentwood Blvd		Main S		Delta Rd	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	95.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	1	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	100.00	0.00	0.00
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

Volumes

Name	Brentwood Blvd		Main S		Delta Rd	
Base Volume Input [veh/h]	562	98	112	445	1	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	2.30	2.30	2.30	2.30	2.30
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	7	0	0	0	4	0
Site-Generated Trips [veh/h]	51	13	19	30	8	11
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	26	0	0	16	0	0
Other Volume [veh/h]	0	16	0	0	10	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	646	127	131	491	23	13
Peak Hour Factor	0.9400	0.9400	0.9100	0.9100	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	172	34	36	135	6	3
Total Analysis Volume [veh/h]	687	135	144	540	24	14
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	6	0	5	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	5	0	5	5	5	0
Maximum Green [s]	30	0	30	60	30	0
Amber [s]	4.4	0.0	3.0	4.4	4.4	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	10	0	0	10	17	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	3.4	0.0	2.0	3.4	3.4	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	29	29	29	29	29	29
L, Total Lost Time per Cycle [s]	5.40	5.40	4.00	5.40	5.40	5.40
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.40	3.40	2.00	3.40	3.40	3.40
g_i, Effective Green Time [s]	9	9	3	17	1	1
g / C, Green / Cycle	0.33	0.33	0.12	0.58	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.21	0.09	0.09	0.17	0.02	0.01
s, saturation flow rate [veh/h]	3197	1427	1599	3197	1599	1427
c, Capacity [veh/h]	1042	465	192	1865	75	67
d1, Uniform Delay [s]	8.45	7.32	12.42	3.05	13.47	13.40
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.72	0.34	5.74	0.08	2.44	1.54
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.66	0.29	0.75	0.29	0.32	0.21
d, Delay for Lane Group [s/veh]	9.16	7.66	18.15	3.13	15.91	14.94
Lane Group LOS	A	A	B	A	B	B
Critical Lane Group	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.03	0.36	0.90	0.03	0.16	0.09
50th-Percentile Queue Length [ft/ln]	25.71	8.98	22.59	0.84	3.93	2.26
95th-Percentile Queue Length [veh/ln]	1.85	0.65	1.63	0.06	0.28	0.16
95th-Percentile Queue Length [ft/ln]	46.28	16.16	40.67	1.52	7.07	4.06

Movement, Approach, & Intersection Results

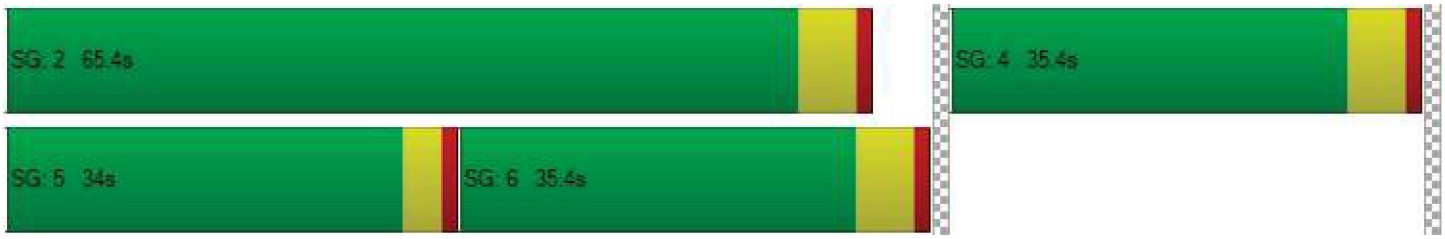
d_M, Delay for Movement [s/veh]	9.16	7.66	18.15	3.13	15.91	14.94
Movement LOS	A	A	B	A	B	B
d_A, Approach Delay [s/veh]	8.92		6.30		15.55	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	7.92					
Intersection LOS	A					
Intersection V/C	0.320					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	1333	667
d_b, Bicycle Delay [s]	20.00	5.00	20.00
l_b,int, Bicycle LOS Score for Intersection	2.238	2.124	1.560
Bicycle LOS	B	B	A

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Appendix C
Planning Survey Report

Application Form and Planning Survey Report

To Comply With and Receive Permit Coverage Under The East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan

Please complete this application to apply for take authorization under the state and federal East Contra Costa County HCP/NCCP incidental take permits. The East Contra Costa County Habitat Conservancy ("Conservancy") or local jurisdiction (City of Brentwood, City of Clayton, City of Oakley, City of Pittsburg, and Contra Costa County) may request more information in order to deem the application complete.

I. PROJECT OVERVIEW

PROJECT INFORMATION	
PROJECT NAME: Stonecreek (Subdivision 9647)	
PROJECT TYPE: ☒ Residential ☐ Commercial ☐ Transportation ☐ Utility ☐ Other	
PROJECT DESCRIPTION (BRIEF): Construction of a 176-lot residential subdivision. A detailed project description is included in Attachment A.	
PROJECT ADDRESS/LOCATION: West of Sellers Avenue, just south of Kings Canyon Way and Teton Road, in Oakley, Contra Costa County, California.	
PARCEL/PROJECT SIZE (ACRES): 50.81+/- acre (3 Parcels encompassing 50.44+/- acres and 0.37+/-acres of Off-site Improvements.	
PROJECT APN(S): 033-140-020, 033-140-021, and 033-140-028	
APPLICATION SUBMITTAL DATE: July 2023	**FINAL PSR DATE:** (City/County/Conservancy use)
LEAD PLANNER: Ken Strelo	
JURISDICTION: ☐ City of Brentwood ☐ City of Clayton ☒ City of Oakley ☐ City of Pittsburg ☐ Contra Costa County ☐ Participating Special Entity*	
*Participating Special Entities are organizations not subject to the authority of a local jurisdiction. Such organizations may include school districts, irrigation districts, transportation agencies, local park districts, geological hazard abatement districts, or other utilities or special districts that own land or provide public services.	
DEVELOPMENT FEE ZONE: ☒ Zone I ☐ Zone II ☐ Zone III ☐ Zone IV	
See figure 9-1 of the HCP/NCCP at www.cocohcp.org for a generalized development fee zone map. Detailed development fee zone maps by jurisdiction are available from the jurisdiction.	

PROJECT APPLICANT INFORMATION	
APPLICANT'S NAME: Ponderosa Homes II, Inc.	
AUTHORIZED AGENT'S NAME AND TITLE: Jeff Schroeder, Senior V.P. Land, Planning & Operations	
PHONE NO.: (925) 460-8910	**APPLICANT'S E-MAIL:** jschroeder@ponderosahomes.com
MAILING ADDRESS: 5020 Franklin Drive, Ste. 200, Pleasanton, CA 94588	

BIOLOGIST INFORMATION[1]	
BIOLOGICAL/ENVIRONMENTAL FIRM: Moore Biological Consultants	
CONTACT NAME AND TITLE: Diane S. Moore, M.S.	
PHONE NO.: (209) 745-1159	**CONTACT'S E-MAIL:** moorebio@softcom.net
MAILING ADDRESS: Moore Biological Consultants, 10330 Twin Cities Rd., Ste. 30, Galt, California 95632	

[1] A USFWS/CDFW-approved biologist (project-specific) is required to conduct the surveys. Please submit biologist(s) approval request to the Conservancy.

II. PROJECT DETAILS

Please complete and/or provide the following attachments:

1) **Project Description**
Attach as **Attachment A: Project Description**. Provide a detailed written description that concisely and completely describes the project and location. Include the following information:
   - All activities proposed for the site or project, including roads utilized, construction staging areas, and the installation of underground facilities, to ensure the entire project is covered by the HCP/NCCP permit
   - Proposed construction dates, including details on construction phases, if applicable
   - Reference a City/County application number for the project, if applicable
   - General Best Management Practices, if applicable
   - If the project will have temporary impacts, please provide a restoration plan describing how the site will be restored to pre-project conditions, including revegetation seed mixes or plantings and timing

2) **Project Vicinity Map**
Provide a project vicinity map. Attach as **Figure 1** in **Attachment B: Figures**.

3) **Project Site Plans**
Provide any project site plans for the project. Attach as **Figure 2** in **Attachment B: Figures**.

4) **CEQA Document**
Indicate the status of CEQA documents prepared for the project. Provide additional comments below table if necessary.

Type of Document	Status	Date Completed
☒ Initial Study	Not yet initiated	N/A
☐ Notice of Preparation		
☐ Draft EIR		
☐ Final EIR		
☐ Notice of Categorical Exemption		
☐ Notice of Statutory Exemption		
☐ Other (describe)		

III. EXISTING CONDITIONS AND IMPACTS

Please complete and/or provide the following attachments:

1) **Field-Verified Land Cover Map**[2]
Attach a field-verified land cover map in **Attachment B: Figures** and label as **Figure 3**. The map should contain all land cover types present on-site overlaid on aerial/satellite imagery. Map colors for the land cover types should conform to the HCP/NCCP (see *Figure 3-3: Landcover in the Inventory Area* for land cover type legend).

2) **Photographs of the Project Site**
Attach representative photos of the project site in **Attachment B: Figures** and label as **Figure 4**. Please provide captions for each photo.

[2] For PSEs and city or county public works projects, please also identify permanent and temporary impact areas by overlaying crosshatching (permanent impacts) and hatching (temporary impacts) on the land cover map.

3) Land Cover Types and Impacts and Supplemental Tables

- For all terrestrial land cover types please provide calculations to the nearest **hundredth of an acre (0.01)**. For aquatic land cover types please provide calculations to the nearest **thousandth of an acre (0.001)**.
- **Permanent Impacts** are broadly defined in the ECCC HCP/NCCP to include all areas removed from an undeveloped or habitat-providing state and includes land in the same parcel or project that is not developed, graded, physically altered, or directly affected in any way but is isolated from natural areas by the covered activity. Unless such undeveloped land is dedicated to the Preserve System or is a deed-restricted creek setback, the development mitigation fee will apply (if proposed, would require Conservancy approval).
- **Temporary Impacts** are broadly defined in the ECCC HCP/NCCP as any impact on vegetation or habitat that does not result in permanent habitat removal (i.e., vegetation can eventually recover).
- If **wetland (riparian woodland/scrub, wetland, or aquatic)** land cover types are present on the parcel but will not be impacted please discuss in the following section 4) Jurisdictional Wetlands and Waters. Wetland impact fees will only be charged if wetland features are impacted. However, development fees will apply to the entire parcel.
- **Stream** land cover type is considered a linear feature where impacts are calculated based on length impacted. The acreage within a stream, below Top of Bank (TOB), must be assigned to the adjacent land cover type(s). Insert area of impact to stream below TOB in parentheses after the Land Cover acreage number (e.g., Riparian Woodland/Scrub: 10 (0.036) – where 10 is the total impacted acreage including 0.036 acre, which is the acreage within stream TOB). Complete following supplemental **Stream Feature Detail** table to provide information for linear feet.
- **Total Impacts** acreage should be the total parcel acreage (development project) or project footprint acreage (rural infrastructure or utility project).

Table 1: Land Cover Types and Impacts

Land Cover Type	Permanent Impacts	Temporary Impacts	*Proposed for HCP/NCCP Dedication on the Parcel (Requires Conservancy Approval)* *Stream Setback*	*Preserve System Dedication*
Grassland				
Annual Grassland				
Alkali Grassland				
Ruderal	50.43			
Shrubland				
Chaparral and Scrub				
Woodland				
Oak Savannah				
Oak Woodland				
Riparian				
Riparian Woodland/Scrub				
Wetland				
Permanent Wetland				
Seasonal Wetland	0.008			
Alkali Wetland				
Aquatic				
Aquatic (Reservoir/Open Water)				
Slough/Channel				
Pond				
Stream (in linear feet)	-	-	-	-
Irrigated Agriculture				
Pasture				
Cropland				
Orchard				
Vineyard				
Other				
Nonnative woodland				
Wind turbines				
Developed (not counted toward Fees)				
Urban	0.37			
Aqueduct				
Turf				
Landfill				
TOTAL IMPACTS	50.81			

Identify any uncommon vegetation and uncommon landscape features[3]:

Supplemental to Table 1: Uncommon Vegetation and Landscape Features

	Permanent Impacts	Temporary Impacts
Uncommon Grassland Alliances		
Purple Needlegrass Grassland		
Blue Wildrye Grassland		
Creeping Ryegrass Grassland		
Wildflower Fields		
Squirreltail Grassland		
One-sided Bluegrass Grassland		
Serpentine Bunchgrass Grassland		
Saltgrass Grassland		
Alkali Sacaton Bunchgrass Grassland		
☐ Other		
Uncommon Landscape Features		
Rock Outcrops		
Caves		
Springs and seeps		
Scalds		
Sand Deposits		
☐ Mines[4]		
☐ Buildings (bat roosts)[3]		
☒ Potential nest sites (trees or cliffs)[3]	2 trees	

Please provide details of impacts to stream features:

Stream Name: None

Watershed:

Supplemental to Table 1: Stream Feature Detail[5]

Stream Width	Stream Type[6]	Permanent Impacts (linear feet)[7]	Temporary Impacts (linear feet)[7]
☐ ≤ 25 feet wide ☐ > 25 feet wide	☐ Perennial ☐ Intermittent ☐ Ephemeral, 3rd or higher order ☐ Ephemeral, 1st or 2nd order		
☐ ≤ 25 feet wide ☐ > 25 feet wide	☐ Perennial ☐ Intermittent ☐ Ephemeral, 3rd or higher order ☐ Ephemeral, 1st or 2nd order		
☐ ≤ 25 feet wide ☐ > 25 feet wide	☐ Perennial ☐ Intermittent ☐ Ephemeral, 3rd or higher order ☐ Ephemeral, 1st or 2nd order		

[3] These acreages are for Conservancy tracking purposes. Impacts to these uncommon vegetation and landscape features should be accounted for within the land cover types in Table 1 (e.g., x acres of purple needlegrass in this supplemental table should be accounted for within annual grassland in Table 1).
[4] Insert amount/number, not acreage. Provide additional information on these features in Attachment A: Project Description.
[5] Use more than 1 row as necessary to describe impacts to streams on site.
[6] See glossary (Appendix A) for definition of stream type and order.
[7] Stream length is measured along stream centerline, based on length of impact to any part of the stream channel, TOB to TOB.

4) Summary of Land Cover Types

Please provide a written summary of descriptions for land cover types found on site including characteristic vegetation.

Ruderal Grassland: There is 50.44 acres of the "Ruderal Grassland" land cover type in the site. Grasslands in the site have been highly disturbed by past agricultural use and grading much of the site 15+ years ago; the site is primarily bare dirt and sparse vegetation (Figures 4a – 4d). The north part of the site was an orchard before it was rough-graded between 2007-2008. The south part of the site appears to have been farmed in hand-picked grapes that were removed between 2020-2021. The north part of the site currently consists of rough-graded house pads and roads and the south part of the site contains resprouted vines and other small shrubs. Soils in the site are very sandy. Grassland species observed in the site include field bindweed (*Convolvulus arvensis*), Russian thistle (*Salsola tragus*), oats (*Avena sp.*), and wild mustard (*Sinapis arvensis*).

Urban/Developed (Off-site Improvements): There is 0.37 acres of the "Urban/Developed" land cover type (i.e., Sellers Avenue along the east edge of the site, along (see Figure 3, 4h, and 5a).

Seasonal Wetland: There is 0.008+/-acre "Seasonal Wetland" in the northwest part of the site, just southeast of a pump station (Figures 3, 4h, and 5a). The wetland is situated in a topographically low area and supports a small patch tules (*Schoenoplectus acutus*). The wetland was created during initial grading of the site years ago; it is not apparent in any historical aerial photographs of the site prior to grading. The wetland is in very close proximity to the pump station, a residential subdivision, and a stubbed off road, and appears to be supported, or at least supplemented, by an underground water source such as a leaking storm drain pipe or irrigation run-off from landscaped areas to the north.

Trees: There are only two trees in the site. There is large palm at a former home site in the northeast part of the site and an ornamental along the south fence line. There are several other trees adjacent to the south edge of the site and a few adjacent to the west edge, which appear to be just off-site.

5) Jurisdictional Wetlands and Waters

If wetlands and waters are present on the project site, project proponents must conduct a delineation of jurisdictional wetlands and waters. Jurisdictional wetlands and waters are defined on pages 1-18 and 1-19 of the ECCC HCP/NCCP as the following land cover types: permanent wetland, seasonal wetland, alkali wetland, aquatic, pond, slough/channel, and stream. It should be noted that these features differ for federal and state jurisdictions. If you have identified any of these land cover types in Table 1, complete the section below.

a) Attach the wetland delineation report as **Attachment E: Wetland Delineation.** If a wetland delineation has not been completed, please explain below in section 4c.

b) Please check the following permits the project may require. Please submit copies of these permits to the Conservancy prior to the start of construction:

☐ CWA Section 404 Permit[8] ☐ CWA Section 401 Water Quality Certification

☐ Waste Discharge Requirements ☐ Lake and Streambed Alteration Agreement

c) Provide any additional information on impacts to jurisdictional wetland and waters below, including status of the permit(s):

An assessment of potentially jurisdictional Waters of the U.S. or wetlands in the site was undertaken on June 15, 2023. There are no potentially jurisdictional Waters of the U.S. in the site.

There is 0.008+/-acre seasonal wetland in the northwest part of the site, just southeast of a pump station (Attachment E). The wetland was created during initial grading of the site years ago and is best described as a "construction artifact". The wetland appears to be supported, or at least supplemented, by an

[8] The USACE Sacramento District issued a Regional General Permit 1 (RGP) related to ECCC HCP/NCCP covered activities. The RGP is designed to streamline wetland permitting in the entire ECCC HCP/NCCP Plan Area by coordinating the avoidance, minimization, and mitigation measures in the Plan with the Corps' wetland permitting requirement. Applicants seeking authorization under this RGP shall notify the Corps in accordance with RGP general condition number 18 (Notification).

underground water source such as a leaking storm drain pipe or irrigation run-off from landscaped areas to the north. It is hydrologically and spatially isolated from Marsh Creek and does not meet the regulatory criteria of a jurisdictional wetland. Despite its created nature, the wetland could fall under the jurisdiction of the California Regional Water Quality Control Board (RWQCB) as a "Water of the State".

The remainder of the site consists primarily of highly disturbed ruderal grassland vegetation and on-site soils are sandy and appear well draining.

The 0.008+/-acre seasonal wetland is within the footprint of the extension of Teton Road and will be filled. Due to a May 26, 2023 Supreme Court decision, ACOE is now "on hold" in processing Approved Jurisdictional Determination (AJD) requests. Depending on project timing, the applicant may choose to request a Preliminary Jurisdictional Determination (PJD) from ACOE and secure authorization from ACOE to fill the wetland under Regional General Permit 1 (RGP 1). Alternately, the applicant may request an AJD (when possible) from ACOE. If ACOE concurs the wetland is non-jurisdictional, no further interface with ACOE will be required. In what is viewed as a highly unlikely scenario the wetland is deemed jurisdictional by ACOE through the AJD process, the applicant would need to secure authorization from ACOE to fill the wetland under RGP 1.

Filling the 0.008+/- acre seasonal wetland will involve securing either 401 Certification and/or Waste Discharge Requirements from RWQCB.

A Lake and Streambed Alteration Agreement from California Department of Fish and Wildlife is not needed as the wetland is not a Stream or Lake.

6) Species-Specific Planning Survey Requirements

Based on the land cover types found on-site and identified in Table 1, check the applicable boxes in Table 2a.

Table 2a. Species –Specific Planning Survey Requirements

Land Cover Type in Project Area	Required Survey Species	Habitat Element in Project Area	Planning Survey Requirement[9]	Info in HCP
☒ Grasslands, oak savannah, agriculture, or ruderal	☐ San Joaquin kit fox	Assumed if within modeled range of species	If within modeled range of species, identify and map potential breeding or denning habitat within the project site and a 250-ft radius around the project footprint.	pp. 6-37 to 6-38
	☒ Western burrowing owl	Assumed	Identify and map potential breeding habitat within the project site and a 500-ft radius around the project footprint. Please note the HCP requires buffers for occupied burrows. Surveys may need to encompass an area larger than the project footprint.	pp. 6-39 to 6-41
☐ Aquatic (ponds, wetlands, streams, sloughs, channels, and marshes)	☐ Giant garter snake	Aquatic habitat accessible from the San Joaquin River	Identify and map potential habitat.	pp. 6-43 to 6-45
	☐ California tiger salamander	Ponds and wetlands Vernal pools Reservoirs Small lakes	Identify and map potential breeding habitat. Document habitat quality and features. Provide the Conservancy with photo-documentation and report.	pp. 6-45
	☐ California red-legged frog	Slow-moving streams, ponds and wetlands	Identify and map potential breeding habitat. Document habitat quality and features. Provide the Conservancy with photo-documentation and report.	p. 6-46
	☐ Covered shrimp	Seasonal wetlands Vernal pools Sandstone rock outcrops Sandstone depressions	Identify and map potential habitat. Please note the HCP requires a 50 foot non-disturbance buffer from seasonal wetlands that may be occupied by covered shrimp. Surveys may need to encompass an area larger than the	pp. 6-46 to 6-48

[9] The planning survey requirements in this table are not comprehensive. Please refer to Chapter 6.4.3 in the ECCC HCP/NCCP for more detail.

		project footprint.		
☒ Any	☐ Townsend's big-eared bat	Rock formations with caves Mines Abandoned buildings outside urban area	Map and document potential breeding or roosting habitat.	pp. 6-36 to 6-37
	☒ Swainson's hawk	Potential nest sites within 1,000 feet of project	Inspect large trees for presence of nest sites. Document and map.	pp. 6-41 to 6-43
	☒ Golden Eagle	Potential nest sites with ½ mile of project	Inspect large trees for presence of nest sites. Document and map.	pp. 6-38 to 6-39
Surveys for all covered species must be conducted by a qualified biologist (USFWS/CDFW project-specific approved). Please submit biologist approval request to the East Contra Costa County Habitat Conservancy. Surveys for all covered species must be conducted according to the respective USFWS or CDFW survey protocols, as identified in Chapter 6.4.3 in the HCP/NCCP.				

7) Planning Survey Species Habitat Maps

Provide Planning Survey Species Habitat Maps as required in Table 2a, attach as **Figure 5** in **Attachment B: Figures**.

8) Results of Species Specific Surveys

Provide a written summary describing the results of the planning surveys. Please discuss the location, quantity, and quality of suitable habitat for specified covered wildlife species on the project site.

General Setting: The 50.81+/- acre Project Site is in Oakley, in Contra Costa County, California (Figure 1). The Study Area is located just west of Sellers Avenue and just south of Kings Canyon Way and Teton Road. The site is within Section 31, in Township 2 North, Range 3 East of the USGS 7.5-minute Brentwood topographic quadrangle. The site has been leveled and is situated at approximately 25 feet above mean sea level.

Surrounding land uses in this portion of Oakley are primarily agricultural and residential, with a mixture of residential subdivisions and larger, ranchette-styled homes on larger parcels. Marsh Creek is situated just west of the site and Sellers Avenue is situated to the east. A residential subdivision, larger home site, and grassland fields border the north edge of the site. There are a few ranchette-styled homes to the south of the site. There is an abandoned nursery situated just southeast of the site.

Western Burrowing Owl: The project site contains ruderal grassland and is within the range of western burrowing owl (*Athene cunicularia*). California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB, 2023) does not contain any records of western burrowing owl within 500 feet of the site or in the larger geographical area depicted in Figure 5b. The site was inspected for burrowing owls and ground squirrel burrows with evidence of burrowing owl occupancy (i.e., white wash, pellets, feathers). Comprehensive inspection of potential burrowing owl habitat was accomplished by walking meandering transects throughout the property. Although several ground squirrel burrows were observed in the site, no western burrowing owls or burrows with evidence of burrowing owl occupancy were observed. Further, most of the ground squirrel burrows appeared unoccupied as cobwebs were seen at the entrance in a majority of the burrows in the site.

Swainson's Hawk: The site contains areas of ruderal grassland and is along the western edge of the range of Swainson's hawks (*Buteo swainsoni*). There are two trees in the site that are potentially suitable for nesting Swainson's hawks and there are several potential nest trees adjacent to and visible from the site that are also suitable, including a row of trees just off-site to the south. All trees in the site and visible from the site were inspected for raptor stick nests and none were observed. No Swainson's hawks were observed during the field survey, which was conducted within the nesting period for this species. CDFW's CNDDB contains no occurrences of Swainson's hawk within 1,000 feet of the site or within the larger geographical area depicted in Figure 5b.

Golden Eagle: The site contains ruderal grassland and is within the range of golden eagles (*Aquila chrysaetos*). CDFW's CNDDB contains no occurrences of golden eagle within 0.5 miles of the site or within the larger geographical area depicted in Figure 5b. There are 2 trees in the site that are potentially suitable for nesting golden eagles and several other large trees adjacent to and visible from the site. Trees in the site and visible from the site were inspected for raptor stick nests and none were observed. No golden eagles were observed during the survey and this species nests more often on cliffs in remote natural areas than in trees near urban settings.

Other Covered Species: The 0.008+/-acre seasonal wetland is not a vernal pool and is not the type of "seasonal wetland" that provides suitable habitat for vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), or other special-status branchiopods. The seasonal wetland is not vegetated with hydrophytes commonly found in seasonal wetlands where listed branchiopods occur such as perennial ryegrass (*Lolium perenne*) and seaside barley (*Hordeum marinum*) and does not support any "vernal pool species" such as coyote thistle (*Eryngium vaseyi*), popcorn-flower (*Plagiobthrys stipitatus*), or Fremont goldfields (*Lasthenia fremontii*). To the contrary, the seasonal wetland is vegetated with a dense stand of bullrush. In conclusion, the seasonal wetland does not provide suitable habitat for special-status branchiopods and protocol-level surveys for covered shrimp were not warranted.

9) Covered and No-Take Plants

Please check the applicable boxes in Table 2b based on the land cover types found in the project area. If suitable land cover types are present on site, surveys must be conducted using approved CDFW/USFWS methods during the appropriate season for identification of covered and no-take species (see page 6-9 of the ECCC HCP/NCCP). Reference populations of covered and no-take plants should be visited, where possible, prior to conducting surveys to confirm that the plant species is visible and detectable at the time surveys are conducted. In order to complete all the necessary covered and no-take plant surveys, spring, summer, and fall surveys may be required.

Table 2b. Covered and No-Take Plant Species

Plant Species	Covered (C) or No-Take (N)	Associated Land Cover Type	Typical Habitat or Physical Conditions, if Known	Typical Blooming Period	Suitable Land Cover Type Present
Adobe navarretia (*Navarretia nigelliformis* ssp. *radians*) [a]	C	Annual Grassland	Generally found on clay barrens in Annual Grassland [b]	Apr–Jun	☐ Yes ☒ No
Alkali milkvetch (*Astragalus tener* ssp. *tener*)	N	Alkali grassland Alkali wetland Annual grassland Seasonal wetland	Generally found in vernally moist habitat in soils with a slight to strongly elevated pH	Mar–Jun	☐ Yes ☒ No
Big tarplant (*Blepharizonia plumosa*)	C	Annual grassland	Elevation below 1500 feet [d] most often on Altamont Series or Complex soils	Jul–Oct	☐ Yes ☒ No
Brewer's dwarf flax (*Hesperolinon breweri*)	C	Annual grassland Chaparral and scrub Oak savanna Oak woodland	Generally, restricted to grassland areas within a 500+ buffer from oak woodland and/or chaparral/scrub [d]	May–Jul	☐ Yes ☒ No
Brittlescale (*Atriplex depressa*)	C	Alkali grassland Alkali wetland	Restricted to soils of the Pescadero or Solano soil series; generally found in southeastern region of plan area [d]	May–Oct	☐ Yes ☒ No
Caper-fruited tropidocarpum (*Tropidocarpum capparideum)*	N	Alkali grassland		Mar–Apr	☐ Yes ☒ No
Contra Costa goldfields (*Lasthenia conjugens*)	N	Alkali grassland Alkali wetland Annual grassland Seasonal wetland	Generally found in vernal pools	Mar–Jun	☐ Yes ☒ No
Diablo Helianthella (*Helianthella castanea*)	C	Chaparral and scrub Oak savanna Oak woodland	Elevations generally above 650 feet [d]	Mar–Jun	☐ Yes ☒ No
Diamond-petaled poppy (*Eschscholzia rhombipetala*)	N	Annual grassland		Mar–Apr	☐ Yes ☒ No

Large-flowered fiddleneck (*Amsinckia grandiflora*)	N	Annual grassland	Generally on clay soil	Apr–May	☐ Yes ☒ No
Mount Diablo buckwheat (*Eriogonum truncatum*)	N	Annual grassland Chaparral and scrub	Ecotone of grassland and chaparral/scrub	Apr–Sep	☐ Yes ☒ No
Mount Diablo fairy-lantern (*Calochortus pulchellus*)	C	Annual grassland Chaparral and scrub Oak savanna Oak woodland	Elevations generally between 650 and 2,600[d]	Apr–Jun	☐ Yes ☒ No
Mount Diablo Manzanita (*Arctostaphylos auriculata*)	C	Chaparral and scrub	Elevations generally between 700 and 1,860 feet; restricted to the eastern and northern flanks of Mt. Diablo [d] and the vicinity of Black Diamond Mines	Jan–Mar	☐ Yes ☒ No
Recurved larkspur (*Delphinium recurvatum*)	C	Alkali grassland Alkali wetland		Mar–Jun	☐ Yes ☒ No
Round-leaved filaree (*California macrophylla*) [c]	C	Annual grassland		Mar–May	☐ Yes ☒ No
San Joaquin spearscale (*Extriplex joaquiniana*) [e]	C	Alkali grassland Alkali wetland		Apr–Oct	☐ Yes ☒ No
Showy madia (*Madia radiata*)	C	Annual grassland Oak savanna Oak woodland	Primarily occupies open grassland or grassland on edge of oak woodland	Mar–May	☐ Yes ☒ No

[a] The species *Navarretia nigelliformis* subsp. *nigelliformis* is no longer considered to occur within Contra Costa County based on specimen annotations at the UC and Jepson Herbaria at the University of California Berkeley as well as the opinions of experts in the genus. This taxon is now recognized as *Navarretia nigelliformis* subsp. *radians.* Any subspecies of *Navarretia nigelliformis* encountered as a part of botanical surveys in support of a PSR should be considered as covered under this HCP/NCCP.

[b] Habitat for the *Navarretia nigelliformis* subspecies that occurs within the inventory are is inaccurately described in the HCP/NCCP as vernal pools. The entity within the Inventory generally occupies clay barrens within Annual Grassland habitat, which is an upland habitat type.

[c] From California Native Plant Society. 2007. *Inventory of Rare and Endangered Plants* (online edition, v7-07d). Sacramento, CA. Species may be identifiable outside of the typical blooming period; a professional botanist shall determine if a covered or no take plant occurs on the project site. Reference population of covered and no-take plants should be visited, where possible, prior to conducting surveys to confirm that the plant is visible and detectable at the time surveys are conducted.

[d] See Species Profiles in Appendix D of the Final HCP/NCCP. Reference populations of covered and no-take plants should be visited, where possible, prior to conducting surveys to confirm that the plant species is visible and detectable at the time surveys are conducted.

[e] In the recent update to the Jepson eflora (JFP 2013) *Atriplex joaquinana* has been circumscribed and segregated into a new genus called *Extriplex* based on the work of Elizabeth Zacharias and Bruce Baldwin (2010). The etymology of the genus *Extriplex* means, "beyond or outside Atriplex".

10) Results of Covered and No-Take Plant Species

Provide a written summary describing the results of the planning surveys conducted as required in Table 2b. Describe the methods used to survey the site for all covered and no-take plants, including the dates and times of all surveys conducted (see Tables 3-8 and 6-5 of the ECCC HCP/NCCP for covered and no-take plants), including reference populations visited prior to conducting surveys.

If any covered or no-take plant species were found, include the following information in the results summary:

- Description and number of occurrences and their rough population size.
- Description of the "health" of each occurrence, as defined on pages 5-49 and 5-50 of the HCP/NCCP.
- A map of all the occurrences.
- Justification of surveying time window, if outside of the plant's blooming period.
- The CNDDB form(s) submitted to CDFW (if this is a new occurrence).
- A description of the anticipated impacts that the covered activity will have on the occurrence and how the project will avoid impacts to all covered and no-take plant species. If impacts to covered plant species cannot be avoided and plants will be removed by covered activity, the Conservancy must be notified and has the option to salvage the covered plants. All projects must demonstrate avoidance of all six no-take plants (see table 6-5 of the HCP/NCCP).

Survey Methods

A survey to assess potentially suitable habitat for special-status plants was undertaken on June 15, 2023. The site was systematically searched by walking and driving throughout the site.

Survey Results and Discussion

The site is ruderal grassland almost completely void of vegetation; a majority of the site is bare dirt. Due to an absence of potentially suitable habitat for special-status plants, focused surveys during the blooming period of each species in Table 2b were not warranted.

IV. SPECIES-SPECIFIC AVOIDANCE AND MINIMIZATION REQUIREMENTS

Please complete and/or provide the following attachments:

1) Species-Specific Avoidance and Minimization for Selected Covered Wildlife

Complete the following table and check the applicable box for covered species determined by the planning surveys.

Table 3. Summary of Applicable Preconstruction Surveys, Avoidance and Minimization, and Construction Monitoring Requirements[10]

Species	Preconstruction Survey Requirements	Avoidance and Minimization Requirements	Construction Monitoring Required	Info in HCP
☐ San Joaquin kit fox	• On project footprint and 250-ft radius, map all dens (>5 in. diameter) and determine status • Provide written survey results to USFWS within 5 working days after surveying	• Monitor dens • Destroy unoccupied dens • Discourage use of occupied (non-natal) dens	• Establish exclusion zones (>50 ft for potential dens, and >100 ft for known dens) • Notify USFWS of occupied natal dens	pp. 6-37 to 6-38
☒ Western burrowing owl	• On project footprint and 500-ft radius, identify and map all owls and burrows, and determine status • Document use of habitat (e.g. breeding, foraging)	• Avoid occupied nests during breeding season (Feb-Sep) • Avoid occupied burrows during nonbreeding season (Sep – Feb) • Install one-way doors in occupied burrow (if avoidance not possible) • Monitor burrows with doors installed	• Establish buffer zones (250 ft around nests) • Establish buffer zones (160 ft around burrows)	pp. 6-39 to 6-41
☐ Giant garter snake	• Delineate aquatic habitat up to 200 ft from water's edge on each side • Document any occurrences	• Limit construction to Oct-May • Dewater habitat April 15 – Sep 30 prior to construction • Minimize clearing for construction	• Delineate 200 ft buffer around potential habitat near construction • Provide field report on monitoring efforts • Stop construction activities if snake is encountered; allow snake to passively relocate • Remove temporary fill or debris from construction site • Mandatory training for construction personnel	pp. 6-43 to 6-45
☐ California tiger salamander	• Provide written notification to USFWS and CDFW regarding timing of construction and likelihood of occurrence on site	• Allow agency staff to translocate species, if requested	• None	p. 6-45
☐ California red-legged frog	• Provide written notification to USFWS and CDFW regarding timing of construction and likelihood of occurrence on site	• Allow agency staff to translocate species, if requested	• None	p. 6-46
☐ Covered shrimp	• Establish presence/absence • Document and evaluate use of all habitat features (e.g. vernal pools, rock outcrops)	• Establish buffer near construction activities • Prohibit incompatible activities	• Establish buffer around outer edge of all hydric vegetation associated with habitat (50 ft or immediate watershed, whichever is larger) • Mandatory training for construction personnel	pp. 6-46 to 6-48
☐ Townsend's big-eared bat	• Establish presence/absence • Determine if potential sites were recently occupied (guano)	• Seal hibernacula before Nov • Seal nursery sites before April • Delay construction near occupied sites until hibernation or nursery seasons are over	• None	pp. 6-36 to 6-37
☒ Swainson's hawk	• Determine whether potential nests are occupied	• No construction within 1,000 ft of occupied nests within breeding season (March 15 - Sep 15) • If necessary, remove active nest tree after nesting season to prevent occupancy in second year.	• Establish 1,000 ft buffer around active nest and monitor compliance (no activity within established buffer)	pp. 6-41 to 6-43
☒ Golden Eagle	• Establish presence/absence of nesting eagles	• No construction within ½ mile near active nests (most activity late Jan – Aug)	• Establish ½ mile buffer around active nest and monitor compliance with buffer	pp. 6-38 to 6-39

[10] The requirements in this table are not comprehensive; they are detailed in the next section on the following page.

2) Required Preconstruction Surveys, Avoidance and Minimization, and Construction Monitoring

All preconstruction surveys shall be conducted in accordance with the requirements set forth in Section 6.4.3, Species-Level Measures, and Table 6-1 of the ECCC HCP/NCCP. Detailed descriptions of preconstruction surveys, avoidance and minimization, and construction monitoring applicable to each of the wildlife species in Table 3 are located below. Please remove the species-specific measures that do not apply to your project (highlight entire section and delete).

WESTERN BURROWING OWL

Preconstruction Surveys

Prior to any ground disturbance related to covered activities, a USFWS/CDFW- approved biologist will conduct a preconstruction survey in areas identified in the planning surveys as having potential burrowing owl habitat. The surveys will establish the presence or absence of western burrowing owl and/or habitat features and evaluate use by owls in accordance with CDFW survey guidelines (California Department of Fish and Game 1995).

On the parcel where the activity is proposed, the biologist will survey the proposed disturbance footprint and a 500-foot radius from the perimeter of the proposed footprint to identify burrows and owls. Adjacent parcels under different land ownership will not be surveyed. Surveys should take place near sunrise or sunset in accordance with CDFW guidelines. All burrows or burrowing owls will be identified and mapped. Surveys will take place no more than 30 days prior to construction. During the breeding season (February 1– August 31), surveys will document whether burrowing owls are nesting in or directly adjacent to disturbance areas. During the nonbreeding season (September 1–January 31), surveys will document whether burrowing owls are using habitat in or directly adjacent to any disturbance area. Survey results will be valid only for the season (breeding or nonbreeding) during which the survey is conducted.

Avoidance and Minimization and Construction Monitoring

This measure incorporates avoidance and minimization guidelines from CDFW's *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 1995).

If burrowing owls are found during the breeding season (February 1 – August 31), the project proponent will avoid all nest sites that could be disturbed by project construction during the remainder of the breeding season or while the nest is occupied by adults or young. Avoidance will include establishment of a non-disturbance buffer zone (described below). Construction may occur during the breeding season if a qualified biologist monitors the nest and determines that the birds have not begun egg-laying and incubation or that the juveniles from the occupied burrows have fledged. During the nonbreeding season (September 1 – January 31), the project proponent should avoid the owls and the burrows they are using, if possible. Avoidance will include the establishment of a buffer zone (described below).

During the breeding season, buffer zones of at least 250 feet in which no construction activities can occur will be established around each occupied burrow (nest site). Buffer zones of 160 feet will be established around each burrow being used during the nonbreeding season. The buffers will be delineated by highly visible, temporary construction fencing.

If occupied burrows for burrowing owls are not avoided, passive relocation will be implemented. Owls should be excluded from burrows in the immediate impact zone and within a 160-foot buffer zone by installing one-way doors in burrow entrances. These doors should be in place for 48 hours prior to excavation. The project area should be monitored daily for 1 week to confirm that the owl has abandoned the burrow. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation (California Department of Fish and Game 1995). Plastic tubing or a similar structure should be inserted in the tunnels during excavation to maintain an escape route for any owls inside the burrow.

SWAINSON'S HAWK

Preconstruction Survey

Prior to any ground disturbance related to covered activities that occurs during the nesting season (March 15–September 15), a qualified biologist will conduct a preconstruction survey no more than 1 month prior to construction to establish whether Swainson's hawk nests within 1,000 feet of the project site are occupied. If

potentially occupied nests within 1,000 feet are off the project site, then their occupancy will be determined by observation from public roads or by observations of Swainson's hawk activity (e.g., foraging) near the project site. If nests are occupied, minimization measures and construction monitoring are required (see below).

Avoidance and Minimization and Construction Monitoring

During the nesting season (March 15–September 15), covered activities within 1,000 feet of occupied nests or nests under construction will be prohibited to prevent nest abandonment. If site-specific conditions or the nature of the covered activity (e.g., steep topography, dense vegetation, limited activities) indicate that a smaller buffer could be used, the Implementing Entity will coordinate with CDFW/USFWS to determine the appropriate buffer size.

If young fledge prior to September 15, covered activities can proceed normally. If the active nest site is shielded from view and noise from the project site by other development, topography, or other features, the project applicant can apply to the Implementing Entity for a waiver of this avoidance measure. Any waiver must also be approved by USFWS and CDFW. While the nest is occupied, activities outside the buffer can take place.

All active nest trees will be preserved on site, if feasible. Nest trees, including non-native trees, lost to covered activities will be mitigated by the project proponent according to the requirements below.

Mitigation for Loss of Nest Trees

The loss of non-riparian Swainson's hawk nest trees will be mitigated by the project proponent by:

- If feasible on-site, planting 15 saplings for every tree lost with the objective of having at least 5 mature trees established for every tree lost according to the requirements listed below.

  AND either

  1) Pay the Implementing Entity an additional fee to purchase, plant, maintain, and monitor 15 saplings on the HCP/NCCP Preserve System for every tree lost according to the requirements listed below, OR

  2) The project proponent will plant, maintain, and monitor 15 saplings for every tree lost at a site to be approved by the Implementing Entity (e.g., within an HCP/NCCP Preserve or existing open space linked to HCP/NCCP preserves), according to the requirements listed below.

The following requirements will be met for all planting options:

- Tree survival shall be monitored at least annually for 5 years, then every other year until year 12. All trees lost during the first 5 years will be replaced. Success will be reached at the end of 12 years if at least 5 trees per tree lost survive without supplemental irrigation or protection from herbivory. Trees must also survive for at least three years without irrigation.
- Irrigation and fencing to protect from deer and other herbivores may be needed for the first several years to ensure maximum tree survival.
- Native trees suitable for this site should be planted. When site conditions permit, a variety of native trees will be planted for each tree lost to provide trees with different growth rates, maturation, and life span, and to provide a variety of tree canopy structures for Swainson's hawk. This variety will help to ensure that nest trees will be available in the short term (5-10 years for cottonwoods and willows) and in the long term (e.g., Valley oak, sycamore). This will also minimize the temporal loss of nest trees.
- Riparian woodland restoration conducted as a result of covered activities (i.e., loss of riparian woodland) can be used to offset the nest tree planting requirement above, if the nest trees are riparian species.
- Whenever feasible and when site conditions permit, trees should be planted in clumps together or with existing trees to provide larger areas of suitable nesting habitat and to create a natural buffer between nest trees and adjacent development (if plantings occur on the development site).
- Whenever feasible, plantings on the site should occur closest to suitable foraging habitat outside the UDA.
- Trees planted in the HCP/NCCP preserves or other approved offsite location will occur within the known range of Swainson's hawk in the inventory area and as close as possible to high-quality foraging habitat.

GOLDEN EAGLE

Preconstruction Survey

Prior to implementation of covered activities, a qualified biologist will conduct a preconstruction survey to establish whether nests of golden eagles are occupied (see Section 6.3.1, *Planning Surveys*). If nests are occupied, minimization requirements and construction monitoring will be required.

Avoidance and Minimization

Covered activities will be prohibited within 0.5 mile of active nests. Nests can be built and active at almost any time of the year, although mating and egg incubation occurs late January through August, with peak activity in March through July. If site-specific conditions or the nature of the covered activity (e.g., steep topography, dense vegetation, limited activities) indicate that a smaller buffer could be appropriate or that a larger buffer should be implemented, the Implementing Entity will coordinate with CDFW/USFWS to determine the appropriate buffer size.

Construction Monitoring

Construction monitoring will focus on ensuring that no covered activities occur within the buffer zone established around an active nest. Although no known golden eagle nest sites occur within or near the ULL, covered activities inside and outside of the Preserve System have the potential to disturb golden eagle nest sites. Construction monitoring will ensure that direct effects to golden eagles are minimized.

3) Construction Monitoring Plan

Before implementing a covered activity, the applicant will develop and submit a construction monitoring plan to the planning department of the local land use jurisdiction and the East Contra Costa County Habitat Conservancy for review and approval. Elements of a brief construction monitoring plan will include the following:

- Results of planning and preconstruction surveys.[11]
- Description of avoidance and minimization measures to be implemented, including a description of project-specific refinements to the measures or additional measures not included in the HCP/NCCP.
- Description of monitoring activities, including monitoring frequency and duration, and specific activities to be monitored.
- Description of the onsite authority of the construction monitor to modify implementation of the activity.

☒ Check box to acknowledge this requirement.

V. SPECIFIC CONDITIONS ON COVERED ACTIVITIES

1) Check off the HCP conservation measures that apply to the project.

APPLIES TO ALL PROJECTS

☒ **Conservation Measure 1.11. Avoid Direct Impacts on Extremely Rare Plants, Fully Protected Wildlife Species, or Migratory Birds.** This conservation measure applies to all projects. All projects will avoid all impacts on extremely rare plants and fully protected species listed in Table 6-5 of the ECCC HCP/NCCP. See HCP pp. 6-23 to 6-25, and Table 6-5.

APPLIES TO PROJECTS THAT IMPACT COVERED PLANT SPECIES

☐ **Conservation Measure 3.10. Plant Salvage when Impacts are Unavoidable.** This condition applies to projects that cannot avoid impacts on covered plants and help protect covered plants by prescribing salvage whenever avoidance of impacts is not feasible. Project proponents

[11] If the preconstruction surveys do not trigger construction monitoring, results of preconstruction surveys should still be submitted to the local jurisdiction and the East Contra Costa County Habitat Conservancy.

wishing to remove populations of covered plants must notify the Conservancy of their construction schedule to allow the Conservancy the option of salvaging the populations. See HCP pp. 6-48 to 6-50.

APPLIES TO PROJECTS THAT INCLUDE ARE ADJACENT TO STREAMS, PONDS, OR WETLANDS

☒ **Conservation Measure 2.12. Wetland, Pond, and Stream Avoidance and Minimization.** All projects will implement measures described in the HCP to avoid and minimize impacts on wetlands, ponds, streams, and riparian woodland/scrub. See HCP pp. 6-33 to 6-35.

APPLIES TO NEW DEVELOPMENT PROJECTS

☒ **Conservation Measure 1.10. Maintain Hydrologic Conditions and Minimize Erosion.** All new development must avoid or minimize direct and indirect impacts on local hydrological conditions and erosion by incorporating the applicable Provision C.3 Amendments of the Contra Costa County Clean Water Program's (CCCCWP's) amended NPDES Permit (order no. R2-2003-0022; permit no. CAS002912). The overall goal of this measure is to ensure that new development covered under the HCP has no or minimal adverse effects on downstream fisheries to avoid take of fish listed under ESA or CESA. See HCP pp. 6-21 to 6-22.

APPLIES TO NEW DEVELOPMENT PROJECTS THAT INCLUDE OR ARE ADJACENT TO STREAMS, PONDS, OR WETLANDS

☒ **Conservation Measure 1.7. Establish Stream Setbacks.** A stream setback will be applied to all development projects covered by the HCP according to the stream types listed in Table 6-2 of the HCP. See HCP pp. 6-15 to 6-18 and Table 6-2.

APPLIES TO NEW DEVELOPMENT PROJECTS ADJACENT TO EXISTING PUBLIC OPEN SPACE, HCP PRESERVES, OR LIKELY HCP ACQUISITION SITES

☐ **Conservation Measure 1.6. Minimize Development Footprint Adjacent to Open Space.** Project applicants are encouraged to minimize their development footprint and set aside portions of their land to contribute to the HCP Preserve System. Land set aside that contributes to the HCP biological goals and objectives may be credited against development fees. See HCP pages 6-14 to 6-15.

☐ **Conservation Measure 1.8. Establish Fuel Management Buffer to Protect Preserves and Property.** Buffer zones will provide a buffer between development and wildlands that allows adequate fuel management to minimize the risk of wildlife damage to property or to the preserve. The minimum buffer zone for new development is 100 feet. See HCP pages 6-18 to 6-19.

☐ **Conservation Measure 1.9. Incorporate Urban-Wildlife Interface Design Elements.** These projects will incorporate design elements at the urban-wildlife interface to minimize the indirect impacts of development on the adjacent preserve. See HCP pp. 6-20 to 6-21.

APPLIES TO ROAD MAINTENANCE PROJECTS OUTSIDE THE UDA

☐ **Conservation Measure 1.12. Implement Best Management Practices for Rural Road Maintenance.** Road maintenance activities have the potential to affect covered species by introducing sediment and other pollutants into downstream waterways, spreading invasive weeds, and disturbing breeding wildlife. In order to avoid and minimize these impacts, BMPs described in the HCP will be used where appropriate and feasible. See HCP pp. 6-25 to 6-26.

APPLIES TO NEW ROADS OR ROAD IMPROVEMENTS OUTSIDE THE UDA

☐ **Conservation Measure 1.14. Design Requirements for Covered Roads Outside the Urban Development Area (UDA).** New roads or road improvements outside the UDA have impacts on many covered species far beyond the direct impacts of their project footprints. To minimize the impacts of new, expanded, and improved roads in agricultural and natural areas of the inventory area, road and bridge construction projects will adopt siting, design, and construction requirements described in the HCP and listed in Table 6-6. See HCP pp. 6-27 to 6-33 and Table 6-6.

APPLIES TO FLOOD CONTROL MAINTENANCE ACTIVITIES

☐ **Conservation Measure 1.13. Implement Best Management Practices for Flood Control Facility Maintenance.** Flood control maintenance activities have the potential to affect covered species by introducing sediment and other pollutants into downstream waterways and disturbing breeding wildlife. In order to avoid and minimize these impacts, BMPs described in the HCP will be used where appropriate and feasible. See HCP pp. 6-26 to 6-27.

2) For all checked conservation measures, describe how the project will comply with each measure. Attach as Attachment C: Project Compliance to HCP Conditions.

VI. MITIGATION MEASURES

1) Mitigation Fee Calculator(s)
Complete and attach the fee calculator (use permanent and/or temporary impact fee calculator as appropriate), and attach as **Attachment D: Fee Calculator(s)**.

2) Briefly describe the amount of fees to be paid <u>and</u> when applicant plans to submit payment.

The 50.81+/- acre site contains 50.43+/- acres of Ruderal Grassland, a 0.008+/-acre Seasonal Wetland, and 0.37+/- acres of Urban/Developed land.

The site is within Fee Zone 1 and construction is expected to commence in 2024.

Under the current (2023) fee schedule, Development fees of $19,611.52 per acre would be assessed on 50.44 acres ($989,205.07).

Additionally, Wetland Mitigation fees of $392,489.03 per acre would be assessed on 0.008 acres ($3,139.91).

Under the 2023 fee schedule, the fee total is $992,344.08.

Fees will be paid pursuant to the fee schedule that is in place at the time construction commences.

ATTACHMENT A: PROJECT DESCRIPTION

Stonecreek (Subdivision 9647)

Project Description
July 2023

The 50.81+/- acre Project Site is in Oakley, in Contra Costa County, California (Figure 1). The Study Area is located just west of Sellers Avenue and just south of Kings Canyon Way and Teton Road. The site is within Section 31, in Township 2 North, Range 3 East of the USGS 7.5-minute Brentwood topographic quadrangle. The project site includes a parcel encompassing 50.44+/- acres and an off-site 0.37-acre sliver along Sellers Avenue.

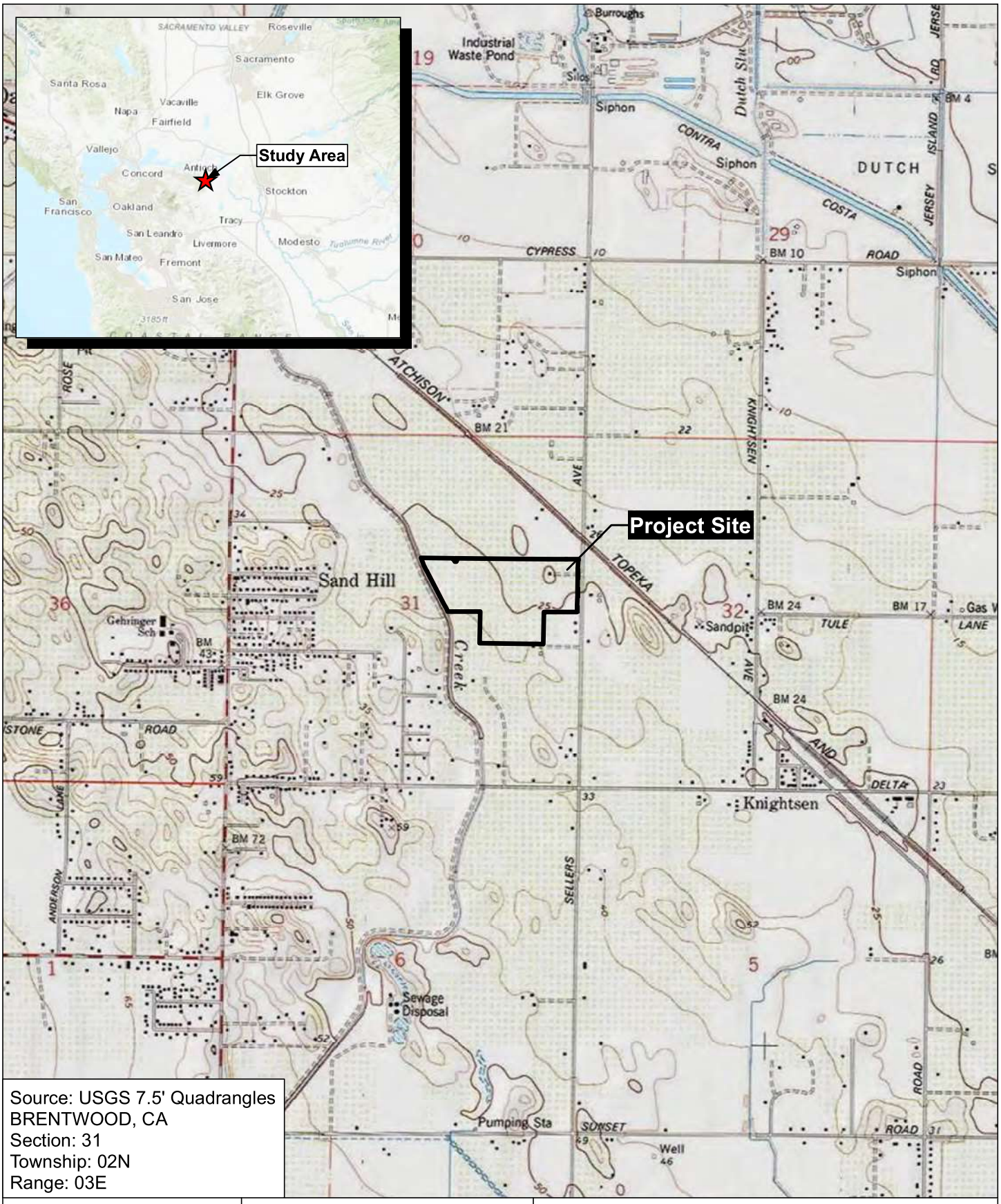
Ponderosa Homes II, Inc. plans to develop the parcel in to a 176-lot residential subdivision (Figures 2a-2f). Access in to the site from the east will be from Sellers Avenue, as well as from Teton Road and Kings Canyon Way, which will be extended to the south from their stubs along the north edge of the site. A network of roads and cul-de-sacs, most of which were rough graded several years ago, will provide access to all of lots in the subdivision. The project is expected to involve improvements to the Sellers Avenue, such as an additional lane and/or construction of a sidewalk. Any off-site road improvements will occur in a 0.37-acre area along the east edge of the site.

There will be a park and a stormwater detention basin in the northwest part of the site between developed areas and the Marsh Creek corridor. A second stormwater detention basin in the northeast part of the site. The treated stormwater will be conveyed to an existing City storm drain system in Teton Road. The proposed project will connect to existing City infrastructure in Teton Road and Kings Canyon Way, respectively, to provide sewer and water service to the site.

Standard construction best management practices (BMPs) will be employed during construction to minimize the potential for erosion and off-site transport of fines. BMPs will include use of water trucks, appropriate compaction of soil, and installation of straw wattles, silt fences or other technologies along the perimeter of the site during construction, and stabilization of bare soils as appropriate with seeding, straw, and/or hydromulch.

Construction is expected to begin in early-2024 and is expected to continue through 2025.

ATTACHMENT B: FIGURES



Source: USGS 7.5' Quadrangles
BRENTWOOD, CA
Section: 31
Township: 02N
Range: 03E

Figure 1

Moore Biological Consultants

0 1,000 2,000

N W E S

Map Date: 06/20/2023

Site Map/USGS

Stonecreek

City of Oakley, Contra Costa County, CA



VICINITY MAP

NOT TO SCALE

GENERAL NOTES:

1. OWNER/APPLICANT: PONDEROSA HOMES II, INC.
5020 FRANKLIN DRIVE, STE. 200
PLEASANTON, CA 94588
(925) 460-8910
JEFF SCHROEDER

2. CIVIL ENGINEER: CARLSON, BARBEE & GIBSON, INC.
2633 CAMINO RAMON, SUITE 350
SAN RAMON, CA 94583
(925) 866-0322
JASON D. VOGAN, RCE 59299

3. SOILS ENGINEER: ENGEO, INC.
17278 GOLDEN VALLEY PARKWAY
LATHROP, CA 95330
(925) 835-0610
STEVE HARRIS, RGE 2804

4. TOPOGRAPHIC SOURCE: GEOMAPS INC.
3362 MATHER FIELD ROAD
RANCHO CORDOVA, CA 95670
(916) 361-9133

5. CONTOUR INTERVAL: 1 - FOOT BASED ON NGVD29 (EXISTING & PROPOSED)

6. BENCHMARK: CONTRA COSTA COUNTY BENCHMARK #3164, SET BRASS TAG AND FASTENER IN SIDEWALK SOUTHEAST CORNER OF BRIDGE OVER MARCH CREEK ON DELTA ROAD, 0.7 MILES EAST OF HIGHWAY 4.
ELEVATION = 42.027 FEET (NGVD29)

7. EXISTING TOPOGRAPHY: AERIAL TOPOGRAPHY IS BASED ON PHOTOGRAPHY TAKEN ON AUGUST 19, 2022 AND PREPARED BY GEOMAPS. THE FLIGHT WAS SURVEY GROUND CONTROLLED BY CARLSON, BARBEE & GIBSON, INC.

8. BASIS OF BEARINGS: THE BASIS OF BEARINGS FOR THIS SURVEY WAS DETERMINED BY FOUND IRON PIPE MONUMENTS ON THE EAST LINE OF THE NORTHEAST QUARTER OF SECTION 31, T.2 N., R.3 E, M.D.B.&M.; THE BEARING BEING N01°02'10"W PER 72 PM 33 AND CONTRA COSTA COUNTY PRECISE TRAVERSE OF SELLERS AVENUE. THE BEARINGS SHOWN ARE ON THE CALIFORNIA COORDINATE SYSTEM ZONE III.

9. FLOOD ZONE: ZONE X (SEE DATUM CONVERSION NOTE)
REFER TO FLOOD INSURANCE RATE MAP
PANEL 06013C0360G (MARCH 21, 2017)

10. ASSESSORS PARCEL NO: 033-140-020, 033-140-021 & 033-140-028

11. PROPOSED SITE AREA: 50.44± AC

12. EXISTING LAND USE: RESIDENTIAL LOW (RL) & RESIDENTIAL VERY LOW (RV)

13. PROPOSED LAND USE: RESIDENTIAL LOW (RL) & RESIDENTIAL VERY LOW (RV)

14. ZONING: P-1 PLANNED UNIT DEVELOPMENT WITH DEVELOPMENT PLAN (P-1)

15. PROPOSED LOT SIZES: 60' X 100' - 6,000 SF MIN
70' X 110' - 7,500 SF MIN

16. PROPOSED DENSITY: 176 DU / 50.44± AC = 3.5 DU/AC

17. EXISTING STRUCTURES: ALL EXISTING BUILDINGS WITHIN THE PROJECT BOUNDARY TO BE REMOVED.

18. EXISTING UTILITIES: ALL EXISTING UTILITIES WITHIN THE PROJECT BOUNDARY TO BE REMOVED UNLESS OTHERWISE NOTED.

19. EXISTING TREES: EXISTING TREES WITHIN THE PROJECT BOUNDARY TO BE REMOVED UNLESS OTHERWISE NOTED.

20. WALLS AND FENCING: ALL WALLS AND FENCING WILL BE PRIVATELY OWNED AND PRIVATELY MAINTAINED EXCEPT LANDSCAPE PRIVACY WALLS ALONG SELLERS AVENUE WHICH WILL BE IN THE CITY RIGHT OF WAY.

21. PUBLIC UTILITIES: ALL UTILITIES WITHIN THE PUBLIC RIGHT OF WAY OR WITHIN A PUBLIC UTILITY EASEMENT WILL BE PUBLIC AND WILL BE PUBLICLY OWNED AND MAINTAINED.

22. UTILITY PROVIDER:

SEWER:	IRON HOUSE SANITARY DISTRICT
WATER:	DIABLO WATER DISTRICT
STORM DRAIN:	CITY OF OAKLEY
GAS & ELECTRIC:	PACIFIC GAS & ELECTRIC
TELEPHONE:	AT&T
CABLE TV:	COMCAST

23. STREETS: ALL STREETS WILL BE PER CITY STANDARD AND DEDICATED TO THE CITY OF OAKLEY AS A PUBLICLY OWNED AND MAINTAINED STREET.

24. GRADING: PROPOSED GRADING IS PRELIMINARY. FINAL GRADING IS SUBJECT TO FINAL DESIGN.

25. BOUNDARY: THE BOUNDARY AND EASEMENTS SHOWN HEREON ARE BASED UPON RECORD TITLE INFORMATION AS LISTED AND DESCRIBED IN THE PRELIMINARY TITLE REPORT PREPARED BY FIRST AMERICAN TITLE COMPANY, DATED APRIL 14, 2022, ORDER NUMBER 0131-625476dda. NO ADDITIONAL TITLE RESEARCH HAS BEEN PREFORMED TO COMPLETE THIS PACKAGE.

26. PHASING: PROJECT MAY BE CONSTRUCTED IN PHASES.

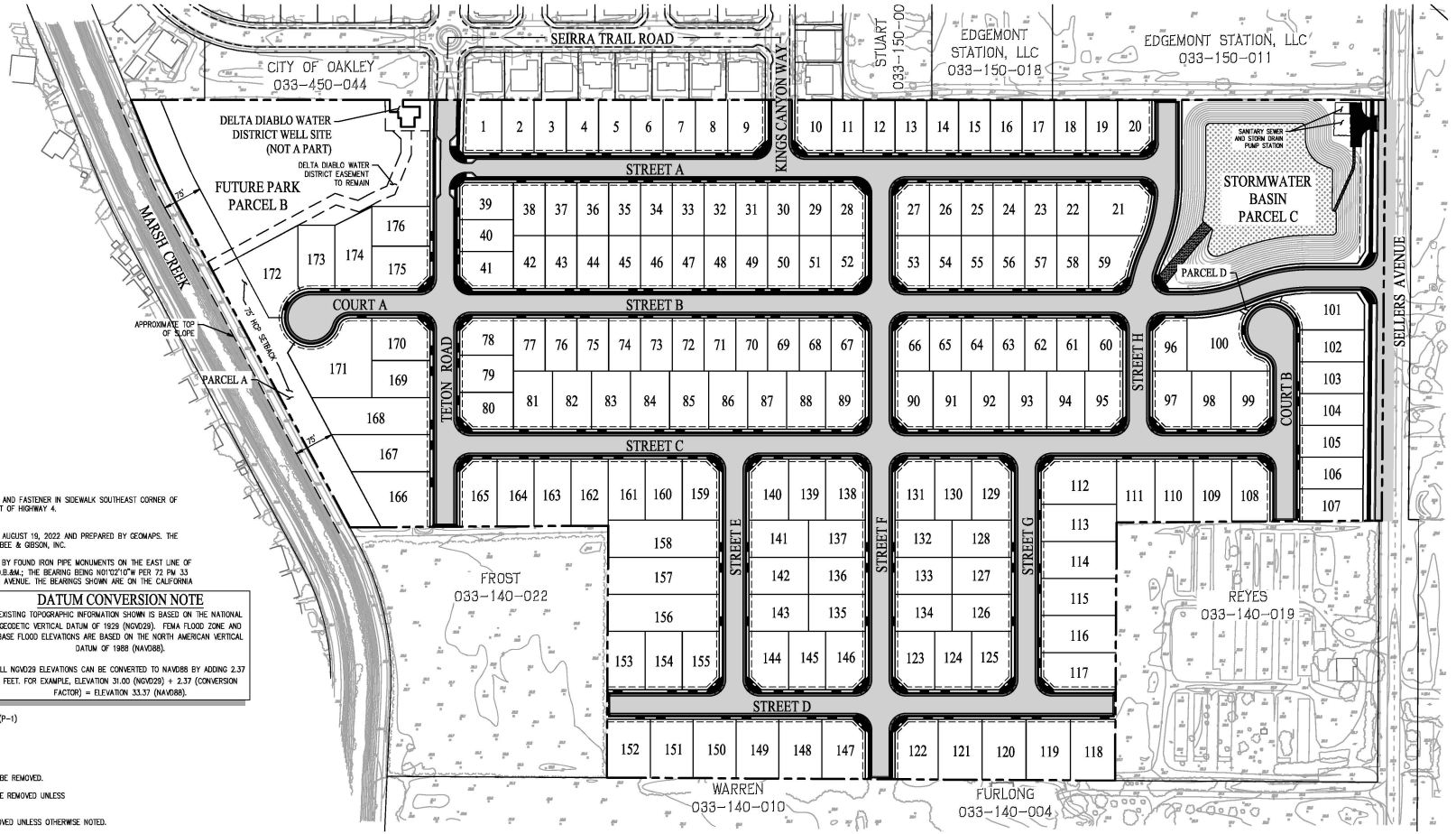
27. FINAL MAP: MULTIPLE FINAL MAPS MAY BE FILED UPON APPROVAL OF THE VESTING TENTATIVE SUBDIVISION MAP.

28. DIMENSIONS: ALL DIMENSIONS ARE PRELIMINARY AND SUBJECT TO CHANGE WITH FINAL MAP.

DATUM CONVERSION NOTE

EXISTING TOPOGRAPHIC INFORMATION SHOWN IS BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29). FEMA FLOOD ZONE AND BASE FLOOD ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

ALL NGVD29 ELEVATIONS CAN BE CONVERTED TO NAVD88 BY ADDING 2.37 FEET. FOR EXAMPLE, ELEVATION 31.00 (NGVD29) + 2.37 (CONVERSION FACTOR) = ELEVATION 33.37 (NAVD88).



PARCEL SUMMARY

PARCEL / LOT	LAND USE	OWNER
LOTS 1-176	RESIDENTIAL	PRIVATE
PARCEL A	HCP BUFFER / OPEN SPACE	CITY
PARCEL B	PARK	CITY
PARCEL C	STORMWATER DETENTION BASIN & WATER QUALITY	CITY
PARCEL D	OPEN SPACE	CITY

Sheet List Table

Sheet Number	Sheet Title
1	GENERAL NOTES, STREET SECTIONS, & SHEET INDEX
2	EXISTING CONDITIONS
3	DIMENSION SITE PLAN (WEST)
4	DIMENSION SITE PLAN (EAST)
5	PRELIMINARY GRADING PLAN (WEST)
6	PRELIMINARY GRADING PLAN (EAST)
7	PRELIMINARY UTILITY PLAN (WEST)
8	PRELIMINARY UTILITY PLAN (EAST)
9	PRELIMINARY STORM WATER CONTROL PLAN

GENERAL NOTES, STREET SECTIONS, & SHEET INDEX

VESTING TENTATIVE MAP

STONECREEK - SUBDIVISION 9647

CITY OF OAKLEY CONTRA COSTA COUNTY CALIFORNIA

SCALE: 1"=100' DATE: MAY 2, 2023

OAKLEY CALIFORNIA

0 100 200 300

cbg CIVIL ENGINEERS • SURVEYORS • PLANNERS
SAN RAMON • (925) 866-0322
ROSEVILLE • (916) 788-4456
WWW.CBANDG.COM

JOB NO.: 1216-010

SHEET NO. 1 OF 9 SHEETS

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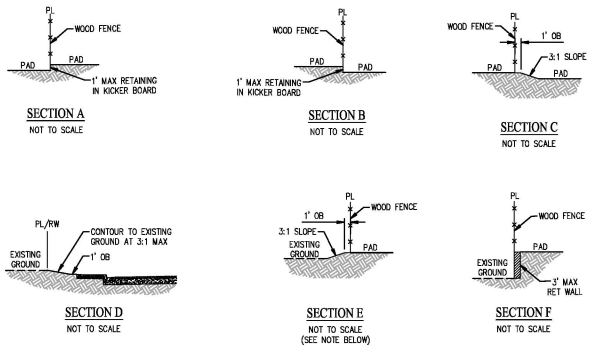
Figure 2a: TENTATIVE MAP - COVER SHEET





EDGE GRADING NOTE

IF TEMPORARY CONSTRUCTION EASEMENT CANNOT BE OBTAIN TO GRADE ONTO ADJACENT PROPERTY, A RETAINING WALL WILL BE REQUIRED.

PAD ELEVATION NOTE - MARSH CREEK EDGE

PAD ELEVATIONS ADJACENT TO MARSH CREEK ARE ESTABLISHED TO ENSURE THAT THE FINISH FLOOR ELEVATION FOR EACH BUILDING WILL BE A MINIMUM 1-FOOT ABOVE THE CREEK'S BASE FLOOD ELEVATION IN CONFORMANCE WITH THE CITY'S FLOODPLAIN MANAGEMENT ORDINANCE.

DATUM CONVERSION NOTE

EXISTING TOPOGRAPHIC INFORMATION SHOWN IS BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29). FEMA FLOOD ZONE AND BASE FLOOD ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

ALL NGVD29 ELEVATIONS CAN BE CONVERTED TO NAVD88 BY ADDING 2.37 FEET. FOR EXAMPLE, ELEVATION 31.00 (NGVD29) + 2.37 (CONVERSION FACTOR) = ELEVATION 33.37 (NAVD88).

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		PROJECT BOUNDARY
		LOT LINE
		FLOOD HAZARD LINE
		TOP OF CURB
		EASEMENT
		CENTERLINE
		SIDEWALK
		AC PAVEMENT
		BIORETENTION
EX 18" SD	18" SD	STORM DRAIN PIPE
		CATCH BASIN
		FIELD INLET
		MANHOLE

ABBREVIATIONS

BD	BOUNDARY
BW	BACK OF WALK
CL	CENTERLINE
EX	EXISTING
FC	FACE OF CURB
HP	HIGH POINT
LP	LOW POINT
OB	OVERBUILD
P	PAD
PL	PROPERTY LINE
PUE	PUBLIC UTILITY EASEMENT
RET	RETAINING
RW	RIGHT OF WAY
SD	STORM DRAIN
SDFM	STORM DRAIN FORCE MAIN
TSM	TOP OF SOIL MIX
TYP	TYPICAL

PRELIMINARY GRADING PLAN (WEST)

VESTING TENTATIVE MAP

STONECREEK - SUBDIVISION 9647

CITY OF OAKLEY CONTRA COSTA COUNTY CALIFORNIA

SCALE: 1"=80' DATE: MAY 2, 2023

OAKLEY CALIFORNIA

0 80 160 240

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ROSEVILLE • (916) 788-4456
WWW.CBANDG.COM

JOB NO.: 1216-010

SHEET NO. 5 OF 9 SHEETS

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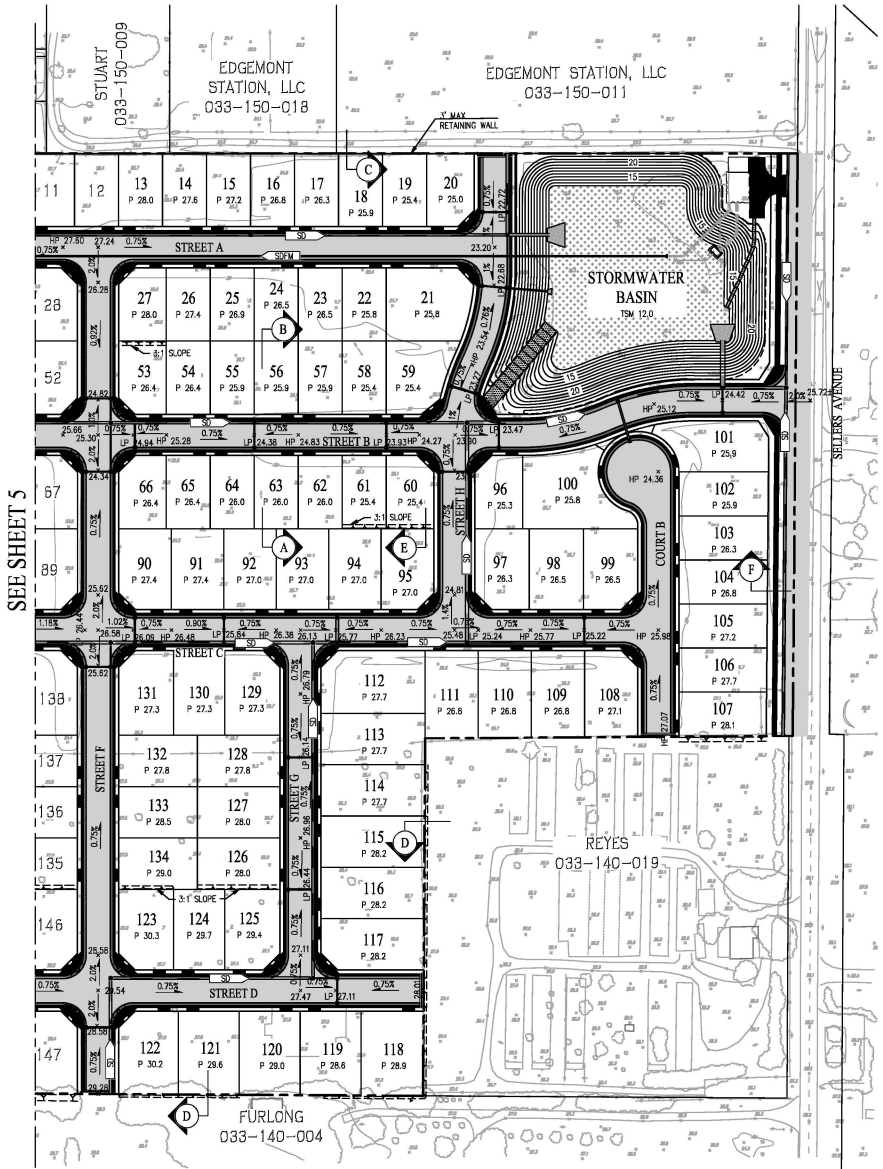
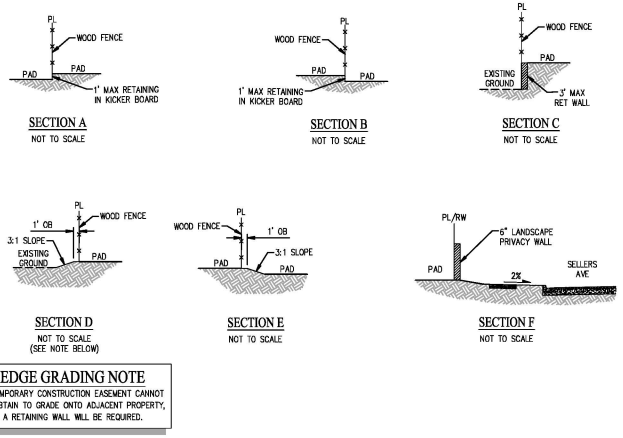
Figure 2b: GRADING PLAN (WEST)





EDGE GRADING NOTE
IF TEMPORARY CONSTRUCTION EASEMENT CANNOT BE OBTAIN TO GRADE ONTO ADJACENT PROPERTY, A RETAINING WALL WILL BE REQUIRED.

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		PROJECT BOUNDARY
		LOT LINE
		TOP OF CURB
		EASEMENT
		CENTERLINE
		SIDEWALK
		AC PAVEMENT
		BIORETENTION
EX 18" SD	18" SD	STORM DRAIN PIPE
		CATCH BASIN
		FIELD INLET
		MANHOLE

ABBREVIATIONS	
BD	BOUNDARY
BW	BACK OF WALK
CL	CENTERLINE
EX	EXISTING
FC	FACE OF CURB
HP	HIGH POINT
LP	LOW POINT
OB	OVERBUILD
P	PAD
PL	PROPERTY LINE
PUE	PUBLIC UTILITY EASEMENT
RET	RETAINING
RW	RIGHT OF WAY
SD	STORM DRAIN
SDFM	STORM DRAIN FORCE MAIN
TSM	TOP OF SOIL MIX
TYP	TYPICAL

PRELIMINARY GRADING PLAN (EAST)
VESTING TENTATIVE MAP
STONECREEK - SUBDIVISION 9647

CITY OF OAKLEY CONTRA COSTA COUNTY CALIFORNIA
SCALE: 1"=80' DATE: MAY 2, 2023

OAKLEY CALIFORNIA

0 80 160 240

cbg CIVIL ENGINEERS • SURVEYORS • PLANNERS
SAN RAMON • (925) 866-0322
ROSEVILLE • (916) 788-4456
WWW.CBANDG.COM

SHEET NO. 6 OF 9 SHEETS

JOB NO.: 1216-010

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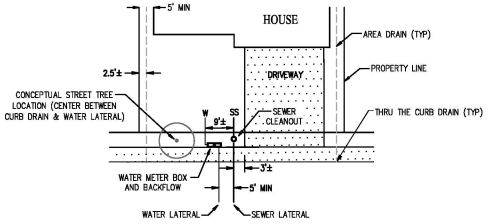
Figure 2c: GRADING PLAN (EAST)





TYPICAL UTILITY LATERAL DETAIL
NOT TO SCALE

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		PROJECT BOUNDARY
		LOT LINE
		TOP OF CURB
		EASEMENT
		CENTERLINE
		SIDEWALK
		AC PAVEMENT
		BIORETENTION
EX 18" SD	18" SD	STORM DRAIN PIPE
EX 8" SS	8" SS	SANITARY SEWER PIPE
EX 8" W	8" W	WATER PIPE
		CATCH BASIN
		FIELD INLET
		MANHOLE
		WATER VALVE
		FIRE HYDRANT
		BLOWOFF

ABBREVIATIONS	
AC	ASPHALT CONCRETE
AD	AREA DRAIN
BD	BOUNDARY
BO	BLOWOFF
BW	BACK OF WALK
CB	CATCH BASIN
CL	CENTERLINE
EX	EXISTING
FC	FACE OF CURB
FH	FIRE HYDRANT
FI	FIELD INLET
INV	INVERT
JT	JOINT TRENCH
OB	OVERBUILD
PUE	PUBLIC UTILITY EASEMENT
R	RADIUS
SF	SQUARE FEET
SD	STORM DRAIN
SDFM	STORM DRAIN FORCE MAIN
SDMH	STORM DRAIN MANHOLE
SS	SANITARY SEWER
SSFM	SANITARY SEWER FORCE MAIN
SSMH	SANITARY SEWER MANHOLE
SW	SIDEWALK
TC	TOP OF CURB
TSM	TOP OF SOIL MIX
TYP	TYPICAL
W	WATER

PRELIMINARY UTILITY PLAN (WEST)

VESTING TENTATIVE MAP

STONECREEK - SUBDIVISION 9647

CITY OF OAKLEY CONTRA COSTA COUNTY CALIFORNIA

SCALE: 1"=80' DATE: MAY 2, 2023

OAKLEY CALIFORNIA

0 80 160 240

JOB NO.: 1216-010

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SHEET NO. 7 OF 9 SHEETS

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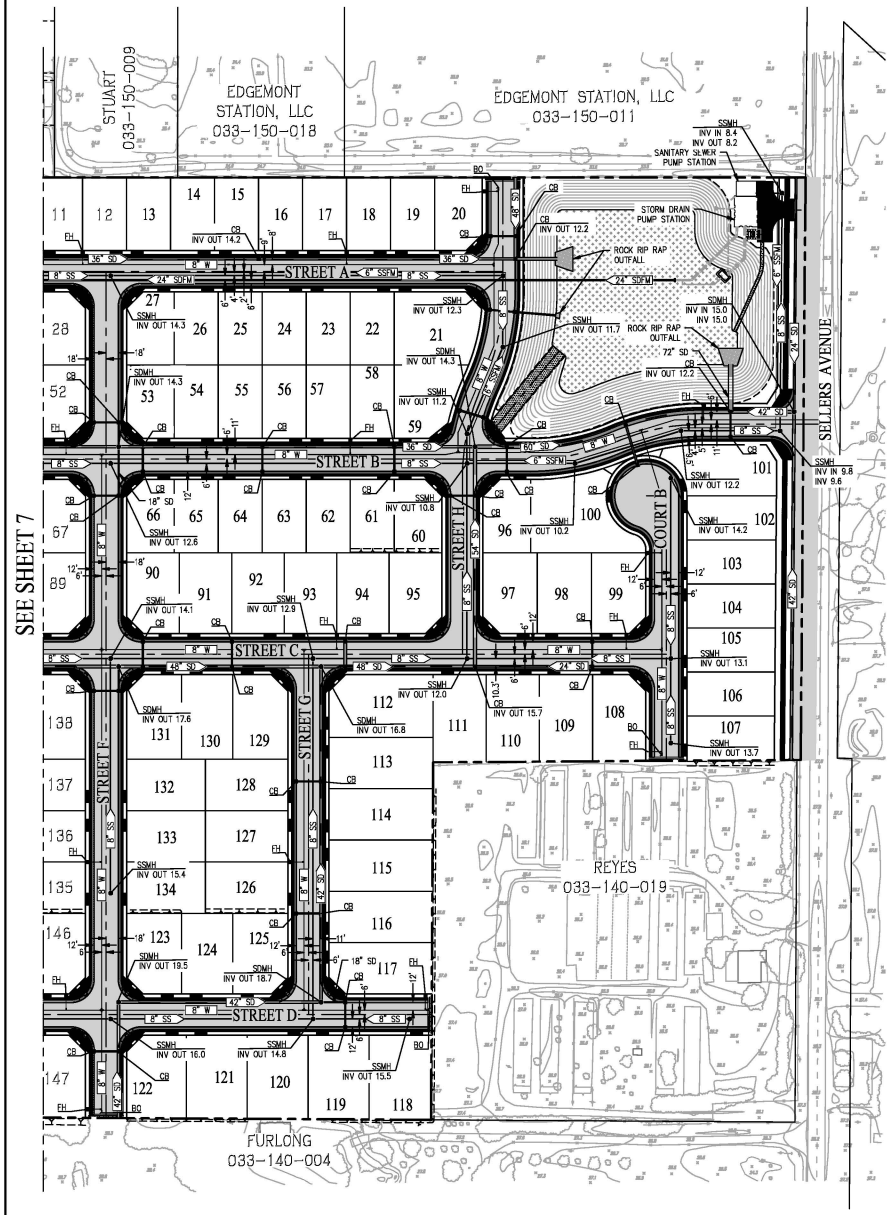
Figure 2d: UTILITY PLAN (WEST)



LEGEND

EXISTING	PROPOSED	DESCRIPTION
		PROJECT BOUNDARY
		LOT LINE
		TOP OF CURB
		EASEMENT
		CENTERLINE
		SIDEWALK
		AC PAVEMENT
		BIORETENTION
EX 18" SD	18" SD	STORM DRAIN PIPE
EX 8" SS	8" SS	SANITARY SEWER PIPE
EX 8" W	8" W	WATER PIPE
		CATCH BASIN
		FIELD INLET
		MANHOLE
		WATER VALVE
		FIRE HYDRANT
		BLOWOFF

ABBREVIATIONS

AC	ASPHALT CONCRETE
AD	AREA DRAIN
BD	BOUNDARY
BO	BLOWOFF
BW	BACK OF WALK
CB	CATCH BASIN
CL	CENTERLINE
EX	EXISTING
FC	FACE OF CURB
FH	FIRE HYDRANT
FI	FIELD INLET
INV	INVERT
JT	JOINT TRENCH
OB	OVERBUILD
PUE	PUBLIC UTILITY EASEMENT
R	RADIUS
SF	SQUARE FEET
SD	STORM DRAIN
SDFM	STORM DRAIN FORCE MAIN
SDMH	STORM DRAIN MANHOLE
SS	SANITARY SEWER
SSFM	SANITARY SEWER FORCE MAIN
SSMH	SANITARY SEWER MANHOLE
SW	SIDEWALK
TC	TOP OF CURB
TSM	TOP OF SOIL MIX
TYP	TYPICAL
W	WATER

PRELIMINARY UTILITY PLAN (EAST)

VESTING TENTATIVE MAP

STONECREEK - SUBDIVISION 9647

CITY OF OAKLEY CONTRA COSTA COUNTY CALIFORNIA

SCALE: 1"=80' DATE: MAY 2, 2023

OAKLEY CALIFORNIA

0 80 160 240

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ROSEVILLE • (916) 788-4456
WWW.CBANDG.COM

SHEET NO. 8 OF 9 SHEETS

JOB NO.: 1216-010

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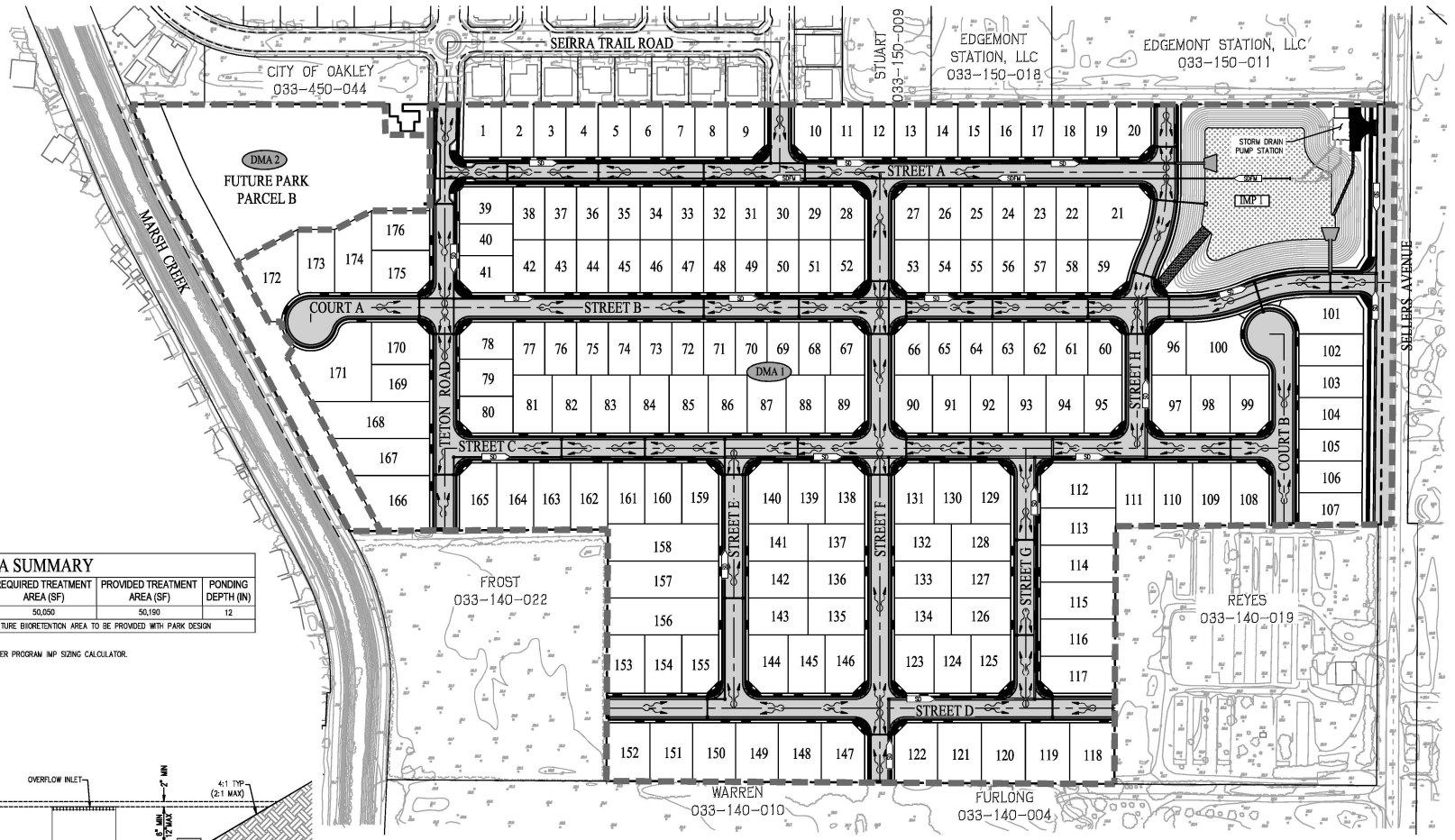
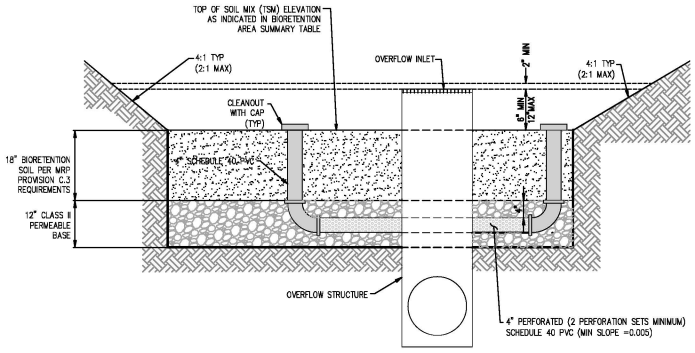
Figure 2e: UTILITY PLAN (EAST)



BIORETENTION AREA SUMMARY						
DMA	DRAINAGE MANAGEMENT AREA (SF)	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)	REQUIRED TREATMENT AREA (SF)	PROVIDED TREATMENT AREA (SF)	PONDING DEPTH (IN)
DMA 1	2,058,481	1,167,134	841,157	50,050	50,190	12
DMA 2	154,277	SELF-RETAINING AREA OR FUTURE BIORETENTION AREA TO BE PROVIDED WITH PARK DESIGN				

NOTES:
1. ALL BIORETENTION AREAS HAVE BEEN SIZED PER THE CONTRA COSTA COUNTY CLEANWATER PROGRAM IMP SIZING CALCULATOR.



BIORETENTION AREA
NOT TO SCALE

BIORETENTION AREA NOTES:
1. INSTALL A 6" DEEP 3'x3' GROUTED COBBLE OUTFALL AT ALL DRAIN OUTLETS AND SWALE CONNECTION LOCATIONS TO BIORETENTION.
2. ALL COBBLES SHALL BE 3"-6" IN DIAMETER.
3. MINIMUM SLOPE OF ALL PERFORATED PIPE TO BE 0.005.
4. ALL PERFORATED DRAIN PIPES TO HAVE 6" MINIMUM OF DRAIN ROCK ABOVE THE PIPE.
5. CONTRACTOR TO PROVIDE AT LEAST 3 INCHES OF COMPOSTED NON-FLOATING MULCH ON ANY EXPOSED EARTH WITHIN THE BIORETENTION AREA.

LEGEND

	PROJECT BOUNDARY
25	LOT NUMBER
	PROPOSED RIGHT OF WAY
	PROPOSED LOT LINE
	PROPOSED FACE OF CURB
	LIMIT OF DRAINAGE MANAGEMENT AREA (DMA)
	GRADE BREAK
	BIORETENTION AREA
12" SD	STORM DRAIN PIPE
	OVERLAND FLOW DIRECTION
DMA 1	DRAINAGE MANAGEMENT AREA
IMP 1	INTEGRATED MANAGEMENT PRACTICE – BIORETENTION AREA

PRELIMINARY STORM WATER CONTROL PLAN

VESTING TENTATIVE MAP

STONECREEK - SUBDIVISION 9647

CITY OF OAKLEY CONTRA COSTA COUNTY CALIFORNIA

SCALE: 1"=100' DATE: MAY 2, 2023

OAKLEY CALIFORNIA

0 100 200 300

JOB NO.: 1216-010

cbg CIVIL ENGINEERS ▪ SURVEYORS ▪ PLANNERS
SAN RAMON ▪ (925) 866-0322
ROSEVILLE ▪ (916) 788-4456
WWW.CBANDG.COM

SHEET NO. 9 OF 9 SHEETS

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Figure 2f: PRELIMINARY STORM WATER CONTROL PLAN



	Ruderal Grassland (Acres)	Seasonal Wetland (Acres)	Urban/Developed (Acres)
Project Site	50.43	0.008	-
Off-Site	-	-	0.37
Total	**50.43**	**0.008**	**0.37**

Figure 3

Project Site (50.44 acres)

Off Site Improvements (0.37 acre)

0 200 400

N W E S

Field Verified Landcover Map

Stonecreek

City of Oakley, Contra Costa County, CA

Moore Biological Consultants

Map Date: 06/28/2023
Aerial Source: Google Earth (02/11/2022)



Previously graded road in the west part of the site, looking west from the east edge of the site; 06/15/23. This will be the future entrance road in to the subdivision from Sellers Avenue.



Previously graded road in the northeast part of the site, looking west; 06/15/23.

FIGURE 4a

MOORE BIOLOGICAL **REPRESENTATIVE PHOTOGRAPHS**



Previously graded house pad in the southwest part of the site, looking east; 06/15/22.



Prior vineyard in the south part of the site, looking west; 06/15/23. This portion of the site supported a small vineyard, but the vines have been removed for several years. There are resprouted vines and small ornamental seedlings within this area.

FIGURE 4b

MOORE BIOLOGICAL **REPRESENTATIVE PHOTOGRAPHS**



Demolished home site in the south part of the site, looking northwest; 06/15/23.



Two palm trees in the northeast part of the site, looking northwest; 06/15/23. This portion of the site previously supported a small home site.

FIGURE 4c

MOORE BIOLOGICAL **REPRESENTATIVE PHOTOGRAPHS**



North edge of the site, looking west from the northeast corner of the site; 06/15/23.



North edge of the site, looking east from the northwest part of the site; 06/15/23.

FIGURE 4d

MOORE BIOLOGICAL **REPRESENTATIVE PHOTOGRAPHS**



South edge of the site, looking west from the southeast part of the site; 06/15/23. There are several trees adjacent to the south edge of the site.



West edge of the site, looking north from the southwest part of the site; 06/15/23.

FIGURE 4e

MOORE BIOLOGICAL **REPRESENTATIVE PHOTOGRAPHS**



Large eucalyptus trees adjacent to the south edge of the site, looking southwest from the south part of the site; 06/15/23.



Shrubs in the northwest part of the site, looking northwest; 06/15/23. Most of the trees and shrubs are located just off-site; a few shrubs may be just within the site boundary.

FIGURE 4f

MOORE BIOLOGICAL **REPRESENTATIVE PHOTOGRAPHS**



A walking path and Marsh Creek located just west of the west edge of the site, looking northwest; 06/15/23.



Cluster of ground squirrel burrows located along an elevated home pad in the south part of the site, looking southeast; 06/15/23.

FIGURE 4g

MOORE BIOLOGICAL **REPRESENTATIVE PHOTOGRAPHS**



Sellers Avenue, looking south from the northeast part of the site; 06/15/23. This area will be subject to off-site road improvements as part of the project.



Seasonal wetland in the northwest part of the site, just southeast of the off-site pump station, looking south; 06/15/23. The wetland developed after initial grading several years ago and may be supported, or at least enhanced, via an underground water source.

FIGURE 4h

MOORE BIOLOGICAL **REPRESENTATIVE PHOTOGRAPHS**



	Ruderal Grassland (Acres) *	Seasonal Wetland (Acres)	Urban/Developed (Acres)
Project Site	50.43	0.008	-
Off-Site	-	-	0.37
Total	**50.43**	**0.008**	**0.37**

*Assumed habitat for burrowing owl

Figure 5a

Project Site (50.44 acres)

Off Site Improvements (0.37 acre)

Trees; assumed habitat for Swainson's hawk, golden eagle, and white-tailed kite.

N W E S

0 200 400

Map Date: 06/268/2023
Aerial Source: Google Earth (02/11/2022)

Moore Biological Consultants

Planning Survey Species Habitat Map

Stonecreek

City of Oakley, Contra Costa County, CA

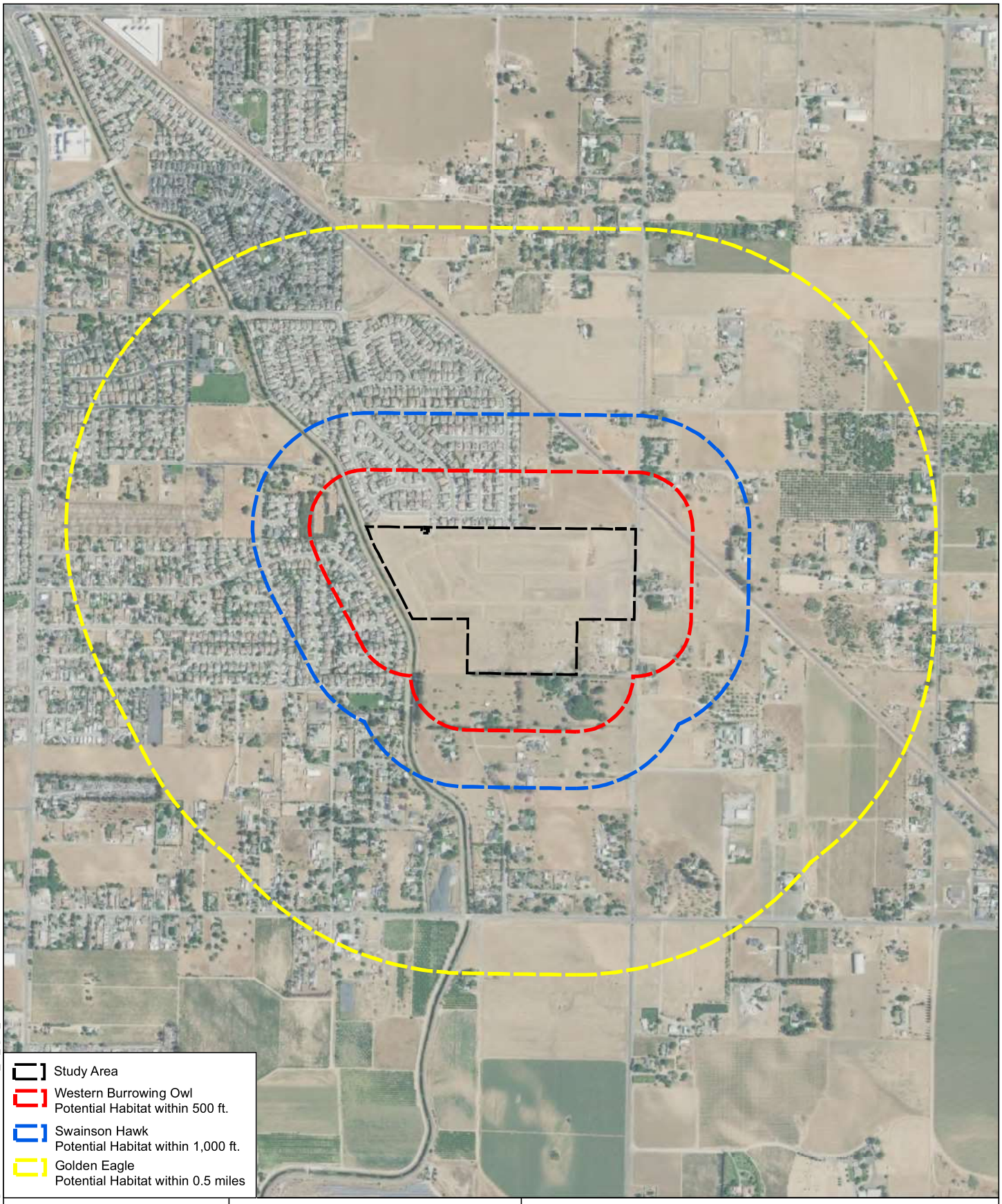

Figure 5b

Moore Biological Consultants

0 500 1,000

N
W E
S

Map Date: 06/22/2023
Aerial Source: Google Earth (08/2020)

Regional Species Habitat Map

Stonecreek

City of Oakley, Contra Costa County, CA

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ATTACHMENT C: PROJECT COMPLIANCE TO HCP CONDITIONS

Stonecreek (Subdivision 9647)

Project Compliance to HCP Conditions
July 2023

HCP/NCCP Conservation Measure 1.11. Avoid Direct Impacts on Extremely Rare Plants, Fully Protected Wildlife Species, or Covered Migratory Birds:

The potential for special-status plants to occur within the site is considered extremely remote, as described in Section III (10).

Species-specific pre-construction surveys, and if needed, monitoring and avoidance requirements for burrowing owl, Swainson's hawk, and golden eagle will be conducted as described in Section IV (2). There is no suitable habitat in the site for ringtail (*Bassariscus astutus*), a "fully protected species," per California Fish and Game Code Section 4700. Similarly, there is no suitable nesting habitat in the site for peregrine falcon (*Falco peregrinus*), a "fully protected species," per California Fish and Game Code Section 3511.

White-tailed kite (*Elanus caeruleus*), another "fully protected species," per California Fish and Game Code Section 3511 could potentially nest in trees in or near the site. Prior to any ground disturbance related to covered activities that occur during the nesting season (March 15-August 31), a qualified biologist will conduct a preconstruction survey no more than 1 month prior to construction to establish whether white-tailed kite is nesting in trees within or visible from the site. In the event active nests are found, an initial 300-foot buffer shall be established around the nest tree. Ground disturbance related to covered activities within the buffer shall either be delayed until a qualified biologist determines nesting is complete, or until the applicant and consults with the Implementing Entity (i.e., City of Oakley) and CDFW and implements CDFW-approved measures to minimize potential disturbance.

Tricolored blackbird (*Agelaius tricolor*), a State of California threatened species, could nest in vegetation in and adjacent to portions of Marsh Creek such as patches of wild rose, bulrush, cattails, and willows. On-site grasslands and vegetation could be used by other species of nesting birds protected by the Migratory Bird Treaty Act. If possible, any ground disturbance related to covered activities will occur outside of the general bird nesting season (February 1 through August 31). Alternately, a qualified biologist will conduct a preconstruction survey no more than 2 weeks prior to any ground disturbance related to covered activities. In the event

active raptors or tricolored blackbird nests are found, and initial 300-foot buffer shall be established around the nests. In the event nests o other birds are found, an initial 50-foot buffer shall be established around the nest. Ground disturbance related to covered activities within the buffers shall either be delayed until a qualified biologist determines nesting is complete, or until the applicant consults with the Implementing Entity and CDFW and implements CDFW-approved measures to minimize potential disturbance.

HCP/NCCP Conservation Measure 1.10. Maintain Hydrologic Conditions and Minimize Erosion:

The project has been designed to maintain hydrologic conditions and minimize erosion. Standard construction best management practices (BMPs) will be employed during construction to minimize the potential for erosion and off-site transport of fines. BMPs will include use of water trucks, appropriate compaction of soil, and installation of straw wattles, silt fences or other technologies along the perimeter of the site during construction, and stabilization of bare soils as appropriate with seeding, straw, and/or hydromulch.

HCP/NCCP Conservation Measure 2.12. Wetland, Pond, and Stream Avoidance and Minimization:

Potentially jurisdictional Waters of the U.S. and wetlands in the site are being avoided to the maximum extent practicable. There are no potentially jurisdictional Waters of the U.S. in the site. The 0.008-acre seasonal wetland in the northwest part of the site is within the footprint of the extension of Teton Road and will be filled. Marsh Creek, which is adjacent to the site, will be fully avoided by project construction.

The following measures from pages 6-33 through 6-35 will be implemented to avoid and minimize impacts of covered activities on wetlands:

- The project will comply with the guidelines in Conservation Measure 1.10 to minimize the effects of urban development on downstream hydrology, streams, and wetlands.
- Personnel conducting ground-disturbing activities adjacent to Marsh Creek will be trained by a qualified biologist in the avoidance and minimization measures and the permit obligations of project proponents working under the ECCCHCP. Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas.

- Trash generated during project construction will be promptly and properly removed from the site.
- No construction or maintenance vehicles will be refueled within 200 feet of Marsh Creek unless a bermed and lined refueling area is constructed and hazardous material absorbent pads are available in the event of a spill.
- Appropriate erosion-control measures (e.g., fiber rolls, filter fences, vegetative buffer strips) will be used on site to reduce siltation and runoff of contaminants into Marsh Creek. Filter fences and mesh will be of material that will not entrap reptiles and amphibians. Erosion control blankets shall be used as a last resort because of their tendency to biodegrade slowly and trap reptiles and amphibians.
- Fiber rolls used for erosion control will be certified as free of noxious weed seed.
- Seed mixtures applied for erosion control will not contain invasive non-native species, and will be composed of native species or sterile nonnative species.
- Herbicides will not be applied within the buffer area along Marsh Creek unless needed to control serious invasive plants. In this case, herbicides that have been approved for use by EPA in or adjacent to aquatic habitats may be used as long as label instructions are followed and applications avoid or minimize impacts on covered species and their habitats. Appropriate herbicides may be applied to the ruderal grassland within the buffer area during the dry season to control nonnative invasive species such as yellow star-thistle. Herbicide drift shall be minimized by applying the herbicide as close to the target area as possible.

HCP/NCCP Conservation Measure 1.7. Establish Stream Setbacks:

A stream is defined in Chapter 3 of the ECCCHCP as “a long, narrow body of flowing water that occupies a channel with defined bed and bank and moves to lower elevations under the force of gravity”.

Marsh Creek, which is adjacent to the site, will be fully avoided by project construction. A 75-foot stream setback will be implemented along Marsh Creek; the subdivision roads and lots will be located outside the stream setback. Bioretention basins will be constructed within the setback.

Stream setbacks are designed to protect existing habitat quality, to protect water quality and hydrologic processes through buffering, and allow for at least

minimal restoration (page 6-16). The stream setback measure is intended to achieve several purposes as listed on pages 6-16 and 6-17 of the ECCCHCP, along a variety of stream types. Six of the seven purposes have applicability to the project:

- Maintain or improve water quality by filtering sediments and pollutants from urban runoff before they reach the stream.
- Allow for protection of potentially restored riparian woodland and scrub within and adjacent to the stream.
- Maintain a buffer zone between urban development and existing and restored nesting habitat for Swainson's hawk and other bird species.
- Maintain and enhance the water quality of the stream to protect native fish populations, including populations of special-status species that occur in downstream creeks (i.e., fall-run Chinook salmon in Marsh Creek).
- Maintain a more viable wildlife corridor for some species (e.g., western pond turtle, raccoon) than would be present with a narrower buffer zone.
- Maximize the natural flood protection value of the floodplain.

ATTACHMENT D: FEE CALCULATOR

ECCC HCP/NCCP 2023 Fee Calculator Worksheet
Permanent Impacts

PROJECT APPLICANT: Ponderosa Homes II, Inc.
PROJECT NAME: Stonecreek (Subdivision 9647)
APN(s): 033-140-020, 033-140-021, and 033-140-028
JURISDICTION: Oakley
DATE: July 2023

DEVELOPMENT FEE		**PERMANENT IMPACTS (ACRES)**		**2023 FEE/ACRE** *subject to change* [1, 5]		
See appropriate ordinance or HCP/NCCP Figure 9-1 to determine Fee Zone	Fee Zone 1	50.44	x	$19,611.52	=	$989,205.07
	Fee Zone 2		x	$39,223.04	=	$0.00
	Fee Zone 3		x	$9,805.76	=	$0.00
	Fee Zone 4[2]		x	$29,417.28	=	$0.00
				Development Fee Total	=	**$989,205.07**

WETLAND MITIGATION FEE		**PERMANENT IMPACTS (ACRES)**		**2023 FEE/ACRE** *subject to change* [1, 5]		
Impacts to riparian/scrub, wetlands, ponds, aquatic, and slough/channel are charged both a wetland mitigation fee and a development fee. Include these impact acres to development fee above.[3]	Riparian woodland / scrub		x	$110,667.08	=	$0.00
	Perennial Wetland		x	$167,718.29	=	$0.00
	Seasonal Wetland	0.008	x	$392,489.03	=	$3,139.91
	Alkali Wetland		x	$396,778.59	=	$0.00
	Ponds		x	$215,976.51	=	$0.00
	Aquatic (open water)		x	$107,988.87	=	$0.00
	Slough / Channel		x	$154,206.78	=	$0.00
	STREAMS	**PERMANENT IMPACTS (LINEAR FEET)**		**2023 FEE/LINEAR FT** *subject to change* [1, 5]		
	Streams 25 feet wide or less		x	$569.07	=	$0.00
	Streams greater than 25 feet wide		x	$854.23	=	$0.00
				Wetland Mitigation Fee Total	=	**$3,139.91**

STREAM SETBACK ENCROACHMENT		**ENCROACHMENT IMPACTS (ACRES)**		**2023 FEE/ACRE** *subject to change* [1, 5]		
	Encroachment in Stream Setback		x	$55,333.54	=	$0.00
				Stream Setback Encroachment Total	=	**$0.00**

FINAL FEE CALCULATION			
	Development Fee Total		$989,205.07
	Wetland Mitigation Fee Total	+	$3,139.91
	Encroachment in Stream Setback Fee Total	+	$0.00
	Mitigation Fee Subtotal	=	**$992,344.98**
	Contribution to Recovery[4]	+	
	TOTAL AMOUNT TO BE PAID	=	**$992,344.98**

[1] Development fees are adjusted annually (no later than March 15 of each year) according to a formula that includes both a Home Price Index (HPI) and a Consumer Price Index (CPI). The Wetland Mitigation Fees are adjusted according to a CPI.

[2] Fee Zone 4 is not shown on Figure 9-1 of the HCP/NCCP but refers to the fee applicable to those few covered acitivities located in northeastern Antioch (p. 9-21).

[3] Per Chapter 9.3.1 of the HCP/NCCP, for every acre of impact on wetlands, streams, ponds, and riparian woodland/scrub, applicants will pay the appropriate development fee (according to fee zone) towards land acquisition and the conservation program as a whole, as well as a wetland mitigation fee to cover the costs of successful restoration or creation.

[4] Participating Special Entities (PSEs) are required to pay fees over and above permanent and temporary impact mitigation fees to cover indirect costs of extending permit coverage, including a portion of the costs of the initial preparation of the Plan, and a portion of the costs of conservation actions designed to contribute to species recovery. This amount will be determined in accordance with the Contribution to Recovery Implementation Policy adopted by the Conservancy Governing Board on December 8, 2014.

[5] The Conservancy conducted the periodic fee audit required by the HCP/NCCP in 2023. Action by the County and participating cities is pending, which could result in adjustments to some or all fees in 2023.

ATTACHMENT E: WETLAND DELINEATION MAP



Data Disclaimer:
The delineation has been done in accordance with the 1987 Wetlands Delineation Manual, US Army Corps of Engineers and the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. The boundaries and jurisdictional status of all waters shown on this map are preliminary and subject to verification by the U.S. Army Corps of Engineers.

Aerial Source: Google Earth (02/11/2022)

Moore Biological Consultants

N

0 200 400

1 inch = 200 feet

Study Area (50.44 acres)

Seasonal Wetland - (0.008 ac / 334 sf)

Potential Waters of the U.S. and Wetlands

Stonecreek

City of Oakley, Contra Costa County, CA

Map Date: July 2023

Appendix D
Peak Flow Control Modeling

Balance Hydrologics

800 Bancroft Way • Suite 101 • Berkeley, CA 94710 • (510) 704-1000
931 Mission Street • Santa Cruz, CA 95060 • (831) 457-9900
12020 Donner Pass Road • Unit B1 • Truckee, CA 96160 • (530) 550-9776
www.balancehydro.com • email: office@balancehydro.com

November 9, 2023

Jeff Schroeder
Ponderosa Homes II, Inc.
5020 Franklin Drive, Suite 200
Pleasanton, California 94588

RE: Summary of Peak Flow Control Modeling for the Stonecreek Subdivision
City of Oakley, Contra Costa County, California

Dear Jeff Schroeder:

Thank you again for providing Balance Hydrologics ("Balance") the opportunity to assist with the modeling of stormwater management infrastructure at the proposed Stonecreek Subdivision ("Project") in the City of Oakley. As you are aware, we had the pleasure of assisting with the drainage planning for the site when it was originally considered for development, and we are pleased to see the project back on track to completion.

Per our discussions with Carlson, Barbee and Gibson, Inc. ("CBG"), Balance staff has completed a series of hydrologic modeling runs consistent with the guidance set forth by the City and the Contra Costa Flood Control and Water Conservation District ("Flood Control") to assess whether the proposed infrastructure can provide flood control for the proposed subdivision. This report summarizes the work completed and design recommendations to achieve flood control objectives.

Project Description and Regional Drainage

The proposed project is located within the City of Oakley, and is bordered by Marsh Creek to the west, Sellers Avenue to the east, and privately owned land/driveways to the north and south (**Figure 1**). Currently the land is unoccupied but partially mass-graded for development (i.e., DMA 1), as the project was underway in 2006 and inactive until a revised plan was resumed in 2023. Completing the 176-lot subdivision over approximately 48 acres within DMA 1 is anticipated to occur first (referred to herein as the "post-project condition"), however, future phases will potentially include development of DMAs 2, 3, 4, and 5 (referred to herein as the "future condition"). This analysis addresses infrastructure sizing for both conditions.



Figure 1. Stonecreek Existing Conditions/Drainage Management Areas

Under pre-project conditions, land uses in the surrounding areas included in the analysis are agricultural and low-density residential. Current drainage consists of overland flow over grassland with a gentle eastward slope. Under existing conditions, DMAs 1 through 4 generally drain northeasterly to concentrate near the northeast corner of their respective parcels and DMA 5 drains northwesterly to concentrate near the northwest corner of the parcel (see **Appendix A** Plate I for pre-project flow paths).

Under post-project conditions, stormwater originating within the proposed subdivision is designed to drain to a stormwater basin in the northeast corner of DMA 1. This basin will be designed to handle flood control and water quality per the Contra Costa County Stormwater C3 manual. Note that hydrograph modification control is not required in this case due to the fact that the runoff will ultimately be discharged to Marsh Creek, which is a recognized exempt engineered channel. Balance Hydrologics' role in these analyses is to solely investigate flood control adequacy of the basin, and CBG is to further assess water quality treatment as required. The stormwater will exit the basin via force-main and tie into the 42" existing stubbed storm line on Teton Road. The previous hydrology report by Balance Hydrologics (2006) planned on up to 20 cfs routed to the Teton Road tie-in; at that time, the City of Oakley approved the plan and indicated there was sufficient capacity to accept 20 cfs. The Teton Road storm drain is then routed to another detention basin to the northeast (part of an existing development) which ultimately is conveyed to Marsh Creek.

Under future conditions, the surrounding parcels on DMAs 2 to 5 are assumed to be developed similarly to DMA 1. According to the Contra Costa County Stormwater Master Plan, the eastern half of DMA 4 is within the boundary of DA 52 and the west half is within the boundary of DMA 52D. This will result in approximately 10 acres of the unplanned area DA 52 draining to Marsh Creek. It is understood from communication with the city that the Flood Control District will revise the drainage area map to reflect this change. Note that a parcel within the proposed development was omitted from analysis (See "Park" in **Figure 1** above). This is designated to become a park in which the stormwater runoff will be self-treating. A second basin will be constructed as necessary depending on the amount of future impervious cover.

Modeling Approach

All modeling was completed using the U.S. Army Corps of Engineers HEC-HMS software parameterized per guidelines published by Flood Control. Model runs were completed for pre-project, post-project, and potential future development conditions with the proposed stormwater basin. Two storm events were examined: the 10-year (10% annual exceedance probability) event representative of relatively large storm events, and the 100-year (1% annual exceedance probability) event as representative of very large storms. Design storm rainfall is based on the mean annual precipitation at the site, which in this case is 11.25 inches per the isohyetal maps published by Flood Control. A 24-hour duration design storm was selected for the analysis as it produces a substantial volume of runoff, particularly in the post-project case. All HEC-HMS inputs are summarized in **Appendix B.** Other model parameters of note include:

- *Drainage Management Areas*. As part of the stormwater drainage design, CBG delineated a total of five Drainage Management Areas ("DMAs"). DMA 1 represents the current anticipated development, and the remaining DMAs 2 through 5 capture potential future development (see **Figure 1** above). To ensure the basin sizing can accommodate current as well as future land development, three scenarios were modeled—the pre-project condition (undeveloped), the post-project condition (DMA 1 developed), and the future potential development (DMAs 1 through 5 developed). The summation of all DMAs totals 91.5 acres.

- *Infiltration Rate*. The infiltration rate was calculated for each DMA based on the relative pervious and impervious area. This variable was adjusted to reflect future impervious development potential in the offsite DMAs. See **Appendix B** for infiltration rate input values.

- *Lag Time*. Using LiDAR and topographic survey data, longest flow paths were delineated as shown in **Appendix A** to inform the watershed response time, or lag time, calculations (see **Appendix B**). Using the Contra Costa Flood Control District HEC-HMS Guidelines, lag time for DMA1 was calculated to be 14.7 minutes pre-project and 10.3 minutes post-project. The surrounding DMAs lag times were differentiated for pre-and post- project conditions by manipulating the Manning's-N values to reflect undeveloped versus developed surfaces, respectively. Pre-development lag times ranged from 8 to 21 minutes, and post-development lag times ranged from 5.1 to 10.3 minutes. Refer to **Appendix B** for lag time calculation parameters.

- *Design rainfall*. The 10-year, 24-hour rainfall used was 2.42 inches, while that for the 100-year, 24-hour storm was 3.61 inches.

Stormwater Basin Parameters

Various hydrologic, regulatory, and site considerations and constraints were taken into account when designing the stormwater basin. Consistent with Flood Control guidance the sub-surface components of the basin (biosoil, rock underlayer, underdrain system, etc.) are not considered as available for storage. Therefore, only the surface ponding area and above-ground outlets are included in HEC-HMS modeling.

- *Groundwater Constraints.* Per the Geotechnical Exploration Report prepared by Engeo Incorporated on April 14, 2005, groundwater at the site lies approximately 10 to 15 feet below the existing ground surface at approximately elevation 13.0 (NAVD88). However, we note that groundwater levels likely vary over a wide range of elevations depending on the season, as well as antecedent conditions. Contra Costa County guidelines require there to be at minimum 10 vertical feet between the groundwater table and the bottom of an unlined stormwater basin. Due to volumetric and land surface constraints, the basin cannot meet this guideline, and will thus be lined and equipped with a permanent dewatering pump that will be connected to the force main routed to Teton Road.

- *Basin Grading*. The basin is designed to have a 4:1 slope from elevation 15 to 23 feet NAVD88. The county requires a minimum of 2 feet of freeboard at the 100-year WSE. The top of basin was designed at existing grade, while the bottom of the basin was optimized with flood control modeling as the highest elevation in which a 2-feet freeboard can still be maintained during the 100-year 24-hour storm event.

- *Bioretention/Water Quality Treatment*. Although it is not within the scope of work for Balance Hydrologics to provide water quality treatment calculations, it is understood that the more surface area at the bottom of the basin, the more water quality treatment area can be provided. Thus, it was decided to keep the bottom of the basin at the highest elevation possible without violating flood control requirements in order to maximize surface area of the basin bottom.

- *Pump Configuration.* The basin will have a permanent dewatering pump in addition to a 7 cfs flood control pump. The flood control pump was modeled to activate at a water surface elevation 16 feet NAVD88 and deactivate when drawdown brings the WSE to 15.5 feet NAVD, with a minimum pump run time of 5 minutes to prevent unnecessary activation and deactivation. Both the dewatering pump and flood control pump will route drainage to the stubbed 42" utility line on Teton Road. As mentioned above, it is understood from the city that the downstream tie-in was designed to accommodate up to 20 cfs of additional flow.

The elevation-area-storage relationship for the basin is summarized in **Table 1** below.

Table 1. Stormwater basin elevation-area-storage values

Elevation	Area		Storage
(feet)	*(ft^2)*	*(acres)*	*(ac-ft)*
15.0	62,640	1.44	0.00
16.0	67,020	1.54	1.49
17.0	71,510	1.64	3.08
18.0	76,110	1.75	4.77
19.0	80,840	1.86	6.57
20.0	85,680	1.97	8.49
21.0	90,650	2.08	10.51
22.0	95,760	2.20	12.65
23.0	101,720	2.34	14.92

Results

Flood control mitigation was evaluated by modeling the drainage areas and proposed basin in HEC-HMS as outlined in Contra Costa County's HEC-HMS guidance. The resulting output provided peak discharge, runoff volumes, and basin water surface elevations ("WSE's") for the 10- and 100-year 24-hour storms as shown in **Appendix C** and summarized in **Table 2** below.

Table 2. HEC-HMS model summary, 10- and 100-year design storms

		Pre-project		Post-Project		Future Development	
		10-year	100-year	10-year	100-year	10-year	100-year
Peak inflow	*(cfs)*	37.9	78.1	55.3	99.7	71.3	117.2
Total Runoff into Basin	*(ac-ft)*	2.42	6.65	4.2	10.0	5.7	13.1
Maximum Basin WSE *(includes 7cfs pump activation)*	*(ft)*	N/A	N/A	16.72	19.24	17.40	20.32

Constraints in the basin design criteria include the 2-foot freeboard requirement above the 100-year WSE and that the 10-year WSE remains below the basin inlets. The basin rim elevation is 23.0 feet so the 100-year WSE may be no higher than 21.0 feet. The lowest inlet to the basin has an invert elevation of 17.5 feet, so the 10-year WSE may not exceed this elevation.

For the post-project condition with only DMA 1 developed, model results show that the basin has more than enough capacity to handle the 10- and 100-year 24- hour storm events without exceeding the WSE constraints listed above. The results indicate 0.78 feet below the 10-year maximum allowed WSE, and 1.76 feet below the 100-year maximum allowed WSE.

For the future development scenario, storage capacity was optimized to be just below the WSE constraints. The model results indicate the 10-year 24- hour storm events result in a maximum WSE 0.10 feet below the 10-year allowed maximum, and the100-year 24- hour storm event results in a WSE 0.68 feet below the 100-year maximum allowed WSE.

Therefore, the results indicate that the proposed basin can accommodate the volume and WSE requirements at the 10- and 100-year 24-hour storm for all modeled potential development scenarios.

Closing

Thank you again for the opportunity to assist with these stormwater management analyses and provide design guidance for the sizing and outlet configuration of the proposed stormwater basin.

Do not hesitate to contact me if you have questions related to the modeling work, results, or conclusions presented herein.

Sincerely,

BALANCE HYDROLOGICS, Inc.



Edward D. Ballman, P.E. 64095
Principal Engineer



Liz Neudeck, EIT
Engineer/Hydrologist

Enclosures: Appendix A: Model/Site Configuration
Appendix B: HEC-HMS Model Inputs
Appendix C: HEC-HMS Model Outputs

References:

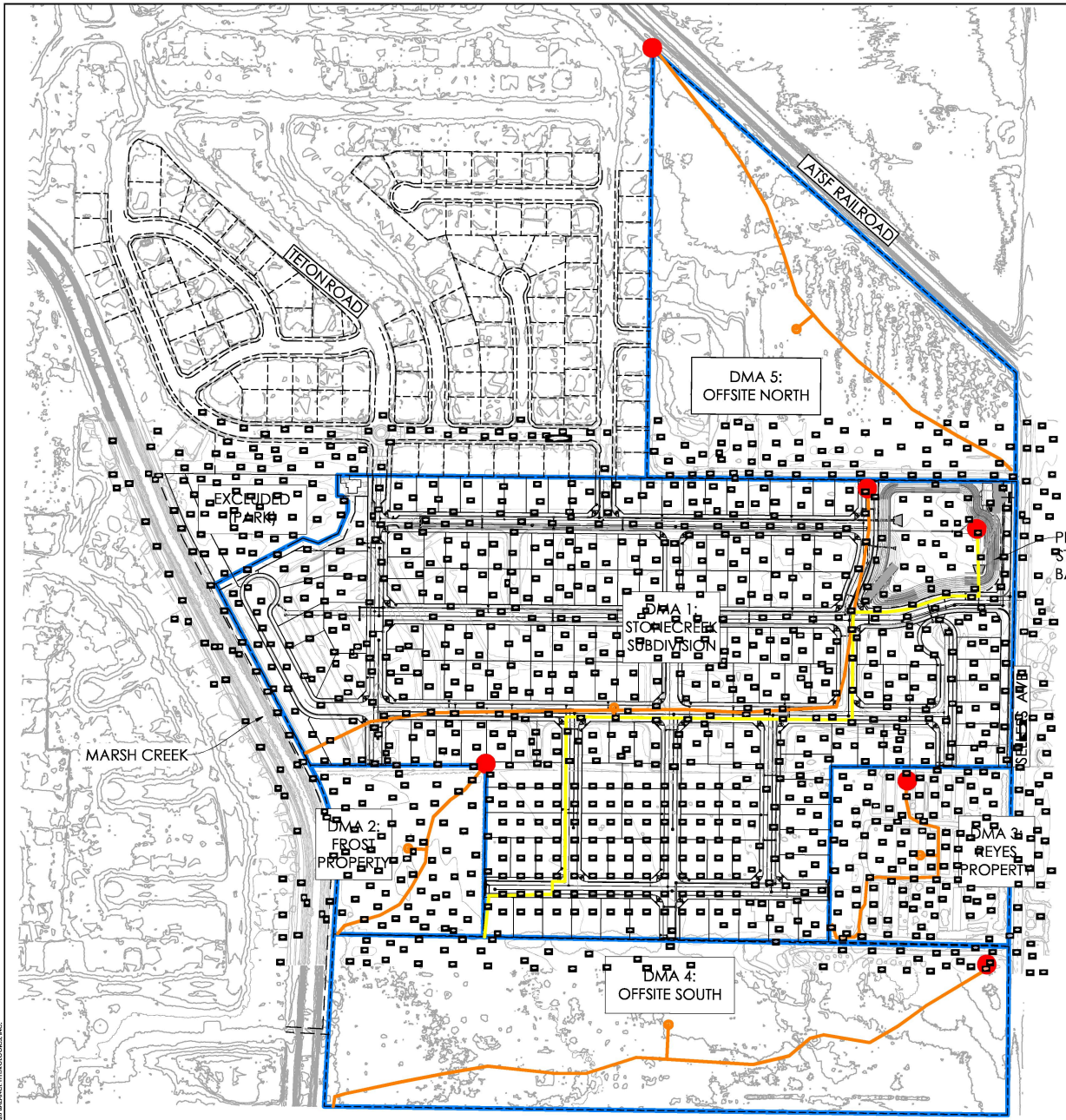
Balance Hydrologics, 2006, Hydrologic Analysis and Preliminary Stormwater Control Plan, Stone Creek Project, City of Oakley, California, p. 9 of 86

ENGEO Incorporated, April 14, 2005, Geotechnical Exploration Bacchini Assemblage, Oakley, California, p.8 of 23

APPENDICES

APPENDIX A

Model/Site Configuration



EXISTING INDEX CONTOUR

EXISTING INTERMEDIATE CONTOUR

EXISTING POINT ELEVATION

DRAINAGE MANAGEMENT AREA BOUNDARY

LONGEST FLOW PATH (PRE-DEVELOPMENT)

LONGEST FLOW PATH (POST-DEVELOPMENT)

DRAINAGE MANAGEMENT AREA CENTROID

POINT OF CONCENTRATION

PROPOSED PARCEL BOUNDARIES

EXISTING PARCEL BOUNDARIES

0' 150' 300' 600'

SCALE: 1" = 150'

Balance Hydrologics, Inc.
12020 Donner Pass Road, Suite B1
Truckee, CA 96161
tel (530) 550-9776
www.balancehydro.com

SUBMITTALS / REVISIONS	BY	DATE
XX% DESIGN		MM-DD-YYXX

DESIGNED BY CBG
DRAWN BY LN
CHECKED BY EB
IN CHARGE EB
DATE 08-22-23

NOT FOR CONSTRUCTION

STONECREEK SUBDIVISION
HYDROLOGIC MODELING WORKMAP

CITY OF OAKLEY, CONTRA COSTA COUNTY, CALIFORNIA

PROJECT NUMBER 223111

SCALE (AT 22" X 34")

SHEET 1

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APPENDIX B

HEC-HMS Model Inputs

Appendix B—HEC-HMS inputs

DMA	Area (sq miles)	Area (ac)	Infiltration (in/hr)	Lag Time (min)
Pre-project (undeveloped)				
DMA 1	0.072	46.10	0.071	21.51
DMA 2	0.007	4.35	0.170	9.23
DMA 3	0.008	5.31	0.167	8.14
DMA 4	0.030	19.32	0.159	20.20
DMA 5	0.026	16.47	0.152	20.69
Post-project				
DMA 1 (developed)	0.072	46.10	0.071	10.33
DMA 2 (undeveloped)	0.007	4.35	0.170	9.23
DMA 3 (undeveloped)	0.008	5.31	0.167	8.14
DMA 4 (undeveloped)	0.030	19.32	0.159	20.20
DMA 5 (undeveloped)	0.026	16.47	0.152	20.69
Future (developed)				
DMA 1	0.072	46.10	0.071	10.33
DMA 2	0.007	4.35	0.071	6.20
DMA 3	0.008	5.31	0.071	5.12
DMA 4	0.030	19.32	0.071	10.39
DMA 5	0.026	16.47	0.071	10.05

Lag Time Calculation Parameters

		Flow Path (*miles*)		Elevations (*feet*)		Slope	N Value	Lag Time	Lag Time
		(longest)	*(centroid)*	*(high)*	*(low)*	*(ft/mile)*	--	*(hrs)*	*(min)*
DMA 1	Pre-project	0.401	0.234	35	23	30	0.07	0.358	21.5
Stonecreek Development	Post-project	0.465	0.285	33	15	39	0.031	0.172	10.3
DMA 2	Pre-project	0.127	0.058	34	32	16	0.07	0.154	9.2
Frost Property	Post-project (future)	0.127	0.058	34	32	16	0.047	0.103	6.2
DMA 3	Pre-project	0.146	0.048	31	27	27	0.07	0.136	8.1
Reyes Property	Post-project (future)	0.146	0.048	31	27	27	0.044	0.085	5.1
DMA 4	Pre-project	0.369	0.183	35	27	22	0.07	0.337	20.2
Offsite South	Post-project (future)	0.369	0.183	35	27	22	0.036	0.173	10.4
DMA 5	Pre-project	0.298	0.165	26	23	10	0.07	0.345	20.7
Offsite North	Post-project (future)	0.298	0.165	26	23	10	0.034	0.167	10.0

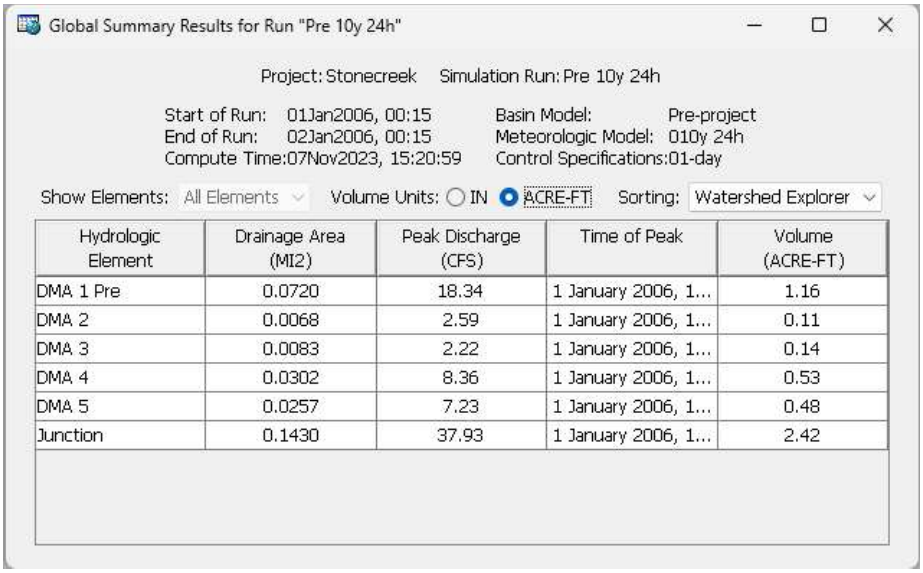
APPENDIX C

HEC-HMS Model Outputs

Appendix C

HEC-HMS Model Outputs

Pre-project 10-year 24-hour



Global Summary Results for Run "Pre 10y 24h"

Project: Stonecreek Simulation Run: Pre 10y 24h

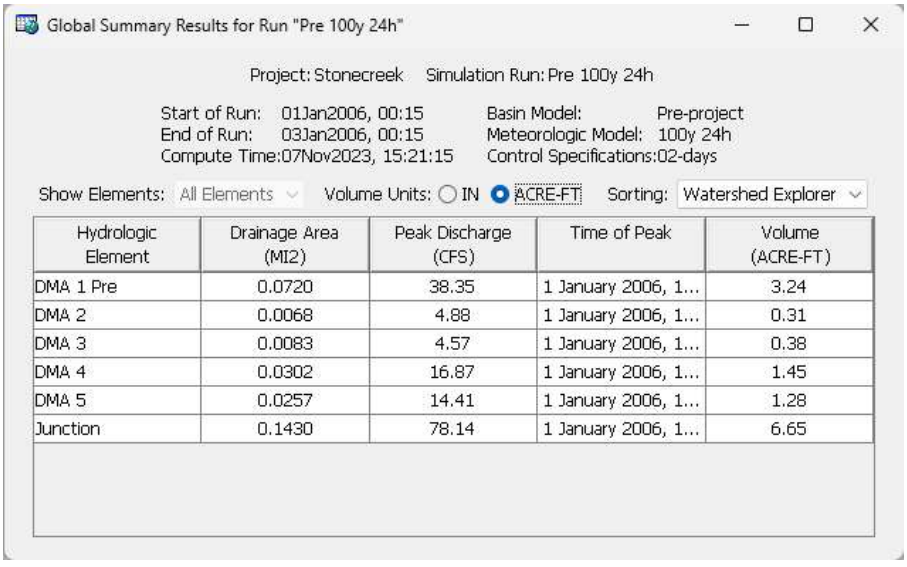
Start of Run: 01Jan2006, 00:15
End of Run: 02Jan2006, 00:15
Compute Time: 07Nov2023, 15:20:59

Basin Model: Pre-project
Meteorologic Model: 010y 24h
Control Specifications: 01-day

Show Elements: All Elements Volume Units: IN ACRE-FT Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
DMA 1 Pre	0.0720	18.34	1 January 2006, 1...	1.16
DMA 2	0.0068	2.59	1 January 2006, 1...	0.11
DMA 3	0.0083	2.22	1 January 2006, 1...	0.14
DMA 4	0.0302	8.36	1 January 2006, 1...	0.53
DMA 5	0.0257	7.23	1 January 2006, 1...	0.48
Junction	0.1430	37.93	1 January 2006, 1...	2.42

Pre-project 100-year 24-hour



Global Summary Results for Run "Pre 100y 24h"

Project: Stonecreek Simulation Run: Pre 100y 24h

Start of Run: 01Jan2006, 00:15
End of Run: 03Jan2006, 00:15
Compute Time: 07Nov2023, 15:21:15

Basin Model: Pre-project
Meteorologic Model: 100y 24h
Control Specifications: 02-days

Show Elements: All Elements Volume Units: IN ACRE-FT Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
DMA 1 Pre	0.0720	38.35	1 January 2006, 1...	3.24
DMA 2	0.0068	4.88	1 January 2006, 1...	0.31
DMA 3	0.0083	4.57	1 January 2006, 1...	0.38
DMA 4	0.0302	16.87	1 January 2006, 1...	1.45
DMA 5	0.0257	14.41	1 January 2006, 1...	1.28
Junction	0.1430	78.14	1 January 2006, 1...	6.65

Post-project 10-year 24-hour (Surrounding areas undeveloped)

Global Summary Results for Run "Post 10y 24h"

Project: Stonecreek Simulation Run: Post 10y 24h

Start of Run: 01Jan2006, 00:15
End of Run: 02Jan2006, 00:15
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Post-project
Meteorologic Model: 010y 24h
Control Specifications: 01-day

Show Elements: All Elements | Volume Units: IN / ACRE-FT | Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
DMA 1 Post	0.0720	35.43	1 January 2006, 1...	2.89
DMA 2	0.0068	2.59	1 January 2006, 1...	0.11
DMA 3	0.0083	3.33	1 January 2006, 1...	0.14
DMA 4	0.0302	8.36	1 January 2006, 1...	0.53
DMA 5	0.0257	7.23	1 January 2006, 1...	0.48
Junction	0.1430	55.26	1 January 2006, 1...	4.15
Detention Basin	0.1430	7.00	1 January 2006, 1...	3.28

Detention basin

Summary Results for Reservoir "Detention Basin"

Project: Stonecreek Simulation Run: Post 10y 24h
Reservoir: Detention Basin

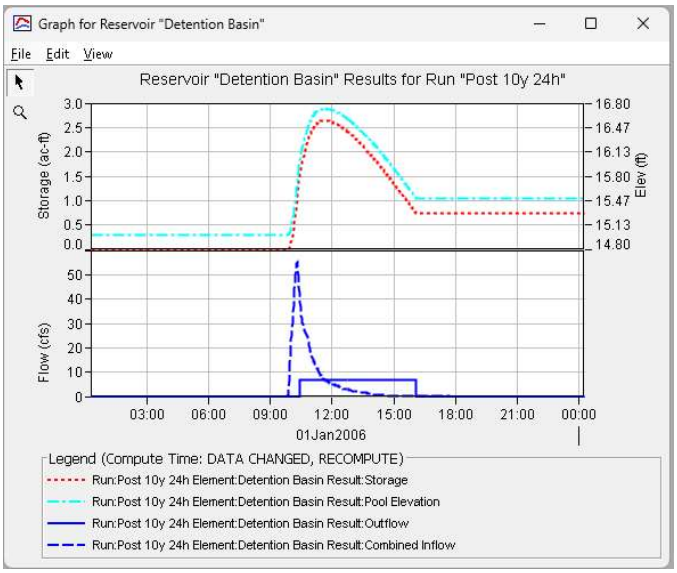
Start of Run: 01Jan2006, 00:15
End of Run: 02Jan2006, 00:15
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Post-project
Meteorologic Model: 010y 24h
Control Specifications: 01-day

Volume Units: IN / ACRE-FT

Computed Results

Peak Inflow:	55.26 (CFS)	Date/Time of Peak Inflow:	01Jan2006, 10:18
Peak Discharge:	7.00 (CFS)	Date/Time of Peak Discharge:	01Jan2006, 10:26
Inflow Volume:	4.15 (ACRE-FT)	Peak Storage:	2.64 (ACRE-FT)
Discharge Volume:	3.28 (ACRE-FT)	Peak Elevation:	16.72 (FT)



Post-project 100-year 24-hour (Surrounding areas undeveloped)

Global Summary Results for Run "Post 100y 24h"

Project: Stonecreek Simulation Run: Post 100y 24h

Start of Run: 01Jan2006, 00:15
End of Run: 03Jan2006, 00:15
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Post-project
Meteorologic Model: 100y 24h
Control Specifications: 02-days

Show Elements: All Elements | Volume Units: IN / ACRE-FT | Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
DMA 1 Post	0.0720	58.49	1 January 2006, 1...	6.58
DMA 2	0.0068	4.88	1 January 2006, 1...	0.31
DMA 3	0.0083	6.19	1 January 2006, 1...	0.38
DMA 4	0.0302	16.87	1 January 2006, 1...	1.45
DMA 5	0.0257	14.41	1 January 2006, 1...	1.28
Junction	0.1430	99.66	1 January 2006, 1...	9.99
Detention Basin	0.1430	7.00	1 January 2006, 1...	9.12

Detention basin

Summary Results for Reservoir "Detention Basin"

Project: Stonecreek Simulation Run: Post 100y 24h
Reservoir: Detention Basin

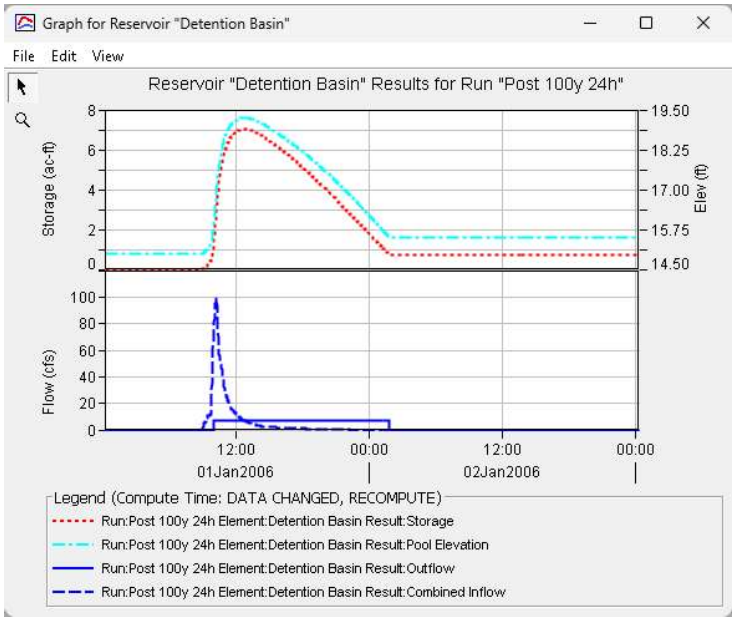
Start of Run: 01Jan2006, 00:15
End of Run: 03Jan2006, 00:15
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Post-project
Meteorologic Model: 100y 24h
Control Specifications: 02-days

Volume Units: IN / ACRE-FT

Computed Results

Peak Inflow:	99.66 (CFS)	Date/Time of Peak Inflow:	01Jan2006, 10:17
Peak Discharge:	7.00 (CFS)	Date/Time of Peak Discharge:	01Jan2006, 10:05
Inflow Volume:	9.99 (ACRE-FT)	Peak Storage:	7.04 (ACRE-FT)
Discharge Volume:	9.12 (ACRE-FT)	Peak Elevation:	19.24 (FT)



Future development 10-year 24-hour

Global Summary Results for Run "Future 10y 24h"

Project: Stonecreek Simulation Run: Future 10y 24h

Start of Run: 01Jan2006, 00:15
End of Run: 02Jan2006, 00:15
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Future development
Meteorologic Model: 010y 24h
Control Specifications: 01-day

Show Elements: All Elements | Volume Units: IN / ACRE-FT | Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
DMA 1 Post	0.0720	35.43	1 January 2006, 1...	2.89
DMA 2	0.0068	3.61	1 January 2006, 1...	0.27
DMA 3	0.0083	4.82	1 January 2006, 1...	0.33
DMA 4	0.0302	14.83	1 January 2006, 1...	1.21
DMA 5	0.0257	12.62	1 January 2006, 1...	1.03
Junction	0.1430	71.27	1 January 2006, 1...	5.74
Detention Basin	0.1430	7.00	1 January 2006, 1...	4.88

Detention basin

Summary Results for Reservoir "Detention Basin"

Project: Stonecreek Simulation Run: Future 10y 24h
Reservoir: Detention Basin

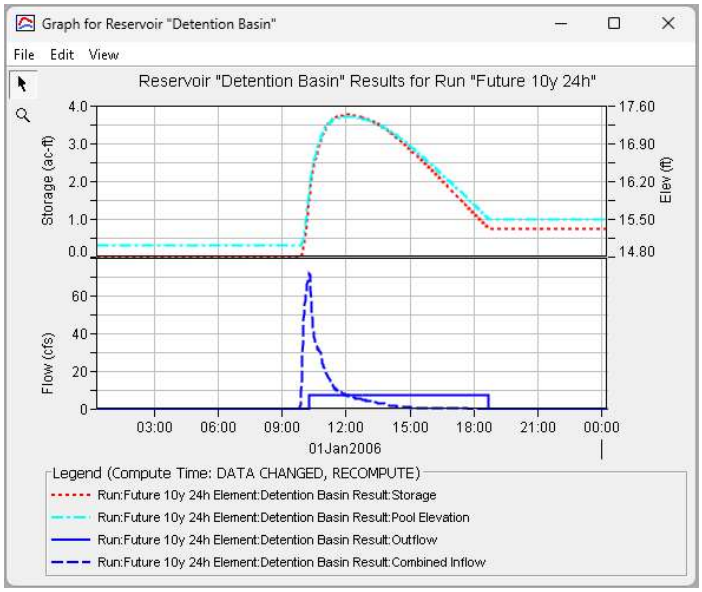
Start of Run: 01Jan2006, 00:15
End of Run: 02Jan2006, 00:15
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Future development
Meteorologic Model: 010y 24h
Control Specifications: 01-day

Volume Units: IN / ACRE-FT

Computed Results

Peak Inflow:	71.27 (CFS)	Date/Time of Peak Inflow:	01Jan2006, 10:16
Peak Discharge:	7.00 (CFS)	Date/Time of Peak Discharge:	01Jan2006, 10:16
Inflow Volume:	5.74 (ACRE-FT)	Peak Storage:	3.75 (ACRE-FT)
Discharge Volume:	4.88 (ACRE-FT)	Peak Elevation:	17.40 (FT)



Future development 100-year 24-hour

Global Summary Results for Run "Future 100y 24h"

Project: Stonecreek Simulation Run: Future 100y 24h

Start of Run: 01Jan2006, 00:15
End of Run: 03Jan2006, 00:15
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Future development
Meteorologic Model: 100y 24h
Control Specifications: 02-days

Show Elements: All Elements | Volume Units: IN / ACRE-FT | Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
DMA 1 Post	0.0720	58.49	1 January 2006, 1...	6.58
DMA 2	0.0068	5.84	1 January 2006, 1...	0.62
DMA 3	0.0083	7.63	1 January 2006, 1...	0.76
DMA 4	0.0302	24.50	1 January 2006, 1...	2.76
DMA 5	0.0257	20.85	1 January 2006, 1...	2.35
Junction	0.1430	117.21	1 January 2006, 1...	13.07
Detention Basin	0.1430	7.00	1 January 2006, 0...	12.21

Detention basin

Summary Results for Reservoir "Detention Basin"

Project: Stonecreek Simulation Run: Future 100y 24h
Reservoir: Detention Basin

Start of Run: 01Jan2006, 00:15
End of Run: 03Jan2006, 00:15
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Future development
Meteorologic Model: 100y 24h
Control Specifications: 02-days

Volume Units: IN / ACRE-FT

Computed Results

Peak Inflow:	117.21 (CFS)	Date/Time of Peak Inflow:	01Jan2006, 10:16
Peak Discharge:	7.00 (CFS)	Date/Time of Peak Discharge:	01Jan2006, 09:56
Inflow Volume:	13.07 (ACRE-FT)	Peak Storage:	9.13 (ACRE-FT)
Discharge Volume:	12.21 (ACRE-FT)	Peak Elevation:	20.32 (FT)

