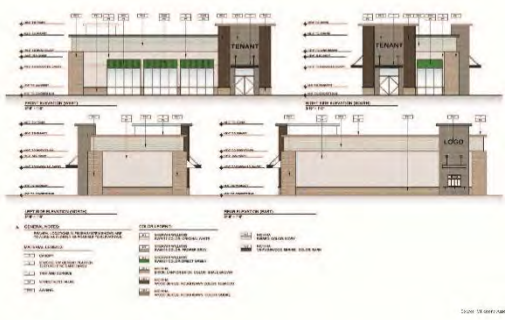
Public Draft Initial Study

Franklin Road Gas Station & Commercial Center

AA21-039; SPR21-008

August 30, 2023





MERCED COUNTY

Prepared by

EMC Planning Group

1978 - 2023

PUBLIC DRAFT INITIAL STUDY

FRANKLIN ROAD GAS STATION & COMMERCIAL CENTER

AA21-039; SPR21-008

PREPARED FOR

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August 30, 2023

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TABLE OF CONTENTS

A. BACKGROUND 1

B. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED 17

C. DETERMINATION 18

D. EVALUATION OF ENVIRONMENTAL IMPACTS 19

1. Aesthetics 20
2. Agriculture and Forest Resources 22
3. Air Quality 24
4. Biological Resources 27
5. Cultural Resources 37
6. Energy 39
7. Geology and Soils 42
8. Greenhouse Gas Emissions 46
9. Hazards and Hazardous Materials 50
10. Hydrology and Water Quality 53
11. Land Use and Planning 57
12. Mineral Resources 58
13. Noise 59
14. Population and Housing 63
15. Public Services 64
16. Recreation 65
17. Transportation 66
18. Tribal Cultural Resources 69
19. Utilities and Services Systems 70
20. Wildfire 73
21. Mandatory Findings of Significance 74

E. SOURCES 76

Appendices

Appendix A Project Plans

Appendix B Air Quality and GHG Report

Appendix C Special-Status Species Lists and Swainson's Hawk Protocol Survey Report

Appendix D California American Water Will-Serve Letter

Appendix E Transportation Analysis

Figures

Figure 1 Location Map 5

Figure 2 Aerial Photograph 7

Figure 3 Site Plan 9

Figure 4 Representative Building Design/Elevations 11

Figure 5 Landscape Plan 13

Figure 6 Sanitary Sewer Main Extension Conceptual Plan 15

Figure 7 Special-Status Species in the Project Vicinity 31

A. BACKGROUND

Project Title	2355 Franklin Road Gas Station & Commercial Center (AA21-039; SPR21-008)
Lead Agency Contact Person and Phone Number	Tiffany Ho, Deputy Director of Planning County of Merced (209) 385-7654, ext. 4407
Date Prepared	August 30, 2023
Study Prepared by	EMC Planning Group Inc. 601 Abrego Street Monterey, CA 93940
Project Location	2355 Franklin Road Merced, CA 95348
Project Sponsor Name and Address	Inderjeet Singh (applicant) c/o Milestone Associates 1000 Lincoln Road, #H202 Yuba City, CA 95991
General Plan Designation (2030 Merced County General Plan – Community of Franklin-Beachwood)	Commercial Neighborhood
Zoning (Merced County – Community of Franklin-Beachwood)	C-1, Neighborhood Commercial

Setting

The 3.76-acre project site is located at 2355 Franklin Road (Assessor Parcel Number 005-230-010) in unincorporated Merced County, approximately 2.0 miles northwest of the City of Merced at the State Route 99/Franklin Road interchange. The project site is within the Franklin Beachwood Community Plan Area. Franklin Road borders the western and eastern boundaries of the site with Ashby Road bordering the site to the north and State Route 99 to the south. A residence and a pet cemetery border the site on the west, agricultural uses on the north, rural residences and an automotive sales business on the east, and State Route 99 on the south. The site contains a single-family dwelling, with the remainder in dry farming use. Figure 1, Location Map. Figure 2, Aerial Photograph, shows the project site and surrounding uses.

Description of Project

The proposed project is a commercial development. It consists of a 6,000 square-foot commercial building, with 3,200 square feet planned for a convenience store ("c-store") and 2,800 square feet planned as a restaurant with drive-through; a fueling facility with 20 fueling spaces (10 multi-product fuel dispensers) with an overhead canopy, two RV/Boat fueling spaces

with an overhead canopy; and a separate, stand-alone 2,200 square-foot coffee shop building with drive-through. Two, 20,000- gallon underground fuel tanks would be installed to support the fueling facility. A total of 94 parking spaces are planned. Access to the site would be from driveways along Franklin Road and Ashby Road. Figure 3, Site Plan, shows the conceptual site plan. Figure 4, Representative Building Design/ Elevations, shows representative elevations of the proposed project. Figure 5, Landscaping Plan, shows the proposed planting design for the project site, including perimeter screening trees along Franklin Road and State Route 99, and a stormwater bioretention area. The project plans are included in Appendix A.

Off-Site Improvements

The project includes a new, approximately 840-foot long, eight-inch diameter sewer line within the Franklin Road. It would connect to the Franklin County Water District (water district) sewer system at Lobo Avenue as shown on Figure 6, Sanitary Sewer Main Extension Conceptual Plan.

Operational Characteristics

The c-store will operate seven days a week and twenty-four hours a day, and employ 10-15 employees with two to three employees onsite per shift. The restaurant will operate seven days a week from 6:00 a.m. to 1:00 a.m. Monday through Sunday, with 20-30 part- and full-time employees and four to six employees onsite per shift. The coffee drive thru will operate seven days a week from 6:00 a.m. to 1:00 a.m. Monday through Sunday. It will employ 5-10 part and full time with two to four employees onsite per shift.

Other Public Agencies Whose Approval is Required

- Franklin County Water District
- Merced County Department of Public Works
- San Joaquin Valley Unified Air Pollution Control District
- State Water Resources Control Board

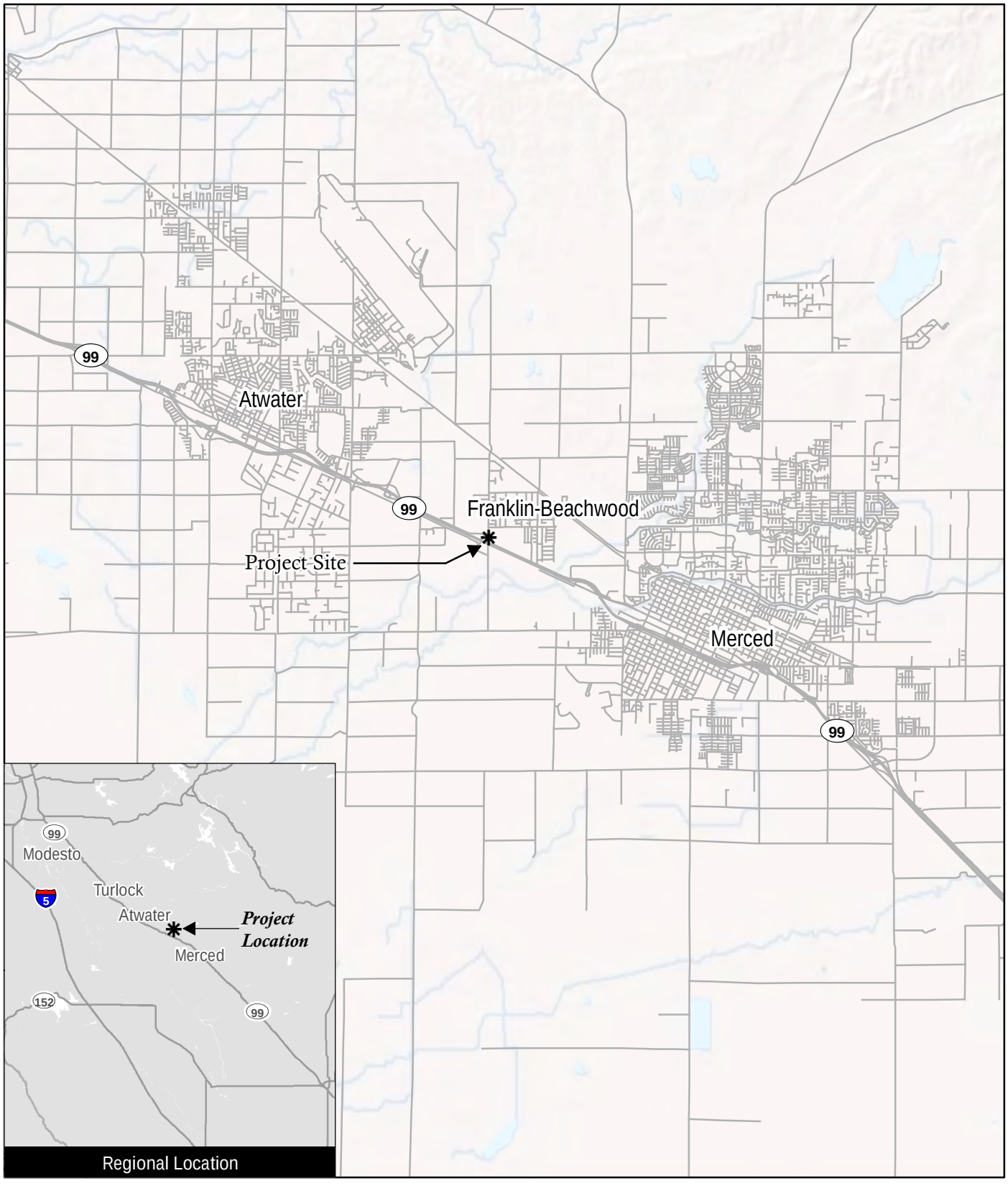
Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

As of the date of this initial study, the County had not received a request for consultation from any tribal representatives of any California Native American tribes traditionally and culturally affiliated with the project area.

Note: Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public

Resources Code section 21080.3.2.) Information may also be available from the California Native American Heritage Commission's Sacred Lands File per Public Resources Code section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code section 21082.3(c) contains provisions specific to confidentiality.

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Source: ESRI 2014

Figure 1

Location Map

2355 Franklin Road Gas Station & Commercial Center

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0 250 feet

Project Location

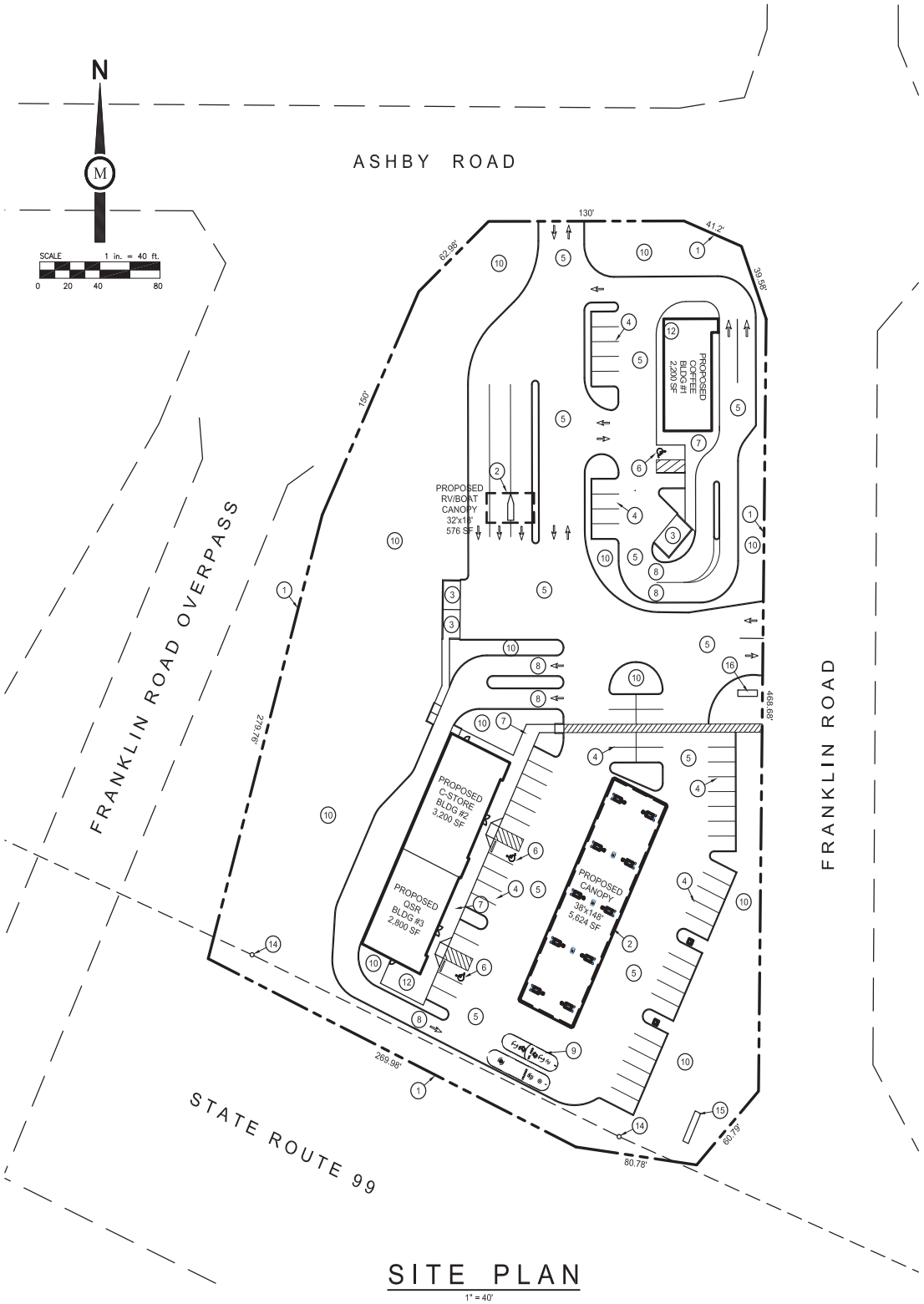
Source: Merced County GIS 2022, Google Earth 2022

Figure 2

Aerial Photograph

2355 Franklin Road Gas Station & Commercial Center

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0 105 feet

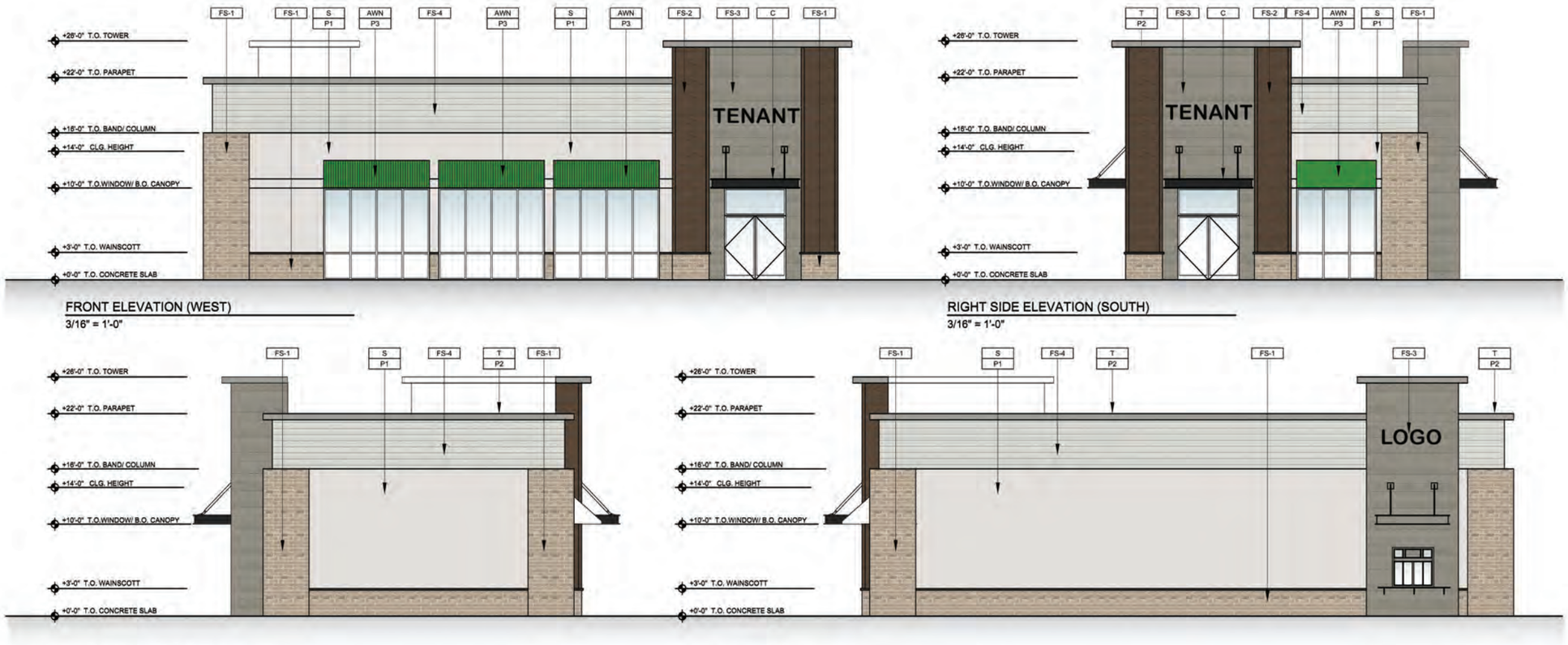
Source: Milestone Associates Imagineering, Inc. 2021

Figure 3

Site Plan

2355 Franklin Road Gas Station & Commercial Center

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FRONT ELEVATION (WEST)
3/16" = 1'-0"

RIGHT SIDE ELEVATION (SOUTH)
3/16" = 1'-0"

LEFT SIDE ELEVATION (NORTH)
3/16" = 1'-0"

REAR ELEVATION (EAST)
3/16" = 1'-0"

A. GENERAL NOTES:

REAVEAL LOCATIONS IN FINISH SYSTEM SHOWN ARE TO ALIGN AS CLOSELY AS POSSIBLE TO ELEVATIONS.

MATERIAL LEGEND:

C	CANOPY
S	STUCCO; 7/8" CEMENT PLASTER TEXTURE: FINE SAND FINISH
T	TRIM AND CORNICE
SF	STOREFRONT; ALUM.
AWN	AWNING

COLOR LEGEND:

P-1	SHERWIN WILLIAMS SW7077 COLOR: ORIGINAL WHITE
P-2	SHERWIN WILLIAMS SW6003 COLOR: PROPER GRAY
P-3	SHERWIN WILLIAMS SW6924 COLOR:DIRECT GREEN
FS-1	NICHIHA BRICK; CANYON BRICK COLOR: SHALE BROWN
FS-2	NICHIHA WOOD SERIES; ROUGHSAWN COLOR: TOBACCO
FS-3	NICHIHA WOOD SERIES; ROUGHSAWN COLOR: SMOKE
FS-4	NICHIHA RIBBED; COLOR: IVORY
FS-5	NICHIHA VINTAGEWOOD SERIES; COLOR: BARK

Source: Milestone Associates Imagineering, Inc. 2021

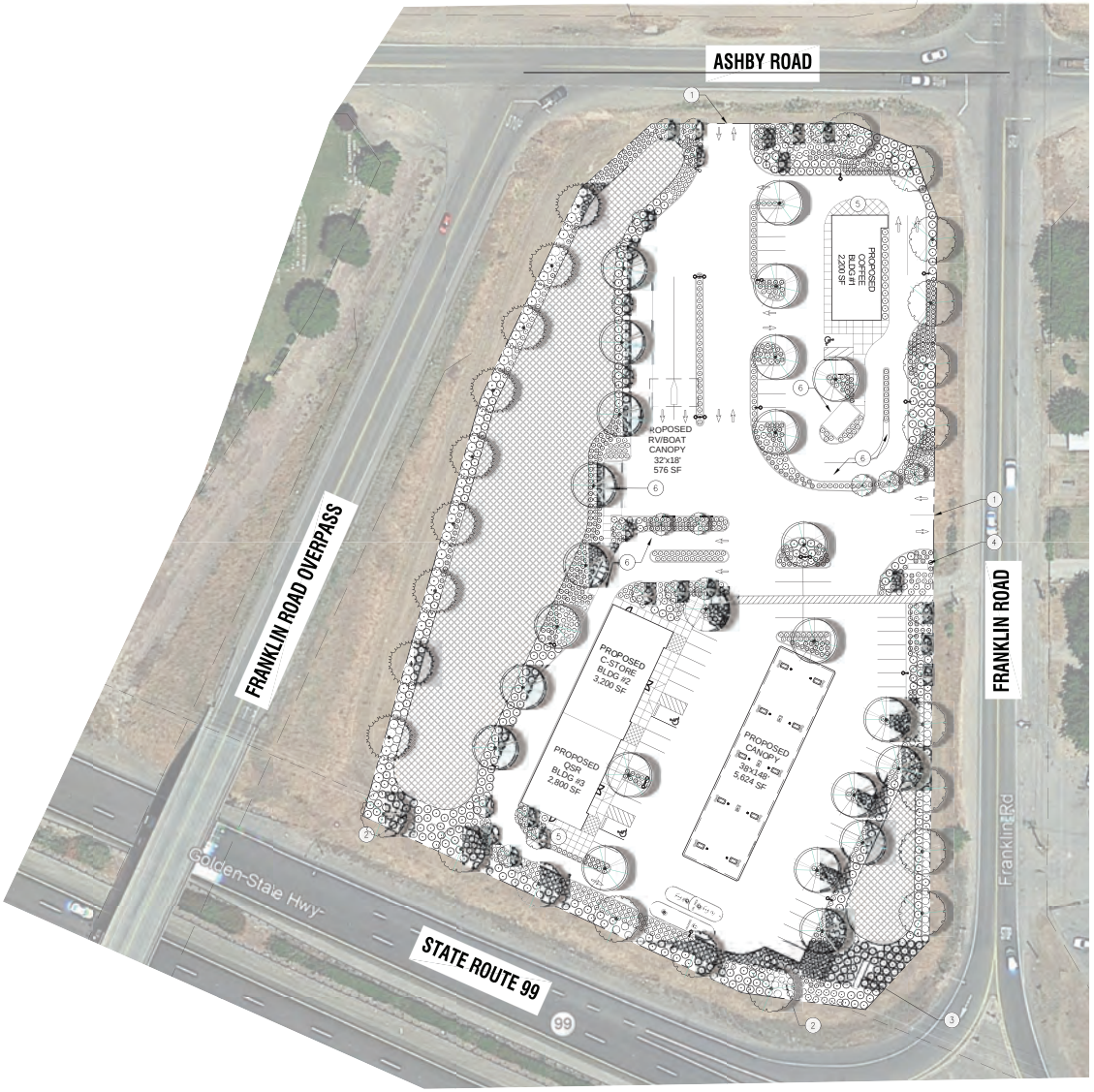
Figure 4
Representative Building Design/Elevations
2355 Franklin Road Gas Station & Commercial Center

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PRELIMINARY PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	WATER USE
ACCENT TREES				
	CERCIS OCCIDENTALIS	WESTERN REDBUD	15 GAL	LOW
	LAGERSTROEMIA X 'MUSKOGEE'	LIGHT LAVENDER CRAPE MYRTLE	15 GAL	LOW
PARKING LOT TREES				
	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE	24" BOX	MODERATE
	PISTACIA CHINENSIS 'KEITH DAVEY'	KEITH DAVEY CHINESE PISTACHE	24" BOX	LOW
	ULMUS PARVIFOLIA	CHINESE ELM	24" BOX	MODERATE
PERIMETER SCREEN TREES				
	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE	24" BOX	MODERATE
	PINUS CANARIENSIS	CANARY ISLAND PINE	24" BOX	LOW
	ZELKOVA SERRATA 'GREEN VASE'	GREEN VASE ZELKOVA	24" BOX	MODERATE
STREET TREES				
	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE	24" BOX	MODERATE
	PISTACIA CHINENSIS 'KEITH DAVEY'	KEITH DAVEY CHINESE PISTACHE	24" BOX	LOW
	ZELKOVA SERRATA 'GREEN VASE'	GREEN VASE ZELKOVA	24" BOX	MODERATE
UPRIGHT TREES				
	ACER X FREEMANII 'ARMSTRONG'	ARMSTRONG MAPLE	15 GAL	MODERATE
	GINKGO BILOBA 'PRINCETON SENTRY'	PRINCETON SENTRY GINKGO	15 GAL	MODERATE
	LAURUS NOBILIS 'SARATOGA'	SARATOGA LAUREL	15 GAL	LOW
ACCENT SHRUBS				
	AGAPANTHUS AFRICANUS 'QUEEN ANNE'	QUEEN ANNE AGAPANTHUS	1 GAL	MODERATE
	HEMEROCALLIS X 'CRANBERRY BABY'	CRANBERRY BABY DAY LILY	1 GAL	MODERATE
	SALVIA X SYLVESTRIS 'MAY NIGHT'	MAY NIGHT SAGE	1 GAL	LOW
GRASSES AND GRASS-LIKE PLANTS				
	CALAMAGROSTIS X ACUTIFLORA 'KARL FOERSTER'	FEATHER REED GRASS	5 GAL	LOW
	DIETES BICOLOR	FORTNIGHT LILY	5 GAL	LOW
	MUHLENBERGIA CAPILLARIS	PINK MUHLY GRASS	1 GAL	LOW
GROUNDCOVERS				
	ARCTOSTAPHYLOS 'EMERALD CARPET'	EMERALD CARPET MANZANITA	1 GAL	LOW
	COTONEASTER DAMMERI 'STRIEBS FINDLING'	STRIEBS FINDLING COTONEASTER	1 GAL	LOW
	MYOPORUM PARVIFOLIUM 'PINK'	PINK TRAILING MYOPORUM	1 GAL	LOW
MEDIUM HEIGHT SHRUBS				
	CALLISTEMON VIMINALIS 'LITTLE JOHN'	LITTLE JOHN BOTTLE BRUSH	1 GAL	LOW
	CISTUS MICROPHYLLA 'HOT LIPS'	HOT LIPS SALVIA	1 GAL	LOW
	NANDINA DOMESTICA 'GULF STREAM'	GULF STREAM NANDINA	1 GAL	LOW
SCREEN SHRUBS / HEDGES				
	LIGUSTRUM JAPONICUM 'TEXANUM'	WAXLEAF PRIVET	5 GAL	LOW
	OLEA EUROPAEA 'LITTLE OLLIE'	LITTLE OLLIE OLIVE	5 GAL	LOW
	XYLOSMA CONGESTUM 'COMPACTA'	COMPACT XYLOSMA	5 GAL	LOW
VINES				
	FICUS BENJAMINA	WEEPING FIG	1 GAL	MODERATE
	PARTHENOCISSUS TRICUSPIDATA	BOSTON IVY	5 GAL	MODERATE
BIOFILTRATION GRASSES				
	CAREX TUMULICOLA	FOOTHILL SEDGE	1 GAL	LOW
	CHONDRAPETALUM TECTORUM 'EL CAMPO'	CAPE RUSH	1 GAL	LOW
	MUHLENBERGIA RIGENS	DEER GRASS	1 GAL	LOW

* THE PLANTS LISTED IN THE PRELIMINARY PLANT SCHEDULE ABOVE REPRESENTS A SAMPLE OF THE TYPES OF TREES, SHRUBS, AND GROUNDCOVERS THAT WE ANTICIPATE BEING APPROPRIATE FOR THIS LOCATION AND REPRESENTS THE OVERALL DESIGN STYLE AND THEME. THE FINAL PLANT SELECTION WILL DRAW FROM THIS LIST; IN ADDITION, NOT ALL PLANS LISTED MAY BE USED AND NEW PLANT SPECIES MAY BE ADDED. HOWEVER, THE PLANTING DESIGN INTENT WILL REMAIN CONSISTENT WITH THIS PLAN AND PLANT SCHEDULE.



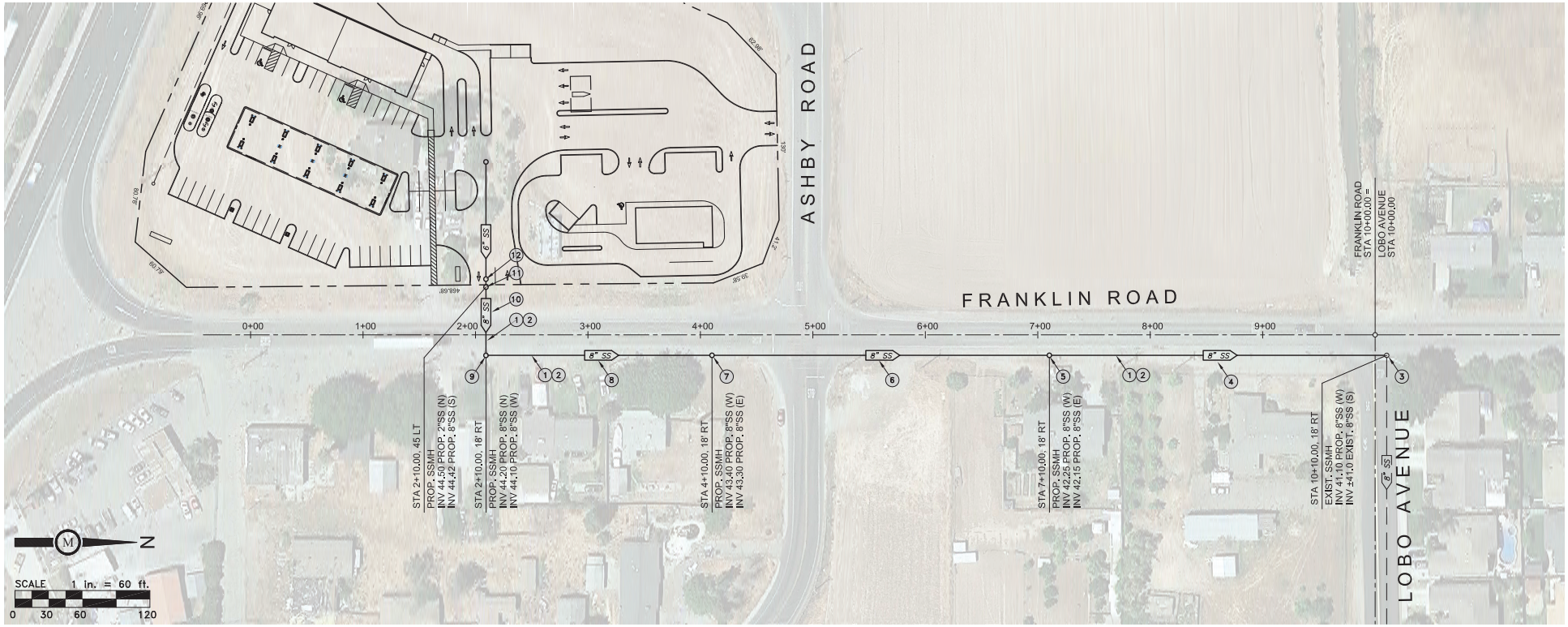
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Source: Milestone Associates Imagineering, Inc. 2021

Figure 5
Landscaping Plan

2355 Franklin Road Gas Station & Commercial Center

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Source: Milestone Associates Imagineering, Inc. 2021

Figure 6

Sanitary Sewer Main Extension Conceptual Plan

2355 Franklin Road Gas Station & Commercial Center

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B. Environmental Factors Potentially Affected

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

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

C. DETERMINATION

On the basis of this initial evaluation:

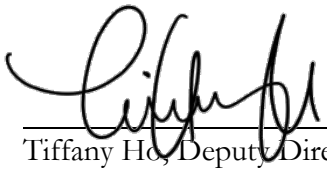
☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

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

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

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

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (1) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (2) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.



9/15/2023

Tiffany Ho, Deputy Director of Planning — Date

D. Evaluation of Environmental Impacts

Notes

1. All answers take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
2. Once it has been determined that a particular physical impact may occur, then the checklist answers indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.
3. "Negative Declaration: Less-Than-Significant Impact with Mitigation Measures Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less-Than-Significant Impact." The lead agency must describe the mitigation measures and briefly explain how they reduce the effect to a less-than-significant level (mitigation measures from section XVII, "Earlier Analyses," may be cross-referenced).
4. Earlier analyses are used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. [Section 15063(c)(3)(D)] In this case, a brief discussion would identify the following:
    a. "Earlier Analysis Used" identifies and states where such document is available for review.
    b. "Impact Adequately Addressed" identifies which effects from the checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and states whether such effects were addressed by mitigation measures based on the earlier analysis.
    c. "Mitigation Measures"—For effects that are "Less-Than-Significant Impact with Mitigation Measures Incorporated," mitigation measures are described which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
5. Checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances, etc.) are incorporated. Each reference to a previously prepared or outside document, where appropriate, includes a reference to the page or pages where the statement is substantiated.
6. "Supporting Information Sources"—A source list is attached, and other sources used or individuals contacted are cited in the discussion.
7. The explanation of each issue identifies:
    a. The significance criteria or threshold, if any, used to evaluate each question; and
    b. The mitigation measure identified, if any to reduce the impact to less than significant.

1. AESTHETICS

Except as provided in Public Resources Code Section 21099 (Modernization of Transportation Analysis for Transit-Oriented Infill Projects), would the project:

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

Comments:

a. The *2030 Merced County General Plan* (general plan) identifies rural and agricultural landscapes as the primary scenic resources in Merced County. Merced County also has many scenic vistas, such as the Coastal and Sierra Nevada mountain ranges, and the Los Banos Creek, Merced, San Joaquin, and Bear Creek river corridors. No designated scenic vista is visible from the project site, nor is the site visible from any nearby scenic vista. The proposed project would not create a substantial adverse effect on a scenic vista and no impact would result.

b. No state- or locally-designated scenic highways are in the vicinity of the project site (Merced County 2012; Caltrans 2023). The nearest officially designated state scenic highway, Interstate 5, is approximately 31 miles to the west. Because the project site is not located within the viewshed of a designated scenic highway, there would be no damage to scenic resources within a scenic highway and no related impact.

c. The project site is within the boundary of the Franklin-Beachwood Community Plan ("community plan"). It is intended for development with urban uses and is within an area that is urbanizing per the community plan. The community plan area includes a mix of commercial uses along the highway and residential uses. The site is bordered by existing commercial uses on the west and east, and by State Route 99 on the south. The site is not

considered to be within a non-urbanized area. While the project would change the visual character of the site, the planned urban use is not expected to substantially degrade visual character.

d. The proposed project is a common land use along State Route 99 and in urban settings. It would introduce sources of light and glare that do not currently existing in the area immediately surrounding the project site, but would be expected given the commercial land use designation for the site. Nighttime lighting for the project and the glare it produces could adversely affect adjacent residential uses if not designed to avoid light splay outside of the project site and/or cast lighting upwards. The applicant has submitted a Photometric Study (refer to Appendix A), which identifies the exterior lighting schedule and photometric plan, including lighting fixture number, types and locations, lighting intensity and areas of illumination for each light fixture. The plan is intended to illustrate how lighting will comply with Merced County Zoning Code sections 18.38.140 (design standards for parking lots) and 18.40.070 (outdoor lighting). These County standards require that all new lighting is directed away from or be properly shaded to eliminate light trespass or glare within a project or onto surrounding properties and that the project would not be a substantial new source of light that would adversely impact day or nighttime views in the area. With required implementation of the lighting plan, potential lighting and glare impacts would be less than significant.

2. AGRICULTURE AND FOREST RESOURCES

In determining whether impacts on agricultural resources are significant environmental effects and in assessing impacts on agriculture and farmland, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:

	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures 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 nonagricultural 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 nonagricultural use or conversion of forest land to non-forest use?	☐	☐	☒	☐

Comments:

a. According to the *2018 Merced County Important Farmland Map*, the project site is designated as "Urban Built Up" (California Department of Conservation 2021). Therefore, the project would not result in the conversion of prime, unique, or farmland of statewide importance to nonagricultural uses.

b. The project site is not zoned for agricultural use and is not under Williamson Act Contract.

c-d. The proposed project site is not zoned for forest land, timberland, or timberland production.

e. The parcel bordering Ashby Road on the north is in active agricultural use. It is not within the community plan boundary and therefore, not planned for urban development. The northern project site boundary has about 200 feet of common frontage on Ashby Road with the subject parcel.

Commercial development commonly is not sensitive to nuisances created by agricultural activity (e.g., noise, dust, etc.). It is not anticipated that future commercial end users would raise issues about such nuisances, if they were to occur, that would compromise the ability of the agricultural parcel owner to maintain agricultural production due to conflicts with the proposed project. Therefore, the proposed project would have a less-than-significant impact from potential indirect conversion of adjacent agricultural land.

3. AIR QUALITY

Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures 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 nonattainment 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?	☐	☐	☒	☐

Comments:

This section is based on the *Air Quality/Health Risk Assessment and Greenhouse Gas Analysis Report for the Franklin Road Retail Center* (Air Quality and GHG Report) prepared by EMC Planning Group in 2022 and included in Appendix B. The assumptions, methodology and model results for operational criteria air pollutant emissions are summarized in the *Franklin Road Commercial Project – Emissions Modeling Methodology, Assumptions, and Results* included in Appendix B. The potential construction and operational health risks to nearby sensitive receptors from emissions of toxic air contaminants (TACs) were evaluated in the *Franklin Hwy Retail Center Health Risk Assessment* (Illingworth and Rodkin 2022) ("health risk assessment"). The health risk assessment is included as an attachment to the Air Quality and GHG Report.

While the air quality report did not consider the off-site sewer line extension, the sewer line extension would not have long term operational impacts to air quality and the short-term construction impacts are not anticipated to change the conclusions of the report, as associated construction activity would be short term and would not involve use of heavy equipment that could generate significant emissions volumes. The conclusions of the report are summarized below. Please refer to the report for a more in-depth discussion of each topic.

a. San Joaquin Valley Air Pollution Control District ("air district") screening criteria can be used to determine if a project's construction and operations emissions could violate ambient air quality standards. Projects that do not exceed the screening thresholds or criteria pollutant emissions volume thresholds would not conflict with or obstruct

implementation of the *2018 PM2.5 Plan for the San Joaquin Valley* ("air quality plan"). Projects with emissions that exceed the air district's thresholds have the potential to exceed ambient air quality standards. Such exceedances would be considered a potentially significant impact, as well as a potential conflict with the air quality plan.

Although the proposed project would generate criteria air pollutant emissions during construction and operations, the emissions volumes are well below the air district standards (EMC Planning Group 2022, p. 2-18). Therefore, the proposed project would not conflict with or obstruct implementation of the air quality plan.

b. Emissions generated during construction and operation would be well below air district standards. Ozone and PM emissions would contribute to regional air quality impacts, but the project contribution would be less-than-cumulatively considerable (EMC Planning Group 2022, p. 2-18).

c. The proposed project would expose nearby off-site sensitive receptors to TACs generated from construction activity, evaporation of gasoline vapors, delivery trucks, restaurant operations, and operational traffic. Exposures of sensitive receptors to substantial concentrations of TACs may increase cancer and other health risks. Increased cancer and non-cancer health risks that exceed the air district thresholds would be a significant impact.

As reported in the Air Quality and GHG Report, exposures to operational emissions were found not to directly result in significant cancer or non-cancer health risks on their own. However, infant cancer risks from exposures to construction emissions exceed air district thresholds. The worst-case maximum increased infant cancer risk was calculated at 29.9 cases per million, which exceeds the air district's cancer risk threshold of 20 cases per million Residential cancer risk would also exceed air district thresholds under combined construction and operations conditions. These are the significant health risk impacts of the proposed project.

Construction emissions would need to be reduced by 60 percent to reduce health risks to below the air district's thresholds. Modeling shows that the use of Tier 4 engines and equipment during construction would reduce TACs in the form of exhaust PM_{10} emissions, which are considered to be equivalent to TACs in the form of diesel particulate matter emissions, by 85 percent. Using Tier 2 or Tier 3 equipment equipped with CARB Level 3 diesel emission control device would reduce emissions by about 80 percent. The reductions in construction period emissions would reduce the construction period infant/child cancer risk to 4.2 chances per million (EMC Planning Group 2022, pp. 2-18,19). Implementation of the following mitigation measure would reduce residential exposures and associated infant/child cancer risks to less than significant.

Mitigation Measure

AQ-1 All off-road diesel construction equipment greater than 25 horsepower and operating at the site and off-site during demolition and earthwork phases for more than 20 hours shall at a minimum meet U.S. EPA Tier 2 or 3 engine standards with Level 3 particulate filtration. Use of equipment with U.S. EPA Tier 4 engine standards would meet this requirement.

d. The most common sources of odors identified in complaints received by local air districts are sewage treatment plants, landfills, recycling facilities, waste transfer stations, petroleum refineries, biomass operations, autobody shops, coating operations, fiberglass manufacturing, foundries, rendering plants, and livestock operations. The proposed project would not produce these or other significant objectionable odors that would affect a substantial number of people. Construction activities such as paving and painting, could generate objectionable odors. Since construction activities would be temporary and are only likely to be detected by the few residents residing closest to the project site, impacts from temporary odors would be less than significant.

4. BIOLOGICAL RESOURCES

Would the project:

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures 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, regulations, or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☐	☒	☐	☐
b.	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and 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, filing, hydrological interruption, or other means?	☐	☐	☐	☒
d.	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e.	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐
f.	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☒	☐

Comments:

The following analysis is based on the results of background research relevant to the project area and on a reconnaissance-level biological field survey conducted by EMC Planning Group biologist Patrick Furtado, M.S., on March 23, 2023. Protocol-level surveys for Swainson's hawk (*Buteo swainsoni*) within 0.50 mile of the site were also completed from April to July, 2023.

Prior to conducting the field survey, Mr. Furtado reviewed construction site plans, aerial photographs, natural resource database accounts, and other relevant scientific literature. This included searching the U.S. Fish and Wildlife Service (USFWS) *Endangered Species Database*

(USFWS 2023a), California Department of Fish and Wildlife (CDFW) *California Natural Diversity Database* ("CNDDB", CDFW 2023a), and California Native Plant Society (CNPS) *Inventory of Rare and Endangered Plants* (CNPS 2023) to identify special-status plants, wildlife, and habitats known to occur in the vicinity of the project site. A review of the National Wetlands Inventory (NWI) database was also conducted to identify jurisdictional aquatic features (wetlands, drainages, and/or riparian areas) on or adjacent to the project site (USFWS 2023b).

The reconnaissance-level biological field survey documented existing plant communities and wildlife habitats and evaluated the potential for special-status species to occur in the project area. Biological resources were documented in field notes, including species observed, dominant plant communities, significant wildlife habitat characteristics, and riparian and wetland habitat. Qualitative estimations of plant cover, structure, and spatial changes in species composition were used to determine plant communities and wildlife habitats. Habitat quality and disturbance levels were described. Plant species were identified in the field or collected for subsequent identification. Searches for reptiles and amphibians were performed by overturning and then replacing rocks and debris, as well as assessment of potentially suitable habitat areas found on the site. Birds were identified by visual and/or auditory recognition and mammals were identified by diagnostic signs (including scat and tracks).

Existing Conditions. The approximately 3.76-acre project site is located approximately two miles northwest of the City of Merced at the State Route 99/Franklin Road interchange as shown in Figure 1, Location Map. Figure 2, Aerial Photograph, shows the project site and surrounding uses. The project site is mapped on the Atwater U.S. Geological Survey (USGS) quadrangle map and is relatively flat with an elevation of approximately 155 feet above sea level.

Offsite Sanitary Sewer Pipeline. An 840-foot offsite sanitary sewer line will be constructed from the project site and run along the eastside of Franklin Road to an existing manhole at the intersection of Franklin Road and Lobo Avenue. This line would connect to the Franklin Water District (FWD) sewer system at Lobo Avenue as shown on Figure 2 Aerial Photograph and Figure 4, Sanitary Sewer Main Conceptual Plan. The road edge is primarily graveled, with scattered common ruderal species adjacent to residential and disturbed agricultural parcels.

Plant and Wildlife Habitat – Wildlife habitat quality on the project site is considered low due to the high level of disturbance from agricultural activities. At the time of the biological survey, the fields on the project site were planted in a cover crop of cultivated oats (*Avena* sp.). The borders of the agricultural fields contained scattered ruderal (weedy) nonnative grasses and forbs, such as ripgut brome (*Bromus diandrus*), foxtail barley (*Hordeum murinum*), wild oats (*Avena fatua*), rattail fescue (*Festuca myuros*), Italian rye grass (*Festuca perennis*), filaree (*Erodium botrys*), wild radish (*Raphanus sativus*), and chickweed (*Stellaria media*). Areas around the existing house and outbuildings were planted with ornamental trees and shrubs.

Scattered California ground squirrel (*Spermophilus beecheyi*) burrows were observed within the agricultural fields. Common wildlife species likely to occur on the project site include raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and Virginia opossum (*Didelphis virginiana*). Small rodents including mice (*Mus musculus*, *Reithrodontomys megalotis*, and *Peromyscus maniculatus*) and California vole (*Microtus californicus*) may also occur, along with common reptiles such as western

fence lizard (*Sceloporus occidentalis*) and Pacific gopher snake (*Pituophis catenifer*). Several species of birds were observed using the project site including northern mockingbird (*Mimus polyglottos*), white-crowned sparrow (*Zonotrichia leucophrys*), house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), and rock pigeon (*Columba livia*).

Aquatic Features. There were no agricultural ditches or aquatic features observed on the project site.

a. Special-status species are those listed as Endangered, Threatened, or Rare, or as candidates for listing by the USFWS and/or CDFW; as Species of Special Concern or Fully Protected species by the CDFW; or as Rare Plant Rank 1B or 2B species by CNPS. Appendix C, Special-Status Species in the Project Vicinity, presents tables with database search results, and lists special-status species documented within the project vicinity, their listing status and suitable habitat description, and their potential to occur on the project site and off-site improvement locations. Figure 7, Special-Status Species with Potential to Occur in the Project Vicinity, presents a map of CNDDB database results.

Given the highly disturbed and agriculturally developed condition of the project site, the lack of native vegetation, and the site's isolation from high quality habitat areas, most special-status plant and animal species known to occur in the region are not expected to occur on the project site due to lack of suitable habitats. No special-status plant or animal species were observed during the biological survey.

Special-status plant and wildlife species recorded as occurring in the vicinity of the project site that are not likely to occur due to lack of suitable habitat include Colusa grass (*Neostapfia colusana*), Sanford's arrowhead (*Sagittaria sanfordii*), vernal pool smallscale (*Atriplex persistens*), burrowing owl (*Athene cunicularia*), San Joaquin kit fox (*Vulpes macrotis mutica*), and tricolored blackbird (*Agelaius tricolor*).

An observation of Sanford's arrowhead was recorded just north of the project site in 2010. This species is listed by the CNPS as a 1B.2 species and is found in standing or slow-moving freshwater ponds, marshes, and ditches. Approximately 850 plants were observed along an agricultural canal vegetated with wetland species (Occurrence no. 75, CDFW 2023a). Suitable wet areas or wetland vegetation were not observed on the project site and this species is not expected to occur.

Nesting birds and raptors may occur on or in the immediate project vicinity. One special-status species, Swainson's hawk, has been documented nesting in the project vicinity and is addressed below.

Nesting Birds. Protected nesting bird species and raptor species have the potential to nest in buildings or structures, on open ground, or in any type of vegetation, including trees, during the nesting bird season (January 15 through September 15). The project site and surrounding properties contain a variety of trees, shrubs, and open grassland areas suitable for nesting. Construction activities, including ground disturbance, and tree removal can impact nesting birds protected under the federal Migratory Bird Treaty Act

and California Fish and Game Code, should nesting birds be present during construction. If protected bird species are nesting on or adjacent to the project site during the bird nesting season, then noise-generating construction activities could result in the loss of fertile eggs, nestlings, or otherwise lead to the abandonment of nests. Implementation of the following mitigation measure would reduce the potential impact to nesting birds and raptors to a less-than-significant level.

Mitigation Measure

BIO-1 To avoid impacts to nesting birds during the nesting season (January 15 through September 15), all construction activities should be conducted between September 16 and January 14, outside of the bird nesting season. If construction or project-related work is scheduled during the nesting season (February 15 to August 30 for small bird species such as passerines; January 15 to September 15 for owls; and February 15 to September 15 for other raptors), a qualified biologist shall conduct nesting bird surveys.

a. Two surveys for active bird nests will occur within 14 days prior to start of construction, with the final survey conducted within 48 hours prior to construction. Appropriate minimum survey radii surrounding each work area are typically 250 feet for passerines, 500 feet for smaller raptors, and 1,000 feet for larger raptors. Surveys will be conducted at the appropriate times of day to observe nesting activities. Locations off the site to which access is not available may be surveyed from within the site or from public areas. If no nesting birds are found, a letter report will be prepared by the biologist and submitted to the Merced County Community and Economic Development Department, where it will be kept on file, and no further measures are required.

b. If the qualified biologist documents active nests within the project site or in nearby surrounding areas, an appropriate buffer between each nest and active construction shall be established. The buffer shall be clearly marked and maintained until the young have fledged and are foraging independently. Prior to construction, the qualified biologist shall conduct baseline monitoring of each nest to characterize "normal" bird behavior and establish a buffer distance, which allows the birds to exhibit normal behavior. The qualified biologist shall monitor the nesting birds daily during construction activities and increase the buffer if birds show signs of unusual or distressed behavior (e.g., defensive flights and vocalizations, standing up from a brooding position, and/or flying away from the nest). If buffer establishment is not possible, the qualified biologist or construction foreman shall have the authority to cease all construction work in the area until the young have fledged and the nest is no longer active. Once the absence of nesting birds has been confirmed, a letter report will be prepared by the biologist and submitted to the Merced County Community and Economic Development Department, where it will be kept on file, and no further measures are required.



Figure 7

Special-Status Species in the Project Vicinity

2355 Franklin Road Gas Station & Commercial Center

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Implementation of this mitigation measure would reduce the potential significant impact to nesting birds and raptors to a less-than-significant level by requiring pre-construction surveys for active bird nests and the implementation of avoidance, minimization, and mitigation measures should they be found on the project site.

Swainson's hawk. Swainson's hawk is listed as a threatened species under the California Endangered Species Act. Swainson's hawk is a long-distance migrator. Nesting grounds occur in northwestern Canada, the western U.S., and Mexico and most populations migrate to wintering grounds in the open pampas and agricultural areas of South America (Argentina, Uruguay, southern Brazil). This round-trip journey may exceed 14,000 miles. The birds return to the nesting grounds and establish nesting territories in early March.

Swainson's hawk nests in the Central Valley of California are generally found in scattered trees or along riparian systems adjacent to agricultural fields or pastures. These open fields and pastures are their primary foraging areas. Observations of this species have been recorded within five miles of the project site, the closest about 0.50 mile north of U.S. Highway 99 at the intersection of Ashby Road and Trindade Road. Nesting activity was documented in 2009 in a windrow of eucalyptus (*Eucalyptus globulus*) trees adjacent to row crop, residential, industrial, orchard and open pasture land uses (Observation no. 1760, CDFW 2023a).

The records of Swainson's hawk observations in the project vicinity indicate the possibility that the species could be present in the project area. To determine whether the proposed project may have potential to directly or indirectly impact Swainson's hawk, protocol-level surveys were initiated in March 2023. Per the California Department of Fish and Game's (now California Department of Fish and Wildlife) *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley*, multiple surveys are required within 0.50 mile of a project site during courtship, nest building, and fledging.

Results of the surveys are included in the *Protocol-Level Swainson's Hawk Survey Results, 2355 Franklin Road, Merced County* in Appendix C. Multiple Swainson's hawk individuals and one successful nesting pair were observed during surveys conducted between April and July 2023. The Swainson's hawk nest and pair identified near the intersection of Lobo Avenue and Ranchero Lane were within 1,866 feet (0.35 mile) of the project site. The *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (California Department of Fish and Wildlife 1994) establishes that a ten-mile radius is the standard flight distance between active and successful nest sites and suitable foraging habitats. It also establishes that alfalfa, low growing field crops, fallow fields, and cereal grain crops constitute foraging habitat for Swainson's hawks. Due to the proximity of the nest to the project site, the 3.5 acres of oats and non-native grasses on the project site has potential to provide foraging habitat. Loss of foraging habitat is a potentially significant indirect impact.

The proposed project could have a potentially significant direct impact on Swainson's hawks if construction disturbance in the form of noise, human disturbance, dust, or other intrusions during the breeding season result in the incidental loss of fertile eggs or nestlings, or otherwise lead to the abandonment of nests.

Implementation of the following mitigation measures per the *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (CDFW 1994) would reduce potential impacts to Swainson's hawk to a less-than-significant level.

Mitigation Measure

BIO-2 The following measures shall be implemented to avoid loss of or harm to Swainson's hawk and other raptors:

a. An active nest tree was documented during the 2023 nesting season within 0.35 mile of the project area. Therefore, consultation with the California Department of Fish and Wildlife and mitigation for the loss of foraging habitat on the project site is required per the guidelines outlined in the California Department of Fish and Wildlife's 1994 *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California*. Suitable foraging habitat includes fallow land, alfalfa or other low growing crops. Prior to the issuance of building permits, the project applicant shall provide the Merced County Community and Economic Development Department with evidence that the applicant has compensated for the loss of Swainson's hawk foraging habitat.

   There are two options for mitigation:

   1. A 1:1 acre ratio of Habitat Management land (at least 10% of the habitat management land requirements shall be met by fee title acquisition or a conservation easement allowing for the active management of the habitat, with the remaining 90% of the habitat management lands protected by a conservation easement [acceptable to the California Department of Fish and Wildlife] on agricultural lands or other suitable habitats which provide foraging habitat for Swainson's hawk) for each acre of development authorized (3.5 acres total); or

   2. A 0.5:1 acre ratio of habitat management land (all of the habitat management land requirements shall be met by fee title acquisition or a conservation easement [acceptable to the California Department of Fish and Wildlife] which allows for the active management of the habitat for prey production on-the Habitat Management lands) for each acre of development authorized (1.75 acres total).

b. If construction is to be initiated outside of the nesting season (March 1–September 15), construction may proceed once mitigation for the loss of foraging habitat has been completed and evidence submitted to the Merced County Community and Economic Department.

c. If construction is to be initiated during the breeding season (March 1 through September 15), a qualified biologist shall conduct preconstruction surveys for Swainson's hawk nests on or within 0.25 miles of the project site. The preconstruction surveys shall be conducted between March 1 through September 15 and shall follow the protocol in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000). If no nests are found within 0.25 miles, a letter report will be prepared by the biologist and submitted to the Merced County Community and Economic Development Department, where it will be kept on file. Once mitigation for the loss of foraging habitat has been completed and evidence submitted to the Merced County Community and Economic Development Department, construction may proceed.

   If active Swainson's hawk nests are located within 0.25 miles of proposed construction activities, construction shall not begin, or shall be discontinued, until the project applicant has consulted with the California Department of Fish and Wildlife to determine the appropriate course of action, consistent with the guidance provided in the *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (California Department of Fish and Game 1994), to reduce potential impacts on nesting Swainson's hawk and to determine under what circumstances construction activities can occur.

   Options for measures to reduce potential impacts may include, but not be limited to one or more of the following: the creation of buffers as measured from the nest(s) locations within which no construction is permitted until the young have left the nest, limits on the timing or location of use of construction equipment, limits on the types of equipment used to reduce noise intensity, and/or other options acceptable to the California Department of Fish and Wildlife. Equipment operation and construction activities shall be suspended until the California Department of Fish and Wildlife provides direction. If ground-disturbing activities are delayed, then additional pre-disturbance surveys shall be conducted such that no more than seven days elapse between the survey and ground-disturbing activities. The qualified biologist shall serve as a construction monitor during those periods when construction activities are to occur near active nest areas to avoid inadvertent impacts to these nests.

d. If it is determined during consultation with the California Department of Fish and Wildlife that impacts to Swainson's hawk cannot be avoided, Incidental Take Authorization will be obtained. Compliance with permit conditions shall be required prior to the start of disturbance activities.

Implementation of this mitigation measure would reduce the potential significant impact to Swainson's hawk to a less-than-significant level by requiring measures for the protection of the species and compensatory mitigation for the loss of foraging habitat.

b. No riparian habitat or sensitive natural communities were observed at the project site.

c. A review of the *National Wetlands Inventory* online database was conducted to identify potential jurisdictional aquatic features on or adjacent to the project site (USFWS 2023b). No aquatic features were documented in the database or observed during the site survey on or adjacent to the project site.

d. Wildlife movement corridors provide connectivity between habitat areas, enhancing processes like nutrient flow, gene flow, seasonal migration, pollination, and predator-prey relationships. Increasing connectivity is a critical strategy for addressing habitat loss and fragmentation, a top threat to biodiversity.

The project site is not located within any previously defined essential connectivity areas as mapped by the *California Essential Habitat Connectivity Project* and is also adjacent to existing suburban neighborhoods and developed agricultural lands (CDFW 2023b). The project site is not likely to facilitate major wildlife movement due to current active disturbance from agricultural activities. As such, the proposed project would have a less-than-significant impact on wildlife movement.

e. The Natural Resources Element of the 2030 Merced County General Plan contains the following policies associated with biological resources that are applicable to the proposed project:

- Policy NR-1.1 - Habitat Protection. Identify areas that have significant long-term habitat and wetland values including riparian corridors, wetlands, grasslands, rivers and waterways, oak woodlands, vernal pools, and wildlife movement and migration corridors, and provide information to landowners.
- Policy NR-1.15 - Urban Forest Protection and Expansion. Protect existing trees and encourage the planting of new trees in existing communities. Adopt an Oak Woodland Ordinance that requires trees larger than a specified diameter that are removed to accommodate development be replaced at a set ratio.
- Policy NR-1.21 - Special Status Species Surveys and Mitigation. Incorporate the survey standards and mitigation requirements of state and federal resource management agencies for use in the County's review processes for both private and public projects.

Trees. There are no policies in the general plan, or regulations in the Merced County Code that pertain to the damage to or loss of trees at the site. Therefore, no further discussion of conflicts with tree protection guidance is necessary.

Mitigation measures contained in this section will mitigate impacts to biological resources to a less-than-significant level. With these considerations, the proposed project would not conflict with local regulations related to biological resources.

f. There are no critical habitat boundaries, habitat conservation plans, natural community conservation plans, or other approved local, regional, or state habitat conservation plans applicable to the proposed project site (CDFW 2023c).

5. CULTURAL RESOURCES

Would the project:

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures 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 an archaeological resource pursuant to section 15064.5?	☐	☒	☐	☐
c.	Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☒	☐	☐

Comments:

a. The project site includes a house and outbuildings constructed in 1919 that will be demolished as part of the proposed project. According to the California Department of Parks and Recreation's Primary Record, JRP Historical Consulting prepared a *Historical Resources Inventory and Evaluation Report, Atwater-Merced Expressway Project, Merced County, California* in 2007, to evaluate the historical significance of these buildings. The report concluded that the property lacks both significance and integrity, and does not appear to meet the criteria for listing in the National Register of Historic Places or California Register of Historical Resources (California Department of Parks and Recreation 2007). Therefore, the proposed project would not cause a substantial change in an aboveground historic resource pursuant to Section 15064.5.

However, unknown buried historic resources could still be present at the project site or along the sewer extension route at depths greater than were disturbed to construct Franklin Road. Such resources, if present, could be damaged or destroyed by ground disturbing construction activities associated with the project. This would be a significant impact. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure

CUL-1 If archaeological resources are discovered during soil-disturbing activities, then work should be stopped within 50 meters (165 feet) of the find until a qualified professional archaeologist can evaluate it. If the find is determined to be significant, then appropriate mitigation measures will be formulated and implemented. The following language shall also be included on all project plans:

"If any archaeological resources are discovered during grading or construction, all work shall be immediately halted and appropriate personnel, including a qualified Native American representative, shall be contacted and consulted. Based on these

consultations, appropriate measures shall be taken to protect the discovered resources, and only after such measures have been implemented shall grading or construction continue."

b. According to the *2030 Merced County General Plan Update Draft Program Environmental Impact Report* (general plan EIR), there is a moderate to very-high potential for discovering buried archaeological sites in Merced County (County of Merced 2012, pp. 9-14, 9-15). While there are no known archaeological resources within the project site or along the Franklin Road sewer line extension route, there is a possibility that unknown archaeological resources are located within the underlying soils. Construction activities associated could damage or destroy these previously undiscovered resources. Implementation of mitigation measure CUL-1 would be required to ensure potential impacts are reduced to less than significant.

c. The general plan EIR indicated that no Native American sacred land sites were identified as areas of concern (p. 9-16). However, there remains the possibility that ground disturbing activities associated with the proposed project could damage or destroy previously undiscovered Native American human remains. Disturbance of Native American human remains would be a significant impact. The following mitigation would reduce this impact to a less-than-significant level.

Mitigation Measure

CUL-2 If human remains are found during construction activities, there will be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until the coroner of Merced County is contacted to determine that no investigation of the cause of death is required.

If the coroner determines the remains to be Native American, the coroner will contact the Native American Heritage Commission within 24 hours. The Native American Heritage Commission will identify the person or persons it believes to be the most likely descendent from the deceased Native American. The most likely descendent may then make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and associated grave goods as provided in California Public Resources Code Section 5097.98.

The landowner or their authorized representative will rebury the Native American human remains and associated grave goods, with appropriate dignity, on the property in a location not subject to further disturbance if: a) the Native American Heritage Commission is unable to identify the most likely descendent or the most likely descendent failed to make a recommendation within 48 hours after being allowed access to the site; b) the descendent identified fails to make a recommendation; or c) the landowner or his authorized representative rejects the recommendation of the descendent, and the mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner.

6. ENERGY

Would the project:

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures Incorporated	Less-Than-Significant Impact	No Impact
a.	Result in a 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?	☐	☐	☐	☒

Comments:

a. This analysis of energy impacts is qualitative because no quantified threshold of energy demand exists at which energy demand could be considered wasteful, inefficient or unnecessary, either during construction or project operations. Rather, energy effects are examined in light of the project type, related development guidance provided in the general plan, the robust suite of plans and regulations promulgated by the state that directly and indirectly result in reduced energy consumption, and applicant-proposed features of the project that would reduce energy demand. For informational purposes, estimates of energy demand from the most common forms of energy used in land use projects – electricity, natural gas, and transportation fuel, are provided first.

As shown in Table 5.3 in the CalEEMod results in Appendix B, electricity demand would be approximately 175,328 kilowatt hours per year. The net increase in electricity demand would be slightly lower given that demand from the existing home on the site would be replaced. For context, according to the California Energy Commission Energy Consumption Data Management System, in 2021, total electricity consumption in Merced County was 3,129,000,000 kilowatt-hours per year. Project demand represents 0.005 percent of that demand.

As discussed in Section 8, Greenhouse Gas Emissions, the applicant has indicated that it is infeasible to construct the planned coffee shop and fast food uses without natural gas infrastructure, but that the convenience store use would be all-electric. According to the California Energy Commission Energy Consumption Data Management System (2021), in 2021, total natural gas consumption in Merced County was 131,258,084 therms. Section 5.2, Energy by Land Use – Natural Gas, in the CalEEMod results included in Air Quality and GHG Report show that projected natural gas demand would be 1,083,253 British Thermal Units per year or approximately 10,835 therms per year. This is conservative because the CalEEMod results include natural gas demand from the convenience store. The projected demand would represent less than .008 percent of the

total 2021 Merced County natural gas demand. Implementation of mitigation measure GHG-1, as described in Section 8, Greenhouse Gas Emissions, may reduce natural gas demand.

The proposed project would generate vehicle trips from trucks and employee that will result in transportation fuel demand. The analysis in Section 17, Transportation, concludes that the proposed project would have a less-than-significant impact from vehicle miles traveled. This suggests that transportation fuel demand may be lower than would be expected for a project whose vehicle miles traveled impact is significant.

A project could be considered to result in significant wasteful, inefficient, or unnecessary energy consumption if its energy demand is extraordinary relative to common land use types. A gas station, convenience store, and restaurant are common land use types and not considered to be extraordinarily energy consumptive relative to similar land use types in the county; the project energy demand is not considered to be wasteful or unnecessary.

The general plan includes policies and implementing actions that address topics including, but not limited to: energy conservation, energy efficiency in housing, energy conservation through land use and planning, greenhouse gas reduction planning, reducing transportation related greenhouse gases, renewable energy use and production, and green building. The general plan EIR concluded that implementing the general plan would result in less-than-significant impacts due to wasteful, inefficient, and unnecessary consumption of energy and the need for new and improved energy transmission facilities. The general plan contemplated commercial uses for the site.

A multitude of state regulations and legislative acts are aimed at reducing electricity/natural gas demand and improving energy efficiency in new construction, promoting alternative energy production and use efficiency, and enhancing vehicle fuel efficiency. Required compliance with many of the regulations is not within the direct control of local agencies or individual project developers, but their implementation can reduce energy demand from land use projects both directly and indirectly. Representative examples include:

- California Energy Action Plan, which includes strategies for expanding use of zero-emission vehicles, and encouraging urban design to reduce VMT and increase pedestrian and bicycle access;
- California Renewables Portfolio Standard to increase the percentage of utility-provided electricity derived from renewable sources;
- Statutes and regulations to improve vehicle fuel efficiency such as Advanced Clean Cars;
- Statues to reduce VMT and related transportation fuel demand such as SB 375, the Sustainable Communities Strategy, and Senate Bill 743, designed to reduce VMT from passenger cars and light-duty vehicles;

- The Clean Energy and Pollution Reduction Act of 2015 (SB 350) requires doubling of the energy efficiency savings in electricity and natural gas for retail customers through energy efficiency and conservation by December 31, 2030;
- The California Energy Code, Building Energy Efficiency Standards (Title 24, Part 6) are uniformly applied building codes to reduce energy consumption and provide energy-efficiency standards for residential and non-residential buildings; and
- California Green Building Standards (Title 24, Part 11), also known as CALGreen, identify green building standards for statewide residential and non-residential construction that are equivalent to or more stringent than those of the California Energy Code for energy efficiency, water efficiency, waste diversion, and indoor air quality.

Construction of the off-site sewer line would demand energy during its construction, primarily in the form of fuel used in construction equipment. Common construction equipment types such as excavators, backhoes, compactors and haul trucks would be employed. Construction equipment fuel use would not be wasteful as existing equipment that conforms to existing applicable regulatory standards would be used.

Given the considerations summarized above, the proposed project would have a less-than-significant energy impact.

b. At this time, there are no regulations at the state or local level that would mandate that the proposed project include on-site renewable energy sources. The proposed project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

7. GEOLOGY AND SOILS

Would the project:

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures 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:				
	(1) 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?	☐	☐	☐	☒
	(2) Strong seismic ground shaking?	☐	☐	☒	☐
	(3) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
	(4) 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, 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?	☐	☒	☐	☐

Comments:

This analysis is provided against the backdrop of CEQA case law addressing the scope of analysis required for potential impacts resulting from existing environmental hazards found at or in the vicinity of a proposed project site. In *California Building Industry Association v. Bay Area Air Quality Management District* (2015), the California Supreme Court held that "agencies subject to CEQA

generally are not required to analyze the impact of existing environmental conditions on a project's future users or residents". The court reasoned that "ordinary CEQA analysis is concerned with a project's impact on the environment, rather than with the environment's impact on a project and its users or residents".

The court did not hold, however, that CEQA never requires consideration of the effects of existing environmental conditions on the future occupants or users of a proposed project. But the circumstances in which such conditions may be considered are narrow: "when a proposed project risks exacerbating those environmental hazards or conditions that already exist, an agency must analyze the potential impact of such hazards on future residents or users. In those specific instances, it is the project's impact on the environment, and not the environment's impact on the project, that compels an evaluation of how future residents or users could be affected by exacerbated conditions".

Risks from geologic and soils hazards are largely related to risks of the environment on the project that cannot be exacerbated by the project. Nevertheless, the analysis here is provided for informational purposes.

a. **Faults.** According to the most recent Alquist-Priolo Earthquake Fault Zone Map, there are no known earthquake faults within the vicinity of the project site and the project site is not within an Alquist-Priolo fault zone (California Department of Conservation 2023).

Ground Shaking. According to general plan EIR Figure 10-5, Seismic Damage Zones within Merced County, the project site and off-site improvement areas are within a "moderate severity and moderate probable damage" area. Ground shaking could lead to structural failure in buildings causing risks to public health and safety.

Although the project area may experience moderate ground shaking in the event of an earthquake, the proposed project would be designed and constructed consistent with local and state seismic design parameters identified in the California Building Code (CBC) as required by general plan policy HS-1.4. The project must also be designed to conform with Merced County Code Chapter 16.16, Building Code, that implements the CBC to reduce geologic hazard risk potential in new development.

Compliance with these uniformly applicable regulations would reduce impacts associated with risks from seismic hazards, including ground shaking, to a less-than-significant level.

Liquefaction. Liquefaction is a phenomenon where loose, saturated, non-cohesive soils such as silts, sands, and gravels undergo a sudden loss of strength during earthquake shaking. According to the general plan EIR, specific liquefaction hazard areas within Merced County have not been identified, but the potential for liquefaction exists due to unconsolidated sediments and a high-water table in Merced County's wetland areas adjacent to the San Joaquin River extending west to the Union Pacific Railroad and east towards State Route 99 (County of Merced 2012, p. 10-8). The project site is not located within this area. Further, the California Department of Conservation's interactive mapping tool shows that the project site and off-site improvements are not within a

potential liquefaction hazard zone (California Department of Conservation 2023) which suggests a reduced risk of liquefaction. Compliance with uniformly applicable regulations in the CBC would reduce impacts from seismic hazards, including liquefaction, to a less than significant level.

Landslides. There are no landslide hazard areas within Merced County (County of Merced 2012, p. 10-14) and the project site is flat. There would be no impact from landslide related risk.

b. Construction activity could expose excavated soils to wind and water erosion. However, construction activities must be conducted consistent with Merced County Code Section 9.53.030, Regulations and Requirements, which includes uniformly applied regulations for minimizing erosion during construction activities, including a requirement to prepare a Storm Water Pollution Prevention Plan The plan will identify measures to be taken during construction to reduce erosion and associated impacts on water quality. The developer is required to prepare and submit this plan to Merced County, whose review and approval is required.

Storm water control measures must also be integrated into the project design to manage storm water in a manner that reduces its potential to create erosion in downstream water bodies under post-development conditions. Associated regulations and performance standards are also included in the Merced County Code Section 9.53.030, Regulations and Requirements. Their intent is, in part, to regulate discharging pollutants into the municipal storm sewer system, and reduce storm water runoff rates and non-point source pollutants through storm water management controls. The developer is required to submit a preliminary storm water control plan for this purpose to demonstrate compliance with the regulations. The storm water control plan is subject to review and approval of Merced County.

Required compliance with the Merced County Code Section 9.53.030 would minimize impacts associated with soil erosion to a less-than-significant level.

c-d. The soils at the project site are characterized as Atwater Loamy Sand that has little to no development limitations (Natural Resources Conservation Center 2023). The proposed project would be required to adhere to all applicable CBC regulations for excavation, grading, and construction. These regulations require that engineered solutions be implemented to avoid or reduce the effects of potential soil hazards associated with development.

Compliance with the CBC in addition to site soils having little to no development limitations would ensure that impacts associated with unstable or expansive soils would be less than significant.

e. The proposed project would connect into the existing sanitary sewer system. No further analysis is required.

f. According to the general plan EIR, paleontological resources can be found virtually anywhere in Merced County (County of Merced 2012, p. 9-14). It is possible that paleontological resources could be accidentally discovered during excavations or other related construction activities. Directly or indirectly destroying a unique paleontological resource would be a significant impact. Implementation of the following mitigation measure would reduce this potential impact to less than significant.

Mitigation Measure

GEO-1 The following language shall be included in all demolition and building permits:

> "If paleontological resources are discovered during demolition and earthmoving activities, work shall stop within 100 feet of the find until a qualified paleontologist can assess if the find is unique and, if necessary, develop appropriate treatment measures in consultation with the Merced County Community and Economic Development Department."

8. GREENHOUSE GAS EMISSIONS

Would the project:

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

Comments:

This section is based on the Air Quality and GHG Report included in Appendix B, which evaluated GHG emissions associated with constructing and operating the project compared and compared those emissions to thresholds of significance provided in guidance published by the Sacramento Metropolitan Air Quality Management District (SMAQMD). The assumptions, methodology and model results for operational GHG emissions are summarized in the memo included in Appendix B. Construction GHG emissions were identified in the *Franklin Hwy Retail Center Health Risk Assessment* (Illingworth and Rodkin 2022) ("health risk assessment") included in the Air Quality and GHG Report.

a. **Construction GHG Emissions.** To date, the County has not adopted thresholds of significance for GHG emissions. Consequently, for this initial study, the County has elected to reference GHG emissions threshold guidance provided by the SMAQMD. The SMAQMD threshold of significance for construction emissions is 1,100 metric tons of GHG equivalent (MT CO_2e) per year. The results show that over the two-year construction period, the highest annual construction emissions volume is projected at 284.29 MT CO_2e. This is substantially below the threshold of significance. Construction GHG impacts would be less than significant.

Operational GHG Emissions. The SMAQMD guidance for assessing significance of operational GHG emissions impacts is performance based. Projects that are consistent with three specific measures are assumed to have a less-than-significant operational GHG emissions impact. The first two measures (or best management practices) are:

- BMP 1 - No natural gas: Projects shall be designed and constructed without natural gas infrastructure; and
- BMP 2 - Electric vehicle (EV) ready: Projects shall meet the current California Green Building Code (CALGreen) Tier 2 standards.

The applicant has indicated that it is infeasible to construct the planned coffee shop and fast food uses without natural gas infrastructure, but that the convenience store use would be all-electric. Per CalEEMod results included in Appendix B, GHG emissions from natural gas that would be used in the coffee shop and fast-food uses are projected at 56.39 MT CO_2e per year.

The SMAQMD has established a quantified threshold of significance for operational GHG emissions of 1,100 MT CO_2e. As stated in the SMAQMD guidance, if after subtracting the GHG reduction volumes from implementing BMPs 1 and 2 from a project's annual operations emissions volume, the volume drops below 1,100 MT CO_2e, the project can be found to have a less-than-significant impact and no further analysis is required. The total unmitigated operational GHG emissions would be 3,071.14 MT CO_2e. The emissions reduction from implementing the EV BMP would be nominal relative to the total mobile source emissions. Therefore, annual operational emissions would still exceed the 1,100 MT CO_2e threshold of significance.

Where the project GHG emissions volume exceeds 1,100 MT CO_2e per year after implementing BMPs 1 and 2, a third BMP is required:

- BMP 3 – Retail projects shall achieve a no net increase in total vehicle miles traveled to show consistency with California Senate Bill 741.

The project is consistent with the BMP 3 as described in Section 17, Transportation.

As previously stated, the applicant has determined that implementing the natural gas BMP is infeasible and to date, has not identified EV infrastructure improvements consistent with CALGreen Tier 2 standards as part of the project description. Consequently, the project would have a significant impact from generating GHG emissions as it does not meet two of the three BMPs.

The SMAQMD guidance includes options for reducing GHG emissions where a project cannot meet one or more of the BMPs. Projects must reduce emissions in an amount equal to or greater than emissions that would not be avoided by implementing one or more of the BMPs. Operational emissions would need to be mitigated through alternative reduction means due to the project inconsistency with BMP 1. Mitigation is also required to assure that the project design includes EV infrastructure consistent with BMP 2. The following mitigation measures address these issues. Implementation of the mitigation measure would reduce the GHG emissions impact of the project to less than significant.

Mitigation Measure

GHG-1 The applicant shall prepare a Greenhouse Gas (GHG) Reduction Plan which identifies one or more GHG reduction actions that will be taken to reduce GHG emissions by 56.39 MT CO_2e per year as a basis for fully mitigating GHG emissions from natural gas. The GHG Reduction Plan shall prioritize on-site GHG reduction design features. Additional measures may be added by the applicant.

In lieu of or in addition to one or more of the on-site measures above, the applicant may make direct investments in off-site GHG reduction activities/programs in the vicinity. Examples of direct investments include building retrofit programs that pay for cool roofs, solar panels, solar water heaters, smart meters, energy efficient lighting energy efficient windows, and insulation. Other examples include financing programs for installing electric vehicle charging stations, electrifying school buses, or planting local urban forests.

The applicant may choose to retain a qualified air quality/GHG professional to quantify the GHG reductions that would result from implementing the GHG Reduction Plan based on substantial evidence to be included in the GHG Reduction Plan.

If the applicant elects to quantify the GHG emissions reductions from on-site measures and/or investments in off-site reduction programs and the reductions are insufficient to reduce project emissions by a minimum of 58.15 MT CO_2e per year, the applicant may secure the reduction balance by purchasing and retiring carbon offset credits. The carbon offset credits shall meet the following performance standards:

- Carbon offset credits shall be issued by a recognized, reputable and accredited registry that mandates the use of established protocols for quantifying and issuing the offset credits. Credits issued based on protocols approved by the California Air Resources Board should be prioritized. Examples of such registries include the Climate Action Reserve, American Carbon Registry, and Vierra.
- The carbon offset credits should be generated from projects developed in the United States. Credits from projects developed internationally should not be used unless the applicant demonstrates with substantial evidence that sufficient carbon offsets from projects in the United States are unavailable. International offsets must be quantified and issued using established protocols that are recognized in the United States and that are issued by recognized, reputable and accredited registries.
- All carbon offset credits purchased to reduce GHG emissions, must meet the criteria of being real, quantifiable, permanent, verifiable, enforceable, and additional, consistent with the standards set forth in Health and Safety Code section 38562, subdivisions (d)(1) and (d)(2).

The applicant shall submit the GHG Reduction Plan for review and approval of the Merced County Community and Economic Development Director prior to County issuance of a building permit. If carbon offsets are proposed, prior to approval of an occupancy permit for the first proposed use, the applicant shall provide an executed contract or other certification to the Merced County Community and Economic Development Director that the requisite volume of carbon offset credits have been purchased.

Mitigation Measure

GHG-2 The proposed project shall be designed to include electric vehicle support improvements consistent with the latest adopted version the CALGreen Tier 2 voluntary standards. Inclusion of these design elements in the final project plans shall be verified by the Merced County Building and Safety Official prior to issuance of a building permit.

b. Given that the County does not have an adopted plan for assessing the impact of GHG emissions, the SMAQMD's guidance is considered to be the applicable plan for reducing GHG emissions. The SMAQMD's guidance is based in significant part on demonstrating consistency with the 2017 Scoping Plan. The 2017 Scoping Plan identifies strategies for meeting the state's 2030 GHG emissions reduction target of 40 percent below 1990 levels by 2030 as codified in Senate Bill 32. Because the proposed project would be fully operational before 2030 and would implement the BMPs identified in the SMAQMD guidance (with required implementation of mitigation measure GHG-1), it would be consistent with that guidance. Consequently, the proposed project not conflict with the applicable plan for reducing GHG emissions.

9. HAZARDS AND HAZARDOUS MATERIALS

Would the project:

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures Incorporated	Less-Than-Significant Impact	No Impact
a.	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b.	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c.	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d.	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, 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 a public-use airport, result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☒	☐
f.	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
g.	Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☒

Comments:

a-b. **Short-Term Construction Impacts.** Construction activities would require the temporary use of hazardous substances, such as fuel, lubricants, and other petroleum-based products for operation of construction equipment as well as oil, solvents, or paints. As a result, the proposed project could result in the exposure of persons and/or the environment to an adverse environmental impact due to the accidental release of a hazardous material. However, the transportation, use, and handling of hazardous materials would be temporary during short-term project construction activities.

Additionally, handling, transport, use, and disposal of hazardous materials must comply with all applicable federal, state, and local agencies and regulations. Compliance with these uniformly applicable local, state, and federal regulations would ensure hazardous materials-related short-term construction impacts would be less than significant.

Long-Term Operational Impacts. Gas station operations would include the use, transport, storage and handling of hazardous materials. As a result, the proposed project could result in potentially adverse impacts to people and the environment associated with hazardous materials being accidentally released into the environment. However, the proposed project would be required to operate in compliance with uniformly applied federal, state, and local regulations designed to lessen risks associated with hazardous materials. These include, but are not limited to:

- California Health and Safety Code, Chapter 6.7, requires USTs installed after 1988 to have a leak detection system consisting of at least one of the following detection methods: secondary containment with interstitial monitoring, automatic tank gauging systems (including continuous automatic tank gauging systems), vapor monitoring (including tracer compound analysis), groundwater monitoring, statistical inventory reconciliation, or other method meeting established performance standards.
- Efficacy requirements established by EPA require that leak detection methods be able to detect certain leak rates. In general, methods must detect the specified leak rate with a probability of detection of at least 95 percent and a probability of false alarm of no more than 5 percent. EPA found that, with effective leak detection, operators can respond quickly to signs of leaks and minimize the extent of environmental damage and the threat to human health and safety.
- USTs and associated fuel delivery infrastructure (i.e., fuel dispensers) would be required to comply with applicable federal, state, and local regulations, including those provisions established by Section 2540.7, Gasoline Dispensing and Service Stations, of the California OSHA Regulations; Chapter 38, Liquefied Petroleum Gases, of the California Fire Code; the Resource Conservation and Recovery Act; and the County Fire Department Hazardous Materials Division.
- The proposed project would also be required to incorporate high-efficiency Phase I and Phase II enhanced vapor recovery (EVR) systems to capture and control gasoline fumes. EVR refers to a new generation of equipment to control emissions at gasoline dispensing facilities in California. EVR systems collect gasoline vapors that would otherwise escape into the atmosphere during bulk fuel delivery (Phase I) or fuel storage and vehicle refueling (Phase II). Since 2009, the installation of Phase I and Phase II EVR systems has been required for gasoline dispensing facilities.
- The fuel dispensers, USTs, and associated fuel delivery infrastructure would be subject to routine inspection by federal, state, and local regulatory agencies with jurisdiction over convenience service station facilities.
- Pursuant to Section 18.40.040 of the Merced County Zoning Code, storage of hazardous materials on-site requires filing a Hazardous Materials Business Plan with the Merced County Community and Economic Development Department, Division of Environmental Health.

Therefore, based on required compliance with federal, state, and local regulations, impacts associated with the handling, transport, use, and disposal of hazardous materials during operations would be less than significant.

c. Franklin Elementary School is approximately 1,800 feet from the project site – more than one-quarter mile away. Sewer main extension construction activity would be as close as about 1,300 feet from the school. Construction activities for the sewer improvements would not involve more than nominal use of non-acute hazardous materials in small quantities and such use would be temporary. Further, use of these materials is regulated via uniformly applied local, state, and federal regulations. Associated impacts would be less than significant.

d. The proposed project site and off-site improvement areas are not included in the California Department of Toxic Substances Control's Cortese List (Envirostor) (California Department of Toxic Substances Control 2023a); the State Water Control Board list of leaking underground storage tank sites (Geotracker) (State Water Resources Control Board 2023a); the State Water Control Board list of solid waste disposal sites with waste constituents above hazardous waste levels outside the waste management unit (State Water Resources Control Board 2023b); the list of "active" Cease and Desist Orders and Cleanup and Abatement Orders from the State Water Resources Control Board (State Water Resources Control Board 2023c); or the California Department of Toxic Substances Control's list of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code (California Department of Toxic Substances Control 2023b).

e. According to the *Merced County Airport Land Use Compatibility Plan*, the project site is within land use compatibility zone "D, Other Overflight Areas." These areas have a low noise impact at less than CNEL 55 dB and are considered low-risk for an aircraft accident occurrence (Merced County Airport Land Use Commission 2012, p. 3-3). Therefore, operation of the proposed project would not result in a safety hazard or excessive noise for people working at the project site.

f. The proposed project would not limit or modify existing access conditions, nor impair the function of adjacent roadways such that it would interfere with emergency response or evacuation. There are no emergency response facilities on Franklin Road or Ashby Road near the site and neither road serves as an emergency evacuation route. The proposed project would have no emergency access related impact.

g. The project site is bordered by roads, agricultural land, residences and commercial uses and is not located within a wildlands fire hazard area. According to the general plan, the project site is located in a Local Response Area that is serviced by Merced County Fire Department where fire hazards are reduced because of fire prevention measures (County of Merced 2012). Therefore, the project would not expose people or structures to significant risks associated with wildland fire.

10. HYDROLOGY AND WATER QUALITY

Would the project:

	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures 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:				
(1) Result in substantial erosion or siltation on- or off-site;	☐	☐	☒	☐
(2) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;	☐	☐	☒	☐
(3) Create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☒	☐
(4) 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?	☐	☐	☐	☒

Comments:

a. **Construction Phase.** Construction activities, such as grading and excavation, have the potential to result in temporary impacts to surface water quality in nearby waterways. When disturbance to the soil occurs, sediments may be dislodged and discharged into the storm drainage system from the site. The proposed project could disturb over three acres, which exceeds the one-acre disturbance threshold requiring a Notice of Intent to be covered by the State of California Construction General Permit.

Under the Construction General Permit, the project contractor will be required to develop and implement a Stormwater Pollution Prevention Plan that contains best management practices to control sediment and other construction-related pollutants in storm water discharges from construction. Implementation of the Stormwater Pollution Prevention Plan would ensure that the project will not violate water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality during construction.

Operational Phase. Projects that create and/or replace 5,000 square feet or more of impervious surface are considered regulated projects under the National Pollution Discharge Elimination System's MS4 Stormwater Permit (Permit Number CA000004, Water Quality Order No. 2013-0001 DWQ). Regulated projects are required to implement measures for site design, source control, runoff reduction, storm water treatment and baseline hydromodification management designed to minimize impacts to downstream water quality under post-development conditions. Because the project includes more than 5,000 square feet of new impervious surfaces, the project is a regulated project that must incorporate these measures. This would ensure that water quality standards will be met such that associated impacts would be less than significant. The project would not be subject to waste discharge requirements.

b, e. **Water Supply Availability.** As further discussed in Section 19, Utilities and Services Section, the project water demand is projected at approximately 7,604 gallons per day (gpd) or 8.52 acre-feet per year (afy). It is assumed that the existing home on the site uses approximately 350 gallons per day; annual demand would be approximately 0.4 afy. Net project demand would; therefore, be about 8.12 afy. This estimate is conservative as it does not consider actual consumptive water use (consumptive water use equals the project's total water use minus the quantity of water demanded that returns to recharge the groundwater basin or to meet demands that would otherwise be met by groundwater).

The project would be served by California American Water, which has provided a "will serve" letter included in Appendix D. California American Water obtains water supply from groundwater as well as other sources. California American Water's issuance of the will-serve letter is an indication that it can supply the project from existing water supplies available to it.

Impact on Groundwater Sustainability. The project site is located in the San Joaquin Valley groundwater basin, within the Merced subbasin. The Merced Subbasin has been designated as a High-Priority Critically Over drafted basin by the California Department of Water Resources (Department of Water Resources 2020). The Sustainable Groundwater Management Act (SGMA) of 2014 (as amended) allows customized groundwater sustainability plans (GWSP) to be designed by groundwater sustainability agencies (GSA) to manage groundwater resources. The goal of SGMA is to have sustainably managed groundwater within 20 years of the initial GWSP submittal and maintain sustainability for a 50-year planning and implementation horizon. The Merced Subbasin GSP was adopted in November 2019 (Merced Sustainable Groundwater Management Agency 2019).

The GWSP includes a projected water budget for the Merced Subbasin. The projected budget assesses the conditions of the subbasin under projected water supply, agricultural and urban demand, and operational conditions. The projected conditions baseline has greater outflows than inflows, resulting in an average annual deficit in groundwater storage of 82,000-acre feet. These declines are in the absence of implementing groundwater sustainability projects and groundwater management actions. Under sustainable groundwater management conditions, the groundwater system of the Merced Subbasin maintains inflows equal to its outflow volume (Merced Sustainable Groundwater Management Plan 2019 p. 2-147).

Projected urban supplies and demand rely in part on urban water management plans for water purveyors that are required to prepare such plans. For other urban development, new demand is projected based on buildout of general plan land uses. For the project site, the Franklin Beachwood Community Plan serves as the general plan land use direction on which future demand was based in the GWSP. The project is not inconsistent with the GWSP as the project demand is assumed as part of the cumulative groundwater demand projected for the subbasin and the project would not increase the demand relative to that identified in the GWSP.

To achieve the sustainability goals for the subbasin, and to avoid undesirable results over the remainder of a 50-year planning horizon, multiple projects and management actions have been identified and considered in the GWSP to ensure subbasin sustainability. The proposed project would not interfere with implementation of the projects identified in the GWSP.

c-d The project would increase impervious surface area relative to existing site conditions. However, the project is required to include site design and post-construction treatment control measures in compliance with the MS4 Stormwater Permit standards. Treatment control measures, including flow-through planters and bioretention areas, would reduce the rate, volume, and pollutant load of runoff leaving the site and entering the public storm drain system. One of the post-construction water quality standards requires that the rate of stormwater runoff from the site under post-project conditions must be no greater than under pre-development conditions. Required implementation of measures needed to meet this standard would assure that the project would not exacerbate downstream flooding or that runoff from the site would exceed the capacity of existing storm drainage facilities. Compliance with the MS4 Stormwater Permit would ensure that stormwater flows generated at the project site would be reduced and treated to the maximum extent feasible. The project would not result in substantial erosion or siltation on- or off-site. Associated project effects would be less than significant.

The 100-year floodplain denotes an area that has a one percent chance of being inundated during any particular 12-month period. Floodplain zones (Special Flood Hazard Areas [SFHA]) are determined by the FEMA and used to create Flood Insurance Rate Maps. According to FEMA Flood Insurance Rate Maps for Merced County, the project site is

located in a Flood Zone AO, which is a 100-year flood hazard area (Federal Emergency Management Agency 2023). The project site is also located within the Yosemite Lake dam failure inundation zone (County of Merced 2021).

For future development to avoid exacerbating flood impacts by impeding or redirecting flood flows, that development must be designed consistent with applicable policies and implementing actions in the general plan and with the floodplain management standards (Chapter 18.26 Special Flood Hazard Areas). These standards are designed to avoid or minimize impeding or redirecting flood flow created by placing fill or other flood barriers within a flood hazard area. Additionally, these standards would require that finished floor elevation of new buildings be above the base flood elevation, which would substantially reduce the potential that such uses would be inundated during a flood event with associated release of hazardous or other materials used or stored at such uses.

There are no landlocked bodies of water near the project site that would affect the site in the event of a seiche, and no risk from tsunami hazards. The project area is flat and there are no hillsides in proximity that would affect the site in the event of a mudflow.

11. LAND USE AND PLANNING

Would the project:

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures Incorporated	Less-Than-Significant Impact	No Impact
a.	Physically divide an established community?	☐	☐	☐	☒
b.	Cause any 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?	☐	☐	☐	☒

Comments:

a. The project site is within the Franklin-Beachwood Community Plan Area and is identified for commercial development in that plan. The proposed project does not include new roadways, infrastructure or development features that would divide an established community; therefore, there would be no impact related to physically dividing an established community.

b. The project is a commercial use at a site designated as Commercial Neighborhood and zoned Neighborhood Commercial C-1, in which vehicle service stations and restaurants are permitted.

As discussed in Section 3.0, Air Quality, the project is consistent with the Clean Air Plan and would have a less-than-significant impact with the incorporation of mitigation. As discussed in Section 4.0, Biological Resources, there are no habitat conservation plans that apply to the project site. Regarding noise, the discussion in Section 13.0, Noise, concludes that the proposed project, as mitigated, would not conflict with general plan policies or municipal code requirements for reducing noise exposure to acceptable levels. As described in Section 16.0, Transportation, as mitigated, the proposed project would not conflict with County policies or plans regarding vehicle miles traveled, public transit, bicycle, or pedestrian facilities.

For these reasons, the proposed project would not result in significant impacts due to conflicts with land use plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect.

12. MINERAL RESOURCES

Would the project:

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures Incorporated	Less-Than-Significant Impact	No Impact
a.	Result in 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 in a local general plan, specific plan, or other land-use plan?	☐	☐	☐	☒

Comments:

a-b. No Mineral Resource Zones or mineral resource production areas are located in or adjacent to the project site. According to the 2030 Merced County General Plan Background Report (Figure 8-10), the project site is not located in an area of sand and gravel resources (Merced County 2013. The California Geological Survey indicates that the proposed project is not within an Aggregate Production Area (California Geologic Survey 2021). Because the site is not within a mineral resources or resource protection zone, there would be no loss of availability of known mineral resources.

13. NOISE

Would the project result in:

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures 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 in applicable standards of other agencies?	☐	☐	☒	☐
b.	Generation of excessive ground-borne vibration or ground borne 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, expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐

Comments:

The information in this section is taken primarily from the *2030 Merced County General Plan* (general plan) and the *2030 Merced County General Plan Background Report*. The project site is bordered by roads, an agricultural parcel, rural residences, and limited commercial uses. The closest sensitive receptors are the several residences located to the east across Franklin Road from the site. These residences are also the closest to the proposed off-site sewer main extension that would be constructed in Franklin Road.

Noise exposure standards typically apply at the outdoor activity areas of the noise receiver. For single-family residential uses, this is typically at the rear yard. The homes themselves typically provide shielding from noise sources located in front of the homes. The rear yards of the homes along Franklin Road area about 130 feet from the centerline of Franklin Road and 150 feet from the project site boundary.

The existing noise environment in the project area is dominated by noise generated from vehicle travel on State Route 99, with minor contributions from travel on adjacent roads and from use of farm equipment. According to Table 11 in the background report, the distances from State Route 99 to the 60 dB and 65 dB Ldn contours along the segment of the highway from State Route 59 to Buhach Road were reported at 730 and 1553 feet, respectively. The Day-Night Average Level (Ldn) metric is the time-weighted energy average noise level for a 24-hour day, with a 10 decibel (dB) penalty added to noise levels occurring during the nighttime hours (10:00 p.m. - 7:00 a.m.). The sensitive receptors along Franklin Road across from the project site are 200 feet to 500 feet from the

highway. Consequently, noise exposures at these residences at the time the background report was prepared in 2013 were substantial and are likely greater today given growth in traffic volumes on the highway over time.

a. **Noise Standards.** The Health and Safety Element of the general plan establishes noise level criteria for both transportation and non-transportation (stationary) noise sources. For transportation noise sources. Table HS-1 of the general plan provides the maximum allowable exterior and interior noise exposure levels for various land use types. For residential land uses, the maximum acceptable exterior noise level is 65 dB Ldn.

The Merced County Code contains noise level standards for residential and non-residential land uses. Specifically, the Merced County Code sets a 65 dB Ldn standard for residential property, with standards applicable to non-residential properties 5 dB higher (Chapter 10.60.030 (A)).

According to Merced County Code Chapter 10.60.040(B)(5), construction activities that include the operation of any tools or equipment used during construction, drilling, earth moving activities, excavating, or demolition are prohibited from 6:00 p.m. to 7:00 a.m. the following day on weekdays. They are also prohibited at any hour during weekend days or legal holidays, except for emergency work.

Construction Noise. Construction noise is typically not considered to be a significant impact if construction is limited to the daytime hours and construction equipment is adequately maintained and muffled. Compliance with applicable County requirements for construction activities, including limiting construction to daytime hours and ensuring construction is adequately maintained and muffled would ensure that noise impacts associated with construction would be less than significant.

Site Operations Noise. The project includes commercial retail uses, including a drive-through restaurant and coffee shop, convenience store, and gas station. Noise sources associated with these types of uses could include, but are not limited to HVAC/mechanical equipment, truck deliveries and movements, loading dock activities, parking lot activities (closing of car doors and trunks, stereos, alarms, etc.), and, drive-through operations. The noise levels produced by such sources can be highly variable as summarized below.

Roof-mounted HVAC units and associated noise levels typically range between 39-44 dB at a distance of 100 feet from the building façade and would not exceed acceptable outdoor noise levels for nearby sensitive receptors.

Slow moving trucks associated with nominal number of anticipated site deliveries could be expected to produce noise levels in the range of 65 to 71 dBA at a distance of 100 feet. While truck noise could at times exceed outdoor noise standards at nearby sensitive receptors, this noise would be infrequent.

Noise due to traffic in parking lots is typically limited by low speeds and is not usually considered to be significant. Human activity in parking lots that can produce noise includes voices, stereo systems and opening and closing car doors and trunk lids. Such activities can occur at any time. The noise levels associated with these activities cannot be precisely defined due to variables such as the number of parking movements, time of day and other factors. It is typical for a passing car in a parking lot to produce a maximum noise level of 54-59 dBA at a distance of 100 feet.

Noise from drive-through operations would likely be most noticeable from loudspeaker use at the menu board. Typical ordering cycles are short and at a distance of 100 feet, maximum noise levels are typically 52-54 dB.

As noted previously, noise exposure standards typically apply at outdoor activity areas of the noise receiver. For single-family residential uses, this is typically at the rear yard. The homes themselves typically provide shielding from noise sources located along adjacent roadway frontages. None of the site operations noise sources are expected to exceed noise exposure standards at outdoor activity areas of these residences given the distances from these noise sources on site and outdoor activity areas. Further, noise generated by such activities would be substantially, if not entirely masked by ambient noise produced by traffic on State Route 99 as described above.

Traffic Noise. The project would increase traffic volumes on the segment of Franklin Road on which the subject residences front. Based information derived from Table 1 and Figure 4 in the transportation analysis as described in Section 17.0, Transportation, the proposed project would generate about 2,758 trips per day. In a worst case, it is assumed that all new trips travel on Franklin Road to access the site. Per the *Franklin-Beachwood Transportation Study and Impact Fee Update* (Omni Means 2015), this segment of Franklin Road carried an average of about 4,279 trips at the time the report was prepared. That number is likely to be greater today and will continue to increase under cumulative development conditions in the Franklin-Beachwood area without the proposed project.

As a rule of thumb, transportation noise is considered to increase by about 3 dB with each doubling of traffic on a roadway. The proposed project would likely double traffic volumes under existing plus project/cumulative conditions. However, a 3 dB increase is not considered to be significant where existing ambient noise levels are 60 dB or greater; 3 dB generally represents the threshold of perception in change for the human ear. Ambient noise levels at the outdoor areas of these residences are already approximately 60 dB Ldn as reported above.

Given the discussion above, noise impacts from on-site project operations and project generated traffic would be less than significant.

b. The dominant sources of man-made vibration are sonic booms, blasting, pile driving, pavement breaking, major demolition activities, diesel locomotives, and rail-car coupling. None of these activities would occur with construction or operation of the project. Minor, short-term vibration from construction activities such as paving may be detected at the closest sensitive land uses, but if this were to occur, it would be both minor and short-term. Vibration levels with potential to impact off-site structures would not occur.

c. According to the Merced County Airport Land Use Compatibility Plan, the project site is within land use compatibility zone "D, Other Overflight Areas." These areas have a low noise impact at less than CNEL 55 dB and are considered low-risk for an aircraft accident occurrence (Merced County Airport Land Use Commission 2012, p. 3-3). Therefore, operation of the proposed project would not result in a safety hazard or excessive noise for people working at the project site.

14. POPULATION AND HOUSING

Would the project:

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures Incorporated	Less-Than-Significant Impact	No Impact
a.	Induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	☐	☐	☐	☒
b.	Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐

Comments:

a. The proposed project is consistent with the general plan land use designation for the site; its development with such uses has already been planned. Employment from the new businesses has; therefore, already been planned. A new sewer main extension would be constructed to serve the project. However, the main is not sized to accommodate growth that is not already planned for the project site. Therefore, the proposed project would not result in substantial unplanned direct or indirect growth and no new adverse impacts would occur.

b. The project would not displace substantial numbers of people or existing housing units. The impact would be less than significant.

15. PUBLIC SERVICES

Would the project result in substantial adverse physical impacts associated with the provision of or 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 following public services:

	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures Incorporated	Less-Than-Significant Impact	No Impact
a. Fire protection?	☐	☐	☒	☐
b. Police protection?	☐	☐	☒	☐
c. Schools?	☐	☐	☐	☒
d. Parks?	☐	☐	☐	☒
e. Other public facilities?	☐	☐	☐	☒

Comments:

a-e. Because no new residences would be constructed, no population increase would occur and no increase in demand for schools, parks, libraries or health services would occur. No feature of the proposed project would pose unusual police or fire protection demands, but a minor increase in calls for such service could occur over the life of the project. With no substantial increase in demand for public services, construction of facilities needed to expand the capacity of these services would not be needed.

16. RECREATION

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures 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?	☐	☐	☐	☒

Comments:

a-b. Implementation of the project would not generate demand for park or recreation resources as it would generate no population increase. Consequently, there would be no increase in the use of existing neighborhood or regional parks or other recreational facilities that would cause or accelerate the physical deterioration of such facilities. The proposed project does not include recreational facilities, nor does it require the construction or expansion of such facilities that would cause an adverse effect on the environment.

17. TRANSPORTATION

Would the project:

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures 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?	☐	☐	☒	☐

Comments:

a. The proposed project could result in environmental impacts if it conflicts with a plan, ordinance or policy related to circulation, and the mitigation to rectify the conflict would result in physical environmental changes with potential to create adverse impacts. The potential for the proposed project to create conflicts and adverse environmental impacts is summarized below. Much of the information provided is taken from the *Transportation Impact Analysis for the Franklin Road Retail Center Project* (KD Anderson & Associates 2022) ("transportation analysis"). The transportation analysis includes evaluations of project effects on vehicle miles traveled (VMT) and addresses pedestrian, bicycle, and transit issues. Traffic operations effects are also addressed at the request of the County, but these effects are not subject to review under CEQA. The transportation analysis is included in Appendix E. Refer to that document for detailed information.

Pedestrian and Bicycle Planning. There are developed areas of the nearby Franklin-Beachwood community that are within walking distance of the proposed project, but gaps in the system of sidewalks exist between the project site and the balance of the community. Due to the number of peak hour vehicles already on study area roads and the number that will be added by the project, conflicts between pedestrians and motor vehicles could increase. Similar issues affect bicyclists. The proposed project would generate customers or employees who could elect to ride bicycles to and from the project site. Bicycles would mix with motor vehicles on the routes to and from the site, which could be a safety issue during peak traffic periods when intersection queuing occurs.

General plan policy CIR-4.1 encourages a complete, safe, and interconnected bicycle and pedestrian circulation system that serves both commuter and recreational travel, and provides access to major destinations within and between Urban Communities and cities.

The Franklin-Beachwood community is an area of urban development for which this policy is being implemented as part of new development projects. The project site plan does not include pedestrian or bicycle improvements along its frontages. Therefore, it is inconsistent with this policy. Implementation of the following mitigation measure is needed to provide this consistency.

Mitigation Measure

TR-1 Prior to approval of the project, the applicant shall modify the site plan to include pedestrian and bicycle facilities consistent with Merced County standards to the to the satisfaction of Merced County Department of Public Works.

Constructing pedestrian and bicycle facilities along the project site frontages would not result new or more severe environmental impacts than described in this initial study for constructing the project as proposed.

Transit Planning. Employees generated by the proposed project may choose to use transit service if it were convenient to the site. The nearest regular transit stop is at the Dan Ward Road/Beachwood Drive intersection located approximately one mile northeast of the site, which is considered beyond an acceptable walking distance from the project site via existing roadways (typically up to one-half mile).

It is unlikely that the proposed project has a sufficient number of employees to support Transit Joint Powers Authority Board of Merced County's consideration of requiring a bus stop near the project site to serve the site. There are no transit stop improvements planned as part of the project. Regardless, the project is not inconsistent with Merced County policies promoting transit use and, therefore, would have no impact.

b. VMT impacts of the proposed project are evaluated in the transportation analysis. Significance criteria provided by the Office of Planning and Research have been used in this analysis. The criteria identify general direction regarding methods to be employed and significance criteria to evaluate VMT impacts. Screening criteria can be used to quickly identify whether a project can be presumed to have a less than significant VMT impact without conducting a detailed study. Projects meeting at least one of the screening criteria can be presumed to have a less than significant VMT impact.

Subsequent to the time the project VMT analysis was completed, Merced County adopted guidelines for evaluating the significance of VMT impacts. Nevertheless, the Office of Planning and Research guidance remains a reasonable basis for evaluating VMT impacts, as the screening criterion used to assess project impact is also a screening criterion in the County's more recently adopted guidelines.

The proposed project would fit under the screening criteria of local-serving non-residential development. This criterion is assessed by measures that note that local-serving retail uses can reduce travel by offering customers more choices in closer proximity. Local-serving retail uses of 50,000 square feet or less of building area can be presumed to have a less than significant impact. The proposed project includes less than

50,000 square feet of building area and would provide goods and services to nearby residents and motorists already traveling on State Route 99. The project site is also closer to the nearby residents than similar existing uses in the cities of Atwater and Merced.

By reducing the need to travel to more distant locations to access similar services, the proposed project will have a positive effect (i.e., reduction) on total regional VMT. The VMT impacts of the proposed project can be presumed to be less than significant.

c-d. The proposed project does not include circulation improvements that could result in related public safety hazards or inadequate emergency access. Access will be at new driveways on Franklin Road and Ashby Road. All transportation improvements must be consistent with the County's specifications, which are based on standard engineering practice for safe and efficient facility design. This includes specifications for emergency vehicle access (both onsite and offsite), sight distance, vehicle speed, turning radii, etc. The proposed site plan and roadway improvement plan will be reviewed by the Merced County Public Works and with fire and polices services to ensure that circulation improvements are designed consistent with their respective standards for safe movement of vehicles, pedestrians, bicyclists and emergency vehicles. The project will have a less-than-significant impact on circulation safety and emergency access.

18. TRIBAL CULTURAL RESOURCES

Would the project:

	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures Incorporated	Less-Than-Significant Impact	No Impact
a. 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, or cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
(1) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources code section 5020.1(k), or	☐	☐	☐	☒
(2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☐	☒

Comments:

a. As of the date of this initial study, the County has not received a request for consultation from any tribal representatives of any California Native American tribes traditionally and culturally affiliated with the project area and there is no evidence to suggest that the site would contain tribal cultural resources. No impacts on tribal cultural resources are anticipated.

19. UTILITIES AND SERVICES SYSTEMS

Would the project:

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures Incorporated	Less-Than-Significant Impact	No Impact
a.	Require or result in the relocation or construction of new or expanded water, wastewater treatment, 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 inadequate 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?	☐	☐	☒	☐

Comments:

a, c. **Water**. The proposed project site would connect with the existing water supply system and would not require off-site improvements. The environmental effects of constructing necessary on-site water infrastructure are addressed in other sections of this initial study as part of the assessment of overall project environmental effects.

Wastewater Conveyance Facilities. The applicant has estimated domestic wastewater generation at an average of 6,612 gallons per day based on the California Plumping Code values. This equates to approximately 0.00661 million gallons per day. A wastewater main that connects to the Franklin County Water District's (water district) existing wastewater conveyance infrastructure system is planned within the Franklin Road right-of-way as shown in Figure 4. The environmental effects of constructing the main are addressed in other sections of this initial study as part of the assessment of overall project environmental effects.

Wastewater Treatment Facilities. Franklin County Water District operates a wastewater treatment plant, three lift stations, and 12 ponds. The water district has indicated that it has sufficient capacity to serve the project and that the project would not trigger the need for new or expanded wastewater treatment facilities (Brenda Way, telephone interview April 7, 2023).

Storm Drainage Facilities. As discussed in Section 10.0, Hydrology and Water Quality, best management practices and low impact design measures would be implemented to collect stormwater runoff, pretreat it for water quality purposes and detain it to ensure that the volume and rate of discharge from the site does not exceed that for existing conditions. Therefore, the proposed project would not create or contribute runoff that would exceed the capacity of the existing stormwater drainage facilities into which stormwater would be discharged. The environmental effects of constructing the on-site storm drain collection system are addressed in other sections of this initial study as part of the assessment of overall project environmental effects.

Electricity/Natural Gas/Telecommunications Facilities. The project site is already served by PG&E and Xfinity and would not require the construction of relocation of related infrastructure beyond minor on-site connection improvements that are addressed in other sections of this initial study as part of the assessment of overall project environmental effects.

b. Refer to the analysis and conclusions provided in Section 10, Hydrology and Water Quality, item "b, e" regarding sufficiency of water supply for the project. As a general rule, wastewater generation volume is assumed to be 85-90 percent of a project's water demand volume. Therefore, considering a wastewater generation volume of 6,612 gallons per day, water demand is assumed to be about 7,604 gallons per day or 8.52-acre feet per year. It is assumed that the existing home on the site uses approximately 350 gallons per day drawn from groundwater; its annual demand would be approximately 0.4 afy. Net project demand would; therefore, be about 8.12 afy. California American Water provided a will-serve letter to the project applicant stating that it has sufficient water available to serve the project. The will-serve letter is included in Appendix D.

d, e. Solid waste at the project site is collected by Winton Disposal Services and disposed of at the Highway 59 Landfill and the Billy Wright Landfill. The landfills are operated by the Merced County Regional Waste Management Authority. Solid waste generated by the proposed project would be disposed at the Highway 59 landfill that is approximately five miles north of the project site. Using CalRecycle's 2020 metric that an average employee in Merced County generates 21 pounds per of solid waste per day (CalRecycle 2023), the proposed project would generate about 1,155 pounds of solid waste per day - 21 pounds per employee per day x up to 55 employees, or 0.58 tons of solid waste per day.

The Highway 59 Landfill has a design capacity of 36.4 million cubic yards and a permitted capacity of approximately 30 million cubic yards. About 22.6 million cubic yards of capacity remained in 2018 (University of Merced 2019). The landfill is also permitted to receive up to 1,500 tons of waste on a daily basis, which translates to a maximum of

459,000 tons per year; however, the average daily and annual tonnage received is substantially less. The estimated closure date for the facility is 2065 (Merced County Regional Waste Authority 2016). The Merced County Regional Waste Management Authority continues to pursue expansion projects to increase landfill disposal capacity. This will ensure the availability of solid waste disposal capacity in Merced County and accommodates for regional growth for the foreseeable future (Merced County Regional Waste Management Authority 2023).

There is no evidence to suggest that the solid waste disposal demand of the proposed project would trigger the need to develop additional landfill capacity.

The Merced County Regional Waste Management Authority is responsible for ensuring that its solid waste management activities are consistent with related state regulatory requirements and for providing sufficient solid waste capacity for its member agencies, including Merced County. As needed, the Merced County Regional Waste Management Authority would implement programs (e.g., recycling, diversion, etc.) necessary to meet state solid waste management mandates. The applicant would be required to participate in and implement such programs at the site level. The proposed project would have a less-than-significant solid waste impact.

20. WILDFIRE

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures 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 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?	☐	☐	☐	☒

Comments:

a. There are no emergency response or evacuation plans that involve facilities or activities in the immediate project area.

b-d. The proposed project is not located on or near state responsibility areas or lands classified as very high fire hazard severity zones (CalFire 2023).

21. MANDATORY FINDINGS OF SIGNIFICANCE

		Potentially Significant Impact	Less-than-Significant Impact with Mitigation Measures 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 an endangered, rare, or threatened species; 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?	☐	☒	☐	☐

Comments:

a. Biological resources effects of the project are described in Section 4, Biological Resources. The proposed project has potential to impact special status wildlife species. Mitigation is identified to reduce this impact to less-than-significant.

Cultural and tribal cultural resource effects of the project are described in sections 5 and 18. No cultural or tribal cultural resources that could represent important evidence of California history are known to exist within the project site or locations of off-site improvements. Impacts on unknown resources, should they be uncovered during project construction activities, would be reduced through implementing associated mitigation measures.

b. The proposed project would not convert prime farmland and farmland of statewide significance to non-agricultural use.

The proposed project would generate criteria air emissions and GHG emissions that contribute to associated cumulative effects. Air quality and GHG impacts would be less than cumulatively considerable with mitigation.

The proposed project would result in an increase in water demand. However, demand from development of the site with commercial uses was assumed in demand projections

included in the groundwater sustainability plan and associated projects needed to ensure subbasin sustainability. Impacts related to water supply and subbasin sustainability were found to be less than significant.

The proposed project would generate a traffic noise that would add to cumulative noise levels on local roadways. However, traffic noise impacts were found to be less than significant.

c. Several characteristics of the project and its location give rise to potential effects on/risks to human beings. The project would be a source of criteria air emissions, toxic air contaminants and GHG emissions that can have adverse effects on humans. However, associated air quality effects were found to be less than significant with mitigation and GHG impacts are reduced to less than significant with mitigation. The planned use of a fueling station gives rise to risks from accidental lease of hazardous materials. However, this fueling stations must be constructed, operated and maintained consistent with regulations designed to minimize risks. Public safety risks could arise from the project site location within a flood hazard zone and a dam inundation zone. Improvements must be designed consistent with the County's flood management regulations that are designed to minimize such risk. Similarly, risks from seismic hazards exist, but these are minimized through required conformance with regulations designed to minimize such risk, including the CBC. No risk from wildfires exists at the site.

Given this information, the project would not have substantial adverse effects on human beings.

E. SOURCES

Environmental Setting

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Mandatory Findings of Significance

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Project Plans

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APPENDIX

OPERATIONAL STATEMENT

PROPOSED GAS STATION / RESTAURANT

3355 Franklin Road, Merced, CA

APN 005-230-10 Merced County

January 10, 2022

PROPERTY OWNER

Inderjeet Singh

560 Pine Creek Circle
Fairfield, CA 94534

APPLICANT

Inderjeet Singh

c/o Milestone Assoc.
1000 Lincoln Rd, #H202
Yuba City, CA 95991
530-755-4700

REPRESENTATIVE

Julio Tinajero
Milestone Associates
1000 Lincoln Rd, #H202
Yuba City, CA 95991
530-870-1432
julio@milestone-ae.com

PROJECT DESCRIPTION

The proposed project consists of the construction of a 6,000 SF building which will a have a 3,200 SF Convenience Store (c-store) and a 2,800 SF restaurant with drive thru service.

A fueling facility with 20 fueling spaces (10 multi-product fuel dispensers) with an overhead canopy, 2 RV/Boat fueling spaces with an overhead canopy, and a separate stand-alone coffee drive thru building, approximately 2,200 SF, all proposed on a 163,786 sq. ft. (3.76 acre) parcel of land located at 3355 Franklin Road in the County of Merced, CA.

Also proposed is a new 8" sewer line connection to the Franklin Water District (FWD) sewer system. This new sewer main will extend from the project site to the existing FWD sewer main located in Lobo avenue, approximately 840 linear feet.

The proposed site improvements will provide for 94 parking spaces, 8 of which will be accessible parking spaces, and 20 spaces located at the fuel pumps. Access to the site is proposed from Franklin Road and Ashby Road.

OPERATIONAL CHARACTERISTICS

The proposed c-store will operate seven (7) days a week. Hours of operation are anticipated to be twenty-four (24) a day. The c-store will employ 10-15 employees over several shifts. Typical shifts will have 2-3 employees. The c-store will sale alcohol and tobacco products either through a Type 20 or Type 21 liquor license, whichever is available. The tobacco products sold will include cigars, cigarettes, chew, etc,

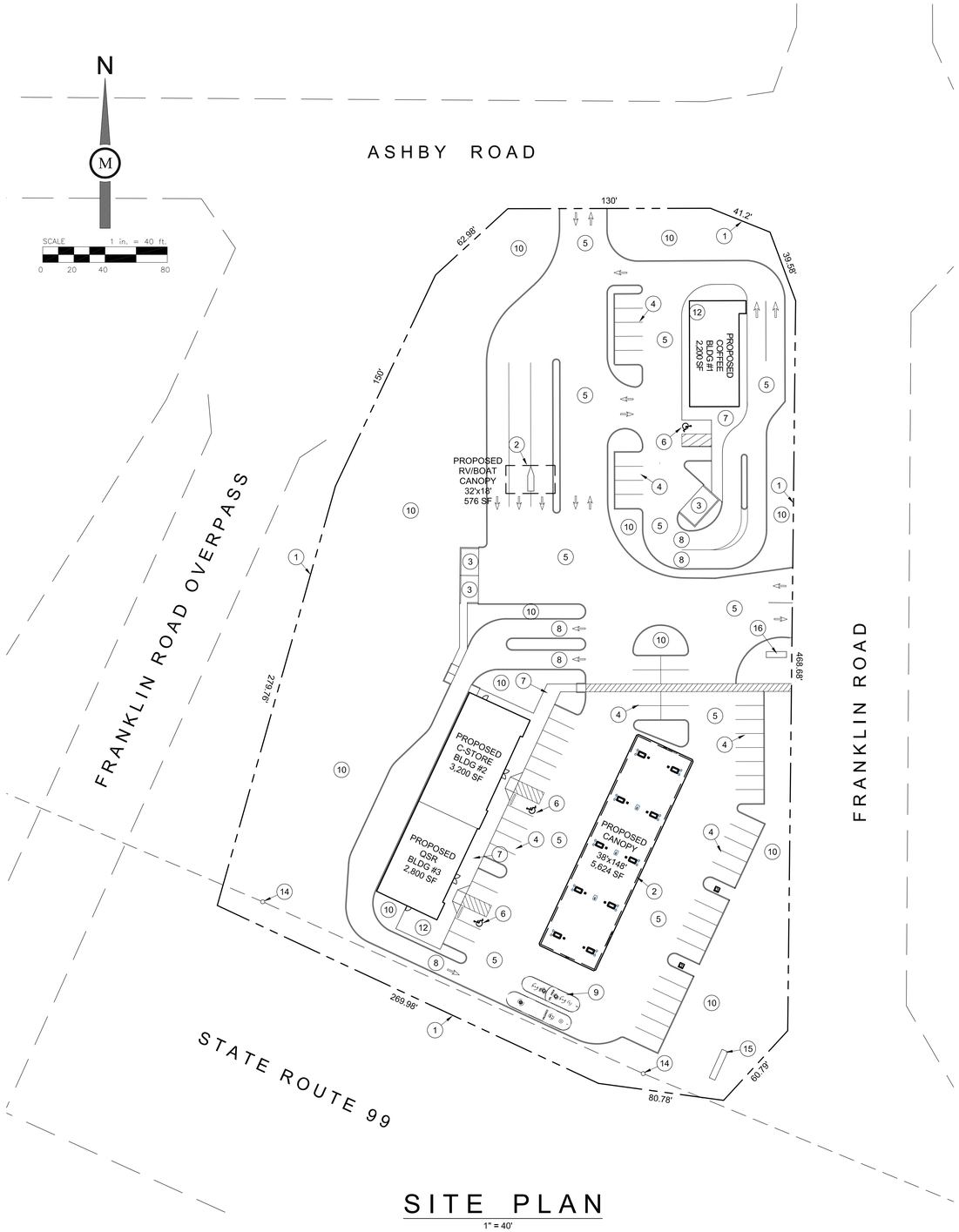
The proposed restaurant will operate seven (7) days a week. Hours of operation will be 6:00 a.m. to 1:00 a.m. Monday through Sunday. The restaurant will employ 20-30 part & full employees consisting of entry-level, assistant and manager positions, over several shifts. Typical shifts will have 4-6 employees.

The proposed coffee drive thru will operate seven (7) days a week. Hours of operation will be 6:00 a.m. to 1:00 a.m. Monday through Sunday. The restaurant will employ 5-10 part & full employees consisting of entry-level, assistant and manager positions, over several shifts. Typical shifts will have 2-4 employees.

SITE PLAN CHARACTERISTICS

The site will have approximately 26,281 SF of landscaping which is approximately 22.2% of the site. Total building coverage, including canopies is approximately 8.8% of the site. The building exterior will be a combination of different colors and patterns of paneling. The proposed project will either be served with a private well and septic system, or be connected to city services, whichever ones are available and feasible.

The applicant is the owner/operator of multiple commercial centers and understands what is required to manage a successful commercial center.

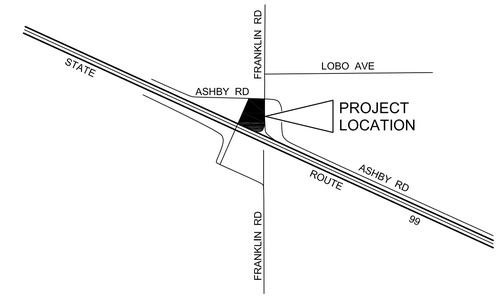


SITE PLAN
1" = 40'

KEYNOTES

#	
1	PROPERTY LINE, TYPICAL
2	DASHED LINE INDICATES LINE OF FUEL CANOPY ABOVE
3	CMU TRASH ENCLOSURE , TYPICAL
4	MERCED STANDARD PARKING STALL 9'–0" WIDE x 19'–0" LONG
5	ASPHALT PAVING, TYPICAL
6	VAN ACCESSIBLE PARKING STALL, TYPICAL
7	CONCRETE WALK, TYPICAL
8	DRIVE–THRU LANE
9	UNDERGROUND FUEL TANKS 1– 20,000 GALLON – REGULAR 1– 20,000 GALLON SPLIT TANK – 10,000 PREMIUM, 10,000 DIESEL
10	LANDSCAPING / STORMWATER BIO–RETENTION BASIN
11	NOT USED
12	OUTDOOR DINING AREA / PATIO
13	NOT USED
14	EXISTING POWER POLE AND OVERHEAD LINES TO REMAIN
15	PROPOSED 20 FT HIGHWAY SIGN
16	PROPOSED 20 FT MONUMENT/PRICE SIGN

VICINITY MAP



PROJECT LOCATION
2355 FRANKLIN ROAD
MERCED, CA 95348
A.P.N.: 005–230–010

PROJECT TEAM

PROPERTY OWNER

INDERJEET SINGH
560 PINE CREEK CIRCLE
FAIRFIELD, CA 94534
PH. (707) 333–3444

DESIGN FIRM/AUTHORIZED AGENT

MILESTONE ASSOCIATES
JULIO TINAJERO
1000 LINCOLN ROAD, STE. H202
YUBA CITY, CA 95991
PH. (530) 755–4700
FAX (530) 755–4567

PROJECT DATA

ASSESSOR'S PARCEL NUMBER:	005–230–10
PROJECT ADDRESS:	2355 FRANKLIN ROAD MERCED, CA 95348
PROJECT JURISDICTION:	MERCED COUNTY
SCOPE OF WORK:	APPLICATION FOR THE DEVELOPMENT OF PROJECT SITE INTO A PROPOSED COFFEE DRIVE THRU, GAS STATION, CONVENIENCE STORE, AND DRIVE–THRU RESTAURANT.
GENERAL PLAN DESIGNATION:	C–1 NEIGHBORHOOD COMMERCIAL
ZONING	C–1 NEIGHBORHOOD COMMERCIAL
SITE AREA:	3.76 ACRES / 163,786 SF
WATER SERVICES	CALIFORNIA WATER COMPANY
WASTE SERVICES:	FRANKLIN WATER DISTRICT
STORMWATER:	ON–SITE BIO–RETENTION BASIN
FIRE SPRINKLERS:	NOT REQUIRED
BUILDING AREA, USE & PARKING:	

BUILDING #1
AREA: 2,200 SF
USE: COFFEE DRIVE THRU
PARKING: 1 PER 100 SF + 1 PER EMPLOYEE
= (2,200 SF/100) + (1 x 4 EMPLOYEES)
= 22 + 4
= 26 SPACES REQUIRED

BUILDING #2
AREA: 3,200 SF
USE: CONVENIENCE STORE
PARKING: 1 PER 400 SF + 1 PER EMPLOYEE
= (3,200 SF/400) + (1 X 6 EMPLOYEES)
= 8 + 6
= 14 SPACES REQUIRED

BUILDING #3
AREA: 2,800 SF
USE: DRIVE–THRU RESTAURANT
PARKING: 1 PER 100 SF + 1 PER EMPLOYEE
= (2,800 SF/100) + (1 x 6 EMPLOYEES)
= 28 + 6
= 34 SPACES

AUTO FUELING CANOPY
AREA: 5,624 SF
USE: FUEL CANOPY
PARKING: NO PARKING REQUIRED

RV/BOAT CANOPY
AREA: 576 SF
USE: FUEL CANOPY
PARKING: NO PARKING REQUIRED

TOTAL BUILDING AREA PROPOSED:	14,400 SF (INCLUDES CANOPIES)
TOTAL PARKING REQUIRED:	74 STANDARD SPACES

PARKING PROVIDED:

BLDG #1 – COFFEE		26
	STANDARD SPACES:	24
	ACCESSIBLE SPACES:	2
BLDG #2 – C–STORE		14
	STANDARD SPACES:	13
	ACCESSIBLE SPACES:	1
BLDG #3 – RESTAURANT		34
	STANDARD SPACES:	32
	ACCESSIBLE SPACES:	2
TOTAL		
	STANDARD SPACES:	66
	ACCESSIBLE SPACES:	8

TOTAL CAR SPACES PROVIDED: 87 STANDARD SPACES (INCLUDES 20 FUEL PUMP SPACES)

SITE AREA TABULATIONS:

BUILDING AREA (INCL. CANOPIES():	14,400 SF	8.8%
LANDSCAPE AREA:	36,281 SF	22.2%
CONCRETE / ASPHALT AREA:	113,105 SF	69.0%
TOTAL SITE AREA:	163,786 SF	

SHEET INDEX

1	SITE PLAN / PROJECT DATA
2	PRELIMINARY LANDSCAPE PLAN
3	PHOTOMETRIC PLAN
4	BLDG #1 EXTERIOR ELEVATIONS
5	BLDG #2-3 EXTERIOR ELEVATIONS
6	FUEL CANOPY PLAN / ELEVATIONS
7	TRASH ENCLOSURE PLAN
8	SANITARY SEWER MAIN EXTENSION PLAN & PROFILE

Milestone Associates Imagineering, Inc.
1000 Lincoln Road, Suite H202, Yuba City, CA 95991
(530) 755-4700

FRANKLIN RETAIL CENTER
2355 FRANKLIN ROAD, MERCED, CA 95348
A.P.N. 005-230-010

SITE PLAN / PROJECT DATA

1

12-28-21

2355 FRANKLIN ROAD COMMERCIAL CENTER

PRELIMINARY PLANT SCHEDULE				
SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	WATER USE
ACCENT TREES				
	CERCIS OCCIDENTALIS	WESTERN REDBUD	15 GAL	LOW
	LAGERSTROEMIA X 'MUSKOGEE'	LIGHT LAVENDER CRAPE MYRTLE	15 GAL	LOW
PARKING LOT TREES				
	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE	24" BOX	MODERATE
	PISTACIA CHINENSIS 'KEITH DAVEY'	KEITH DAVEY CHINESE PISTACHE	24" BOX	LOW
	ULMUS PARVIFOLIA	CHINESE ELM	24" BOX	MODERATE
PERIMETER SCREEN TREES				
	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE	24" BOX	MODERATE
	PINUS CANARIENSIS	CANARY ISLAND PINE	24" BOX	LOW
	ZELKOVA SERRATA 'GREEN VASE'	GREEN VASE ZELKOVA	24" BOX	MODERATE
STREET TREES				
	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE	24" BOX	MODERATE
	PISTACIA CHINENSIS 'KEITH DAVEY'	KEITH DAVEY CHINESE PISTACHE	24" BOX	LOW
	ZELKOVA SERRATA 'GREEN VASE'	GREEN VASE ZELKOVA	24" BOX	MODERATE
UPRIGHT TREES				
	ACER X FREEMANII 'ARMSTRONG'	ARMSTRONG MAPLE	15 GAL	MODERATE
	GINKGO BILOBA 'PRINCETON SENTRY'	PRINCETON SENTRY GINKGO	15 GAL	MODERATE
	LAURUS NOBILIS 'SARATOGA'	SARATOGA LAUREL	15 GAL	LOW
ACCENT SHRUBS				
	AGAPANTHUS AFRICANUS 'QUEEN ANNE'	QUEEN ANNE AGAPANTHUS	1 GAL	MODERATE
	HEMEROCALLIS X 'CRANBERRY BABY'	CRANBERRY BABY DAY LILY	1 GAL	MODERATE
	SALVIA X SYLVESTRIS 'MAY NIGHT'	MAY NIGHT SAGE	1 GAL	LOW
GRASSES AND GRASS-LIKE PLANTS				
	CALAMAGROSTIS X ACUTIFLORA 'KARL FOERSTER'	FEATHER REED GRASS	5 GAL	LOW
	DIETES BICOLOR	FORTNIGHT LILY	5 GAL	LOW
	MUHLENBERIGA CAPILLARIS	PINK MUHLY GRASS	1 GAL	LOW
GROUNDCOVERS				
	ARCTOSTAPHYLOS 'EMERALD CARPET'	EMERALD CARPET MANZANITA	1 GAL	LOW
	COTONEASTER DAMMERI 'STRIEBS FINDLING'	STRIEBS FINDLING COTONEASTER	1 GAL	LOW
	MYOPORUM PARVIFOLIUM 'PINK'	PINK TRAILING MYOPORUM	1 GAL	LOW
MEDIUM HEIGHT SHRUBS				
	CALLISTEMON VIMINALIS 'LITTLE JOHN'	LITTLE JOHN BOTTLE BRUSH	1 GAL	LOW
	CISTUS MICROPHYLLA 'HOT LIPS'	HOT LIPS SALVIA	1 GAL	LOW
	NANDINA DOMESTICA 'GULF STREAM'	GULF STREAM NANDINA	1 GAL	LOW
SCREEN SHRUBS / HEDGES				
	LIGUSTRUM JAPONICUM 'TEXANUM'	WAXLEAF PRIVET	5 GAL	LOW
	OLEA EUROPAEA 'LITTLE OLLIE'	LITTLE OLLIE OLIVE	5 GAL	LOW
	XYLOSMA CONGESTUM 'COMPACTA'	COMPACT XYLOSMA	5 GAL	LOW
VINES				
	FICUS BENJAMINA	WEEPING FIG	1 GAL	MODERATE
	PARTHENOCISSUS TRICUSPIDATA	BOSTON IVY	5 GAL	MODERATE
BIOFILTRATION GRASSES				
	CAREX TUMULICOLA	FOOTHILL SEDGE	1 GAL	LOW
	CHONDRAPETALUM TECTORUM 'EL CAMPO'	CAPE RUSH	1 GAL	LOW
	MUHLENBERGIA RIGENS	DEER GRASS	1 GAL	LOW

* THE PLANTS LISTED IN THE PRELIMINARY PLANT SCHEDULE ABOVE REPRESENTS A SAMPLE OF THE TYPES OF TREES, SHRUBS, AND GROUNDCOVERS THAT WE ANTICIPATE BEING APPROPRIATE FOR THIS LOCATION AND REPRESENTS THE OVERALL DESIGN STYLE AND THEME. THE FINAL PLANT SELECTION WILL DRAW FROM THIS LIST; IN ADDITION, NOT ALL PLANS LISTED MAY BE USED AND NEW PLANT SPECIES MAY BE ADDED. HOWEVER, THE PLANTING DESIGN INTENT WILL REMAIN CONSISTENT WITH THIS PLAN AND PLANT SCHEDULE.

PROJECT IRRIGATION NOTE

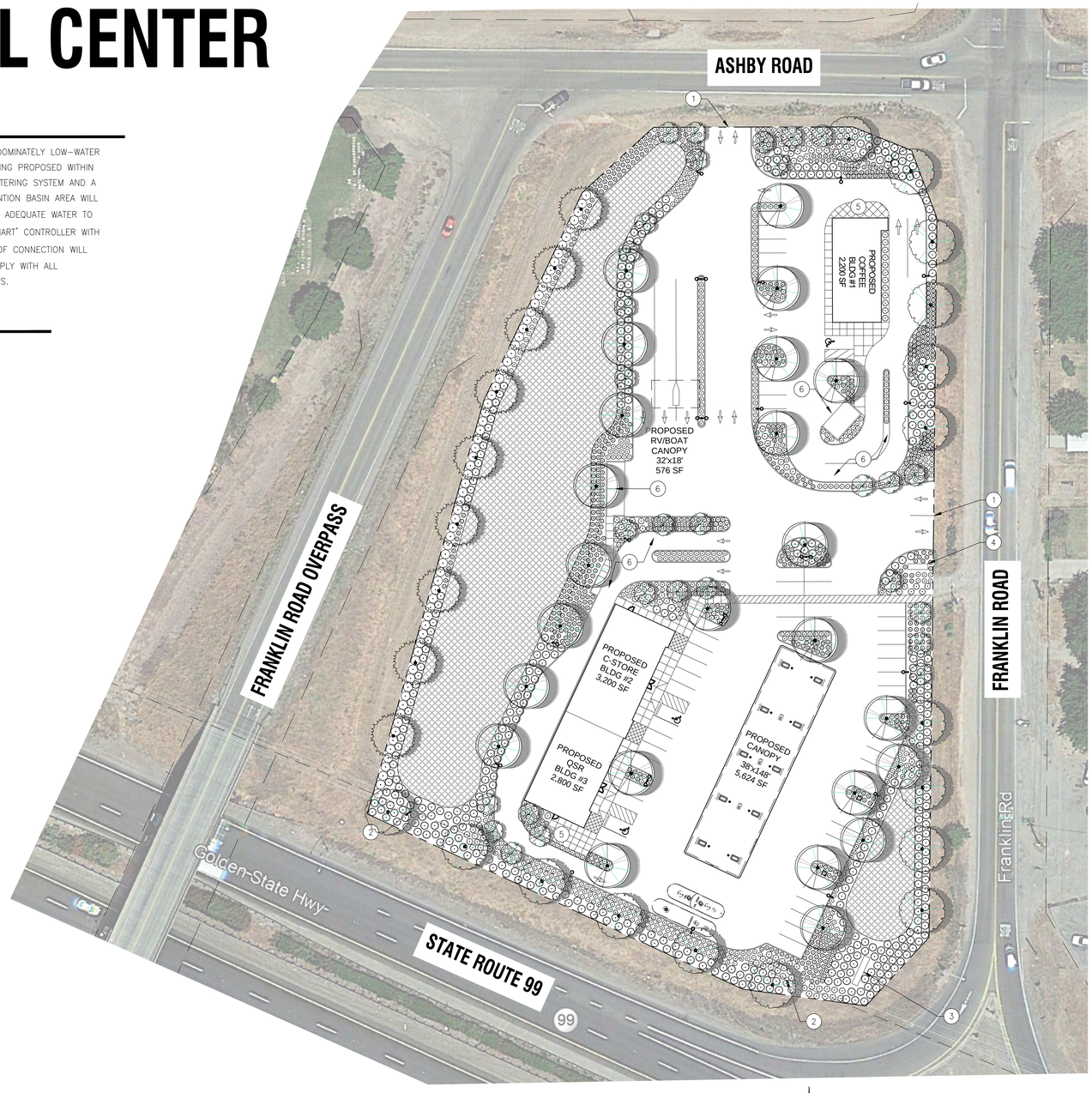
THE PROPOSED PLANTING DESIGN FOR THIS PROJECT IS COMPRISED OF PREDOMINATELY LOW-WATER USE TREES, SHRUBS, AND GROUNDCOVERS WITH BIO-RETENTION GRASSES BEING PROPOSED WITHIN THE DETENTION BASIN AREA. THE TREES WILL BE IRRIGATED WITH A ROOT WATERING SYSTEM AND A SURFACE SUPPLEMENTAL BUBBLER. THE SHRUBS, GROUNDCOVERS, AND DETENTION BASIN AREA WILL BE IRRIGATED WITH LOW VOLUME POINT SOURCE DRIP/BUBBLERS TO PROVIDE ADEQUATE WATER TO THE PLANT ROOT ZONE. THE SITE IRRIGATION WILL BE CONTROLLED BY A 'SMART' CONTROLLER WITH WEATHER SENSING CAPABILITIES (HUNTER, RAINBIRD, OR EQUAL). THE POINT OF CONNECTION WILL UTILIZE A BACKFLOW PREVENTER, MASTER VALVE, AND FLOW SENSOR TO COMPLY WITH ALL APPLICABLE LOCAL AND STATE WATER EFFICIENT LANDSCAPE ORDINANCE CODES.

LANDSCAPE AREA

TOTAL PROJECT AREA – PARCEL SIZE:	160,416 SF	
TOTAL LANDSCAPE AREA:	74,861 SF	100%
SHRUB AND GROUNDCOVER AREA:	46,298 SF	61.8%
EXISTING VEGETATION TO REMAIN:	28,563 SF	38.2%
PERCENT OF SITE IN LANDSCAPE:		46.7%

LEGEND

1. PROPOSED ENTRY DRIVE
2. EXISTING POWER POLE
3. PROPOSED HIGHWAY SIGN
4. PROPOSED MONUMENT SIGN
5. OUTDOOR DINING AREA
6. PROPOSED TRASH ENCLOSURE – PER ARCHITECT'S PLANS
7. DRIVE-THRU WITH MENU BOARDS



N

0 20 40 80

SCALE: 1" = 40'

LANDSCAPE CONCEPT PLAN

12/10/2021

NOTE: THIS DOCUMENT IS FOR CONCEPTUAL PLANNING PURPOSES ONLY. THIS DOCUMENT IS MARKED PRELIMINARY AND NOT TO BE USED FOR CONSTRUCTION PURPOSES. ANY IMAGES SHOWN ARE TO CONVEY CONCEPT ONLY. CONSTRUCTION PLANS WILL VARY DEPENDING ON BUDGET, CLIENT DIRECTION, COMMUNITY INPUT AND FINAL MATERIALS SELECTION.

O'DELL ENGINEERING



Plan View
Scale - 1/32" = 1ft

Schedule

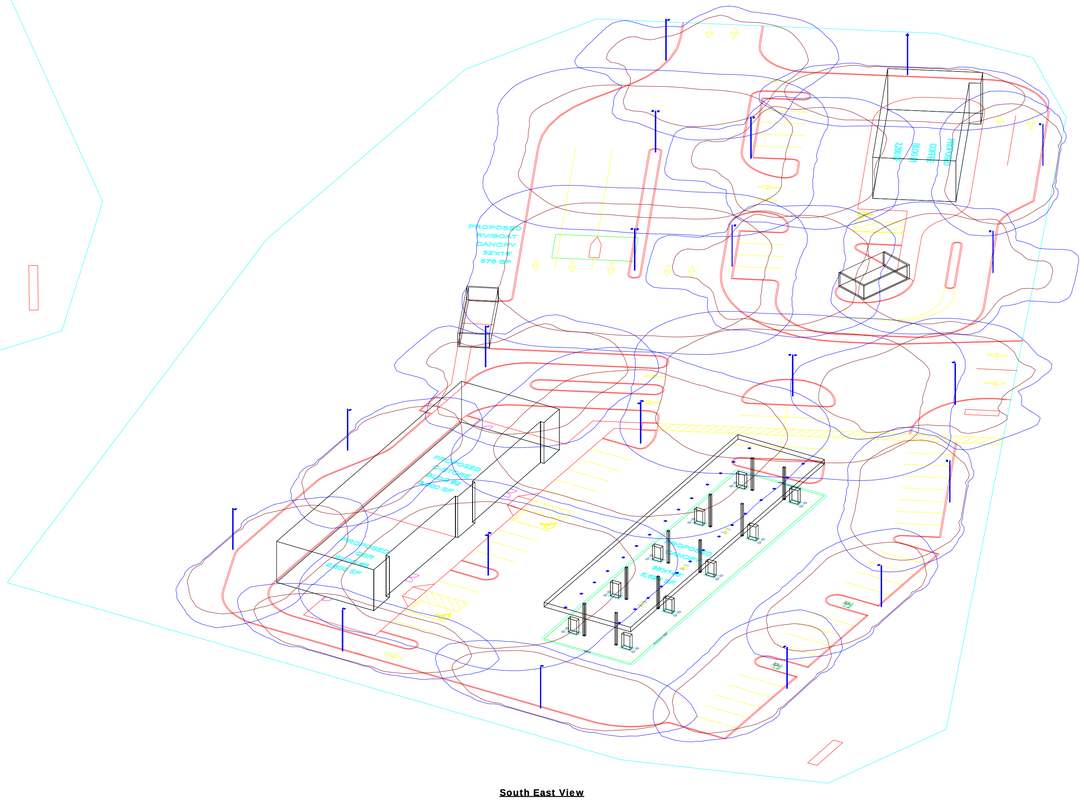
Symbol	Label	Quantity	Manufacturer	Catalog Number	Description	Lamp	Lumens Per Lamp	Light Loss Factor	Wattage
	C	28	HiGas	100W	FL12-100 4000K Ra80 F00A02	LED	14618	0.9	100.4
	S1	9	Lithonia Lighting	DSX0 LED P6 40K BLC MVOLT	DSX0 LED P6 40K BLC MVOLT	LED	13089	0.9	134
	S2	6	Lithonia Lighting	DSX0 LED P6 40K TFTM MVOLT	DSX0 LED P6 40K TFTM MVOLT	LED	15964	0.9	134
	S3	5	Lithonia Lighting	DSX0 LED P6 40K T5W MVOLT	DSX0 LED P6 40K T5W MVOLT	LED	16466	0.9	268

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
BUILDING #1 DRIVE / PARKING	+	3.5 fc	7.1 fc	1.2 fc	5.9:1	2.9:1
BUILDING #1 DRIVE-THRU	+	3.4 fc	7.4 fc	1.1 fc	6.7:1	3.1:1
BUILDING #1 SIDEWALKS	+	2.2 fc	5.6 fc	0.5 fc	11.2:1	4.4:1
BUILDING #2 & 3 DRIVE / PARKING	+	4.6 fc	9.3 fc	1.5 fc	6.2:1	3.1:1
BUILDING #2 & 3 DRIVE-THRU	+	3.9 fc	7.6 fc	1.3 fc	5.8:1	3.0:1
BUILDING #2 & 3 SIDEWALKS	+	3.1 fc	6.1 fc	0.5 fc	12.2:1	6.2:1
DRIVE LANE	+	3.3 fc	7.0 fc	1.0 fc	7.0:1	3.3:1
UNDER GAS CANOPY	+	41.6 fc	54.1 fc	23.9 fc	2.3:1	1.7:1

Luminaire Locations

Label	MH
C	14.00
S1	18.00
S2	18.00
S3	18.00



South East View

Disclaimer
Photometric analyses performed by CJS Lighting are intended for informational and/or estimation purposes only. Using industry-recognized software, calculations correspond to the information provided to CJS Lighting, and are subject to the limitations of the software. Assumptions may be made for information that is not provided or available. It is the responsibility of the client to verify that the input data is consistent with actual field conditions. Performance may differ as a result of end-user environment and application. Due to the above considerations, CJS Lighting does not guarantee that actual light levels measured in the field will match initial calculations, and recommend that drawings be submitted to a certified electrical engineer for verification.

CJS Lighting

FRANKLIN RETAIL SITE

Designer
DEW
Date
12/3/2021
Scale
AS NOTED
Drawing No.

Summary



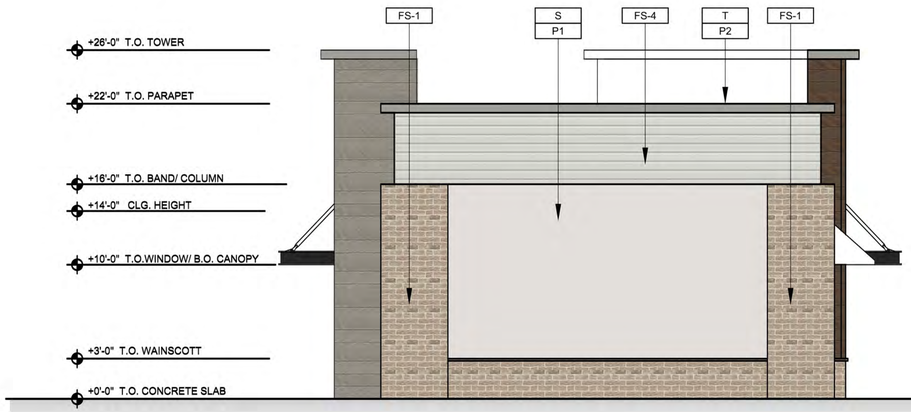
FRONT ELEVATION (WEST)

3/16" = 1'-0"



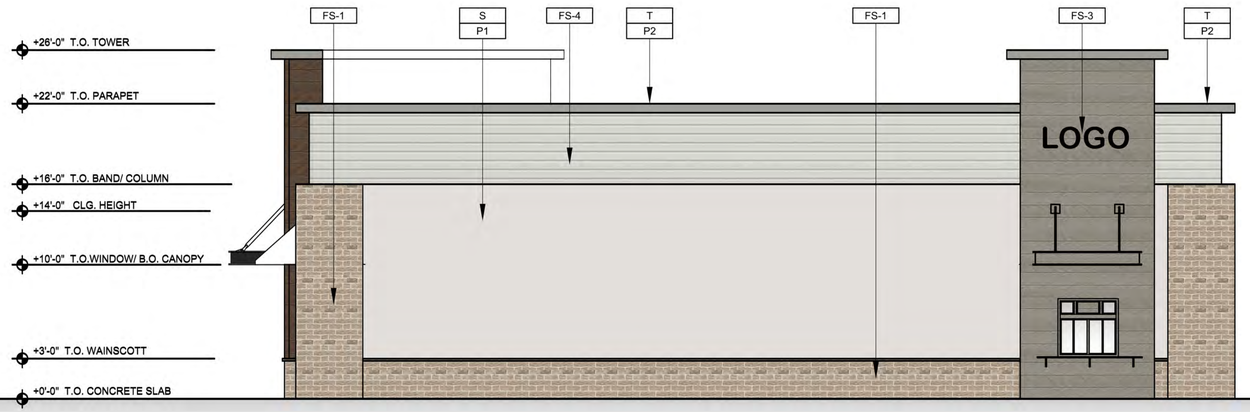
RIGHT SIDE ELEVATION (SOUTH)

3/16" = 1'-0"



LEFT SIDE ELEVATION (NORTH)

3/16" = 1'-0"



REAR ELEVATION (EAST)

3/16" = 1'-0"

A. GENERAL NOTES:

REAVEAL LOCATIONS IN FINISH SYSTEM SHOWN ARE TO ALIGN AS CLOSELY AS POSSIBLE TO ELEVATIONS.

MATERIAL LEGEND:

- C — CANOPY
- S — STUCCO; 7/8" CEMENT PLASTER TEXTURE: FINE SAND FINISH
- T — TRIM AND CORNICE
- SF — STOREFRONT; ALUM.
- AWN — AWNING

COLOR LEGEND:

- P-1 — SHERWIN WILLIAMS SW7077 COLOR: ORIGINAL WHITE
- P-2 — SHERWIN WILLIAMS SW6003 COLOR: PROPER GRAY
- P-3 — SHERWIN WILLIAMS SW6924 COLOR:DIRECT GREEN
- FS-1 — NICHIHA BRICK; CANYON BRICK COLOR: SHALE BROWN
- FS-2 — NICHIHA WOOD SERIES; ROUGHSAWN COLOR: TOBACCO
- FS-3 — NICHIHA WOOD SERIES; ROUGHSAWN COLOR: SMOKE
- FS-4 — NICHIHA RIBBED; COLOR: IVORY
- FS-5 — NICHIHA VINTAGEWOOD SERIES; COLOR: BARK

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BUILDING #1 EXTERIOR ELEVATIONS

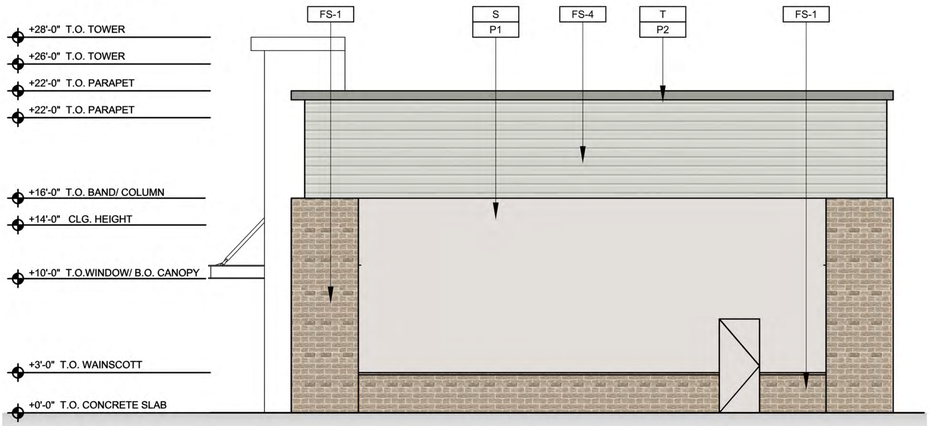
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12-13-21



FRONT ELEVATION (EAST)

3/16" = 1'-0"



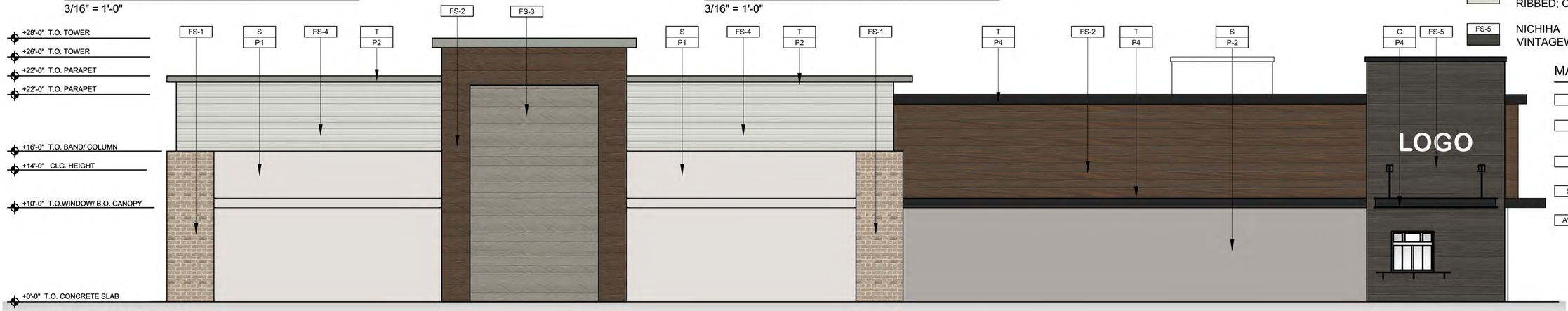
LEFT SIDE ELEVATION (NORTH)

3/16" = 1'-0"



RIGHT SIDE ELEVATION (SOUTH)

3/16" = 1'-0"



REAR ELEVATION (WEST)

3/16" = 1'-0"

A. GENERAL NOTES:

REAVEAL LOCATIONS IN FINISH SYSTEM SHOWN ARE TO ALIGN AS CLOSELY AS POSSIBLE TO ELEVATIONS.

COLOR LEGEND:

P-1	SHERWIN WILLIAMS SW7077 COLOR: ORIGINAL WHITE
P-2	SHERWIN WILLIAMS SW6003 COLOR: PROPER GRAY
P-3	SHERWIN WILLIAMS SW6924 COLOR:DIRECT GREEN
P-4	SHERWIN WILLIAMS SW7069 COLOR:IRON ORE
FS-1	NICHIHA BRICK; CANYON BRICK COLOR: SHALE BROWN
FS-2	NICHIHA WOOD SERIES; ROUGHSAWN COLOR: TOBACCO
FS-3	NICHIHA WOOD SERIES; ROUGHSAWN COLOR: SMOKE
FS-4	NICHIHA RIBBED; COLOR: IVORY
FS-5	NICHIHA VINTAGEWOOD SERIES; COLOR: BARK

MATERIAL LEGEND:

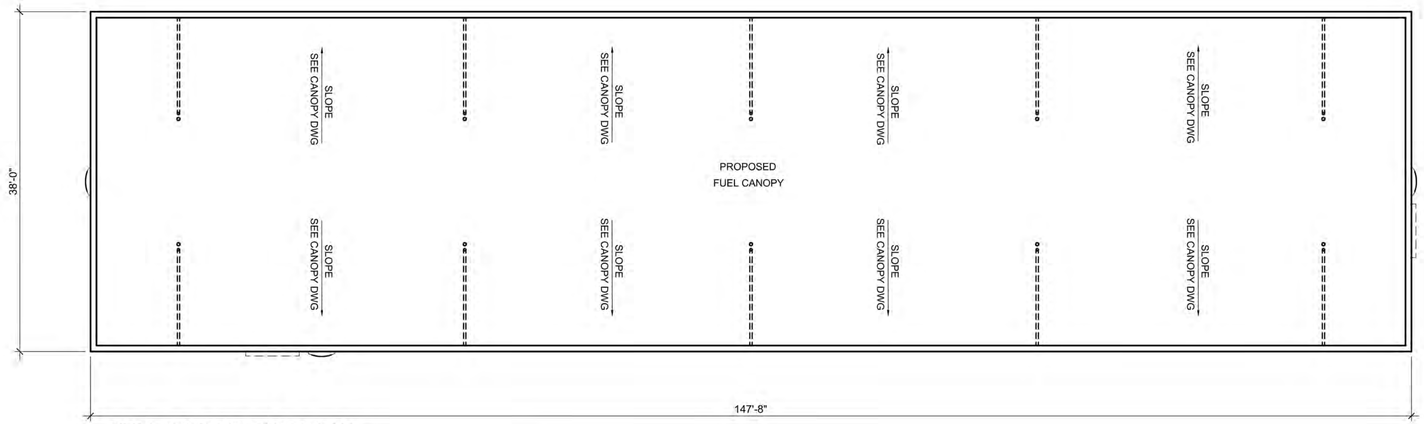
C	CANOPY
S	STUCCO; 7/8" CEMENT PLASTER TEXTURE: FINE SAND FINISH
T	TRIM AND CORNICE
SF	STOREFRONT; ALUM.
AWN	AWNING

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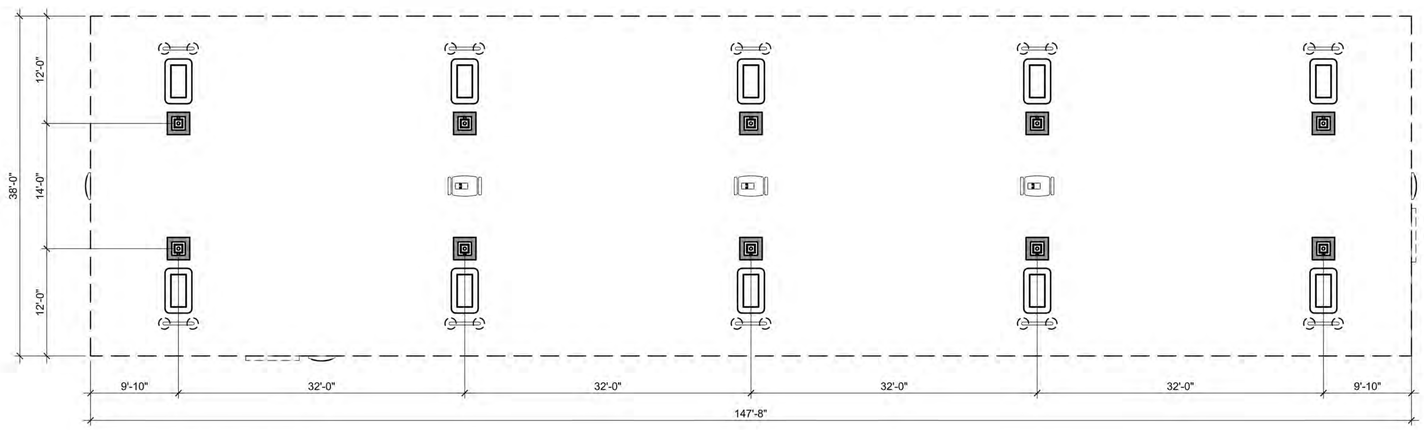
BUILDING #1 EXTERIOR ELEVATIONS

12-13-21



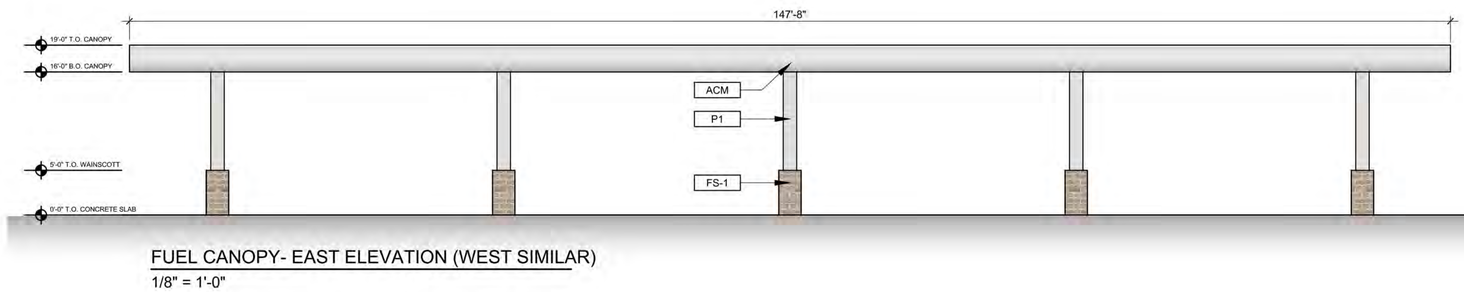
FUEL CANOPY-ROOF PLAN

1/8" = 1'-0"



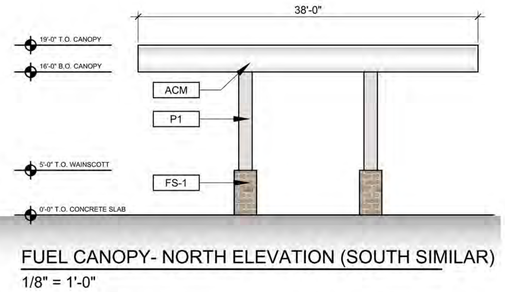
FUEL CANOPY- PLAN

1/8" = 1'-0"



FUEL CANOPY- EAST ELEVATION (WEST SIMILAR)

1/8" = 1'-0"



FUEL CANOPY- NORTH ELEVATION (SOUTH SIMILAR)

1/8" = 1'-0"

A. GENERAL NOTES:

REAVEAL LOCATIONS IN FINISH SYSTEM SHOWN ARE TO ALIGN AS CLOSELY AS POSSIBLE TO ELEVATIONS.

COLOR LEGEND:

P-1 — SHERWIN WILLIAMS
SW7077 COLOR: ORIGINAL WHITE

FS-1 — NICHIHA
BRICK; CANYON BRICK COLOR: SHALE BROWN

MATERIAL LEGEND:

ACM — ACM PANEL; TBD

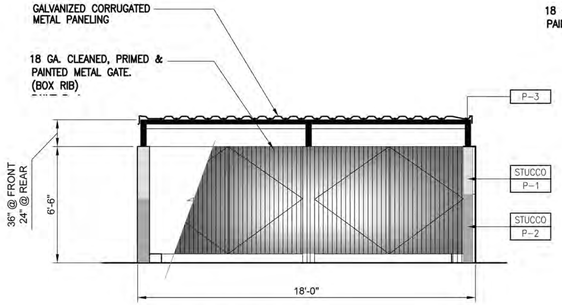
S — STUCCO; 7/8" CEMENT PLASTER
TEXTURE: FINE SAND FINISH

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(530) 755-4700

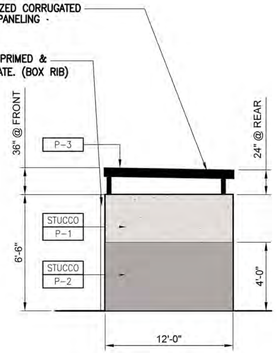
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FUEL CANOPY

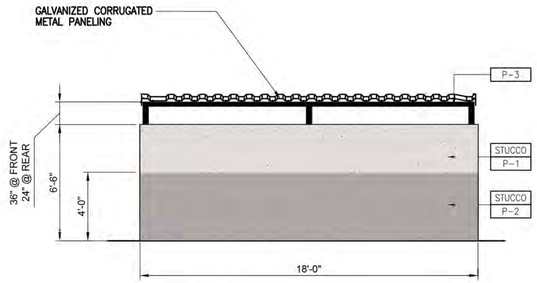
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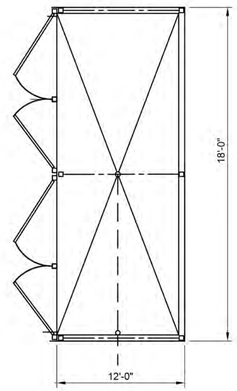
FRONT ELEVATION



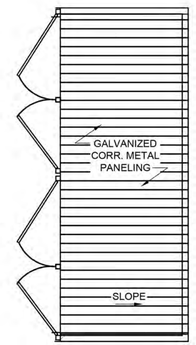
SIDE ELEVATION



REAR ELEVATION



FLOOR PLAN



ROOF PLAN

COLOR LEGEND

P-1	SHERWIN WILLIAMS SW7077 COLOR: ORIGINAL WHITE
P-2	SHERWIN WILLIAMS SW6003 COLOR: PROPER GRAY
P-3	SHERWIN WILLIAMS SW7069 COLOR:IRON ORE

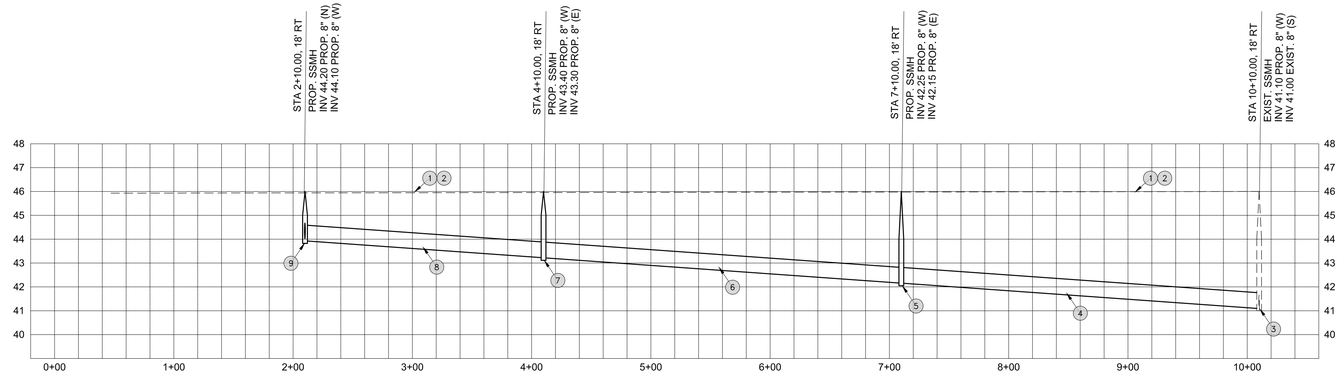
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TRASH ENCLOSURE

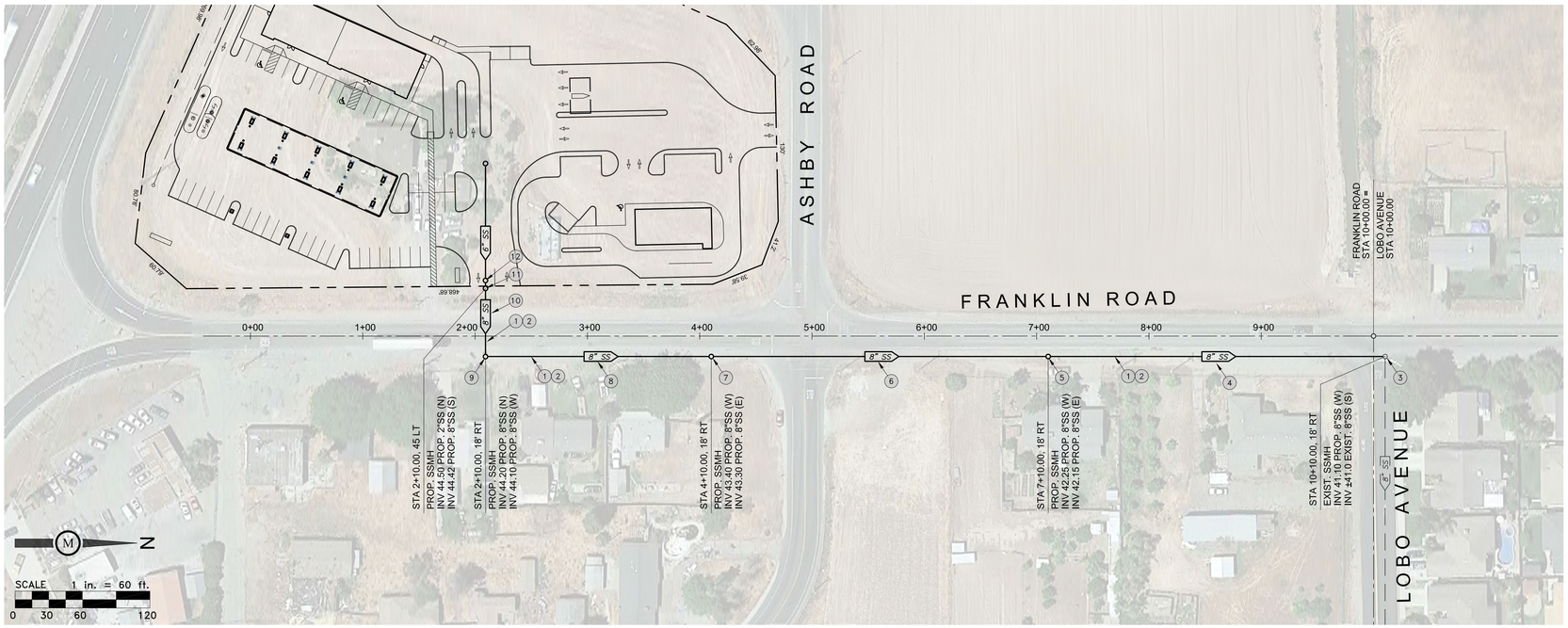
7

12-13-21



PROFILE

HORIZ. SCALE: 1" = 60'
VERT. SCALE: 1" = 3'



PLAN

SCALE: 1" = 60'

CONSTRUCTION NOTES:

1. SAWCUT AND REMOVE APPROXIMATELY 1726 SF OF EXISTING AC PAVEMENT. SAWCUT LINES SHALL BE NEAT STRAIGHT LINES.
2. COMPACT NATIVE SOILS AND REPLACE ROAD SECTION IN KIND, MINIMUM 8" TYPE "A" HMA OVER 13" CLASS 2 AB PER CALTRANS STANDARDS.
3. EXISTING SANITARY SEWER MANHOLE TO REMAIN
   RIM EL. ±46.0
   INV 41.10 PROP. 8" (W)
   INV ±41.0 EXIST. 8" (S)
4. INSTALL ±300 LF OF 8"SS PVC SDR 26 AT S=0.0035
5. INSTALL NEW SSMH PER COUNTY REQUIREMENTS
   RIM EL. = ±46.0
   INV 42.25 PROP 8"SS (W)
   INV 42.15 PROP. 8"SS (E)
6. INSTALL ±300 LF OF 8"SS PVC SDR 26 AT S=0.0035
7. INSTALL NEW SSMH PER COUNTY REQUIREMENTS
   RIM EL. = ±46.0
   INV 43.40 PROP 8"SS (W)
   INV 43.30 PROP. 8"SS (E)
8. INSTALL ±200 LF OF 8"SS PVC SDR 26 AT S=0.0035
9. INSTALL NEW SSMH PER COUNTY REQUIREMENTS
   RIM EL. = ±46.0
   INV 44.20 PROP 8"SS (N)
   INV 44.10 PROP. 8"SS (E)
10. INSTALL ±63 LF OF 8"SS PVC SDR 26 @ S=0.0035
11. INSTALL NEW SSMH PER COUNTY REQUIREMENTS
    RIM EL. = ±46.0
    INV 44.52 PROP 2"SS (N) - FORCE MAIN
    INV 44.42 PROP. 8"SS (S)
12. INSTALL ON-SITE SEWER LIFT STATION
    RIM EL. ±45.8
    INV 44.52 PROP. 2"SS (S) FORCE MAIN
    INV 41.00 PROP. 6"SS (N)

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CONCEPTUAL SANITARY SEWER
MAIN EXTENSION
PLAN & PROFILE

12-28-21

Air Quality and GHG Report

APPENDIX B

Air Quality/Health Risk Assessment
and Greenhouse Gas Analysis Report

Franklin Road Retail Center

August 26, 2022







Prepared by

EMC Planning Group

AIR QUALITY/HEALTH RISK ASSESSMENT
AND GREENHOUSE GAS ANALYSIS REPORT

FRANKLIN ROAD RETAIL CENTER

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August 26, 2022

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Table of Contents

1.0 INTRODUCTION 1-1

1.1 Project Location and Setting 1-1

1.2 Project Description 1-1

2.0 AIR QUALITY/HEALTH RISK ASSESSMENT 2-1

2.1 Environmental Setting 2-1

2.2 Regulatory Setting 2-8

2.3 Thresholds of Significance 2-16

2.4 Analysis, Impacts and Mitigation Measures 2-17

3.0 GREENHOUSE GASES 3-1

3.1 Environmental Setting 3-1

3.2 Regulatory Setting 3-7

3.3 Thresholds of Significance 3-18

3.4 Analysis, Impacts and Mitigation Measures 3-19

4.0 SOURCES 4-1

Appendices

Appendix A Emissions Modeling Methodology, Assumptions, and Results

Appendix B Health Risk Assessment

Tables

Table 2-1 Common Criteria Air Pollutants 2-3

Table 2-2 Typical Non-road Engine Emissions Standards 2-6

Table 2-3 National and California Ambient Air Quality Standards 2-9

Table 2-4 Air District Thresholds of Significance 2-17

Table 2-5 Unmitigated Operational Criteria Air Pollutant Emissions 2-18

Table 3-1 GHG Types and Their Contribution to Global Warming 3-5
Table 3-2 GHG Global Warming Potentials 3-6
Table 3-3 Net Annual Unmitigated Operational GHG Emissions 3-20

Figures

Figure 1 Location Map 1-3
Figure 2 Existing Land Uses and Features 1-5
Figure 3 Site Plan 1-7

1.0 Introduction

This air quality/health risk assessment and greenhouse gas emissions (GHG) report has been prepared by EMC Planning Group on behalf of the applicant for the Franklin Road Commercial Center ("proposed project" or "project"). The information is intended to serve as a technical input to the California Environmental Quality Act environmental review process to be undertaken by Merced County as the lead agency. The project location and description are presented first to provide context for the technical analyses which follow.

1.1 Project Location and Setting

The 3.76-acre project site is located in Merced County, approximately 2.0 miles northwest of the City of Merced at the U.S. Highway 99/Franklin Road interchange as shown in Figure 1, Location Map. Figure 2, Existing Land Uses and Features, shows existing conditions within and adjacent to the project site. Franklin Road borders the western and eastern boundaries of the site, Ashby Road the northern boundary, and U.S. Highway 101 the southern boundary. Rural residential uses and a pet cemetery border the site on the west, agricultural uses on the north, rural residences and an automotive sales business on the east, and U.S. Highway 99 on the south. The site contains a single-family dwelling, with the remainder vacant and in dry farming use.

1.2 Project Description

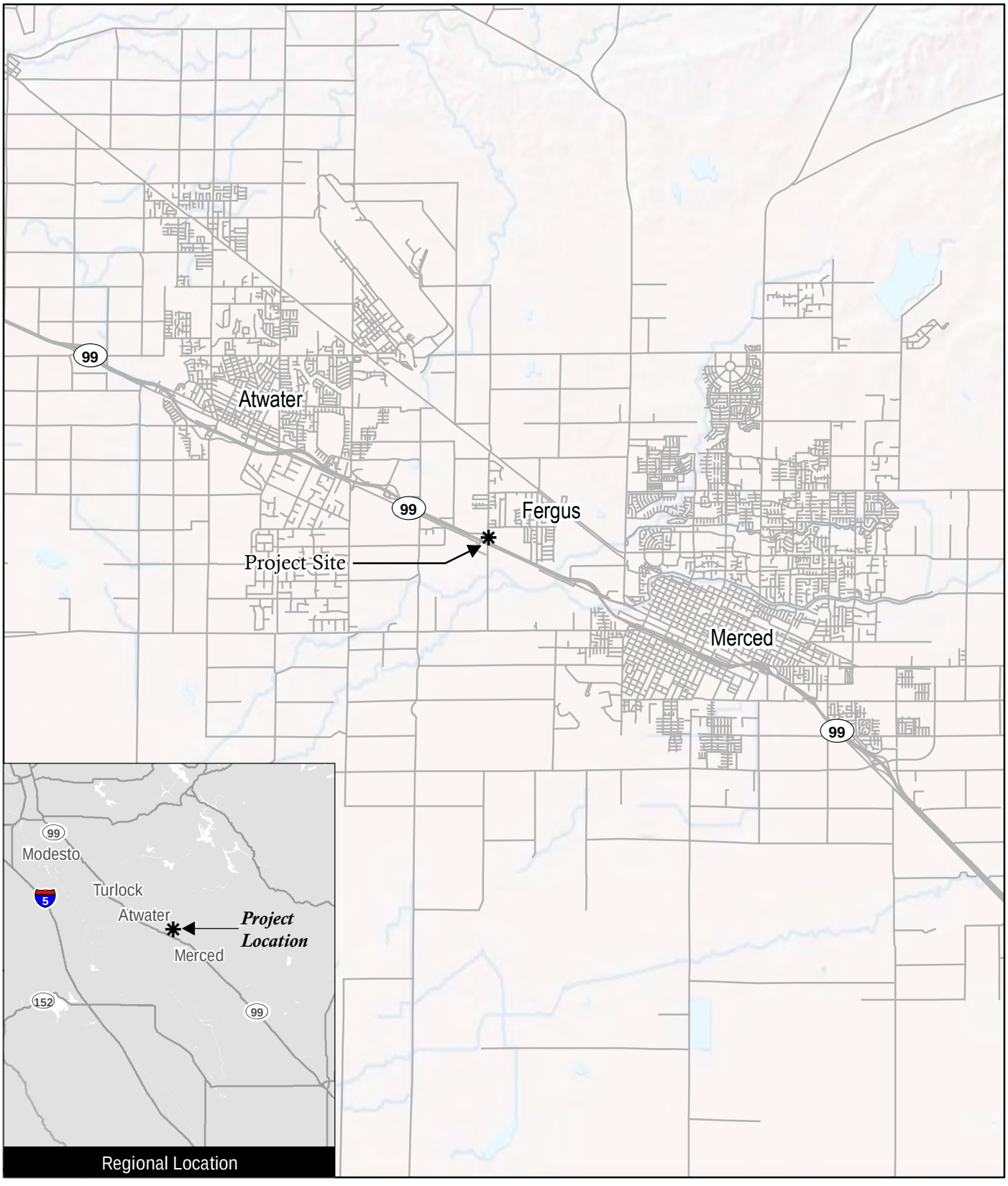
The project description provided here is taken from information contained in the specific plan. The description information highlights aspects of the proposed project that have specific relevance to modeling criteria air emissions and toxic air contaminants, energy demand, and GHGs, and evaluating project impacts.

Land Use and Development Capacity

The proposed use is a retail commercial development. Figure 3, Site Plan, shows the proposed types and arrangement of uses. It would include three uses: a coffee shop building, a convenience store with associated fueling facility with a total of 22 fueling positions, and a quick-serve restaurant. The coffee shop component includes a 2,200 square-foot building and associated parking. The 3,300 square-foot convenience store and 2,800 square foot quick-serve restaurant would be located within the same building, also with associated parking. A total of 8,300 square feet of enclosed building area is planned, with another 4,100 square feet of area located under the fuel pump canopies.

The 11-pump (two fueling positions per pump) fueling facility is associated with the convenience store. Ten of the fuel pumps are designed to accommodate passenger cars and trucks. The remaining pump is separated from the others and would accommodate larger trucks and RVs/trailers. Ancillary features include landscaping and signage.

The applicant anticipates that the project would be constructed during 2022-2023 and fully operational in 2025.



Source: ESRI 2014

Figure 1

Location Map

Franklin Road Commercial Center Air Quality/Health Risk Assessment and Greenhouse Gas Analysis Report

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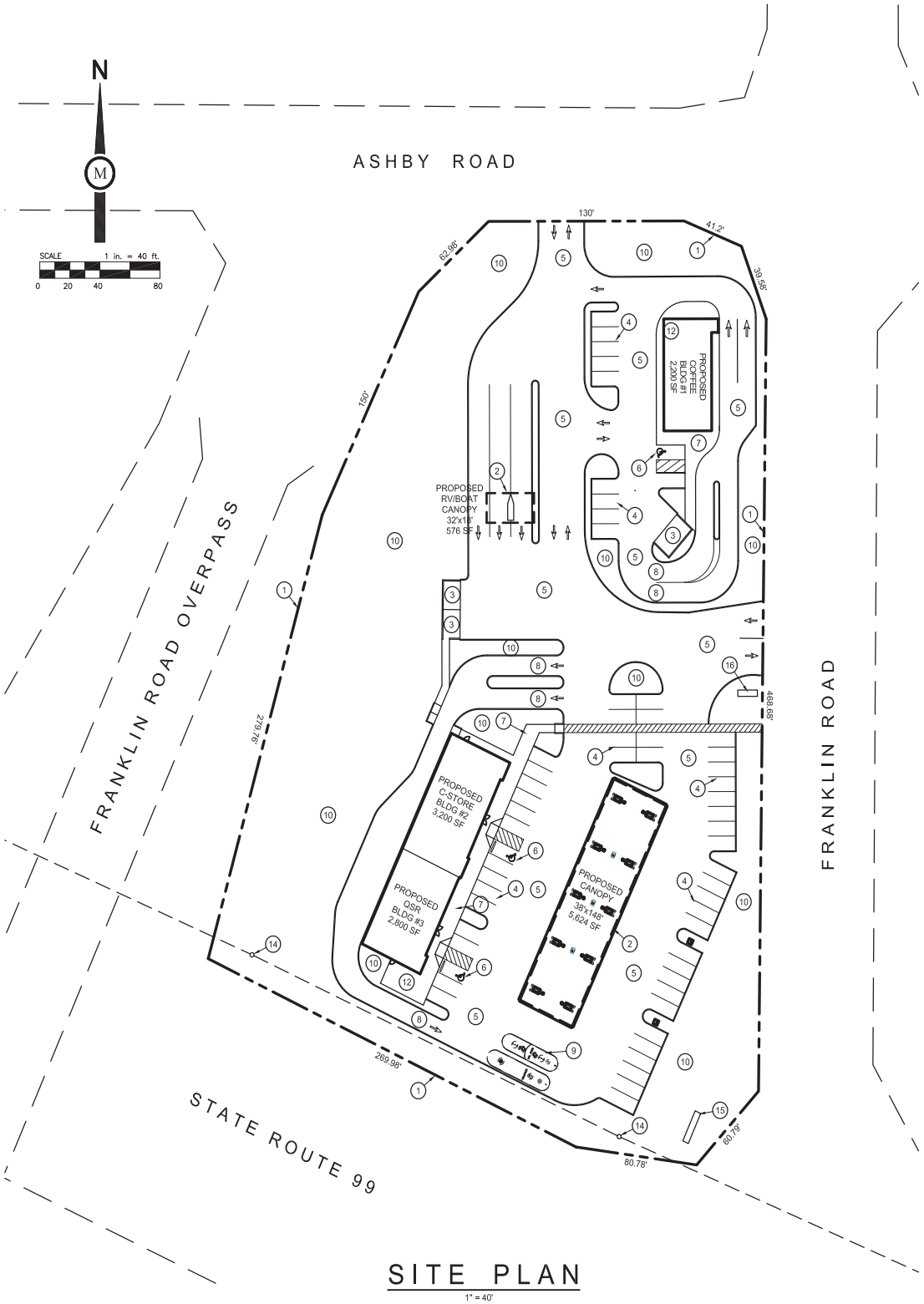
Source: Merced County GIS 2022, Google Earth 2022

Figure 2

Existing Land Uses and Features

Franklin Road Commercial Center Air Quality/Health Risk Assessment and Greenhouse Gas Analysis Report

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0 80 feet

Source: Milestone Associates Imagineering, Inc. 2021

Figure 3

Site Map

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2.0
Air Quality/Health Risk Assessment

This section includes discussions of the regional climate and topography, common criteria air pollutants, toxic air contaminants, applicable regulations, and potential criteria air pollutant and toxic air contaminant impacts from constructing and operating the proposed project.

The background information and impact analysis is based on the proposed project plans, the *Franklin Road Commercial Project – Emissions Modeling Methodology, Assumptions, and Results* (EMC Planning Group 2022) ("AQ/GHG memo") found in Appendix A along with a memo summarizing modeling assumptions and results, the San Joaquin Valley Air Pollution Control District ("air district" or SJVAPCD) *Guidance for Assessing and Mitigating Air Quality Impacts* (GAMAQI) (SJVAPCD 2015), and the *Franklin Hwy Retail Center Health Risk Assessment* (Illingworth and Rodkin 2022) ("health risk assessment") found in Appendix B.

2.1 Environmental Setting

Regional Climate and Topography

The project site is located in Merced County within the San Joaquin Valley Air Basin (air basin), which is about 35 miles wide and 250 miles long. The air basin encompasses the San Joaquin Valley with the Sierra Nevada Mountains to the east, the Coast Ranges to the west, and the Tehachapi mountains to the south. Merced County is located in the northern portion of the air basin, which also includes San Joaquin County, Stanislaus County, Madera County, Fresno County, Kings County, Tulare County, and a portion of Kern County. Surrounded by mountain ranges, the air basin drains to the north, with an opening at the Carquinez Strait leading into San Francisco Bay and then the Pacific Ocean. Summer winds blowing out of the north become trapped in the southern portion of the basin. The potential for serious summer air pollution in the air basin is strong because of high surface temperatures, plentiful sunshine, relatively stable air, and mountains that trap emissions. In winter, low rainfall, strong inversions and weak winds allow emissions to build up to high levels. Air flow is considerably affected by summertime inversions at lower elevations than the surrounding topography and as a result can lead to a buildup of ozone and ozone precursor pollutants within the basin. Wintertime inversions trap air near the ground and can lead to buildup of particulate matter air pollutants.

Criteria Air Pollutants and Their Effects on Human Health

The six most common and widespread air pollutants of concern, or "criteria pollutants," are ground level ozone, nitrogen oxides, particulate matter, carbon monoxide, sulfur dioxide, and lead. In addition, reactive organic gases are a key contributor to the criteria pollutants because they react with other substances to form ground level ozone. The common properties, sources, and related health and environmental effects of these pollutants are summarized in Table 2-1, Common Criteria Air Pollutants.

Health effects of criteria air pollutants include, but are not limited to, asthma, bronchitis, chest pain, coughing, throat irritation, and airway inflammation. Currently available modeling tools are not equipped to provide a meaningful analysis of the correlation between an individual development project's criteria air pollutant emissions and specific human health impacts. The thresholds of significance for criteria air pollutants crafted by local air districts are not intended to be indicative of any localized human health impact that an individual project may have. The CEQA air quality analysis for criteria air pollutants is not really a localized, project-level impact analysis but one of regional, cumulative impacts. For these reasons, it is not the norm to conduct an analysis of the localized health impacts associated with criteria air pollutant emissions as part of the CEQA process.

Ozone (O_3)

Ground-level ozone is created by complex chemical reactions between nitrogen oxides and reactive organic gases in the presence of sunlight. Since ground-level ozone is not emitted directly into the atmosphere, but is formed because of photochemical reactions, it is considered a secondary pollutant.

Ozone is a strong irritant that attacks the respiratory system, leading to the damage of lung tissue. Asthma, bronchitis, and other respiratory ailments, as well as cardiovascular diseases, are aggravated by exposure to ozone. A healthy person exposed to high concentrations may become nauseated or dizzy, may develop a headache or cough, or may experience a burning sensation in the chest. Research has shown that exposure to ozone damages the alveoli (the individual air sacs in the lung where the exchange of oxygen and carbon dioxide between the air and blood takes place). Research has shown that ozone also damages vegetation.

If project-generated concentrations of reactive organic gases and/or nitrogen oxides exceed the applicable thresholds of significance, concentrations of ground level ozone resulting from these pollutants could potentially result in significant resulting in adverse human health impacts.

Reactive Organic Gases (ROG)

Reactive organic gases are emitted from a variety of sources, including liquid and solid fuel combustion, evaporation of organic solvents, and waste disposal.

Table 2-1 Common Criteria Air Pollutants

Pollutant	Properties	Major Sources	Related Health & Environmental Effects
Ozone (O_3)	Ground level ozone is not emitted directly into the air. It results from chemical reactions between nitrogen oxides (NOx) and reactive organic gases (ROG) in presence of sunlight.	▪ Automobiles; ▪ Industrial facilities; ▪ Gasoline vapors; ▪ Chemical solvents; ▪ Electric utilities.	▪ Chest pain, coughing, throat irritation, and airway inflammation ▪ Worsens bronchitis, emphysema, and asthma. ▪ Affects sensitive vegetation and ecosystems
Nitrogen oxides (NO_X)	Group of highly reactive gases including nitrogen dioxide (NO_2).	▪ Combustion of fuel; ▪ Automobiles; ▪ Power plant; ▪ Off-road Equipment.	▪ Irritate respiratory system / increase respiratory infections ▪ Development of asthma ▪ Forms acid rain – harms sensitive ecosystems ▪ Creates hazy air ▪ Contributes to nutrient pollution in coastal waters
Respirable and Fine Particulate Matter (PM_{10}) ($PM_{2.5}$)	Mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, soot, dirt, or smoke can be seen with the naked eye. Others are so small that they can only be detected with an electron microscope.	▪ Automobiles; ▪ Power Plants; ▪ Construction sites; ▪ Tilled farm fields; ▪ Unpaved roads; ▪ Smokestacks.	▪ Aggravated asthma; ▪ Irritation of the airways, coughing, and difficulty breathing; ▪ Decreased lung function; ▪ Premature death; ▪ Reduced visibility.
Carbon Monoxide (CO)	Colorless, odorless gas released when something is burned.	▪ Fuel combustion; ▪ Industrial processes; ▪ Highly congested traffic.	▪ Chest pain for those with heart disease; ▪ Vision problems; ▪ Dizziness, unconsciousness, and death (at high levels).
Sulfur Oxides (SO_X)	In the entire group of sulfur oxides (SO_X), sulfur dioxide (SO_2) is the component of the greatest concern.	▪ Fuel combustion; ▪ Industrial processes; ▪ Locomotives, ships, and other heavy equipment; ▪ Volcanoes.	▪ Makes breathing difficult; ▪ Worsens asthma; ▪ Contributes to acid rain; ▪ Reduced visibility; ▪ Damages statues and monuments.
Lead (Pb)	Lead is a naturally occurring element found in small amounts in the earth's crust.	▪ Ore and metal processing; ▪ Leaded aviation fuel; ▪ Waste Incinerators; ▪ Utilities; ▪ Lead-acid battery manufacturers.	▪ High blood pressure and heart disease in adults; ▪ Behavioral problems, learning deficits, and lowered IQ in infants and young children; ▪ Decreased plant and animal growth; ▪ Neurological effects in vertebrates.

SOURCE: United States Environmental Protection Agency 2021

Nitrogen Oxides (NO_X)

Most nitrogen oxides are created during combustion of fuels. Nitrogen oxides are a major contributor to ozone formation. Nitrogen dioxide is a reddish-brown gas that can irritate the lungs and can cause breathing difficulties at high concentrations. Like ozone, nitrogen dioxide is not directly emitted, but is formed through a reaction between nitric oxides and atmospheric oxygen. Nitrogen dioxide also contributes to the formation of particulate matter (see discussion below). Nitrogen dioxide concentrations in the air basin have been well below ambient air quality standards; therefore, nitrogen dioxide concentrations from land use projects are not a concern.

Particulate Matter (PM_{10} and $PM_{2.5}$)

Particulate matter refers to a wide range of solid or liquid particles in the atmosphere, including smoke, dust, aerosols, and metallic oxides. Particulate matter with diameter of 10 micrometers or less is referred to as PM_{10}. $PM_{2.5}$ includes a subgroup of finer particles that have a diameter of 2.5 micrometers or less. Particulate matter is directly emitted to the atmosphere as a byproduct of fuel combustion, wind erosion of soil and unpaved roads, and from construction or agricultural operations. Small particles are also created in the atmosphere through chemical reactions. Approximately 64 percent of fugitive dust is respirable particulate matter. Minimal grading typically generates about 10 pounds per day per acre on average while excavation and earthmoving activities typically generate about 38 pounds per day per acre.

Although particles greater than 10 micrometers in diameter can cause irritation in the nose, throat, and bronchial tubes, natural mechanisms remove much of these particles. Particles less than 10 micrometers in diameter are able to pass through the body's natural defenses and the mucous membranes of the upper respiratory tract and enter into the lungs. The particles can damage the alveoli. The particles may also carry carcinogens and other toxic compounds, which can adhere to the particle surfaces and enter the lungs.

Carbon Monoxide (CO)

Carbon monoxide is a component of motor vehicle exhaust, which contributes about 56 percent of all carbon monoxide emissions nationwide. Other non-road engines and vehicles (such as construction equipment and boats) contribute about 22 percent of all carbon monoxide emissions nationwide. Carbon monoxide can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and tissues. Carbon monoxide contributes to the formation of ground-level ozone.

Higher levels of carbon monoxide generally occur in areas with heavy traffic congestion. In cities, 85 to 95 percent of all carbon monoxide emissions may come from motor vehicle exhaust. Concentration of carbon monoxide is a direct function of vehicle idling time and, thus, traffic flow conditions. Transport of carbon monoxide emissions is extremely limited; it disperses rapidly from the source under normal meteorological conditions. Under certain meteorological conditions,

however, carbon monoxide concentrations close to a congested roadway or intersection may reach unhealthy levels, affecting local sensitive receptors (residents, school children, hospital patients, the elderly, etc.). Emissions thresholds established for carbon monoxide apply to direct or stationary sources.

Typically, high carbon monoxide concentrations are associated with roadways or intersections operating at unacceptable levels of service. Congested intersections with high volumes of traffic could cause carbon monoxide "hot spots," where localized high concentrations of carbon monoxide occur.

Sulfur Oxides (SO_X)

Sulfur dioxide (SO_2) is the component of greatest concern and is used as the indicator for the larger group of gaseous sulfur oxides (SO_X). Emissions that lead to high concentrations of SO_2 generally also lead to the formation of other sulfur oxides. Sulfur dioxide is a colorless acid gas with a pungent odor. Sulfur dioxide is produced by the combustion of sulfur-containing fuels, such as oil, coal and diesel. Sulfur dioxide dissolves in water vapor to form acid, and interacts with other gases and particles in the air to form sulfates and other products that can be harmful to people and their environment. Health effects of sulfur dioxide include damage to lung tissue and increased risk of acute and chronic respiratory disease.

Lead (Pb)

Lead is a metal found naturally in the environment as well as in manufactured products. Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. Emissions of lead from the transportation sector and levels of lead in the air decreased 98 percent between 1980 and 2014 (United States Environmental Protection Agency 2021), following regulatory efforts to ultimately remove lead from gasoline. As a result of the phase-out of leaded gasoline, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Toxic Air Contaminants and their Effects on Human Health

Toxic air contaminants are pollutants that may be expected to result in an increase in mortality or serious illness or may pose a present or potential hazard to human health. Health effects include cancer, birth defects, neurological damage, damage to the body's natural defense system, and diseases that lead to death. Toxic air contaminants can be classified as either carcinogens or non-carcinogens.

Diesel Emissions

Diesel exhaust is the predominant toxic air contaminant in urban air and is estimated to represent about two-thirds of the cancer risk from toxic air contaminants. Diesel engines emit a complex mix

of pollutants including nitrogen oxides, particulate matter, and toxic air contaminants. The most visible constituents of diesel exhaust are very small carbon particles or soot, known as diesel particulate matter (DPM). Diesel exhaust also contains over 40 cancer-causing substances, most of which are readily adsorbed on the soot particles. Among the toxic air contaminants contained in diesel exhaust are dioxin, lead, polycyclic organic matter, and acrolein. Diesel engine emissions are responsible for about 70 percent of California's estimated cancer risk attributable to toxic air contaminants (California Air Resources Board 2022). As a significant fraction of particulate pollution, DPM contributes to numerous health impacts, including increased hospital admissions, particularly for heart disease, but also for respiratory illness, and even premature death.

Diesel exhaust is especially common during the grading stage of construction (when most of the heavy equipment is used), and adjacent to heavily trafficked roadways where diesel trucks are common. The United States Environmental Protection Agency regulates diesel engine design and fuel composition at the federal level, and has implemented a series of measures since 1993 to reduce nitrogen oxides and particulate emissions from off-road and highway diesel equipment. Before EPA began regulating sulfur in diesel, diesel fuel contained as much as 5,000 parts per million (ppm) of sulfur. In 2006, EPA introduced regulations to lower the amount of sulfur in diesel fuels to 15 ppm (United States Environmental Protection Agency 2021). This fuel is known as ultra-low sulfur diesel.

EPA Tier 1 non-road diesel engine standards were introduced in 1996, Tier 2 in 2001, Tier 3 in 2006, with final Tier 4 in 2014 (DieselNet 2022). Table 2-2, Typical Non-road Engine Emissions Standards, compares emissions standards for NO_X and particulate matter from non-road engine Tier 1 through Tier 4 for typical engine sizes. As illustrated in the table, emissions for these pollutants have decreased significantly for construction equipment manufactured over the past 20 years, and especially for construction equipment manufactured in the past seven years.

Table 2-2 Typical Non-road Engine Emissions Standards

Engine Tier and Year Introduced	NO_X Emissions[1]			Particulate Emissions[1]		
	100-175 HP	175-300 HP	300-600 HP	100-175 HP	175-300 HP	300-600 HP
Tier 1 (1996)	6.90	6.90	6.90	--	0.40	0.40
Tier 2 (2001)	--	--	--	0.22	0.15	0.15
Tier 3 (2006)	--	--	--	-- †[2]	-- †[2]	-- †[2]
Tier 4 (2014)[3]	0.30	0.30	0.30	0.015	0.015	0.015

SOURCE: DieselNet 2022
NOTES:
1. Expressed in g/bhp-hr, where g/bhp-hr stands for grams per brake horsepower-hour.
2. † - Not adopted, engines must meet Tier 2 PM standard.
3. Tier 4 diesel engines would reduce DPM as much as 85 percent (Diesel Net, 2022).

In California, non-road equipment fleets can retain older equipment, but fleets must meet averaged emissions limits. Since 2018 new equipment for large and medium fleets must be Tier 3 or better. New equipment for small fleets must meet the Tier 3 or better standard by January 2023. Over time all older fleet equipment must be fitted with particulate filters. Large and medium fleets have increasingly strict fleet compliance targets through 2023 and small fleets through 2029. A small fleet has total horsepower of 2,500 or less, and a medium fleet has total horsepower of between 2,500 and 5,000. Owners or operators of portable engines and other types of equipment can register their units under the California Air Resources Board (CARB) statewide Portable Equipment Registration Program in order to operate their equipment throughout California without having to obtain individual permits from local air districts (California Air Resources Board 2019).

Construction Emissions

Emissions generated during construction are "short-term" in the sense that they would be limited to the actual periods of site development and construction. Short-term construction emissions are typically generated by the use of heavy equipment, the transport of materials, and construction employee commute trips. Construction-related emissions consist primarily of reactive organic gases, nitrogen oxides, DPM, respirable and fine particulate matter, and carbon monoxide. Emissions of reactive organic gasses, nitrogen oxides, DPM, and carbon monoxide are generated primarily by the operation of gas and diesel-powered motor vehicles, asphalt paving activities, and the application of architectural coatings. Respirable and fine particulate matter emissions are generated primarily by wind erosion of exposed graded surfaces.

Polycyclic Aromatic Hydrocarbons (PAHs)

The U.S. Center for Disease Control describes polycyclic aromatic hydrocarbons (PAHs) as a class of chemicals that occur naturally in coal, crude oil, and gasoline. They also are produced when coal, oil, gas, wood, garbage, and tobacco are burned. PAHs generated from these sources can bind to or form small particles in the air. High-temperature cooking will form PAHs in meat and in other foods. Some PAHs are carcinogenic and prolonged exposure can lead to increased health risks. The health effects from environmental exposure to low levels of PAHs are unknown. Large amounts of naphthalene in air can irritate eyes and breathing passages. Workers who have been exposed to large amounts of naphthalene from skin contact with the liquid form and from breathing naphthalene vapor have developed blood and liver abnormalities. (U.S. EPA 2022).

Sensitive Receptors

Although air pollution can affect all segments of the population, certain groups are more susceptible to its adverse effects than others. Children, the elderly, and the chronically or acutely ill are the most sensitive population groups. These sensitive receptors are commonly associated with specific land uses such as residential dwelling units, schools, day care centers, nursing homes, and hospitals. In addition, certain air pollutants, such as carbon monoxide, only have significant effects if they directly

affect a sensitive population. The air district's CEQA Guidelines suggests that the proximity of sensitive individuals (receptors) to a construction site constitutes a special condition and may require a more comprehensive evaluation of toxic DPM impacts.

The air district also identifies areas where sensitive receptors are most likely to spend time such as schools, parks and playgrounds, day care centers, nursing homes, hospitals, and residential dwelling unit(s).

2.2 Regulatory Setting

Federal

United States Environmental Protection Agency

The EPA was established on December 2, 1970 to create a single agency that covered several agency concerns: federal research, monitoring, standard-setting and enforcement. The purpose of the EPA is to protect the overall health of humans and the environment. The EPA does this by safeguarding all Americans from the hazardous risks in the environment where they live and work. Environmental safety is one of the primary concerns of U.S. policies and the following are commonly used to establish environmental policy: natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade. The EPA has established a series of increasingly strict emission standards for new off-road diesel equipment, on-road diesel trucks, and harbor craft. Construction equipment used for the project, including heavy-duty trucks, and off-road construction equipment would be required to comply with the U.S. EPA Nonroad Diesel Rule emission standards.

Federal Clean Air Act

Air quality is regulated on the federal level. The Clean Air Act, adopted in 1970 and amended in 1990, set federal standards for air quality.

The federal Clean Air Act required the EPA to set National Ambient Air Quality Standards for several air pollutants on the basis of human health and welfare criteria. The Clean Air Act also set deadlines for the attainment of these standards. The Clean Air Act established two types of national air standards: primary and secondary standards. Primary standards set limits to protect public health, including the health of sensitive persons such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Historically, air quality laws and regulations have divided air pollutants into two broad categories of airborne pollutants: "criteria pollutants" and "toxic air contaminants."

In general, the Clean Air Act creates a partnership between state and federal governments for implementation of the Clean Air Act provisions. The federal Clean Air Act requires states to prepare

an air quality control plan known as a State Implementation Plan. California's State Implementation Plan contains the strategies and control measures that California will use to attain the National Ambient Air Quality Standards. If, when reviewing the State Implementation Plan for conformity with Clean Air Act Amendments mandates, the EPA determines a State Implementation Plan to be inadequate, EPA may prepare a Federal Implementation Plan for the non-attainment area and may impose additional control measures.

National Ambient Air Quality Standards

Ambient air quality is described in terms of compliance with the state and national standards. State standards are discussed below. In general, criteria pollutants are pervasive constituents, such as those emitted in vast quantities by the combustion of fossil fuels. Both the state and federal governments have developed ambient air quality standards for the most prevalent pollutants, which include ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, respirable particulate matter, and fine particulate matter. Table 2-3, National and California Ambient Air Quality Standards, lists state and federal ambient air quality standards for common air pollutants.

Table 2-3 National and California Ambient Air Quality Standards

Pollutant	Averaging Time	National Standards1				California Standards2	
		Primary3,4		Secondary3,5		Concentration3	
		ppm	µg/m3	ppm	µg/m3	ppm	µg/m3
Ozone[6]	1 Hour	-	-	-	-	0.09	180
	8 Hour	0.07	137	0.07	137	0.07	137
PM_{10}[7]	24 Hour	-	150	-	150	-	50
	Annual	-	-	-	-	-	20
$PM_{2.5}$[7]	24 Hour	-	35	-	35	-	-
	Annual	-	12	-	15	-	12
Carbon Monoxide (CO)	8 Hour	9	10	-	-	9.0	10
	1 Hour	35	40	-	-	20.0	23
Nitrogen Dioxide (NO_2)[8]	Annual	0.053	100	0.053	100	0.03	57
	1 Hour	0.10	188	-	-	0.18	339
Sulfur Dioxide (SO_2)[9]	Annual	0.03	See note 9	-	-	-	-
	24 Hour	0.14	See note 9	-	-	0.04	105
	3 Hour	-	-	0.5	1,300	-	-
	1 Hour	0.075	196	-	-	0.25	655
Lead[10,11]	30 Day Average	-	-	-	-	-	1.5

Pollutant	Averaging Time	National Standards1				California Standards2	
		Primary3,4		Secondary3,5		Concentration3	
		ppm	µg/m3	ppm	µg/m3	ppm	µg/m3
	Rolling 3-month Average	-	0.15	-	0.15	-	-
	Calendar Quarter	See note 10	1.5	See note 10	1.5	-	-
Visibility Reducing Particles[12]	8 Hour	No Federal Standards				See note 12	
Sulfates	24 Hour					-	25
Hydrogen Sulfide	1 Hour					0.03	42
Vinyl Chloride[10]	24 Hour					0.01	26

SOURCE: California Air Resources Board 2016

NOTES:

1. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact EPA for further clarification and current federal policies.
2. California standards for ozone, carbon monoxide, sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
5. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
6. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
7. On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m3 to 12.0 µg/m3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m3, as was the annual secondary standard of 15 µg/m3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
8. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 parts per billion (ppb). Note that the national 1-hour standard is in units of ppb. California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
9. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
10. CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
11. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated non-attainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
12. In 1989, CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

National Emissions Standards for Hazardous Air Pollutants are emissions standards set by the EPA for an air pollutant not covered by National Ambient Air Quality Standards that may cause an increase in fatalities or in serious, irreversible, or incapacitating illness. The standards for a particular source category require the maximum degree of emission reduction that the EPA determines to be achievable, which is known as the Maximum Achievable Control Technology.

State

California Clean Air Act

The California Clean Air Act, signed into law in 1988, requires all areas of the State to achieve and maintain California ambient air quality standards by the earliest practical date. California's ambient air quality standards are established to protect the health of the most sensitive groups, apply to the same criteria air pollutants as the federal Clean Air Act, and also includes State-identified criteria air pollutants, which are sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride. Table 2-3 shows the ambient air quality standards currently in effect for each of the federally identified criteria air pollutants, as well as, state recognized pollutants, such as sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride.

California Air Resources Board

The federal Clean Air Act gives states primary responsibility for directly monitoring, controlling, and preventing air pollution. CARB is responsible for coordination and oversight of federal, state, and local air pollution control programs in California and for implementing the requirements of the federal and State Clean Air acts. The duties of CARB include coordinating air quality attainment efforts, setting standards, conducting research, and creating solutions to air pollution. The CARB oversees regional or local air quality management or air pollution control districts that are charged with developing attainment plans for the areas over which they have jurisdiction. CARB grants these regional or local air districts explicit statutory authority to adopt indirect source regulations and transportation control measures, including measures to encourage the use of ridesharing, flexible work hours, or other measures that reduce the number or length of vehicle trips. Through its Mobile Sources Program, CARB has developed programs and policies to reduce emissions from on-road heavy-duty diesel vehicles. Specifically, the On-Road Heavy-Duty Diesel Vehicle Regulation requires diesel trucks and buses that operate in the State to be upgraded to reduce emissions. By January 1, 2023, nearly all vehicles must have engines certified to 2010 model year engines or equivalent (California Air Resources Control Board 2022b).

Air Quality Management Plans

The federal Clean Air Act requires areas with unhealthy levels of ozone, inhalable particulate matter, carbon monoxide, nitrogen dioxide, and sulfur dioxide to develop plans, known as State Implementation Plans. State Implementation Plans are comprehensive plans that describe how an area will attain national ambient air quality standards. State Implementation Plans are a compilation

of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), district rules, state regulations, and federal controls. California grants air districts explicit statutory authority to adopt indirect source regulations and transportation control measures, including measures to encourage the use of ridesharing, flexible work hours, or other measures that reduce the number or length of vehicle trips. Local air districts prepare State Implementation Plan elements and submit them to CARB for review and approval. CARB forwards State Implementation Plan revisions to the EPA for approval and publication in the Federal Register.

California Air Toxics Program

CARB created a statewide air toxic program in the 1980s, and soon thereafter was the creation of the Toxic Air Contaminant Identification and Control Act of 1983 (AB 1807). The Toxic Air Contaminant Identification and Control Act established the California Air Toxic Program that was designed to lower all exposure to air pollutants. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) adds on to AB 1807 by demanding an inventory for all air pollutants, a system where notices are provided to those who are unprotected by the air pollutant, and plans to lower these health risks. AB 1807 required CARB to implement standards for the ranking and control of the air pollutants. AB 1807 also requires CARB to use the data within the AB 2588 program. Gasoline dispensing facilities are subject to these standards.

Regional/Local

Air Basin Attainment Status

In accordance with the Clean Air Act, CARB is required to designate regions of the state as attainment, non-attainment, or unclassified with regard to that region's compliance with criteria air pollutants standards. An "attainment" designation for a region signifies that pollutant concentrations do not violate the standard for that pollutant in that region. A "non-attainment" designation indicates that a pollutant concentration violated the standard at least once. An "unclassified" designation signifies that available data does not support either an attainment or non-attainment status.

Attainment status is found on the air district website (SJVAPCD 2022a). The primary air pollutants of concern in the air basin are ozone and particulate matter, for which the air basin is in nonattainment. According to the air district, the air basin is in nonattainment for the federal and state standards for ozone (eight-hour) and $PM_{2.5}$, and with the state standards for ozone (one hour) and PM_{10}. The air basin is either unclassified or in attainment with all other state and federal ambient air quality standards.

San Joaquin Valley Air Pollution Control District Regulations

On August 19, 2021, the air district approved the *2018 $PM_{2.5}$ Plan for the San Joaquin Valley* (2018 $PM_{2.5}$ Plan), which revises the district's previous $PM_{2.5}$ attainment plan to establish a new attainment target for the 1997 annual $PM_{2.5}$ standard. The air basin would have met this standard by the

projected attainment target of 2020, but for significant effect of wildfire smoke in addition to data collection issues at the air monitoring site in Bakersfield. Based on implementation of the control strategy in the 2018 $PM_{2.5}$ Plan, modeling has shown that the air basin is on track attain the 1997 annual $PM_{2.5}$ standard by 2023, if not earlier (SJVAPCD 2021).

The air district has adopted the following thresholds, rules and regulations to implement the 2018 $PM_{2.5}$ Plan and address ozone and particulate matter emissions in the air basin:

- Rule 2010: Requires that any person constructing, altering, replacing or operating any source operation which emits, may emit, or may reduce emissions to obtain an Authority to Construct or a Permit to Operate.
- Rule 2201, New Source Review Rule, is a major component of the district's attainment strategy. Rule 2201 provides mechanisms, including emission trade-offs, by which permits for new or modified stationary sources may be granted, without jeopardizing the attainment or maintenance of ambient air quality standards by ensuring a no net increase in emissions above specified thresholds for all nonattainment pollutants and their precursors.
- Rule 4001, New Source Performance Standards, and Rule 4002, National Emissions Standards for Hazardous Air Pollutants: identify standards, criteria and compliance requirements for new sources of air pollution, including toxic air contaminant emissions.
- Rule 4101, Visible Emissions, provides visibility standards and criteria for discharge of any air contaminant other than water vapor.
- Rule 4102 – Nuisance. A person shall not discharge from any source whatsoever such quantities of air contaminants or other materials which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such person or the public or which cause or have a natural tendency to cause injury or damage to business or property.
- Rule 4601 – Architectural Coatings. Limits volatile organic compound emissions from architectural coatings, including the storage, cleanup and labeling of such coatings.
- Rule 4641, Cutback, Slow Cure, and Emulsified Asphalt Paving and Maintenance Operations, restricts the application and manufacturing of certain types of asphalt for paving and maintenance operations (would apply to both construction and post-construction activities).
- Rule 4692, Commercial Charbroiling, limits VOC and PM_{10} emissions from commercial charbroiling at restaurants. Chain-driven char broilers that cook 400 pounds or more of meat in any calendar week or 10,800 pounds in any calendar year must be equipped with a catalytic oxidizer that has a control efficiency of at least 83 percent for PM_{10} emissions and a control efficiency of at least 86 percent for VOC emissions. Annual or one-time reports are required for all other charbroiling operations. Underfired char broilers subject to the rule must register each piece of equipment and maintain weekly records.

- Rule 9510, Indirect Source Review, addresses reduction measures for ozone precursor and PM_{10} emissions from new land use development projects. New projects that would generate substantial air pollutant emissions are subject to this rule. The rule is the result of state requirements outlined in the regions' portion of the state implementation plan in compliance with the Clean Air Act. Projects that include 2,000 square feet or more of commercial space are subject to this rule (SJVAPCD 2015). Rule 9510 requires projects to mitigate both construction and operational period emissions by applying the air district-approved mitigation measures and paying fees to support programs that reduce emissions. Fees apply to the unmitigated portion of the emissions and are based on estimated costs to reduce the emissions from other sources plus expected costs to cover administration of the program.
- The air district controls fugitive dust PM_{10} emissions through Regulation VIII, the purpose of which is to reduce ambient concentrations of PM_{10} by requiring actions to prevent, reduce or mitigate anthropogenic (human caused) fugitive dust emissions. Emissions reduction measures also reduce $PM_{2.5}$ emissions. This applies to activities such as construction, bulk materials, open areas, paved and unpaved roads, material transport, and agricultural areas. Sources regulated are required to provide dust control plans that meet the regulation requirements. Fees are collected by the air district to cover costs for reviewing plans and conducting field inspections.

Air quality prescreening and emissions thresholds are found on the air district website. Guidance and methodology for analysis of air quality impacts are provided in the air district's GAMAQI.

The air district screening criteria help determine if a project's construction and operations emissions would have the potential to violate ambient air quality standards. Projects that do not exceed the screening thresholds or criteria pollutant emissions volume thresholds would not conflict with or obstruct implementation of the air quality plan. Projects with emissions that exceed the air district's thresholds have the potential to exceed the ambient air quality standards, which would be considered a potentially significant impact, and a potential conflict with the air district's air quality plan.

Merced County General Plan

The Merced County general plan Policy LU-10.9: Air Quality Management Coordination, calls for coordination with the air district and neighboring jurisdictions in the San Joaquin Valley Air Basin to ensure regional cooperation on cross-jurisdictional and regional transportation and air quality issues, and to establish parallel air quality programs and implementation measures, such as trip reduction ordinances and indirect source programs. Policy LU-10.10 requires consultation with the air district during CEQA review. The Merced County General Plan includes an Air Quality Element.

In addition to the land use element policies identified above, the following general plan policies and implementing programs address air emissions in Merced County and are applicable to the proposed project:

Policy AQ-1.1: Energy Consumption Reduction (RDR). Encourage new residential, commercial, and industrial development to reduce air quality impacts from energy consumption.

Policy AQ-1.2: Business Energy Reduction Strategies (RDR). Encourage all businesses to: replace high mileage fleet vehicles with more efficient and/or alternative fuel vehicles; increase the energy efficiency of facilities; transition toward the use of renewable energy instead of non-renewable energy sources; adopt purchasing practices that promote emissions reductions and reusable materials; and increase recycling.

Policy AQ-2.2: Development Review Process. Use the development review process to achieve measurable reductions in criteria pollutants, toxic air contaminants, and greenhouse gas emissions.

Policy AQ-5.1: Residential Buffers (RDR). Require effective buffers between residential and other sensitive land uses, and nonresidential land uses that generate hazardous air emissions such as highways (e.g., I-5 and SR-99), trucking centers, gasoline dispensing facilities, and dry cleaners. Effective buffers shall be determined by requiring consultation with the SJVAPCD for any project that may have a health risk impact, including those projects that would otherwise appear to be exempt from CEQA requirements.

Policy AQ-6.3: Paving Materials (RDR). Require all access roads, driveways, and parking areas serving new commercial and industrial development to be constructed with materials that minimize particulate emissions and are appropriate to the scale and intensity of use.

Policy AQ-6.8: Voluntary Emissions Reduction Agreement. Require all project applicants, where project emissions for any criteria pollutant have been evaluated to exceed SJVAPCD significance thresholds, to consult with the SJVAPCD regarding the establishment of a Voluntary Emissions Reduction Agreement between the applicant and the SJVAPCD. Support the SJVAPCD in its efforts to fund the Emission Reduction Incentive Program.

Policy AQ-1.11: Truck-Related Development (RDR). Discourage development that causes significant increases in truck traffic on roads that are not capable of accommodating truck traffic due to pavement section deficiency or other capacity limitations, unless adequate mitigation through fees or improvements in required as part of the permit approval.

Policy AQ-2.1: Air Quality Plan Compliance (RDR. Require all development projects to comply with applicable regional air quality plans and policies.

Policy AQ-2.2: Development Review Process (RDR). Use the development review process to achieve measurable reductions in criteria pollutant, toxic air contaminants, and greenhouse gas emissions.

Policy AQ-2.4: Mitigation (RDR). Require that local and regional air quality impacts identified during CEQA review for projects reviewed and approved by the County are consistently and fairly mitigated.

Policy AQ-2.5: Innovative Mitigation Measures (RDR, IGC, JP). Encourage innovative mitigation measures and project redesign to reduce air quality impacts by coordinating with the San Joaquin Valley Air Pollution Control District, project applicants, and other interested parties.

Policy AQ-2.7: Air District Best Performance Standards (RDR). Require the County to use the Best Performance Standards adopted by SJVAPCD during the development review and decision-making process to ensure new projects meet the targets set by the district.

Policy AQ-4.1: Decrease Vehicle Miles Traveled (RDR). Require diverse, higher-density land uses (e.g., mixed-use and infill development) to decrease vehicle miles traveled.

Policy AQ-4.4: Transportation Alternatives (JP). Require employers and developers to provide employees and residents with attractive, affordable transportation alternatives, such as transit stops, van pool pick-up and drop-off locations, and biking paths/storage.

2.3 Thresholds of Significance

CEQA Guidelines Appendix G is a sample initial study checklist that includes a number of factual inquiries related to the subject of air quality, as it does on a whole series of additional topics. Lead agencies are under no obligation to use these inquiries in fashioning thresholds of significance on the subject of air quality impacts, or on any subject addressed in the checklist. Rather, with few exceptions, CEQA grants agencies discretion to develop their own thresholds of significance. Even so, it is a common practice for lead agencies to take the language from the inquiries set forth in Appendix G and to use that language in fashioning thresholds. The County of Merced has done so here. Therefore, for the purposes of this analysis, a significant air quality impact would occur if implementation of the proposed project would:

- 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.
- Expose sensitive receptors to substantial pollutant concentrations.

The CEQA Guidelines (Section 15064.7) provide that, when available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make determinations of significance. Table 2-4, Air District Thresholds of Significance, presents the air district thresholds of significance for criteria pollutant emissions and significance thresholds for health risks from exposures to TAC emissions.

Table 2-4 Air District Thresholds of Significance

Pollutant	Construction or Operations (Tons per Year)
NO_x	10
ROG	10
PM_{10}	15
$PM_{2.5}$	15
SO_x	27
CO	100
TACs (Health Risks)	Maximally Exposed Individual Cancer Risk > 20 cases per 1 million persons, and/or Non-cancer Health Risk Chronic and Acute Hazard Index > 1.0

SOURCE: SJVAPCD 2022

2.4 Analysis, Impacts and Mitigation Measures

This section includes information, data and analysis regarding air quality issues that is relevant to the proposed project based on the air district's GAMAQI and the thresholds of significance described above. Criteria air pollutant and GHG emissions associated with the construction and operation of the project were predicted using CalEEMod version 2020.4.0. The model results for operational emissions reflect compliance with several State regulatory measures that reduce emissions. The assumptions, methodology and model results for operational criteria air pollutant emissions are summarized in the AQ/GHG memo: *Franklin Road Commercial Project – Emissions Modeling Methodology, Assumptions, and Results* (EMC Planning Group 2022) and are included in Appendix A. The potential construction and operational health risk impact to nearby sensitive receptors from emissions of TAC were evaluated in the *Franklin Hwy Retail Center Health Risk Assessment* (Illingworth and Rodkin 2022) ("health risk assessment"). The health risk assessment and its attachments are included in Appendix B.

Criteria Air Pollutant Emissions

Ozone and PM emissions generated during construction and operational activities would contribute to regional air quality impacts and would be cumulatively considerable if emissions volumes exceed the air district standards. The potential for this to occur is evaluated below.

Construction Criteria Emissions

Construction activity is anticipated to include demolition, site preparation and grading, building construction, paving and application of architectural coatings. Construction of the project is expected to occur over a 14-month period, assumed to start in 2023. Construction exhaust PM_{10} emissions (assumed to be DPM) were quantified by Illingworth and Rodkin using CalEEMod with the construction schedule based on CalEEMod model default conditions as shown in Appendix B.

According to the CalEEMod results from the health risk assessment, unmitigated construction criteria pollutant emissions are well below the air district thresholds, with the largest pollutant volumes attributed to CO emissions of approximately 2.12 tons in the first year of construction.

Operational Criteria Emissions

Unmitigated operational criteria emissions volumes were analyzed using the same model land use defaults and vehicle trip information used in the health risk assessment, but model inputs were adjusted to reflect emissions reductions that will result from connection to municipal water and sewer mains, compliance with the State Model Water Efficient Landscape Ordinance (MWELO), phasing out of gas-powered landscaping tools by 2024 (AB 1346), and solid waste diversion of 75 percent (AB 341) as described in Appendix A. Table 2-5, Unmitigated Operational Criteria Air Pollutant Emissions, presents the CalEEMod results for operational emissions.

Table 2-5 Unmitigated Operational Criteria Air Pollutant Emissions

Emissions	ROG	NO_x	PM_{10}	$PM_{2.5}$	SO_x	CO
Annual Unmitigated	1.39	3.17	2.84	0.79	0.03	12.38
Air District Threshold	10	10	15	15	27	100
Exceeds Threshold? (YES/NO)	NO	NO	NO	NO	NO	NO

SOURCE: Illingworth and Rodkin 2022, EMC Planning Group 2022.
NOTE: Amounts are expressed in tons per year,

Conclusion

Although the proposed project would generate criteria air pollutant emissions during construction and operations, the emissions are well below the air district standards. Ozone and PM emissions would contribute to regional air quality impacts, but the project contribution would be less-than-cumulatively considerable.

Exposure to Substantial Pollutant Concentrations - Off-Site Sensitive Receptor Health Risks

The proposed project would introduce new sources of TACs that would expose nearby off-site sensitive receptors to TACs generated from construction activity, evaporation of gasoline vapors, delivery trucks, restaurant operations, and operational traffic. Exposures of sensitive receptors to substantial concentrations of TACs may increase cancer and other health risks. Increased cancer and non-cancer health risks from TAC concentrations that exceed the air district thresholds would be a significant impact.

To evaluate the exposure of sensitive receptors to emissions of TACs from the project, a health risk assessment of both project construction and operational activities was conducted. The health risk assessment predicts lifetime cancer risk and non-cancer risks. The health risk assessment involves

predicting emissions from the various sources of TACs, dispersion modeling using historical meteorological data, and calculation of health risks using the air district's recommended risk assessment methods for infant, child, and adult exposures for residential receptors, and for off-site worker exposure. Emissions modeling was conducted using CalEEMod, and dispersion modeling to determine pollutant concentrations was conducted using AERMOD. The methods used to predict health risk impacts are described in Attachment 1 of the health risk assessment in Appendix B.

Sensitive Receptors

Construction equipment and associated heavy-duty truck traffic generates diesel exhaust, which is a known TAC. The primary community risk impact issue associated with construction emissions is cancer risk. The health risk assessment identified construction emissions volumes using CalEEMod, downwind concentrations of diesel particulate matter were calculated using AERMOD. Modeled sensitive receptor locations are shown in the health risk assessment Figure 2 (Illingworth and Rodkin 2022, page 8). The location of the Maximally Exposed Individuals (MEI) was also determined. Cancer risk and hazards were predicted at the receptor representative MEI for residences and the representative MEI of workers.

Construction Health Risk Impacts

The CalEEMod model provided unmitigated total annual PM_{10} exhaust emissions, which are assumed to be DPM, for the off-road construction equipment and for exhaust emissions from on-road vehicles (haul trucks, vendor trucks, and worker vehicles). For health risk modeling of on-site and near-site vehicle traffic, a travel distance of one mile was used in the CalEEMod modeling for worker, vendor, and haul trips. The construction DPM emissions include on-road emissions resulting from haul truck travel during grading activities, worker travel, and vendor deliveries during building construction. Calculated DPM exhaust emissions were 0.0811 tons in the first year of construction and 0.0810 tons in the second year of construction (Illingworth and Rodkin 2022, Table 1). As shown on Figure 3 of the health risk assessment, the maximum-modeled unmitigated (uncontrolled) annual DPM concentration would occur at a residential receptor east of the project site along Franklin Road. The location where the maximum impact occurred (maximally exposed individual) is identified on Figure 3.

Increased cancer risks were calculated at this location using the modeled annual concentrations and the air district's recommended risk assessment methods for infant, child, and adult exposures for residential receptors, and for off-site worker exposure. The results indicate that unmitigated construction emissions would result in a maximum off-site worker cancer risk of 1.5 cases per million. Potential non-cancer health effects due to chronic exposures to DPM were also evaluated and were found to fall below the air district significance thresholds. The chronic inhalation reference exposure level (REL) for DPM is 5 $\mu g/m^3$. The Hazard Index (HI), which is the ratio of the annual DPM concentration to the REL, is less than 0.1 at all receptor locations. Therefore, non-cancer health risks resulting from exposures to project construction emissions are less than significant.

The maximum increased infant cancer risk at the residential MEI would be 29.9 case per million, which exceeds the air district's cancer risk threshold of 20 cases per million. This is a significant impact. Construction emissions would need to be reduced by 60 percent to reduce health risks to below the air district's threshold. Modeling shows that the use of Tier 4 engines and equipment during construction would reduce exhaust PM_{10} emissions, considered to be equivalent to DPM emissions, by 85 percent. The use of Tier 2 or Tier 3 equipment equipped with CARB Level 3 diesel emission control device would reduce emissions by about 80 percent. The reductions in construction period emissions would reduce the construction period infant/child cancer risk to 4.2 chances per million. Implementation of the following mitigation measure would reduce residential exposures and associated infant/child cancer risks to less than significant.

Mitigation Measure

AQ-1 All off-road diesel construction equipment greater than 25 horsepower and operating at the site during demolition and earthwork phases for more than 20 hours shall at a minimum meet U.S. EPA Tier 2 or 3 engine standards with Level 3 particulate filtration. Use of equipment with U.S. EPA Tier 4 engine standards would meet this requirement. Optionally, the applicant could develop and implement a plan that would achieve a 60-percent reduction in on- and near-site DPM emissions during construction.

Operations Health Risk Impacts

Under operational conditions, the proposed project has both permitted air pollutant sources (gas station) and sources not subject to air district permitting.

TAC Emissions Sources

Gas Station

Gas stations are regulated by the air district as they are a source of ROG emissions that contain TACs, primarily benzene, associated with loading, storage, refueling of vehicles and spillage that result in evaporative emissions. Emissions attributed to the gas station were estimated separately from the area source operational emissions in the health risk assessment. Emissions calculations are based on annual throughput anticipated for the facility. A description of the methodology and assumptions used in the calculation of gas station emissions is described in greater detail on page 10 of the health risk assessment.

Transportation - Mobile-Source

Project-related traffic would generate emissions that, in combination with existing emissions sources, would increase off-site sensitive receptor exposures that would lead to increased health risks. Specific sources of emissions include retail customer traffic traveling to and from the project site along with traffic activity on the site. The health risk assessment assumes that these sources would be operational well into the future.

Fast-Food Restaurant

The proposed fast-food restaurant would generate TACs from cooking meat. The air district identifies two TACs from meat cooking: PAHs without naphthalene and naphthalene. PAH and naphthalene emissions were estimated using default emission factors and emissions provided in the air district guidance documents.

TAC Emissions Modeling and Results

The U.S. EPA AERMOD dispersion model was used to calculate operational DPM and other TAC concentrations at existing sensitive residence and worker receptors in the vicinity of the project site. TAC concentrations from on-site and off-site (roadway) and restaurant emission sources were calculated. On-site emission sources include project-related customer vehicles and fuel delivery trucks and operations of the restaurant. Off-site emission sources include project vehicle travel routes. The results are summarized in the health risk assessment Table 2. The emission sources and receptors where TAC concentrations were calculated are shown in health risk assessment Figure 3.

For non-health risks during operations, the model results show that the HI is less than 0.1 at all receptor locations. Details on the emission calculations and dispersion modeling information are provided as an attachment to the health risk assessment. Non-cancer health risks resulting from exposures to project construction emissions are less than significant.

Operational cancer and non-cancer health risks would not exceed air district thresholds. The residential cancer risk for exposures to unmitigated operational emissions from the gas station would be 3.4 cases per million; and for workers; 0.4 cases per million. The residential cancer risk for exposures to unmitigated operational emissions from all other uses on the site would be 4.6 cases per million; and for workers; 0.5 cases per million. All operational cancer risks levels are below the air district standard and are less than significant.

However, the health risk assessment found that when assuming two partial years of emissions from construction are added to constant operational emissions for 68 additional years (70 years total with operation starting in 2025), residential cancer risk at the residential MEI would be 37.9 cases per million, which exceeds the air district threshold. Worker cancer risks at the worker MEI, assuming a total of 40 years of worker exposures, would be 2.4 cases per million, which does not exceed the threshold. Implementation of mitigation measure AQ-1 during construction reduces the combined cancer risk to less than significant. No additional mitigation is required.

Conclusion

Infant cancer risks from exposures to construction emissions exceed air district thresholds. Residential cancer risk would also exceed air district thresholds under combined construction and operations conditions. These are the significant health risk impacts of the proposed project. Implementation of mitigation measure AQ-1 would reduce these significant impacts to less than

significant. No other significant cancer risks or non-cancer health risks from construction emissions exposures would occur. Exposures to operational emissions would not directly result in significant cancer or non-cancer health risks on their own.

3.0 Greenhouse Gases

This section includes summary discussions of climate change science, existing setting conditions, applicable climate change policy and regulatory direction, projected project GHG emissions, and GHG impacts and mitigation measures.

The background information and impact analysis presented in this section is based on proposed project plans, and information in Appendix A and Appendix B.

3.1 Environmental Setting

This section provides a general overview of climate change science and climate change issues in California.

Climate Change Science

The international scientific community has concluded with a high degree of confidence that human activities are causing an accelerated warming of the atmosphere. The resulting change in climate has serious global implications and consequently, human activities that contribute to climate change may have a potentially significant effect on the environment. In recent years, concern about climate change and its potential impacts has risen dramatically. That concern has translated into a range of international treaties and national and regional agreements aimed at diminishing the rate at which global warming is occurring. Over time, the federal government has been tackling concerns about climate change to varying degrees through a range of initiatives and regulatory actions. Many states and local agencies, private sector interests, and other public and private interests have also taken initiative to combat climate change. At the state level, California has taken a leadership role in tackling climate change, as evidenced by the programs outlined in the Regulatory Setting section below.

Effects of Climate Change

Rising Temperatures

The Intergovernmental Panel on Climate Change, which includes more than 1,300 scientists from the United States and other countries, estimated that over the last century, global temperatures have increased by about 3.6 degrees Fahrenheit (°F) (NASA 2019). The Intergovernmental Panel on Climate Change forecasts indicate that global temperatures can be expected to continue to rise between 2.5 and 10°F over the next century.

Cal-Adapt, a climate change projection modeling tool developed by California Energy Commission, includes information on environmental change projections resulting from global warming. The model indicates that temperatures in the Merced area region have historically (1961-1990) averaged about 76°F. Under a high GHG emissions projection scenario, temperatures are projected to rise to an average of 86°F by 2099 (Cal-Adapt 2022). Merced has historically experienced an average of three extreme heat days per year (1961-1990). The model projections fluctuate on an annual basis. Under a high GHG emissions scenario, the number of extreme heat days per year is expected to increase to an average of 54 by 2099.

Reduced Snowpack

The Sierra Nevada snowpack acts as a large natural reservoir that stores water during the winter and releases it into rivers and reservoirs in the spring and summer. It is expected that there will be less snowfall in the Sierra Nevada and that the elevations at which snow falls will rise. Similarly, there will be less snowpack water storage to supply runoff water in the warmer months. It has already been documented that California's snow line is rising. More precipitation is expected to fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snowpack. The Sierra Nevada snowpack provides approximately 80 percent of California's annual water supply. The rapid decrease in snowpack and spring melt poses a threat to groundwater resources in many parts of the state where rivers that recharge groundwater with melt water from the Sierra Nevada will have reduced groundwater recharge potential.

Water Supply

Climate change is expected to increase pressure on and competition for water resources, further exacerbating already stretched water supplies. Decreasing snowpack and spring stream flows and increasing demand for water from a growing population and hotter climate could lead to increasing water shortages. Water supplies are also at risk from rising sea levels. Competition for water between cities, farmers, and the environment is expected to increase.

Anticipated changes to source water conditions including more intense storm events, longer drought periods, reduced snowpack at lower elevations, and earlier spring runoff will likely impact the quality of the source waters. Changes in source water quantity and quality may result in increased treatment needs and increased treatment costs.

Precipitation Levels

Precipitation levels are difficult to predict compared to other indicators of climate change. Annual rain and snowfall patterns vary widely from year to year, especially in California. Generally, higher temperatures increase evaporation and decrease snowfall, resulting in a drier climate. On average, Cal-Adapt projections show little change in total annual precipitation in California. Furthermore, among several models, precipitation projections do not show a consistent trend during the next

century. The Mediterranean seasonal precipitation pattern is expected to continue, with most precipitation falling during winter from North Pacific storms. One of the four climate models projects slightly wetter winters, while a second projects slightly drier winters with a 10 to 20 percent decrease in total annual precipitation. However, even modest changes would have a significant impact because California ecosystems are conditioned to historical precipitation levels and water resources are nearly fully utilized.

Merced has historically averaged about 12.6 inches of rainfall per year (1961-1990). Under a high GHG emissions scenario, that number is forecast to increase to about 14.3 inches by the end of the century (Cal-Adapt 2021).

More Frequent and Extreme Storm Events

Extreme weather is expected to become more common throughout California. More extreme storm events are expected to increase water runoff to streams and rivers during the winter months, heightening flood risks. Warmer ocean surface temperatures have caused warmer and wetter conditions in the Sierra Nevada, increasing flood risk. Strong winter storms may produce atmospheric rivers that transport large amounts of water vapor from the Pacific Ocean to the California coast. These often last for days and drop heavy rain or snow. Storms involving such atmospheric rivers occurred during the winter of 2016-2017. As the strength of these storms increases, the risk of flooding increases.

Sea Level Rise

Sea level rise is one of the most significant effects of climate change. Sea level has been rising over the past century, and the rate has increased in recent decades. Globally, sea levels are rising due to two main reasons: thermal expansion of warming ocean water and melting of ice from glaciers and ice sheets. Rising sea levels amplify the threat and magnitude of storm surges in coastal areas. The threat of flooding will continue to increase over time as sea levels rise and the magnitude of storms increase. Rising sea levels will create stress on coastal ecosystems that provide recreation, protection from storms, and habitat for fish and wildlife, including commercially valuable fisheries. Rising sea levels can also introduce new, or exacerbate existing, saltwater intrusion into freshwater resources.

Diminished Air Quality

Climate change is expected to exacerbate air quality problems by increasing the frequency, duration, and intensity of conditions conducive to air pollution formation. Higher temperatures and increased ultraviolet radiation from climate change are expected to facilitate the chemical formation of more secondary air pollutants from ground-level sources. Conversely, decreased precipitation is expected to reduce the volume of particulates cleansed from the air. Incidents of wildfires are expected to increase due to climate change, further contributing to air quality problems.

According to the American Lung Association, Californians experience the worst air quality in the nation. Statewide, over 35 million Californians (91 percent) live in counties affected by unhealthy air during the year (American Lung Association 2017).

Ecosystem Changes

Climate change effects will have broad impacts on local and regional ecosystems, habitats, and wildlife as average temperatures increase, precipitation patterns change, and more extreme weather events occur. Species that cannot rapidly adapt are at risk of extinction. As temperatures increase, California vegetation is expected to change. Desert and grassland vegetation is projected to increase while forest vegetation is projected to generally decline. The natural cycle of plant flowering and pollination, as well as the temperature conditions necessary for a thriving locally adapted agriculture, may also be affected. Perennial crops, such as grapes, may take years to recover. Increased temperatures also provide a foothold for invasive species of weeds, insects, and animals.

Social Vulnerability to Climate Change

The impacts of climate change will not affect people equally. People exposed to the most severe climate-related hazards are often those least able to cope with the associated impacts, due to their limited resources and adaptive capacity. Climate change is expected to have a greater impact on larger populations living in poorer and developing countries with lower incomes that rely on natural resources and agricultural systems that will likely be affected by changing climates.

Certain groups in developed countries like the United States will also experience more impacts from climate change than others. People in rural areas are more likely to be affected by climate change related droughts or severe storms compared to their urban counterparts. However, certain groups living in cities will also be at higher risk than others. Place of residence is another vulnerability indicator, as renters, households without air conditioning, households lacking access to grocery stores, households in treeless areas, and households on impervious land cover are also more vulnerable to climate change impacts.

Merced area residents who are at greatest risk include children, the elderly, those with existing health problems, the socially and/or economically disadvantaged, those who are less mobile, and those who work outdoors. Place of residence is another vulnerability indicator, as renters, households without air conditioning, households lacking access to grocery stores, households in treeless areas, and households on impervious land cover are also more vulnerable to climate change impacts.

Health Effects/Illness

As temperatures rise from global warming, the frequency and severity of heat waves will grow and increase the potential for bad air days, which can lead to increases in illness and death due to dehydration, heart attack, stroke, and respiratory disease. Additionally, dry conditions can lead to a greater number of wildfires producing smoke that puts people with asthma and respiratory conditions at risk of illness or death.

Higher temperatures and the increased frequency of heat waves are expected to significantly increase heat-related illnesses, such as heat exhaustion and heat stroke, while also exacerbating conditions associated with cardiovascular and respiratory diseases, diabetes, nervous system disorders, emphysema, and epilepsy. An increase of 10°F in average daily temperature is associated with a 2.3 percent increase in mortality. During heat waves mortality rates can increase to about nine percent. As temperatures in the area increase, vulnerable populations such as children, the elderly, people with existing illnesses, and people who work outdoors will face the greatest risk of heat-related illness.

As climate change affects the temperature, humidity, and rainfall levels across California, some areas could become more suitable habitats for insects (especially mosquitoes), ticks, and mites that may carry diseases. Wetter regions are typically more susceptible to vector-borne diseases, especially human hantavirus cardiopulmonary syndrome, Lyme disease, and West Nile virus.

Greenhouse Gas Types

GHGs are emitted by natural processes and human activities. The human-produced GHGs most responsible for global warming and their relative contribution to it are carbon dioxide, methane, nitrous oxide, and chlorofluorocarbons. The contribution of these GHGs to global warming based on the U.S. inventory of GHGs in 2019 (United States Environmental Protection Agency 2021) is summarized in Table 3-1, GHG Types and Their Contribution to Global Warming.

Table 3-1 GHG Types and Their Contribution to Global Warming

Greenhouse Gas	Percent of all GHG	Typical Sources
Carbon dioxide	81.6 percent	Combustion of fuels, solid waste, wood
Methane (CH_4)	10.2 percent	Fuel production/combustion; livestock, decay of organic materials
Nitrous Oxide (N_2O)	5.6 percent	Combustion of fuels, solid waste, agricultural/industrial processes
Chlorofluorocarbons (CFCs)	2.6 percent	Industrial processes

SOURCE: United States Environmental Protection Agency 2021
NOTE: Percentages reflect weighting for global warming potential

Greenhouse Gas Global Warming Potentials

Each type of GHG has a different capacity to trap heat in the atmosphere and each type remains in the atmosphere for a particular length of time. The ability of a GHG to trap heat is measured by an index called the global warming potential expressed as carbon dioxide equivalent. Carbon dioxide is considered the baseline GHG in this index and has a global warming potential of one.

The GHG volume produced by a particular source is often expressed in terms of carbon dioxide equivalent (CO_2e). Carbon dioxide equivalent describes how much global warming a given type of GHG will cause, with the global warming potential of CO_2 as the base reference. Carbon dioxide equivalent is useful because it allows comparisons of the impact from many different GHGs, such as methane, perfluorocarbons, or nitrous oxide. If a project is a source of several types of GHGs, their individual global warming potential can be standardized and expressed in terms of CO_2e. Table 3-2, GHG Global Warming Potentials presents a summary of the global warming potential of various GHGs.

Methane has a global warming potential of 21 times that of carbon dioxide, and nitrous oxide has a global warming potential of 310 times that of CO_2. The families of chlorofluorocarbons, hydrofluorocarbons, and perfluorocarbons have a substantially greater global warming potential than other GHGs, generally ranging from approximately 1,300 to over 10,000 times that of CO_2. While CO_2 represents the vast majority of the total volume of GHGs released into the atmosphere, the release of even small quantities of other types of GHGs can be significant for their contribution to climate change.

Table 3-2 GHG Global Warming Potentials

GHG	Atmospheric Lifetime (Years)	Global Warming Potential (100-Year Time Horizon)
Carbon Dioxide CO_2	50-200	1
Methane CH_4	12 (+/- 3)	21
Nitrous Oxide N_2O	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC Tetrafluoromethane CF_4	50,000	6,500
PFC Hexafluoroethane C_2F_6	10,000	9,200
Sulfur Hexafluoride SF_6	3,200	23,900

SOURCE: United Nations Framework Convention on Climate Change 2019

Greenhouse Gas Inventories

California GHG Emissions Inventory

California is a substantial contributor of global greenhouse gases. Based on the California Air Resources Board's most recent state GHG inventory, a net of 418.2 million metric tons of carbon dioxide equivalent GHG emissions (CO_2e) were generated in 2019 (California Air Resources Board 2022). In 2019, 41.0 percent of all GHG gases emitted in the state came from the transportation sector. Industrial uses and electric power generation (in state generation and out of state generation

for imported electricity) were the second and third largest categories at 24.0 percent and 14.0 percent, respectively. The commercial and residential use sectors combined to generate about 14.0 percent of the 2019 emissions, while the agricultural sector contributed 7.0 percent.

Merced County GHG Emissions Inventory

A GHG emissions inventory was conducted in 2012 as part of the *Merced County General Plan Revised Draft Background Report* (Merced County 2012). Under the business-as-usual condition, approximately 5,710,000 MT CO_2e of emissions were projected for 2020. Agriculture related source emissions dominated the inventory at about 57 percent, with transportation sources second at about 33 percent. Natural gas and electricity consumption were the next most significant sources at about 2 percent and 1.6 percent, respectively.

3.2 Regulatory Setting

State, regional, and local policies and regulations pertaining to climate change are summarized below. The Federal government has also adopted policies and regulations to address climate change. However, because California has been at the forefront of addressing climate change, its suite of policies and regulations is generally more comprehensive and stringent than is the Federal government's. Therefore, this regulatory setting section focuses on California's climate change regulatory framework. This framework provides context for how climate change is being addressed and identifies policy and regulatory actions whose implementation would lessen the contribution of the proposed project to climate change.

State

Overall Statutory Framework

The California Legislature has enacted a series of statutes addressing the need to reduce GHG emissions across the State. These statutes can be categorized into four broad categories: (i) statutes setting numerical statewide targets for GHG reductions, and authorizing California Air Resources Board to enact regulations to achieve such targets; (ii) statutes setting separate targets for increasing the use of renewable energy for the generation of electricity throughout the state; (iii) statutes addressing the carbon intensity of vehicle fuels, which prompted the adoption of regulations by California Air Resources Board; and (iv) statutes intended to facilitate land use planning consistent with statewide climate objectives. The discussion below will address each of these key sets of statutes, as well as California Air Resources Board "Scoping Plans" intended to achieve GHG reductions under the first set of statutes and recent building code requirements intended to reduce energy consumption.

Statutes Setting Statewide GHG Reduction Targets

Assembly Bill 32 (Global Warming Solutions Act)

In September 2006, the California State Legislature enacted the California Global Warming Solutions Act of 2006, also known as Assembly Bill (AB) 32. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that was phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources.

Senate Bill 32

Effective January 1, 2017, Senate Bill (SB) 32 added a new section to the Health and Safety Code. It provides that "[i]n adopting rules and regulations to achieve the maximum technologically feasible and cost-effective greenhouse gas emissions reductions authorized by [Division 25.5 of the Health and Safety Code], [CARB] shall ensure that statewide greenhouse gas emissions are reduced to at least 40 percent below the statewide greenhouse gas emissions limit no later than December 31, 2030." In other words, SB 32 requires California, by the year 2030, to reduce its statewide GHG emissions so that they are 40 percent below those that occurred in 1990.

Between AB 32 (2006) and SB 32 (2016), the Legislature has codified some of the ambitious GHG reduction targets included within certain high-profile Executive Orders issued by the last two governors. The 2020 statewide GHG reduction target in AB 32 was consistent with the second of three statewide emissions reduction targets set forth in former Governor Arnold Schwarzenegger's 2005 Executive Order known as S-3-05, which is expressly mentioned in AB 32. That Executive Branch document included the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80 percent below 1990 levels. To meet the targets, the Governor directed several state agencies to cooperate in the development of a climate action plan. The Secretary of Cal-EPA leads the Climate Action Team, whose goal is to implement global warming emission reduction programs identified in the Climate Action Plan and to report on the progress made toward meeting the emission reduction targets established in the executive order.

In 2015, former Governor Brown issued another Executive Order, B-30-15, which created a "new interim statewide greenhouse gas emission reduction target to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030 to ensure California meets its target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050." SB 32 codified this target.

The Legislature has not yet set a 2050 target in the manner done for 2020 and 2030 through AB 32 and SB 32, though references to a 2050 target can be found in statutes outside the Health and Safety Code. In the 2015 legislative session, the Legislature passed Senate Bill 350 (SB 350), which is discussed in more detail below. This legislation added to the Public Utilities Code language that essentially puts into statute the 2050 GHG reduction target already identified in Executive Order S-3-05, albeit in the limited context of new state policies (i) increasing the overall share of electricity that must be produced through renewable energy sources and (ii) directing certain state agencies to begin planning for the widespread electrification of the California vehicle fleet. Section 740.12(a)(1)(D) of the Public Utilities Code now states that "[t]he Legislature finds and declares [that] … [r]educing emissions of [GHGs] to 40 percent below 1990 levels by 2030 and to 80 percent below 1990 levels by 2050 will require widespread transportation electrification." Furthermore, Section 740.12(b) now states that the California Public Utilities Commission, in consultation with California Air Resources Board and the California Energy Commission, must "direct electrical corporations to file applications for programs and investments to accelerate widespread transportation electrification to reduce dependence on petroleum, meet air quality standards, and reduce emissions of greenhouse gases to 40 percent below 1990 levels by 2030 and to 80 percent below 1990 levels by 2050."

In 2018, Governor Brown issued Executive Order B-55-18. This order establishes a statewide goal to achieved carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter. This goal is in addition to the existing statewide targets of reducing GHGs, including meeting the 80 percent below 1990 levels by 2050 target. The carbon neutrality goal assumes that later than 2045, remaining emissions be offset by equivalent net removals of carbon dioxide from the atmosphere, including through sequestration in forests, soils and other natural landscapes.

Targets for the Use of Renewable Energy for the Generation of Electricity

California Renewables Portfolio Standard

In September 2002, the Legislature enacted Senate Bill 1078, which established the Renewables Portfolio Standard program, requiring retail sellers of electricity, including electrical corporations, community choice aggregators, and electric service providers, to purchase a specified minimum percentage of electricity generated by eligible renewable energy resources such as wind, solar, geothermal, small hydroelectric, biomass, anaerobic digestion, and landfill gas. The legislation set a target by which 20 percent of the State's electricity would be generated by renewable sources.

In September 2006, the Legislature enacted Senate Bill 107, which modified the Renewables Portfolio Standard to require that at least 20 percent of electricity retail sales be served by renewable energy resources by year 2010. In April 2011, the Legislature enacted Senate Bill X1-2, which set even a more aggressive statutory targets for renewable electricity of 33 percent by 2020.

In 2015, the Legislature enacted Senate Bill 350 that increased Renewable Portfolio Standard to require 50 percent of electricity generated to be from renewables by 2030. On September 10, 2018, former Governor Brown signed into law SB 100. SB 100 raises California's Renewable Portfolio Standard requirement to 50 percent renewable resources target by December 31, 2026, and 60 percent target by December 31, 2030.

Actions to Reducing Carbon Intensity of Vehicle Fuels

Assembly Bill 1493, Pavley Clean Cars Standards

In July 2002, the Legislature enacted Assembly Bill 1493 ("Pavley Bill"), which directed CARB to develop and adopt regulations that achieve the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty trucks beginning with model year 2009. In September 2004, CARB approved regulations to reduce GHG emissions from new motor vehicles beginning with the 2009 model year. These regulations created what are commonly known as the "Pavley standards." In September 2009, CARB adopted amendments to the Pavley standards to reduce GHG emissions from new motor vehicles through the 2016 model year. These regulations created what are commonly known as the "Pavley II standards."

In January 2012, CARB adopted an Advanced Clean Cars program aimed at reducing both smog-causing pollutants and GHG emissions for vehicles model years 2017-2025. This historic program combined the control of smog-causing (criteria) pollutants and GHG emissions into a single coordinated set of requirements. The regulations focus on substantially increasing the number of plug-in hybrid cars and zero-emission vehicles in the vehicle fleet and on making fuels such as electricity and hydrogen readily available for these vehicle technologies. The components of the Advanced Clean Cars program are the low-emission vehicle regulations that reduce criteria pollutants and GHG emissions from light- and medium-duty vehicles, and the zero-emission vehicle regulation, which requires manufacturers to produce an increasing number of pure zero-emission vehicles (meaning battery electric and fuel cell electric vehicles), with provisions to also produce plug-in hybrid electric vehicles in the 2018 through 2025 model years.

It is expected that the Advanced Clean Car regulations will reduce GHG emissions from California passenger vehicles by about 34 percent below 2016 levels by 2025, all while improving fuel efficiency and reducing motorists' costs.

Executive Order S-01-07

This order establishes a statewide goal to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In 2018, CARB passed amendments to the Low Carbon Fuel Standard that set a target to reduce fuel carbon intensity by 20 percent by 2030, compared to a 2010 baseline

Actions for Increasing Electric Vehicle Use

Executive Order B-16-12

In March 2012, former Governor Brown issued an Executive Order, B-16-12, which embodied a vision of a future in which zero-emission vehicles will play a big part in helping the state meet its GHG reduction targets. Executive Order B-16-12 directed state government to accelerate the market for in California through fleet replacement and electric vehicle infrastructure. The Executive Order set the following targets:

- By 2015, all major cities in California will have adequate infrastructure and be "zero-emission vehicles ready";
- By 2020, adequate infrastructure to support one million zero-emission vehicles;
- By 2025, 1.5 million zero-emission vehicles on the road in California; and
- By 2050, virtually all personal transportation in the State will be based on zero-emission vehicles, and greenhouse gas emissions from the transportation sector will be reduced by 80 percent below 1990 levels.

In sum, California has set a statutory goal of requiring that, by the year 2030, half of the electricity generated in California should be from renewable sources, with increased generation capacity intended to be sufficient to allow the mass conversion of the statewide vehicle fleet from petroleum-fueled vehicles to electrical vehicles and/or other zero-emission vehicles. The Legislature is thus looking to California drivers to buy electric cars, powered by green energy, to help the State meet its aggressive statutory goal, created by SB 32, of reducing statewide GHG emissions by 2030 to 40 percent below 1990 levels. Another key prong to this strategy is to make petroleum-based fuels less carbon intensive. A number of statutes in recent years have addressed that strategy.

Senate Bill 350

In addition to setting increased renewable energy portfolio targets, this bill indirectly promotes electrification of the transportation fleet by promoting actions to enhance availability of renewable energy as a vehicle transportation energy source.

Executive Order B-48-18

In January 2018, former Governor Brown issued Executive Order B-48-18. This executive order requires that all state entities work with the private sector and all appropriate levels of government to put at least five million zero-emission vehicles on California roads by 2030. It also requires all State entities to work with the private sector and all appropriate levels of government to spur the construction and installation of 200 hydrogen fueling stations and 250,000 zero-emission vehicle chargers, including 10,000 direct current fast chargers, by 2025.

Executive Order N-79-20

In 2020, California Governor Gavin Newsom issued Executive Order N-79-20, which sets statewide goals for phasing out gasoline-powered cars and trucks in California. Under the Order, 100 percent of in-state sales of new passenger cars and trucks are to be zero-emission by 2035; 100 percent of in-state sales of medium- and heavy-duty trucks and busses are to be zero-emission by 2045, but only where feasible; and 100 percent of off-road vehicles and equipment sales are to be zero-emission by 2035 where feasible.

Cap and Trade Program

On October 20, 2011, in a related action, CARB adopted the final cap-and-trade program for California. The California cap-and-trade program creates a market-based system with an overall emissions limit for affected sectors. The program is intended to regulate more than

85 percent of California's emissions and staggers compliance requirements according to the following schedule: (1) electricity generation and large industrial sources (2012); (2) fuel combustion and transportation (2015). The statewide cap for GHG emissions from major sources commenced in 2013. This cap declines over time, achieving GHG emission reductions throughout the program's duration. The program expanded in 2015 to include fuel distributors (natural gas and propane fuel providers and transportation fuel providers) to address emissions from transportation fuels, and from combustion of other fossil fuels not directly covered at large sources in the program's initial phase.

In early 2017, former Governor Brown signed AB 398, which extended the life of the existing Cap and Trade Program through December 2030.

Statutes Intended to Facilitate Land Use Planning Consistent with Statewide Climate Objectives

California Senate Bill 375 (Sustainable Communities Strategy)

This 2008 legislation built on AB 32 by setting forth a mechanism for coordinating land use and transportation on a regional level for the purpose of reducing GHGs. The focus is to reduce miles traveled by passenger vehicles and light trucks. CARB is required to set GHG reduction targets for each metropolitan region. Each of California's metropolitan planning organizations then prepares a sustainable communities strategy that demonstrates how the region will meet its GHG reduction target through integrated land use, housing, and transportation planning. Once adopted by the metropolitan planning organizations, the sustainable communities strategy is to be incorporated into that region's federally enforceable regional transportation plan. If a metropolitan planning organization is unable to meet the targets through the sustainable communities strategy, then an alternative planning strategy must be developed that demonstrates how targets could be achieved, even if meeting the targets is deemed to be infeasible.

Local agencies that adopt land use, housing, and transportation policies that are consistent with and facilitate implementation of the related GHG reduction strategies in a sustainable communities strategy benefit through potential CEQA streamlining for qualifying projects proposed within their boundaries.

Climate Change Scoping Plans

AB 32 Scoping Plan

In December 2008, California Air Resources Board adopted the Climate Change Scoping Plan, which contains the main strategies California planned to implement to achieve reduction of approximately 118 million metric tons (MMT) CO2e, or approximately 22 percent from the state's projected 2020 emission level of 545 MMT of CO2e under a business-as-usual scenario This is a reduction of 47 MMT CO2e, or almost 10 percent, from 2008 emissions. The Scoping Plan also included CARB recommended GHG reductions for each emissions sector of the state GHG inventory.

2014 Scoping Plan Update

In response to comments on the 2008 Scoping Plan, and AB 32's requirement to update the Scoping Plan every five years, CARB revised and reapproved the Scoping Plan in 2014. The 2014 Scoping Plan contains the main strategies California would implement to achieve a reduction of approximately 16 percent from the state's projected 2020 emission levels. The 2014 Scoping Plan also includes a breakdown of the amount of GHG reductions CARB recommends for each emissions sector of the state's GHG inventory. Several strategies to reduce GHG emissions are included: the Low Carbon Fuel Standard, the Pavley Rule, the Advanced Clean Cars program, the Renewable Portfolio Standard, and the Sustainable Communities Strategy.

2017 Scoping Plan

With the passage of SB 32, the Legislature also passed companion legislation AB 197, which provides additional direction for updating the prior scoping plan. The 2017 Scoping Plan represents a second update to the scoping plan to reflect the 2030 target of reducing statewide GHG emissions by 40 percent below 1990 levels codified by SB 32. The GHG reduction strategies in the 2017 Scoping Plan proposed to implement to meet the target include:

- SB 350 - achieve 50 percent Renewables Portfolio Standard (RPS) by 2030 and doubling of energy efficiency savings by 2030;
- Low Carbon Fuel Standard - increased stringency (reducing carbon intensity 18 percent by 2030, up from 10 percent in 2020);
- Mobile Source Strategy (Cleaner Technology and Fuels Scenario) - maintaining existing GHG standards for light- and heavy-duty vehicles, put 4.2 million zero-emission vehicles on the roads, and increase zero-emission buses, delivery and other trucks;

- Sustainable Freight Action Plan - improve freight system efficiency, maximize use of near-zero emission vehicles and equipment powered by renewable energy, and deploy over 100,000 zero-emission trucks and equipment by 2030;
- Short-Lived Climate Pollutant Reduction Strategy - reduce emissions of methane and hydrofluorocarbons 40 percent below 2013 levels by 2030 and reduce emissions of black carbon 50 percent below 2013 levels by 2030;
- SB 375 Sustainable Communities Strategies - increased stringency of 2035 targets;
- Post-2020 Cap-and-Trade Program - declining caps, continued linkage with Québec, and linkage to Ontario, Canada;
- 20 percent reduction in greenhouse gas emissions from the refinery sector; and
- By 2018, develop an Integrated Natural and Working Lands Action Plan to secure California's land base as a net carbon sink.

2022 Scoping Plan

The draft 2022 Scoping Plan Update assesses progress toward the statutory 2030 target identified in SB 32, while laying out a path to achieving carbon neutrality no later than 2045 as identified in Executive Order B-55-18. The 2022 Scoping Plan Update focuses on outcomes needed to achieve carbon neutrality by assessing paths for clean technology, energy deployment, natural and working lands, and others, and is designed to meet the State's long-term climate objectives and support a range of economic, environmental, energy security, environmental justice, and public health priorities.

This is the first Scoping Plan that adds carbon neutrality as a science-based guide beyond statutorily established emission reduction targets. Previous plans focused on specific GHG reduction targets for the industrial, energy, and transportation sectors—to meet 1990 levels by 2020, and then the more aggressive 40 percent below that for the 2030 target. Carbon neutrality takes it one step further by expanding actions to capture and store carbon including through natural and working lands and mechanical technologies, while drastically reducing anthropogenic sources of carbon pollution.

Building Code Requirements Intended to Reduce GHG Emissions

California Energy Code

The California Energy Code (California Code of Regulations, Title 24, Part 6), which is incorporated into the California Building Standards Code, was first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The California Energy Code is updated every three years by the California Energy Commission as the Building Energy Efficiency Standards (BEES) to allow consideration and possible incorporation of new energy efficiency technologies and construction methods. Although the BEES were not originally intended to reduce GHG emissions, increased energy efficiency results in decreased GHG emissions because energy efficient buildings

require less electricity. The California Building Standards Code is enforceable at the project-level. Energy standards have supported California's long-term strategy to meet energy demand, and conserve resources. The Energy Code governs window and door materials, lighting, electrical panels, insulation, faucets and additional building features. The requirements vary between home and business buildings, as well as among climate zones in which they are implemented. The current 2022 Energy Code updates the prior 2019 code by requiring actions/features that continue to support California's gradual transition away from use of fossil fuels, and improve environmental quality.

California Green Building Standards Code

The purpose of the California Green Building Standards Code (California Code of Regulations Title 24, Part 11) ("CALGreen") is to improve public health and safety and to promote the 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 in the following categories: 1) planning and design; 2) energy efficiency; 3) water efficiency and conservation; 4) material conservation and resource efficiency; and 5) environmental quality. The code requires all new buildings in the state to be more energy efficient and environmentally responsible.

These comprehensive regulations are intended to achieve major reductions in interior and exterior building energy consumption. CALGreen institutes mandatory minimum environmental performance standards for all ground-up new construction of commercial, residential, and state-owned buildings, as well as schools and hospitals. CALGreen includes mandatory standards that address:

- Planning and Design (e.g., stormwater, bicycle facilities, clean air vehicles, EV support infrastructure, light pollution and grading and paving);
- Water Efficiency (metering, conserving fixtures, landscaping, outdoor recycle water supply);
- Materials Conservation and Efficiency (moisture control, construction waste management, soil and debris management, recycling, systems commissioning, etc.); and
- Environmental Quality (fireplaces and woodstoves, ducting, paints, carpets, flooring, interior air quality, noise, ozone and refrigerants, etc.).

The current 2019 CALGreen code is in effect until December 31, 2022. Updates were adopted in July 2022, with the update to take effect on January 1, 2023. The primary changes in the 2022 code are to planning and design standards. The 2022 update encourages efficient electric heat pumps, establishes electric-ready requirements for new homes, expands solar photovoltaic and battery storage standards, strengthens ventilation standards, and promote electrification of the vehicle fleet by expanding standards for electric vehicle infrastructure (e.g., electric vehicle charging stations) for residential and non-residential development. Changes in the water efficiency, materials conservations, and environmental quality standards were limited.

Regional/Local

San Joaquin Valley Air Pollution Control District

In 2009, the San Joaquin Valley Air Pollution Control District adopted its "Guidance for Valley Land-Use Agencies in Addressing GHG Emissions Impacts for New Projects." That guidance includes four possible options for determining significance of GHG impacts: 1) project is exempt from CEQA; 2) project complies with a plan for reduction or mitigating GHG emissions; 3) project reduces GHG emissions by 29 percent by implementing best management practices (this option applies primarily to GHG sources other than land use projects); or 4) project reduces GHG emissions by 29 percent or more below statewide business as usual conditions by applying project specific mitigation.

Regarding the proposed project, none of these options is applicable: 1) the project is not exempt from CEQA; 2) there is currently no plan for reducing GHG emissions that has been adopted against which the project can be assessed for compliance; and 3/4) recent CEQA court cases have found that quantified thresholds of significance which are based on statewide targets for GHG emissions generally are not valid for application to local, proposed land use projects (the San Joaquin Valley Air Pollution Control District derived the referenced 29 percent reduction targets from statewide GHG reduction guidance).

Merced County General Plan

Policy guidance from both the general plan is relevant to the proposed project. Representative general plan policies that would directly or indirectly result in GHG emissions by reducing vehicle trip numbers and/or lengths, or by reducing energy demand include:

> **Policy AQ-1.1:** Energy Consumption Reduction - Encourage new residential, commercial, and industrial development to reduce air quality impacts from energy consumption.
>
> **Policy AQ-1.2:** Business Energy Reduction Strategies - Encourage all businesses to: replace high mileage fleet vehicles with more efficient and/or alternative fuel vehicles; increase the energy efficiency of facilities; transition toward the use of renewable energy instead of non-renewable energy sources; adopt purchasing practices that promote emissions reductions and reusable materials; and increase recycling.
>
> **Policy AQ-1.7:** Heat Island Effect Reduction - Require increased tree canopy and reflective surface materials in order to reduce the heat island effect (i.e., increased temperatures due to heat radiation off paved surfaces and rooftops).
>
> **Policy AQ-4.1:** Decrease Vehicle Miles Traveled - Require diverse, higher-density land uses (e.g., mixed-use and infill development) to decrease vehicle miles traveled.
>
> **Policy AQ-4.3:** Public Transport Use Incentives - Prepare incentives and programs to encourage use of public transit and decrease vehicle miles traveled.

Policy AQ-4.4: Transportation Alternatives - Require employers and developers to provide employees and residents with attractive, affordable transportation alternatives, such as transit stops, van pool pick-up and drop-off locations, and biking paths/storage.

Policy AQ-4.6: Non-Motorized Transportation - Encourage non-motorized transportation corridors within and between communities.

Policy AQ-1.5: calls for the County to prepare a climate action plan. While the County has initiated this process, it is anticipated that a climate action plan would not be adopted before the proposed project is considered for approval by the County, so would not be available as a basis for evaluating the GHG impacts of the project.

Policy CIR-1.22: Complete Streets - Require new urban streets within Urban Communities to be designed and constructed to not only accommodate automobile, truck, and bus traffic, but to also serve all users, including pedestrians, bicyclists, and transit passengers of all ages and abilities.

Policy CIR-3.2: Transit Improvements - Continue to support transit efforts by the Merced County Association of Governments, Dial-A-Ride, UC Merced Transit, other public entities, private social service providers, and other various private charter services to improve and expand public transit throughout the County.

Policy CIR-4.2: Bicycle Lanes and Pedestrian Paths - Require all new or major reconstructed streets within Urban Communities to accommodate travel by pedestrians and bicyclists, except where pedestrians and bicyclists are prohibited by law from using a given facility or where the costs of including bikeways and walkways would be excessively disproportionate to the need or probable use.

Policy CIR-4.6: Multi-Use Trails - Encourage the development of multi-use corridors (such as hiking, equestrian, and mountain biking) in open space areas, along power line transmission corridors, utility easements, rivers, creeks, abandoned railways, and irrigation canals.

2022 Regional Transportation Plan and Sustainable Communities Strategy for Merced County

The *Regional Transportation Plan and Sustainable Communities Strategy for Merced County* (Merced County Association of Governments 2022) (RTP/SCS) contains the County's strategy for ensuring that the County transportation system will continue to operate efficiently in the future with sufficient capacity to meet demand and that mobility options are available. The RTP component of the plan focuses on regional transportation infrastructure needs. The SCS components of the plan address planned growth patterns that have been defined by local cities and the County to help reduce vehicle miles traveled consistent with California Senate Bill 375, the Sustainable Communities and Climate Protection Act, which is intended to reduce transportation related greenhouse gas emissions.

The RTP/SCS identifies a range of transportation infrastructure projects and programs to be implemented over time to support transportation efficiency and accommodate planned growth. Improvement projects and programs range from road capacity improvements to bicycle, transit, rail, and complete streets projects. The RTP/SCS includes one program that affects transportation in Delhi - expanded microtransit service.

3.3 Thresholds of Significance

CEQA Guidelines Appendix G is a sample initial study checklist that includes a number of factual inquiries related to the subject of GHGs, as it does on a whole series of additional environmental topics. Lead agencies are under no obligation to use these inquiries in fashioning thresholds of significance on the subject of GHG impacts, or on any subject addressed in the checklist. Rather, with few exceptions, CEQA grants agencies discretion to develop their own thresholds of significance. Even so, it is a common practice for lead agencies to take the language from the inquiries set forth in Appendix G and to use that language in fashioning thresholds. The County has done so here. Therefore, for purposes of this SEIR, a significant impact would occur if implementation of the proposed project would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

To date, the County has neither adopted a plan for reducing GHGs, nor adopted a threshold of significance for GHGs. In this circumstance, local agencies commonly refer to guidance and plans from regional air districts for assessing the impacts of GHGs. Such local and regional GHG plans are commonly adopted to guide local agencies in reducing their fair share of GHG emissions to help meet state wide GHG reduction targets. The County is located within boundary of the San Joaquin Valley Air Pollution Control District. The San Joaquin Valley Air Pollution Control District developed GHG analysis guidance in 2008. Given the evolution of climate change science, changes in the related regulatory environment, and decisions in court cases regarding GHG analysis in CEQA documents that have occurred since then, that guidance is no longer applicable.

Given the absence of a local or regional threshold of significance or plan for reducing GHGs, for the Franklin Road Retail Center project, the County is referencing guidance provided by an adjacent air district, the Sacramento Metropolitan Air Quality Management District (SMAQMD), for determining the significance of GHG impacts of the proposed project. The SMQAMD guidance is found in Chapter 6, Greenhouse Gas Emissions, its *Guide to Air Quality Assessment in Sacramento County* (Sacramento Metropolitan Air Quality Management District 2021). The "assessment guide"

was originally adopted in 2009, but was most recently updated in 2021. It reflects current practice and the cumulative efforts of the state and the SMAQMD to manage GHG emissions from land use projects.

For addressing GHG impacts in CEQA documents, the assessment guide relies on the SMAQMD's *CEQA Thresholds for Evaluating the Significance of Climate Impacts from Land Use Projects and Plans* (Sacramento Metropolitan Air Quality Management District 2020). The "thresholds guidance" document includes substantial evidence used to identify quantified construction and operational thresholds of significance and to identify best management practices (BMPs) for new land development projects, which if incorporated into a proposed project, would render its operational GHG impact less than significant. The thresholds are designed to reduce emissions from individual land use projects. The thresholds guidance is based largely on the air district's analysis of GHG emissions trends and on state level GHG reduction targets and strategies embedded in state statutes and executive orders, particularly the *2017 Scoping Plan* (California Air Resources Board 2017). The 2017 Scoping Plan includes state strategies for reducing GHG emissions to achieve the state wide GHG reduction target of 40 percent below 1990 levels by 2030 as codified in Senate Bill 32. It identifies a key role for local governments by recommending that they establish GHG reduction goals for both their municipal operations and the community consistent with those of the state. The proposed project would be operational well before 2030. Therefore, guidance for reducing emissions to meet the state 2030 target is particularly relevant.

3.4 Analysis, Impacts and Mitigation Measures

This section includes information, data and analysis needed to evaluate the GHG impacts of the proposed project. GHG emissions from constructing and operating the project are estimated and compared to the thresholds of significance. The assumptions, methodology and model results for operational GHG emissions are summarized in the *Franklin Road Commercial Project – Emissions Modeling Methodology, Assumptions, and Results* (EMC Planning Group 2022) memo included in Appendix A. Construction GHG emissions were identified in the *Franklin Hwy Retail Center Health Risk Assessment* (Illingworth and Rodkin 2022) ("health risk assessment") included in Appendix B.

Generation of GHG Emissions

Construction GHG Emissions

The SMAQMD threshold of significance for construction emissions is 1,100 metric tons of GHG equivalent (MT CO_2e) per year. Construction GHG emissions were quantified using CalEEMod as part of the health risk analysis described in Section 2.0. The construction emissions data is included in Appendix B. The results show that over the two-year construction period, the highest annual construction emissions volume is projected at 284.29 MT CO_2e. This is substantially below the threshold of significance. Construction GHG impacts would be less than significant.

Operational GHG Emissions

For operational emissions (emissions that would occur annually due to the long-term operation of a project), the significance determination is based on a multi-step process. First, operational emissions are quantified using CalEEMod. Operational emissions are reported in the memo in Appendix A. The memo also describes assumptions used in the modeling process. GHG emissions from existing activities on the site as well emissions at buildout of the proposed project were modeled, as were changes in carbon sequestration (in this case, the loss of the carbon storage capacity of existing site soils and vegetation that would occur with its development). The results are shown in Table 3-3, Net Annual Unmitigated Operational GHG Emissions. Refer to the technical memorandum for discussion of modeling assumptions and a description of carbon sequestration changes.

Table 3-3 Net Annual Unmitigated Operational GHG Emissions

Operational	Existing Operational[1]	Sequestration Change	Net Annual
3,085.47	<15.00>	0.67	3,071.14

SOURCE: Illingworth and Rodkin 2022, EMC Planning Group 2022
NOTES:
1. Brackets indicate amount subtracted from proposed operational emissions.
All results are reported in MT CO_2e

Independent of a project's annual operational emissions volume, to be consistent with GHG emissions targets described in the threshold guidance document, individual projects are to incorporate the following two BMPs:

1. No natural gas: Projects shall be designed and constructed without natural gas infrastructure; and
2. Electric vehicle (EV) ready: Projects shall meet the current California Green Building Code (CALGreen) Tier 2 standards.

The applicant has indicated that it is infeasible to construct the planned coffee shop and fast food uses without natural gas infrastructure, but that the convenience store use would be all-electric. Per Section 5.2, Energy by Land Use – NaturalGas, of the CalEEMod results in Appendix A, the coffee shop and fast-food uses would generate 56.39 MT CO_2e per year of GHGs from natural gas combustion.

The SMAQMD has established a quantified threshold of significance for operational GHG emissions of 1,100 MT CO_2e. As stated in the assessment guide, if after subtracting the GHG reduction volumes from implementing BMPs 1 and 2 from a project's annual operations emissions volume, the volume drops below 1,100 MT CO_2e, the project can be found to have a less-than-significant impact and no further analysis is required. The emissions reduction from implementing

the EV BMP would be nominal relative to the total mobile source emissions of 3,071.14 MT CO_2e shown in Table 3-3. Therefore, annual operational emissions would still exceed the 1,100 MT CO_2e threshold of significance.

Where the project GHG emissions volume exceeds 1,100 MT CO_2e per year after implementing BMPs 1 and 2, a third BMP is required:

3. Residential projects shall achieve a 15 percent reduction in vehicle miles traveled (VMT) per resident.

The *Transportation Impact Analysis for the Franklin Road Retail Center Project* (KD Anderson & Associates 2022) was prepared to evaluate the project's VMT impacts. The analysis concludes that the VMT impact of the project is less than significant; no mitigation to reduce VMT is required.

The threshold guidance document states that projects that incorporate BMPs 1 and 2 and meet the BMP 3 requirement regarding VMT can be found to be consistent with the GHG reduction targets identified in the threshold document and described in the assessment guide, and therefore, found to have a less-than-significant GHG impact. The thresholds guidance document also states:

> If a project cannot incorporate the required BMPs, other reductions or purchasing and retiring GHG/carbon offsets from a registry approved by the SMAQMD may be required thresholds guidance document, p. 40); and
>
> …if applicants cannot or choose not to incorporate the required BMPs, they can propose alternative GHG reduction strategies that achieve equivalent reductions, provided that they are surplus to reductions needed to achieve the State's targets. (thresholds guidance document, p. 43).

The project is consistent with BMP 3. However, the applicant has determined that implementing BMP regarding natural gas is infeasible and to date, has not identified EV infrastructure improvements consistent with CALGreen Tier 2 standards as part of the project description. Consequently, the project would have a significant impact from generating GHG emissions as it does not meet two of the three BMPs.

As noted above, the project would generate 56.39 MT CO_2e of GHGs from using natural gas. This volume must be mitigated through alternative reduction means. Mitigation is also required to assure that the project design includes EV infrastructure consistent with BMP 2. The following mitigation measures address these issues. Implementation of the mitigation measure would reduce the GHG emissions impact of the project to less-than-significant.

Mitigation Measures

GHG-1 The applicant shall prepare a Greenhouse Gas (GHG) Reduction Plan which identifies one or more GHG reduction actions that will be taken to reduce GHG emissions by 56.39 MT CO_2e per year as a basis for fully mitigating GHG emissions from natural gas.

The GHG Reduction Plan shall prioritize on-site GHG reduction design features. Additional measures may be added by the applicant.

In lieu of or in addition to one or more of the on-site measures above, the applicant may make direct investments in off-site GHG reduction activities/programs in the vicinity. Examples of direct investments include building retrofit programs that pay for cool roofs, solar panels, solar water heaters, smart meters, energy efficient lighting energy efficient windows, and insulation. Other examples include financing programs for installing electric vehicle charging stations, electrifying school buses, or planting local urban forests.

The applicant may choose to retain a qualified air quality/GHG professional to quantify the GHG reductions that would result from implementing the Reduction Plan based on substantial evidence to be included in the Reduction Plan.

If the applicant elects to quantify the GHG emissions reductions from on-site measures and/or investments in off-site reduction programs and the reductions are insufficient to reduce project emissions by a minimum of 58.15 MT CO_2e per year, the applicant may secure the reduction balance by purchasing and retiring carbon offset credits. The carbon offset credits shall meet the following performance standards:

- Carbon offset credits shall be issued by a recognized, reputable and accredited registry that mandates the use of established protocols for quantifying and issuing the offset credits. Credits issued based on protocols approved by the California Air Resources Board should be prioritized. Examples of such registries include the Climate Action Reserve, American Carbon Registry, and Vierra.

- The carbon offset credits should be generated from projects developed in the United States. Credits from projects developed internationally should not be used unless the applicant demonstrates with substantial evidence that sufficient carbon offsets from projects in the United States are unavailable. International offsets must be quantified and issued using established protocols that are recognized in the United States and that are issued by recognized, reputable and accredited registries.

- All carbon offset credits purchased to reduce GHG emissions, must meet the criteria of being real, quantifiable, permanent, verifiable, enforceable, and additional, consistent with the standards set forth in Health and Safety Code section 38562, subdivisions (d)(1) and (d)(2).

The applicant shall submit the GHG Reduction Plan for review and approval of the Merced County Community and Economic Development Director prior to issuing building permits for the project. If carbon offsets are proposed, prior to approval of an occupancy permit for the first proposed use, the applicant shall provide an executed

contract or other certification to the Merced County Community and Economic Development Director that the requisite volume of carbon offset credits have been purchased.

GHG-2 The proposed project shall be designed to include electric vehicle support improvements to consistent with the latest adopted version the CALGreen Tier 2 voluntary standards. Inclusion of these design elements in the final project plans shall be verified by the Merced County Building and Safety Official prior to issuance of a building permit.

Conflict Applicable GHG Reduction Plan, Policy, or Regulation

Given that the County does not have an adopted plan for assessing the impact of GHG emissions, the SMAQMD's guidance is considered to be the applicable plan for reducing GHG emissions. The SMAQMD's guidance is based in significant part on demonstrating consistency with the 2017 Scoping Plan. The 2017 Scoping Plan identifies strategies for meeting the state's 2030 GHG emissions reduction target of 40 percent below 1990 levels by 2030 as codified in Senate Bill 32. Because the proposed project would be fully operational before 2030 and would implement the three BMPs identified in the SMAQMD guidance (with required implementation of mitigation measure GHG-1), it would be consistent with that guidance. Consequently, the proposed project would have no impact from conflict with the applicable plan for reducing GHG emissions.

Conclusion

The proposed project would have a significant impact from generating GHGs in the absence of mitigation measures GHG-1 and GHG-2. These mitigations would ensure that the project is consistent with the GHG reduction plan guidance from the SMAQMD, which is being used as a basis for evaluating GHG emissions impacts of the proposed project. With implementation of these measures, the project would have no impact from conflict with the applicable plan for reducing GHG emissions.

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Emissions Modeling Methodology, Assumptions, and Results

A

APPENDIX

EMC PLANNING GROUP INC.
A LAND USE PLANNING & DESIGN FIRM

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To: **Ron Sissem, Principal-in-Charge**

From: **Zane Mortensen, Assistant Planner**

Cc: **Sally Rideout, Principal Planner, File**

Date: **July 15, 2022**

Re: **Franklin Road Commercial Project – Emissions Modeling Methodology, Assumptions, and Results**

PROJECT DESCRIPTION

The proposed Franklin Road Commercial project (proposed project) is a commercial development located on 3.76 acres at the Franklin Road/State Highway 99 interchange. Existing uses of the site consists of a residence, and outbuildings (approximately 3,500 square feet) and hay or similar crop production on approximately 3.25 acres of the site.

The proposed project includes demolishing existing structures and constructing three new uses: a coffee shop building, a convenience store building with associated fueling facility with a total of 11 fuel pumps (22 total fueling positions), and a quick-serve restaurant. The coffee shop component includes a 2,200 square-foot building and associated parking. The convenience store (3,300 square feet) and quick-serve restaurant (2,800 square feet) would be located within the same building, also with associated parking. A total of 8,300 square feet of enclosed building area is planned, with another 4,100 square feet of area located under the fuel pump canopies. Ten of the fuel pumps are designed to accommodate passenger cars and trucks. The remaining pump is separated from the others and would accommodate larger trucks and RVs/trailers. The proposed coffee shop includes 11 parking spaces and the gas station/convenience store includes 48 parking spaces. Other proposed improvements include walkways, landscaping, and a storm water detention facility.

The project site is located in the San Joaquin Valley Air Basin, which is under the jurisdiction of the San Joaquin Valley Air Pollution Control District ("air district").

SCOPE OF ASSESSMENT

This assessment includes descriptions of the methodology and assumptions used, and an estimate of operational criteria air pollutant emissions and operational greenhouse gas (GHG) emissions. The emissions estimates are derived from the California Emissions Estimator Model (CalEEMod) version 2020.4 software, a modeling platform recommended by the California Air Resources Board (CARB) and accepted by the air district. Model results are attached to this assessment.

METHODOLOGY

Emissions Model

CalEEMod estimates construction and operational emissions associated with land use development projects The CalEEMod software utilizes emissions models USEPA AP-42 emission factors, CARB vehicle emission models studies and studies commissioned by other California agencies.

The CalEEMod platform allows calculations of indirect emissions from processes "downstream" of the proposed project such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use. Data inputs to the model are based on a comparison of proposed land uses with CalEEMod default land uses while utilizing the size metrics provided by the applicant.

CalEEMod is capable of estimating changes in the carbon sequestration potential of a site based on changes in natural vegetation communities and the net number of new trees that would be planted as part of the project. The model calculates a one-time only loss in the carbon sequestration potential of the site that would result from changes in land use such as converting vegetation to built or paved surfaces, and can provide an estimate of the change in the carbon sequestration potential that would result from planting new trees in an amount that is greater than the number of trees to be removed (net number of new trees).

Project Characteristics

Data inputs to the model take into account the type and size of existing and proposed uses utilizing CalEEMod default land uses based on the size metrics shown on the project plans and land use calculations, and operational vehicle trip information used in emissions modeling conducted in the *Franklin Retail Center Air Quality Health Risk Assessment* (Illingworth and Rodkin 2022) ("health risk assessment") to determine construction and operational health risks.

The size and type of existing and proposed sources of criteria air pollutant and GHG emissions and their respective CalEEMod land use default categories are presented in Table 1, Project Characteristics.

Table 1 Project Characteristics

Project Components	CalEEMod Default Land Use[1]	Existing[3]	Proposed[2]
Single-family Residential	Single-family Residential	1 unit	-
Parking Lot	Parking Lot	-	67 spaces
Concrete/paving	Other Asphalt Surfaces	-	2 acres
Convenience store/ Gas Station	Convenience Market with Gas Pumps	-	11 pumps
Fast Food Restaurant with Drive Through	Fast Food Restaurant With Drive Thru	-	2,800
Coffee Shop with Drive Through	Fast Food Restaurant With Drive Thru	-	2,200
Landscaping	City Park	-	34,848
Cropland	Cropland	3.25 Acres	0 Acres

SOURCE: Trinity Consultants 2021, Milestone Imagineering 2021, Illingworth and Rodkin 2022.
NOTES:
1. CalEEMod default land use subtype. Descriptions of the model default land use categories and subtypes are found in the User's Guide for CalEEMod Version 2020.4 available online at: http://www.aqmd.gov/caleemod/user's-guide.
2. Expressed in units of square feet unless otherwise noted.
3. Existing building sizes are estimated Google Earth and included in CalEEMod demolition data inputs.

Operational criteria air pollutant emissions, and construction and operational GHG emissions are quantified based on the project characteristics information presented in Table 1. Construction criteria air pollutant emissions are quantified in the health risk assessment.

Modeling Scenarios

Two modeling scenarios were prepared to estimate existing and proposed unmitigated project GHG emissions.

Existing Emissions Scenario

Existing sources of criteria pollutant emissions are accounted for in air district air quality management plans. Existing operational GHG emissions are quantified based on the model's default emissions factors for existing land uses in the present year. The results of this model will be used to find the net change in GHG emissions.

Unmitigated Emissions Scenario

The "unmitigated" emissions scenario is an estimate of projected operational emissions that takes into account compliance with uniformly applied regulatory measures that reduce GHG emissions and have criteria air emission reduction co-benefits. This scenario includes modeled operational criteria air pollutant emissions and GHG emissions that would be generated during the project demolition, construction, and operational activities. Regulatory compliance consistent with California Pollution Control Officers Association (CAPCOA) emissions reduction measures that are assumed in the modeling process are found in the *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity* are referenced here parenthetically.

Compliance with the following regulations during operations is assumed:

- State Model Water Efficient Landscape Ordinance (CAPCOA WUW-4);
- Landscaping equipment is set to electric only to reflect phasing out of gas-powered landscaping tools potentially by 2024 (AB 1346). It is assumed that these or similar requirements will be in effect at buildout (CAPCOA A-1); and
- Solid waste diversion of 75 percent is applied consistent with waste diversion targets identified in AB 341. It is assumed that these or similar requirements will be in effect at buildout (CAPCOA SW-1).

Assumptions

Unless otherwise noted, the CalEEMod data inputs are based on or derived from information provided in the project plans and from information derived in consultation with Illingworth and Rodkin. The following primary assumptions were made:

1. Construction and operational air pollutant and GHG emissions were estimated using the following CalEEMod default land use subtypes identified in Table 1:
    a. Emissions generated by the existing residence is assumed to be similar to the CalEEMod default land use of Single-Family Housing;
    b. Emissions generated by the coffee shop and quick-serve restaurant are assumed to be similar to emissions generated by the CalEEMod default land use category of Fast-Food Restaurant with Drive Thru;
    c. Emissions generated by the convenience store and fueling stations are assumed to be similar to emissions generated by the CalEEMod default land use category of Convenience market with Gas Pumps;
    d. Emissions generated by the proposed surface parking lot are assumed to be similar to emissions that would be generated by the CalEEMod default land use subtype "Parking Lot", which is defined as a single surface parking lot typically covered with asphalt; and
    e. Emissions generated by landscaping are assumed to be similar to emissions generated by the CalEEMod default land use subtype "City Park".
2. The proposed project would be fully operational in 2025; and
3. Changes to carbon sequestration potential were estimated based on the conversion of 3.25 acres of hay production.

Operational Emissions Data Input

Each air district (or county) assigns trip lengths for urban and rural settings, which are incorporated into the CalEEMod defaults. The model defaults were set to "rural" and the jurisdictional authority parameters are based on the model defaults for the air district. Model defaults for mobile operational sources were adjusted based on the health risk assessment

inputs provided by Illingworth and Rodkin (2022) and trip generation information provided by the project traffic engineer KD Anderson & Associates, Inc. (2022).

Carbon Sequestration Potential Data Inputs

CalEEMod estimates a one-time only change in sequestration potential resulting from changes in natural communities. The proposed project would remove approximately 3.25 acres of cropland. Cropland is identified as a natural community with carbon sequestration value in the model; therefore, an estimate of the one-time loss in carbon sequestration value from loss of cropland is included in this assessment.

CalEEMod also calculates the change in carbon sequestration potential based upon the net number of trees (the difference between trees removed and new tree plantings) on a site, averaged over a 20-year growth cycle. A landscaping plan was not available at the time of modeling; therefore, an estimate of the change in sequestration potential from tree planting was not made.

RESULTS

Criteria air pollutant emissions results are reported in tons per year. GHG emissions are reported on an annual basis in metric tons of carbon dioxide equivalent (MT CO_2e). Detailed model results are attached to this memorandum.

Operational Criteria Air Pollutants

Unmitigated operational criteria air pollutant emissions are summarized in Table 2, Unmitigated Operational Criteria Air Pollutant Emissions.

Table 2 Unmitigated Operational Criteria Air Pollutant Emissions

Emissions	ROG[1]	NO_x[1]	Total PM_{10}[1,2]	Exhaust PM_{10}[1,3]	Total $PM_{2.5}$[1,2]
Annual Emissions (tons per year)	1.39	3.17	2.84	0.04	0.79

SOURCE: EMC Planning Group 2022
NOTES:
1. Results may vary due to rounding.
2. Expressed in tons per year.

GHG Emissions

The model results for unmitigated annual GHG emissions generated by existing uses, construction and proposed operations are attached to this memorandum.

Construction Emissions

Short-term construction GHG emissions are from the CalEEMod results for mitigated construction emissions provided in the health risk assessment (Illingworth and Rodkin 2022). Construction activities would 284.29 MT CO_2e in the highest single year of construction.

Existing Operational Emissions

Existing sources of GHG emissions would generate approximately 15.00 MT CO_2e per year.

Project Operational Emissions

The unmitigated annual operational GHG emissions volume estimates is summarized in Table 3, Unmitigated Operational GHG Emissions.

Table 3 Unmitigated Operational GHG Emissions

Emissions Sources	2022 Existing (Metric Tons CO_2e)[1,2]	2025 Proposed (Metric Tons CO_2e)[1,2]
Area	0.45	<0.001
Energy	2.16	74.53
Mobile	11.75	3,001.02
Waste	0.54	7.25
Water	0.09	2.67
Total	15.00	3,085.47

SOURCE: EMC Planning Group 2022
NOTES:
1. Results may vary due to rounding.
2. Expressed in MT CO_2e per year.

Carbon Sequestration Potential

Model results indicating the change in carbon sequestration potential on the project site are shown in Section 2.3 of the model results. The model estimates a total net loss of 20.15 MT CO_2e sequestration potential over the lifetime of the project due to the removal of the

existing 3.25 acres of cropland. Averaged over a 30-year lifetime, the annual loss in carbon sequestration would be 0.67 MT CO_2e per year.

Total Unmitigated GHG Emissions at Buildout

Total GHG emissions at project buildout consist of amortized construction emissions added to the operational emissions and the amortized annual loss in carbon sequestration potential, minus existing emissions as shown in Table 4, Net Unmitigated Annual GHG Emissions Attributable to the Project.

Table 4 Net Unmitigated Annual GHG Emissions Attributable to the Project

Operational Emissions[1]	Existing Operational Emissions[1,2]	Change in Carbon Sequestration Potential[1]	Net Annual Project Emissions[1]
3,085.47	<15.00>	0.67	3,071.14

SOURCE: Illingworth and Rodkin 2022, EMC Planning Group 2022
NOTES:
1. Results may vary due to rounding.
2. Brackets indicate amount subtracted from proposed operational emissions.

SOURCES

1. Breeze Software, A Division of Trinity Consultants. June 2021. *California Emissions Estimator (CalEEMod) Version 2020.4*.0
2. Breeze Software, A Division of Trinity Consultants. May 2021. *CalEEMod User's Guide (Version 2020.4.0)*.
3. San Joaquin Valley Air Pollution Control District. March 19, 2015. *Guide for Assessing Air Quality Impacts*.
4. Milestone Associates Imagineering, Inc. 2021. Franklin Retail Center Site Plan.
5. Anderson, Ken. KDAnderson & Associates, Inc. 2022. Email Communication to Consultant. May 10, 2022.
6. Illingworth and Rodkin. 2022. *Franklin Retail Center Air Quality Health Risk Assessment*. June 10, 2022.

7. California Air Pollution Control Officers Association. 2022. *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity.*

Franklin Road Commercial Project - Existing - Merced County, Annual

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

Franklin Road Commercial Project - Existing

Merced County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	1.00	Dwelling Unit	0.32	1,800.00	3

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	49
Climate Zone	4			**Operational Year**	2022
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Land Use Change - Inital and final acreage estimate based on site area minus existing single family residential coverage.

Sequestration -

Water And Wastewater - No septic system

Table Name	Column Name	Default Value	New Value
tblWater	AerobicPercent	87.46	97.79
tblWater	SepticTankPercent	10.33	0.00

2.0 Emissions Summary

Franklin Road Commercial Project - Existing - Merced County, Annual

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

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	8.9900e-003	4.6000e-004	7.5900e-003	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005	0.0000	0.4453	0.4453	2.0000e-005	1.0000e-005	0.4482
Energy	1.4000e-004	1.2300e-003	5.2000e-004	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	2.1458	2.1458	1.4000e-004	4.0000e-005	2.1614
Mobile	5.6400e-003	0.0141	0.0535	1.2000e-004	0.0102	1.6000e-004	0.0104	2.7500e-003	1.5000e-004	2.8900e-003	0.0000	11.4950	11.4950	6.1000e-004	7.9000e-004	11.7458
Waste						0.0000	0.0000		0.0000	0.0000	0.2192	0.0000	0.2192	0.0130	0.0000	0.5431
Water						0.0000	0.0000		0.0000	0.0000	0.0231	0.0459	0.0690	6.1000e-004	5.0000e-005	0.0994
Total	**0.0148**	**0.0158**	**0.0616**	**1.3000e-004**	**0.0102**	**3.3000e-004**	**0.0106**	**2.7500e-003**	**3.2000e-004**	**3.0600e-003**	**0.2423**	**14.1321**	**14.3744**	**0.0143**	**8.9000e-004**	**14.9980**

Franklin Road Commercial Project, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Franklin Road Commercial Project, Merced County

Merced County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	2.00	Acre	0.00	87,120.00	0
Parking Lot	67.00	Space	0.00	26,800.00	0
City Park	0.80	Acre	0.00	34,848.00	0
Fast Food Restaurant w/o Drive Thru	2.20	1000sqft	0.00	2,200.00	0
Fast Food Restaurant with Drive Thru	2.80	1000sqft	0.00	2,800.00	0
Convenience Market with Gas Pumps	22.00	Pump	3.76	3,105.85	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	49
Climate Zone	3			**Operational Year**	2025
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - From I&R HRA (2022) Used drive thru restaurant for drive thru coffee shop. Est dway and other asphalt at 2 acres. Assigned site acreage to GDF

Water And Wastewater - Connected to Municipal water and sewer

Land Use Change - Estimated acreage from Google Earth

Area Mitigation - AB 1346 Phase out of gas-powered equip

Water Mitigation - Compliance with State MWELO

Waste Mitigation - Compliance with AB 341

Franklin Road Commercial Project, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Table Name	Column Name	Default Value	New Value
tblLandUse	LotAcreage	2.00	0.00
tblLandUse	LotAcreage	0.60	0.00
tblLandUse	LotAcreage	0.80	0.00
tblLandUse	LotAcreage	0.05	0.00
tblLandUse	LotAcreage	0.06	0.00
tblLandUse	LotAcreage	0.07	3.76
tblVehicleTrips	DV_TP	28.00	0.00
tblVehicleTrips	DV_TP	21.00	0.00
tblVehicleTrips	DV_TP	37.00	0.00
tblVehicleTrips	DV_TP	21.00	0.00
tblVehicleTrips	PB_TP	6.00	0.00
tblVehicleTrips	PB_TP	65.00	0.00
tblVehicleTrips	PB_TP	12.00	0.00
tblVehicleTrips	PB_TP	50.00	0.00
tblVehicleTrips	PR_TP	66.00	100.00
tblVehicleTrips	PR_TP	14.00	100.00
tblVehicleTrips	PR_TP	51.00	100.00
tblVehicleTrips	PR_TP	29.00	100.00
tblVehicleTrips	ST_TR	1.96	0.00
tblVehicleTrips	ST_TR	322.50	83.68
tblVehicleTrips	ST_TR	696.00	258.68
tblVehicleTrips	ST_TR	616.12	224.26
tblVehicleTrips	SU_TR	2.19	0.00
tblVehicleTrips	SU_TR	322.50	83.68
tblVehicleTrips	SU_TR	500.00	198.41
tblVehicleTrips	SU_TR	472.58	172.01
tblVehicleTrips	WD_TR	0.78	0.00
tblVehicleTrips	WD_TR	322.50	83.68

Franklin Road Commercial Project, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblVehicleTrips	WD_TR	346.23	197.73
tblVehicleTrips	WD_TR	470.95	171.42
tblWater	AerobicPercent	87.46	97.79
tblWater	AerobicPercent	87.46	97.79
tblWater	AerobicPercent	87.46	97.79
tblWater	AerobicPercent	87.46	97.79
tblWater	AerobicPercent	87.46	97.79
tblWater	AerobicPercent	87.46	97.79
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0474	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.3000e-004	9.3000e-004	0.0000	0.0000	9.8000e-004
Energy	5.8400e-003	0.0531	0.0446	3.2000e-004		4.0400e-003	4.0400e-003		4.0400e-003	4.0400e-003	0.0000	74.0286	74.0286	3.7300e-003	1.3800e-003	74.5325
Mobile	1.3373	3.1131	12.3388	0.0310	2.8069	0.0326	2.8395	0.7528	0.0307	0.7835	0.0000	2,939.4351	2,939.4351	0.1417	0.1948	3,001.0152
Waste						0.0000	0.0000		0.0000	0.0000	2.9261	0.0000	2.9261	0.1729	0.0000	7.2493
Water						0.0000	0.0000		0.0000	0.0000	0.6184	1.2372	1.8555	0.0164	1.3700e-003	2.6726

Franklin Road Commercial Project, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**1.3906**	**3.1662**	**12.3840**	**0.0313**	**2.8069**	**0.0366**	**2.8435**	**0.7528**	**0.0348**	**0.7876**	**3.5445**	**3,014.7017**	**3,018.2462**	**0.3347**	**0.1975**	**3,085.4706**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
Vegetation Land Change	-20.1500
Total	**-20.1500**

4.0 Operational Detail - Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Unmitigated	1.3373	3.1131	12.3388	0.0310	2.8069	0.0326	2.8395	0.7528	0.0307	0.7835	0.0000	2,939.4351	2,939.4351	0.1417	0.1948	3,001.0152

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
Convenience Market with Gas Pumps	1,840.96	1,840.96	1840.96	4,903,593	4,903,593
Fast Food Restaurant w/o Drive Thru	435.01	569.10	436.50	1,212,824	1,212,824
Fast Food Restaurant with Drive Thru	479.98	627.93	481.63	1,341,014	1,341,014
Other Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	2,755.94	3,037.98	2,759.09	7,457,432	7,457,432

4.3 Trip Type Information

Franklin Road Commercial Project, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	100	0	0
Convenience Market with Gas Pumps	9.50	7.30	7.30	0.80	80.20	19.00	100	0	0
Fast Food Restaurant w/o Drive Thru	9.50	7.30	7.30	1.50	79.50	19.00	100	0	0
Fast Food Restaurant with Drive Thru	9.50	7.30	7.30	2.20	78.80	19.00	100	0	0
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.523140	0.047841	0.156254	0.146076	0.028387	0.007025	0.014133	0.049672	0.000816	0.000458	0.021177	0.002172	0.002848
Convenience Market with Gas Pumps	0.523140	0.047841	0.156254	0.146076	0.028387	0.007025	0.014133	0.049672	0.000816	0.000458	0.021177	0.002172	0.002848
Fast Food Restaurant w/o Drive Thru	0.523140	0.047841	0.156254	0.146076	0.028387	0.007025	0.014133	0.049672	0.000816	0.000458	0.021177	0.002172	0.002848
Fast Food Restaurant with Drive Thru	0.523140	0.047841	0.156254	0.146076	0.028387	0.007025	0.014133	0.049672	0.000816	0.000458	0.021177	0.002172	0.002848
Other Asphalt Surfaces	0.523140	0.047841	0.156254	0.146076	0.028387	0.007025	0.014133	0.049672	0.000816	0.000458	0.021177	0.002172	0.002848
Parking Lot	0.523140	0.047841	0.156254	0.146076	0.028387	0.007025	0.014133	0.049672	0.000816	0.000458	0.021177	0.002172	0.002848

5.0 Energy Detail

Historical Energy Use: N

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	16.2220	16.2220	2.6200e-003	3.2000e-004	16.3825
NaturalGas Unmitigated	5.8400e-003	0.0531	0.0446	3.2000e-004		4.0400e-003	4.0400e-003		4.0400e-003	4.0400e-003	0.0000	57.8065	57.8065	1.1100e-003	1.0600e-003	58.1500

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Franklin Road Commercial Project, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Convenience Market with Gas Pumps	32953.1	1.8000e-004	1.6200e-003	1.3600e-003	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	1.7585	1.7585	3.0000e-005	3.0000e-005	1.7690
Fast Food Restaurant w/o Drive Thru	462132	2.4900e-003	0.0227	0.0190	1.4000e-004		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	24.6611	24.6611	4.7000e-004	4.5000e-004	24.8077
Fast Food Restaurant with Drive Thru	588168	3.1700e-003	0.0288	0.0242	1.7000e-004		2.1900e-003	2.1900e-003		2.1900e-003	2.1900e-003	0.0000	31.3869	31.3869	6.0000e-004	5.8000e-004	31.5734
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**5.8400e-003**	**0.0531**	**0.0446**	**3.2000e-004**		**4.0300e-003**	**4.0300e-003**		**4.0300e-003**	**4.0300e-003**	**0.0000**	**57.8065**	**57.8065**	**1.1000e-003**	**1.0600e-003**	**58.1500**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Convenience Market with Gas Pumps	24598.3	2.2759	3.7000e-004	4.0000e-005	2.2984
Fast Food Restaurant w/o Drive Thru	62194	5.7544	9.3000e-004	1.1000e-004	5.8113
Fast Food Restaurant with Drive Thru	79156	7.3238	1.1800e-003	1.4000e-004	7.3962
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	9380	0.8679	1.4000e-004	2.0000e-005	0.8765
Total		**16.2220**	**2.6200e-003**	**3.1000e-004**	**16.3824**

6.0 Area Detail

Franklin Road Commercial Project, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Use Electric Lawnmower

Use Electric Leafblower

Use Electric Chainsaw

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Unmitigated	0.0474	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.3000e-004	9.3000e-004	0.0000	0.0000	9.8000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	8.0100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0394					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.3000e-004	9.3000e-004	0.0000	0.0000	9.8000e-004
Total	**0.0474**	**0.0000**	**5.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**9.3000e-004**	**9.3000e-004**	**0.0000**	**0.0000**	**9.8000e-004**

7.0 Water Detail

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Unmitigated	1.8555	0.0164	1.3700e-003	2.6726

7.2 Water by Land Use

Unmitigated

Franklin Road Commercial Project, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 0.895041	0.2898	5.0000e-005	1.0000e-005	0.2927
Convenience Market with Gas Pumps	0.230058 / 0.132402	0.2395	2.1500e-003	1.8000e-004	0.3470
Fast Food Restaurant w/o Drive Thru	0.667774 / 0.0400238	0.5835	6.2300e-003	5.2000e-004	0.8945
Fast Food Restaurant with Drive Thru	0.849894 / 0.0509394	0.7427	7.9300e-003	6.6000e-004	1.1384
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**1.8555**	**0.0164**	**1.3700e-003**	**2.6726**

8.0 Waste Detail

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Unmitigated	2.9261	0.1729	0.0000	7.2493

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.0175	3.5500e-003	2.1000e-004	0.0000	8.8000e-003
Fast Food Restaurant w/o Drive Thru	6.335	1.2860	0.0760	0.0000	3.1859

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fast Food Restaurant with Drive-Thru	8.0625	1.6366	0.0967	0.0000	4.0546
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**2.9261**	**0.1729**	**0.0000**	**7.2493**

11.0 Vegetation

11.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Cropland	3.25 / 0	-20.1500	0.0000	0.0000	-20.1500
Total		**-20.1500**	**0.0000**	**0.0000**	**-20.1500**

Health Risk Assessment

B

APPENDIX

FRANKLIN RETAIL CENTER

AIR QUALITY HEALTH RISK ASSESSMENT

Merced, California

June 10, 2022

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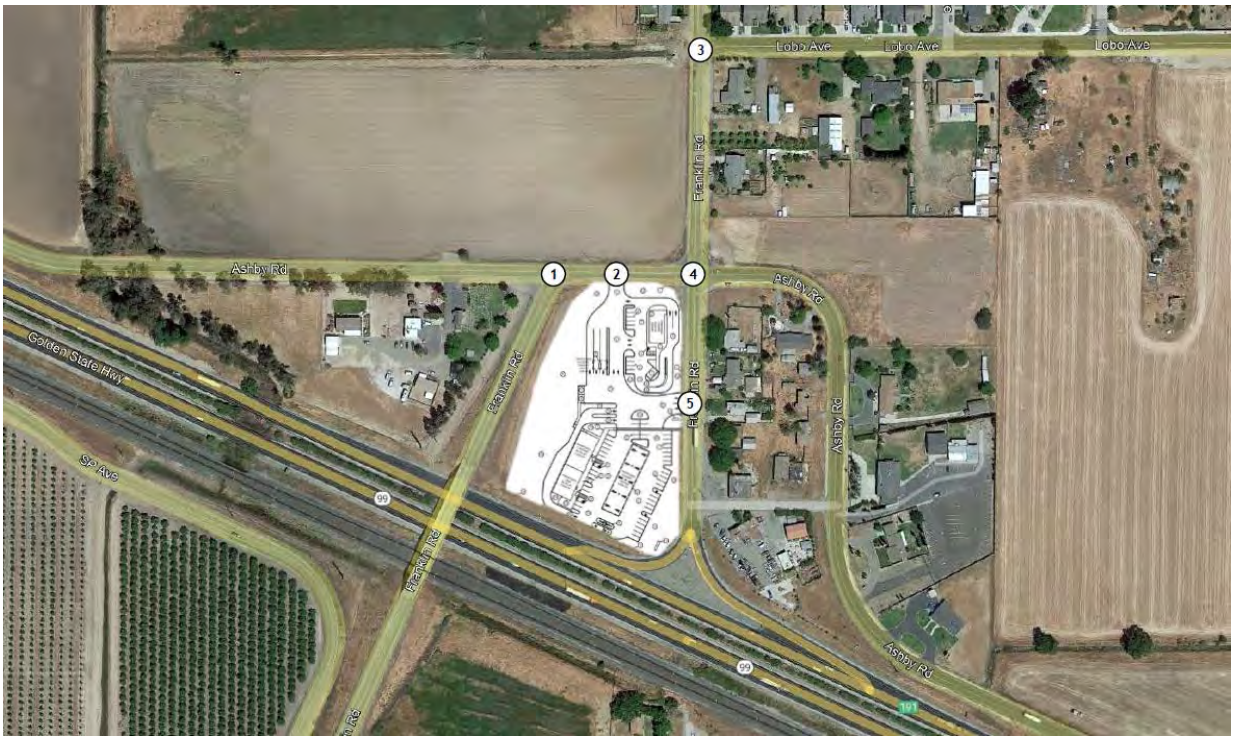
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INTRODUCTION

This report assesses the air quality health risks associated with the Franklin Retail Center project proposed in Merced, California. The project consists of the construction of a gasoline dispensing operation, with convenience store, a quick serve restaurant with drive-thru, and a coffee shop with drive-thru. The Project is located at 2355 Franklin Road in Merced, CA. There are some single-family residences near the project site. The project site is shown in Figure 1.

Figure 1. Franklin Retail Center Project Location



The Proposed Project includes the demolition of the existing residence and agricultural buildings construction of the retail center. Specifically, the project would construct the following:

Convenience Market with Gas Pumps (22 dispensers)
2,800 sf Fast Food Restaurant with Drive Thru
2,200 sf Fast Food Restaurant with Drive Thru (Coffee shop)

The project's potential impacts on air quality during construction and operation were assessed in a separate air quality report using the California Emissions Estimator Model (CalEEMod) Version 2020.4.0. The CalEEMod modeling from the project was used to develop construction and operational emissions used in this health risk analysis. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has published the Guide for Assessing and Mitigating Air Quality

Impacts (GAMAQI) that was used to conduct this air quality analysis.[1] This report describes construction and operation period air quality health risk impacts and identifies any necessary mitigation measures to reduce or eliminate air quality impacts identified as significant.

TOXIC AIR CONTAMINANTS

Besides the "criteria" air pollutants, there is another group of substances found in ambient air referred to as Hazardous Air Pollutants (HAPs) under the CAA and Toxic Air Contaminants (TACs) under the CCAA. These contaminants tend to be localized and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects if exposure to low concentrations occurs for long periods. They are regulated at the local, state, and federal level.

HAPs are the air contaminants identified by U.S. EPA as known or suspected to cause cancer, serious illness, birth defects, or death. Many of these contaminants originate from human activities, such as fuel combustion and solvent use. Mobile source air toxics (MSATs) are a subset of the 188 HAPS. Of the 21 HAPs identified by U.S. EPA as MSATs, a priority list of six priority HAPs were identified that include: diesel exhaust, benzene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene. The Federal Highway Administration[2] reports that while vehicle miles traveled (VMT) in the United States is expected to increase by 64 percent over the period 2000 to 2020, emissions of MSATs are anticipated to decrease substantially as a result of efforts to control mobile source emissions (by 57 percent to 67 percent depending on the contaminant).

California developed a program under the Toxic Air Contaminant Identification and Control Act (Assembly Bill [AB] 1807, Tanner 1983), also known as the Tanner Toxics Act, to identify, characterize and control TACs. Subsequently, AB 2728 (Tanner, 1992) incorporated all 188 HAPs into the AB 1807 process. TACs include all HAPs plus other containments identified by CARB. These are a broad class of compounds known to cause morbidity or mortality (cancer risk). TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter (DPM) near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and federal level.

The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987, Connelly), described by CARB[3], was enacted in 1987, and requires stationary sources to report the types and quantities of certain substances routinely released into the air. The goals of the Air Toxics "Hot Spots" Act are to collect emission data, to identify facilities having localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce those significant risks to acceptable levels.

Particulate Matter

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[1] SJVAPCD. 2015. Guide for Assessing and Mitigating Air Quality Impacts. March.

[2] Federal Highway Administration, 2016. Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents. https://www.fhwa.dot.gov/environMent/air_quality/air_toxics/policy_and_guidance/msat/

[3] California Air Resources Board (CARB). 2016. AB 2588 Air Toxics "Hot Spots" Program. https://www.arb.ca.gov/ab2588/ab2588.htm

Particulate matter from diesel exhaust is the predominant TAC in urban air and is estimated to represent about 70 percent of the cancer risk from TACs, based on the statewide average reported by CARB[4]. According to CARB, diesel exhaust is a complex mixture of gases, vapors and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by CARB, and are listed as carcinogens either under State Proposition 65 or under the Federal Hazardous Air Pollutants programs.

CARB reports that recent air pollution studies have shown an association that diesel exhaust and other cancer-causing TACs emitted from vehicles are responsible for much of the overall cancer risk from TACs in California. Particulate matter emitted from diesel-fueled engines (DPM) was found to comprise much of that risk. In 1998, CARB formally identified DPM as a TAC. DPM is of particular concern since it can be distributed over large regions, thus leading to widespread public exposure. The particles emitted by diesel engines are coated with chemicals, many of which have been identified by U.S. EPA as HAPs, and by CARB as TACs. The vast majority of diesel exhaust particles (over 90 percent) consist of $PM_{2.5}$, which are the particles that can be inhaled deep into the lung. Like other particles of this size, a portion will eventually become trapped within the lung possibly leading to adverse health effects. While the gaseous portion of diesel exhaust also contains TACs, CARB's 1998 action was specific to DPM, which accounts for much of the cancer-causing potential from diesel exhaust. California has adopted a comprehensive diesel risk reduction program to reduce DPM emissions 85 percent by 2020[5]. The EPA and CARB adopted low sulfur diesel fuel standards in 2006 that reduce DPM substantially.

Non-Diesel Total Organic Gases

Gasoline-powered vehicles, particularly light-duty autos and trucks, emit TACs mostly in the form of total organic gases (TOG). TOG emissions associated with these types of vehicles occur primarily in two forms: running exhaust and evaporative running losses. Additional TOG emissions occur when starting a vehicle, especially cold vehicles. Mobile source TOG includes TACs such as benzene, 1,3-Butadiene, and formaldehyde. Emissions of these TACs are controlled through requirements of motor vehicle exhaust systems and the formulation of gasoline by the U.S. EPA and CARB

Benzene

Benzene is a fundamental component of gasoline and diesel fuel as well as vehicle exhaust. Benzene is emitted through the evaporation of gasoline vapors. Since it is known to cause cancer in humans, benzene was classified as a TAC in 1984 by CARB. Benzene emissions from fuel use are regulated in numerous ways that include standards for the formulation of gasoline, vehicle emission standards, and vapor control systems for storage, fuel dispensing facilities and vehicle on-board fuel systems.

[4] California Air Resources Board (CARB) 2012. Overview: Diesel Exhaust and Health. https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health Accessed May 20, 2018.

[5] California Air Resources Board (CARB). 2000. Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles. October. https://www.arb.ca.gov/diesel/documents/rrpFinal.pdf

SJVAPCD RULES AND REGULATIONS

The SJVAPCD has adopted rules and regulations that apply to land use projects, such as the proposed project. These are described below.

SJVAPCD Indirect Source Review Rule

In 2005, the SJVAPCD adopted Rule 9510 Indirect Source Review (ISR or Rule 9510) to reduce NO_x and PM_{10} emissions from new land use development projects. The rule, which became effective March 1, 2006, is the result of state requirements outlined in the region's portion of the State Implementation Plan (SIP). Rule 9510 was amended in December 2017 (and became effective March 21, 2018) to ensure that all large development projects are subject to the rule. The SJVAPCD's SIP commitments are contained in the 2004 Extreme Ozone Attainment Demonstration Plan and the 2003 PM_{10} Plan. These plans identified the need to reduce PM_{10} and NO_x substantially in order to attain and maintain the ambient air-pollution standards on schedule.

New projects that would generate substantial air pollutant emissions are subject to this rule. The rule requires projects to mitigate both construction and operational period emissions by applying the SJVAPCD-approved mitigation measures and paying fees to support programs that reduce emissions. The rule requires mitigated exhaust emissions during construction based on the following levels:

- 20 percent reduction from unmitigated baseline in total NO_x exhaust emissions
- 45 percent reduction from unmitigated baseline in total PM_{10} exhaust emissions

For operational emissions, Rule 9510 requires the following reductions:

- 33.3 percent of the total operational NO_x emissions from unmitigated baseline
- 50 percent of the total operational PM_{10} exhaust emissions from unmitigated baseline

Fees apply to the unmitigated portion of the emissions and are based on estimated costs to reduce the emissions from other sources plus estimated costs to cover administration of the program. In accordance with ISR, the project applicant will submit an application for approval of an Air Impact Assessment (AIA) to the SJVAPCD.

Regulation VIII – Fugitive PM_{10}

SJVAPCD controls fugitive PM_{10} through Regulation VIII (Fugitive PM_{10} Prohibitions). The purpose of this regulation is to reduce ambient concentrations of PM_{10} by requiring actions to prevent, reduce or mitigate anthropogenic (human caused) fugitive dust emissions. This applies to activities such as construction, bulk materials, open areas, paved and unpaved roads, material transport, and agricultural areas. Sources regulated are required to provide dust control plans that meet the regulation requirements. Fees are collected by SJVAPCD to cover costs for reviewing plans and conducting field inspections.

Other SJVAPCD Rules

Other SJVAPCD Rules and Regulations that may be applicable to the project include, but are not limited to:

- Rule 4101 (Visible Emissions): The purpose of this rule is to prohibit the emissions of visible air contaminants to the atmosphere. The provisions of this rule apply to any source operation which emits or may emit air contaminants.
- Rule 4102 (Nuisance): The purpose of this rule is to protect the health and safety of the public, and applies to any source operation that emits or may emit air contaminants or other materials.
- Rule 4601 (Architectural Coatings): The purpose of this rule is to limit Volatile Organic Compounds (VOC) emissions from architectural coatings. Emissions are reduced by limits on VOC content and providing requirements on coatings storage, cleanup, and labeling.
- Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations): The purpose of this rule is to limit VOC emissions from asphalt paving and maintenance operations. Paving operations will be subject to Rule 4641.
- Rule 4692 (Commercial Charbroiling): This rule limits VOC and PM10 emissions from commercial charbroiling at restaurants. Chain-driven charbroilers that cook 400 pounds or more of meat in any calendar week or 10,800 pounds in any calendar year must be equipped with a catalytic oxidizer that has a control efficiency of at least 83% for PM10 emissions and a control efficiency of at least 86% for VOC emissions. Annual or one-time reports are required for all other charbroiling operations. Underfired charbroilers subject to the rule must register each piece of equipment and maintain weekly records.

The Air District is anticipated to provide a determination of applicable rules/regulations to the project when specific building, grading, etc. plans are provided to the Air District prior to initiation of construction- and operation-related activities that fall within the purview of the Air District's regulatory authority.

SENSITIVE RECEPTORS

"Sensitive receptors" are defined as facilities where sensitive population groups, such as children, the elderly, the acutely ill, and the chronically ill, are likely to be located. Land uses that include sensitive receptors are residences, schools, playgrounds, childcare centers, retirement homes, convalescent homes, hospitals, and medical clinics. The nearest residences consist of single-family residences located to east and west of the site, across both segments of Franklin Road that bound the project site.

HEALTH RISK ASSESSMENT

Emissions of toxic pollutants potentially associated with the Project are estimated using various emissions models. Concentrations of these pollutants in the ambient air are estimated using the U.S. EPA AERMOD dispersion model. The AERMOD dispersion model is a SJVUAPCD-recommended model for use in modeling analysis of these types of emission sources and activities for CEQA projects.[6] Modeling allows the estimation of both short-term and long-term average concentrations in air for use in a health risk assessment, accounting for site-specific meteorological conditions. Health risks potentially associated with the estimated concentrations of pollutants in the air are characterized in terms of excess lifetime cancer risks (for carcinogenic substances), or comparison with reference exposure levels (RELs) for non-cancer health effects (for non-carcinogenic substances).

Health risks were evaluated for a hypothetical maximum exposed individual (MEI) located at the maximum impact sensitive receptor (sensitive receptors are described below). The hypothetical MEI is an individual assumed to be located where the highest concentrations of air pollutants associated with Project emissions are predicted to occur, based on the air dispersion modeling. Health risks were evaluated at existing locations of nearby sensitive receptors (residences, schools, etc.). Health risks potentially associated with concentrations of carcinogenic air pollutants were calculated as estimated excess lifetime excess cancer risks. The excess lifetime cancer risk for a pollutant is estimated as the product of a 70-year exposure dose over a lifetime and a cancer potency factor; in other words, it represents the increased cancer risk associated with continuous exposure to concentration of toxic air contaminants in the air over a 70-year period. SJVAPCD-recommended exposure parameters were used for the cancer risk and non-cancer health effects calculations, as described in *Attachment 1*.

STANDARDS OF SIGNIFICANCE

Appendix G, of the California Environmental Quality Act (CEQA) Guidelines (Environmental Checklist) contains a list of project effects that may be considered significant. The project would result in a significant impact if it would:

- Expose sensitive receptors to substantial pollutant concentrations.

The SJVAPCD has developed the Guide for Assessing and Mitigating Air Quality Impacts (SJVAPCD 2015), also known as the GAMAQI[7]. The following threshold of significance, obtained from the SJVAPCD's GAMAQI, is used to determine whether a proposed project would result in a significant air quality impact:

1) Toxic Air Contaminants or Hazardous Air Pollutants. Exposure to HAPs or TACs would be considered significant if the probability of contracting cancer for the Maximally

[6] San Joaquin Valley Air Pollution Control District, Guidance for Air Dispersion Modeling, Draft 01/07 Rev 2.0

[7] Source: San Joaquin Valley Air Pollution Control District, GAMAQI, See website at http://www.valleyair.org/transportation/0714-GAMAQI-Criteria-Pollutant-Thresholds-of-Significance.pdf

Exposed Individual would exceed 20 in 1 million or would result in a Hazard Index greater than 1 for non-cancer health effects.

ANALYSIS

Impact 1: Exposure of Sensitive Receptors to Toxic Air Contaminants. Construction activity, evaporation of gasoline vapors, delivery trucks, restaurant operations, and operational traffic would expose nearby receptors to toxic air contaminants. This is a potentially significant impact.

To evaluate the exposure of sensitive receptors to emissions of Toxic Air Contaminants (TACs) from the project, a health risk assessment of both project construction activities and emissions from project operation was conducted. The health risk assessment predicts lifetime cancer risk and non-cancer risks. The health risk assessment involves prediction of emissions from the various sources of TACs, dispersion modeling using historical meteorological data and calculation of health risks using SJVAPCD recommended risk assessment methods for infant, child, and adult exposures for residential receptors, and for off-site worker exposure. Modeled receptors are shown in Figure 2. The methods used to predict health risk impacts are described in *Attachment 1*.

Construction Health Risk Impacts

Construction activity is anticipated to include some demolition, site preparation and grading, building construction, paving and some application of architectural coatings. Construction equipment and associated heavy-duty truck traffic generates diesel exhaust, which is a TAC. This health risk assessment focused on modeling on-site construction activity using emissions computed using the CalEEMod. Construction of the project is expected to occur over a 14-month period, assumed to start in 2023. The construction schedule is based on CalEEMod model default conditions.

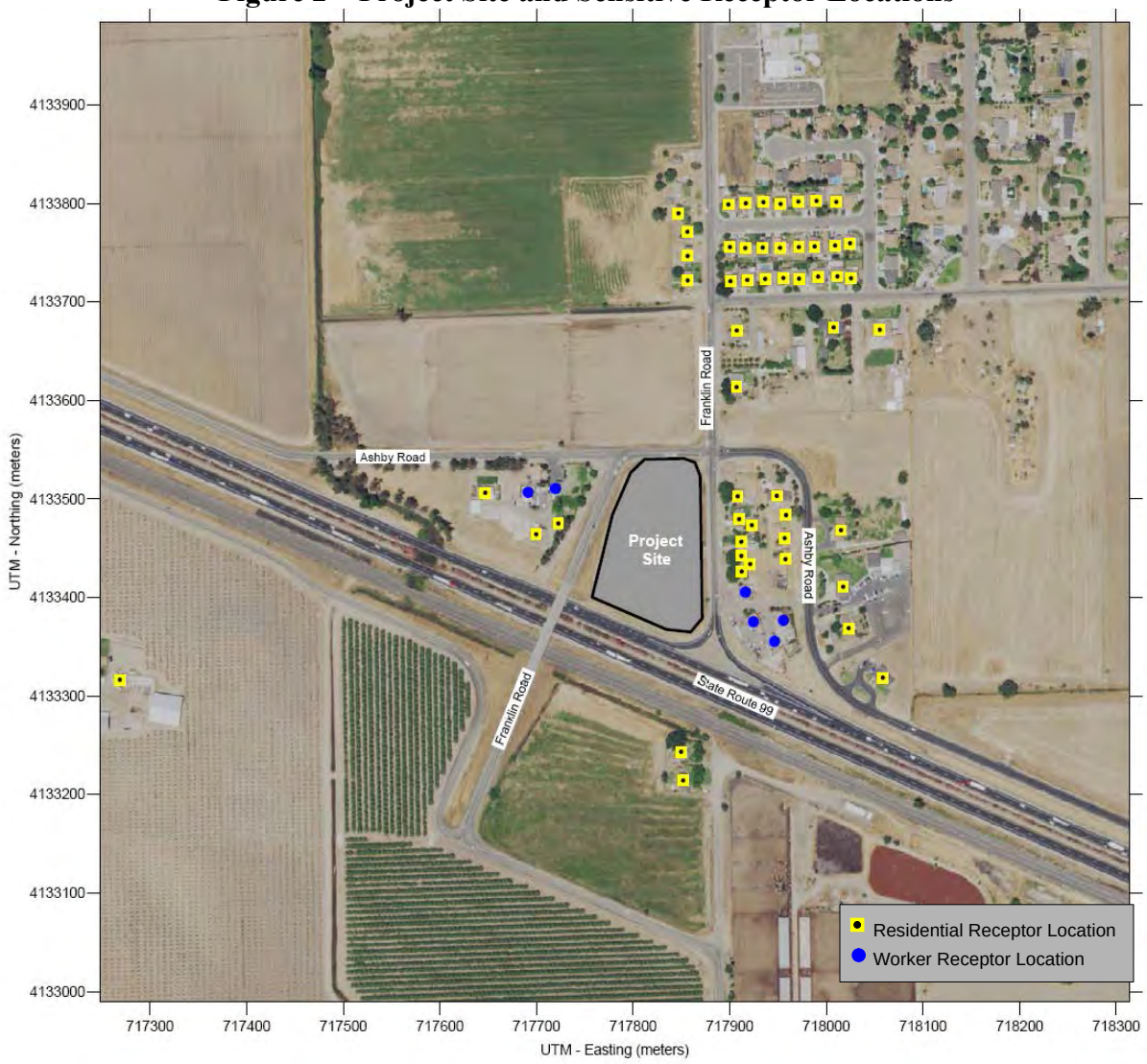
Construction Emissions

Construction period air pollutant emissions were modeled using the California Emissions Estimator Model, CalEEMod 2020.3.2 model, with project construction information. This model was developed by the South Coast AQMD and other California Air Districts. SJVAPCD recommends the use of this model for construction and operational analysis of land use development projects. The model predicts emissions of ozone precursor pollutants (i.e., ROG and NO_x) and particulate matter (i.e., PM_{10} and $PM_{2.5}$). The CalEEMod model provided unmitigated total annual PM_{10} exhaust emissions (assumed to be diesel particulate matter) for the off-road construction equipment and for exhaust emissions from on-road vehicles (haul trucks, vendor trucks, and worker vehicles). For health risk modeling of on-site and near-site vehicle traffic, a travel distance of one mile was used in the CalEEMod modeling for worker, vendor, and haul trips. DPM exhaust emissions are reported in Table 1. The construction DPM emissions include on-road emissions resulting from haul truck travel during grading activities, worker travel, and vendor deliveries during building construction. A summary of the on-site CalEEMod model output with emission calculations are provided in *Attachment 2*.

Table 1. Construction Period DPM Emissions

Year	Unmitigated PM10 Exhaust Emissions	Mitigated PM10 Exhaust Emissions
2023	0.0811 tons	0.0109 tons (87% reduction)
2024	0.0180 tons	0.0030 tons (83% reduction)

Figure 2 – Project Site and Sensitive Receptor Locations



Dispersion Modeling

The US EPA AERMOD dispersion model was used to calculate DPM and other TAC concentrations at existing sensitive receptors (residences and workers) in the vicinity of the project site. The AERMOD dispersion model is a SJVAPCD-recommended model for use in modeling analysis of these types of emission activities for CEQA projects.[8]

For modeling construction impacts the AERMOD modeling utilized an area source to represent the location of on-site construction activities. Emissions were distributed evenly across the area source. To represent the construction equipment exhaust emissions, an emission release height of 6 meters (20 feet) was used for the area sources. The elevated source height reflects the height of the equipment exhaust pipes plus an additional distance for the height of the exhaust plume above the exhaust pipes to account for plume rise of the exhaust gases. Emissions from on-road truck travel at and near the project site were included in the area source. Emissions were modeled as occurring daily between 7 am - 4 pm, when the majority of construction activity would occur. Figure 2 shows the project site and nearby sensitive receptor locations (residential and worker) where health impacts were evaluated.

The model used a 5-year data set (2013-2017) of hourly meteorological data from Merced Airport prepared for use with the AERMOD model by the SJVAPCD. DPM concentrations were calculated at nearby sensitive receptors using a receptor height of 1.5 meters (4.9 feet). Flat terrain was used for the modeling since there is negligible elevation difference between the source and receptors and the receptors with the highest modeled concentrations are close to the project site. Rural dispersion conditions were used in the modeling given the area surrounding the project site is predominantly rural.

Details on the emission calculations and dispersion modeling information for the construction sources are provided in *Attachment 2*.

Construction Cancer Risk and Hazards

The maximum-modeled unmitigated (uncontrolled) annual DPM concentration occurred at a residential receptor east of the project along Franklin Road. The location where the maximum impact occurred (maximally exposed individual) is identified on Figure 3. Increased cancer risks were calculated at this location using the modeled annual concentrations and SJVAPCD recommended risk assessment methods for infant, child, and adult exposures for residential receptors, and for off-site worker exposure. Results of this assessment indicate that, with uncontrolled project construction emissions, the maximum increased infant cancer risk at the maximally exposed residential individual location would be 29.9 in one million. The maximum off-site worker cancer risk would be 1.5 in one million. Potential non-cancer health effects due to chronic exposure to DPM were also evaluated. The chronic inhalation reference exposure level (REL) for DPM is 5 $\mu g/m^3$. The Hazard Index (HI), which is the ratio of the annual DPM concentration to the REL, is less than 0.1 at all receptor locations. *Attachment 2* contains the construction health risk assessment.

[8] San Joaquin Valley Air Pollution Control District, Guidance for Air Dispersion Modeling, Draft 01/07 Rev 2.0

Operation Health Risk Impacts

The project includes both permitted air pollutant sources and sources not subject to SJVUAPCD permitting. Permitted sources are the gasoline dispensing facility (GDF), where TACs from the evaporation of gasoline transferred from trucks, stored, and transferred to vehicles occur. Unpermitted sources include land use emissions from traffic and building operation including restaurant operation.

Gasoline Dispensing Facilities

GDFs are regulated by the SJVAPCD, as they are a source of ROG emissions that contain TACs. The project includes a 22-position gasoline dispensing facility (GDF). Because GDFs require permits from the Air District (unlike other "unpermitted" operational sources discussed earlier), emissions attributed to the GDF were estimated separately from the area source operational emissions above. The emissions calculations are based on annual throughput (i.e., fuel received and dispensed) anticipated for the facility. The project estimates a daily throughput of 200,000 gallons per month, which equates to 2.4 million gallons per year. GDFs are a source of ROG emissions that include TACs, primarily benzene, associated with loading, storage, refueling of vehicles and spillage that result in evaporative emissions.

CalEEMod does not compute evaporative ROG emissions from gasoline dispensing facilities (GDF). The transfer and storage of gasoline results in emissions of organic compounds, considered in this assessment as ROG. Emissions of ROG and benzene, which is a TAC, were computed based on projected annual throughput of gasoline using the volatile organic compound (VOC) emission factors in terms of emissions for each process per 1,000 gallons of gasoline throughput. [9] The emission factors are based on annual gasoline throughput and account for emissions from fuel storage tank loading and pressure driven (breathing) losses, motor vehicle refueling, spillage while refueling, and minor emissions from vapor permeation through gasoline dispensing hoses. The fueling emission factors include the effects of vehicles equipped with onboard refueling vapor recovery (ORVR) systems. ORVR systems were phased in beginning with 1998 model year passenger vehicles, and are now installed on all passenger, light-duty, and medium-duty vehicles manufactured since the 2006 model year. These computations are provided in *Attachment 3*.

The transfer and storage of gasoline results in evaporative emissions, which is made up of several pollutants considered TACs, specifically Benzene, Ethylbenzene, Toluene, and Xylenes. CARB and the California Air Pollution Control Officer's Association (CAPCOA) developed guidance and a screening tool to calculate the health risk values for GDFs.[10] Inputs for the screening tool includes annual gas throughput, meteorological data, distance to nearest resident or business receptors, and control scenarios. This screening tool was used to calculate the health risk for the proposed project using the gasoline throughput, project setting, distance to the nearest receptor, and exposure parameters consistent with SJVAPCD risk assessment methods. The screening tool

[9] CARB, Gasoline Service Station Industrywide Risk Assessment Guidance, 2022. Web: https://ww2.arb.ca.gov/resources/documents/gasoline-service-station-industrywide-risk-assessment-guidance

[10] CARB, Gasoline Service Station Industrywide Risk Assessment Guidance, 2022. Web: https://ww2.arb.ca.gov/resources/documents/gasoline-service-station-industrywide-risk-assessment-guidance

inputs and health risk screening values for the existing and proposed GDFs are provided in *Attachment 3.*

Project Traffic-Related Emissions

Local traffic generated by the project leads to operational health risk impacts. Specific sources of emissions include retail customer traffic traveling to and from the project site along with traffic activity on the site. Impacts from these sources are addressed. These sources are assumed to be operational well into the future (i.e., 70 years). The year 2025 was assumed to be the first full year of operation and was used as the year of analysis for generating emission rates. Vehicle emission rates are anticipated to decrease in the future due to improvements in exhaust systems and turnover of the fleet from older, more polluting vehicles to newer cleaner vehicles.

Daily traffic generation was calculated as 2,758 new primary trips per day based on the Project's traffic analysis. The project uses generate 6,815 daily trips, but 1,350 of those are internal trips (double-counted) and 2,757 trips are from vehicles already passing by or near the site. For health risk modeling purposes, on-site traffic includes all Project traffic, adjusted for internalization, while off-site traffic only included the new primary trips. The distribution of customer vehicle trips on the local roads (Franklin Rd. and Ashby Rd.), the Project driveways, was based on the traffic report for the project. This included 5,630 daily trips with 3,530 trips at the Franklin Road driveway and 2,100 at the Ashby Road driveway. Vehicles were assumed to travel at a speed of 35 mph while off site on Franklin Road east of the site, 30 mph on Franklin road west of the site, 30 mph on Ashby Road, 60 mph on State Route 99 while approaching and departing Franklin Road, and 5 mph while traveling onsite in the retail/commercial areas.

The number of fuel delivery trucks visiting that station was estimated to be 273 trucks per year based on a total station fuel use of 2.4 million gallons per year. All fuel delivery trucks were assumed to be heavy duty diesel fueled trucks (HDT). These trucks were assumed to arrive at the station via Franklin Road, travel to the fuel tank area, unload their fuel, and then depart the station via Franklin Road.

The primary TAC of concern from project vehicles are MSATs, as previously described. DPM and MSAT emissions for customer vehicles were calculated using emission factors from the Caltrans version of the EMFAC2017 emissions model, known as CT-EMFAC2017[11], and the increased local project-related traffic described above. Vehicle emission processes modeled include running/idle exhaust, running evaporative losses for organic MSATs, tire and brake wear, and fugitive road dust. Vehicle emissions are projected to decrease in the future and are reflected in the CT-EMFAC2017 emissions estimates. Inputs to the model include region (i.e., Merced County), type of road (for road dust calculation purposes), traffic mix (assigned by CT-EMFAC2017 for the county), year of analysis (i.e., 2025), and season (Annual). Year 2025 emissions were conservatively assumed as being representative of future conditions over the period that cancer risks are evaluated (70 years), since, as discussed above, overall vehicle emissions will decrease in the future. Customer vehicles were assumed to include autos and trucks up to and including light heavy duty trucks.

[11] California Department of Transportation. 2019. CT-EMFAC2017 User Guide. January.

Emission factors from the CT-EMFAC2017 model for travel speeds of 30, 35, and 60 mph were used in calculating project vehicle emissions while traveling off-site. Emission factors for a travel speed of 5 mph were used in calculating project vehicle emissions while traveling on-site. Emissions were assumed to occur 24-hours per day, 365 days per year. MSAT emission rates used in the analysis are provided in *Attachment 3*.

Fast-Food Restaurant Emissions

The proposed fast-food restaurant would generate TACs from the cooking of meat. The SJVAPCD's *Guidance for Air Dispersion Modeling* lists two TACs from meat cooking, PAHs without naphthalene and naphthalene. PAH and naphthalene emissions from meat cooking were estimated using default emission factors and emissions provided in SJVAPCD guidance[12]. Emission calculation details are included in *Attachment 3*.

Dispersion Modeling

The US EPA AERMOD dispersion model was used to calculate project-related operational DPM and other TAC concentrations at existing sensitive receptors (residences and workers) in the vicinity of the project site. The AERMOD dispersion model is a SJVAPCD-recommended model for use in modeling analysis of these types of emission activities for CEQA projects.[13] The modeling used the same meteorological data from Merced Airport as previously discussed for the construction health risk modeling. TAC concentrations from on-site and off-site (i.e., roadway) and restaurant emission sources were calculated at nearby residences and worker locations using a receptor height of 1.5 meters (4.9 feet). Since there is negligible elevation difference between the modeled sources and receptors, flat terrain was used for the modeling.

On-site emission sources include project-related customer vehicles and fuel delivery trucks and operation of the restaurant (meat cooking). Off-site emission sources include project vehicle travel routes. The modeled emission sources and receptors where TAC concentrations were calculated are shown in Figure 3. Vehicle emissions were modeled as line-volume sources (a series of volume sources along a line) representing off-site and on-site travel routes depicted in Figure 3. Fuel delivery truck idling was modeled as a point source at the storage tank filling area. Vehicle volume and point source modeling parameters were based on EPA[14] and SJVAPCD[15] recommended source parameters. Additional information on the emissions and modeling for project sources is included in *Attachment 4*.

[12] TAC emissions rates obtained from Section 2.3.4.2 of the *Guidance for Air Dispersion Modeling*, SJVAPCD.

[13] San Joaquin Valley Air Pollution Control District, Guidance for Air Dispersion Modeling, Draft 01/07 Rev 2.0

[14] US EPA. 2015. Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas. November 2015

[15] San Joaquin Valley Air Pollution Control District. 2018. SJVAPCD Memo FYI – 366 Estimating and Modeling Emissions from Truck Travel and Idling. May 24, 2018.

Project Cancer Risk and Hazards

Computed health risk impacts are shown in Table 2. These risks include the contribution of exposure to construction emissions during early years of 0 to 2 years and exposure to operational emissions during years 2 through 70. Cancer risk and hazards were predicted at the receptor representative of maximum exposures for residences and a receptor with maximum exposures representative of workers.

Using the maximum modeled TAC concentrations, total increased cancer risks from project operations were computed using the most recent methods recommended by SJVAPCD and OEHHA that include nearly continuous exposures with adjustments for infants and children. Based on modeled TAC concentrations, operational cancer risks were calculated for 70-year residential exposures of 8.0 in one million, while worker increased cancer risk would be 0.9 per million. When assuming two partial years of emissions from construction (i.e., 2023 and 2024) and constant operational emissions for 68 additional years (70 years total with operation starting in 2025), residential cancer risk is 37.9 per million and worker cancer risk is 2.4 per million (based on a total of 40 years of exposure). The acute and chronic HIs from DPM and MSATs would be less than 0.1 at all receptor locations Details on the emission calculations and dispersion modeling information for these sources are provided in *Attachment 3*.

Table 2. **Construction and Operational Period Health Risk Impacts**

Activity	Maximum Residential Cancer Risk (per million)		Maximum Worker Cancer Risk (per million)	
	Unmitigated	**Mitigated**	**Unmitigated**	**Mitigated**
Construction Years 0-2	29.9 infant	4.2 infant	1.5 adult	0.2 adult
GDF Screening Risk Years ≥3	3.4 child/adult	3.4 child/adult	0.4 adult	0.4 adult
Operation Years ≥3	4.6 child/adult	4.6 child/adult	0.5 adult	0.5 adult
Construction & Operation Lifetime	37.9	12.2	2.4	1.1

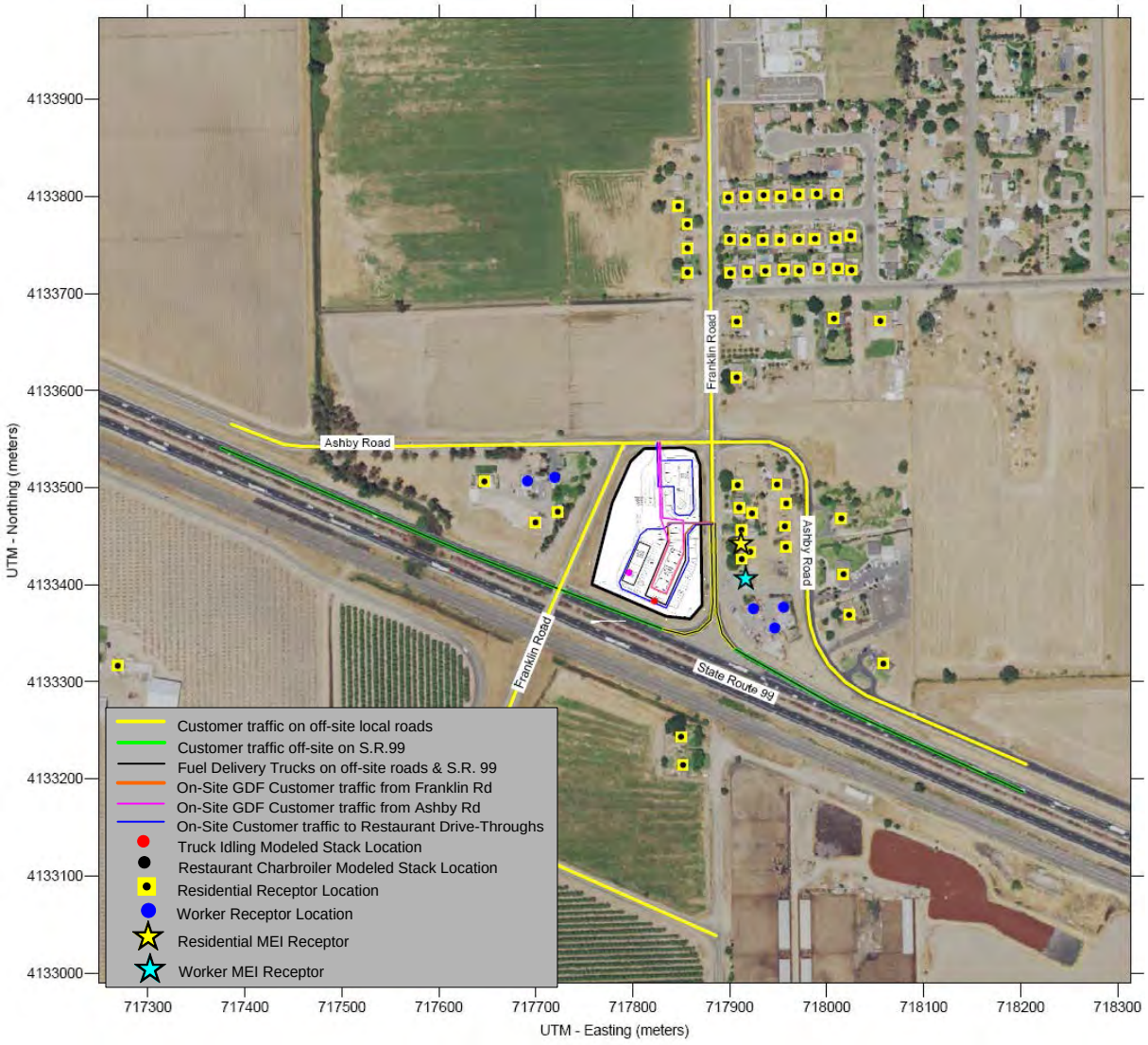
Mitigation Measure for Impact 1 All off-road diesel construction equipment greater than 25 horsepower and operating at the site during demolition and earthwork phases for more than 20 hours shall at a minimum meet U.S. EPA Tier 2 or 3 engine standards with Level 3 particulate filtration. Use of equipment with U.S. EPA Tier 4 engine standards would meet this requirement. Optionally, the applicant could develop and implement a plan that would achieve a 60-percent reduction in on- and near-site DPM emissions during construction.

Effectiveness of Mitigation

Construction emissions need to be reduced by 60 percent such that total project cancer risk is less than that significance threshold of 20 in a million. CalEEMod modeling indicates that implementation of Mitigation Measure AQ-1 using Tier 4 equipment during construction would reduce exhaust PM_{10} emissions, considered to be equivalent to DPM emissions, by 85 percent. The use of Tier 2 or Tier 3 equipment equipped with CARB Level 3 diesel emission control device would reduce emissions by about 80 percent. The reductions in construction period emissions

would reduce the construction period cancer risk for residents to 4.2 chances per million. This level is below the significance threshold of 20 chances per million. When construction risks are considered with operational emissions, the overall 70-year project cancer risk would be 12.2 chances per million, if using Tier 4 equipment.

Figure 3. Sensitive Receptor Locations and Modeled On-Site Emission Sources



Attachment 1: Health Risk Assessment

Health Risk Calculation Methodology

A health risk assessment for exposure to TACs requires the application of a risk characterization model to the results from the air dispersion model to estimate potential health risk at each sensitive receptor location. The State of California Office of Environmental Health Hazard Assessment (OEHHA) and CARB develop recommended methods for conducting health risk assessments. The most recent OEHHA risk assessment guidelines were published in February of 2015.[16] These guidelines incorporate substantial changes designed to provide for enhanced protection of children, as required by state law, compared to previous published risk assessment guidelines. The SJVAPCD has recently revised Risk Management Policy to incorporate OEHHA's new guidelines.[17]

This health risk assessment used the recent 2015 OEHHA risk assessment guidelines and SJVAPCD recommended procedures for applying the OEHHA guidelines.[18] Guidance based on consultations with SJVAPCD was also incorporated into the assessment[19].

Cancer Risk

Potential increased cancer risks from inhalation of TACs are calculated based on the average annual TAC concentration, inhalation dose, the TAC cancer potency factor, and an age sensitivity factor to reflect the greater sensitivity of infants and children to cancer causing TACs. The inhalation dose depends on a person's breathing rate, exposure time and frequency of exposure, and the exposure duration over a 70-year lifetime period. These parameters vary depending on the age, or age range, of the persons being exposed and whether the exposure is considered to occur at a residential location, at a workplace, or at a school.

The current OEHHA guidance used by SJVAPCD recommends that cancer risk be calculated by age groups to account for different breathing rates and sensitivity to TACs. Specifically, for a 70-year residential exposure period they recommend evaluating risks for the third trimester of pregnancy to age zero, ages zero to less than two (infant exposure), ages two to less than 16 (child exposure), and ages 16 to 70 (adult exposure). Age sensitivity factors (ASFs) associated with the different types of exposure are an ASF of 10 for the third trimester and infant exposures, an ASF of 3 for a child exposure, and an ASF of 1 for an adult exposure. For workers, a 40-year adult exposure period is assumed in calculating the 70-year lifetime cancer risk. Also associated

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[16] OEHHA 2015. *Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. Office of Environmental Health Hazard Assessment. February 2015.

[17] San Joaquin Valley Air Pollution Control District. 2015. *APR-1906 Framework for Performing Health Risk Assessments*. June30, 2015.

[18] San Joaquin Valley Air Pollution Control District. 2015. *Final Draft Staff Report, Update to District's Risk Management Policy to Address OEHHA's Revised Risk Assessment Guidance Document*. May 28, 2015

[19] San Joaquin Valley Air Pollution Control District. 2020. Email from Kyle Melching of the SJVAPCD and James Reyff of Illingworth & Rodkin, Inc. on February 6, 2020.

with each exposure type are different breathing rates, expressed as liters per kilogram of body weight per day (L/kg-day) for residential exposures or L/kg per 8 hours for worker exposures. As recommended by the SJVAPCD, 95th percentile breathing rates are used for all age groups.

Functionally, cancer risk is calculated using the following parameters and formulas:

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 10^6

Where:

CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where:

C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day) or 8-hr breathing rate for worker
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

The health risk parameters used in this evaluation are summarized in Tables 1 and 2.

TABLE 1 - Health Risk Parameters used for Cancer Risk Calculations

	Exposure Type →	**Infant**		**Child**	**Adult**	**Worker**
Parameter	***Age Range*** →	**3rd Trimester**	**0<2**	**2 < 16**	**16 - 70**	**> 16**
Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$ (refer to Table 2)						
Daily Breathing Rate (L/kg-day)[a]		361	1,090	745	290	230[b]
Inhalation Absorption Factor		1	1	1	1	1
Averaging Time ((years)		70	70	70	70	70
Exposure Duration (years)		0.25	2	14	54	40
Exposure Frequency (days/year)		350	350	350	350	250
Age Sensitivity Factor		10	10	3	1	1
Fraction of Time at Home		1.0	1.0	1.0	1.0	-

[a] 95th percentile breathing rates for all age groups

[b] Worker 95th percentile 8-hour breathing rate.

Table 2 - Cancer Potency Factors and Reference Exposure Levels

TAC	**Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$**	**Reference Exposure Levels ($\mu g/m^3$)**	
		Acute (1-hour)	**Chronic (annual ave)**
DPM	1.10E+00	-	5
Benzene	1.00E-01	27	3
Ethylbenzene	8.70E-03	-	2,000
Formaldehyde	2.10E-02	55	9
PAH	3.90E00	-	-
Naphthalene	1.20E-01	-	9
1,3 Butadiene	6.00E-01	660	2

Aceltaldehyde	1.00E-02	470	140

Non-Cancer Hazard Calculation

Potential non-cancer health hazards from TAC exposure are expressed in terms of a hazard index (HI), which is the ratio of the TAC concentration to a reference exposure level (REL). Non-cancer health effects can be acute due to short term TAC exposure (one hour) or chronic due to longer term TAC exposure (annual average). OEHHA has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. TAC concentrations below the REL are not expected to cause adverse health impacts, even for sensitive individuals. The total HI is calculated as the sum of the HIs for each TAC evaluated and the total HI is compared to the SJVAPCD significance thresholds to determine whether a significant non-cancer health impact from a project would occur.

Typically, for projects involving construction or for residential projects locating near roadways with substantial TAC emissions, the primary TAC of concern with non-cancer health effects is DPM. For other emission sources, such as gasoline stations, benzene, toluene, and xylenes (organic TACs) are of concern with respect acute and chronic non-cancer health effects.

Attachment 2: Construction Risk Assessment

Franklin Retail Center Project, Merced, CA

DPM Emissions and Modeling Emission Rates - Without Controls

Construction Year	Activity	Area Source	DPM Emissions (ton/year)	DPM Emissions (lb/yr)	DPM Emissions (lb/hr)	DPM Emissions (g/s)	Modeled Area (m^2)	DPM Emission Rate ($g/s/m^2$)
2023	Construction	2023_DPM	0.0811	162.2	0.06932	8.73E-03	15349	5.69E-07
2024	Construction	2024_DPM	0.0180	36.0	0.0154	0.0019	15349	1.26E-07

Construction Hours for Modeling

hr/day =	9	(7am - 4pm Mon-Fri)
days/yr =	260	
hours/year =	2340	

DPM Emissions and Modeling Emission Rates - With Mitigation

Construction Year	Activity	Area Source	DPM Emissions (ton/year)	DPM Emissions (lb/yr)	DPM Emissions (lb/hr)	DPM Emissions (g/s)	Modeled Area (m^2)	DPM Emission Rate ($g/s/m^2$)
2023	Construction	2023_DPM	0.0109	21.8	0.00932	1.17E-03	15349	7.65E-08
2024	Construction	2024_DPM	0.00297	5.9	0.0025	0.0003	15349	2.08E-08

Construction Hours for Modeling

hr/day =	9	(7am - 4pm Mon-Fri)
days/yr =	260	
hours/year =	2340	

Franklin Road Retail Center, Meerced, CA - Construction Impacts - Without Mitigation
AERMOD Risk Modeling Parameters & Maximum Concentrations
Off-Site Residential Receptors (1.5m heights)

Receptor Informnation

Number of Receptors 52
Receptor Height = 1.5 meters
Receptor Distances = Variable - placed at nearby residences

Meteorolgical Conditions

SJVAPCD Merced Airport Met I 2013-2017
Land Use Classification Rural
Wind Speed = variable
Wind Direction = variable

MEI Maximum Concentrations

Emissions Period	DPM Concentration ($\mu g/m^3$)
2023	0.13955
2024	0.0309

Franklin Road Retail Center, Meerced, CA - Construction Impacts - Without Mitigation
Maximum DPM Cancer Risk Calculations From Construction
70-Year Residential Exposure - Infant/Child at Off-Site Single Family Home

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

	Infant/Child			Adult
Age -->	**3rd Trimester**	**0 - < 2**	**2 - < 16**	**16 - 70**
Parameter				
ASF =	10	10	3	1
CPF =	1.10E+00	1.10E+00	1.10E+00	1.10E+00
DBR* =	361	1090	745	290
A =	1	1	1	1
EF =	350	350	350	350
ED =	0.25	2	14	54
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	1.00

* 95th percentile breathing rates for all age groups

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Exposure Year	Exposure Duration (years)	Age	Infant/Child - Exposure Information: DPM Conc (ug/m3) Year	Infant/Child - Exposure Information: DPM Conc (ug/m3) Annual	Infant/Child - Exposure Information: Age Sensitivity Factor	Infant/Child Cancer Risk (per million)	Adult - Exposure Information: Modeled DPM Conc (ug/m3) Year	Adult - Exposure Information: Modeled DPM Conc (ug/m3) Annual	Adult - Exposure Information: Age Sensitivity Factor	Adult Cancer Risk (per million)	Hazard Index (HI)
0	0.25	-0.25 - 0*	2023	0.1396	10	1.90					
1	1	1	2023	0.1396	10	22.92	2023	0.1396	1	0.61	0.028
2	1	2	2024	0.0309	10	5.08	2024	0.0309	1	0.14	0.006
3	1	3	2025	0.0000	3	0.00	2025	0.0000	1	0.00	
4	1	4	2026	0.0000	3	0.00	2026	0.0000	1	0.00	
5	1	5	2027	0.0000	3	0.00	2027	0.0000	1	0.00	
6	1	6	2028	0.0000	3	0.00	2028	0.0000	1	0.00	
7	1	7	2029	0.0000	3	0.00	2029	0.0000	1	0.00	
8	1	8	2030	0.0000	3	0.00	2030	0.0000	1	0.00	
9	1	9	2031	0.0000	3	0.00	2031	0.0000	1	0.00	
10	1	10	2032	0.0000	3	0.00	2032	0.0000	1	0.00	
11	1	11	2033	0.0000	3	0.00	2033	0.0000	1	0.00	
12	1	12	2034	0.0000	3	0.00	2034	0.0000	1	0.00	
13	1	13	2035	0.0000	3	0.00	2035	0.0000	1	0.00	
14	1	14	2036	0.0000	3	0.00	2036	0.0000	1	0.00	
15	1	15	2037	0.0000	3	0.00	2037	0.0000	1	0.00	
16	1	16	2038	0.0000	3	0.00	2038	0.0000	1	0.00	
17	1	17	2039	0.0000	1	0.00	2039	0.0000	1	0.00	
18	1	18	2040	0.0000	1	0.00	2040	0.0000	1	0.00	
19	1	19	2041	0.0000	1	0.00	2041	0.0000	1	0.00	
20	1	20	2042	0.0000	1	0.00	2042	0.0000	1	0.00	
21	1	21	2043	0.0000	1	0.00	2043	0.0000	1	0.00	
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.	...	...	...	...	...	...	...	...	...	...	
.	...	...	...	...	...	...	...	...	...	...	
65	1	65	2087	0.0000	1	0.00	2087	0.0000	1	0.00	
66	1	66	2088	0.0000	1	0.00	2088	0.0000	1	0.00	
67	1	67	2089	0.0000	1	0.00	2089	0.0000	1	0.00	
68	1	68	2090	0.0000	1	0.00	2090	0.0000	1	0.00	
69	1	69	2091	0.0000	1	0.00	2091	0.0000	1	0.00	
70	1	70	2092	0.0000	1	0.00	2092	0.0000	1	0.00	
Total Increased Cancer Risk						**29.89**				**0.74**	

* Third trimester of pregnancy

Franklin Road Retail Center, Meerced, CA - Construction Impacts - With Mitigation
AERMOD Risk Modeling Parameters & Maximum Concentrations
Off-Site Residential Receptors (1.5m heights)

Receptor Informnation

Number of Receptors 52
Receptor Height = 1.5 meters
Receptor Distances = Variable - placed at nearby residences

Meteorolgical Conditions

SJVAPCD Merced Airport Met I 2013-2017
Land Use Classification Rural
Wind Speed = variable
Wind Direction = variable

MEI Maximum Concentrations

Emissions Period	DPM Concentration ($\mu g/m^3$)
2023	0.01876
2024	0.0051

Franklin Road Retail Center, Meerced, CA - Construction Impacts - With Mitigation
Maximum DPM Cancer Risk Calculations From Construction
70-Year Residential Exposure - Infant/Child at Off-Site Single Family Home

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

	Infant/Child			Adult
Age -->	**3rd Trimester**	**0 - < 2**	**2 - < 16**	**16 - 70**
Parameter				
ASF =	10	10	3	1
CPF =	1.10E+00	1.10E+00	1.10E+00	1.10E+00
DBR* =	361	1090	745	290
A =	1	1	1	1
EF =	350	350	350	350
ED =	0.25	2	14	54
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	1.00

* 95th percentile breathing rates for all age groups

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Exposure Year	Exposure Duration (years)	Age	Infant/Child - Exposure Information: DPM Conc (ug/m3) Year	Infant/Child - Exposure Information: DPM Conc (ug/m3) Annual	Infant/Child - Exposure Information: Age Sensitivity Factor	Infant/Child Cancer Risk (per million)	Adult - Exposure Information: Modeled DPM Conc (ug/m3) Year	Adult - Exposure Information: Modeled DPM Conc (ug/m3) Annual	Adult - Exposure Information: Age Sensitivity Factor	Adult Cancer Risk (per million)	Hazard Index (HI)
0	0.25	-0.25 - 0*	2023	0.0188	10	0.26					
1	1	1	2023	0.0188	10	3.08	2023	0.0188	1	0.08	0.004
2	1	2	2024	0.0051	10	0.84	2024	0.0051	1	0.02	0.001
3	1	3	2025	0.0000	3	0.00	2025	0.0000	1	0.00	
4	1	4	2026	0.0000	3	0.00	2026	0.0000	1	0.00	
5	1	5	2027	0.0000	3	0.00	2027	0.0000	1	0.00	
6	1	6	2028	0.0000	3	0.00	2028	0.0000	1	0.00	
7	1	7	2029	0.0000	3	0.00	2029	0.0000	1	0.00	
8	1	8	2030	0.0000	3	0.00	2030	0.0000	1	0.00	
9	1	9	2031	0.0000	3	0.00	2031	0.0000	1	0.00	
10	1	10	2032	0.0000	3	0.00	2032	0.0000	1	0.00	
11	1	11	2033	0.0000	3	0.00	2033	0.0000	1	0.00	
12	1	12	2034	0.0000	3	0.00	2034	0.0000	1	0.00	
13	1	13	2035	0.0000	3	0.00	2035	0.0000	1	0.00	
14	1	14	2036	0.0000	3	0.00	2036	0.0000	1	0.00	
15	1	15	2037	0.0000	3	0.00	2037	0.0000	1	0.00	
16	1	16	2038	0.0000	3	0.00	2038	0.0000	1	0.00	
17	1	17	2039	0.0000	1	0.00	2039	0.0000	1	0.00	
18	1	18	2040	0.0000	1	0.00	2040	0.0000	1	0.00	
19	1	19	2041	0.0000	1	0.00	2041	0.0000	1	0.00	
20	1	20	2042	0.0000	1	0.00	2042	0.0000	1	0.00	
21	1	21	2043	0.0000	1	0.00	2043	0.0000	1	0.00	
.•	…	…	…	…	…	…	…	…	…	…	
.•	…	…	…	…	…	…	…	…	…	…	
.•	…	…	…	…	…	…	…	…	…	…	
65	1	65	2087	0.0000	1	0.00	2087	0.0000	1	0.00	
66	1	66	2088	0.0000	1	0.00	2088	0.0000	1	0.00	
67	1	67	2089	0.0000	1	0.00	2089	0.0000	1	0.00	
68	1	68	2090	0.0000	1	0.00	2090	0.0000	1	0.00	
69	1	69	2091	0.0000	1	0.00	2091	0.0000	1	0.00	
70	1	70	2092	0.0000	1	0.00	2092	0.0000	1	0.00	
Total Increased Cancer Risk						**4.17**				**0.10**	

* Third trimester of pregnancy

Franklin Road Retail Center, Meerced, CA - Construction Impacts - Without Mitigation
AERMOD Risk Modeling Parameters & Maximum Concentrations
Off-Site Worker Receptors (1.5m heights)

Receptor Informnation

Number of Receptors	6
Receptor Height =	1.5 meters
Receptor Distances =	Variable - placed at nearby work places

Meteorolgical Conditions

SJVAPCD Merced Airport Met D	2013-2017
Land Use Classification	Rural
Wind Speed =	variable
Wind Direction =	variable

Worker MEI Maximum Concentrations

Emissions Period	DPM Concentration ($\mu g/m^3$)
2023	0.1342
2024	0.02972

Franklin Road Retail Center, Meerced, CA - Construction Impacts - Without Mitigation
Maximum DPM Cancer Risk Calculations From Construction
40-Year Worker Exposure - Off-Site

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)

Inhalation Dose = C_{air} x WAF x BR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
WAF = Worker Adjustment Factor (unitless)
= (24hrs/9 hrs) x (7 days/5 days) = 3.73 for construction modeling
= 1.0 for roadway modeling (continuous emissions)
BR = 8-hour breathing rate for workers
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

TAC	CPF
DPM	1.10

	Adult
Age -->	17 - 70
Parameter	
ASF =	1
BR* =	230
A =	1
EF =	250
ED =	40
AT =	70
WAF =	3.73

* 95th percentile worker 8-hr breathing rate

Construction Cancer Risk by Year - Maximum Risk Location

Exposure Year	Exposure Duration (years)	Work Year	Worker - Exposure Information: DPM Conc (ug/m3) Year	DPM Conc (ug/m3) Annual	Age Sensitivity Factor	Cancer Risk (per million)
1	1	1	2023	0.1342	1	1.239
2	1	2	2024	0.0297	1	0.274
3	1	3	2025	0.0000	1	0.000
4	1	4	2026	0.0000	1	0.000
5	1	5	2027	0.0000	1	0.000
6	1	6	2028	0.0000	1	0.000
7	1	7	2029	0.0000	1	0.000
8	1	8	2030	0.0000	1	0.000
9	1	9	2031	0.0000	1	0.000
10	1	10	2032	0.0000	1	0.000
11	1	11	2033	0.0000	1	0.000
12	1	12	2034	0.0000	1	0.000
13	1	13	2035	0.0000	1	0.000
14	1	14	2036	0.0000	1	0.000
15	1	15	2037	0.0000	1	0.000
16	1	16	2038	0.0000	1	0.000
17	1	17	2039	0.0000	1	0.000
18	1	18	2040	0.0000	1	0.000
19	1	19	2041	0.0000	1	0.000
20	1	20	2042	0.0000	1	0.000
21	1	21	2043	0.0000	1	0.000
…	…	…	…	…	1	…
…	…	…	…	…	1	…
…	…	…	…	…	1	…
35	1	35	2057	0.0000	1	0.000
36	1	36	2058	0.0000	1	0.000
37	1	37	2059	0.0000	1	0.000
38	1	38	2060	0.0000	1	0.000
39	1	39	2061	0.0000	1	0.000
40	1	40	2062	0.0000	1	0.000
Total Increased Cancer Risk						**1.51**

Franklin Road Retail Center, Meerced, CA - Construction Impacts - With Mitigation
AERMOD Risk Modeling Parameters & Maximum Concentrations
Off-Site Worker Receptors (1.5m heights)

Receptor Informnation

Number of Receptors	6
Receptor Height =	1.5 meters
Receptor Distances =	Variable - placed at nearby work places

Meteorolgical Conditions

SJVAPCD Merced Airport Met D	2013-2017
Land Use Classification	Rural
Wind Speed =	variable
Wind Direction =	variable

Worker MEI Maximum Concentrations

Emissions Period	DPM Concentration ($\mu g/m^3$)
2023	0.01804
2024	0.00491

Franklin Road Retail Center, Meerced, CA - Construction Impacts - With Mitigation
Maximum DPM Cancer Risk Calculations From Construction
40-Year Worker Exposure - Off-Site

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)

Inhalation Dose = C_{air} x WAF x BR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
WAF = Worker Adjustment Factor (unitless)
= (24hrs/9 hrs) x (7 days/5 days) = 3.73 for construction modeling
= 1.0 for roadway modeling (continuous emissions)
BR = 8-hour breathing rate for workers
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

TAC	CPF
DPM	1.10

	Adult
Age -->	17 - 70
Parameter	
ASF =	1
BR* =	230
A =	1
EF =	250
ED =	40
AT =	70
WAF =	3.73

* 95th percentile worker 8-hr breathing rate

Construction Cancer Risk by Year - Maximum Risk Location

Exposure Year	Exposure Duration (years)	Work Year	Worker - Exposure Information: DPM Conc (ug/m3) Year	DPM Conc (ug/m3) Annual	Age Sensitivity Factor	Cancer Risk (per million)
1	1	1	2023	0.0180	1	0.17
2	1	2	2024	0.0049	1	0.05
3	1	3	2025	0.0000	1	0.00
4	1	4	2026	0.0000	1	0.00
5	1	5	2027	0.0000	1	0.00
6	1	6	2028	0.0000	1	0.00
7	1	7	2029	0.0000	1	0.00
8	1	8	2030	0.0000	1	0.00
9	1	9	2031	0.0000	1	0.00
10	1	10	2032	0.0000	1	0.00
11	1	11	2033	0.0000	1	0.00
12	1	12	2034	0.0000	1	0.00
13	1	13	2035	0.0000	1	0.00
14	1	14	2036	0.0000	1	0.00
15	1	15	2037	0.0000	1	0.00
16	1	16	2038	0.0000	1	0.00
17	1	17	2039	0.0000	1	0.00
18	1	18	2040	0.0000	1	0.00
19	1	19	2041	0.0000	1	0.00
20	1	20	2042	0.0000	1	0.00
21	1	21	2043	0.0000	1	0.00
…	…	…	…	…	1	…
…	…	…	…	…	1	…
…	…	…	…	…	1	…
35	1	35	2057	0.0000	1	0.00
36	1	36	2058	0.0000	1	0.00
37	1	37	2059	0.0000	1	0.00
38	1	38	2060	0.0000	1	0.00
39	1	39	2061	0.0000	1	0.00
40	1	40	2062	0.0000	1	0.00
Total Increased Cancer Risk						**0.21**

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Franklin Hwy Retail Center, Merced County

Merced County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Popula
Fast Food Restaurant with Drive Thru	2.80	1000sqft	0.00	2,800.00	0
Fast Food Restaurant w/o Drive Thru	2.20	1000sqft	0.00	2,200.00	0
Convenience Market with Gas Pumps	22.00	Pump	3.76	3,105.85	0
Parking Lot	67.00	Space	0.00	26,800.00	0
Other Asphalt Surfaces	2.00	Acre	0.00	87,120.00	0
City Park	0.80	Acre	0.00	34,848.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	49
Climate Zone	3			**Operational Year**	2025
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Used drive thru restaurant for drive thru coffee shop. Estimated driveway and other asphalt at 2 acres. Assigned site acreage to Gas Station

Construction Phase - Use default

Demolition - Estimated from Google Earth

Vehicle Trips - Used trip generation with passby/diverted adjustments = primary trips

Fast food = 492/2.8 = 171.42/224.26/172.01 Coffee = 435/2.2 = 197.72/258.68/198.41 GDF = 1841/22 = 83.68/83.68/83.68

Construction Off-road Equipment Mitigation - SJV BMPs and Tier 4 mobile and generators

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Trips and VMT - Near site traffic = 1 mile trip length

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblLandUse	LotAcreage	0.06	0.00
tblLandUse	LotAcreage	0.05	0.00
tblLandUse	LotAcreage	0.07	3.76
tblLandUse	LotAcreage	0.60	0.00

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblLandUse	LotAcreage	2.00	0.00
tblLandUse	LotAcreage	0.80	0.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	WorkerTripLength	10.80	1.00
tblTripsAndVMT	WorkerTripLength	10.80	1.00
tblTripsAndVMT	WorkerTripLength	10.80	1.00
tblTripsAndVMT	WorkerTripLength	10.80	1.00
tblTripsAndVMT	WorkerTripLength	10.80	1.00
tblTripsAndVMT	WorkerTripLength	10.80	1.00
tblVehicleTrips	CC_TL	7.30	1.00
tblVehicleTrips	CC_TL	7.30	1.00
tblVehicleTrips	CC_TL	7.30	1.00
tblVehicleTrips	CC_TL	7.30	1.00
tblVehicleTrips	CNW_TL	7.30	1.00
tblVehicleTrips	CNW_TL	7.30	1.00
tblVehicleTrips	CNW_TL	7.30	1.00
tblVehicleTrips	CNW_TL	7.30	1.00

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblVehicleTrips	CW_TL	9.50	1.00
tblVehicleTrips	CW_TL	9.50	1.00
tblVehicleTrips	CW_TL	9.50	1.00
tblVehicleTrips	CW_TL	9.50	1.00
tblVehicleTrips	DV_TP	21.00	0.00
tblVehicleTrips	DV_TP	21.00	0.00
tblVehicleTrips	DV_TP	28.00	0.00
tblVehicleTrips	DV_TP	37.00	0.00
tblVehicleTrips	PB_TP	65.00	0.00
tblVehicleTrips	PB_TP	50.00	0.00
tblVehicleTrips	PB_TP	6.00	0.00
tblVehicleTrips	PB_TP	12.00	0.00
tblVehicleTrips	PR_TP	14.00	100.00
tblVehicleTrips	PR_TP	29.00	100.00
tblVehicleTrips	PR_TP	66.00	100.00
tblVehicleTrips	PR_TP	51.00	100.00
tblVehicleTrips	ST_TR	322.50	83.68
tblVehicleTrips	ST_TR	616.12	224.26
tblVehicleTrips	ST_TR	1.96	0.00
tblVehicleTrips	ST_TR	696.00	258.68
tblVehicleTrips	SU_TR	322.50	83.68
tblVehicleTrips	SU_TR	472.58	172.01
tblVehicleTrips	SU_TR	2.19	0.00
tblVehicleTrips	SU_TR	500.00	198.41
tblVehicleTrips	WD_TR	322.50	83.68
tblVehicleTrips	WD_TR	470.95	171.42
tblVehicleTrips	WD_TR	0.78	0.00
tblVehicleTrips	WD_TR	346.23	197.73

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.1949	1.7319	1.8792	3.2500e-003	0.0859	0.0811	0.1671	0.0411	0.0761	0.1172	0.0000	282.0148	282.0148	0.0676	1.9700e-003	284.2921
2024	0.1262	0.3991	0.5094	8.4000e-004	1.8800e-003	0.0180	0.0199	5.1000e-004	0.0169	0.0174	0.0000	72.9129	72.9129	0.0174	4.8000e-004	73.4901
Maximum	**0.1949**	**1.7319**	**1.8792**	**3.2500e-003**	**0.0859**	**0.0811**	**0.1671**	**0.0411**	**0.0761**	**0.1172**	**0.0000**	**282.0148**	**282.0148**	**0.0676**	**1.9700e-003**	**284.2921**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0940	1.2439	2.1238	3.2500e-003	0.0378	0.0109	0.0487	0.0172	0.0109	0.0281	0.0000	282.0145	282.0145	0.0676	1.9700e-003	284.2917
2024	0.1049	0.3370	0.5675	8.4000e-004	1.8800e-003	2.9700e-003	4.8400e-003	5.1000e-004	2.9600e-003	3.4800e-003	0.0000	72.9129	72.9129	0.0174	4.8000e-004	73.4901
Maximum	**0.1049**	**1.2439**	**2.1238**	**3.2500e-003**	**0.0378**	**0.0109**	**0.0487**	**0.0172**	**0.0109**	**0.0281**	**0.0000**	**282.0145**	**282.0145**	**0.0676**	**1.9700e-003**	**284.2917**

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**38.08**	**25.82**	**-12.67**	**0.00**	**54.83**	**85.97**	**71.35**	**57.44**	**85.06**	**76.52**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**3-1-2023**	**5-31-2023**	0.6628	0.4214
2	**6-1-2023**	**8-31-2023**	0.5457	0.3965
3	**9-1-2023**	**11-30-2023**	0.5396	0.3919
4	**12-1-2023**	**2-29-2024**	0.5168	0.3902
5	**3-1-2024**	**5-31-2024**	0.1870	0.1822
		Highest	0.6628	0.4214

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0474	1.0000e-005	8.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.7300e-003	1.7300e-003	0.0000	0.0000	1.8400e-003
Energy	5.8400e-003	0.0531	0.0446	3.2000e-004		4.0400e-003	4.0400e-003		4.0400e-003	4.0400e-003	0.0000	74.0286	74.0286	3.7300e-003	1.3800e-003	74.5325
Mobile	0.8497	1.0808	4.2864	5.3200e-003	0.3832	6.2000e-003	0.3894	0.1028	5.8100e-003	0.1086	0.0000	504.5561	504.5561	0.0694	0.0571	523.2974
Waste						0.0000	0.0000		0.0000	0.0000	11.7045	0.0000	11.7045	0.6917	0.0000	28.9973
Water						0.0000	0.0000		0.0000	0.0000	0.5545	1.2607	1.8152	0.0572	1.3700e-003	3.6521

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.9030**	**1.1339**	**4.3319**	**5.6400e-003**	**0.3832**	**0.0102**	**0.3934**	**0.1028**	**9.8500e-003**	**0.1126**	**12.2589**	**579.8470**	**592.1060**	**0.8219**	**0.0598**	**630.4811**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0474	1.0000e-005	8.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.7300e-003	1.7300e-003	0.0000	0.0000	1.8400e-003
Energy	5.8400e-003	0.0531	0.0446	3.2000e-004		4.0400e-003	4.0400e-003		4.0400e-003	4.0400e-003	0.0000	74.0286	74.0286	3.7300e-003	1.3800e-003	74.5325
Mobile	0.8497	1.0808	4.2864	5.3200e-003	0.3832	6.2000e-003	0.3894	0.1028	5.8100e-003	0.1086	0.0000	504.5561	504.5561	0.0694	0.0571	523.2974
Waste						0.0000	0.0000		0.0000	0.0000	11.7045	0.0000	11.7045	0.6917	0.0000	28.9973
Water						0.0000	0.0000		0.0000	0.0000	0.5545	1.2607	1.8152	0.0572	1.3700e-003	3.6521
Total	**0.9030**	**1.1339**	**4.3319**	**5.6400e-003**	**0.3832**	**0.0102**	**0.3934**	**0.1028**	**9.8500e-003**	**0.1126**	**12.2589**	**579.8470**	**592.1060**	**0.8219**	**0.0598**	**630.4811**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

1	Demolition	Demolition	3/1/2023	3/28/2023	5	20	
2	Site Preparation	Site Preparation	3/29/2023	4/4/2023	5	5	
3	Grading	Grading	4/5/2023	4/14/2023	5	8	
4	Building Construction	Building Construction	4/15/2023	3/1/2024	5	230	
5	Paving	Paving	3/2/2024	3/27/2024	5	18	
6	Architectural Coating	Architectural Coating	3/28/2024	4/22/2024	5	18	

Acres of Grading (Site Preparation Phase): 7.5

Acres of Grading (Grading Phase): 8

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 12,159; Non-Residential Outdoor: 4,053; Striped Parking Area: 6,835 (Architectural

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Grading	Graders	1	8.00	187	0.41
Demolition	Excavators	3	8.00	158	0.38
Paving	Pavers	1	8.00	130	0.42
Paving	Rollers	2	6.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Paving Equipment	2	6.00	132	0.36
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	1	13.00	0.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	66.00	26.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Demolition	6	15.00	0.00	14.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Fugitive Dust					1.4800e-003	0.0000	1.4800e-003	2.2000e-004	0.0000	2.2000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0227	0.2148	0.1964	3.9000e-004		9.9800e-003	9.9800e-003		9.2800e-003	9.2800e-003	0.0000	33.9921	33.9921	9.5200e-003	0.0000	34.2301
Total	**0.0227**	**0.2148**	**0.1964**	**3.9000e-004**	**1.4800e-003**	**9.9800e-003**	**0.0115**	**2.2000e-004**	**9.2800e-003**	**9.5000e-003**	**0.0000**	**33.9921**	**33.9921**	**9.5200e-003**	**0.0000**	**34.2301**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-005	1.7000e-004	1.2000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0381	0.0381	0.0000	1.0000e-005	0.0399
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7000e-004	1.2000e-004	1.1700e-003	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1179	0.1179	2.0000e-005	1.0000e-005	0.1218
Total	**2.8000e-004**	**2.9000e-004**	**1.2900e-003**	**0.0000**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.1560**	**0.1560**	**2.0000e-005**	**2.0000e-005**	**0.1617**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Fugitive Dust					5.8000e-004	0.0000	5.8000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.0300e-003	0.1391	0.2447	3.9000e-004		1.8200e-003	1.8200e-003		1.8200e-003	1.8200e-003	0.0000	33.9920	33.9920	9.5200e-003	0.0000	34.2300
Total	**8.0300e-003**	**0.1391**	**0.2447**	**3.9000e-004**	**5.8000e-004**	**1.8200e-003**	**2.4000e-003**	**9.0000e-005**	**1.8200e-003**	**1.9100e-003**	**0.0000**	**33.9920**	**33.9920**	**9.5200e-003**	**0.0000**	**34.2300**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-005	1.7000e-004	1.2000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0381	0.0381	0.0000	1.0000e-005	0.0399
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7000e-004	1.2000e-004	1.1700e-003	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1179	0.1179	2.0000e-005	1.0000e-005	0.1218
Total	**2.8000e-004**	**2.9000e-004**	**1.2900e-003**	**0.0000**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.1560**	**0.1560**	**2.0000e-005**	**2.0000e-005**	**0.1617**

3.3 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Fugitive Dust					0.0491	0.0000	0.0491	0.0253	0.0000	0.0253	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.6500e-003	0.0688	0.0456	1.0000e-004		3.1700e-003	3.1700e-003		2.9100e-003	2.9100e-003	0.0000	8.3627	8.3627	2.7000e-003	0.0000	8.4303
Total	**6.6500e-003**	**0.0688**	**0.0456**	**1.0000e-004**	**0.0491**	**3.1700e-003**	**0.0523**	**0.0253**	**2.9100e-003**	**0.0282**	**0.0000**	**8.3627**	**8.3627**	**2.7000e-003**	**0.0000**	**8.4303**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.0000e-005	4.0000e-005	3.5000e-004	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0354	0.0354	1.0000e-005	0.0000	0.0365
Total	**8.0000e-005**	**4.0000e-005**	**3.5000e-004**	**0.0000**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0354**	**0.0354**	**1.0000e-005**	**0.0000**	**0.0365**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Fugitive Dust					0.0192	0.0000	0.0192	9.8500e-003	0.0000	9.8500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7400e-003	0.0304	0.0574	1.0000e-004		1.6000e-004	1.6000e-004		1.6000e-004	1.6000e-004	0.0000	8.3627	8.3627	2.7000e-003	0.0000	8.4303
Total	**1.7400e-003**	**0.0304**	**0.0574**	**1.0000e-004**	**0.0192**	**1.6000e-004**	**0.0193**	**9.8500e-003**	**1.6000e-004**	**0.0100**	**0.0000**	**8.3627**	**8.3627**	**2.7000e-003**	**0.0000**	**8.4303**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.0000e-005	4.0000e-005	3.5000e-004	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0354	0.0354	1.0000e-005	0.0000	0.0365
Total	**8.0000e-005**	**4.0000e-005**	**3.5000e-004**	**0.0000**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0354**	**0.0354**	**1.0000e-005**	**0.0000**	**0.0365**

3.4 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Fugitive Dust					0.0283	0.0000	0.0283	0.0137	0.0000	0.0137	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.8400e-003	0.0717	0.0590	1.2000e-004		3.1000e-003	3.1000e-003		2.8500e-003	2.8500e-003	0.0000	10.4243	10.4243	3.3700e-003	0.0000	10.5085
Total	**6.8400e-003**	**0.0717**	**0.0590**	**1.2000e-004**	**0.0283**	**3.1000e-003**	**0.0314**	**0.0137**	**2.8500e-003**	**0.0166**	**0.0000**	**10.4243**	**10.4243**	**3.3700e-003**	**0.0000**	**10.5085**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1000e-004	5.0000e-005	4.7000e-004	0.0000	4.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0472	0.0472	1.0000e-005	0.0000	0.0487
Total	**1.1000e-004**	**5.0000e-005**	**4.7000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**5.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0472**	**0.0472**	**1.0000e-005**	**0.0000**	**0.0487**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Fugitive Dust					0.0111	0.0000	0.0111	5.3400e-003	0.0000	5.3400e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.0800e-003	0.0413	0.0760	1.2000e-004		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004	0.0000	10.4242	10.4242	3.3700e-003	0.0000	10.5085
Total	**2.0800e-003**	**0.0413**	**0.0760**	**1.2000e-004**	**0.0111**	**1.9000e-004**	**0.0112**	**5.3400e-003**	**1.9000e-004**	**5.5300e-003**	**0.0000**	**10.4242**	**10.4242**	**3.3700e-003**	**0.0000**	**10.5085**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1000e-004	5.0000e-005	4.7000e-004	0.0000	4.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0472	0.0472	1.0000e-005	0.0000	0.0487
Total	**1.1000e-004**	**5.0000e-005**	**4.7000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**5.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0472**	**0.0472**	**1.0000e-005**	**0.0000**	**0.0487**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	tons/yr										MT/yr					
Off-Road	0.1455	1.3306	1.5026	2.4900e-003		0.0647	0.0647		0.0609	0.0609	0.0000	214.4194	214.4194	0.0510	0.0000	215.6946
Total	**0.1455**	**1.3306**	**1.5026**	**2.4900e-003**		**0.0647**	**0.0647**		**0.0609**	**0.0609**	**0.0000**	**214.4194**	**214.4194**	**0.0510**	**0.0000**	**215.6946**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.7800e-003	0.0408	0.0257	1.0000e-004	2.2400e-003	1.1000e-004	2.3500e-003	6.5000e-004	1.1000e-004	7.6000e-004	0.0000	9.7807	9.7807	1.0000e-004	1.4800e-003	10.2256
Worker	0.0110	4.7500e-003	0.0478	5.0000e-005	4.5600e-003	6.0000e-005	4.6200e-003	1.2200e-003	5.0000e-005	1.2700e-003	0.0000	4.7972	4.7972	9.0000e-004	4.6000e-004	4.9561
Total	**0.0128**	**0.0456**	**0.0735**	**1.5000e-004**	**6.8000e-003**	**1.7000e-004**	**6.9700e-003**	**1.8700e-003**	**1.6000e-004**	**2.0300e-003**	**0.0000**	**14.5779**	**14.5779**	**1.0000e-003**	**1.9400e-003**	**15.1817**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Off-Road	0.0688	0.9871	1.6701	2.4900e-003		8.6000e-003	8.6000e-003		8.6000e-003	8.6000e-003	0.0000	214.4191	214.4191	0.0510	0.0000	215.6943
Total	**0.0688**	**0.9871**	**1.6701**	**2.4900e-003**		**8.6000e-003**	**8.6000e-003**		**8.6000e-003**	**8.6000e-003**	**0.0000**	**214.4191**	**214.4191**	**0.0510**	**0.0000**	**215.6943**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.7800e-003	0.0408	0.0257	1.0000e-004	2.2400e-003	1.1000e-004	2.3500e-003	6.5000e-004	1.1000e-004	7.6000e-004	0.0000	9.7807	9.7807	1.0000e-004	1.4800e-003	10.2256
Worker	0.0110	4.7500e-003	0.0478	5.0000e-005	4.5600e-003	6.0000e-005	4.6200e-003	1.2200e-003	5.0000e-005	1.2700e-003	0.0000	4.7972	4.7972	9.0000e-004	4.6000e-004	4.9561
Total	**0.0128**	**0.0456**	**0.0735**	**1.5000e-004**	**6.8000e-003**	**1.7000e-004**	**6.9700e-003**	**1.8700e-003**	**1.6000e-004**	**2.0300e-003**	**0.0000**	**14.5779**	**14.5779**	**1.0000e-003**	**1.9400e-003**	**15.1817**

3.5 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0331	0.3025	0.3638	6.1000e-004		0.0138	0.0138		0.0130	0.0130	0.0000	52.1661	52.1661	0.0123	0.0000	52.4744

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.0331**	**0.3025**	**0.3638**	**6.1000e-004**		**0.0138**	**0.0138**		**0.0130**	**0.0130**	**0.0000**	**52.1661**	**52.1661**	**0.0123**	**0.0000**	**52.4744**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.3000e-004	9.9000e-003	6.1300e-003	2.0000e-005	5.4000e-004	3.0000e-005	5.7000e-004	1.6000e-004	3.0000e-005	1.8000e-004	0.0000	2.3390	2.3390	2.0000e-005	3.5000e-004	2.4453
Worker	2.4500e-003	1.0500e-003	0.0110	1.0000e-005	1.1100e-003	1.0000e-005	1.1200e-003	3.0000e-004	1.0000e-005	3.1000e-004	0.0000	1.1397	1.1397	2.0000e-004	1.0000e-004	1.1760
Total	**2.8800e-003**	**0.0110**	**0.0171**	**3.0000e-005**	**1.6500e-003**	**4.0000e-005**	**1.6900e-003**	**4.6000e-004**	**4.0000e-005**	**4.9000e-004**	**0.0000**	**3.4787**	**3.4787**	**2.2000e-004**	**4.5000e-004**	**3.6213**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0163	0.2392	0.4059	6.1000e-004		1.9200e-003	1.9200e-003		1.9200e-003	1.9200e-003	0.0000	52.1660	52.1660	0.0123	0.0000	52.4744
Total	**0.0163**	**0.2392**	**0.4059**	**6.1000e-004**		**1.9200e-003**	**1.9200e-003**		**1.9200e-003**	**1.9200e-003**	**0.0000**	**52.1660**	**52.1660**	**0.0123**	**0.0000**	**52.4744**

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.3000e-004	9.9000e-003	6.1300e-003	2.0000e-005	5.4000e-004	3.0000e-005	5.7000e-004	1.6000e-004	3.0000e-005	1.8000e-004	0.0000	2.3390	2.3390	2.0000e-005	3.5000e-004	2.4453
Worker	2.4500e-003	1.0500e-003	0.0110	1.0000e-005	1.1100e-003	1.0000e-005	1.1200e-003	3.0000e-004	1.0000e-005	3.1000e-004	0.0000	1.1397	1.1397	2.0000e-004	1.0000e-004	1.1760
Total	**2.8800e-003**	**0.0110**	**0.0171**	**3.0000e-005**	**1.6500e-003**	**4.0000e-005**	**1.6900e-003**	**4.6000e-004**	**4.0000e-005**	**4.9000e-004**	**0.0000**	**3.4787**	**3.4787**	**2.2000e-004**	**4.5000e-004**	**3.6213**

3.6 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.9300e-003	0.0745	0.1100	1.7000e-004		3.5900e-003	3.5900e-003		3.3200e-003	3.3200e-003	0.0000	14.7423	14.7423	4.6300e-003	0.0000	14.8581
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.9300e-003**	**0.0745**	**0.1100**	**1.7000e-004**		**3.5900e-003**	**3.5900e-003**		**3.3200e-003**	**3.3200e-003**	**0.0000**	**14.7423**	**14.7423**	**4.6300e-003**	**0.0000**	**14.8581**

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-004	1.3000e-004	1.3300e-003	0.0000	1.3000e-004	0.0000	1.4000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1382	0.1382	2.0000e-005	1.0000e-005	0.1425
Total	**3.0000e-004**	**1.3000e-004**	**1.3300e-003**	**0.0000**	**1.3000e-004**	**0.0000**	**1.4000e-004**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**0.0000**	**0.1382**	**0.1382**	**2.0000e-005**	**1.0000e-005**	**0.1425**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.4100e-003	0.0756	0.1260	1.7000e-004		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004	0.0000	14.7423	14.7423	4.6300e-003	0.0000	14.8581
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.4100e-003**	**0.0756**	**0.1260**	**1.7000e-004**		**4.6000e-004**	**4.6000e-004**		**4.6000e-004**	**4.6000e-004**	**0.0000**	**14.7423**	**14.7423**	**4.6300e-003**	**0.0000**	**14.8581**

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-004	1.3000e-004	1.3300e-003	0.0000	1.3000e-004	0.0000	1.4000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1382	0.1382	2.0000e-005	1.0000e-005	0.1425
Total	**3.0000e-004**	**1.3000e-004**	**1.3300e-003**	**0.0000**	**1.3000e-004**	**0.0000**	**1.4000e-004**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**0.0000**	**0.1382**	**0.1382**	**2.0000e-005**	**1.0000e-005**	**0.1425**

3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0801					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6300e-003	0.0110	0.0163	3.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004	0.0000	2.2979	2.2979	1.3000e-004	0.0000	2.3012
Total	**0.0818**	**0.0110**	**0.0163**	**3.0000e-005**		**5.5000e-004**	**5.5000e-004**		**5.5000e-004**	**5.5000e-004**	**0.0000**	**2.2979**	**2.2979**	**1.3000e-004**	**0.0000**	**2.3012**

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	8.0000e-005	8.7000e-004	0.0000	9.0000e-005	0.0000	9.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0898	0.0898	2.0000e-005	1.0000e-005	0.0927
Total	**1.9000e-004**	**8.0000e-005**	**8.7000e-004**	**0.0000**	**9.0000e-005**	**0.0000**	**9.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0898**	**0.0898**	**2.0000e-005**	**1.0000e-005**	**0.0927**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0801					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6300e-003	0.0110	0.0163	3.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004	0.0000	2.2979	2.2979	1.3000e-004	0.0000	2.3012
Total	**0.0818**	**0.0110**	**0.0163**	**3.0000e-005**		**5.5000e-004**	**5.5000e-004**		**5.5000e-004**	**5.5000e-004**	**0.0000**	**2.2979**	**2.2979**	**1.3000e-004**	**0.0000**	**2.3012**

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	8.0000e-005	8.7000e-004	0.0000	9.0000e-005	0.0000	9.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0898	0.0898	2.0000e-005	1.0000e-005	0.0927
Total	**1.9000e-004**	**8.0000e-005**	**8.7000e-004**	**0.0000**	**9.0000e-005**	**0.0000**	**9.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0898**	**0.0898**	**2.0000e-005**	**1.0000e-005**	**0.0927**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated	0.8497	1.0808	4.2864	5.3200e-003	0.3832	6.2000e-003	0.3894	0.1028	5.8100e-003	0.1086	0.0000	504.5561	504.5561	0.0694	0.0571	523.2974
Unmitigated	0.8497	1.0808	4.2864	5.3200e-003	0.3832	6.2000e-003	0.3894	0.1028	5.8100e-003	0.1086	0.0000	504.5561	504.5561	0.0694	0.0571	523.2974

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Convenience Market with Gas Pumps	1,840.96	1,840.96	1840.96	670,109	670,109
Fast Food Restaurant with Drive Thru	479.98	627.93	481.63	182,491	182,491
City Park	0.00	0.00	0.00		
Other Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Fast Food Restaurant w/o Drive Thru	435.01	569.10	436.50	165,393	165,393
Total	2,755.94	3,037.98	2,759.09	1,017,993	1,017,993

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Convenience Market with Gas Pumps	1.00	1.00	1.00	0.80	80.20	19.00	100	0	0
Fast Food Restaurant with Drive Thru	1.00	1.00	1.00	2.20	78.80	19.00	100	0	0
City Park	1.00	1.00	1.00	33.00	48.00	19.00	100	0	0
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Fast Food Restaurant w/o Drive Thru	1.00	1.00	1.00	1.50	79.50	19.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS
Convenience Market with Gas Pumps	0.523140	0.047841	0.156254	0.146076	0.028387	0.007025	0.014133	0.049672	0.000816	0.000458	0.021177	0.002172
Fast Food Restaurant with Drive Thru	0.523140	0.047841	0.156254	0.146076	0.028387	0.007025	0.014133	0.049672	0.000816	0.000458	0.021177	0.002172
City Park	0.523140	0.047841	0.156254	0.146076	0.028387	0.007025	0.014133	0.049672	0.000816	0.000458	0.021177	0.002172
Other Asphalt Surfaces	0.523140	0.047841	0.156254	0.146076	0.028387	0.007025	0.014133	0.049672	0.000816	0.000458	0.021177	0.002172

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Parking Lot	0.523140	0.047841	0.156254	0.146076	0.028387	0.007025	0.014133	0.049672	0.000816	0.000458	0.021177	0.002172
Fast Food Restaurant w/o Drive Thru	0.523140	0.047841	0.156254	0.146076	0.028387	0.007025	0.014133	0.049672	0.000816	0.000458	0.021177	0.002172

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	16.2220	16.2220	2.6200e-003	3.2000e-004	16.3825
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	16.2220	16.2220	2.6200e-003	3.2000e-004	16.3825
NaturalGas Mitigated	5.8400e-003	0.0531	0.0446	3.2000e-004		4.0400e-003	4.0400e-003		4.0400e-003	4.0400e-003	0.0000	57.8065	57.8065	1.1100e-003	1.0600e-003	58.1500
NaturalGas Unmitigated	5.8400e-003	0.0531	0.0446	3.2000e-004		4.0400e-003	4.0400e-003		4.0400e-003	4.0400e-003	0.0000	57.8065	57.8065	1.1100e-003	1.0600e-003	58.1500

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	kBTU/yr	tons/yr										MT/yr				
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Convenience Market with Gas Pumps	32953.1	1.8000e-004	1.6200e-003	1.3600e-003	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	1.7585	1.7585	3.0000e-005	3.0000e-005
Fast Food Restaurant w/o Drive Thru	462132	2.4900e-003	0.0227	0.0190	1.4000e-004		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	24.6611	24.6611	4.7000e-004	4.5000e-004
Fast Food Restaurant with Drive Thru	588168	3.1700e-003	0.0288	0.0242	1.7000e-004		2.1900e-003	2.1900e-003		2.1900e-003	2.1900e-003	0.0000	31.3869	31.3869	6.0000e-004	5.8000e-004
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**5.8400e-003**	**0.0531**	**0.0446**	**3.2000e-004**		**4.0300e-003**	**4.0300e-003**		**4.0300e-003**	**4.0300e-003**	**0.0000**	**57.8065**	**57.8065**	**1.1000e-003**	**1.0600e-003**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O
Land Use	kBTU/yr	tons/yr										MT/yr				
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Convenience Market with Gas Pumps	32953.1	1.8000e-004	1.6200e-003	1.3600e-003	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	1.7585	1.7585	3.0000e-005	3.0000e-005
Fast Food Restaurant w/o Drive Thru	462132	2.4900e-003	0.0227	0.0190	1.4000e-004		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	24.6611	24.6611	4.7000e-004	4.5000e-004
Fast Food Restaurant with Drive Thru	588168	3.1700e-003	0.0288	0.0242	1.7000e-004		2.1900e-003	2.1900e-003		2.1900e-003	2.1900e-003	0.0000	31.3869	31.3869	6.0000e-004	5.8000e-004
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total		**5.8400e-003**	**0.0531**	**0.0446**	**3.2000e-004**		**4.0300e-003**	**4.0300e-003**		**4.0300e-003**	**4.0300e-003**	**0.0000**	**57.8065**	**57.8065**	**1.1000e-003**	**1.0600e-003**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Convenience Market with Gas Pumps	24598.3	2.2759	3.7000e-004	4.0000e-005	2.2984
Fast Food Restaurant w/o Drive Thru	62194	5.7544	9.3000e-004	1.1000e-004	5.8113
Fast Food Restaurant with Drive Thru	79156	7.3238	1.1800e-003	1.4000e-004	7.3962
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	9380	0.8679	1.4000e-004	2.0000e-005	0.8765
Total		**16.2220**	**2.6200e-003**	**3.1000e-004**	**16.3824**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Convenience Market with Gas Pumps	24598.3	2.2759	3.7000e-004	4.0000e-005	2.2984
Fast Food Restaurant w/o Drive Thru	62194	5.7544	9.3000e-004	1.1000e-004	5.8113
Fast Food Restaurant with Drive Thru	79156	7.3238	1.1800e-003	1.4000e-004	7.3962
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	9380	0.8679	1.4000e-004	2.0000e-005	0.8765
Total		**16.2220**	**2.6200e-003**	**3.1000e-004**	**16.3824**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0474	1.0000e-005	8.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.7300e-003	1.7300e-003	0.0000	0.0000	1.8400e-003
Unmitigated	0.0474	1.0000e-005	8.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.7300e-003	1.7300e-003	0.0000	0.0000	1.8400e-003

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	8.0100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0394					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	8.0000e-005	1.0000e-005	8.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.7300e-003	1.7300e-003	0.0000	0.0000	1.8400e-003
Total	**0.0474**	**1.0000e-005**	**8.9000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.7300e-003**	**1.7300e-003**	**0.0000**	**0.0000**	**1.8400e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	8.0100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0394					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	8.0000e-005	1.0000e-005	8.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.7300e-003	1.7300e-003	0.0000	0.0000	1.8400e-003
Total	**0.0474**	**1.0000e-005**	**8.9000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.7300e-003**	**1.7300e-003**	**0.0000**	**0.0000**	**1.8400e-003**

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	1.8152	0.0572	1.3700e-003	3.6521
Unmitigated	1.8152	0.0572	1.3700e-003	3.6521

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 0.953185	0.3087	5.0000e-005	1.0000e-005	0.3117
Convenience Market with Gas Pumps	0.230058 / 0.141003	0.2338	7.5200e-003	1.8000e-004	0.4756
Fast Food Restaurant w/o Drive Thru	0.667774 / 0.0426239	0.5600	0.0218	5.2000e-004	1.2605

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fast Food Restaurant with Drive Thru	0.849894 / 0.0542486	0.7127	0.0278	6.6000e-004	1.6043
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**1.8152**	**0.0572**	**1.3700e-003**	**3.6521**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 0.953185	0.3087	5.0000e-005	1.0000e-005	0.3117
Convenience Market with Gas Pumps	0.230058 / 0.141003	0.2338	7.5200e-003	1.8000e-004	0.4756
Fast Food Restaurant w/o Drive Thru	0.667774 / 0.0426239	0.5600	0.0218	5.2000e-004	1.2605
Fast Food Restaurant with Drive Thru	0.849894 / 0.0542486	0.7127	0.0278	6.6000e-004	1.6043
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**1.8152**	**0.0572**	**1.3700e-003**	**3.6521**

8.0 Waste Detail

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	11.7045	0.6917	0.0000	28.9973
Unmitigated	11.7045	0.6917	0.0000	28.9973

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.07	0.0142	8.4000e-004	0.0000	0.0352
Fast Food Restaurant w/o Drive Thru	25.34	5.1438	0.3040	0.0000	12.7435
Fast Food Restaurant with Drive Thru	32.25	6.5465	0.3869	0.0000	16.2186
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000

Total		**11.7045**	**0.6917**	**0.0000**	**28.9973**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.07	0.0142	8.4000e-004	0.0000	0.0352
Fast Food Restaurant w/o Drive Thru	25.34	5.1438	0.3040	0.0000	12.7435
Fast Food Restaurant with Drive Thru	32.25	6.5465	0.3869	0.0000	16.2186
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**11.7045**	**0.6917**	**0.0000**	**28.9973**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Franklin Hwy Retail Center, Merced County - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Attachment 3: Project Operation and Health Risks

Attachment 3: Project Operation and Health Risks

Franklin Road Retail Center Project - On and Off-Site Customer Traffic Volume Calculations for Modeling

Project Generation Rates

Land Use	Percent
Convenience Market with Gas Pumps	**78.5%**
Fast Food Restaurant with Drive Thru	**23.7%**
Coffee / Donut Shop	**21.3%**
Total	

Traffic Report Trips

Site Entrance	Total Average Daily Trips	Percent
Franklin Road Entrance	3,530	62.7%
Ashby Road Entrance	2,100	37.3%
Total On-Site (Project) Trips	**5,630**	

On-Site Modeled Road Loops Trips/Vehicles

	Daily Trips	Daily Vehicles	Percent
GDF Traffic Loop from Franklin Rd	2,773	1,386	49.3%
GDF Traffic Loop from Ashby Rd	1,650	825	29.3%
Fast Food w/o Drive Thru Traffic Loop (Franklin)	1,198	599	21.3%
Fast Food Drive Thru Traffic Loop (Ashby)	1,336	668	23.7%

Off-Site Modeled Road Loops Trips/Vehicles

	Modeled Segment	Daily Trips	% of Proj Trips	Speed (mph)
SR 99 - East of Franklin Rd	1	760	13.5%	60
SR 99 - West of Franklin Rd	2	760	13.5%	60
Franklin Road North - South of East Entrance - Northbound	3	760	13.5%	35
Franklin Road North - South of East Entrance - Southbound	4	760	13.5%	35
Franklin Road North - North of East Entrance to Ashby	5	1480	26.3%	35
Franklin Road North - North of Ashby Road	6	1190	21.1%	35
Ashby Road - East of Franklin North	7	570	10.1%	30
Ashby Road - between Franklin Roads North and South	8	710	12.6%	30
Franklin Road South	9	360	6.4%	30
Ashby Road - West of Franklin Road South	10	240	4.3%	35
Truck Route - SR 99 East of Franklin Rd	11	0.75	0.0%	60
Truck Route - SR 99 West of Franklin Rd	12	0.75	0.0%	60
Truck Route - Franklin Rd - Northbound	13	0.75	0.0%	35
Truck Route - Franklin Rd - Southbound	14	0.75	0.0%	35
Project Traffic		5,630		

Franklin Road Retail Center

2025 Fuel Delivery Truck Emissions - DPM

Road Segment	Segment ID	Road Segment length (ft)	Road Segment length (m)	Modeled Road Segment Width (ft)	Modeled Road Segment Width (m)	Plume Height[a] (ft)	Plume Height[a] (m)	Vertical Dispersion[a] (ft)	Vertical Dispersion[a] (m)	Release Height[a] (ft)	Release Height[a] (m)	HHDT that are HHDT	No. of Daily Trucks	Travel Speed (mph)	DPM EF[b] (g/veh-mi)	Truck Travel DPM Emissions Daily (g/day)	Truck Travel DPM Emissions Hourly (g/s)	Truck Travel DPM Emissions Annual (lbs/yr)
On-site Travel:																		
Segment E - Fuel Delivery Truck On-Site Truck Route	SEG_E	849.98046	259.1	12	3.66	22.3	6.8	10.4	3.16	11.2	3.4	1	0.75	5	0.011455	1.38E-03	1.59E-08	1.11E-03
Off-site:																		
Segment 11 - Truck Route - SR 99 East of Franklin Rd	SEG_11	1093	333.1	12	3.66	22.3	6.8	10.4	3.16	11.2	3.4	1	0.75	60	0.027330	4.23E-03	4.89E-08	3.40E-03
Segment 12 - Truck Route - SR 99 West of Franklin Rd	SEG_12	1617	492.8	12	3.66	22.3	6.8	10.4	3.16	11.2	3.4	1	0.75	60	0.027330	6.25E-03	7.24E-08	5.03E-03
Segment 13 - Truck Route - Franklin Rd - Northbound	SEG_13	440	134.2	12	3.66	22.3	6.8	10.4	3.16	11.2	3.4	1	0.75	35	0.008124	5.06E-04	5.86E-09	4.07E-04
Segment 14 - Truck Route - Franklin Rd - Southbound	SEG_14	505	153.9	12	3.66	22.3	6.8	10.4	3.16	11.2	3.4	1	0.75	35	0.008124	5.80E-04	6.72E-09	4.67E-04

[a] Source Parameters from EPA *Transportation Conformity Guidance for Hot-Spot Analyses in PM2.5 and PM10 Nonattainment and Maintenace Areas* (2015)

[b] Emissions Factors from CT_EMFAC2017

2025 Fuel Delivery HDDT Idle Emissions - DPM

On-Site	Stack Height[a] (ft)	Stack Height[a] (m)	Stack Diameter[a] (ft)	Stack Diameter[a] (m)	Stack Velocity[a] (m/s)	Temp[a] (K)	No. of Daily Trucks	Idle Emissions Factor[b] (g/veh-hr)	Idle Emissions Daily (g/day)	Idle Emissions Hourly (g/s)	Idle Emissions Annual (g/yr)	Idle Emissions Annual (lb/yr)
Fuel Delivery Trucks	12.6	3.84	0.33	0.1	51.71	366	0.75	0.057275	0.0106989	1.238E-07	3.90511	0.00861

[a] Source Parameters from SJVAPCD *Guidance for Air Dispersion Modelin* g

[b] Emissions Factor from CT_EMFAC2017

Fuel Delivery Truck Info

Annual Fuel Deliveries (gal)	=	2,400,000
Fuel Truck Capacity (gal)	=	8,800
Fuel Trucks per Year	=	273
Fuel Truck Trips per day	=	1.5
Fuel Trucks per day	=	0.75
Operation Days	=	365
Daily Operation Hours	=	24

Truck Idle DPM Emission Information

Emissions Factor @ 5 mph (g/mi)	=	0.011455
HHDT Idle Emissions Rate (g/hr)	=	0.057275
Idle Time per truck (min)	=	15

*Idle emission factor (g/hr) = EF @5 mph (g/mi) * 5 mph*

Franklin Road Retail Center

Project Traffic Vehicle Emissions - DPM

Road Segment	Segment ID	Segment length (ft)	Segment length (m)	Segment Width (ft)	Segment Width (m)	Plume Height[a] (ft)	Plume Height[a] (m)	Vertical Dispersion[a] (ft)	Vertical Dispersion[a] (m)	Release Height[a] (ft)	Release Height[a] (m)	Trip Distribution (%)	Trips per day	Speed (mph)	DPM Emissions Factors[b] Evaporative g/veh-hr	Exhaust g/veh-mi	Total g/veh-mi	Project DPM Emissions Daily (g/day)	Project DPM Emissions Hourly (g/s)	Project DPM Emissions Annual (lb/year)
On-Site																				
Segment A - GDF Traffic Loop from Franklin Rd	SEG_A	769	234.4	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	49.3%	2773	5	0	0	0.00213	0.00213	0.430146	4.98E-06	0.346133
Segment B - GDF Traffic Loop from Ashby Rd	SEG_B	1150	350.5	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	29.3%	1650	5	0	0	0.00213	0.00213	0.3825564	4.428E-06	0.3078383
Segment C - Coffee/Donut Shop Traffic Loop (Franklin Rd)	SEG_C	986	300.7	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	21.3%	1198	5	0	0	0.00213	0.00213	0.238468	2.76E-06	0.1918922
Segment D - Fast Food Drive Thru Traffic Loop (Ashby)	SEG_D	707	215.4	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	23.7%	1336	5	0	0	0.00213	0.00213	0.1904765	2.205E-06	0.153274
Off-site																				
Segment 1 - SR99 - East of Franklin	SEG_1	1093	333.1	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	60	0	0	0.000565	0.000565	0.0444403	5.14E-07	0.0357605
Segment 2 - SR99 West of Franklin	SEG_2	1617	492.8	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	60	0	0	0.000565	0.000565	0.0657499	7.61E-07	0.0529081
Segment 3 - Franklin North - South of East Drive - Northbound	SEG_3	440	134.2	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	35	0	0	0.000597	0.000597	0.018913	2.189E-07	0.0152192
Segment 4 - Franklin North - South of East Drive - Southbound	SEG_4	505	153.9	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	35	0	0	0.000597	0.000597	0.021690	2.51E-07	0.0174536
Segment 5 - Franklin North North of East Drive to Ashby	SEG_5	274	83.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	26.3%	1480	35	0	0	0.000597	0.000597	0.04590	5.312E-07	0.0369316
Segment 6 - Franklin North - North of Ashby	SEG_6	1219	371.4	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	21.1%	1190	35	0	0	0.000597	0.000597	0.16397	1.898E-06	0.1319418
Segment 7 - Ashby - East of Franklin North	SEG_7	1783	543.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	10.1%	570	30	0	0	0.00067	0.00067	0.12899	1.493E-06	0.1037984
Segment 8 - Ashby - Between Franklin Rds North & South	SEG_8	298	90.8	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	12.6%	710	30	0	0	0.00067	0.00067	0.02684	3.106E-07	0.0215976
Segment 9 - Franklin South - South of Ashby	SEG_9	2302	701.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	6.4%	360	30	0	0	0.00067	0.00067	0.10516	1.217E-06	0.0846192
Segment 10 - Ashby West of Franklin South	SEG_10	1342	409.0	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	4.3%	240	35	0	0	0.000597	0.000597	0.03641	4.215E-07	0.029302

[a] Source Parameters from EPA *Transportation Conformity Guidance for Hot-Spot Analyses in PM2.5 and PM10 Nonattainment and Maintenace Areas* (2015)

[b] Emissions Factors from CT_EMFAC2017

Franklin Road Retail Center

Project Traffic Vehicle Emissions - Benzene

Road Segment	Segment ID	Segment length (ft)	Segment length (m)	Segment Width (ft)	Segment Width (m)	Plume Height[a] (ft)	Plume Height[a] (m)	Vertical Dispersion[a] (ft)	Vertical Dispersion[a] (m)	Release Height[a] (ft)	Release Height[a] (m)	Trip Distribution (%)	Trips per day	Speed (mph)	Benzene Emissions Factors[b] Evaporative g/veh-hr	Exhaust g/veh-mi	Total g/veh-mi	Project Benzene Emissions Daily (g/day)	Project Benzene Emissions Hourly (g/s)	Project Benzene Emissions Annual (lb/year)
On-Site																				
Segment A - GDF Traffic Loop from Franklin Rd	SEG_A	769	234.4	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	49.3%	2773	5	0.017353	0.0034706	0.005491	0.0089616	1.8097635	2.09E-05	1.4562938
Segment B - GDF Traffic Loop from Ashby Rd	SEG_B	1150	350.5	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	29.3%	1650	5	0.017353	0.0034706	0.005491	0.0089616	1.6095387	1.863E-05	1.2951755
Segment C - Coffee/Donut Shop Traffic Loop (Franklin Rd)	SEG_C	986	300.7	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	21.3%	1198	5	0.017353	0.0034706	0.005491	0.0089616	1.0033122	1.16E-05	0.8073527
Segment D - Fast Food Drive Thru Traffic Loop (Ashby)	SEG_D	707	215.4	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	23.7%	1336	5	0.017353	0.0034706	0.005491	0.0089616	0.8013963	9.275E-06	0.6448735
Off-site																				
Segment 1 - SR99 - East of Franklin	SEG_1	1093	333.1	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	60	0.017353	0.0002892	0.000746	0.0010352	0.0814254	9.42E-07	0.065522
Segment 2 - SR99 West of Franklin	SEG_2	1617	492.8	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	60	0.017353	0.0002892	0.000746	0.0010352	0.1204698	1.394E-06	0.0969405
Segment 3 - Franklin North - South of East Drive - Northbound	SEG_3	440	134.2	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	35	0.017353	0.0004958	0.000854	0.0013498	0.042762	4.949E-07	0.0344103
Segment 4 - Franklin North - South of East Drive - Southbound	SEG_4	505	153.9	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	35	0.017353	0.0004958	0.000854	0.0013498	0.049040	5.676E-07	0.039462
Segment 5 - Franklin North North of East Drive to Ashby	SEG_5	274	83.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	26.3%	1480	35	0.017353	0.0004958	0.000854	0.0013498	0.10377	1.20E-06	0.0835014
Segment 6 - Franklin North - North of Ashby	SEG_6	1219	371.4	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	21.1%	1190	35	0.017353	0.0004958	0.000854	0.0013498	0.37072	4.291E-06	0.2983166
Segment 7 - Ashby - East of Franklin North	SEG_7	1783	543.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	10.1%	570	30	0.017353	0.0005784	0.001019	0.0015974	0.30755	3.56E-06	0.2474792
Segment 8 - Ashby - Between Franklin Rds North & South	SEG_8	298	90.8	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	12.6%	710	30	0.017353	0.0005784	0.001019	0.0015974	0.06399	7.406E-07	0.0514936
Segment 9 - Franklin South - South of Ashby	SEG_9	2302	701.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	6.4%	360	30	0.017353	0.0005784	0.001019	0.0015974	0.25072	2.90E-06	0.2017516
Segment 10 - Ashby West of Franklin South	SEG_10	1342	409.0	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	4.3%	240	35	0.017353	0.0004958	0.000854	0.0013498	0.08233	9.529E-07	0.0662511

[a] Source Parameters from EPA *Transportation Conformity Guidance for Hot-Spot Analyses in PM2.5 and PM10 Nonattainment and Maintenace Areas* (2015)

[b] Emissions Factors from CT_EMFAC2017

Franklin Road Retail Center

Project Traffic Vehicle Emissions - Ethylbenzene

Road Segment	Segment ID	Segment length (ft)	Segment length (m)	Segment Width (ft)	Segment Width (m)	Plume Height[a] (ft)	Plume Height[a] (m)	Vertical Dispersion[a] (ft)	Vertical Dispersion[a] (m)	Release Height[a] (ft)	Release Height[a] (m)	Trip Distribution (%)	Trips per day	Speed (mph)	Ethylbenzene Emissions Factors[b] Evaporative g/veh-hr	Exhaust g/veh-mi	Total g/veh-mi	Project Ethylbenzene Emissions Daily (g/day)	Hourly (g/s)	Annual (lb/year)
On-Site																				
Segment A - GDF Traffic Loop from Franklin Rd	SEG_A	769	234.4	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	49.3%	2773	5	0.02846	0.00569	0.002268	0.0079596	1.6074131	1.86E-05	1.293465
Segment B - GDF Traffic Loop from Ashby Rd	SEG_B	1150	350.5	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	29.3%	1650	5	0.02846	0.00569	0.002268	0.0079596	1.4295756	1.655E-05	1.1503614
Segment C - Coffee/Donut Shop Traffic Loop (Franklin Rd)	SEG_C	986	300.7	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	21.3%	1198	5	0.02846	0.00569	0.002268	0.0079596	0.8911315	1.03E-05	0.7170823
Segment D - Fast Food Drive Thru Traffic Loop (Ashby)	SEG_D	707	215.4	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	23.7%	1336	5	0.02846	0.00569	0.002268	0.0079596	0.7117919	8.238E-06	0.5727699
Off-site																				
Segment 1 - SR99 - East of Franklin	SEG_1	1093	333.1	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	60	0.02846	0.00047	0.000315	0.0007893	0.0620827	7.19E-07	0.0499572
Segment 2 - SR99 West of Franklin	SEG_2	1617	492.8	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	60	0.02846	0.00047	0.000315	0.0007893	0.0918521	1.063E-06	0.0739122
Segment 3 - Franklin North - South of East Drive - Northbound	SEG_3	440	134.2	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	35	0.02846	0.00081	0.000359	0.0011721	0.037132	4.298E-07	0.0298798
Segment 4 - Franklin North - South of East Drive - Southbound	SEG_4	505	153.9	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	35	0.02846	0.00081	0.000359	0.0011721	0.042584	4.929E-07	0.0342665
Segment 5 - Franklin North North of East Drive to Ashby	SEG_5	274	83.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	26.3%	1480	35	0.02846	0.00081	0.000359	0.0011721	0.09011	1.043E-06	0.0725076
Segment 6 - Franklin North - North of Ashby	SEG_6	1219	371.4	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	21.1%	1190	35	0.02846	0.00081	0.000359	0.0011721	0.32191	3.726E-06	0.2590403
Segment 7 - Ashby - East of Franklin North	SEG_7	1783	543.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	10.1%	570	30	0.02846	0.00095	0.000429	0.0013776	0.26522	3.07E-06	0.213422
Segment 8 - Ashby - Between Franklin Rds North & South	SEG_8	298	90.8	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	12.6%	710	30	0.02846	0.00095	0.000429	0.0013776	0.05519	6.387E-07	0.0444072
Segment 9 - Franklin South - South of Ashby	SEG_9	2302	701.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	6.4%	360	30	0.02846	0.00095	0.000429	0.0013776	0.21622	2.503E-06	0.1739873
Segment 10 - Ashby West of Franklin South	SEG_10	1342	409.0	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	4.3%	240	35	0.02846	0.00081	0.000359	0.0011721	0.07149	8.275E-07	0.0575285

[a] Source Parameters from EPA *Transportation Conformity Guidance for Hot-Spot Analyses in PM2.5 and PM10 Nonattainment and Maintenace Areas* (2015)

[b] Emissions Factors from CT_EMFAC2017

Franklin Road Retail Center

Project Traffic Vehicle Emissions - Formaldehyde

Road Segment	Segment ID	Segment length (ft)	Segment length (m)	Segment Width (ft)	Segment Width (m)	Plume Height[a] (ft)	Plume Height[a] (m)	Vertical Dispersion[a] (ft)	Vertical Dispersion[a] (m)	Release Height[a] (ft)	Release Height[a] (m)	Trip Distribution (%)	Trips per day	Speed (mph)	Formaldehyde Emissions Factors[b] Evaporative g/veh-hr	Exhaust g/veh-mi	Total g/veh-mi	Project Formaldehyde Emissions Daily (g/day)	Hourly (g/s)	Annual (lb/year)
On-Site																				
Segment A - GDF Traffic Loop from Franklin Rd	SEG_A	769	234.4	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	49.3%	2773	5	0	0	0.007039	0.007039	1.4215012	1.65E-05	1.1438641
Segment B - GDF Traffic Loop from Ashby Rd	SEG_B	1150	350.5	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	29.3%	1650	5	0	0	0.007039	0.007039	1.2642322	1.463E-05	1.0173117
Segment C - Coffee/Donut Shop Traffic Loop (Franklin Rd)	SEG_C	986	300.7	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	21.3%	1198	5	0	0	0.007039	0.007039	0.7880641	9.12E-06	0.6341452
Segment D - Fast Food Drive Thru Traffic Loop (Ashby)	SEG_D	707	215.4	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	23.7%	1336	5	0	0	0.007039	0.007039	0.6294667	7.285E-06	0.5065239
Off-site																				
Segment 1 - SR99 - East of Franklin	SEG_1	1093	333.1	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	60	0	0	0.000816	0.000816	0.0641828	7.43E-07	0.0516471
Segment 2 - SR99 West of Franklin	SEG_2	1617	492.8	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	60	0	0	0.000816	0.000816	0.0949592	1.099E-06	0.0764125
Segment 3 - Franklin North - South of East Drive - Northbound	SEG_3	440	134.2	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	35	0	0	0.000962	0.000962	0.030477	3.527E-07	0.0245242
Segment 4 - Franklin North - South of East Drive - Southbound	SEG_4	505	153.9	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	35	0	0	0.000962	0.000962	0.034951	4.045E-07	0.0281245
Segment 5 - Franklin North North of East Drive to Ashby	SEG_5	274	83.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	26.3%	1480	35	0	0	0.000962	0.000962	0.07396	8.56E-07	0.0595113
Segment 6 - Franklin North - North of Ashby	SEG_6	1219	371.4	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	21.1%	1190	35	0	0	0.000962	0.000962	0.26421	3.058E-06	0.2126097
Segment 7 - Ashby - East of Franklin North	SEG_7	1783	543.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	10.1%	570	30	0	0	0.001144	0.001144	0.22025	2.549E-06	0.1772319
Segment 8 - Ashby - Between Franklin Rds North & South	SEG_8	298	90.8	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	12.6%	710	30	0	0	0.001144	0.001144	0.04583	5.304E-07	0.0368771
Segment 9 - Franklin South - South of Ashby	SEG_9	2302	701.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	6.4%	360	30	0	0	0.001144	0.001144	0.17955	2.078E-06	0.1444842
Segment 10 - Ashby West of Franklin South	SEG_10	1342	409.0	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	4.3%	240	35	0	0	0.000962	0.000962	0.05868	6.791E-07	0.047217

[a] Source Parameters from EPA *Transportation Conformity Guidance for Hot-Spot Analyses in PM2.5 and PM10 Nonattainment and Maintenace Areas* (2015)

[b] Emissions Factors from CT_EMFAC2017

Franklin Road Retail Center

Project Traffic Vehicle Emissions - Naphthalene

Road Segment	Segment ID	Segment length (ft)	Segment length (m)	Segment Width (ft)	Segment Width (m)	Plume Height[a] (ft)	Plume Height[a] (m)	Vertical Dispersion[a] (ft)	Vertical Dispersion[a] (m)	Release Height[a] (ft)	Release Height[a] (m)	Trip Distribution (%)	Trips per day	Speed (mph)	Naphthalene Emissions Factors[b] Evaporative g/veh-hr	Exhaust g/veh-mi	Total g/veh-mi	Project Naphthalene Emissions Daily (g/day)	Hourly (g/s)	Annual (lb/year)
On-Site																				
Segment A - GDF Traffic Loop from Franklin Rd	SEG_A	769	234.4	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	49.3%	2773	5	0.00243	0.00049	0.000154	0.0006398	0.1292054	1.50E-06	0.1039699
Segment B - GDF Traffic Loop from Ashby Rd	SEG_B	1150	350.5	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	29.3%	1650	5	0.00243	0.00049	0.000154	0.0006398	0.1149106	1.33E-06	0.0924671
Segment C - Coffee/Donut Shop Traffic Loop (Franklin Rd)	SEG_C	986	300.7	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	21.3%	1198	5	0.00243	0.00049	0.000154	0.0006398	0.07163	8.29E-07	0.0576397
Segment D - Fast Food Drive Thru Traffic Loop (Ashby)	SEG_D	707	215.4	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	23.7%	1336	5	0.00243	0.00049	0.000154	0.0006398	0.0572145	6.622E-07	0.0460398
Off-site																				
Segment 1 - SR99 - East of Franklin	SEG_1	1093	333.1	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	60	0.00243	4.05E-05	0.000021	6.148E-05	0.004836	5.60E-08	0.0038915
Segment 2 - SR99 West of Franklin	SEG_2	1617	492.8	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	60	0.00243	4.05E-05	0.000021	6.148E-05	0.0071549	8.281E-08	0.0057575
Segment 3 - Franklin North - South of East Drive - Northbound	SEG_3	440	134.2	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	35	0.00243	6.94E-05	0.000025	0.0000944	0.002991	3.461E-08	0.0024065
Segment 4 - Franklin North - South of East Drive - Southbound	SEG_4	505	153.9	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	35	0.00243	6.94E-05	0.000025	0.0000944	0.003430	3.97E-08	0.0027598
Segment 5 - Franklin North North of East Drive to Ashby	SEG_5	274	83.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	26.3%	1480	35	0.00243	6.94E-05	0.000025	0.0000944	0.00726	8.40E-08	0.0058398
Segment 6 - Franklin North - North of Ashby	SEG_6	1219	371.4	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	21.1%	1190	35	0.00243	6.94E-05	0.000025	0.0000944	0.02593	3.00E-07	0.0208632
Segment 7 - Ashby - East of Franklin North	SEG_7	1783	543.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	10.1%	570	30	0.00243	8.10E-05	0.000029	0.00011	0.02117	2.45E-07	0.0170364
Segment 8 - Ashby - Between Franklin Rds North & South	SEG_8	298	90.8	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	12.6%	710	30	0.00243	8.10E-05	0.000029	0.00011	0.00441	5.10E-08	0.0035448
Segment 9 - Franklin South - South of Ashby	SEG_9	2302	701.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	6.4%	360	30	0.00243	8.10E-05	0.000029	0.00011	0.01726	2.00E-07	0.0138885
Segment 10 - Ashby West of Franklin South	SEG_10	1342	409.0	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	4.3%	240	35	0.00243	6.94E-05	0.000025	0.0000944	0.00576	6.664E-08	0.0046334

[a] Source Parameters from EPA *Transportation Conformity Guidance for Hot-Spot Analyses in PM2.5 and PM10 Nonattainment and Maintenace Areas* (2015)

[b] Emissions Factors from CT_EMFAC2017

Franklin Road Retail Center

Project Traffic Vehicle Emissions - 1,3 Butadiene

Road Segment	Segment ID	Segment length (ft)	Segment length (m)	Segment Width (ft)	Segment Width (m)	Plume Height[a] (ft)	Plume Height[a] (m)	Vertical Dispersion[a] (ft)	Vertical Dispersion[a] (m)	Release Height[a] (ft)	Release Height[a] (m)	Trip Distribution (%)	Trips per day	Speed (mph)	1,3-Butadiene Emissions Factors[b] Evaporative g/veh-hr	Evaporative g/veh-mi	Exhaust g/veh-mi	Total g/veh-mi	Project 1,3 Butadiene Emissions Daily (g/day)	Hourly (g/s)	Annual (lb/year)
On-Site																					
Segment A - GDF Traffic Loop from Franklin Rd	SEG_A	769	234.4	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	49.3%	2773	5	0	0	0.001197	0.001197	0.2417299	2.80E-06	0.194517
Segment B - GDF Traffic Loop from Ashby Rd	SEG_B	1150	350.5	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	29.3%	1650	5	0	0	0.001197	0.001197	0.2149859	2.488E-06	0.1729965
Segment C - Coffee/Donut Shop Traffic Loop (Franklin Rd)	SEG_C	986	300.7	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	21.3%	1198	5	0	0	0.001197	0.001197	0.1340123	1.55E-06	0.107838
Segment D - Fast Food Drive Thru Traffic Loop (Ashby)	SEG_D	707	215.4	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	23.7%	1336	5	0	0	0.001197	0.001197	0.1070424	1.239E-06	0.0861357
Off-site																					
Segment 1 - SR99 - East of Franklin	SEG_1	1093	333.1	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	60	0	0	0.000166	0.000166	0.0130568	1.51E-07	0.0105066
Segment 2 - SR99 West of Franklin	SEG_2	1617	492.8	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	60	0	0	0.000166	0.000166	0.0193177	2.236E-07	0.0155447
Segment 3 - Franklin North - South of East Drive - Northbound	SEG_3	440	134.2	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	35	0	0	0.000189	0.000189	0.005988	6.93E-08	0.0048182
Segment 4 - Franklin North - South of East Drive - Southbound	SEG_4	505	153.9	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	35	0	0	0.000189	0.000189	0.006867	7.948E-08	0.0055255
Segment 5 - Franklin North North of East Drive to Ashby	SEG_5	274	83.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	26.3%	1480	35	0	0	0.000189	0.000189	0.01453	1.682E-07	0.0116919
Segment 6 - Franklin North - North of Ashby	SEG_6	1219	371.4	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	21.1%	1190	35	0	0	0.000189	0.000189	0.05191	6.008E-07	0.0417705
Segment 7 - Ashby - East of Franklin North	SEG_7	1783	543.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	10.1%	570	30	0	0	0.000226	0.000226	0.04351	5.036E-07	0.0350126
Segment 8 - Ashby - Between Franklin Rds North & South	SEG_8	298	90.8	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	12.6%	710	30	0	0	0.000226	0.000226	0.00905	1.048E-07	0.0072852
Segment 9 - Franklin South - South of Ashby	SEG_9	2302	701.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	6.4%	360	30	0	0	0.000226	0.000226	0.03547	4.105E-07	0.0285432
Segment 10 - Ashby West of Franklin South	SEG_10	1342	409.0	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	4.3%	240	35	0	0	0.000189	0.000189	0.01153	1.334E-07	0.0092765

[a] Source Parameters from EPA *Transportation Conformity Guidance for Hot-Spot Analyses in PM2.5 and PM10 Nonattainment and Maintenace Areas* (2015)

[b] Emissions Factors from CT_EMFAC2017

Franklin Road Retail Center

Project Traffic Vehicle Emissions - Acetaldehyde

Road Segment	Segment ID	Segment length (ft)	Segment length (m)	Segment Width (ft)	Segment Width (m)	Plume Height[a] (ft)	Plume Height[a] (m)	Vertical Dispersion[a] (ft)	Vertical Dispersion[a] (m)	Release Height[a] (ft)	Release Height[a] (m)	Trip Distribution (%)	Trips per day	Speed (mph)	Acetaldehyde Emissions Factors[b] Evaporative g/veh-hr	Evaporative g/veh-mi	Exhaust g/veh-mi	Total g/veh-mi	Project Acetaldehyde Emissions Daily (g/day)	Hourly (g/s)	Annual (lb/year)
On-Site																					
Segment A - GDF Traffic Loop from Franklin Rd	SEG_A	769	234.4	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	49.3%	2773	5	0	0	0.002576	0.002576	0.5202141	6.02E-06	0.4186097
Segment B - GDF Traffic Loop from Ashby Rd	SEG_B	1150	350.5	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	29.3%	1650	5	0	0	0.002576	0.002576	0.4626598	5.355E-06	0.3722965
Segment C - Coffee/Donut Shop Traffic Loop (Franklin Rd)	SEG_C	986	300.7	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	21.3%	1198	5	0	0	0.002576	0.002576	0.2884008	3.34E-06	0.2320725
Segment D - Fast Food Drive Thru Traffic Loop (Ashby)	SEG_D	707	215.4	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	23.7%	1336	5	0	0	0.002576	0.002576	0.2303603	2.666E-06	0.185368
Off-site																					
Segment 1 - SR99 - East of Franklin	SEG_1	1093	333.1	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	60	0	0	0.000277	0.000277	0.0217875	2.52E-07	0.0175322
Segment 2 - SR99 West of Franklin	SEG_2	1617	492.8	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	60	0	0	0.000277	0.000277	0.0322349	3.731E-07	0.025939
Segment 3 - Franklin North - South of East Drive - Northbound	SEG_3	440	134.2	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	35	0	0	0.000331	0.000331	0.010486	1.214E-07	0.0084381
Segment 4 - Franklin North - South of East Drive - Southbound	SEG_4	505	153.9	12	3.66	8.5	2.6	3.97	1.21	4.27	1.3	13.5%	760	35	0	0	0.000331	0.000331	0.012026	1.392E-07	0.0096769
Segment 5 - Franklin North North of East Drive to Ashby	SEG_5	274	83.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	26.3%	1480	35	0	0	0.000331	0.000331	0.02545	2.945E-07	0.0204763
Segment 6 - Franklin North - North of Ashby	SEG_6	1219	371.4	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	21.1%	1190	35	0	0	0.000331	0.000331	0.09091	1.052E-06	0.0731536
Segment 7 - Ashby - East of Franklin North	SEG_7	1783	543.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	10.1%	570	30	0	0	0.000393	0.000393	0.07566	8.757E-07	0.0608847
Segment 8 - Ashby - Between Franklin Rds North & South	SEG_8	298	90.8	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	12.6%	710	30	0	0	0.000393	0.000393	0.01574	1.822E-07	0.0126684
Segment 9 - Franklin South - South of Ashby	SEG_9	2302	701.6	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	6.4%	360	30	0	0	0.000393	0.000393	0.06168	7.139E-07	0.0496349
Segment 10 - Ashby West of Franklin South	SEG_10	1342	409.0	24	7.32	8.5	2.6	3.97	1.21	4.27	1.3	4.3%	240	35	0	0	0.000331	0.000331	0.02019	2.337E-07	0.0162462

[a] Source Parameters from EPA *Transportation Conformity Guidance for Hot-Spot Analyses in PM2.5 and PM10 Nonattainment and Maintenace Areas* (2015)

[b] Emissions Factors from CT_EMFAC2017

File Name: Merced (SJV) - 2025 - Annual-No HDTs.EF
CT-EMFAC2017 Version: 1.0.2.27401
Run Date: 6/7/2022 13:13
Area: Merced (SJV)
Analysis Year: 2025
Season: Annual

==========

Vehicle Category	VMT Fraction Across Category	Diesel VMT Within Cat	Gas VMT Fraction Within Category
Truck 1	0.034	0.611	0.389
Truck 2	0	0.983	0.011
Non-Truck	0.966	0.015	0.965

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Road Type: Local Rural
Silt Loading Factor: CARB 1.6 g/m2
Precipitation Correction: CARB P = 51 days N = 365 days

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Fleet Average Running Exhaust Emission Factors (grams/veh-mile)

Pollutant Name	<= 5 mph	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph
PM2.5	0.010215	0.006719	0.004616	0.00333	0.002537	0.002039	0.001722	0.001528	0.001422	0.001389	0.001422	0.001525	0.001708	0.001837	0.001837
PM10	0.011021	0.00724	0.004969	0.003582	0.002727	0.00219	0.001848	0.001639	0.001525	0.001489	0.001525	0.001634	0.001831	0.00197	0.00197
NOx	0.19583	0.172744	0.150611	0.136999	0.129391	0.124469	0.121482	0.120148	0.120298	0.121841	0.124754	0.129044	0.134759	0.13781	0.13781
CO	1.675861	1.44496	1.252528	1.107059	0.999438	0.912845	0.841212	0.781925	0.733497	0.695329	0.667729	0.652269	0.652097	0.659373	0.659421
HC	0.206549	0.135213	0.091109	0.06455	0.048887	0.039097	0.032862	0.029001	0.026857	0.026095	0.026607	0.028492	0.032054	0.034618	0.034621
TOG	0.228591	0.150046	0.100607	0.070857	0.053589	0.042847	0.036005	0.031768	0.029415	0.028578	0.029138	0.031209	0.03512	0.037935	0.03794
ROG	0.17203	0.112966	0.075293	0.052635	0.039638	0.031593	0.026486	0.023343	0.021622	0.021048	0.021535	0.023174	0.02622	0.028415	0.02842
1,3-Butadiene	0.001197	0.000778	0.000527	0.000375	0.000284	0.000226	0.000189	0.000167	0.000155	0.000151	0.000155	0.000166	0.000188	0.000203	0.000203
Acetaldehyde	0.002576	0.001811	0.001092	0.000665	0.000489	0.000393	0.000331	0.000293	0.000271	0.000263	0.000267	0.000277	0.000295	0.000308	0.000309
Acrolein	0.000266	0.000172	0.000117	0.000084	0.000064	0.000051	0.000042	0.000037	0.000035	0.000034	0.000035	0.000037	0.000042	0.000046	0.000046
Benzene	0.005491	0.00359	0.002408	0.001697	0.001279	0.001019	0.000854	0.000753	0.000698	0.00068	0.000695	0.000746	0.000838	0.000905	0.000905
Diesel PM	0.00213	0.001624	0.001229	0.000955	0.000781	0.00067	0.000597	0.000552	0.000531	0.00053	0.000549	0.000565	0.000581	0.000584	0.000584
Ethylbenzene	0.002268	0.001473	0.000998	0.000712	0.000538	0.000429	0.000359	0.000317	0.000293	0.000286	0.000293	0.000315	0.000355	0.000385	0.000385
Formaldehyde	0.007039	0.004842	0.003015	0.001925	0.001428	0.001144	0.000962	0.000849	0.000786	0.000763	0.000778	0.000816	0.000887	0.000937	0.000938
Naphthalene	0.000154	0.000102	0.000068	0.000048	0.000036	0.000029	0.000025	0.000022	0.00002	0.00002	0.00002	0.000021	0.000024	0.000025	0.000025
POM	0.000214	0.000142	0.000093	0.000064	0.000048	0.000038	0.000032	0.000028	0.000026	0.000025	0.000026	0.000027	0.00003	0.000032	0.000032
DEOG	0.022908	0.016767	0.009478	0.005165	0.003708	0.002992	0.002529	0.002234	0.00206	0.001985	0.002002	0.002008	0.002019	0.002026	0.00203
CO2	678.861191	552.7226	448.5165	373.2486	319.5883	283.815	263.7157	255.0904	255.4096	262.8128	273.5094	284.3386	293.1361	295.77	295.77
N2O	0.016691	0.014345	0.011725	0.010325	0.009305	0.008553	0.008135	0.00781	0.007597	0.007606	0.007753	0.007942	0.008252	0.008442	0.008442
CH4	0.029326	0.020411	0.014803	0.011257	0.009	0.007513	0.006524	0.005881	0.005496	0.005324	0.005348	0.005578	0.006053	0.006383	0.006383
BC	0.002559	0.001679	0.001155	0.000835	0.000637	0.000511	0.000431	0.000382	0.000355	0.000345	0.000352	0.000371	0.000405	0.000429	0.000429

Fleet Average Fuel Consumption (gallons/veh-mile)

Fuel Type	<= 5 mph	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph
Gasoline	0.077374	0.062821	0.05138	0.042751	0.036498	0.03239	0.030035	0.029086	0.029168	0.029994	0.031237	0.032475	0.033427	0.033721	0.033721
Diesel	0.004031	0.00343	0.002453	0.002076	0.001825	0.001639	0.001581	0.001512	0.001461	0.001498	0.001552	0.001584	0.001635	0.001657	0.001657

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Fleet Average Running Loss Emission Factors (grams/veh-hour)

Pollutant Name	Emission Factor
HC	1.623052
TOG	1.735252
ROG	1.735252
1,3-Butadiene	0
Benzene	0.017353
Ethylbenzene	0.028458
Naphthalene	0.002429
CH4	0.248622
HFC	0.016896

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Fleet Average Tire Wear Factors (grams/veh-mile)

Pollutant Name	Emission Factor
PM2.5	0.002021
PM10	0.008086

==========

Fleet Average Brake Wear Factors (grams/veh-mile)

Pollutant Name	Emission Factor
PM2.5	0.01708
PM10	0.039852

==========

Fleet Average Road Dust Factors (grams/veh-mile)

Pollutant Name	Emission Factor
PM2.5	0.471876
PM10	3.145838

==========END==========

File Name:	Merced (SJV) - 2025 - Annual-HD Trucks Only.EF
CT-EMFAC2017 Version:	1.0.2.27401
Run Date:	6/6/2022 14:30
Area:	Merced (SJV)
Analysis Year:	2025
Season:	Annual

==========

Vehicle Category	VMT Fraction Across Category	Diesel VMT Within Cat	Gas VMT Fraction Within Category
Truck 1	0	0.611	0.389
Truck 2	1	0.983	0.011
Non-Truck	0	0.015	0.965

==========

Road Type:	Local Rural	
Silt Loading Factor:	CARB	1.6 g/m2
Precipitation Correction:	CARB	P = 51 days, N = 365 days

==========

Fleet Average Running Exhaust Emission Factors (grams/veh-mile)

Pollutant Name	<= 5 mph	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph
PM2.5	0.011147	0.009751	0.007651	0.00642	0.006078	0.006561	0.007851	0.009948	0.012852	0.016563	0.021081	0.026391	0.032485	0.032486	0.032486
PM10	0.011654	0.010194	0.007998	0.006711	0.006354	0.006858	0.008207	0.010399	0.013434	0.017312	0.022034	0.027584	0.033955	0.033955	0.033955
NOx	12.811652	9.718964	6.859488	5.45393	4.264629	3.197724	2.34956	1.720117	1.309395	1.117403	1.14416	1.38912	1.851988	1.852089	1.852089
CO	2.027684	1.258581	0.694189	0.470063	0.362512	0.281238	0.215342	0.164711	0.12927	0.108979	0.103828	0.1139	0.139208	0.174754	0.223101
HC	0.106371	0.068239	0.038639	0.025965	0.020202	0.016253	0.013328	0.011376	0.010365	0.010272	0.011086	0.012819	0.015445	0.018482	0.022191
TOG	0.149324	0.095468	0.053808	0.036147	0.028169	0.022692	0.018628	0.015922	0.014536	0.01445	0.015649	0.018142	0.021897	0.026254	0.031602
ROG	0.125306	0.079399	0.044415	0.029868	0.023344	0.018856	0.015524	0.01332	0.012229	0.012242	0.013355	0.015559	0.018839	0.022654	0.027351
1,3-Butadiene	0.000284	0.00018	0.000102	0.000069	0.000054	0.000043	0.000036	0.000031	0.000028	0.000028	0.000031	0.000035	0.000043	0.000051	0.000061
Acetaldehyde	0.010051	0.006362	0.003539	0.002379	0.001864	0.001508	0.001242	0.001066	0.000979	0.000982	0.001074	0.001254	0.001521	0.001833	0.00221
Acrolein	0.000006	0.000004	0.000003	0.000002	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Benzene	0.002843	0.0018	0.00101	0.00068	0.000532	0.00043	0.000354	0.000304	0.000279	0.00028	0.000305	0.000355	0.00043	0.000515	0.000617
Diesel PM	0.011455	0.010042	0.007888	0.006626	0.00628	0.006784	0.008124	0.010298	0.013307	0.017151	0.021831	0.02733	0.033642	0.033642	0.033642
Ethylbenzene	0.000471	0.000298	0.000169	0.000115	0.000089	0.000072	0.000059	0.000051	0.000047	0.000047	0.000051	0.000059	0.000071	0.000084	0.0001
Formaldehyde	0.020161	0.012762	0.007103	0.004776	0.003741	0.003026	0.002492	0.002139	0.001965	0.001971	0.002155	0.002516	0.003051	0.003676	0.00443
Naphthalene	0.00013	0.000083	0.000047	0.000031	0.000024	0.00002	0.000016	0.000014	0.000013	0.000013	0.000014	0.000016	0.000019	0.000023	0.000027
POM	0.000167	0.000108	0.000062	0.000042	0.000034	0.000028	0.000025	0.000023	0.000024	0.000026	0.00003	0.000036	0.000044	0.000049	0.000055
DEOG	0.136567	0.086443	0.048076	0.032318	0.025321	0.020484	0.016871	0.014478	0.013301	0.01334	0.01459	0.017041	0.020671	0.024919	0.030047
CO2	3066.891357	2536.286	1997.377	1704.894	1487.718	1304.378	1163.854	1065.642	1009.246	994.1845	1022.567	1091.639	1201.195	1201.351	1201.351
N2O	0.481406	0.398234	0.3135	0.268298	0.234272	0.205461	0.183315	0.167783	0.158809	0.156347	0.160758	0.171631	0.188958	0.188958	0.188958
CH4	0.011761	0.008319	0.005027	0.003344	0.002545	0.002001	0.001597	0.001309	0.001122	0.001024	0.001007	0.001088	0.00125	0.001434	0.001652
BC	0.001684	0.001471	0.001155	0.000969	0.000918	0.000991	0.001185	0.001502	0.00194	0.0025	0.003182	0.003983	0.004904	0.004903	0.004903

Fleet Average Fuel Consumption (gallons/veh-mile)

Fuel Type	<= 5 mph	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph
Gasoline	0.004581	0.003719	0.003041	0.002528	0.002161	0.001918	0.001778	0.001721	0.001727	0.001777	0.00185	0.001925	0.001984	0.001984	0.001984
Diesel	0.297599	0.246162	0.193758	0.165814	0.144774	0.126955	0.113258	0.103652	0.098103	0.096582	0.099313	0.106042	0.116766	0.116766	0.116766

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Fleet Average Running Loss Emission Factors (grams/veh-hour)

Pollutant Name	Emission Factor
HC	0.052232
TOG	0.055843
ROG	0.055843
1,3-Butadiene	0
Benzene	0.000558
Ethylbenzene	0.000916
Naphthalene	0.000078
CH4	0.007504
HFC	0.064422

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Fleet Average Tire Wear Factors (grams/veh-mile)

Pollutant Name	Emission Factor
PM2.5	0.008342
PM10	0.033367

==========

Fleet Average Brake Wear Factors (grams/veh-mile)

Pollutant Name	Emission Factor
PM2.5	0.029684
PM10	0.069263

==========

Fleet Average Road Dust Factors (grams/veh-mile)

Pollutant Name	Emission Factor
PM2.5	5.18301
PM10	34.5534

==========END==========

Fast Food Restaurants

District Default Values						
Usage			Average Lb/week			
Facility Type	Description	Controls*	Hamburger	Poultry w/ skin	Poultry w/o skin	Pork
1	CD-Charbroiler	**86%**	**800**		**265**	
2	Flat Griddle	**0%**	**360**		**110**	**110**
3	UF-Charbroiler	**0%**	**270**	**145**		
4	Flat Griddle	**0%**			**110**	**110**
*w/ District Required Control Equipment						

Emission Factors		Lb/Ton of meat							
		Hamburger		Poultry w/ skin		Poultry w/o skin		Pork	
Facility Type	Description	PAH wo/Na-phthalene	Naph-thalene	PAH wo/Na-phthalene	Naph-thalene	PAH wo/Na-phthalene	Naph-thalene	PAH wo/Na-phthalene	Naph-thalene
1	CD-Charbroiler	**0.000724**	**0.046**			**0.00046**	**0.018**		
2	Flat Griddle	**0.000054**	**0.012**			**0.000044**	**0.018**	**0.000044**	**0.002**
3	UF-Charbroiler	**0.000702**	**0.038**	**0.00046**	**0.018**				
4	Flat Griddle					**0.000044**	**0.018**	**0.000044**	**0.002**

Emissions		Lb/Year							
		Hamburger		Poultry w/ skin		Poultry w/o skin		Pork	
Facility Type	Description	PAH wo/Na-phthalene	Naph-thalene	PAH wo/Na-phthalene	Naph-thalene	PAH wo/Na-phthalene	Naph-thalene	PAH wo/Na-phthalene	Naph-thalene
1	CD-Charbroiler	2.11E-03	1.34E-01	0.00E+00	0.00E+00	4.44E-04	1.74E-02	0.00E+00	0.00E+00
2	Flat Griddle	5.05E-04	1.12E-01	0.00E+00	0.00E+00	1.26E-04	5.15E-02	1.26E-04	5.72E-03
3	UF-Charbroiler	4.93E-03	2.67E-01	1.73E-03	6.79E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	Flat Griddle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-04	5.15E-02	1.26E-04	5.72E-03

How to us this worksheet:
This worksheet allows the user to enter the proposed quantity for each type of meat cooked by type of operation. If the user is uncertain which type of operation will be used for a single proposed fast food location then the emissions from the highest priority operation with the District's default values should be used.
Examples:

1) Proposed site has two fast food locations. The user will use Facility Type 1 and 2.
2) Proposed site has four fast food locations. The user will use Facility Type 1,2,3, and 4.
3) Proposed site has six fast food locations. The user will use Facility Type 1,2,3, and 4 for the first four locations
   For all other locations Facility Type 4 should be used.

Stack Parameters: Height = 5ft above roof height, Temperature = 200 F, Velocity = 1210 ft/min, Diameter = 1 ft

Project Emissions

Emission Summary		Total (Lb/Yr)		Total (Lb/Hr)		Total (g/s)	
Facility Type	Description	PAH wo/Na-phthalene	Naph-thalene	PAH wo/Na-phthalene	Naph-thalene	PAH wo/Na-phthalene	Naph-thalene
3	UF-Charbroiler	6.66E-03	3.35E-01	7.61E-07	3.82E-05	9.58E-08	4.81E-06

Franklin Road Retail Center, Meerced, CA - Project Construction & Operation - Without Construction Mitigation
AERMOD Risk Modeling Parameters, Maximum TAC Concentrations & Non-Cancer Health Effects
Off-Site Residential Receptors - 1.5 meter Receptor Heights

Receptor Information
Number of Receptors 52
Receptor Height = 1.5 meters
Receptor distances = variable - at nearby residences

Meteorological Conditions
SJVAPCD Merced Met Dat 2013-2017
Land Use Classification rural
Wind speed = variable
Wind direction = variable

Residential MEI Concentrations

TAC	TAC Concentration ($\mu g/m^3$) 2023 Max Period Average	2024 Max Period Average	2025 Max Period Average
DPM	0.13955	0.03090	0.00366
Benzene	0.00000	0.00000	0.01426
Ethylbenzene	0.00000	0.00000	0.01264
Formaldehyde	0.00000	0.00000	0.01114
PAHs	0.00000	0.00000	0.0000045
Naphthalene	0.00000	0.00000	0.00125
1,3 Butadiene	0.00000	0.00000	0.00192
Aceltaldehyde	0.00000	0.00000	0.00405

2023 - Maximum Non-Cancer Health Effects

TAC	Maximum Concentration Period Ave ($\mu g/m^3$)	Maximum Concentration 1-Hour ($\mu g/m^3$)	Hazard Index Chronic	Hazard Index Acute
DPM	0.13955	-	2.79E-02	-
Benzene	-	-	-	-
Ethylbenzene	-	-	-	-
Formaldehyde	-	-	-	-
PAHs			-	-
Naphthalene	-	-	-	-
1,3 Butadiene	-	-	-	-
Aceltaldehyde	-	-	-	-
Total			**0.028**	**0.000**

* Maximum for residential receptors

2024 - Non-Cancer Health Effects

TAC	Maximum Concentration Period Ave ($\mu g/m^3$)	Maximum Concentration 1-Hour ($\mu g/m^3$)	Hazard Index Chronic	Hazard Index Acute
DPM	0.02666	-	5.33E-03	-
Benzene	-	-	-	-
Ethylbenzene	-	-	-	-
Formaldehyde	-	-	-	-
PAHs			-	-
Naphthalene	-	-	-	-
1,3 Butadiene	-	-	-	-
Aceltaldehyde	-	-	-	-
Total			**0.005**	**0.000**

* Maximum for residential receptors

2025 - Non-Cancer Health Effects

TAC	Maximum Concentration Period Ave ($\mu g/m^3$)	Maximum Concentration 1-Hour ($\mu g/m^3$)	Hazard Index Chronic	Hazard Index Acute
DPM	0.00366	-	7.32E-04	-
Benzene	0.01426	0.19625	4.75E-03	7.27E-03
Ethylbenzene	0.01264	-	6.32E-06	-
Formaldehyde	0.01114	0.15411	1.24E-03	2.80E-03
PAHs	0.0000045	-	-	-
Naphthalene	0.00125	-	1.39E-04	-
1,3 Butadiene	0.00192	0.02632	9.60E-04	3.99E-05
Aceltaldehyde	0.00405	0.05622	2.89E-05	1.20E-04
Total			**0.008**	**0.010**

* Maximum for residential receptors

Franklin Road Retail Center, Meerced, CA - Project Construction & Operation - Without Construction Mitigaton
Maximum Residential Cancer Risk from Project Construction & Operation
at Residential MEI Location
70-Year Residential Exposure

Cancer Risk Calculation Method
Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

Parameter / Age -->	Infant/Child 3rd Trimester	Infant/Child 0 to 2	Infant/Child 2 to 16	Adult 17 - 70
ASF	10	10	3	1
DBR* =	361	1090	745	290
A =	1	1	1	1
EF =	350	350	350	350
ED =	0.25	2	14	54
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	1.00

* 95th percentile breathing rates

Cancer Potency Factors and Reference Exposure Levels (REL)

TAC	CPF $(mg/kg\text{-}day)^{-1}$	REL ($\mu g/m^3$) Acute (1-hour)	REL ($\mu g/m^3$) Chronic (ann ave)
DPM	1.10E+00	-	5
Benzene	1.00E-01	27	3
Ethylbenzene	8.70E-03	-	2,000
Formaldehyde	2.10E-02	55	9
PAHs	3.90E+00	-	-
Naphthalene	1.20E-01	-	9
1,3 Butadiene	6.00E-01	660	2
Aceltaldehyde	1.00E-02	470	140

Project Construction & Operation Cancer Risk - Maximum Impact at Residential Receptor Location

Exposure Year Age	Initial Exposure Year	Exposure Duration (years)	Age Sensitivity Factor	Maximum - Exposure Information Annual Conc (ug/m3) DPM	Benzene	Ethyl-benzene	Form-aldehyde	PAHs	Naph-thalene	1,3 Buta-diene	Acetal-dehyde	Cancer Risk (per million) DPM	Benzene	Ethyl-benzene	Form-aldehyde	PAHs	Naph-thalene	1,3 Buta-diene	Acetal-dehyde	Total
0	2023	0.25	10	0.13955	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.8978	0.0000	0.0000	0.0000	0.00000	0.0000	0.0000	0.0000	1.90
0 - 1	2023	1	10	0.13955	0.00000	0.00000	0.000000	0.000000	0.00000	0.000000	0.00000	22.9206	0.0000	0.000000	0.0000	0.00000	0.0000	0.0000	0.0000	22.92
1 < 2	2024	1	10	0.03090	0.00000	0.00000	0.000000	0.000000	0.00000	0.000000	0.00000	5.0752	0.0000	0.000000	0.0000	0.00000	0.0000	0.0000	0.0000	5.08
2 < 16	2025	14	3	0.00366	0.01426	0.01264	0.011140	0.000005	0.00125	0.001920	0.00405	1.7257	0.6112	0.04714	0.1003	0.007522	0.0643	0.4938	0.0174	3.07
16 - 70	2025	54	1	0.00366	0.01426	0.01264	0.011140	0.000005	0.00125	0.001920	0.00405	0.8637	0.3059	0.02359	0.0502	0.003765	0.0322	0.2471	0.0087	1.54
Total Increased Cancer Risk												**32.48**	**0.92**	**0.07**	**0.15**	**0.011**	**0.10**	**0.74**	**0.03**	**34.50**

* Third trimester of pregnancy

Franklin Road Retail Center, Meerced, CA - Project Construction & Operation - With Construction Mitigation
AERMOD Risk Modeling Parameters, Maximum TAC Concentrations & Non-Cancer Health Effects
Off-Site Residential Receptors - 1.5 meter Receptor Heights

Receptor Information
Number of Receptors 52
Receptor Height = 1.5 meters
Receptor distances = variable - at nearby residences

Meteorological Conditions
SJVAPCD Merced Met Dat 2013-2017
Land Use Classification rural
Wind speed = variable
Wind direction = variable

Residential MEI Concentrations

TAC	TAC Concentration (µg/m³) 2023 Max Period Average	2024 Max Period Average	2025 Max Period Average
DPM	0.01876	0.00510	0.00366
Benzene	0.00000	0.00000	0.01426
Ethylbenzene	0.00000	0.00000	0.01264
Formaldehyde	0.00000	0.00000	0.01114
PAHs	0.00000	0.00000	0.0000045
Naphthalene	0.00000	0.00000	0.00125
1,3 Butadiene	0.00000	0.00000	0.00192
Aceltaldehyde	0.00000	0.00000	0.00405

2023 - Maximum Non-Cancer Health Effects

TAC	Maximum Concentration Period Ave (µg/m³)	Maximum Concentration 1-Hour (µg/m³)	Hazard Index Chronic	Hazard Index Acute
DPM	0.01876	-	3.75E-03	-
Benzene	-	-	-	-
Ethylbenzene	-	-	-	-
Formaldehyde	-	-	-	-
PAHs			-	-
Naphthalene	-	-	-	-
1,3 Butadiene	-	-	-	-
Aceltaldehyde	-	-	-	-
Total			**0.004**	**0.000**

* Maximum for residential receptors

2024 - Non-Cancer Health Effects

TAC	Maximum Concentration Period Ave (µg/m³)	Maximum Concentration 1-Hour (µg/m³)	Hazard Index Chronic	Hazard Index Acute
DPM	0.00510	-	1.02E-03	-
Benzene	-	-	-	-
Ethylbenzene	-	-	-	-
Formaldehyde	-	-	-	-
PAHs			-	-
Naphthalene	-	-	-	-
1,3 Butadiene	-	-	-	-
Aceltaldehyde	-	-	-	-
Total			**0.001**	**0.000**

* Maximum for residential receptors

2025 - Non-Cancer Health Effects

TAC	Maximum Concentration Period Ave (µg/m³)	Maximum Concentration 1-Hour (µg/m³)	Hazard Index Chronic	Hazard Index Acute
DPM	0.00366	-	7.32E-04	-
Benzene	0.01426	0.19625	4.75E-03	7.27E-03
Ethylbenzene	0.01264	-	6.32E-06	-
Formaldehyde	0.01114	0.15411	1.24E-03	2.80E-03
PAHs	0.0000045	-	-	-
Naphthalene	0.00125	-	1.39E-04	-
1,3 Butadiene	0.00192	0.02632	9.60E-04	3.99E-05
Aceltaldehyde	0.00405	0.05622	2.89E-05	1.20E-04
Total			**0.008**	**0.010**

* Maximum for residential receptors

Franklin Road Retail Center, Meerced, CA - Project Construction & Operation - With Construction Mitigation
Maximum Residential Cancer Risk from Project Construction & Operation
With Construction Mitigation Applied
at Residential MEI Location - 70-Year Residential Exposure

Cancer Risk Calculation Method
Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6
Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)
Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}
Where: C_{air} = concentration in air $(\mu g/m^3)$
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

Parameter / Age -->	Infant/Child 3rd Trimester	Infant/Child 0 to 2	Infant/Child 2 to 16	Adult 17 - 70
ASF	10	10	3	1
DBR* =	361	1090	745	290
A =	1	1	1	1
EF =	350	350	350	350
ED =	0.25	2	14	54
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	1.00

* 95th percentile breathing rates

Cancer Potency Factors and Reference Exposure Levels (REL)

TAC	CPF $(mg/kg\text{-}day)^{-1}$	REL (µg/m³) Acute (1-hour)	REL (µg/m³) Chronic (ann ave)
DPM	1.10E+00	-	5
Benzene	1.00E-01	27	3
Ethylbenzene	8.70E-03	-	2,000
Formaldehyde	2.10E-02	55	9
PAHs	3.90E+00	-	-
Naphthalene	1.20E-01	-	9
1,3 Butadiene	6.00E-01	660	2
Aceltaldehyde	1.00E-02	470	140

Project Construction & Operation Cancer Risk - Maximum Impact at Residential Receptor Location

Exposure Year Age	Initial Exposure Year	Exposure Duration (years)	Age Sensitivity Factor	Maximum - Exposure Information Annual Conc (ug/m3) DPM	Benzene	Ethyl-benzene	Form-aldehyde	PAHs	Naph-thalene	1,3 Buta-diene	Acetal-dehyde	Cancer Risk (per million) DPM	Benzene	Ethyl-benzene	Form-aldehyde	PAHs	Naph-thalene	1,3 Buta-diene	Acetal-dehyde	Total
0	2023	0.25	10	0.01876	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.2551	0.0000	0.0000	0.0000	0.00000	0.0000	0.0000	0.0000	0.26
0 - 1	2023	1	10	0.01876	0.00000	0.00000	0.000000	0.000000	0.00000	0.000000	0.00000	3.0813	0.0000	0.000000	0.0000	0.00000	0.0000	0.0000	0.0000	3.08
1 < 2	2024	1	10	0.00510	0.00000	0.00000	0.000000	0.000000	0.00000	0.000000	0.00000	0.8377	0.0000	0.000000	0.0000	0.00000	0.0000	0.0000	0.0000	0.84
2 < 16	2025	14	3	0.00366	0.01426	0.01264	0.011140	0.000005	0.00125	0.001920	0.00405	1.7257	0.6112	0.04714	0.1003	0.007522	0.0643	0.4938	0.0174	3.07
16 - 70	2025	54	1	0.00366	0.01426	0.01264	0.011140	0.000005	0.00125	0.001920	0.00405	0.8637	0.3059	0.02359	0.0502	0.003765	0.0322	0.2471	0.0087	1.54
Total Increased Cancer Risk												**6.76**	**0.92**	**0.07**	**0.15**	**0.011**	**0.10**	**0.74**	**0.03**	**8.78**

* Third trimester of pregnancy

Franklin Road Retail Center, Meerced, CA - Project Construction & Operation
AERMOD Risk Modeling Parameters, Maximum TAC Concentrations
Off-Site Worker Receptors - 1.5 meter Receptor Heights

Receptor Information
Number of Receptors 6
Receptor Height = 1.5 meters
Receptor distances = variable - at nearby workplaces

Meteorological Conditions
SJVAPCD Merced Met Dat 2013-2017
Land Use Classification rural
Wind speed = variable
Wind direction = variable

Residential MEI Concentrations

	TAC Concentration ($\mu g/m^3$)		
	2023	2024	2025
TAC	Max Period Average	Max Period Average	Max Period Average
DPM	0.13420	0.02972	0.00292
Benzene	0.00000	0.00000	0.01128
Ethylbenzene	0.00000	0.00000	0.00999
Formaldehyde	0.00000	0.00000	0.00881
PAHs	0.00000	0.00000	0.0000047
Naphthalene	0.00000	0.00000	0.00104
1,3 Butadiene	0.00000	0.00000	0.00152
Aceltaldehyde	0.00000	0.00000	0.00320

2023 - Maximum Non-Cancer Health Effects

	Maximum Concentration		Hazard Index	
TAC	Period Ave ($\mu g/m^3$)	1-Hour ($\mu g/m^3$)	Chronic	Acute
DPM	0.07950	-	1.59E-02	-
Benzene	-	-	-	-
Ethylbenzene	-	-	-	-
Formaldehyde	-	-	-	-
PAHs			-	-
Naphthalene	-	-	-	-
1,3 Butadiene	-	-	-	-
Aceltaldehyde	-	-	-	-
Total			**0.016**	**0.000**

* Maximum for worker receptors

2024 - Non-Cancer Health Effects

	Maximum Concentration		Hazard Index	
TAC	Period Ave ($\mu g/m^3$)	1-Hour ($\mu g/m^3$)	Chronic	Acute
DPM	0.02666	-	5.33E-03	-
Benzene	-	-	-	-
Ethylbenzene	-	-	-	-
Formaldehyde	-	-	-	-
PAHs			-	-
Naphthalene	-	-	-	-
1,3 Butadiene	-	-	-	-
Aceltaldehyde	-	-	-	-
Total			**0.005**	**0.000**

* Maximum for worker receptors

2025 - Non-Cancer Health Effects

	Maximum Concentration		Hazard Index	
TAC	Period Ave ($\mu g/m^3$)	1-Hour ($\mu g/m^3$)	Chronic	Acute
DPM	0.00292	-	5.84E-04	-
Benzene	0.01128	0.09088	3.76E-03	3.37E-03
Ethylbenzene	0.00999	-	5.00E-06	-
Formaldehyde	0.00881	0.07121	9.79E-04	1.29E-03
PAHs	0.00000	-	-	-
Naphthalene	0.00104	-	1.15E-04	-
1,3 Butadiene	0.00152	0.01219	7.60E-04	1.85E-05
Aceltaldehyde	0.00320	0.02598	2.29E-05	5.53E-05
Total			**0.006**	**0.005**

* Maximum for worker receptors

Franklin Road Retail Center, Meerced, CA - Project Construction & Operation
Maximum Worker Cancer Risk from Project Operation
at Off-Site Worker MEI Location
40-Year Off-Site Worker Exposure

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x WAF x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
WAF = Worker Adjustment Factor (unitless)
= (24 hrs/9 hrs) x (7 days/5 days) = 3.73 for construction modeling
= 1.0 for roadway modeling (continuous emisions)
DBR = daily breathing rate (L/kg body weight-day) for residential & 8-hour breathing rate for workers
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

	Infant/Child			Adult	Worker
Age -->	3rd Trimester	0 to 2	2 to 16	17 - 70	17 - 70
Parameter					
ASF	10	10	3	1	1
DBR* =	361	1090	745	290	230
WAF** =	-	-	-	-	3.7
A =	1	1	1	1	1
EF =	350	350	350	350	250
ED =	0.25	2	14	54	40
AT =	70	70	70	70	70
FAH =	1.00	1.00	1.00	1.00	-

* 95th percentile breathing rates, worker breathing rate is an 8-hour rate (L/kg per 8 hours)

** Worker adjustment factor only applied for worker exposures.

Cancer Potency Factors and Reference Exposure Levels (REL)

		REL ($\mu g/m^3$)	
TAC	CPF $(mg/kg\text{-}day)^{-1}$	Acute (1-hour)	Chronic (ann ave)
DPM	1.10E+00	-	5
Benzene	1.00E-01	27	3
Ethylbenzene	8.70E-03	-	2,000
Formaldehyde	2.10E-02	55	9
PAHs	3.90E+00	-	-
Naphthalene	1.20E-01	-	9
1,3 Butadiene	6.00E-01	660	2
Aceltaldehyde	1.00E-02	470	140

Project Construction & Operation Cancer Risk - Maximum Impact at Worker Receptor Location

				Maximum - Exposure Information								Cancer Risk (per million)								
				Annual Conc (ug/m3)																
Exposure Year Age Range	Initial Exposure Year	Exposure Duration (years)	Age Sensitivity Factor	DPM	Benzene	Ethyl-benzene	Form-aldehyde	PAH	Naph-thalene	1,3 Buta-diene	Acetal-dehyde	DPM	Benzene	Ethyl-benzene	Form-aldehyde	PAH	Naph-thalene	1,3 Buta-diene	Acetal-dehyde	Total
17 - 70	2023	1	1	0.13420	0.00000	0.00000	0.000000	0.000000	0.00000	0.000000	0.00000	1.2392	0.0000	0.00000	0.0000	0.0000	0.0000	0.0000	0.0000	1.24
17 - 70	2024	1	1	0.02972	0.00000	0.00000	0.000000	0.000000	0.00000	0.000000	0.00000	0.2744	0.0000	0.00000	0.0000	0.0000	0.0000	0.0000	0.0000	0.27
17 - 70	2025	38	1	0.00292	0.01128	0.00999	0.008810	0.000005	0.00104	0.001520	0.00320	0.2747	0.0965	0.00743	0.0158	0.0016	0.0106	0.0780	0.0027	0.49
Total Increased Cancer Risk												**1.79**	**0.10**	**0.01**	**0.02**	**0.00**	**0.01**	**0.08**	**0.00**	**2.001**

Franklin Road Retail Center, Meerced, CA - Project Operation
AERMOD Risk Modeling Parameters, Maximum TAC Concentrations
With Construction Mitigation Applied
Off-Site Worker Receptors - 1.5 meter Receptor Heights

Receptor Information

Number of Receptors 6
Receptor Height = 1.5 meters
Receptor distances = variable - at nearby workplaces

Meteorological Conditions

SJVAPCD Merced Met Data 2013-2017
Land Use Classification rural
Wind speed = variable
Wind direction = variable

Residential MEI Concentrations

	TAC Concentration ($\mu g/m^3$)		
	2023	2024	2025
TAC	Max Period Average	Max Period Average	Max Period Average
DPM	0.01804	0.00491	0.00292
Benzene	0.00000	0.00000	0.01128
Ethylbenzene	0.00000	0.00000	0.00999
Formaldehyde	0.00000	0.00000	0.00881
PAHs	0.00000	0.00000	0.0000047
Naphthalene	0.00000	0.00000	0.00104
1,3 Butadiene	0.00000	0.00000	0.00152
Aceltaldehyde	0.00000	0.00000	0.00320

2023 - Maximum Non-Cancer Health Effects

	Maximum Concentration		Hazard Index	
	Period Ave	1-Hour		
TAC	($\mu g/m^3$)	($\mu g/m^3$)	Chronic	Acute
DPM	0.01804	-	3.61E-03	-
Benzene	-	-	-	-
Ethylbenzene	-	-	-	-
Formaldehyde	-	-	-	-
PAHs			-	-
Naphthalene	-	-	-	-
1,3 Butadiene	-	-	-	-
Aceltaldehyde	-	-	-	-
Total			**0.004**	**0.000**

* Maximum for worker receptors

2024 - Non-Cancer Health Effects

	Maximum Concentration		Hazard Index	
	Period Ave	1-Hour		
TAC	($\mu g/m^3$)	($\mu g/m^3$)	Chronic	Acute
DPM	0.00491	-	9.82E-04	-
Benzene	-	-	-	-
Ethylbenzene	-	-	-	-
Formaldehyde	-	-	-	-
PAHs			-	-
Naphthalene	-	-	-	-
1,3 Butadiene	-	-	-	-
Aceltaldehyde	-	-	-	-
Total			**0.001**	**0.000**

* Maximum for worker receptors

2025 - Non-Cancer Health Effects

	Maximum Concentration		Hazard Index	
	Period Ave	1-Hour		
TAC	($\mu g/m^3$)	($\mu g/m^3$)	Chronic	Acute
DPM	0.00292	-	5.84E-04	-
Benzene	0.01128	0.09088	3.76E-03	3.37E-03
Ethylbenzene	0.00999	-	5.00E-06	-
Formaldehyde	0.00881	0.07121	9.79E-04	1.29E-03
PAHs	0.00000	-	-	-
Naphthalene	0.00104	-	1.15E-04	-
1,3 Butadiene	0.00152	0.01219	7.60E-04	1.85E-05
Aceltaldehyde	0.00320	0.02598	2.29E-05	5.53E-05
Total			**0.006**	**0.005**

* Maximum for worker receptors

Franklin Road Retail Center, Meerced, CA - Project Operation
Maximum Worker Cancer Risk from Project Operation
With Construction Mitigation Applied
at Off-Site Worker MEI Location
40-Year Off-Site Worker Exposure

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x WAF x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)

WAF = Worker Adjustment Factor (unitless)
= (24 hrs/9 hrs) x (7 days/5 days) = 3.73 for construction modeling
= 1.0 for roadway modeling (continuous emisions)

DBR = daily breathing rate (L/kg body weight-day) for residential & 8-hour breathing rate for workers

A = Inhalation absorption factor

EF = Exposure frequency (days/year)

10^{-6} = Conversion factor

Values

	Infant/Child			Adult	Worker
Age -->	3rd Trimester	0 to 2	2 to 16	17 - 70	17 - 70
Parameter					
ASF	10	10	3	1	1
DBR* =	361	1090	745	290	230
WAF** =	-	-	-	-	3.7
A =	1	1	1	1	1
EF =	350	350	350	350	250
ED =	0.25	2	14	54	40
AT =	70	70	70	70	70
FAH =	1.00	1.00	1.00	1.00	-

* 95th percentile breathing rates, worker breathing rate is an 8-hour rate (L/kg per 8 hours)

** Worker adjustment factor only applied for worker exposures.

Cancer Potency Factors and Reference Exposure Levels (REL)

		REL ($\mu g/m^3$)	
	CPF	Acute	Chronic
TAC	$(mg/kg\text{-}day)^{-1}$	(1-hour)	(ann ave)
DPM	1.10E+00	-	5
Benzene	1.00E-01	27	3
Ethylbenzene	8.70E-03	-	2,000
Formaldehyde	2.10E-02	55	9
PAHs	3.90E+00	-	-
Naphthalene	1.20E-01	-	9
1,3 Butadiene	6.00E-01	660	2
Aceltaldehyde	1.00E-02	470	140

Project Construction & Operation Cancer Risk - Maximum Impact at Worker Receptor Location

				Maximum - Exposure Information								Cancer Risk (per million)							
				Annual Conc (ug/m3)															
Exposure Year Age Range	Initial Exposure Year	Exposure Duration (years)	Age Sensitivity Factor	DPM	Benzene	Ethyl-benzene	Form-aldehyde	PAH	Naph-thalene	1,3 Buta-diene	Acetal-dehyde	DPM	Benzene	Ethyl-benzene	Form-aldehyde	PAH	Naph-thalene	1,3 Buta-diene	Acetal-dehyde	Total
17 - 70	2023	1	1	0.01804	0.00000	0.00000	0.000000	0.000000	0.00000	0.000000	0.00000	0.1666	0.0000	0.00000	0.0000	0.0000	0.0000	0.0000	0.0000	0.17
17 - 70	2024	1	1	0.00491	0.00000	0.00000	0.000000	0.000000	0.00000	0.000000	0.00000	0.0453	0.0000	0.00000	0.0000	0.0000	0.0000	0.0000	0.0000	0.05
17 - 70	2025	38	1	0.00292	0.01128	0.00999	0.008810	0.000005	0.00104	0.001520	0.00320	0.2747	0.0965	0.00743	0.0158	0.0016	0.0106	0.0780	0.0027	0.49
Total Increased Cancer Risk												**0.49**	**0.10**	**0.01**	**0.02**	**0.00**	**0.01**	**0.08**	**0.00**	**0.699**

Franklin Road Retail Center - CARB GDF Health Risk Screening Model Output

EVR Phase I & EVR Phase II				
Receptor Distance	Cancer Risk (chances/million)		Chronic	Acute
	Resident	Worker	HI	HI
61.5	3.4	0.5	0.0	0.3
70.3	2.8	0.4	0.0	0.3
Not Selected	0.0	0.0	0.0	0.0
Not Selected	0.0	0.0	0.0	0.0
Not Selected	0.0	0.0	0.0	0.0
Not Selected	0.0	0.0	0.0	0.0

Summary of Inputs

Annual Throughput	2400000	gallons/year	
Max Hourly Dispensing	700	gallons/hour	
Max Hourly Loading	8800	gallons/hour	
Surface File Name	"C:\Projects\I&R\Met Data\Merced\Merced_2013-2017.SFC"		
Profile File Name	"C:\Projects\I&R\Met Data\Merced\Merced_2013-2017.pfl"		
Building downwash included	yes		
Emission Factors			
CARB default emission factors used	Loading	0.15	lb/gal
	Breathing	0.024	lb/gal
	Refueling	0.089	lb/gal
	Spillage	0.24	lb/gal
	Hose Permeation	0.009	lb/gal
Fraction of time at home for >16	1	unitless	
Exposure Duration Resident	70	years	
Exposure Duration Worker	40	years	

Operating Schedule					
0.36	0.36	0.36	0.36	0.36	1.46
1.46	1.46	1.46	1.46	1.46	1.46
1.46	1.46	1.46	1.46	1.46	1.46
1.46	0.36	0.36	0.36	0.36	0.36

Dispersion Type	Rural
Tool version	Version 1.0 - February 18, 2022

GDF ROG Emissions Calcualtions

2400000gallons/year

From CARB Worksheet

Loading	0.15lb/kgal	360
Breathing	0.024lb/kgal	57.6
Refueling	0.089lb/kgal	213.6
Spillage	0.24lb/kgal	576
Hose	0.009lb/kgal	21.6
	pounds:	1,229
	Tons:	**0.6144**

Special-Status Species Lists and Swainson's Hawk Protocol Survey Report

C

APPENDIX

Appendix C Special-Status Plant Species with Potential to Occur in the Project Vicinity

Species	Status (Federal/State/ CNPS)	Suitable Habitat Description	Potential to Occur on Project Site
Alkali milk-vetch *(Astragalus tener* var. *tener)*	--/--/1B.2	Alkaline sites in playas, valley and foothill grassland (on adobe clay), and vernal pools; elevation 1-60m. Blooming Period: March - June.	Unlikely. Suitable alkaline habitat not found at the project site.
Alkali-sink goldfields (*Lasthenia chrysantha*)	--/--/1B.1	Vernal pools. Alkaline; elevation 0-200m.	Unlikely. Suitable vernal pool habitat not found at the project site.
Beaked clarkia *(Clarkia rostrata)*	--/--/1B.3	Cismontane woodland, and valley and foothill grassland. North-facing slopes, sometimes on sandstone; elevation 60-460m. Blooming Period: April – May.	Unlikely. Suitable woodland or grassland habitat not found at the project site.
California alkali grass *(Puccinellia simplex)*	--/--/1B.2	Meadows and seeps, chenopod scrub, valley and foothill grasslands, vernal pools. Alkaline, vernally mesic. Sinks, flats,and lake margins; elevation 1-915m. Blooming Period: March - May.	Unlikely. Suitable mesic habitat not found at the project site.
Colusa grass *(Neostapfia colusana)*	FT/SE/1B.1	Vernal pools, usually in large or deep vernal pool bottoms, adobe soils; elevation 5-110m. Blooming Period: May – August.	Unlikely. Suitable vernal pool habitat not found at the project site.
Coulter's goldfields *(Lasthenia glabrata* ssp. *coulteri)*	--/--/1B.1	Coastal salt marshes and swamps, playas, and vernal pools; elevation 1-1220m. Blooming Period: February – June.	Unlikely. Suitable marsh or vernal pool habitat not found at the project site.
Delta button-celery *(Eryngium racemosum)*	--/SE/1B.1	Riparian scrub; prefers seasonally inundated floodplain on clay soils; elevation 3-75m. Blooming Period: June - August.	Unlikely. Suitable riparian habitat not found at the project site.
Dwarf downingia *(Downingia pusilla)*	--/--/2B.2	Valley and foothill grassland (mesic sites), and vernal pools; elevation 1-485m. Blooming Period: March – May.	Unlikely. Suitable mesic or vernal pool habitat not found at the project site.
Forked hare-leaf *(Lagophylla dichotoma)*	--/--/1B.1	Cismontane woodland, valley and foothill grassland, sometimes clay; elevation 190-335m. Blooming Period: April – May.	Unlikely. Suitable mesic habitat not found at the project site.
Hairy orcutt grass *(Orcuttia pilosa)*	FE/SE/1B.1	Vernal pools; elevation 25-125m. Blooming Period: May – September.	Unlikely. Suitable mesic habitat not found at the project site.
Heartscale *(Atriplex cordulata* var. *cordulata)*	--/--/1B.2	Chenopod scrub, valley and foothill grassland, and meadows. Prefers alkaline flats and scalds in the Central Valley, on sandy soils; elevation 1-150m. Blooming Period: April - October.	Unlikely. Suitable vernal pool habitat not found at the project site
Heckard's pepper-grass *(Lepidium latipes* var. *heckardii)*	--/--/1B.2	Alkaline flats in valley and foothill grassland; elevation 2-200m. Blooming Period: March – May.	Unlikely. Suitable alkaline habitat not found at the project site.
Henderson's bent grass *(Agrostis hendersonii)*	--/--/3.2	Valley and foothill grassland, vernal pools, moist places in grassland or vernal pool habitat; elevation 65-1030m. Blooming Period: April – June.	Unlikely. Suitable mesic or vernal pool habitat not found at the project site.
Hoover's spurge *(Chamaesyce hooveri)*	FT/--/1B.2	Vernal pools, and valley and foothill grassland; pools on volcanic mudflow or clay substrates; elevation 25-140m. Blooming Period: July – August.	Unlikely. Suitable mesic or vernal pool habitat not found at the project site.

Species	Status (Federal/State/ CNPS)	Suitable Habitat Description	Potential to Occur on Project Site
Keck's checkerbloom *(Sidalcea keckii)*	FE/--/1B.1	Cismontane woodland, and valley and foothill grassland. Prefers grassy slopes in blue oak woodland; elevation 180-425m. Blooming Period: April – May.	Unlikely. Suitable woodland or grassland habitat not found at the project site.
Lesser saltscale *(Atriplex minuscula)*	--/--/1B.1	Chenopod scrub, playas, and valley and foothill grassland. In alkali sinks in sandy, alkaline soils; elevation 20-100m. Blooming Period: May - October.	Unlikely. Suitable alkaline habitat not found at the project site.
Merced phacelia *(Phacelia cillata* var. *opaca)*	--/--/1B	Valley and foothill grassland. Adobe or clay soils of valley floors, open hills, or alkaline flats; elevation 60-150m. Blooming Period: February – May.	Unlikely. Suitable grassland with clay soils not found at the project site.
Prostrate vernal pool navarretia *(Navarretia prostrata)*	--/--/1B.1	Coastal scrub, valley and foothill grassland, and vernal pools. Alkaline soils in grassland, or in vernal pools; elevation 15-700m. Blooming Period: April - July.	Unlikely. Suitable mesic or vernal pool habitat not found at the project site.
Recurved larkspur *(Delphinium recurvatum)*	--/--/1B.2	Alkaline sites in chenopod scrub, cismontane woodland, and valley and foothill grassland; elevation 3-750m. Blooming Period: March – May.	Unlikely. Suitable alkaline habitat not found at the project site.
San Joaquin spearscale *(Extriplex joaquinana)*	--/--/1B.2	Alkaline sites in chenopod scrub, meadows and seeps, playas, and valley and foothill grassland; elevation 1-320m. Blooming Period: April - October.	Unlikely. Suitable alkaline or mesic habitat not found at the project site.
San Joaquin Valley Orcutt grass *(Orcuttia inaequalis)*	FT/SE/1B.1	Vernal pools, endemic to the San Joaquin Valley; elevation 30-755m. Blooming Period: April – September.	Unlikely. Suitable mesic or vernal pool habitat not found at the project site.
Sanford's arrowhead *(Sagittaria sanfordii)*	--/--/1B.2	Marshes and swamps. Found in standing or slow-moving freshwater ponds, marshes, and ditches; elevation 0-610m. Blooming Period: May - October.	Unlikely. Suitable marsh or vernal pool habitat not found at the project site.
Shining navarretia *(Navarretia nigelliformis* ssp. *radians)*	--/--/1B.2	Cismontane woodland, valley and foothill grassland, and vernal pools; elevation 200-1000m. Blooming Period: May - July.	Unlikely. Suitable mesic or vernal pool habitat not found at the project site.
Spiny-sepaled button-celery *(Eryngium spinosepalum)*	--/--/1B.2	Vernal pools within valley and foothill grassland. Some sites on clay soils of granitic origin; elevation 100-420m. Blooming Period: April - May.	Unlikely. Suitable vernal pool or hard pan habitat not found at the project site.
Subtle orache *(Atriplex subtilis)*	--/--/1B.2	Alkaline sites in valley and foothill grassland; elevation 40-100m. Blooming Period: August – October.	Unlikely. Suitable alkaline habitat not found at the project site.
Vernal pool smallscale *(Atriplex persistens)*	--/--/1B.2	Vernal pools on alkaline soils; elevation 10-115m. Blooming Period: July - October.	Unlikely. Suitable habitat not found at the project site.
Watershield *(Brasenia schreberi)*	--/--2B.3	Freshwater marshes and swamps, aquatic, known from water bodies both natural and artificial in California; elevation 1-2180m. Blooming Period: June – September.	Unlikely. Suitable marsh habitat not found at the project site.

Species	Status (Federal/State/ CNPS)	Suitable Habitat Description	Potential to Occur on Project Site
Wright's trichocoronis *(Trichocoronis wrightii* var. *wrightii)*	--/--/2B.1	Marshes and swamps, riparian forest, meadows and seeps, vernal pools. Mud flats of vernal lakes, drying river beds, alkali meadows; elevation 5-435m. Blooming Period: May – September.	Unlikely. Suitable mesic or vernal pool habitat not found at the project site.

SOURCE: CDFW 2023, CNPS 2023

NOTE: Status Codes:

Federal (USFWS)

FE: Listed as Endangered under the Federal Endangered Species Act.

FT: Listed as Threatened under the Federal Endangered Species Act.

FC: A Candidate for listing as Threatened or Endangered under the Federal Endangered Species Act.

FSC: Species of Special Concern.

FD: Delisted under the Federal Endangered Species Act.

State (CDFW)

SE: Listed as Endangered under the California Endangered Species Act.

ST: Listed as Threatened under the California Endangered Species Act.

SR: Listed as Rare under the California Endangered Species Act.

SC: A Candidate for listing as Threatened or Endangered under the California Endangered Species Act.

SSC: Species of Special Concern.

SFP: Fully Protected species under the California Fish and Game Code.

SD: Delisted under the California Endangered Species Act.

CNPS Rare Plant Ranks and Threat Code Extensions

1B: Plants that are considered Rare, Threatened, or Endangered in California and elsewhere.

2B: Plants that are considered Rare, Threatened, or Endangered in California, but more common elsewhere.

.1: Seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat).

.2: Fairly endangered in California (20-80% occurrences threatened).

.3: Not very endangered in California (<20% of occurrences threatened or no current threats known).

Appendix C Special-Status Wildlife Species with Potential to Occur in the Project Vicinity

Species	Status (Federal/State)	Suitable Habitat Description	Potential to Occur on Project Site
American badger *(Taxidea taxus)*	--/SSC	Most abundant in drier, open stages of most shrub, forest, and herbaceous habitats. Need sufficient food and open, uncultivated ground with friable soils to dig burrows. Prey on burrowing rodents.	Unlikely. Suitable open, undisturbed habitat not found at the project site.
Bald eagle *(Haliaeetus leucocephalus)*	FD/SE	Ocean shore, lake margins, and rivers for both nesting and wintering. Most nests within one mile of water. Nests in large, old-growth, or dominant live tree with open branches.	Unlikely. Suitable undisturbed habitat not found at the project site.
Blunt-nosed leopard lizard *(Gambelia sila)*	FE/SE	Resident of sparsely vegetated alkali and desert scrub habitats, in areas of low topographic relief. Seeks cover in mammal burrows, under shrubs or structures such as fence posts.	Unlikely. Suitable desert scrub habitat not found at the project site.
Burrowing owl *(Athene cunicularia)*	--/SSC	Open, dry, annual or perennial grasslands, desert, or scrubland, with available small mammal burrows.	Unlikely. Suitable open or grassland habitats not found at the project site.
California linderiella *(Linderiella occidentalis)*	FSC/--	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Water in the pools typically has very low alkalinity, conductivity, and total dissolved solids.	Unlikely. Suitable aquatic habitat not found at the project site.
California tiger salamander *(Ambystoma californiense)*	FT/ST	Grasslands and oak woodlands near seasonal pools and stock ponds in central and coastal California. Needs upland habitat to aestivate (remain dormant during dry months) in small mammal burrows, cracks in the soil, or moist leaf litter. Requires seasonal water sources that persist into late March for breeding habitat.	Unlikely. Suitable aquatic habitat not found at the project site.
Coast horned lizard *(Phrynosoma blainvillii)*	--/SSC	Arid grassland and scrubland habitats; prefers lowlands along sandy washes with scattered low bushes. Requires open areas for sunning, bushes for cover, patches of loose soil for burrowing, and abundant supply of ants and other insects for feeding.	Unlikely. Suitable grassland or scrub habitat not found at the project site.
Conservancy fairy shrimp *(Branchinecta conservatio)*	FE/--	Endemic to the grasslands of the northern two-thirds of the central valley; found in large, turbid pools. Also occurs in swales formed by old, braided alluvium filled by winter/spring rains.	Unlikely. Suitable aquatic habitat not found at the project site.
Ferruginous hawk *(Buteo regalis)*	--/WL	(Wintering) Open grasslands, sagebrush flats, desert scrub, low foothills and fringes of pinyon-juniper habitats. Mostly consumes flat lagomorphs, ground squirrels, and mice.	Unlikely. Suitable open undisturbed habitats not found at the project site.
Giant garter snake *(Thamnophis gigas)*	FT/ ST	Prefers freshwater marsh and low gradient streams. Adapted to drainage canals and irrigation ditches. The most aquatic garter snake in California.	Unlikely. Suitable aquatic habitat not found at the project site.

Species	Status (Federal/State)	Suitable Habitat Description	Potential to Occur on Project Site
Golden eagle *(Aquila chrysaetos)*	--/SFP	Rolling foothill mountain areas, sage-juniper flats, and desert. Cliff-walled canyons provide nesting habitat in most parts of range. Also uses large trees in open areas.	Unlikely. Suitable open, undisturbed habitat not found at the project site.
Hoary bat *(Lasiurus cinereus)*	--/SSC	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	Unlikely. Suitable open areas adjacent to aquatic habitat not found at the project site.
Merlin *(Falco columbarius)*	--/--/WL	Sea coast, tidal estuaries, open woodlands, savannahs, edges of grassland and deserts, farms and ranches, clumps of trees or windbreaks are required for roosting in open county.	Unlikely. Suitable sea coast or woodland habitats not found at the project site.
Mountain plover *(Charadrius montanus)*	--/SSC	Short grasslands, freshly plowed fields, newly sprouting grain fields, and sometimes sod farms. Prefers short vegetation, bare ground, and flat topography, such as grazed areas and areas with burrowing rodents.	Unlikely. Fields planted with tall cover crop at the project site.
Northern California legless lizard *(Anniella pulchra)*	--/SSC	Sandy or loose loamy soils under sparse vegetation, moist soils. *Anniella pulchra* is traditionally split into two subspecies: *A. pulchra pulchra* (silvery legless lizard) and *A. pulchra nigra* (black legless lizard), but these subspecies are no longer recognized.	Unlikely. Suitable open loose soils not found at the project site.
Northern leopard frog *(Lithobates pipiens)*	--/SSC	Native range is east of Sierra Nevada-Cascade crest. Found near permanent or semi-permanent water in a variety of habitats; highly aquatic species. Shoreline cover, submerged and emergent aquatic vegetation are important habitat characteristics.	Unlikely. Suitable aquatic habitat not found at the project site.
Pallid bat *(Antrozous pallidus)*	--/SSC	Deserts, grasslands, scrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures.	Unlikely. Suitable open areas with low disturbance not found at the project site.
San Joaquin kit fox *(Vulpes macrotis mutica)*	FE/ST	Annual grasslands or grassy open stages with scattered shrubby vegetation. Needs loose-textured sandy soils for burrowing, and suitable prey base.	Unlikely. Project surrounded by developed areas and Highway 99, a loud and busy road corridor.
Steelhead *(Oncorhynchus mykiss irideus)*	FT/--	Coastal stream with clean spawning gravel. Requires cool water and pools. Needs migratory access between natal stream and ocean.	Unlikely. Suitable aquatic habitat not found at the project site.
Swainson's hawk *(Buteo swainsoni)*	--/ST	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas, such as grasslands or agricultural fields supporting rodent populations.	Possible. Species recorded nesting within ½-mile of the project site.

Species	Status (Federal/State)	Suitable Habitat Description	Potential to Occur on Project Site
Tricolored blackbird *(Agelaius tricolor)*	--/SE	Areas adjacent to open water with protected nesting substrate, which typically consists of dense, emergent freshwater marsh vegetation.	Unlikely. Suitable aquatic habitat not found at the project site.
Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)*	FT/--	Elderberry shrubs, usually in Central Valley riparian habitats.	Unlikely. Suitable elderberry shrubs not found at the project site.
Vernal pool fairy shrimp *(Branchinecta lynchi)*	FT/--	Endemic to the grasslands of the Central Valley, Central Coast Mtns., and South Coast Mtns. in astatic rain-filled pools. Inhabits small, clear-water sandstone depression pools and grass swale, earth slump, or basalt-flow depression pools.	Unlikely. Suitable aquatic habitat not found at the project site.
Vernal pool tadpole shrimp *(Lepidurus packardi)*	FE/--	Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water. Pools commonly found in swales of unplowed grasslands.	Unlikely. Suitable aquatic habitat not found at the project site.
Western mastiff bat *(Eumops perotis californicus)*	--/SSC	Many open, semi-arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, chaparral, etc. Roosts in crevices in cliff faces, high buildings, trees and tunnels.	Unlikely. Suitable open areas with low disturbance not found at the project site.
Western pond turtle *(Emys marmorata)*	--/SSC	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Needs basking sites (such as rocks or partially submerged logs) and suitable upland habitat for egg-laying (sandy banks or grassy open fields).	Unlikely. Suitable aquatic habitat not found at the project site.
Western red bat *(Lasiurus blossevillii)*	--/SSC	Roosts primarily in trees, 2-40 feet above the ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	Unlikely. Suitable open areas with low disturbance not found at the project site.
Western spadefoot *(Spea hammondii)*	--/SSC	Occurs primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands, breeds in winter and spring (January - May) in quiet streams and temporary pools.	Unlikely. Suitable aquatic habitat not found at the project site.

SOURCE: CDFW 2023

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E M C

Planning for Success.

August 15, 2023

Tiffany Ho, Planner III
County of Merced
2222 M Street, 2nd Floor
Merced, CA, 95340

Re: Protocol-Level Swainson's Hawk Survey Results
2355 Franklin Road, Merced County

Dear Tiffany,

Thank you for requesting protocol-level biological surveys from EMC Planning Group. This report documents the results of surveys conducted for Swainson's hawk *(Buteo swainsoni*) as outlined in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000).

Environmental Setting

The 3.76-acre project site is located at 2355 Franklin Road (Assessor Parcel Number 005-230-010) in unincorporated Merced County, approximately two miles northwest of the City of Merced at the State Route 99/Franklin Road interchange. The project site is within the Franklin Beachwood Community Plan Area. Franklin Road borders the western and eastern boundaries of the site with Ashby Road to the north and State Route 99 to the south. A residence and the Franklin Pet Cemetery border the site on the west, agricultural land on the north, rural residences and an automotive sales business on the east, and State Route 99 on the south. At the time of the surveys, 0.26 acres of the property itself was developed with a residential house with a driveway and various trees surrounding the structure. The remaining 3.5 acres of the property was sown with cover crops and non-native grasses. The area within a one-half radius surrounding the property was surveyed per Swainson's Hawk survey protocol (California Department of Fish and Game 1994). The survey area is bisected by State Route 99 and made up of agricultural lands to the east (almond, row crops, fallow fields), a dairy farm to the southwest, and rural houses and small farms scattered intermittently throughout.

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Methods

Prior to the start of surveys, a records search of the California Natural Diversity Database was conducted to identify records of Swainson's hawk observations (Figure 1) (CDFW 2023) to determine the historical presence of the species in the vicinity.

Inger Marie Laursen, Associate Biologist, completed Swainson's hawk nesting bird surveys within the one-half mile survey area. She was assisted by EMC Planning Group biologists Patrick Furtado and Katherine Hardisty-Cranstone. All potential nest trees were surveyed from multiple angles for the presence of a nest using a Nikon Fieldscope ED 25-75x spotting scope and Lecia 10x42 binoculars.

All surveys began at sunrise and continued until noon or later. One survey occurred at the start off Survey Period II to familiarize biologists with the terrain. Three surveys were conducted in Survey Period III between April 5 and April 20 to identify potential nest sites and three more were conducted in Survey Period V between June 10 and July 30 to assess nesting success. Each survey was conducted via car as recommended by the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000). Frequent stops were made to assess nearby trees and fields for raptors.

Results

The findings of each survey are organized by date and survey period below.

Survey Period II

March 23, 2023: Patrick Furtado and Inger Marie Laursen arrived at the site at 7 am to familiarize themselves with the layout and prepare for the subsequent surveys. Trees within half mile surrounding the project site were inspected to identify potential raptor nesting sites. The survey concluded at 11:00 am.

Survey Period III

April 9, 2023: Inger Marie Laursen arrived at the project site and began surveying at 6:50 am. The skies were clear, temperature of 48 degrees Fahrenheit, and no wind. Surveying by car, she headed north and west at the beginning of the survey, stopping regularly to scan the trees for nests and raptors, both perched or flying.

From 8:56-10:58 am, she observed a pair of Swainson's hawks in the area of Ranchero Lane and Lobo Avenue. One adult (light morph) was observed soaring and foraging over the

grassland. The adult then perched in a tree near the corner of Lobo Avenue and Ranchero Lane with nest sticks present in adjacent trees. A second adult (dark-morph) was perched in a redwood tree at the other end of the grassland by the Joe Stefani Elementary School.

At 11:11 am, Laursen observed a red-tailed hawk *(Buteo jamaicensis*) flying to its nest in a eucalyptus tree behind a house on Bronco Lane. No Swainson's hawks were seen in the vicinity.

At 11:44 am, Laursen returned to Swainson's hawk pair at Lobos and Ranchero. She observed an adult Swainson's hawk in a complete nest located in a deciduous tree in a grassland near the corner of Lobo Avenue and Ranchero Lane. The dark-morph presumed female was observed returning to the nest with nesting material. The female was also observed laying down in the nest, presumably incubating eggs. The pair was also heard vocalizing during the observational periods. See Figure 2, Swainson's Hawk Observations, for the location of the nest and Figure 3, Swainson's Hawk Nesting Pair Photographs, for focal observation and confirmation of Swainson's hawk. Both American crows (*Corvus brachyrhynchos*) and California scrub-jays (*Aphelocoma californica*) were mobbing the Swainson's hawk pair in their nest tree. She viewed a second nest with unknown status in the tree adjacent to the nest tree.

No other Swainson's hawks were seen during this survey. The survey concluded at 1:14 pm.

April 17, 2023: Laursen arrived at the project site and began surveying at 6:55 am, the late timing due to traffic. The sky was 100% overcast with a temperature of 48 degrees Fahrenheit and up to 2 mph winds.

From 6:55 to 7:49 am, Laursen observed the nesting pair seen on April 9th. The dark-morph and presumed female was seen laying down in the nest while the other adult was not visible in the area. The nest was observed from multiple angles as the tree was beginning to leaf out. The adult in the nest stood up at one point and seemed to be adjusting eggs in the nest before laying back down. The survey proceeded north of the project site where Laursen heard a Swainson's hawk call. While no individual was observed, one red-tailed hawk was seen foraging over the nearby field.

The same red-tailed hawk nest as seen on March 23 and April 9 was observed at 10:00 am on south side of project site. The pair was present at the nest and at least one of the adults was in the nest at all times.

A second pair of red-tailed hawks was seen in a nest located in the driveway of 3476 Elliott Avenue, identified by their distinctive call. The adult pair was in the process of building a nest in the crown of a populus tree. The pair copulated five times during the observation.

No other raptors were observed during the survey. The survey concluded at 1:17 pm.

April 20, 2023: Laursen arrived at the project site at 6:35 am to clear skies, 46 degrees Fahrenheit and up to 2 mph winds. She started the survey heading south by car on Franklin Road to check on the red-tailed hawk nest at Bronco Lane. It was still active with an adult on the nest. The red-tailed hawk nest at Elliot Avenue was also active. One adult was seen in each respective nest with the second adult not visible in the nest or surrounding area.

From 9:59-12:30, Laursen monitored the known Swainson's hawk nest near Ranchero Lane. The presumed dark-morph female was on and off the nest periodically throughout observation period. The female was observed foraging over the grassland and returning to the nest with sticks. The male was often perched near the nest and the pair was heard vocalizing frequently throughout the morning.

No other raptors were observed during the survey. The survey concluded at 12:30 pm.

Survey Period V

June 12, 2023: Starting at 5:39 am on the south border of the parcel, Inger Marie Laursen and Katherine Hardisty-Cranstone moved south to begin their search. The weather conditions began at 60 degrees Fahrenheit with 70% cloud cover and minimal winds. Laursen and Cranstone observed a new pair of Swainson's hawks south of Franklin Road by a canal. The same pair may have been observed 20 minutes later on the north side of State Route 99 on Ashby Road in the eucalyptus grove near the Franklin Pet Cemetery. One dark morph Swainson's hawk flew overhead once with nesting material in the south grove of eucalyptus by the Franklin Pet Cemetery, but no nest was found. It is possible that this was a pair that had a failed nest and showed up in the area late in the nesting season.

The active Swainson's hawk nest by Lobo Avenue and Ranchero Lane had one large nestling with a downy head and pin feathers present on wings, back, and tail. Laursen and Cranstone observed the dark-morph female in the nest and the light morph male provisioning food.

The red-tailed hawk nest by Elliot Avenue seemed to have failed. No hawks were seen in the vicinity and no movement or vocalizations were observed in the nest. The red-tailed hawk nest in the eucalyptus grove by Bronco Lane contained two healthy and well-developed

young that were estimated to be near the fledgling stage. The adults were seen perched in surrounding trees.

The survey concluded at 12:30.

June 21, 2023: Laursen and Cranstone started the day at 5:41 am observing the Swainson's hawk nest at Lobo Avenue and Ranchero Lane. The two adults were observed perched in the populus tree across the street to the south of the nest tree; vocalizing, and hunting over the adjacent grassland. The chick was in the nest. It displayed much darker colors than on the June 12 survey. Laursen and Cranstone met Darlene Stolling, the previous owner of the property where the nest was located. She informed Laursen and Cranstone that the Swainson's hawks have been nesting in those set of trees for decades. The property is now owned by the county and is slated for a large, high impact park development that will include basketball courts, baseball fields, a community center, walking trails, and more.

At 7 am, a second pair of Swainson's hawks were observed quite close to the established Swainson's hawk nest. Laursen and Cranstone were able to confirm that the first pair was still perched in the tree by the Stolling house. Laursen and Cranstone speculate that it could be the wandering pair viewed on June 12.

One white-tailed kite (*Elanus leucurus*) was observed foraging above a cattle field due west of Franklin Elementary School.

Upon completing the preliminary circuit of the northern portion of the survey area, one light-morph Swainson's hawk was observed taking off from the eucalyptus grove where one was seen with nesting material on June 12. It soared over the orchard south of State Route 99 by the Franklin Pet Cemetery. Laursen and Cranstone scanned the eucalyptus grove once more and attempted to find the individual on the south side of State Route 99, but no obvious nests were observed.

The red-tailed hawk nest on Bronco Lane contained two juveniles vocalizing and exhibiting branching behavior. Upon revisiting the failed red-tailed hawk nesting tree on Elliot Avenue, Laursen and Cranstone observed two dark morph red-tailed hawks carrying nesting materials towards a eucalyptus tree near an old barn. They were unable to determine nest or chick status as the nest was presumably on the far side of the tree and outside of the survey area.

Laursen and Cranstone returned to the drainage ditch south of Franklin Road where the wandering Swainson's hawk pair was observed on June 12. They observed a partial nest and either a dark morph Swainson's hawk or red-tailed hawk perched at the top of the tree. The individual and nest tree were observed for an hour and no activity was viewed in or around

the nest. One red-shouldered hawk (*Buteo lineatus*) was observed on a telephone wire near nest as well as a pair of red-tailed hawks.

The survey concluded at 12:00 pm after returning to the established Swainson's hawk nest and observing the chick as it adjusted itself in the nest.

July 9, 2023: Laursen and Cranstone arrived at the known Swainson's hawk nest at 5:31 am to clear skies, 56 degrees Fahrenheit and up to 3 mph winds. Both adults were perched in the populus tree across Lobo Avenue from the nest tree. The juvenile fledged between June 21st and July 9th and was observed perched near the nest tree vocalizing for food and being mobbed by northern mockingbirds (*Mimus polyglottos)*. The juvenile Swainson's hawk flew out of sight for two hours while the two adults remained near nest tree, calling for the juvenile to return. The dark morph female looked to be molting. The juvenile returned to nest tree, but no parental feedings occurred.

Laursen and Cranstone surveyed the north portion of the site and saw one red-tailed hawk perched on a light post over State Route 99, but observed no other raptor activity in the area.

On the southern side of State Route 99, Laursen and Cranstone went to inspect the Bronco Lane red-tailed hawk nest. The nest was empty and no individuals were observed in or around the area. Laursen determined that the juveniles had fledged.

At 9 am, an osprey (*Pandion haliaetus*) was observed perched and hunting over the agricultural drainage ditch south of Franklin Road. The wandering Swainson's hawk pair from earlier in the season was not seen anywhere in the survey area.

A thorough survey was done of the half mile radius and no further raptor activity was observed. Laursen and Cranstone concluded the survey at 12 pm at the Swainson's hawk nest where the fledged juvenile had returned to the nest and was vocalizing for food while the parents soared nearby. The skies were clear with up to 4.6 mph winds and the temperature was 71.9 degrees Fahrenheit.

Conclusions

The *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (California Department of Fish and Game 1994) establishes that a ten-mile radius is the standard flight distance between active and successful nest sites and suitable foraging habitats. It also establishes that alfalfa, low growing field crops, fallow fields, and cereal grain crops constitute foraging habitat for Swainson's hawks. Due to the proximity of the nesting Swainson's hawk pair identified 1,866 feet (0.35 miles) from the project site, the 3.5 acres of

oats and non-native grasses on the project site has potential to provide foraging habitat. The following potentially significant impacts to nesting Swainson's hawks could occur as a result of project implementation:

- The proposed project could have a significant impact on Swainson's hawk habitat due to the loss of 3.5 acres of Swainson's hawk foraging habitat.

- Construction impacts such as noise, human disturbance, dust, or other intrusions during the breeding season could result in indirect impacts to Swainson's hawk, causing behavioral changes or impacts including the incidental loss of fertile eggs or nestlings, or the abandonment of nests. These impacts are considered potentially significant

The following measures are recommended to avoid, reduce, or mitigation potential impacts to Swainson's hawk:

1. An active nest tree was documented during the 2023 nesting season within 0.35 miles of the project site. Therefore, consultation with the California Department of Fish and Wildlife and mitigation for the loss of foraging habitat on the project site is required per the guidelines outlined in the *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (California Department of Fish and Game 1994). Suitable foraging habitat includes fallow land, alfalfa or other low growing crops (California Department of Fish and Game 1994). Prior to the issuance of grading permits, the project applicant shall provide the County of Merced Planning Department with evidence that the applicant has compensated for the loss of Swainson's hawk foraging habitat.

   Consultation with the California Department of Fish and Wildlife should be initiated by the applicant. There are two options for mitigating loss of foraging habitat:

   a. A 1:1 acre ratio of Habitat Management land (at least 10% of the habitat management land requirements shall be met by fee title acquisition or a conservation easement allowing for the active management of the habitat, with the remaining 90% of the habitat management lands protected by a conservation easement [acceptable to the California Department of Fish and Wildlife] on agricultural lands or other suitable habitats which provide foraging habitat for Swainson's hawk) for each acre of development authorized (3.5 acres total); or

   b. A 0.5:1 acre ratio of habitat management land (all of the habitat management land requirements shall be met by fee title acquisition or a conservation easement [acceptable to the California Department of Fish

and Wildlife] which allows for the active management of the habitat for prey production on-the Habitat Management lands) for each acre of development authorized (1.75 acres total).

2. If construction is to be initiated outside of the nesting season (March 1–September 15), construction may proceed once mitigation for the loss of foraging habitat has been completed and evidence submitted to the County of Merced Planning Department.

3. If construction is to be initiated during the breeding season (March 1 through September 15), a qualified biologist shall conduct preconstruction surveys for Swainson's hawk nests on or within 0.25 miles of the project site. The preconstruction surveys shall be conducted between March 1 through September 15 and shall follow the protocol in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000). If no nests are found within 0.25 miles, a letter report will be prepared by the biologist and submitted to the Merced County Planning Department, where it will be kept on file. Once mitigation for the loss of foraging habitat has been completed and evidence submitted to the County of Merced Planning Department, construction may proceed.

   If active Swainson's hawk nests are located within 0.25 miles of proposed construction activities, construction shall not begin, or shall be discontinued, until the project applicant has consulted with the California Department of Fish and Wildlife to determine the appropriate course of action, consistent with the guidance provided in the *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (California Department of Fish and Game 1994), to reduce potential impacts on nesting Swainson's hawk and to determine under what circumstances construction activities can occur.

   Options for measures to reduce potential impacts may include, but not be limited to one or more of the following: the creation of buffers as measured from the nest(s) locations within which no construction is permitted until the young have left the nest, limits on the timing or location of use of construction equipment, limits on the types of equipment used to reduce noise intensity, and/or other options acceptable to the California Department of Fish and Wildlife. Equipment operation and construction activity shall be suspended until the California Department of Fish and Wildlife provides direction. If ground-disturbing activities are delayed, then additional pre-disturbance surveys shall be conducted such that no more than seven days elapse between the survey and ground-disturbing activities. The qualified biologist shall serve as a construction monitor during those

periods when construction activities are to occur near active nest areas to avoid inadvertent impacts to these nests.

4. If it is determined during consultation with the California Department of Fish and Wildlife that impacts to Swainson's hawk cannot be avoided, Incidental Take Authorization will be obtained. Compliance with permit conditions shall be required prior to the start of disturbance activities.

Records documenting the observations of Swainson's hawk made during this survey were submitted to the California Natural Diversity Database on April 28, 2023, and July 11, 2023 (Attachment 1). We hope this letter meets your needs at this time. If you have any questions, please contact Katherine Hardisty-Cranstone at hardistycranstone@emcplanning.com.

Sincerely,

Katherine Hardisty-Cranstone
Assistant Biologist

Inger Marie Laursen
Associate Biologist

Attachments:

Figure 1 Historical Swainson's Hawk Records in the Project Vicinity
Figure 2 Swainson's Hawk Observations
Figure 3 Swainson's Hawk Nesting Pair Photographs

Attachment 1. California Natural Diversity Database Forms

Sources

Bechard, M. J., C. S. Houston, J. H. Sarasola, and A. S. England (2020). Swainson's Hawk (*Buteo swainsoni*), version 1.0. *Birds of the World* (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA.

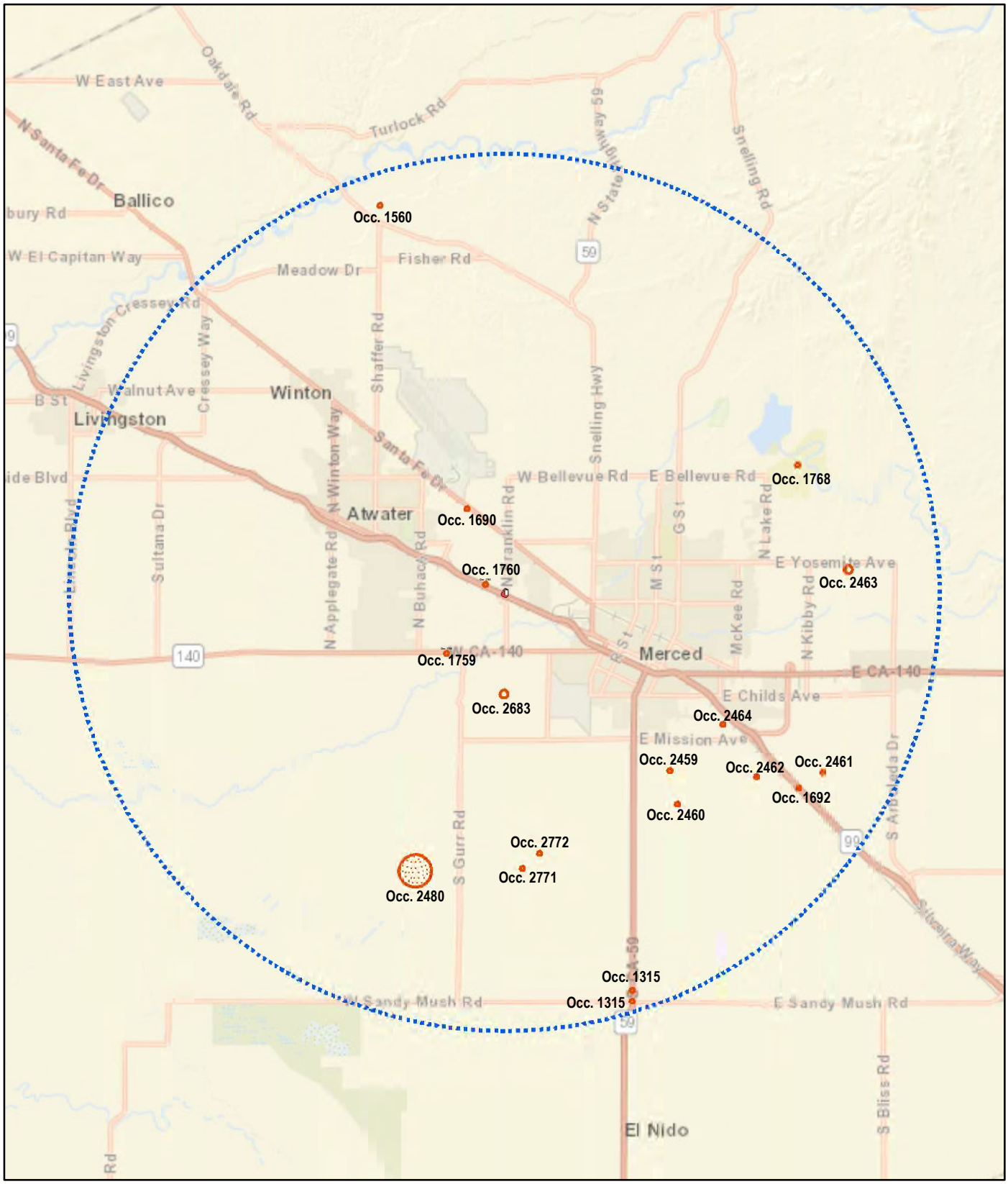
California Department of Fish and Wildlife (CDFW). 2023. California Natural Diversity Database (CNDDB) online database. https://wildlife.ca.gov/data/cnddb

California Department of Fish and Game (CDFG). 1994. *Staff Report regarding Mitigation for Impacts to Swainson's Hawks (Buteo swainsoni) in the Central Valley of California.*

Cornell Lab of Ornithology. 2023. *Merlin.*

David Allen Sibley. 2003. *The Sibley Field Guide to Birds of Western North America.*

Swainson's Hawk Technical Advisory Committee. 2000. *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley*.



0 4 miles

Project Location

Swainson's Hawk Records

10-Mile Radius

Source: ESRI 2023, CDFW CNDDB 2023

Figure 1

Historical Swainson's Hawk Records in the Project Vicinity

2355 Franklin Road Gas Station & Commercial Center



0 900 feet

Project Location

0.5-Mile Radius

Swainson's Hawk Nest

Source: Merced County GIS 2022, ESRI 2023

Figure 2

Swainson's Hawk Observations

2355 Franklin Road Gas Station & Commercial Center



Photo 1. Swainson's hawk flying with nesting material



Photo 2. Swainson's hawk nest with perched adult located 0.35 miles from project site.



Photo 3. Nesting pair of Swainson's hawks perched near nest tree



Photo 4. Fledged juvenile Swainson's hawk perched near nest tree

Source: EMC Planning Group 2023

Figure 3

Swainson's Hawk Nesting Pair Photographs

2355 Franklin Road Gas Station & Commercial Center

CNDDB Online Field Survey Form Report

California Natural Diversity Database
Department of Fish and Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: 916.324.0475
cnddb@wildlife.ca.gov
www.dfg.ca.gov/biogeodata/cnddb/

This data has been reported to the CNDDB, but may not have been evaluated by the CNDDB staff

Source code LAU23F0001
Quad code 3712035
Occ. no. _____
EO index no. _____
Map index no. _____

Scientific name: *Buteo swainsoni*

Common name: Swainson's hawk

Date of field work (mm-dd-yyyy): 04-09-2023

Comment about field work date(s): Swainson's Hawk Protocol Survey

OBSERVER INFORMATION

Observer: Inger Marie Laursen

Affiliation:

Address: 240 Cox Road , Aptos, CA 95003

Email: iml@jaredphoto.com

Phone: (831) 334-9287

Other observers:

DETERMINATION

Keyed in: Sibley Field Guide to Birds of Western North America

Compared w/ specimen at:

Compared w/ image in:

By another person:

Other:

Identification explanation: Long-slender wings with pointed tips, dark (grey) flight feathers, white dorsal rump band, wide sub-terminal band on tail, under tail coverts are light and striped, dark hood (on throat and upper breast), pale under wing coverts.

Identification confidence: Very confident

Species found: Yes **If not found, why not?**

Level of survey effort: 3 Protocol surveys during April 5 -20.

Total number of individuals: 2

Collection? **Collection number:**

Museum/Herbarium:

ANIMAL INFORMATION

How was the detection made? Seen

Number detected in each age class:

adults	juveniles	larvae	egg mass	unknown
2				

Age class comment: 2 Adults

Bird site use:

☑ **Nesting** ☐ **Rookery** ☐ **Nesting colony** ☐ **Burrow site** ☐ **Lek**

☐ **Non-breeding (over-wintering)** ☐ **Communal roost** ☐ **Other**

Site use description: Adults incubating in deciduous tree.

What was the observed behavior? Nest was in incubation stage. 9 April 2023: Adult observed in nest. Both female (dark morph) and male (light morph) observed at nest. Adults foraging over grassland. Adults also observed at/in nest on April 17 and April 20.

Describe any evidence of reproduction: Adults was observed in the nest. Incubating stage. Adults were bringing additional nesting material to the nest.

SITE INFORMATION

Habitat description: Nest is located in a deciduous in the grassland at the corner of Lobo Avenue and Ranchero Lane.

Slope: Land owner/manager: NA

Aspect:

Site condition + population viability: Fair

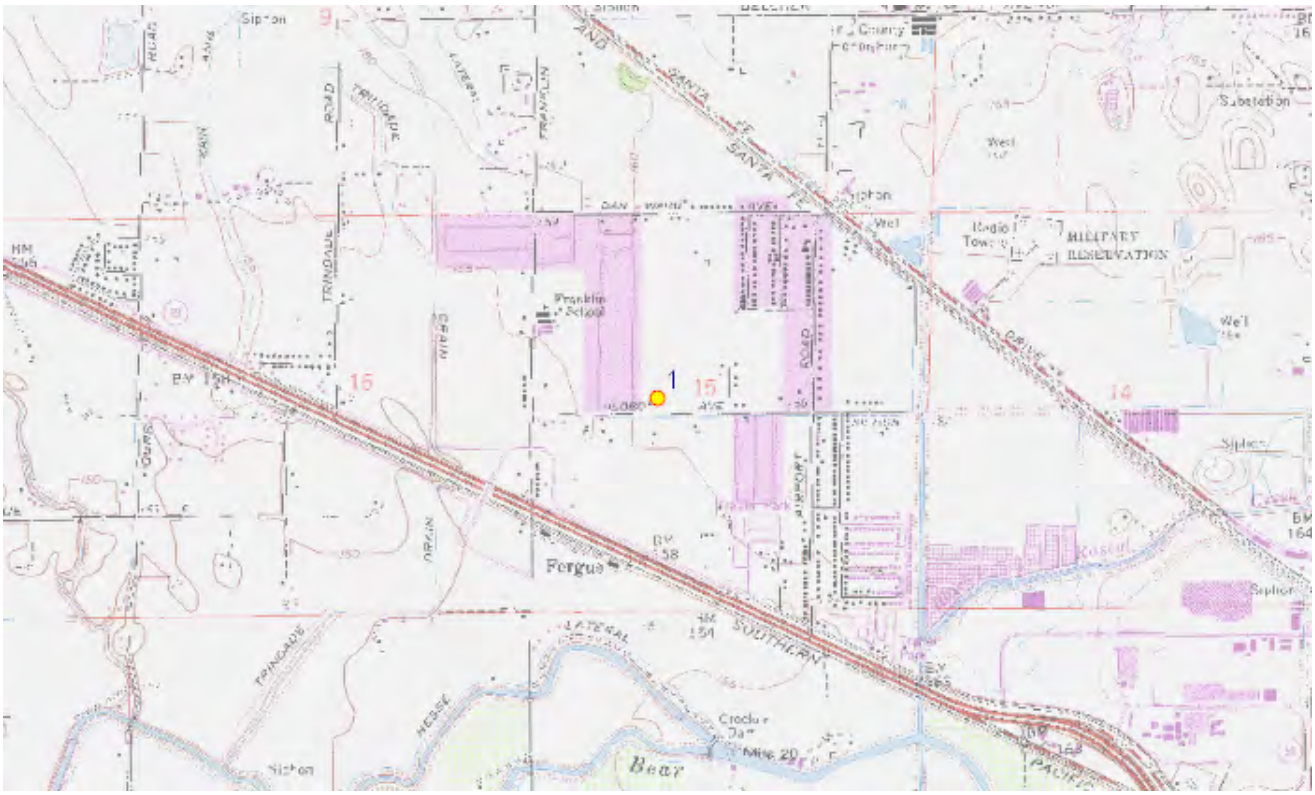
Immediate & surrounding land use: Residential, Elementary School, small ranches, grassland, ag (row crops, grain fields), light industry, roads.

Visible disturbances: Adjacent to residential, small farms and school properties.

Threats: Loss of foraging habitat due any further growth of housing/industry and orchards.

General comments: Nest is located in third tree from Lobo Avenue.

MAP INFORMATION



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTM E NAD83	UTM N NAD83	UTM Zone
	Merced	Atwater	158	37.32493	-120.53516	718392	4133769	10
1	**Public Land Survey**	**Feature Comment**						
	M T07S R13E 15	SWHA nest						

The mapped feature is accurate within: 5 m

Source of mapped feature: google earth

Mapping notes: From google earth

Location/directions comments:

Attachment(s):	20230420-IMG_0541-IML.jpg, Image shows one adults in nest and one perched on branch nearby. ; 20230420-IMG_0406-IML.jpg, Female flying with nesting material.; 20230420-IMG_0394-IML.jpg, Female standing in nest.; 20230420-IMG_0393-IML.jpg, Adult incubating. ; 20230417-IMG_1624-IML.jpg, Nest tree and habitat viewed from Lobo Avenue. ; 20230409-IMG_1036-IML.jpg, Nest tree and habitat viewed from Ranchero Lane.

CNDDB Online Field Survey Form Report

California Natural Diversity Database
Department of Fish and Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: 916.324.0475
cnddb@wildlife.ca.gov
www.dfg.ca.gov/biogeodata/cnddb/

This data has been reported to the CNDDB, but may not have been evaluated by the CNDDB staff

Source code LAU23F0002
Quad code 3712035
Occ. no. _____
EO index no. _____
Map index no. _____

Scientific name: *Buteo swainsoni*

Common name: Swainson's hawk

Date of field work (mm-dd-yyyy): 07-09-2023

Comment about field work date(s): Swainson's Hawk Protocol Survey.

OBSERVER INFORMATION

Observer: Inger Marie Laursen

Affiliation:

Address: 240 Cox Road , Aptos, CA 95003

Email: iml@jaredphoto.com

Phone: (831) 334-9287

Other observers:

DETERMINATION

Keyed in: Sibley Field Guide to Birds of Western North America

Compared w/ specimen at:

Compared w/ image in:

By another person:

Other:

Identification explanation: Long-slender wings with pointed tips, dark (grey) flight feathers, white dorsal rump band, wide sub-terminal band on tail, under tail coverts are light and striped, dark hood (on throat and upper breast), pale under wing coverts.

Identification confidence: Very confident

Species found: Yes **If not found, why not?**

Level of survey effort: Swainson's Hawk Protocol Surveys for period 5 on 12 June, 21 June and 9 July. Submitted a previous CNDDB record on 28 April 2023 for this nest during incubation covering the second protocol survey period.

Total number of individuals: 3

Collection? No **Collection number:**

Museum/Herbarium:

ANIMAL INFORMATION

How was the detection made? Seen

Number detected in each age class:

adults	juveniles	larvae	egg mass	unknown
2	1			

Age class comment: 2 Adults (female = dark morph, male = light morph) and 1 nestling that had fledged by 9 July.

Bird site use:

☑ **Nesting** ☐ **Rookery** ☐ **Nesting colony** ☐ **Burrow site** ☐ **Lek**

☐ **Non-breeding (over-wintering)** ☐ **Communal roost** ☐ **Other**

Site use description: Adults nesting in deciduous tree.

What was the observed behavior? On 12 June downy chick. On 21 June chick covered with mature feathers and minimal down (age ~ 39 days old). On 9 July fledgling was flying independently in the area, calling/begging while perched in trees and from natal nest. Adults were present.

Describe any evidence of reproduction: Nestling in nest cared for by adults.

SITE INFORMATION

Habitat description: Nest is located in a deciduous in the grassland at the corner of Lobo Avenue and Ranchero Lane.

Slope: Land owner/manager: County of Merced

Aspect:

Site condition + population viability: Fair

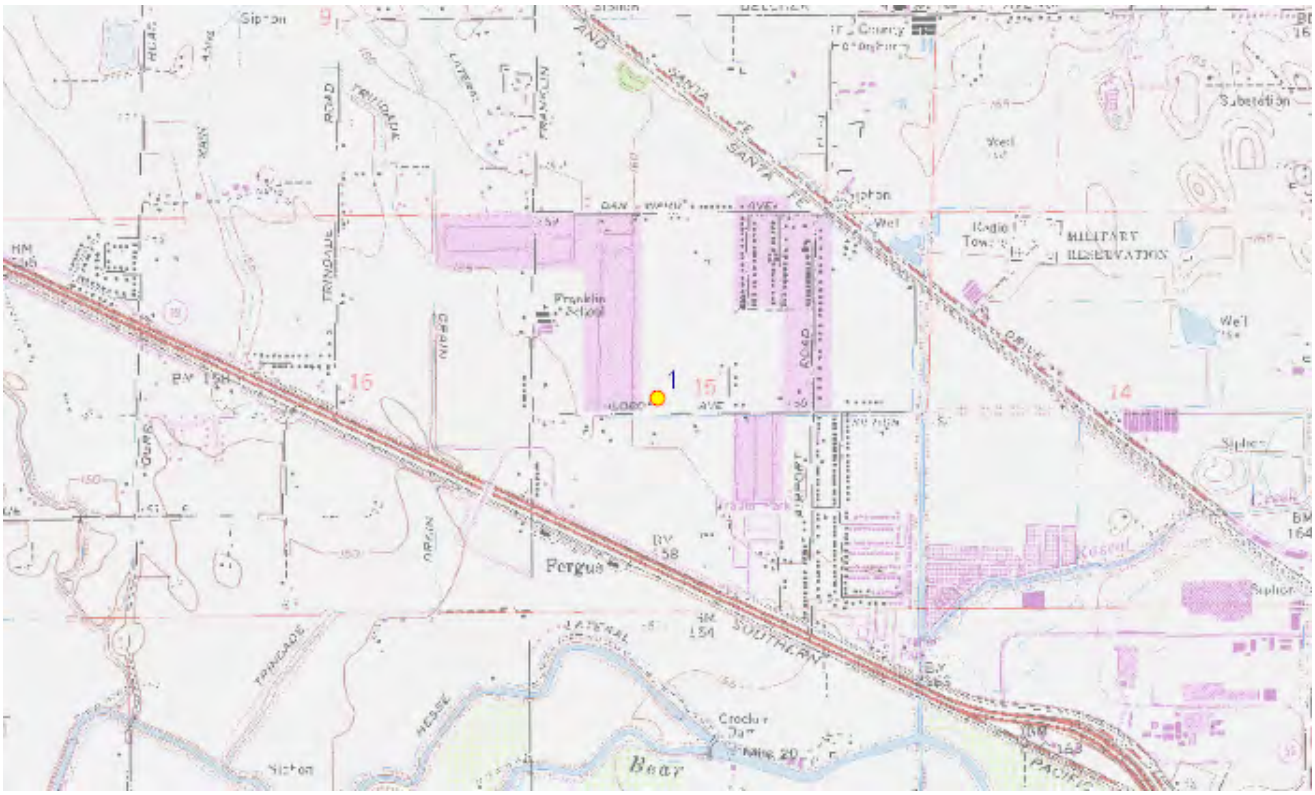
Immediate & surrounding land use: Residential, Elementary School, small ranches, grassland, ag (row crops, grain fields), light industry, road, HWY 99.

Visible disturbances: Adjacent to residential, small farms and school properties.

Threats: Loss of nesting and foraging habitat due to any further growth of housing/industry, orchard, etc.

General comments: Nest is located in the third deciduous tree from Lobo Avenue.

MAP INFORMATION



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTM E NAD83	UTM N NAD83	UTM Zone
	Merced	Atwater	158	37.32493	-120.53516	718393	4133768	10
1	**Public Land Survey**	**Feature Comment**						
	M T07S R13E 15	SWHA nest						

The mapped feature is accurate within: 5 m

Source of mapped feature: Google earth

Mapping notes:

Location/directions comments:

Attachment(s):	SWHA nestling_LoboAve_12June23_IML.jpg; SWHA_NestTree_LoboAve_12June23_IML.jpg; SWHA_Nestling_LoboAve_21June23_IML.jpg; SWHA_fledgling_LoboAve_9July_IML.jpg; SWHA_Pair_9July2023_IML.jpg, Adults perched in tree south of Lobo Avenue across from nest tree.

California American Water Will-Serve Letter

D

APPENDIX

CALIFORNIA
AMERICAN WATER

March 8, 2022

Inderjeet Singh
560 Pine Creek Circle
Fairfield, CA 95434

SUBJECT: REQUEST FOR WATER SERVICE – CONDITIONAL WILL SERVE LETTER

2355 Franklin Blvd.
Meadowbrook, District

Dear Inderjeet Singh:

This letter responds to your request for new water service and describes the requirements and process to establish new water service connections. This letter also serves as notice that the area planned to be developed at **Franklin Rd.**, Merced County, is within the service area of the Meadowbrook, system of California American Water ("CAW"), a public utility operating under the jurisdiction of the California Public Utilities Commission ("CPUC").

Water service will be furnished to this project in accordance with CPUC rules and regulations and CAW tariffs on file with the CPUC. A copy of CAW's Service Installation Rule 16 ("Rule 16") filed with the CPUC is enclosed. This Rule calls for the cost of water facilities to be contributed to CAW.

Every project will have specific fees or infrastructure requirements necessary to provide adequate water service. Designs must be in accordance with CAW standards and specifications, and in accordance with state, local codes, CPUC regulations and other requirements. Based on the project water demand requirements and the preliminary design documents, CAW's Engineering and Operations staff will review the project and identify the extent of the required water system improvements necessary to serve the project.

Be advised that facilities associated with the water service, installed downstream of the water meter or the property line are the responsibility of the property owner, not CAW. Any and all costs of initial construction and continued maintenance of such facilities are the responsibility of the property owner.

To protect the public water supply, installation of a CAW approved backflow prevention device may be required, prior to activating water service. In these cases, prior to service activation, the applicant will be required to: (a) furnish certification from the California Department of Water Resources and/or the Merced County Health Department that any privately owned well has been properly abandoned; or (b) install a CAW approved and Merced County Certified backflow prevention device at the applicant's expense.

Upon the completion of the final walk-through inspection by CAW, you will be billed for all new water service installations within the project boundary in accordance with the current CAW tariff. The applicant is responsible for notifying CAW of any change in the party to be billed due to transfer of ownership or occupancy.

Additional project related design and processing requirements are outlined in the attached Information Sheet for your reference. This conditional Will Serve Letter is valid for one (1) year from issuance.

CAW looks forward to being the water service provider for the proposed project and will work with you to make the project a success. Upon receipt of the required submittals, CAW will assign the project to appropriate staff and begin assisting with identification of the necessary water facilities through the design review process. If we can be of further assistance, please call Spencer Phillips at (916) 568-4210.

Sincerely,

CALIFORNIA-AMERICAN WATER COMPANY

S. Audie Foster

S. Audie Foster
Director of Operations
Northern Division

Enclosure: CPUC Rule 16

Transportation Analysis

E

APPENDIX

TRANSPORTATION IMPACT ANALYSIS

FOR

FRANKLIN ROAD RETAIL CENTER PROJECT

Merced County, CA

Prepared for:

EMC Planning Group
301 Lighthouse Avenue, Suite C
Monterey, CA 93940

Prepared by:

KDAnderson & Associates, Inc.
3853 Taylor Road, Suite G
Loomis, CA 95650
(916) 660-1555

July 5, 2022

2925-40

TRANSPORTATION IMPACT ANALYSIS FOR
FRANKLIN ROAD RETAIL CENTER PROJECT
Merced County, CA

TABLE OF CONTENTS

INTRODUCTION 1
Proposed Project 1
Study Scope 1
Study Area 2
Summary Conclusions 2

EXISTING SETTING 8
Existing Circulation System 8
Alternative Transportation Modes 10
Existing Traffic Volumes 11

REGULATORY FRAMEWORK 13
State of California 13
Regional 13
Local 14

PROJECT CHARACTERISTICS 17
Project Description 17
Project Travel Characteristics 17
External Trip Distribution 20
Trip Assignment 21

EXISTING PLUS PROJECT CEQA IMPACTS 23
Level of Service and Vehicle Miles Traveled (VMT) 23
VMT Methods and Significance Criteria 23
Impacts to Other Transportation Modes 25
Safety Impacts to Caltrans Facilities 26

TRAFFIC OPERATIONAL ANALYSIS 27
Level of Service Calculation 27
Current Peak Hour Traffic Conditions 28
Existing Plus Project Traffic Operational Effects 33
Future Cumulative Traffic Operations Assumptions 36
Future Cumulative No Project Traffic Operations Results 40
Future Cumulative Plus Project Traffic Operational Effects 46

APPENDIX 50

KDA

TRANSPORTATION IMPACT ANALYSIS FOR
FRANKLIN ROAD RETAIL CENTER PROJECT
Merced County, CA

INTRODUCTION

This report summarizes analysis of **KDAnderson & Associates'** analysis of the potential transportation impacts associated with development of the Franklin Road Retail Center Project in Merced County. Figure 1 identifies the project's location along SR 99 at Franklin Road.

Proposed Project

The Franklin Road Retail Center proposes convenience oriented goods and services to motorists passing the site on SR 99 and to residents of the local Franklin-Beechwood area. The project includes these land uses, as shown in Figure 2.

- 3,200 sf convenience store with 22 vehicle fueling positions
- 2,800 sf fast food restaurant with drive-thru
- 2,200 sf coffee shop with drive-thru

As shown in Figure 2 the project site plan proposes full access driveways on Franklin Road and on Ashby Road.

Study Scope

The purpose of this analysis is to identify potential transportation impacts under the requirements of the California Environmental Quality Act (CEQA) as well as traffic operational effects as they relate to the introduction of project automobile and truck traffic on state highways and Merced County Road. The analysis includes an evaluation of the current setting based on existing traffic operations. The status of facilities serving all transportation modes (i.e., motor vehicles, pedestrians, bicycles and transit) have been described. Project effects have been identified based on anticipated automobile and truck trip generation / distribution that reflects proposed access to adjoining streets. CEQA impacts relating to Vehicle Miles Traveled (VMT) with regular operation of the project has been discussed within the context of screening criteria presented in Governors' Office of Planning and Research (OPR) CEQA guidance. A traffic operations analysis was also conducted to identify the project's effects on state highway safety and to assess consistency with Merced County General Plan policies for the operation of the area circulation system. Applicable CEQA mitigation measures relating to VMT and safety have been identified, and alternative improvements needed to meet Merced County General Plan Circulation Element policy standards have been suggested.

Study Area

The Franklin Road Retail Center site is located in the area north of State Route 99 (SR 99) in the rural Merced County community of Franklin - Beachwood. The study area includes the adjoining SR 99 NB on and off ramps as well as local Merced County intersections adjoining the project.

Summary Conclusions

Setting. The project will have regional access to northbound SR 99, a controlled access freeway that links the site with other Merced County communities and is the regional backbone of the Central Valley circulation system. Local access is available via Franklin Road through the community of Franklin - Beachwood and via Ashby Road. Direct site access will occur at new driveways on Franklin Road and Ashby Road near their intersection.

Current peak hour traffic operations were evaluated in the morning, afternoon and evening peak hours at key intersections. Today the Franklin Road / Ashby Road intersection and the Franklin Road / Lobo Avenue intersection operate with Levels of Service that exceed minimum Merced County General Plan requirements during the a.m. peak hour. Peak hour traffic signal warrants are met at each intersection.

The Franklin - Beachwood Transportation Study (FBTS) and Impact Fee Update[1] prepared for Merced County indicated that a traffic signal could be installed at the Franklin Road / Lobo Avenue intersection without adding any turn lanes. This improvement would yield LOS B in the a.m. peak hour.

The FBTS indicated that a roundabout could be installed at the Franklin Road, and a single lane roundabout would yield LOS A under existing conditions. The FBTS included a preliminary roundabout layout accommodating Cal-Legal trucks. The availability of right of way for this improvement design, or for a layout accommodating STAA trucks is unknown. The Franklin - Beachwood Bridge & Major Thoroughfare (FB B&MT) fee project list suggests that a traffic signal would be installed at this location. A traffic signal would need to be accompanied by intersection widening to accommodate separate left turn lanes on each approach as well as the turning requirement of trucks. The availability of right of way for this level of improvement is unknown. A traffic signal would deliver LOS C in the a.m. peak hour with current traffic volumes.

Trip Generation. The proposed project is expected to generate 5,515 external daily trips of which 2,757 would be diverted from traffic already on SR 99 or would be "pass-by" trips from the stream of traffic already on Franklin Road and Ashby Road. 2,758 daily primary trips would be made by persons specifically to visit the project.

[1] Franklin-Beechwood Transportation Study and Impact Fee Update, Omni-Means, 2016

CEQA VMT Impacts. SB 743 requires the Governor's Office of Planning and Research (OPR) to identify new metrics for identifying and mitigating transportation impacts within CEQA. Because Merced County has not yet adopted guidelines for evaluating the significance of VMT impacts, potential significance criteria contained in the OPR *Technical Advisory on Evaluating Transportation Impacts in CEQA* (California Governor's Office of Planning and Research 2018) have been used. The projects VMT impacts can be presumed to be less than significant under the "Locally Serving Retail" screening criteria suggested by OPR.

Impacts to Pedestrian Facilities. There are developed areas of Franklin - Beachwood that are within walking distance of the proposed project, but gaps in the system of sidewalks exist today between the project and the balance of the community. In those areas pedestrians traveling to the site would use the unpaved roadway shoulder or edge of pavement, as would be the case for any current pedestrians visiting other uses in the area of the Ashby Road / Franklin Road intersection. Due to the number of peak hour vehicles already on study area roads and the number that will be added by the project, conflicts between pedestrians and motor vehicles could increase. This is a significant impact that requires mitigation.

Pedestrian Mitigation: The project proponent shall construct an all-weather pedestrian facility within the existing right of way in the area between the project and the existing sidewalk on Franklin Road at Lobo Avenue to the satisfaction of Merced County DPW.

Impacts to Bicycle Facilities. The same issues affecting pedestrian travel also affect bicycles. The project could generate some customers or employees who elect to ride bicycles to and from the site. Bicycles would mix with motor vehicles on the routes to and from the site. During most of the day this activity does not represent a significant safety issue, but during peak traffic periods when intersection queuing occurs the project could increase bicycle / motor vehicle conflicts. This is a significant impact that requires mitigation.

Bicycle Mitigation: The project proponent shall improve the project's frontage to Merced County standards and construct shoulders on Franklin Road from Ashby Road to Lobo Avenue to the satisfaction of Merced County DPW.

Impacts to Transit. Some employees could elect to use transit service if it was convenient to the site. The closest regular transit stop is at the Dan Ward Road / Beechwood Drive intersection, which is not convenient. The extent to which Merced County Transit desires a dedicated bus stop near the project is unknown.

Transit Mitigation: If required by Merced County, a bus stop shall be developed along the project frontage.

Safety Impacts to Caltrans Facilities. Under current practice, safety impacts on state facilities are typically considered within the context of queuing on off-ramps and in turn lanes at intersections, truck turning requirements and the need for alternative traffic control devices. Queuing that spills over from a turn lane or extends down an off-ramp to the mainline freeway could represent significant safety issues. Intersections where truck paths leave the pavement or

encroach into opposing lanes are a safety issue. Operation of an intersection with inappropriate traffic control devices would also represent a potential safety issue.

The project will increase the length of the northbound queues at the Franklin Road / Ashby Road intersection and at the project access on Franklin Road. Without improvements such queues could create safety problems for off-ramp traffic. This is a significant impact that requires mitigation.

Safety Mitigation: The Project proponent shall widen Franklin Road south of the Ashby Road intersection to provide a northbound left turn lane that extends along the project's frontage.

Safety Mitigation: The Project proponent shall widen Ashby Road between the Overcrossing and Franklin Road intersection to provide a Two-Way Left Turn lane that extends along the project's frontage. Improvements to Ashby Road are included in the Franklin - Beachwood Bridge and Major Thoroughfare (FB B&MT) Fee Program.

Safety Mitigation: The Project proponent shall install a roundabout or traffic signal at the Franklin Road / Ashby Road intersection to the satisfaction of Merced County DPW. Improvements to Franklin Road / Ashby Road intersection, including a traffic signal, are included in the B&MT Fee.

With these mitigations, the project's impact to safety on state facilities is not significant.

Project Traffic Operational Effects. The additional traffic caused by the project would lengthen delays at intersections that already operate poorly in the a.m. peak hour and would also result in LOS F conditions at the Franklin Road / Ashby Road intersection during the p.m. peak hour. These conditions exceed Merced County's minimum LOS D standard.

The FBTS suggested a traffic signal at the Franklin Road / Lobo Avenue intersection. That improvement would yield LOS B in the a.m. peak hour under Existing Plus Project conditions. However, that improvement is not yet included in the FB B&MT fee.

At the Franklin Road / Ashby Road intersection the roundabout suggested by the FBTS would provide LOS B or better conditions under the Existing Plus Project condition. A traffic signal with left turn lanes would deliver LOS C. This design option would require constructing a three lane section on both Ashby Road and Franklin Road along the project frontage

Without improvements the project's traffic appreciably lengthens the 95th percentile queues near the site in peak traffic hours. Projected queue lengths are shorter with potential improvements. A roundabout at Franklin Road / Ashby Road would result in eastbound queues that extend towards but not through the project driveway. A traffic signal with left turn lanes would result in eastbound queues on Ashby Road that extended through the project driveway.

Long Term Traffic Operations without the Project. The FBTS identified Year 2035 conditions that account for Franklin - Beachwood area development and regional circulation system improvements, although no development on the Franklin Road Retail Center site was assumed under those assumptions. The Franklin Road / Lobo Avenue and Franklin Road / Ashby Road intersections would operate at LOS F with very long delays. A traffic signal at the Franklin Road / Lobo Avenue intersection would yield LOS B in the a.m. and p.m. peak hour. A single lane roundabout at the Franklin Road / Ashby Road intersection would yield LOS B in the a.m. peak hour and LOS D in the p.m. peak hour. A traffic signal with left turn lanes on all approaches would provide LOS E in the p.m. peak hour.

Long Term Conditions with Franklin Road Retail Center. The additional traffic caused by the project would lengthen delays at all intersections that are already projected to operate poorly in the future. A traffic signal at the Franklin Road / Lobo Avenue intersection would yield LOS D under Cumulative Plus Project conditions. However, as noted before this improvement is not yet included in the FB B&MT fee.

At the Franklin Road / Ashby Road intersection the roundabout suggested by the FBTS would operate at LOS E in the p.m. peak hour under the Cumulative Plus Project condition. Additional improvements beyond those suggested in the FBTS would be needed to satisfy Merced County's minimum standards. A second eastbound lane on the roundabout would be needed starting on the eastbound Ashby Road entrance and continuing around to the eastbound exit. The level of improvement would yield LOS C. However, the availability of right of way for this level of improvement is unknown.

A traffic signal with left turn lanes on all approaches would deliver LOS F under Cumulative plus Project conditions during the p.m. peak hour.

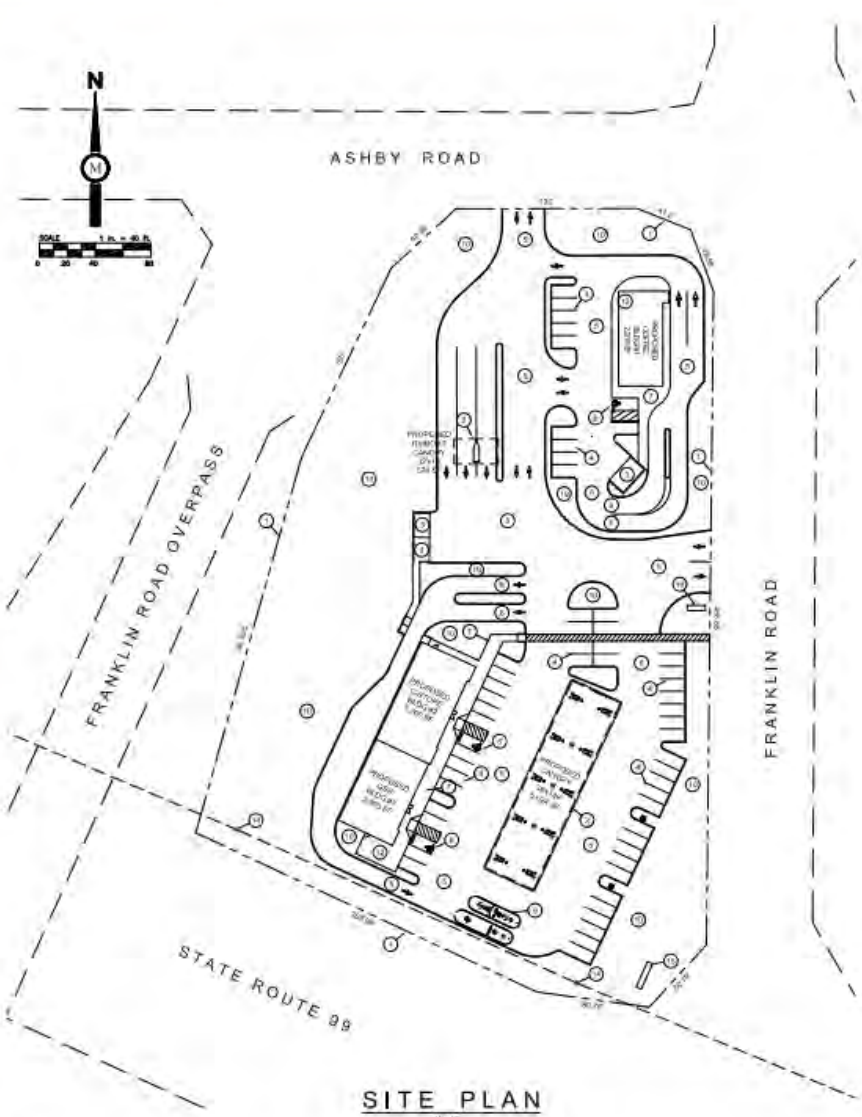


VICINITY MAP

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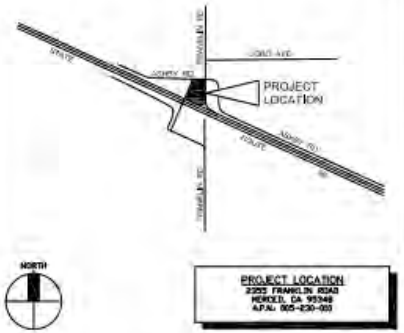
figure 1



KEYNOTES

1. PROPERTY LINE, TYPICAL
2. DASHED LINE INDICATES LINE OF FUEL CANOPY ABOVE
3. CMU TRASH ENCLOSURE , TYPICAL
4. MERCED STANDARD PARKING STALL 9'-0" WIDE x 19'-0" LONG
5. ASPHALT PAVING, TYPICAL
6. VAN ACCESSIBLE PARKING STALL, TYPICAL
7. CONCRETE WALK, TYPICAL
8. DRIVE-THRU LANE
9. UNDERGROUND FUEL TANKS
   1- 20,000 GALLON - REGULAR
   1- 20,000 GALLON SPLIT TANK - 10,000 PREMIUM, 10,000 DIESEL
10. LANDSCAPING / STORMWATER BIO-RETENTION BASIN
11. NOT USED
12. OUTDOOR DINING AREA / PATIO
13. NOT USED
14. EXISTING POWER POLE AND OVERHEAD LINES TO REMAIN
15. PROPOSED 20 FT HIGHWAY SIGN
16. PROPOSED 20 FT MONUMENT/PRICE SIGN

VICINITY MAP



PROJECT LOCATION
2355 FRANKLIN ROAD
A.P.N. 005-230-010

PROJECT TEAM

PROPERTY OWNER

INDERJEET SINGH
595 PINE CREEK CIRCLE
FAIRFIELD, CA 94534
PH. (707) 333-3444

DESIGN FIRM/AUTHORIZED AGENT

MILESTONE ASSOCIATES
JULIO TINAJERO
1000 LINCOLN ROAD, STE. H202
YUBA CITY, CA 95991
PH. (530) 755-4700
FAX (530) 755-4567

PROJECT DATA

ASSESSOR'S PARCEL NUMBER:	005-230-10
PROJECT ADDRESS:	2355 FRANKLIN ROAD MERCED, CA 95348
PROJECT JURISDICTION:	MERCED COUNTY
SCOPE OF WORK:	APPLICATION FOR THE DEVELOPMENT OF PROJECT SITE INTO A PROPOSED COFFEE DRIVE THRU, GAS STATION, CONVENIENCE STORE, AND DRIVE-THRU RESTAURANT.
GENERAL PLAN DESIGNATION:	C-1 NEIGHBORHOOD COMMERCIAL
ZONING:	C-1 NEIGHBORHOOD COMMERCIAL
SITE AREA:	3.76 ACRES / 163,786 SF
WATER SERVICES:	CALIFORNIA WATER COMPANY
WASTE SERVICES:	FRANKLIN WATER DISTRICT
STORMWATER:	ON-SITE BIO-RETENTION BASIN
FIRE SPRINKLERS:	NOT REQUIRED
BUILDING AREA, USE & PARKING:	BUILDING #1 AREA: 2,200 SF USE: COFFEE DRIVE THRU PARKING: 1 PER 100 SF = 1 PER EMPLOYEE = (2,200 SF/100) = (1 x 4 EMPLOYEES) = 22 + 4 = 26 SPACES REQUIRED BUILDING #2 AREA: 3,200 SF USE: CONVENIENCE STORE PARKING: 1 PER 400 SF = 1 PER EMPLOYEE = (3,200 SF/400) = (1 X 6 EMPLOYEES) = 8 + 6 = 14 SPACES REQUIRED BUILDING #3 AREA: 2,800 SF USE: DRIVE-THRU RESTAURANT PARKING: 1 PER 100 SF = 1 PER EMPLOYEE = (2,800 SF/100) = (1 x 6 EMPLOYEES) = 28 + 6 = 34 SPACES AUTO FUELING CANOPY AREA: 5,624 SF USE: FUEL CANOPY PARKING: NO PARKING REQUIRED RV/BOAT CANOPY AREA: 576 SF USE: FUEL CANOPY PARKING: NO PARKING REQUIRED
TOTAL BUILDING AREA PROPOSED:	14,400 SF (INCLUDES CANOPIES)
TOTAL PARKING REQUIRED:	74 STANDARD SPACES
PARKING PROVIDED:	BLDG #1 - COFFEE: 26 STANDARD SPACES: 24 ACCESSIBLE SPACES: 2 BLDG #2 - C-STORE: 14 STANDARD SPACES: 13 ACCESSIBLE SPACES: 1 BLDG #3 - RESTAURANT: 34 STANDARD SPACES: 32 ACCESSIBLE SPACES: 2 TOTAL: STANDARD SPACES: 69 ACCESSIBLE SPACES: 6
TOTAL CAR SPACES PROVIDED:	87 STANDARD SPACES (INCLUDES 20 FUEL PUMP SPACES)
SITE AREA TABULATIONS:	BUILDING AREA (INCL. CANOPIES): 14,400 SF 8.8% LANDSCAPE AREA: 36,281 SF 22.2% CONCRETE / ASPHALT AREA: 113,105 SF 69.0% TOTAL SITE AREA: 163,786 SF

SHEET INDEX

1 SITE PLAN / PROJECT DATA
2 PRELIMINARY LANDSCAPE PLAN
3 PHOTOMETRIC PLAN
4 BLDG #1 EXTERIOR ELEVATIONS
5 BLDG #2-3 EXTERIOR ELEVATIONS
6 FUEL CANOPY PLAN / ELEVATIONS
7 TRASH ENCLOSURE PLAN
8 SANITARY SEWER MAIN EXTENSION PLAN & PROFILE

Milestone Associates Imagineering, Inc.
1000 Lincoln Road, Suite H202, Yuba City, CA 95991
(530) 755-4760

FRANKLIN RETAIL CENTER
2355 FRANKLIN ROAD, MERCED, CA 95348
A.P.N. 005-230-010

SITE PLAN / PROJECT DATA 1

12-28-21

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Transportation Engineers

SITE PLAN

2925-40 RA 6/28/2022

figure 2

EXISTING SETTING

Existing Circulation System

Regional access to the Franklin Retail Center project site is provided by northbound SR 99 and by several Merced County roads that serve the Franklin Beechwood area. The text that follows describes these existing transportation facilities.

Roadways. The study area includes these roadways:

State Route 99 (SR 99). SR 99 is the major regional north-south route through Merced County. The project site is immediately adjunct to this four-lane / six-lane controlled access freeway. The California Department of Transportation (Caltrans) provides a record of the daily traffic volumes on its facilities. Caltrans reported that in 2020 State Route 99 carried an *Average Annual Daily Traffic (AADT)* volume of 56,000 vehicles per day on SR 99 north of the 16th Street interchange in Merced and 49,000 AADT south of E. Atwater Blvd. Trucks comprise 24% of the daily traffic on SR 99 through the study area. The speed limit is 65 mph.

Franklin Road. Franklin Road is a two-lane north-south collector road that lies on the western side of the Franklin-Beachwood area. The northern portion of Franklin Road extends north for on- and off-ramps on northbound SR 99 across the Ashby Road intersection to Santa Fe Drive before continuing to Bellevue Road. The southern portion of Franklin Road extends from an intersection on Ashby Road across SR 99 to its southern terminus on State Route 140 about 1½ miles below SR 99. The level of improvements that have been made to Franklin Road vary along its length, with curb gutter and sidewalk provided in the area of recent residential development in the area south of Lobo Avenue and adjoining Franklin Elementary School. In May 2021 Franklin Road carried 7,240 vehicles per day (vpd) north of Lobo Avenue and 9,240 vpd between Lobo Avenue and Ashby Road. The posted speed limit on Franklin Road is 25 mph within school zones when children are present, and 40 mph elsewhere within the study area.

Ashby Road. Ashby Road is a two-lane major collector which runs parallel to and north of SR 99 from 16th Street to Gurr Road near the SR 99 / Atwater -Merced Expressway interchange. There are no curb & gutter or sidewalks along Ashby Road. In May 2021 Ashby Road carried 2,430 vpd west of Franklin Overcrossing, 8,190 vpd between the Overcrossing and Franklin Road and 4,040 vpd east of Franklin Road. The posted speed limit within the study area is 45 mph.

Lobo Avenue. Lobo Avenue is a two-lane east-west collector that extends between Franklin Road and Drake Avenue. Lobo Avenue is stop-controlled at intersections with Franklin Road, Beachwood Drive, and at Drake Avenue. Curb, gutter and sidewalks exists along the north side of Lobo Avenue. In May 2021 Lobo Avenue carried 3,030 vpd east of Franklin Road. The posted speed limit is 35 mph.

Santa Fe Drive. Santa Fe Drive is a five-lane undivided arterial oriented northwest / southeast and is on the north side of the Franklin-Beachwood area, parallel to the Santa Fe

Railroad about a mile north of SR 99. Santa Fe Drive connects to the City of Merced to the south and the City of Turlock to the north in Stanislaus County. Within the Franklin - Beachwood area, Santa Fe Drive is signalized at Franklin Road and at Beachwood Drive, where adjacent railroad crossings are present. Within the study area the posted speed limit is 55 mph.

Atwater-Merced Expressway (AME). Currently, Phase 1a of the Atwater-Merced Expressway (AME) has been constructed from SR 99 to Green Sands Avenue about 1½ miles west of the Franklin-Beachwood area. Phase 1b will connect Green Sands Avenue to Santa Fe Drive, and Phase 2 will extend AME to the SR 59 / Bellevue Road intersection in north Merced, and Phase 3 will extend south from Phase 1 to SR 140.

Interchanges and Intersections. These facilities exist in the area of the proposed project.

The **SR 99 / Franklin Road interchange (Exit 191)** is a partial connection to that features isolated off-ramp and on-ramps that meet in the area south of the Franklin Road / Ashby Road intersection. The NB off-ramp extends from SR 99 for about 300 feet into a 200 foot radius curve that ends at the limit of the state right of way. A 30 mph advisory warning sign is posted. From that point Franklin Road continues for about 500 feet to Ashby Road. Southbound Franklin Road extends from the Ashby Road intersection for about 500 feet to a 100-foot radius curve within the state ROW. The on-ramp continues for about 300 feet to mainline SR 99.

Access to southbound SR 99 occurs via Ashby Road at the 16th Street interchange about 2½ miles east of the project site or at the AME interchange about 3 miles west of the project.

The **Franklin Road / Ashby Road intersection** is located 500 feet beyond SR 99 is controlled by an all-way stop. While localized widening has occurred to accommodate truck turns, each approach is a single travel lane. The are no sidewalks or crosswalks marked at this intersection, and the intersection has no streetlights.

The **Ashby Road / Franklin Overcrossing intersection** is a "Tee" located about 300 feet west of the Ashby Road / Franklin Road intersection (i.e., centerline to centerline). Each approach is a single travel lane, and traffic is controlled by a stop sign on the northbound Overcrossing approach. The are no sidewalks or crosswalks marked at this intersection, and the intersection has no streetlights.

The **Franklin Road / Lobo Avenue intersection** is a "Tee" located about 500 feet north of Ashby Road (i.e., centerline to centerline). Each approach is a single travel lane, and traffic is controlled by a stop sign on the westbound Lobo Avenue approach. Sidewalks exist on the north side of Lobo Avenue and the east side of Franklin Road north of the intersection. There are no crosswalks, but a streetlight exists on the northeast corner. Access to Franklin Elementary School exists on the east side of Franklin Road about 700 feet beyond the intersection.

Alternative Transportation Modes

Public Transit. The Transit Joint Powers Authority Board for Merced County operates transit services in Merced County[2]. *The Bus* delivers fixed route service in major cities and serving rural communities. The Winton Commuter (W-1) route links Winton, Atwater, Franklin-Beechwood and Merced. https://www.mercedthebus.com/202/W1---Winton-Commuter This route passes the project site fourteen times on weekdays four times on Weekends with a designated stop at the Dan Ward Road / Beechwood Drive intersection.

Bicycle Facilities. According to Caltrans guidelines, bicycle facilities are generally divided into four categories:

- Class I Bikeway (Bike Path). A completely separate facility designated for the exclusive use of bicycles and pedestrians with vehicle and pedestrian cross-flow minimized.
- Class II Bikeway (Bike Lane). A striped lane designated for the use of bicycles on a street or highway. Vehicle parking and vehicle/pedestrian cross-flow are permitted at designated locations.
- Class III Bikeway (Bike Route). A route designated by signs or pavement markings for bicyclists within the vehicular travel lane (i.e., shared use) of a roadway.
- Class IV Bikeway (Separated Bikeway). A bikeway for the exclusive use of bicycles and includes a separation required between the separated bikeway and the through vehicular traffic. The separation may include, but is not limited to, grade separation, flexible posts, inflexible posts, inflexible barriers, or on-street parking.

The *Merced County Regional Bicycle Transportation Plan (2008)* guides development of bicycle facilities in the County[3]. No dedicated bicycle lane facilities exist today in the immediate area of the project, but Lobo Avenue is designated a Class III bike route where bicycles and automobiles can safely share the roadway. The plan indicates that Class II bicycle lanes could be developed on Franklin Road from Ashby Road to Santa Fe Drive in the future.

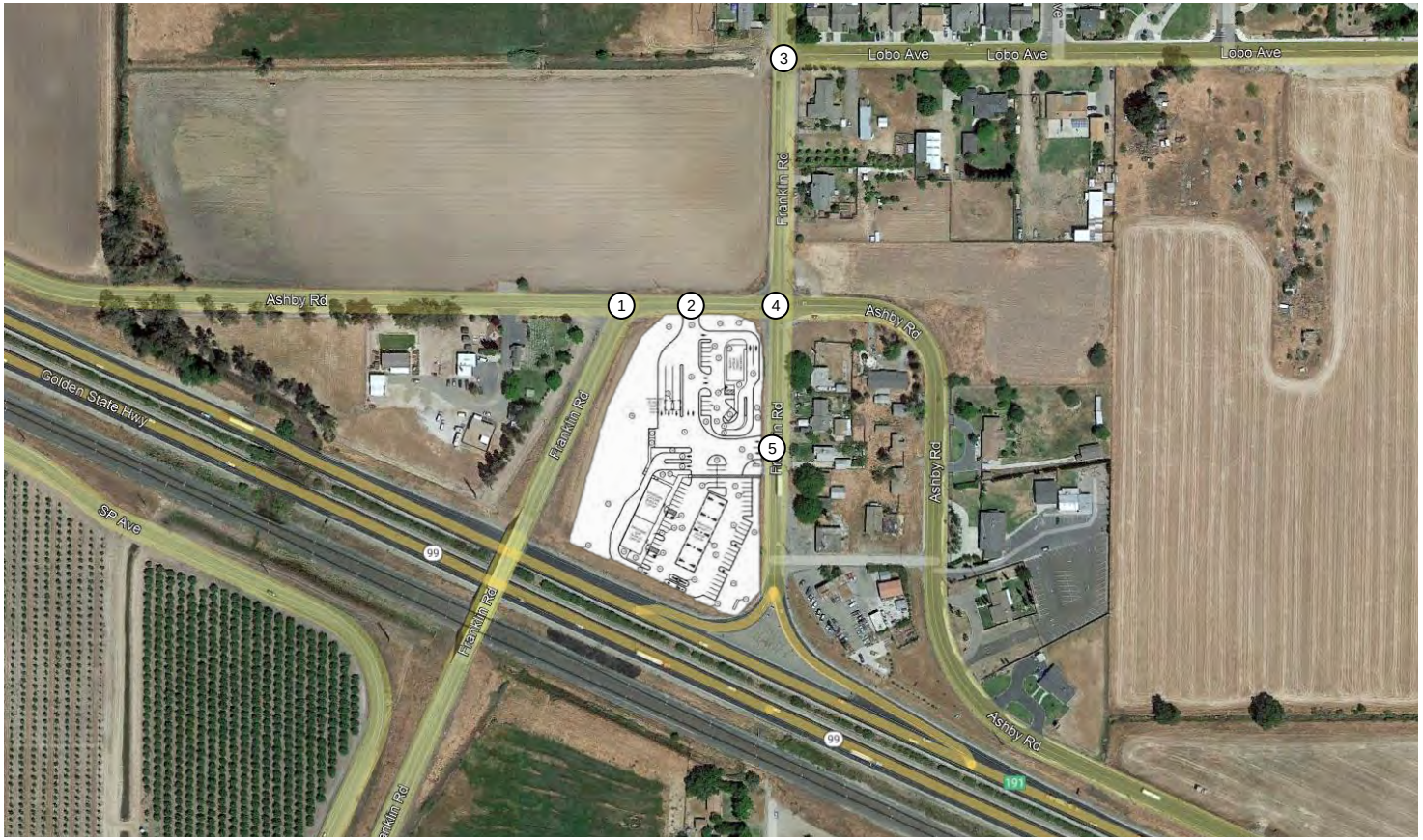
Pedestrian Facilities. There are no dedicated pedestrian facilities in the immediate area of the project, and any pedestrian activity occurs on unimproved shoulders. Sidewalk begins on the east side of Franklin Road at the Lobo Avenue intersection and begins on the west side another ¼ mile further north.

[2] https://www.mercedthebus.com/27/About-Us
[3] https://www.ca-ilg.org/sites/main/files/file-attachments/finalregbp.pdf

Existing Traffic Volumes

Peak Hour Traffic Volume Data. While new traffic volume data was collected of this analysis, construction of regional circulation system improvements elsewhere in Merced County may have influenced those count results. West of the Franklin - Beachwood area construction of SR 99 mainline widening required intermittent traffic controls that limited access to northbound SR 99 through Atwater. As a result, there may have been greater use of Ashby Road and the Franklin Road ramps, although the actual change is difficult to assess. Thus new count results were compared to intersection data collected for Merced County in 2015 and segment traffic volumes collected in 2021 in order to provide representative data for this analysis.

Morning (6:00 a.m. to 9:00 a.m.), afternoon (2:00 p.m. to 4:00 p.m.) and evening (4:00 p.m. to 6:00 p.m.) peak hour traffic volume data was assembled for the three existing study area intersections. Traffic count data was originally collected on April 21, 2022, but subsequent investigation determined that local schools were not in session at that time. Additional a.m. and afternoon data was then collected on May 24, 2022 and May 25, 2022 when schools were in session. These counts results were compared to previous data, and the greater of available count results were used to adjust all turning movements to a consistent basis. Resulting traffic volumes for the three analysis time periods are presented in Figure 3.



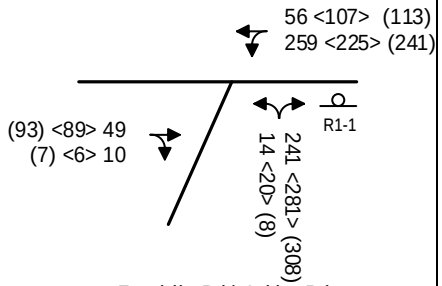
Legend

- XX — AM Peak Hour Volume
- <XX> — Afternoon Peak Hour Volume
- (XX) — PM Peak Hour Volume
- R1-1 — Stop Sign
- Signal

NORTH

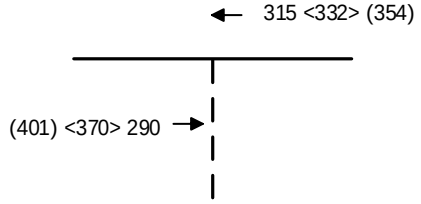
N.T.S.

1



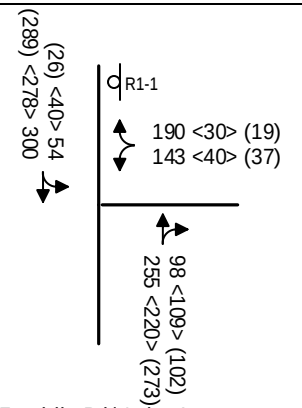
Franklin Rd/ Ashby Rd

2



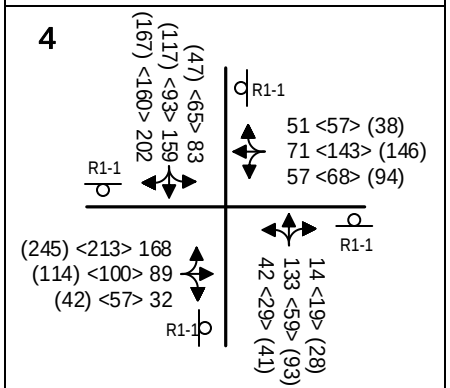
Project Dwy/ Ashby Rd

3



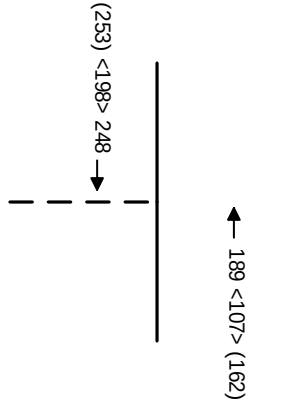
Franklin Rd/ Lobo Ave

4



Franklin Rd/ Ashby Rd

5



Franklin Rd/ Project Dwy

EXISTING TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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figure 3

REGULATORY FRAMEWORK

The text which follows summarizes the circulation policies which govern the study area.

State of California

SB 743

SB 743 modified CEQA direction and requires local agencies to move from a Level of Service (LOS) based analysis to evaluation of impacts based on Vehicle Miles Traveled (VMT). General guidance as to methods for calculating VMT and significance criteria are contained in the Office of Planning & Research (OPR) *Technical Advisory on Evaluating Transportation Impacts in CEQA* (California Governor's Office of Planning and Research 2018). However, while SB 743 eliminates LOS as a CEQA criteria, this measure can still be considered in terms of General Plan consistency.

California Department of Transportation

In its **Vehicle Miles Traveled-Focused Transportation Impact Study Guideline (2020)**, Caltrans establishes operational objectives for highway performance based on VMT and safety rather than Level of Service while addressing impacts to alternative transportation modes.

Caltrans policy regarding applicable traffic controls is based on **Traffic Operations Policy Directive 13-02.** This directive requires that Caltrans consider the relative merits of alternative traffic controls when it becomes necessary to stop traffic on state highways. Roundabouts are the default intersection control, but all-way stops and traffic signals are to be considered. The policy directive requires preparation of an *Intersection Control Evaluation (ICE)* to determine the preferred traffic control.

Caltrans Encroachment Permit is required for improvements made to the state highway by private parties or local agencies, and the design of these improvements is subject to Caltrans approval.

Large trucks are permitted on designated facilities under the **Surface Transportation Authority Act (STAA).** Roadways to be added to designated routes are processed through Caltrans with evidence of the adequacy of each road and intersection for the trucks.

Regional

Merced County Association of Governments (MCAG)

The **2018 Regional Transportation Plan and Sustainable Communities Strategy (RTP/STS)** for Merced County is a federally mandated, long-range transportation plan for the six incorporated cities and the unincorporated county. The RTP/STS specifies the policies, projects, and programs necessary over a 20-plus year period to maintain, manage, and improve the

region's transportation systems. It establishes goals and objectives for the future system. It identifies the actions necessary to achieve these goals and describes a funding strategy and options for implementing the actions. The RTP/STS is updated every 3 years. The present 2018 update concerns the period from 2018 to 2040. MCAG is currently undergoing the process for the 2022 RTP, and a public review draft plan is available.

To coordinate local planning efforts with other regional, state, and federal agencies, and to monitor and respond to policies that will affect the development and implementation of the RTP, MCAG prioritizes transportation projects in a Regional Transportation Improvement Program for federal and state funding. The process is based on each project for need, feasibility, and adherence to federal transportation policies.

The RTP's Regional Road network includes I-5, SR 33, SR 152 through the study area. No Tier I projects (i.e., projects that have a funding source) in this area are included Appendix K of the draft 2022 RTP/STS.

Local

Merced County General Plan

General Plan. The *2030 Merced County General Plan* (County of Merced 2013) *Circulation Element* focuses on providing roadways for growing automobile demands and alternative modes of transportation. This requires improving those alternative modes through regional coordination, improved funding, better land use and design, and fair pricing. The overarching goal of the element seeks a balanced transportation system that moves people and goods in a safe and efficient way that minimizes environmental impacts, supports urban land uses, and serves rural needs. The following are policies of the *General Plan Circulation Element* related to LOS standards:

> "Policy CIR-1.5: County Level of Service Standards (RDR)
> Implement a Countywide roadway system that achieves the following level-of-service (LOS) standards during peak traffic periods:
>
> > "a) For roadways located within rural areas: LOS "C" or better.
> >
> > "b) For roadways located outside Urban Communities that serve as connectors between Urban Communities: LOS of "D" or better.
> >
> > "c) For roadways located within Urban Communities: LOS of "D" or better.
>
> "Policy CIR-1.6: Level of Service "E" Exception (RDR)
> Allow a level of service "E" or worse only on a minor component of the circulation system (such as a left turn movement from a local roadway) if the major component of the circulation system (such as a through movement on a

collector or arterial roadway) would be significantly compromised in the process of improving the level of service of the minor component."

Merced County has jurisdiction of non-state roadways.

Merced County Mandatory Improvements (Chapter 16.08 of the Merced County Code)

Merced County Code describes requirements of new development relates to infrastructure. Merced County Code Section 16.08.040.D Mandatory Improvement Requirements – Truck Impacts to Rural Roads addresses truck traffic, as noted below.

> D. Truck Impacts to Rural Roads. Roads in rural areas of Merced County have not been constructed to support heavy truck traffic generated from new developments. Projects that generate heavy truck traffic on rural roads will increase the rate of deterioration of the pavement structural section. This increased rate of deterioration will reduce the service life and the desired performance objectives of Merced County roadways.
>
> The effects on pavement life from passenger cars, pickups, and two-axle trucks are considered to be negligible. However, many projects have the potential to generate heavy truck traffic. Heavy trucks, for the purpose of this section, include 10-wheel dump trucks, trucks with 4, 5 or more axles or any combination of a truck and trailer with 4, 5 or more axles. Typical projects that generate heavy truck traffic include dairies, poultry ranches, agricultural processing centers, gravel mining and/or processing operations, commercial centers, and industrial developments.
>
> The California Environmental Quality Act (CEQA) requires that proposed projects assess, among other things, their potential impacts to public services. If a project has the potential to reduce the service life and the desired performance objectives of Merced County roadways, then the project should be required to mitigate or offset the adverse impact.
>
> 1. In order to avoid any significant impact that a project may have on the structural section of Merced County roadways, the following conditions of approval shall be applied to projects that generate an average of one or more loaded heavy truck trips per day:
>
>   • The applicant shall provide a roadway impact evaluation, prepared by a registered Geotechnical Engineer or Civil Engineer, to determine the potential impact that the project will have on Merced County roadways. This evaluation should take into consideration the truck traffic generated from the project, the truck routes, truck types and weights, as well as the structural integrity of the roadways along the truck routes. Should any roadway be identified that will be significantly impacted by the project (significantly reduced service life, etc.), then the applicant shall pay a "fair share" contribution into the Merced County Road Fund to offset the impact.

• In lieu of performing a roadway impact evaluation, the applicant may enter into a Roadway Impact Agreement with Merced County. The roadway impact agreement will stipulate that the project applicant shall keep accurate records of all of the loaded heavy trucks that either enter or exit the project site. Once every year for the life of the project, the applicant shall contribute $2.50 into the Merced County Road Fund for every loaded heavy truck that either enters or exits the site (empty trucks are not to be counted). If the project generating the impact ceases to exist, the roadway impact agreement will become void.

2. Additional conditions of approval may be required on a case by case basis for projects that generate truck traffic to provide for improvements to roadways within the immediate vicinity of the project site.

PROJECT CHARACTERISTICS

The characteristics of the Franklin Road Retail Center project with regards to trip generation and distribution are discussed in this report section.

Project Description

The project proposes these uses on a 3.76 acre site:

- 3,200 sf convenience store with 22 vehicle fueling positions
- 2,800 sf fast food restaurant with drive-thru
- 2,200 sf coffee shop with drive -thru

Project Travel Characteristics

Information in the project description has been used for this analysis.

Trip Generation Rates. The number of automobile and truck trips associated with the regular operation of this project has been estimated based on rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual, 11th Edition* and *the Trip Generation handbook, 3rd Edition.* As shown in Table 1, rates are available for each use on a daily basis and for the hour of peak commute traffic on adjoining streets.

Some data is available for mid-afternoon hours, as noted in Table 2. As shown the share of total daily traffic generated during mid-afternoon hours is typically lower than that occurring during peak commute hours. As a result, no quantitative analysis of the project effects in the afternoon has been prepared.

Trip Generation Forecasts. Identified trip generation rates were applied to the project's uses as noted below.

Gross Trip Generation. Resulting gross trip generation estimates for the three identified uses in the proposed project are presented in Table 1. These assume each is an isolated freestanding use. As shown, the project could generate 6,815 gross daily trips, with 667 a.m. and 583 p.m. peak hour trips.

Truck Trips. The site plan includes a fueling canopy with two fueling positions that can accommodate trucks and RV's. By simply applying the standard ITE "per position" trip generation rate this portion of the project could be expected to generate 32 to 36 peak hour trips (i.e., 16 to 18 customers). Most of that traffic would be expected to be single-unit trucks, pick-ups with trailers or large RVs, but the site would accommodate the turning requirements of occasional full size tractor-trailer combinations.

Internal Trips. A share of the trips attracted to each use on site is likely to be made by persons who also elect to visit another part of the project as part of the same stop. These trips

may be made on foot or by automobile but either mode will represent trips that do not use the off-site street system. The share of each use's trips that may be internal is based on consideration of assumption made in other traffic studies as well as the characteristics of each use and the methods described in the *ITE Trip Generation Handbook.* This analysis conservatively assumes that 15% of the gas station / store trips would also involve a stop at another use during the a.m. peak hour. The internal share is projected to be lower during the p.m. peak hour because the coffee shop and fast-food restaurant are lower trip generators at that time.

After counting for internal interaction, the project is expected to generate 5,515 external daily trips, with 563 external a.m. peak hour trips and 543 external p.m. trips.

TABLE 1
FRANKLIN ROAD RETAIL CENTER TRIP GENERATION RATES AND FORECASTS

ITE Code	Description	Unit	Trips per unit						
			Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Trip Generation Rates									
934	*Fast Food Restaurant With Drive Thru Window*	ksf	467.48	51%	49%	44.61	52%	48%	33.03
937	*Coffee / Donut Shop with Drive Thru Window*	ksf	553.57	51%	49%	85.88	50%	50%	38.99
945	*Convenience Store /Gas Station (2.0 to 4.0 ksf)*	Fueling Positions	196.91	50%	50%	16.06	50%	50%	18.42
Franklin Retail Center									
934	*Fast Food Restaurant With Drive Thru Window*	2.80 ksf	1,309	64	61	125	48	44	92
	Internal		345	10	10	20	5	5	10
	External		964	54	51	105	43	39	82
	Pass-By – Diverted Linked	50%	482	26	26	52	20	20	40
	Primary		482	28	25	53	23	19	42
937	*Coffee / Donut Shop with Drive Thru Window*	2.20 ksf	1,174	96	93	189	43	43	86
	Internal		305	16	16	32	5	5	10
	External		869	80	77	157	38	38	76
	Pass-By – Linked Diverted	50%	434	39	39	78	19	19	38
	Primary		435	41	38	79	19	19	38
945	*Convenience Store / Gas Station (2.0 to 4.0 ksf)*	22 positions	4,332	176	177	353	202	203	405
	Internal	15% daily and AM 5% PM	<650>	26	26	52	10	10	20
	External		3,682	150	151	301	192	193	385
	Pass-by - Linked Diverted	Daily 50%, AM 63%, PM 56%	1,841	95	95	190	108	108	216
	Primary		1,841	55	56	111	84	85	169
Project Gross Total			**6,815**	**336**	**331**	**667**	**293**	**290**	**583**
Internal			1,350	52	52	104	20	20	40
External			*5,515*	*284*	*279*	*563*	*273*	*270*	*543*
Pass-By – Linked Diverted			2,757	160	160	320	147	147	294
Primary			2,758	124	119	243	126	123	249
Project Heavy Truck Trips									
2 RV/ Trailer/ Truck positions Only (included above)			394	16	16	32	18	19	37
Heavy Trucks: (20,000 gallons diesel monthly / 140 gallons per fill-up = 143 fill-up per month/30 days = 4.76 fill-ups per day			**10**	**1**	**1**	**2**	**1**	**1**	**2**

TABLE 2 SHARE OF DAILY TRIPS BY ANALYSIS HOUR				
ITE Code	**Land Use Description**	**Percent of Daily Traffic**		
		AM Peak	**Afternoon**	**PM Peak**
934	*Fast Food Restaurant With Drive Thru Window*	9.5%	6.5%	7.1%
937	*Coffee / Donut Shop with Drive Thru Window*	16.1%	5.6%	7.3%
945	*Convenience Store /Gas Station*	6.1%	6.4%	7.1%

External Trip Distribution

The geographic distribution of project-related external trips used in this analysis is based on consideration of the nature of the proposed uses and their likely trade areas. Based on its location, many of the trips associated with the project will be drawn from the stream of traffic passing the site on northbound SR 99. Roughly 25,000 vehicles per day use NB SR 99.

External Trip Types / Estimates. Typically, the external trips associated with retail-service uses are divided between ***"primary", "diverted linked***" and **"pass-by" trips.** Primary or "new" trips represent those trips specifically made for the purpose of visiting the site. These trips would affect the project access as well as the local and regional circulation system. Diverted linked trips are those that already occur on part of the regional circulation system for another purpose but may use local streets to reach the project. In this case, trips drawn from existing traffic on SR 99 to the project are diverted linked trips. Pass-by trips are those made as part of another trip by patrons who simply turn into and out of the project. Pass-by trips by motorists who are already driving by the site on Franklin Road and on Ashby Road would not affect the regional circulation system.

ITE data indicates that 56-62% of the trips to convenience stress - gasoline stations are "pass-by" trips, and the same source suggests that pass-by trips comprise 50% of the trips generated by fast food restaurants. For this analysis it has been assumed that ½ of these trips are true "pass-by" from Ashby Road and Franklin Road and that the other ½ are trips diverted from NB SR 99.

Overall, of the project's 5,515 external daily trips, 1,379 (25%) are expected to be pass-by trips drawn from traffic already on Ashby Road and Franklin Road, 1,378 diverted linked trips drawn to and from traffic on NB SR 99 and the balance (50%) are primary trips.

Primary Trip / Diverted Linked Trip / Pass-by Trips Directional Distribution. Table 3 presents the assumptions made regarding the directional distribution of trips generated by the project. As noted, this analysis assumes that primary automobile trips will be drawn from the Franklin - Beachwood area to the north and west, while smaller shares would be drawn from the rural area south of SR 99 and the area west of the site along Ashby Road. These distribution assumptions reflect the relative absence gas stations, coffee shops and fast food restaurants in the Franklin - Beachwood area. Diverted linked trips will come from NB SR 99. Pass-by trips will

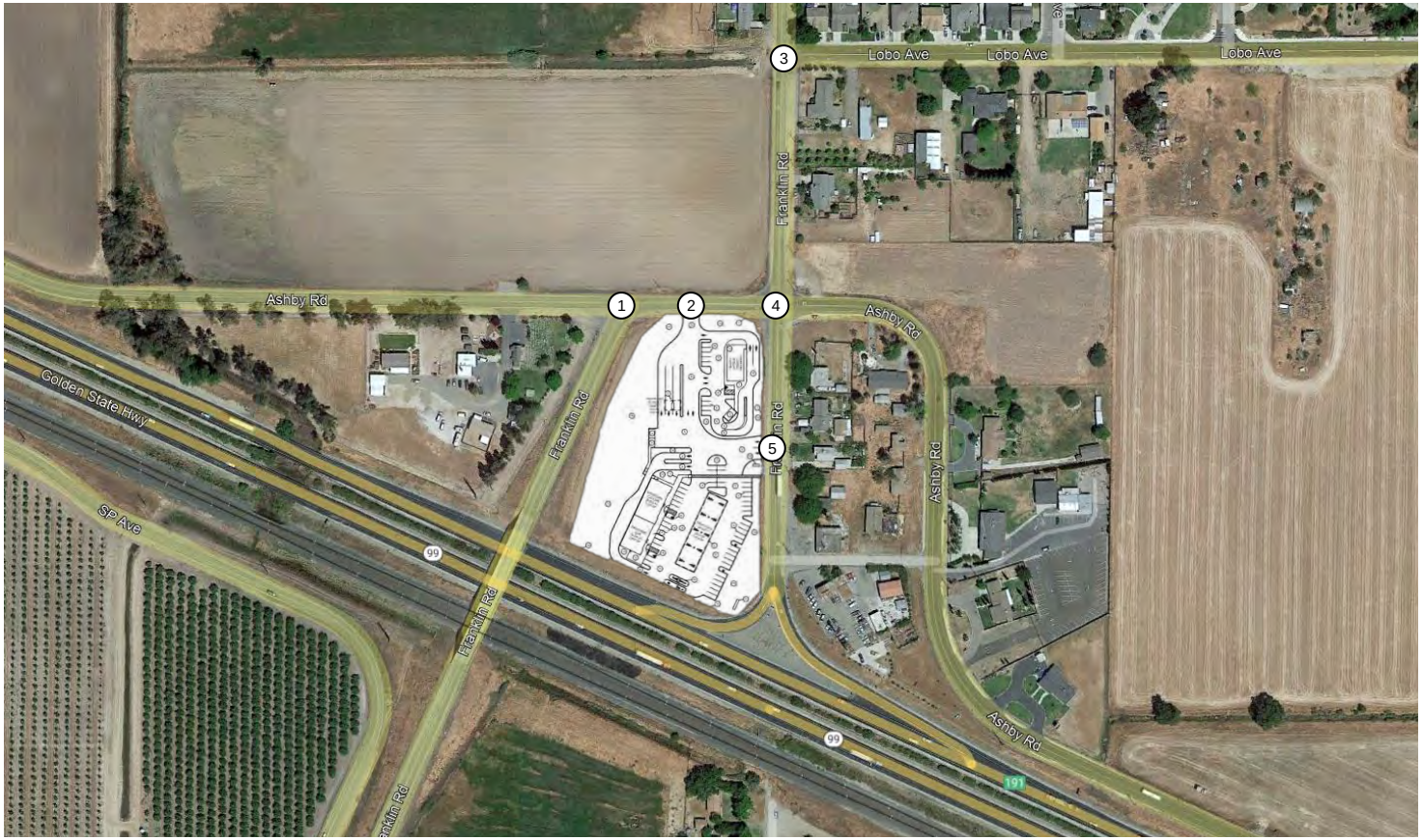
be drawn in proportion to the peak hour volume entering the Ashby Road / Franklin Road intersection during each time period.

TABLE 3
PRIMARY TRIP/ DIVERTED LINKED / PASS-BY TRIPS DISTRIBUTION

Direction	Route	Percentage			
		Primary	Link Diverted	Pass-by Trips	
				AM Peak Hour	PM Peak Hour
North	Franklin Road	25%	-		
East	Lobo Ave	25%			
	Ashby Road	25%			
West	Ashby Road	10%			
South	Franklin Overcrossing	15%			
Total		**100%**			
	SR 99 NB		**100%**		
	Northbound on Franklin			22%	14%
	Southbound on Franklin			25%	19%
	Eastbound on Ashby			27%	37%
	Westbound on Ashby			26%	30%
Total				**100%**	**100%**

Trip Assignment

Using the trip generation and distribution assumptions described above, the trips generated by the proposed project were assigned to the study area street system via the project's two driveways. Figure 4 presents total peak hour automobile and truck traffic volumes accompanying operation of the project.



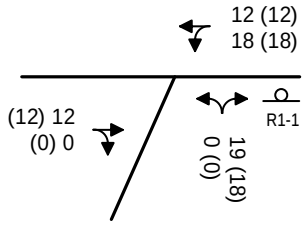
Legend

- XX — AM Peak Hour Volume
- (XX) — PM Peak Hour Volume
- R1-1 — Stop Sign
- Signalized Intersection

NORTH

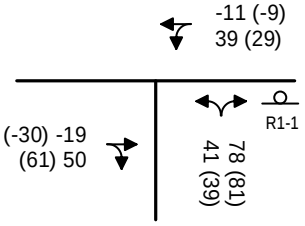
N.T.S.

1



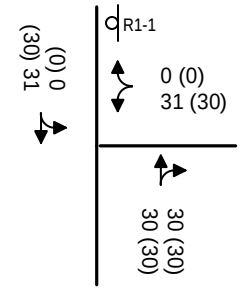
Franklin Rd/ Ashby Rd

2



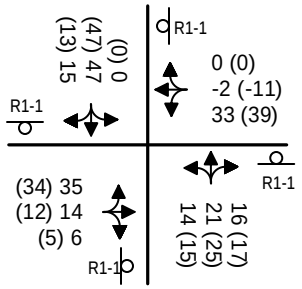
Project Dwy/ Ashby Rd

3



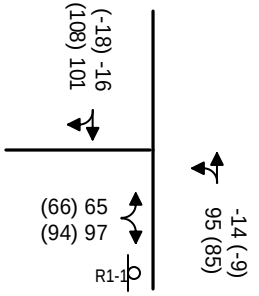
Franklin Rd/ Lobo Ave

4



Franklin Rd/ Ashby Rd

5



Franklin Rd/ Project Dwy

PROJECT ONLY TRAFFIC VOLUMES AND LANE CONFIGURATIONS

KD Anderson & Associates, Inc.
Transportation Engineers

EXISTING PLUS PROJECT CEQA IMPACTS

Level of Service and Vehicle Miles Traveled (VMT)

Level of Service (LOS) has been used in the past in California Environmental Quality Act (CEQA) documents to identify the significance of a project's impact on traffic operating conditions. As noted in the California Governor's Office of Planning and Research (OPR) document *Technical Advisory on Evaluating Transportation Impacts in CEQA* (California Governor's Office of Planning and Research 2018),

> "Senate Bill 743 (Steinberg, 2013), which was codified in Public Resources Code section 21099, required changes to the guidelines implementing CEQA (CEQA Guidelines) (Cal. Code Regs., Title 14, Div. 6, Ch. 3, § 15000 et seq.) regarding the analysis of transportation impacts. . . OPR has proposed, and the California Natural Resources Agency (Agency) has certified and adopted, changes to the CEQA Guidelines that identify vehicle miles traveled (VMT) as the most appropriate metric to evaluate a project's transportation impacts. With the California Natural Resources Agency's certification and adoption of the changes to the CEQA Guidelines, automobile delay, as measured by "level of service" and other similar metrics, generally no longer constitutes a significant environmental effect under CEQA. (Pub. Resources Code, § 21099, subd. (b)(3).)"

VMT Methods and Significance Criteria

The OPR *Technical Advisory* provides general direction regarding the methods to be employed and significance criteria to evaluate VMT impacts, absent polices adopted by local agencies. The directive addresses several aspects of VMT impact analysis, and is organized as follows:

- ***Screening Criteria***: Screening criteria are intended to quickly identify when a project should be expected to cause a less-than-significant VMT impact without conducting a detailed study.
- ***Significance Thresholds***: Significance thresholds define what constitutes an acceptable level of VMT and what could be considered a significant level of VMT requiring mitigation.
- ***Analysis Methodology***: These are the potential procedures and tools for producing VMT forecasts to use in the VMT impact assessment.
- ***Mitigation***: Projects that are found to have a significant VMT impact based on the adopted significance thresholds are required to implement mitigation measures to reduce impacts to a less than significant level (or to the extent feasible).

Screening Criteria. Screening criteria can be used to quickly identify whether sufficient evidence exists to presume a project will have a less than significant VMT impact without conducting a detailed study. However, each project should be evaluated against the evidence supporting that screening criteria to determine if it applies. Projects meeting at least one of the criteria below can be presumed to have a less than significant VMT impact, absent substantial evidence that the project will lead to a significant impact.

- ***Small Projects:*** Defined as a project that generates 110 or fewer average daily vehicle trips.
- ***Affordable Housing:*** Defined as a project consisting of deed-restricted affordable housing.
- ***Local Serving Retail***: Defined as retail uses of 50,000 square feet or less can be presumed to have a less than significant impact.
- ***Projects in Low VMT-Generating Area:*** Defined as a residential or office project that is in a VMT efficient area based on an available VMT Estimation Tool. The project must be consistent in size and land use type (i.e., density, mix of uses, transit accessibility, etc.) as the surrounding built environment.
- ***Proximity to High Quality Transit:*** The directive notes that employment and residential development located within ½ mile of a high-quality transit corridor offering 15-minute headways can be presumed to have a less than significant impact.

Screenline Evaluation. The extent to which the proposed project's VMT impacts can he presumed to be less than significant has been determined based on review of the OPR directive's screening criteria and general guidance.

The OPR ***Small Project*** criteria is not applicable to this project. As was noted in Table 1 the project is expected to generate 2,758 primary daily trips. As the 110 ADT threshold for automobiles trips is exceeded, the project's VMT impacts cannot be presumed to be less than significant based on this criterion.

The OPR directive provides this explanation for a Presumption of Less Than Significant Impact for ***Affordable Residential Development.***

> Adding affordable housing to infill locations generally improves jobs-housing match, in turn shortening commutes and reducing VMT.24,25 Further, "… low-wage workers in particular would be more likely to choose a residential location close to their workplace, if one is available." In areas where existing jobs-housing match is closer to optimal, low income housing nevertheless generates less VMT than market- rate housing. Therefore, a project consisting of a high percentage of affordable housing may be a basis for the lead agency to find a less-than-significant impact on VMT. Evidence supports a presumption of less than significant impact for a 100 percent affordable residential development (or the residential component of a mixed-use development) in infill locations. Lead agencies may develop their own presumption of less than significant impact for residential projects (or residential portions of mixed use projects) containing a particular amount of affordable housing, based on local circumstances and evidence. Furthermore, a project which includes any affordable residential units may factor the effect of the affordability on VMT into the assessment of VMT generated by those units.

The proposed project is not a residential development, and this criterion does not apply.

Local-Serving Non-Residential Development is assessed by criterion that notes that local serving retail uses can reduce travel by offering customers more choices in closer proximity.

Local serving retail uses of 50,000 square feet or less can be presumed to have a less than significant impact. OPR guidance notes:

By adding retail opportunities into the urban fabric and thereby improving retail destination proximity, local-serving retail development tends to shorten trips and reduce VMT. Thus, lead agencies generally may presume such development creates a less-than-significant transportation impact. Regional-serving retail development, on the other hand, which can lead to substitution of longer trips for shorter ones, may tend to have a significant impact. Where such development decreases VMT, lead agencies should consider the impact to be less-than-significant.

The Franklin Road Retail Center clearly provides goods and services to Franklin - Beachwood residents and to motorists already traveling on SR 99. The project site is closer to Franklin - Beachwood residents than existing C-Stores and fast food restaurants in Atwater and Merced. By reducing the need to travel to larger metropolitan areas, the proposed project will have a positive effect (i.e., reduction) on total regional VMT. As suggested by OPR, the Franklin Road Retail Center is less than 50,000 sf, it's VMT impact can be presumed to be less than significant, and no further analysis is required.

Impacts to Other Transportation Modes

Pedestrian Facilities. There are developed areas of Franklin - Beachwood that are within walking distance of the proposed project, but gaps in the system of sidewalks exist today between the project and the balance of the community. In those areas pedestrians traveling to the site would use the roadway shoulder or edge of pavement, as would be the case for any current pedestrians visiting other uses in the area of the Ashby Road / Franklin Road intersection. Due to the number of peak hour vehicles already on study area roads and the number that will be added by the project, conflicts between pedestrians and motor vehicles could increase. This is a significant impact that requires mitigation.

Mitigation. The project proponent shall construct an all-weather pedestrian facility within the exiting right of way in the area between the project and the existing sidewalk on Franklin Road at Lobo Avenue to the satisfaction of Merced County DPW.

Bicycle Facilities. The same issues affecting pedestrian travel also affect bicycles. The project could generate some customers or employees who elect to ride bicycles to and from the site. Bicycles would mix with motor vehicles on the routes to and from the site. During most of the day this activity does not represent a significant safety issue, but during peak traffic periods when intersection queuing occurs the project could increase bicycle / motor vehicle conflicts. This is a significant impact that requires mitigation.

Mitigation. The project proponent shall improve the project's frontage to Merced County standards and construct shoulders on Franklin Road from Ashby Road to Lobo Avenue to the satisfaction of Merced County DPW.

Transit. Some employees could elect to use transit service if it was convenient to the site. The closest regular transit stop at the Dan Ward Road / Beechwood Drive intersection, which is not convenient. The extent to which Merced County Transit desires a dedicated bus stop near the project is unknown.

Mitigation. If required by Merced County, a bus stop shall be developed along the project frontage.

Safety Impacts to Caltrans Facilities

Considerations. While Level of Service analysis is no longer a consideration, a project's impacts to safety on Caltrans facilities remains a significance criterion under CEQA. Under current practice, safety impacts on state facilities are typically considered within the context of queuing on off-ramps and in turn lanes at intersections, truck turning requirements and the need for alternative traffic control devices. Queuing that spills over from a turn lane or extends down an off-ramp to the mainline freeway could represent significant safety issues. Intersections where truck paths leave the pavement or encroach into opposing lanes are a safety issue. Operation of an intersection with inappropriate traffic control devices would also represent a potential safety issue.

Evaluation. As noted in the Traffic Operational Analysis development of the project will increase the length of the northbound queue at the Franklin Road / Ashby Road intersection and at the project access on Franklin Road. Without improvements such queues could create safety problems for off ramp traffic. This is a significant impact that requires mitigation.

Mitigation. The Project proponent shall widen Franklin Road south of the Ashby Road intersection to provide a northbound left turn lane that extends along the project's frontage.

Mitigation. The Project proponent shall widen Ashby Road between the Overcrossing and Franklin Road intersection to provide a Two-Way Left-Turn lane that extends along the project's frontage.

Mitigation. The project proponent shall install a roundabout or traffic signal at the Franklin Road / Ashby Road intersection to the satisfaction of Merced County DPW.

With these mitigations, the project's impact to safety on state facilities is not significant.

TRAFFIC OPERATIONAL ANALYSIS

While no longer part of CEQA evaluation, local agencies may continue to consider a project's traffic operational effects within the context of safety and General Plan policies. This report section evaluates the current and future operation of local area circulation system within the context of Merced County General Plan policies.

Level of Service Calculation

"Levels of Service" were determined at study area intersections to quantitatively evaluate traffic conditions and to provide a basis for comparison of operating conditions with and without project generated traffic. LOS analysis is also the basis for peak period queue forecasts included in the evaluation of safety impacts.

"Level-of-Service" (LOS) is a quantitative measure of traffic operating conditions whereby a letter grade "A" through "F" is assigned to an intersection. LOS "A" through "F" represents progressively worsening traffic conditions. The characteristics associated with the various LOS for intersections are presented in Table 4. LOS "E" and "F" are associated with severe congestion and delay and are unacceptable to most motorists, and exceed the Merced County General Plan's minimum standard.

TABLE 4
LEVEL OF SERVICE DEFINITIONS

Level of Service	Signalized Intersection	Unsignalized Intersection	Roadway (Daily)
"A"	Uncongested operations, all queues clear in a single-signal cycle. Delay ≤ 10.0 sec	Little or no delay. Delay ≤ 10 sec/veh	Completely free flow.
"B"	Uncongested operations, all queues clear in a single cycle. Delay > 10.0 sec and ≤ 20.0 sec	Short traffic delays. Delay > 10 sec/veh and ≤ 15 sec/veh	Free flow, presence of other vehicles noticeable.
"C"	Light congestion, occasional backups on critical approaches. Delay > 20.0 sec and ≤ 35.0 sec	Average traffic delays. Delay > 15 sec/veh and ≤ 25 sec/veh	Ability to maneuver and select operating speed affected.
"D"	Significant congestions of critical approaches but intersection functional. Cars required to wait through more than one cycle during short peaks. No long queues formed. Delay > 35.0 sec and ≤ 55.0 sec	Long traffic delays. Delay > 25 sec/veh and ≤ 35 sec/veh	Unstable flow, speeds and ability to maneuver restricted.
"E"	Severe congestion with some long standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es). Delay > 55.0 sec and ≤ 80.0 sec	Very long traffic delays, failure, extreme congestion. Delay > 35 sec/veh and ≤ 50 sec/veh	At or near capacity, flow quite unstable.
"F"	Total breakdown, stop-and-go operation. Delay > 80.0 sec	Intersection blocked by external causes. Delay > 50 sec/veh	Forced flow, breakdown.

Sources: Highway Capacity Manual, 6th Edition.

Levels of Service were calculated using the respective methods in the Highway Capacity Manual, 6th Edition (HCM) using SYNCHRO software. 95th percentile queue lengths are a byproduct of this analysis using SimTraffic simulation.

Current Peak Hour Traffic Conditions

Level of Service. Levels of Service (LOS) were calculated (refer to Appendix for calculation worksheets) under existing conditions, and current LOS at the three intersections is presented in Table 5. As shown, two locations operate at Levels of service that exceed Merced County's minimum LOS D requirement. During the a.m. peak hour the westbound approach to the ***Franklin Road / Lobo Avenue intersection*** operates at LOS F. The Franklin Road / Ashby Road intersection operates at LOS E during the a.m. peak hour.

Afternoon traffic conditions around schools can be poor even though standard capacity intersection measures (i.e., LOS) do not indicate a problem. Parents waiting for the bell often accumulate at drop off / loading zones and queues can be created that extend back onto adjoining streets. Spillover queues can cause congestion and delays for through traffic that are not revealed by LOS calculations and are not easily remedied by capacity improvements on public streets.

The FBTS indicated that a traffic signal could be installed at the Franklin Road / Lobo Avenue intersection without adding any turn lanes. This improvement would yield LOS B in the a.m. peak hour.

The FBTS indicated that a roundabout could be installed at the Franklin Road / Ashby Road intersection, and a single lane roundabout would yield LOS A under existing conditions. The FBTS included a preliminary roundabout layout accommodating Cal-Legal trucks. The availability of right of way for this improvement design, or for a layout accommodating STAA trucks is unknown.

As noted later in this report under the discussion of cumulative traffic operations, the Franklin - Beachwood Bridge & Major Thoroughfare (FB B&MT) fee project list suggest that a traffic signal would be installed at this location. A traffic signal would need to be accompanied by intersection widening to accommodate separate left turn lanes on each approach as well as the turning requirement of trucks. The availability of right of way for this level of improvements is unknown. A traffic signal would deliver LOS C in the a.m. peak hour.

Peak Period Queues. Table 6 identifies the length of 95th percentile queues occurring at the three study intersections based on SimTraffic simulation. As indicated current 95th percentile queues are not projected to extend from any intersection to a point that they block access to adjoining streets.

Our observation of peak hour traffic at the Franklin Road / Ashby Road intersection did reveal instances when queueing was a problem. During both the a.m. and afternoon peak hours there were isolated occasions when the queue of eastbound traffic on Ashby Road extended back from

Franklin Road through the Franklin Overcrossing intersection. At that point it was not possible for westbound traffic to turn left onto the Overcrossing. In addition, there were instances when a queue of northbound traffic did form on the Overcrossing approach to the Ashby Road intersection. The lengths of queues on other intersection approaches were generally consistent with the simulation results.

Queuing at the Franklin Road / Ashby Road intersection is greatly influenced by the turning movements of occasional tractor-trailer combination. Because those vehicles slowly cover most of the intersection when turning, traffic on other approaches is delayed when large trucks turn.

The roundabout at Franklin Road / Ashby Road suggested in the FBTS would produce shorter queues. A traffic signal with separate left turn lanes would also shorten queues.

Peak Hour Traffic Signal Warrants. Traffic operating conditions at unsignalized intersections was also evaluated based on the extent to which existing traffic volumes satisfy traffic signal warrant requirements based on guidelines contained in the Manual of Uniform Traffic Control Devices (MUTCD). The peak hour traffic volumes at the three intersections were reviewed to determine whether either the a.m., afternoon or p.m. volume satisfies peak hour warrant requirements (i.e., Warrant 3). As noted in Table 7, today the volume of traffic at the Franklin Road / Lobo Avenue intersection satisfies warrants in the a.m. peak hour, and the p.m. peak hour volumes at the Franklin Road / Ashby Road intersection also reaches the level that satisfied peak hour warrants.

It is important to note that merely satisfying one of the nine traffic signal warrants is not by itself justification for installing a traffic signal. A complete traffic signal warrants analysis, which is beyond the scope of this analysis, would be needed to confirm that a traffic signal is the appropriate traffic control device in a particular situation.

TABLE 5
EXSITING PLUS PROJECT PEAK HOUR INTERSECTION LEVELS OF SERVICE

Location	Control	AM Peak Hour				Afternoon Peak Hour		PM Peak Hour			
		Existing		Plus Project		Existing		Existing		Plus Project	
		Average Delay (sec / veh)	LOS	Average Delay (sec / veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec / veh)	LOS	Average Delay (sec /veh)	LOS
Ashby Road / Franklin Crossing NB approach	NB Stop	11.4	B	12.0	B	12.0	B	11.5	B	12.0	B
Ashby Road / Access NB approach	NB Stop	-	-	13.7	B	-	-	-	-	15.7	C
Franklin Road / Lobo Ave WB approach	WB Stop	**63.2**	**F**	**155.9**	**F**	13.7	B	14.4	B	17.8	C
	Signal	11.1	B	13.3	B	5.8	A	5.7	A	6.2	A
Franklin Road / Ashby Rd	AWS	**40.1**	**E**	**103.9**	**F**	17.9	C	25.2	D	**63.5**	**F**
	roundabout	8.2	A	10.6	B	7.1	A	8.0	A	10.0	B
	Signal	22.9	C	30.4	C	20.5	C	23.2	C	31.5	C
Franklin Road / Access EB approach	EB Stop	-	-	15.4	C	-	-	-	-	15.0	C

Bold values indicate conditions in excess of Merced County's LOS D minimum

TABLE 6
EXSISTING PLUS PROJECT PEAK HOUR INTERSECTION 95th PERCENTILE QUEUES

Location	lane	Storage (feet)	AM Peak Hour (7:00 to 9:00 a.m.)				Afternoon (2:00 to 4:00 p.m.)		PM Peak Hour (4:00 to 6:00 p.m.)			
			Existing		Existing Plus Project		Existing		Existing		Existing Plus Project	
			Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)
Ashby Road / Franklin Crossing	NB approach	1,325[1]	255	75	274	85	301	95	316	95	334	155
	WB approach	120[2]	315	50	345	60	332	55	354	55	384	65
	EB approach	-	59	-	71	**<25**	95	<25	100	<25	112	<25
Ashby Road / Access	NB approach	-	0	-	119	90	0	-	0	-	120	105
	WB approach	140[3]	315	<25	343	50	332	<25	354	<25	374	60
	EB approach	120[4]	290	<25	331	**30**	370	<25	401	25	432	**60**
Franklin Road / Lobo Ave	WB approach	500[5]	332	200	364	**535**	70	60	36	60	86	65
	SB approach	260[6]	354	60	393	85	318	50	315	50	345	55
Franklin Road / Ashby Road	EB approach	140[7]	289	95	348	**130**	370	100	401	125	452	**145**
	SB approach	475[8]	444	135	506	275	318	105	331	115	391	175
	NB approach	240[9]	189	75	240	100	107	60	162	70	219	95
Franklin Road / Access	NB approach	240[10]	189	-	270	70	107	0	162	0	238	70
	EB approach	-	0	-	162	85	0	-	0	-	160	90
With Roundabout												
Franklin Road / Ashby Road	EB approach	140	289	55	348	100	370	55	401	65	452	120
	SB approach	475	444	85	506	155	318	45	331	50	391	75
	NB approach	240	189	30	240	45	107	<25	163	25	219	35

Bold values exceed storage. [1] distance to SP Ave. [2] distance to proposed driveway. [3] distance to Franklin Road. [4] distance to Overcrossing [5] distance to Sunrise Ave. [6] distance to Autumn Drive [7] distance to access. [8] distance to Lobo Ave. [9] distance to access. [10] distance to Caltrans ROW: the distance to ramp gore is 805 feet.

TABLE 7
EXISTING PLUS PROJECT PEAK HOUR TRAFFIC SIGNAL WARRANTS STATUS AT INTERSECTION

Location	AM Peak Hour				Afternoon Peak		PM Peak Hour			
	Existing		Existing Plus Project		Existing		Existing		Existing Plus Project	
	Volume (vph) Major / Minor	Warrant Met?	Volume (vph) Major / Minor	Warrant Met?	Volume (vph) Major / Minor	Warrant Net?	Volume (vph) Major / Minor	Warrant Met?	Volume (vph) Major / Minor	Warrant Met?
Ashby Road / Franklin Crossing	374 / 256	No	416 / 274	No	427 / 301	No	454 / 316	No	496 / 334	No
Ashby Road / Access	605 / -	-	674 / 119	No	702 / -	-	755 / -	-	806 / 120	No
Franklin Road / Lobo Ave	707 / 333	**Yes**	806 / 364	**Yes**	647 / 70	No	690 / 56	No	780 / 86	No
Franklin Road / Ashby Road	633 / 289	No	746 / 348	**Yes**	638 / 318	No	679 / 331	**Yes**	760 / 391	**Yes**
Franklin Road / Access	437 / --	-	603 / 162	No	305 / -	-	415 / -		587 / 160	No

Based on MUTCD Warrant 3 for urban locations (i.e., design speed ≤40 mph)

Existing Plus Project Traffic Operational Effects

The effects of the Franklin Road Retail Project have been assessed based on the sum of existing traffic and project trips shown in Figure 5.

Intersection and Driveway Level of Service. Table 5 also summarizes the results of Level of Service calculations for the three study intersections and the two project driveways under "Existing plus Project" conditions.

As noted, the additional traffic caused by the project would lengthen delays at intersections that already operate poorly in the a.m. peak hour and would also result in LOS F conditions at the Franklin Road / Ashby Road intersection during the p.m. peak hour. These conditions exceed Merced County's minimum LOS D standard.

As noted previously, the FBTS suggested a traffic signal at the Franklin Road / Lobo Avenue intersection. That improvement would yield LOS B in the a.m. peak hour under Existing Plus Project conditions. However, as discussed later in this report under Cumulative conditions, that improvement is not yet included in the FB B&MT fee.

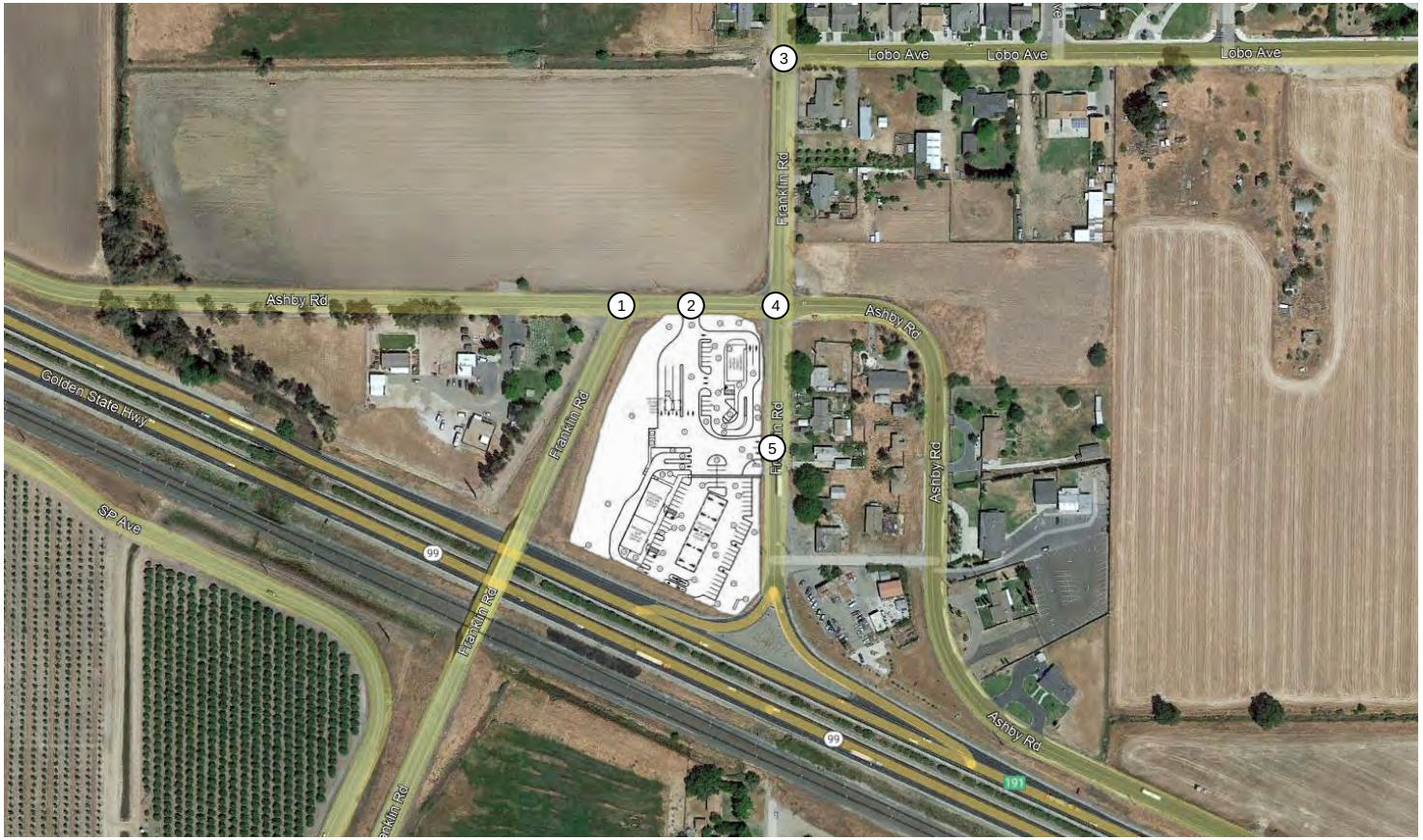
At the Franklin Road / Ashby Road intersection the roundabout suggested by the FBTS would LOS B or better conditions under the Existing Plus Project condition. A traffic signal with left turn lanes would deliver LOS C. This design option would require constructing a three lane section on both Ashby Road and Franklin Road along the project frontage.

Queueing. Table 6 also identifies the length of 95th percentile queues at key locations with the addition of project traffic and no improvements. As shown, project traffic appreciably lengthens the 95th percentile queues in peak traffic hours. Forecast queues exceed the available storage at the Franklin Road / Lobo Avenue intersection and at the Franklin Road / Ashby Road intersection. The queuing created at the later intersection will extend on Ashby Road through the project's driveway, and left turns into and out of the site would be difficult during peak hours.

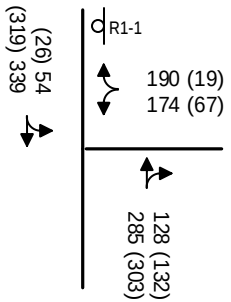
Projected queue lengths are shorter with potential improvements. A roundabout at Franklin Road / Ashby Road would result in eastbound queues that extend to but not through the project driveway.

Queues occurring with traffic signals are presented in Table 8. A traffic signal with left turn lanes would result in eastbound queues on Ashby Road that extended through the project driveway.

Traffic Signal Warrants. Table 7 also presents the status of MUTCD peak hour warrant requirements with the addition of project trips. The project creates volumes that satisfy peak hour warrants in the a.m. peak hour at the Franklin Road / Ashby Road intersection.

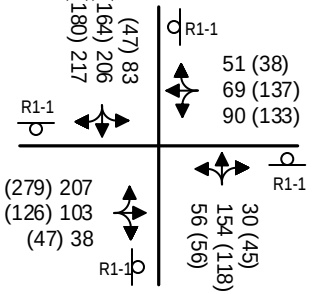


3



Franklin Rd/ Lobo Ave

4



Franklin Rd/ Ashby Rd

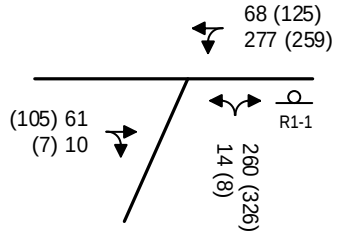
Legend

XX	AM Peak Hour Volume
(XX)	PM Peak Hour Volume
R1-1	Stop Sign
	Signalized Intersection

NORTH

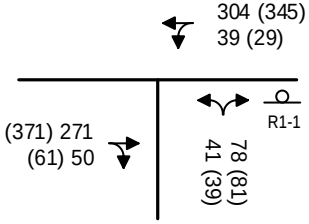
N.T.S.

1



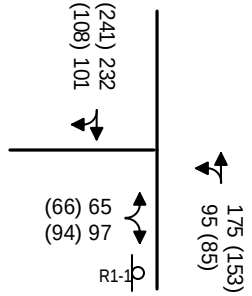
Franklin Rd/ Ashby Rd

2



Project Dwy/ Ashby Rd

5



Franklin Rd/ Project Dwy

EXISTING PLUS PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

KD Anderson & Associates, Inc.
Transportation Engineers

TABLE 8
EXSISTING PLUS PROJECT PEAK HOUR INTERSECTION 95th PERCENTILE QUEUES WITH TRAFFIC SIGNALS

Location	Lane	Storage (feet)	AM Peak Hour (7:00 to 9:00 a.m.)				Afternoon (2:00 to 4:00 p.m.)		PM Peak Hour (4:00 to 6:00 p.m.)			
			Existing		Existing Plus Project		Existing		Existing		Existing Plus Project	
			Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th 5 Queue (feet)	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)
Ashby Road / Franklin Crossing	NB approach	1,325[1]	255	105	274	95	301	105	316	145	334	180
	WB left	120[2]	315	55	345	60	332	55	354	65	384	65
	EB approach	-	59	-	71	**<25**	95	<25	100	<25	112	30
Ashby Road / Access	NB approach	-	0	-	119	75	0	-	0	-	120	110
	WB approach	140[3]	315	<25	343	<25	332	<25	354	<25	374	<25
	EB approach	120[4]	290	**60**	331	**60**	370	60	401	**75**	432	**110**
Franklin Road / Lobo Ave	WB approach	500[5]	332	70	364	190	70	60	36	60	86	70
	SB approach	260[6]	354	80	393	190	318	50	315	80	345	100
Franklin Road / Ashby Road	EB left	140[7]	289	135	348	**120**	370	135	401	140	452	**145**
	SB approach	475[8]	444	130	506	250	318	130	331	150	391	175
	NB approach	240[9]	189	70	240	130	107	70	162	90	219	115
Franklin Road / Access	NB approach	240[10]	189	-	270	<25	107	0	162	0	238	0
	EB approach	-	0	-	162	85	0	-	0	-	160	80

Bold values exceed storage. [1] distance to SP Ave. [2] distance to proposed driveway. [3] distance to Franklin Road. [4] distance to Overcrossing [5] distance to Sunrise Ave. [6] distance to Autumn Drive [7] distance to access. [8] distance to Lobo Ave. [9] distance to access. [10] distance to Caltrans ROW: the distance to ramp gore is 805 feet.

Future Cumulative Traffic Operations Assumptions

Approach. This analysis of long-term traffic operating conditions makes use of the best available information to address the combined effects of other Franklin - Beachwood development, growth in Merced County and regional circulation system improvements, as well as the proposed Franklin Road Retail Center. In 2016 Merced County commissioned the Franklin - Beachwood Transportation Study (FBTS) and Impact Fee Update[4]. That work identified Year 2035 traffic volumes in the area of the proposed project based on an update to the MCAG regional travel demand forecasting model and growth assumptions for the Franklin - Beachwood area. While the Franklin - Beachwood Bridge and Major Thoroughfare (B&MT) program was not revised as a result of this study, its traffic volumes represent the best available starting point for long term analysis.

Land Use. Land use assumptions made for the FBTS were reviewed to determine how the Franklin Road Retail Center site was addressed. In addition, a list of approved Franklin - Beachwood area projects was obtained from Merced County and compared to the FBTS's land use assumptions to determine whether addition development should be assumed.

The FBTS identified future land use assumption for local area Traffic Analysis Zones (TAZ). The Franklin Retail center site is a single TAZ (TAZ 813). No land use was assumed for this TAZ in the FBTS. Thus, FBTS traffic forecasts would represent a "No Project" condition.

Merced County staff identified the following projects that have been approved in the Franklin-Beachwood area in the last two years:

- CUP20-016 / SPR20-009 - To construct a 5,350 square foot vehicle service station featuring four (4) fuel pumps and a 5,350 square foot convenience store/mini-mart, and two 2,275 square foot commercial shell buildings (totaling 9,900 square foot of building area). The project site is located at the southeast corner of North Beachwood Drive and West Cabot Avenue in the Franklin-Beachwood area, identified as Assessor's Parcel Numbers 057-010-010 and 057-310-012. The property is designated Franklin-Beachwood Urban Community – General Commercial land use in the General Plan and is zoned C-2 (General Commercial).

This site is in TAZ 822. The FBTS identified 14 future retail employees in this TAZ, which is generally equivalent to 7,000 sf of new retail development. The overall plan area was expected to add 186 retail employees or about 93,000 of retail uses. This project can reasonably be assumed to be addressed in the FBTS's forecasts.

- ZCLR21-036 – To open a novelty/gift shop within an existing commercial building, located at the N/E corner of N. Beachwood Dr & N. Santa Fe Rd in the Merced area, identified as APN 057-251-001. The property is designated Franklin-Beachwood Urban Community - Neighborhood Commercial land use in the General Plan and is zoned C-1 (Neighborhood Commercial).

[4] Franklin-Beechwood Transportation Study and Impact Fee Update, Omni-Means, 2016

This site is in TAZ 803. The FBTS identified 122 future retail employees in this TAZ, which is generally equivalent to 61,000 sf of new retail development. This project can reasonably be assumed to be addressed in the FBTS's forecasts.

- MAS21-003 - To divide two parcels, totaling approximately 17 acres, into 84 residential lots. The project site is located on the east and west sides of North Cowden Avenue, 120 feet south of West Dan Ward Road, identified as Assessor's Parcel Numbers (APNs) 057-530-001 & 057-530-002. The property is designated Franklin-Beachwood Urban Community - Low Density Residential land use in the General Plan and zoned R-1 (Single-Family Residential). CEQA: Staff recommends the Planning Commission find that no further environmental review is required pursuant to Section 15183 – "Projects Consistent with a Community Plan or Zoning" of the CEQA Guidelines. TSH (**This approval succeeds MAS15-002 which expired**)

This site is in TAZ 809. The FBTS identified 107 future single family residences in this TAZ. This project can reasonably be assumed to be addressed in the FBTS's forecasts.

- CUP21-010 - To operate a semi-truck and RV storage service. The project site is located on the north side of N. Ashby Rd., 0.27 west of N. Fern St., in the Franklin-Beachwood area, identified as Assessor's Parcel Numbers 057-390-054 and 057-390-053. The property is designated Franklin-Beachwood Urban Community – General Commercial land use in the General Plan and is zoned C-2 (General Commercial).

This site is in TAZ 819. The FBTS identified 24 future retail employees in this TAZ, which is generally equivalent to 12,000 sf of new retail development. Because the approved use is a very low trip generator, this project can reasonably be assumed to be addressed in the FBTS's forecasts.

Based on this review no change to the peak hour traffic volume forecasts presented in the FBTS has been made to address other projects.

Circulation System Improvements. The extent to which local and area regional circulation system improvements could affect future travel patterns in the Franklin - Beachwood area has been considered from these three standpoints.

- Improvements in the adopted Franklin - Beachwood Bridge & Major Throughfare Program
- Improvements identified in the Draft 2002 Merced County Regional Transportation Plan/ Sustainable Communities Strategy (RTP/SCS)
- Improvement discussed in the FBTS but not adopted by Merced County

Bridge & Major Thoroughfare Project list. Table 9 lists the project included in the adopted Franklin - Beachwood B&MT fee. As indicated, some improvements in the area of the Franklin Road Retail Center are listed, but these projects would not directly alter current travel patterns.

TABLE 9 FRANKLIN - BEACHWOOD BRIDGE & MAJOR THOROUGHFARE PROJECT LOST (2008)				
Item	**Description**	**Total 2008 Cost (1,000's)**	**Regional Share**	**Franklin Beechwood Share**
1	New Collector Road Construction (Ranchero Lane)	$12,804	$0	$12,804
2	Santa Fe Road Extension (Beechwood to New Collector)	$ 2,934	$0	$ 2,934
3	Franklin Road (Overcrossing, Connector Road, Signal @ Ashby, and Improvements)	$16,005	$15,364	$ 640
4	Beechwood Drive Improvements (including signal @ Ashby)	$ 717	$0	$ 717
5	Santa Fe Drive Improvements	$ 7,853	$7,539	$ 314
6	Ashby Road @ 16th Street Traffic Signal	$ 610	$0	$ 610
	Cost per Peak Hour Trip			$4,230

Year 2022 Merced County RTP/SCS Project List. Table 10 lists those Tier 1 projects identified in Table K of the Draft Year 2022 Merced County RTP/SCS. No projects are in the immediate study area.

TABLE 10 DRAFT YEAR 2022 MERCED COUNTY RTP/SCS					
Agency	**Title**	**Limits / Description**	**Year**	**Total Cost ($1,000's)**	**Funding Source**
Tier I Projects					
County	Atwater-Merced Expressway (AME) Phase 1B &2	4-labe expressway from Green Sands to SR 59/Bellevue Road	2025	$79,000	STIP, SB 1, Measure V
Caltrans	SR-99 "Atwater widening" (4F to 6F)	In and near the City of Atwater, widen SR 99 to 6 lanes	2035	$220,000	SB-1, STIP
Caltrans	SR-99 "Merced Widening" (4F to 6F)	In and near the City of Merced widen SR 99 to 6 lanes	2,030	$200,000	SB-1, STIP

Improvement Discussed in the FBTS but not Adopted by Merced County. The FBST determined that operational issues in the vicinity of intersections on Santa Fe Drive were the most appreciable long term issue affecting the Franklin - Beachwood area. Several improvement alternatives were discussed to address those issue. The FBTS also suggested improvements to intersections on Franklin Road, as noted previously. The improvements alternatives are described in the following excerpts from the FBTS.

Alternative 1 features converting the two-way stop-controlled intersection of Beachwood Drive/Dan Ward Road/Santa Fe Road to an actuated traffic signal control that is coordinated

with the traffic signal at the intersection of Beachwood Drive/Santa Fe Drive and includes railroad pre-emption. Coordination between the two traffic signals and the railroad crossing is necessary to maximize avoidance of queue spillback over the railroad tracks and to clear the vehicles off the tracks when a train is approaching for safety. The traffic signal alternative features widening the intersection to accommodate left turn pockets northbound and southbound, and right turn pockets eastbound and westbound. The north- and southbound left turns would operate with a protected left turn phase and the side streets would be split phased (non-concurrent).

Alternative 2 features converting the intersection of Beachwood Drive/Dan Ward Road/Santa Fe Road to a single-lane roundabout. This concept, like Alternative 1 will require special design considerations to maximize avoidance of queue spillback over the railroad tracks.

Alternative 3 features closing the Beachwood Drive at-grade railroad crossing and converts both intersections from four-legged intersections to three-legged intersections ("T-intersections") with an all-way stop-control at the intersection of Beachwood Drive/Dan Ward Road/Santa Fe Road. The third alternative also considers the Ranchero Lane Extension to be constructed and will relocate the railroad crossing, in concert with the closure, to the west at the new intersection of Santa Fe Drive/Ranchero Lane Extension, which is consistent with the County's General Plan. All alternatives will have pre-emption/coordination with any railroad crossing and adjacent traffic signal(s) to accommodate the frequent train activity and provide safety for vehicles crossing the tracks.

Alternative 4 features closing the Beachwood Drive at-grade railroad crossing and converts both intersections from four-legged intersections to three-legged intersections ("T-intersections") with an all-way stop-control at the intersection of Beachwood Drive/Dan Ward Road/Santa Fe Road. The fourth alternative also considers the Lobo Avenue Extension to be constructed and will relocate the railroad crossing, in concert with the closure, to the east at the new intersection of Santa Fe Drive/Lobo Avenue Extension, which passes through the planned industrial area. Also, this alternative features extending Santa Fe Road southeast to provide access to the Lobo Avenue extension, including construction of a roundabout at the new intersection of Santa Fe Road and Lobo Avenue. Truck restrictions on the Lobo Avenue Extension and the Santa Fe Road Extension will also be in place to restrict truck access to the existing Franklin-Beachwood residential areas. All alternatives will have pre-emption/coordination with any railroad crossing and adjacent traffic signal(s) to accommodate the frequent train activity and provide safety for vehicles crossing the tracks.

The RBTS report suggests constructing additional lanes on Franklin Road for the short segment between Santa Fe Drive and Belcher Avenue. Traffic signals are indicated as being necessary at the intersections of Franklin Road with Dan Ward Road and Franklin Road with Lobo Avenue. A roundabout is proposed to be constructed at the intersections of Franklin Road at Ashby Road and Franklin Road at Belcher Avenue. The Department of Public Works, in order to reduce conflicts between traffic along Franklin Road and the urban land uses in the Franklin-Beachwood Area suggest the following:

a. After the Atwater-Merced Expressway is extended to Santa Fe Drive, ***restrict truck traffic from using Franklin Road between Ashby Road and Santa Fe Drive.*** (Note: it is important truck traffic continue to be allowed to use Franklin Road until AME is extended; otherwise, truck traffic will be diverted through other sensitive neighborhoods.)

b. After the Atwater-Merced Expressway is extended to Santa Fe Drive, construct ***traffic calming features along Franklin Road such as choker sections and chicanes*** to force traffic to drive at slower speeds. ***Reduce lane widths and develop Class 2 bicycle paths along Franklin Road.***

c. When warranted, construct ***traffic signals*** at the intersections of Franklin Road with Dan Ward Road and ***Franklin Road with Lobo Avenue.*** (Refer to preliminary layout in Appendix)

d. When warranted, construct a ***roundabout*** at the intersections ***of Franklin Road with Ashby Road*** and Franklin Road with Belcher Avenue. (Refer to Preliminary Layout in Appendix.

Assumptions. The extent to which any identified projects should be assumed to have been completed in the cumulative analysis has been considered. The FBTS presents future traffic volume study intersections with and without implementation of changes to Santa Fe Drive access. Review of those forecasts indicated that those Franklin - Beachwood area improvements did not result in any appreciable change to the volume of peak hour traffic at study intersections. Because Merced County did not adopt the findings of the FBTS and because the 2022 RTP/SCS project list does not include any of those improvements, their implementation has not been assumed herein.

As indicated in the FBTS the development of AME Phase 1B & 2 may alter the volume of traffic on Franklin Road. The FBTS indicates that its long term traffic volumes forecasts assume that AME is completed through Phase 2.

Future Cumulative No Project Traffic Operations Results

Volumes. Figure 6 presents future traffic volumes developed from the FBTS.

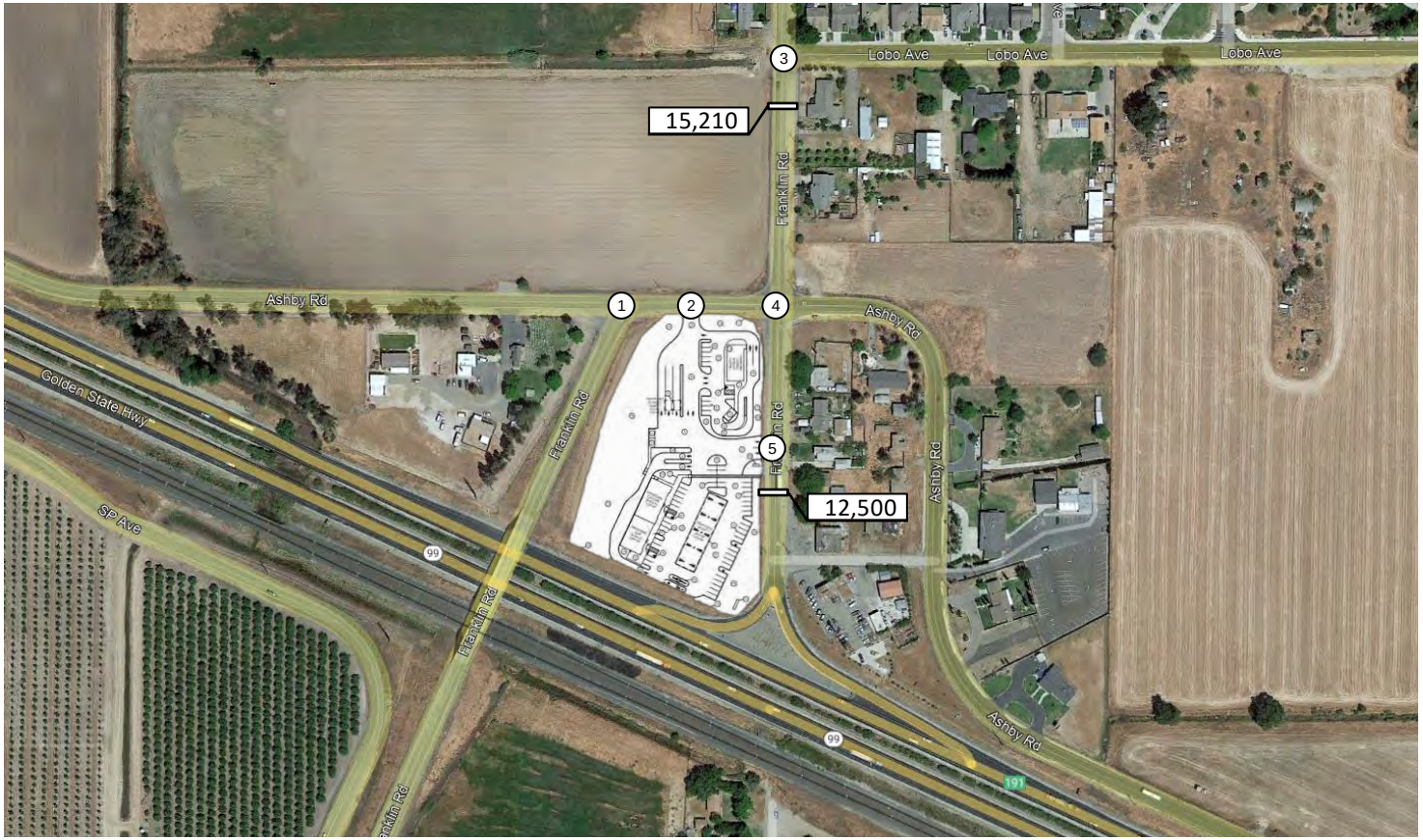
Level of Service. Future Levels of Service (LOS) were calculated for Cumulative traffic conditions, and the results are presented in Table 11. As shown, without improvements the Franklin Road / Lobo Avenue and Franklin Road / Ashby Road intersections would operate at LOS F with very long delays.

A traffic signal at the Franklin Road / Lobo Avenue intersection would yield LOS B in the a.m. and p.m. peak hour.

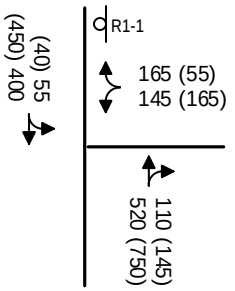
A single lane roundabout at the Franklin Road / Ashby Road intersection would yield LOS B in the a.m. peak hour and LOS D in the p.m. peak hour. A traffic signal with left turn lanes on all approaches would provide LOS E in the p.m. peak hour.

Peak Period Queues. Table 12 identifies the length of 95th percentile queues occurring at the three study intersections based on SimTraffic simulation. As indicated without improvements queues are projected to extend far beyond the Franklin Road / Ashby Road intersection and block access to adjoining streets.

Peak Hour Traffic Signal Warrants. As shown in Table 13, all three existing intersections would carry volumes that satisfy peak hour traffic signal warrants.

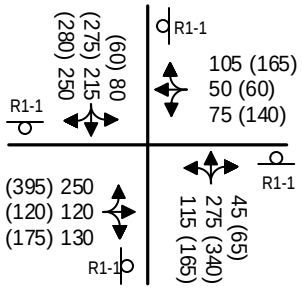


3



Franklin Rd/ Lobo Ave

4



Franklin Rd/ Ashby Rd

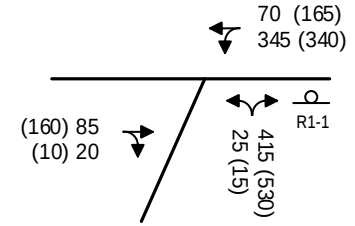
Legend

- XX — AM Peak Hour Volume
- <XX> — Afternoon Peak Hour Volume
- (XX) — PM Peak Hour Volume
- R1-1 — Stop Sign
- Signal

NORTH

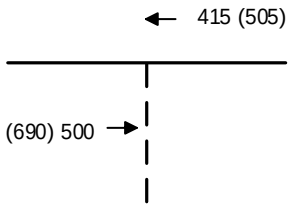
N.T.S.

1



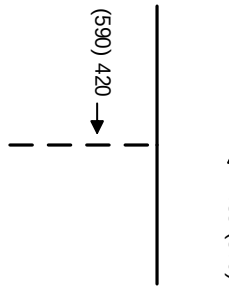
Franklin Rd/ Ashby Rd

2



Project Dwy/ Ashby Rd

5



Franklin Rd/ Project Dwy

CUMULATIVE NO PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

KD Anderson & Associates, Inc.
Transportation Engineers

TABLE 11
CUMULATIVE PLUS PROJECT PEAK HOUR INTERSECTION LEVELS OF SERVICE

Location	Control	AM Peak Hour				PM Peak Hour			
		No Project		Plus Project		No Project		Plus Project	
		Average Delay (sec / veh)	LOS	Average Delay (sec / veh)	LOS	Average Delay (sec / veh)	LOS	Average Delay (sec /veh)	LOS
Ashby Road / Franklin Crossing NB approach	NB Stop	21.5	C	26.1	D	24.0	C	28.4	D
Ashby Road / Access NB approach	NB Stop	-	-	20.1	C	-	-	30.5	D
Franklin Road / Lobo Ave WB Approach	WB Stop	**357.9**	**F**	**547.6**	F	**367.3**	**F**	**589.3**	**F**
	Signal	17.5	B	13.3	B	15.5	B	28.3	C
Franklin Road / Ashby Rd	AWS	**241.7**	**F**	**334.3**		**374.6**	**F**	**443.6**	**F**
	Roundabout	17.0	B	28.5	C	36.9	D	**62.8**	**E**
	Roundabout with 2nd lane							33.1	C
	Signal	42.7	D	**57.6**	**E**	**76.4**	**E**	**97.3**	**F**
Franklin Road / Access EB approach	EB Stop	-	-	30.0	D	-	-	**75.1**	**F**

Bold values indicate conditions in excess of Merced County's LOS D minimum

TABLE 12
CUMULATIVE PLUS PROJECT PEAK HOUR INTERSECTION 95th PERCENTILE QUEUES

Location	lane	Storage (feet)	AM Peak Hour (7:00 to 9:00 a.m.)				PM Peak Hour (4:00 to 6:00 p.m.)			
			No Project		Plus Project		No Project		Plus Project	
			Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)
No Improvements										
Ashby Road / Franklin Crossing	NB approach	1,325	440	575	459	860	545	670	563	665
	WB approach	120[2]	415	75	445	75	505	70	535	70
	EB approach	-	105	**55**	117	**100**	170	**510**	182	**270**
Ashby Road / Access	NB approach	-	-		119	**275**	-	-	120	260
	WB approach	140[3]	415	<25	443	**45**	505	<25	525	30
	EB approach	120[4]	500	**140**	531	**115**	690	**105**	721	**105**
Franklin Road / Lobo Ave	WB approach	500[5]	310	**>1,000**	341	**>1,000**	220	**>1,000**	250	**>1,000**
	SB approach	260[6]	455	235		**515**	490	**530**	520	**615**
Franklin Road / Ashby Road	EB approach	140[7]	500	**170**	555	150	690	**150**	741	**145**
	SB approach	475[8]	545	**485**	607	520	615	**465**	674	**445**
	NB approach	240[9]	435	285	486	**315**	570	**275**	627	**405**
Franklin Road / Access	NB approach	240[10]	435	110	516	320	570	**465**	646	**405**
	EB approach	-	-		162	215	-	-	160	**185**
Roundabout										
Franklin Road / Ashby Road	EB approach	140	500	265	555	**515**	690	**730**	741	**1,415**
	SB approach	475	545	230	607	400	615	315	674	**505**
	NB approach	240	435	210	486	**355**	570	445	627	**635**
Roundabout with 2nd EB lane	EB approach									**280**
	SB approach									**510**
	NB approach									**290**

Bold values exceed storage. [1] distance to SP Ave. [2] distance to proposed driveway. [3] distance to Franklin Road. [4] distance to Overcrossing [5] distance to Sunrise Ave. [6] distance to Autumn Drive [7] distance to access. [8] distance to Lobo Ave. [9] distance to access. [10] distance to Caltrans ROW: the distance to ramp gore is 805 feet.

TABLE 13
CUMLATIVE PLUS PROJECT PEAK HOUR TRAFFIC SIGNAL WARRANTS STATUS AT INTERSECTION

Location	AM Peak Hour				PM Peak Hour			
	No Project		Plus Project		No Project		Plus Project	
	Volume (vph) Major / Minor	Warrant Met?	Volume (vph) Major / Minor	Warrant Met?	Volume (vph) Major / Minor	Warrant Met?	Volume (vph) Major / Minor	Warrant Met?
Ashby Road / Franklin Crossing	520 / 440	**Yes**	562 / 459	**Yes**	675 / 545	**Yes**	717 / 563	**Yes**
Ashby Road / Access	915 / -	-	974 / 119	No	1,195 / -	**-**	1,246 / 120	No
Franklin Road / Lobo Ave	1,085 / 310	**Yes**	1,176 / 341	**Yes**	1,385 / 220	**Yes**	1,475 / 250	**Yes**
Franklin Road / Ashby Road	980 / 500	**Yes**	1,093 / 555	**Yes**	1,185 / 690	**Yes**	1,302 / 741	**Yes**
Franklin Road / Access	855 / --	-	1,071 / 162	No	1,160 / -		1,326 / 160	**Yes**

Based on MUTCD Warrant 3 for urban locations (i.e., design speed ≤40 mph)

Future Cumulative Plus Project Traffic Operational Effects

The effects of the Franklin Road Retail Project under long term conditions have been assessed based on the sum of Long Term traffic and project trips shown in Figure 7.

Intersection and Driveway Level of Service. Table 11 also summarizes the results of Level of Service calculations for the three study intersections and the two project driveways under "Cumulative plus Project" conditions.

As noted, the additional traffic caused by the project would lengthen delays at all intersections that are already projected to operate poorly in the future. Conditions at all intersection are LOS F which exceeds Merced County's minimum LOS D standard.

A traffic signal at the Franklin Road / Lobo Avenue intersection would yield LOS D under Cumulative Plus Project conditions. However, as noted before this improvement is not yet included in the FB B&MT fee.

At the Franklin Road / Ashby Road intersection the roundabout suggested by the FBTS would yield LOS E in the p.m. peak hour under the Cumulative Plus Project condition. Additional improvements beyond those suggested in the FBTS would be needed to satisfy Merced County's minimum standards. A second eastbound lane on the roundabout would be needed starting on the eastbound Ashby Road entrance and continuing around to the eastbound exit. The level of improvement would yield LOS C. However, the availability of right of way for this level of improvement is unknown.

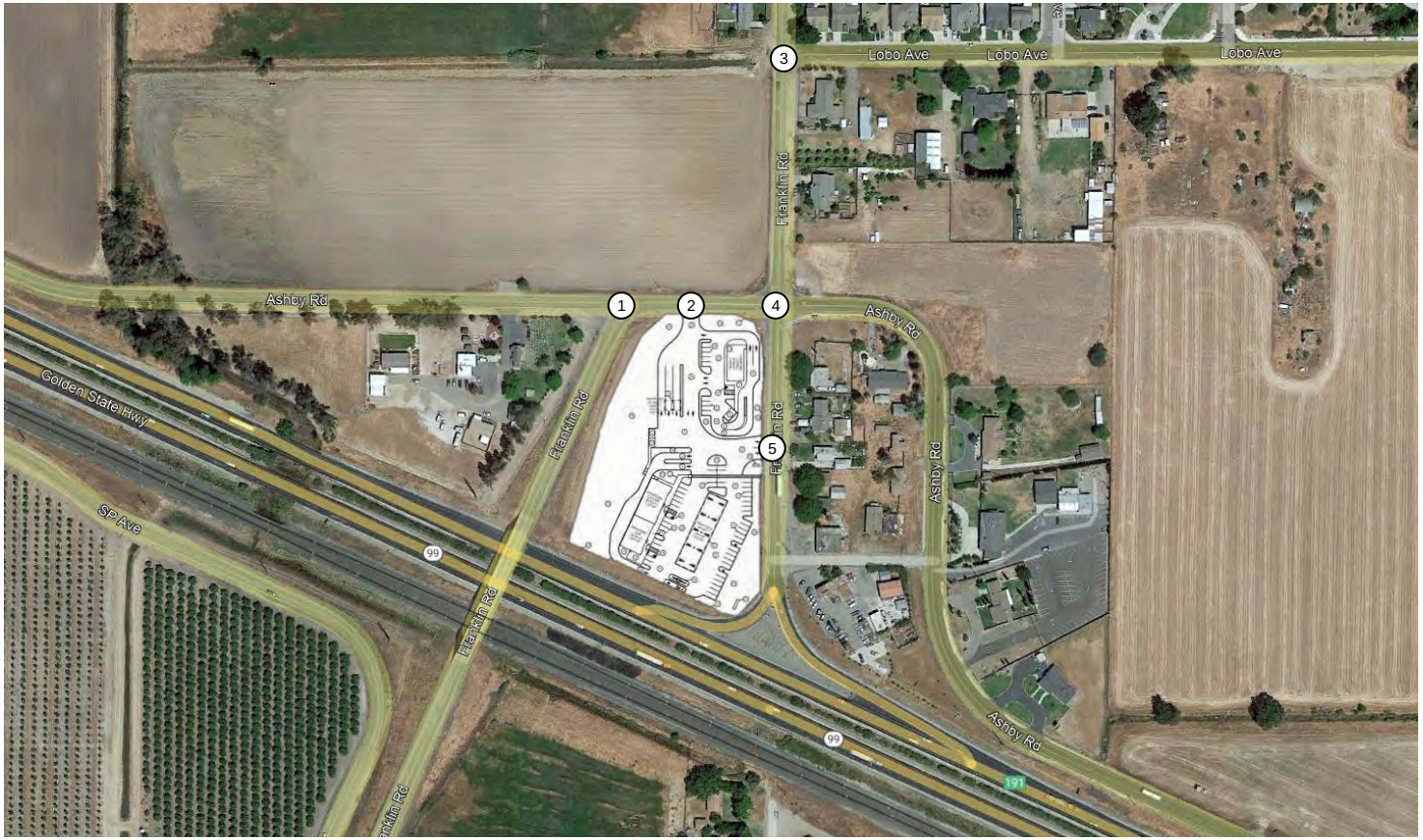
A traffic signal with left turn lanes on all approaches would deliver LOS F under Cumulative plus Project conditions during the p.m. peak hour.

Queueing. Table 12 also identifies the length of 95th percentile queues at key locations with the addition of project traffic and no improvements. As shown, project traffic appreciably lengthens the 95th percentile queues that were already excessive in peak traffic hours. Forecast queues exceed the available storage at the Franklin Road / Lobo Avenue intersection and at the Franklin Road / Ashby Road intersection. The queuing created at the latter intersection will extend on Ashby Road through the project's driveway, and left turns into and out of the site would be difficult during peak hours.

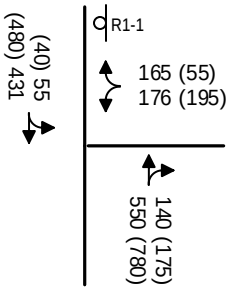
Projected queue lengths are shorter with potential improvements. A single lane roundabout at Franklin Road / Ashby Road would result in eastbound queues that were shorter but still extend through the project driveway. Similar, the northbound queue on Franklin Road would extend past the new driveway. Queues would be shortened with the expanded roundabout described above but would still extend through the driveway and make left turn access problematic.

As shown in Table 14 at some locations a traffic signal with separate left turn lanes would result in queues that are slightly shorter than those expected with stop signs, but eastbound and northbound queues would remain problematic.

Traffic Signal Warrants. Table 13 also presents the status of MUTCD peak hour warrant requirements with the addition of project trips. The project contributes to volumes that satisfy peak hour warrants at the three study intersections.

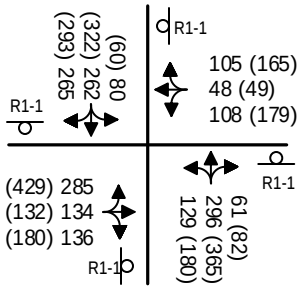


3



Franklin Rd/ Lobo Ave

4



Franklin Rd/ Ashby Rd

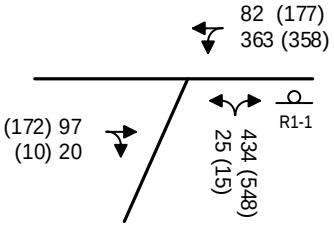
Legend

XX	AM Peak Hour Volume
(XX)	PM Peak Hour Volume
R1-1	Stop Sign
	Signalized Intersection

NORTH

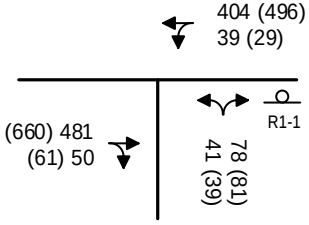
N.T.S.

1



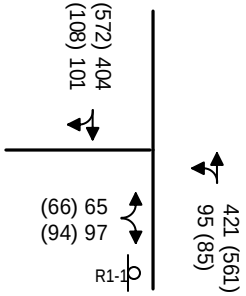
Franklin Rd/ Ashby Rd

2



Project Dwy/ Ashby Rd

5



Franklin Rd/ Project Dwy

CUMULATIVE PLUS PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

KD Anderson & Associates, Inc.
Transportation Engineers

TABLE 14
CUMULATIVE PLUS PROJECT PEAK HOUR INTERSECTION 95th PERCENTILE QUEUES WITH TRAFFIC SIGNALS

Location	lane	Storage (feet)	AM Peak Hour (7:00 to 9:00 a.m.)				PM Peak Hour (4:00 to 6:00 p.m.)			
			No Project		Plus Project		No Project		Plus Project	
			Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)
No Improvements										
Ashby Road / Franklin Crossing	NB approach	1,325[1]	440	330	459	>1,000	545	>1,000	563	>1,000
	WB left	120[2]	415	75	445	75	505	80	535	75
	EB approach	-	105	**40**	117	**65**	170	**125**	182	**135**
Ashby Road / Access	NB approach	-	-		119	**205**	-	-	120	**550**
	WB approach	140[3]	415	<25	443	**<25**	505	<25	525	<25
	EB approach	120[4]	500	**125**	531	**130**	690	**100**	721	**100**
Franklin Road / Lobo Ave	WB approach	500[5]	310	190	341	280	220	185	250	**235**
	SB approach	260[6]	455	**555**		**>1,000**	490	**>1,000**	520	**>1,000**
Franklin Road / Ashby Road	EB approach	140[7]	500	**145**	555	**150**	690	**145**	741	**145**
	SB approach	475[8]	545	**405**	607	**485**	615	**510**	674	**490**
	NB approach	240[9]	435	140	486	**230**	570	**265**	627	**300**
Franklin Road / Access	NB approach	240[10]	435	<25	516	**40**	570	**225**	646	**700**
	EB approach	-	-		162	115	-	-	160	**270**

Bold values exceed storage. [1] distance to SP Ave. [2] distance to proposed driveway. [3] distance to Franklin Road. [4] distance to Overcrossing [5] distance to Sunrise Ave. [6] distance to Autumn Drive [7] distance to access. [8] distance to Lobo Ave. [9] distance to access. [10] distance to Caltrans ROW: the distance to ramp gore is 805 feet.

APPENDIX

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.1
Total Del/Veh (s)	0.6	1.6	5.7	3.1

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.6	1.6	1.1

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.1
Total Del/Veh (s)	6.6	1.7	1.1	1.9

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.0	0.1
Total Del/Veh (s)	6.9	8.2	6.3	7.5	7.4

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.0
Total Del/Veh (s)	0.1	1.4	1.0

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	11.1

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	4	67	122
Average Queue (ft)	0	20	57
95th Queue (ft)	3	52	93
Link Distance (ft)	785	95	626
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	LT
Maximum Queue (ft)	30	4
Average Queue (ft)	1	0
95th Queue (ft)	19	4
Link Distance (ft)	95	126
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	74	8	72
Average Queue (ft)	32	0	14
95th Queue (ft)	59	4	48
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	118	122	66	128
Average Queue (ft)	62	62	37	64
95th Queue (ft)	100	100	58	105
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	1			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 1

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.0	0.2	0.3	0.1
Total Del/Veh (s)	0.6	0.3	2.0	0.8	9.7	5.4	3.1

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	WBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.6	1.6	1.1

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.3	0.3	0.1
Total Del/Veh (s)	8.4	4.0	1.8	1.3	3.5	0.7	1.9

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.9	7.8	5.3	7.6	9.2	6.3	6.0	7.3	3.7	8.1	9.5	6.0

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	7.4

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0
Total Del/Veh (s)	0.1	1.4	1.0

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	11.1

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	4	67	122
Average Queue (ft)	0	20	57
95th Queue (ft)	3	52	93
Link Distance (ft)	785	95	626
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	LT
Maximum Queue (ft)	30	4
Average Queue (ft)	1	0
95th Queue (ft)	19	4
Link Distance (ft)	95	126
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	74	8	72
Average Queue (ft)	32	0	14
95th Queue (ft)	59	4	48
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	118	122	66	128
Average Queue (ft)	62	62	37	64
95th Queue (ft)	100	100	58	105
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	1			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 1

Intersection	
Int Delay, s/veh	7.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	89	6	225	107	20	281
Future Vol, veh/h	89	6	225	107	20	281
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	98	7	247	118	22	309

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	105	0	714	102
Stage 1	-	-	-	-	102	-
Stage 2	-	-	-	-	612	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1486	-	398	953
Stage 1	-	-	-	-	922	-
Stage 2	-	-	-	-	541	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1486	-	327	953
Mov Cap-2 Maneuver	-	-	-	-	327	-
Stage 1	-	-	-	-	922	-
Stage 2	-	-	-	-	445	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.4	12
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	845	-	-	1486	-
HCM Lane V/C Ratio	0.391	-	-	0.166	-
HCM Control Delay (s)	12	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.9	-	-	0.6	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	370	0	0	332	0	0
Future Vol, veh/h	370	0	0	332	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	402	0	0	361	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	402	0	763	402
Stage 1	-	-	-	-	402	-
Stage 2	-	-	-	-	361	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1157	-	372	648
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	705	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1157	-	372	648
Mov Cap-2 Maneuver	-	-	-	-	372	-
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	705	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1157	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	40	30	220	109	40	278
Future Vol, veh/h	40	30	220	109	40	278
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	44	33	242	120	44	305

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	695	302	0	0	362	0
Stage 1	302	-	-	-	-	-
Stage 2	393	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	408	738	-	-	1197	-
Stage 1	750	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	390	738	-	-	1197	-
Mov Cap-2 Maneuver	390	-	-	-	-	-
Stage 1	750	-	-	-	-	-
Stage 2	652	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.7	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	489	1197	-
HCM Lane V/C Ratio	-	-	0.157	0.037	-
HCM Control Delay (s)	-	-	13.7	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-

Intersection	
Intersection Delay, s/veh	17.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	213	100	57	68	143	57	29	59	19	65	93	160
Future Vol, veh/h	213	100	57	68	143	57	29	59	19	65	93	160
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	234	110	63	75	157	63	32	65	21	71	102	176
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	21.5	15.6	12	17.7
HCM LOS	C	C	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	27%	58%	25%	20%
Vol Thru, %	55%	27%	53%	29%
Vol Right, %	18%	15%	21%	50%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	107	370	268	318
LT Vol	29	213	68	65
Through Vol	59	100	143	93
RT Vol	19	57	57	160
Lane Flow Rate	118	407	295	349
Geometry Grp	1	1	1	1
Degree of Util (X)	0.226	0.687	0.508	0.592
Departure Headway (Hd)	6.913	6.087	6.215	6.1
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	517	594	577	591
Service Time	4.982	4.138	4.273	4.151
HCM Lane V/C Ratio	0.228	0.685	0.511	0.591
HCM Control Delay	12	21.5	15.6	17.7
HCM Lane LOS	B	C	C	C
HCM 95th-tile Q	0.9	5.3	2.9	3.9

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	107	198	0
Future Vol, veh/h	0	0	0	107	198	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	116	215	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	331	215	215	0	-	0
Stage 1	215	-	-	-	-	-
Stage 2	116	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	664	825	1355	-	-	-
Stage 1	821	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	664	825	1355	-	-	-
Mov Cap-2 Maneuver	664	-	-	-	-	-
Stage 1	821	-	-	-	-	-
Stage 2	909	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1355	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.2	0.1
Total Del/Veh (s)	0.5	1.6	4.6	2.7

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.5	1.1	0.8

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.3	0.2
Total Del/Veh (s)	16.1	2.2	1.6	6.5

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0	0.0
Total Del/Veh (s)	6.8	7.0	7.1	9.2	7.8

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.1
Total Del/Veh (s)	0.1	1.8	1.1

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	13.1

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	65	92
Average Queue (ft)	16	48
95th Queue (ft)	49	76
Link Distance (ft)	95	626
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB
Directions Served	TR
Maximum Queue (ft)	12
Average Queue (ft)	0
95th Queue (ft)	11
Link Distance (ft)	95
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	286	11	94
Average Queue (ft)	102	0	21
95th Queue (ft)	201	4	61
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	112	90	95	183
Average Queue (ft)	57	47	48	76
95th Queue (ft)	94	76	75	133
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 0

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.3	0.2	0.1
Total Del/Veh (s)	0.6	0.1	1.8	0.8	8.2	4.4	2.7

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	WBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.5	1.1	0.8

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.3	0.3	0.0	0.0	0.3	0.3	0.2
Total Del/Veh (s)	19.2	14.0	2.4	1.8	3.8	1.1	6.5

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.8	7.2	5.0	6.8	8.6	4.7	6.6	7.3	4.5	9.6	11.0	7.5

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	7.8

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.2	0.0	0.1
Total Del/Veh (s)	0.1	1.8	1.1

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	13.1

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	65	92
Average Queue (ft)	16	48
95th Queue (ft)	49	76
Link Distance (ft)	95	626
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB
Directions Served	TR
Maximum Queue (ft)	12
Average Queue (ft)	0
95th Queue (ft)	11
Link Distance (ft)	95
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	286	11	94
Average Queue (ft)	102	0	21
95th Queue (ft)	201	4	61
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	112	90	95	183
Average Queue (ft)	57	47	48	76
95th Queue (ft)	94	76	75	133
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	7.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	49	10	259	56	14	241
Future Vol, veh/h	49	10	259	56	14	241
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	12	320	69	17	298

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	72	0	775	66
Stage 1	-	-	-	-	66	-
Stage 2	-	-	-	-	709	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1528	-	366	998
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	488	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1528	-	286	998
Mov Cap-2 Maneuver	-	-	-	-	286	-
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	382	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.6	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	878	-	-	1528	-
HCM Lane V/C Ratio	0.359	-	-	0.209	-
HCM Control Delay (s)	11.4	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.6	-	-	0.8	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	290	0	0	315	0	0
Future Vol, veh/h	290	0	0	315	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	315	0	0	342	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	315	0	657	315
Stage 1	-	-	-	-	315	-
Stage 2	-	-	-	-	342	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1245	-	430	725
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	719	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1245	-	430	725
Mov Cap-2 Maneuver	-	-	-	-	430	-
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	719	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1245	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	20.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	143	190	255	98	54	300
Future Vol, veh/h	143	190	255	98	54	300
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	177	235	315	121	67	370

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	880	376	0	0	436	0
Stage 1	376	-	-	-	-	-
Stage 2	504	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	318	670	-	-	1124	-
Stage 1	694	-	-	-	-	-
Stage 2	607	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	294	670	-	-	1124	-
Mov Cap-2 Maneuver	294	-	-	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	561	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	63.2	0	1.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	432	1124	-
HCM Lane V/C Ratio	-	-	0.952	0.059	-
HCM Control Delay (s)	-	-	63.2	8.4	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	11.2	0.2	-

Intersection	
Intersection Delay, s/veh	40.1
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	168	89	32	57	71	51	42	133	14	83	159	202
Future Vol, veh/h	168	89	32	57	71	51	42	133	14	83	159	202
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	207	110	40	70	88	63	52	164	17	102	196	249
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	28.8	17.9	18.3	65.8
HCM LOS	D	C	C	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	22%	58%	32%	19%
Vol Thru, %	70%	31%	40%	36%
Vol Right, %	7%	11%	28%	45%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	189	289	179	444
LT Vol	42	168	57	83
Through Vol	133	89	71	159
RT Vol	14	32	51	202
Lane Flow Rate	233	357	221	548
Geometry Grp	1	1	1	1
Degree of Util (X)	0.498	0.737	0.477	1.005
Departure Headway (Hd)	7.78	7.44	7.875	6.603
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	467	485	460	548
Service Time	5.78	5.526	5.875	4.676
HCM Lane V/C Ratio	0.499	0.736	0.48	1
HCM Control Delay	18.3	28.8	17.9	65.8
HCM Lane LOS	C	D	C	F
HCM 95th-tile Q	2.7	6.1	2.5	14.4

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	189	248	0
Future Vol, veh/h	0	0	0	189	248	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	205	270	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	475	270	270	0	-	0
Stage 1	270	-	-	-	-	-
Stage 2	205	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	548	769	1293	-	-	-
Stage 1	775	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	548	769	1293	-	-	-
Mov Cap-2 Maneuver	548	-	-	-	-	-
Stage 1	775	-	-	-	-	-
Stage 2	829	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1293	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.2	0.0	0.3	0.1
Total Del/Veh (s)	0.7	1.6	5.6	3.1

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.7	1.6	1.1

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.1
Total Del/Veh (s)	7.5	1.8	0.9	1.9

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.0	0.1
Total Del/Veh (s)	8.4	9.1	7.2	8.2	8.3

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.1
Total Del/Veh (s)	0.1	1.6	1.1

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	12.4

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	6	70	116
Average Queue (ft)	0	21	59
95th Queue (ft)	4	56	95
Link Distance (ft)	785	95	626
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	LT
Maximum Queue (ft)	56	4
Average Queue (ft)	3	0
95th Queue (ft)	25	4
Link Distance (ft)	95	126
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	64	5	78
Average Queue (ft)	30	0	13
95th Queue (ft)	57	4	48
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	134	155	87	135
Average Queue (ft)	73	66	44	69
95th Queue (ft)	116	115	71	112
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	1			
Queuing Penalty (veh)	2			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 2

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.0	0.3	0.3	0.1
Total Del/Veh (s)	0.7	0.1	2.0	0.8	11.8	5.5	3.1

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	WBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.7	1.6	1.1

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.3	0.3	0.1
Total Del/Veh (s)	8.9	4.1	2.0	1.5	3.7	0.6	1.9

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.1	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	8.2	9.3	6.7	8.5	10.0	7.3	6.8	8.3	4.1	9.3	9.9	6.7

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	8.3

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.2	0.0	0.1
Total Del/Veh (s)	0.1	1.6	1.1

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	12.4

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	6	70	116
Average Queue (ft)	0	21	59
95th Queue (ft)	4	56	95
Link Distance (ft)	785	95	626
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	LT
Maximum Queue (ft)	56	4
Average Queue (ft)	3	0
95th Queue (ft)	25	4
Link Distance (ft)	95	126
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	64	5	78
Average Queue (ft)	30	0	13
95th Queue (ft)	57	4	48
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	134	155	87	135
Average Queue (ft)	73	66	44	69
95th Queue (ft)	116	115	71	112
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	1			
Queuing Penalty (veh)	2			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 2

Intersection	
Int Delay, s/veh	7.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	7	241	113	8	308
Future Vol, veh/h	93	7	241	113	8	308
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	102	8	265	124	9	338

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	110	0	760	106
Stage 1	-	-	-	-	106	-
Stage 2	-	-	-	-	654	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1480	-	374	948
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	517	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1480	-	302	948
Mov Cap-2 Maneuver	-	-	-	-	302	-
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	418	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.4	11.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	899	-	-	1480	-
HCM Lane V/C Ratio	0.386	-	-	0.179	-
HCM Control Delay (s)	11.5	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.8	-	-	0.7	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	401	0	0	354	0	0
Future Vol, veh/h	401	0	0	354	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	436	0	0	385	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	436	0	821	436
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	385	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1124	-	344	620
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	688	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1124	-	344	620
Mov Cap-2 Maneuver	-	-	-	-	344	-
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	688	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1124	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	37	19	273	102	26	289
Future Vol, veh/h	37	19	273	102	26	289
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	21	300	112	29	318

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	732	356	0	0	412	0
Stage 1	356	-	-	-	-	-
Stage 2	376	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	388	688	-	-	1147	-
Stage 1	709	-	-	-	-	-
Stage 2	694	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	376	688	-	-	1147	-
Mov Cap-2 Maneuver	376	-	-	-	-	-
Stage 1	709	-	-	-	-	-
Stage 2	672	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.4	0	0.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	444	1147	-
HCM Lane V/C Ratio	-	-	0.139	0.025	-
HCM Control Delay (s)	-	-	14.4	8.2	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Intersection Delay, s/veh	25.2
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	245	114	42	94	146	38	41	93	28	47	117	167
Future Vol, veh/h	245	114	42	94	146	38	41	93	28	47	117	167
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	269	125	46	103	160	42	45	102	31	52	129	184
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	34.5	20	15.2	23.3
HCM LOS	D	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	25%	61%	34%	14%
Vol Thru, %	57%	28%	53%	35%
Vol Right, %	17%	10%	14%	50%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	162	401	278	331
LT Vol	41	245	94	47
Through Vol	93	114	146	117
RT Vol	28	42	38	167
Lane Flow Rate	178	441	305	364
Geometry Grp	1	1	1	1
Degree of Util (X)	0.375	0.827	0.596	0.684
Departure Headway (Hd)	7.574	6.756	7.028	6.765
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	474	533	513	535
Service Time	5.646	4.813	5.093	4.824
HCM Lane V/C Ratio	0.376	0.827	0.595	0.68
HCM Control Delay	15.2	34.5	20	23.3
HCM Lane LOS	C	D	C	C
HCM 95th-tile Q	1.7	8.3	3.8	5.2

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	162	253	0
Future Vol, veh/h	0	0	0	162	253	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	176	275	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	451	275	275	0	-	0
Stage 1	275	-	-	-	-	-
Stage 2	176	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	566	764	1288	-	-	-
Stage 1	771	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	566	764	1288	-	-	-
Mov Cap-2 Maneuver	566	-	-	-	-	-
Stage 1	771	-	-	-	-	-
Stage 2	855	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1288	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.1
Total Del/Veh (s)	0.6	1.8	5.2	3.0

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.0
Total Del/Veh (s)	0.9	1.6	9.1	2.4

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.3	0.2
Total Del/Veh (s)	54.8	2.5	2.1	18.9

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.5	0.2	0.0	0.0	0.2
Total Del/Veh (s)	9.9	8.5	9.1	18.6	12.9

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.2	0.3	0.0	0.1
Total Del/Veh (s)	7.1	2.2	2.4	3.3

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	24.2

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	6	72	104
Average Queue (ft)	0	22	56
95th Queue (ft)	6	59	87
Link Distance (ft)	785	95	626
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	56	76	119
Average Queue (ft)	4	15	46
95th Queue (ft)	30	52	87
Link Distance (ft)	95	126	210
Upstream Blk Time (%)	0	0	0
Queuing Penalty (veh)	1	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	623	10	112
Average Queue (ft)	220	0	30
95th Queue (ft)	556	5	84
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	141	106	125	320
Average Queue (ft)	82	54	60	128
95th Queue (ft)	132	87	101	260
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	2			0
Queuing Penalty (veh)	6			0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	104	91	24
Average Queue (ft)	51	29	2
95th Queue (ft)	85	69	12
Link Distance (ft)	155	352	263
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 7

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.0	0.2	0.3	0.1
Total Del/Veh (s)	0.7	0.2	2.0	1.1	9.7	5.0	3.0

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.2	0.0
Total Del/Veh (s)	1.0	0.4	3.7	1.4	11.2	8.0	2.4

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.3	0.3	0.0	0.0	0.4	0.3	0.2
Total Del/Veh (s)	57.1	52.6	2.8	2.0	5.3	1.6	18.9

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.4	0.7	0.1	0.2	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	10.0	10.1	9.0	8.4	10.2	6.2	8.9	9.5	6.7	20.0	20.3	16.5

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	12.9

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.2	0.3	0.3	0.0	0.0	0.1
Total Del/Veh (s)	10.6	5.0	3.9	1.3	2.5	2.0	3.3

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	24.2

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	6	72	104
Average Queue (ft)	0	22	56
95th Queue (ft)	6	59	87
Link Distance (ft)	785	95	626
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	56	76	119
Average Queue (ft)	4	15	46
95th Queue (ft)	30	52	87
Link Distance (ft)	95	126	210
Upstream Blk Time (%)	0	0	0
Queuing Penalty (veh)	1	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	623	10	112
Average Queue (ft)	220	0	30
95th Queue (ft)	556	5	84
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	141	106	125	320
Average Queue (ft)	82	54	60	128
95th Queue (ft)	132	87	101	260
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	2			0
Queuing Penalty (veh)	6			0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	104	91	24
Average Queue (ft)	51	29	2
95th Queue (ft)	85	69	12
Link Distance (ft)	155	352	263
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 7

Intersection	
Int Delay, s/veh	8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	61	10	277	68	14	260
Future Vol, veh/h	61	10	277	68	14	260
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	75	12	342	84	17	321

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	87	0	849	81
Stage 1	-	-	-	-	81	-
Stage 2	-	-	-	-	768	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1509	-	331	979
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	458	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1509	-	252	979
Mov Cap-2 Maneuver	-	-	-	-	252	-
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	349	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.5	12
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	853	-	-	1509	-
HCM Lane V/C Ratio	0.397	-	-	0.227	-
HCM Control Delay (s)	12	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.9	-	-	0.9	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	271	50	39	304	41	78
Future Vol, veh/h	271	50	39	304	41	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	295	54	42	330	45	85

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	349	0	736	322
Stage 1	-	-	-	-	322	-
Stage 2	-	-	-	-	414	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1210	-	386	719
Stage 1	-	-	-	-	735	-
Stage 2	-	-	-	-	667	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1210	-	369	719
Mov Cap-2 Maneuver	-	-	-	-	369	-
Stage 1	-	-	-	-	735	-
Stage 2	-	-	-	-	638	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	13.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	542	-	-	1210	-
HCM Lane V/C Ratio	0.239	-	-	0.035	-
HCM Control Delay (s)	13.7	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0.1	-

Intersection	
Int Delay, s/veh	48.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	174	190	285	128	54	339
Future Vol, veh/h	174	190	285	128	54	339
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	215	235	352	158	67	419

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	984	431	0	0	510	0
Stage 1	431	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	275	624	-	-	1055	-
Stage 1	655	-	-	-	-	-
Stage 2	576	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	252	624	-	-	1055	-
Mov Cap-2 Maneuver	252	-	-	-	-	-
Stage 1	655	-	-	-	-	-
Stage 2	528	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	155.9	0	1.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	366	1055	-
HCM Lane V/C Ratio	-	-	1.228	0.063	-
HCM Control Delay (s)	-	-	155.9	8.6	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	19.2	0.2	-

Intersection	
Intersection Delay, s/veh	103.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	207	103	38	90	69	51	56	154	30	83	206	217
Future Vol, veh/h	207	103	38	90	69	51	56	154	30	83	206	217
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	256	127	47	111	85	63	69	190	37	102	254	268
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	67.1	27.7	31.7	195.2
HCM LOS	F	D	D	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	23%	59%	43%	16%
Vol Thru, %	64%	30%	33%	41%
Vol Right, %	12%	11%	24%	43%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	240	348	210	506
LT Vol	56	207	90	83
Through Vol	154	103	69	206
RT Vol	30	38	51	217
Lane Flow Rate	296	430	259	625
Geometry Grp	1	1	1	1
Degree of Util (X)	0.699	0.965	0.624	1.352
Departure Headway (Hd)	9.447	9.001	9.78	7.794
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	385	408	371	469
Service Time	7.447	7.001	7.78	5.871
HCM Lane V/C Ratio	0.769	1.054	0.698	1.333
HCM Control Delay	31.7	67.1	27.7	195.2
HCM Lane LOS	D	F	D	F
HCM 95th-tile Q	5.1	11.2	4	28.3

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	65	97	95	175	232	101
Future Vol, veh/h	65	97	95	175	232	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	71	105	103	190	252	110

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	703	307	362	0	-	0
Stage 1	307	-	-	-	-	-
Stage 2	396	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	404	733	1197	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	680	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	365	733	1197	-	-	-
Mov Cap-2 Maneuver	365	-	-	-	-	-
Stage 1	674	-	-	-	-	-
Stage 2	680	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.4	2.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1197	-	522	-	-
HCM Lane V/C Ratio	0.086	-	0.337	-	-
HCM Control Delay (s)	8.3	0	15.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.3	-	1.5	-	-

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.1
Total Del/Veh (s)	1.0	1.8	8.4	4.4

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.0
Total Del/Veh (s)	1.8	2.0	15.2	3.7

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.1
Total Del/Veh (s)	9.0	2.1	1.0	2.3

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.3	0.0	0.0	0.1
Total Del/Veh (s)	12.1	11.0	9.3	12.7	11.6

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.1
Total Del/Veh (s)	7.4	2.4	2.3	3.4

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	16.2

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	22	80	191
Average Queue (ft)	1	28	70
95th Queue (ft)	16	65	153
Link Distance (ft)	785	95	626
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	80	87	140
Average Queue (ft)	14	16	53
95th Queue (ft)	60	58	106
Link Distance (ft)	95	126	210
Upstream Blk Time (%)	1		0
Queuing Penalty (veh)	6		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	76	8	74
Average Queue (ft)	38	0	16
95th Queue (ft)	64	4	54
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	144	152	114	216
Average Queue (ft)	94	75	57	92
95th Queue (ft)	146	126	94	176
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	4			0
Queuing Penalty (veh)	19			0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	121	78	22
Average Queue (ft)	51	29	2
95th Queue (ft)	90	67	13
Link Distance (ft)	155	352	263
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 25

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.4	0.3	0.1
Total Del/Veh (s)	1.0	0.1	2.2	1.1	10.0	8.3	4.4

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.4	0.2	0.0
Total Del/Veh (s)	1.9	0.8	4.3	1.8	17.2	14.3	3.7

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.2	0.3	0.1
Total Del/Veh (s)	10.1	4.7	2.3	1.7	4.0	0.7	2.3

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.2	0.1	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	11.9	12.9	11.0	10.2	12.2	9.5	9.3	10.3	6.8	13.1	14.6	10.8

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	11.6

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.2	0.2	0.2	0.0	0.0	0.1
Total Del/Veh (s)	9.6	5.8	4.2	1.3	2.5	1.8	3.4

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	16.2

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	22	80	191
Average Queue (ft)	1	28	70
95th Queue (ft)	16	65	153
Link Distance (ft)	785	95	626
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	80	87	140
Average Queue (ft)	14	16	53
95th Queue (ft)	60	58	106
Link Distance (ft)	95	126	210
Upstream Blk Time (%)	1		0
Queuing Penalty (veh)	6		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	76	8	74
Average Queue (ft)	38	0	16
95th Queue (ft)	64	4	54
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	144	152	114	216
Average Queue (ft)	94	75	57	92
95th Queue (ft)	146	126	94	176
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	4			0
Queuing Penalty (veh)	19			0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	121	78	22
Average Queue (ft)	51	29	2
95th Queue (ft)	90	67	13
Link Distance (ft)	155	352	263
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 25

Intersection	
Int Delay, s/veh	7.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	105	7	259	125	8	326
Future Vol, veh/h	105	7	259	125	8	326
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	115	8	285	137	9	358

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	123	0	826	119
Stage 1	-	-	-	-	119	-
Stage 2	-	-	-	-	707	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1464	-	342	933
Stage 1	-	-	-	-	906	-
Stage 2	-	-	-	-	489	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1464	-	270	933
Mov Cap-2 Maneuver	-	-	-	-	270	-
Stage 1	-	-	-	-	906	-
Stage 2	-	-	-	-	386	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.4	12
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	881	-	-	1464	-
HCM Lane V/C Ratio	0.417	-	-	0.194	-
HCM Control Delay (s)	12	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	2.1	-	-	0.7	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	371	61	29	345	39	81
Future Vol, veh/h	371	61	29	345	39	81
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	403	66	32	375	42	88

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	469	0	875	436
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	439	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1093	-	320	620
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	650	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1093	-	308	620
Mov Cap-2 Maneuver	-	-	-	-	308	-
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	15.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	466	-	-	1093	-
HCM Lane V/C Ratio	0.28	-	-	0.029	-
HCM Control Delay (s)	15.7	-	-	8.4	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	67	19	303	132	26	319
Future Vol, veh/h	67	19	303	132	26	319
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	21	333	145	29	351

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	815	406	0	0	478	0
Stage 1	406	-	-	-	-	-
Stage 2	409	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	347	645	-	-	1084	-
Stage 1	673	-	-	-	-	-
Stage 2	671	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	336	645	-	-	1084	-
Mov Cap-2 Maneuver	336	-	-	-	-	-
Stage 1	673	-	-	-	-	-
Stage 2	649	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.8	0	0.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	376	1084	-
HCM Lane V/C Ratio	-	-	0.251	0.026	-
HCM Control Delay (s)	-	-	17.8	8.4	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1	0.1	-

Intersection	
Intersection Delay, s/veh	63.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	279	126	47	133	137	38	56	118	45	47	164	180
Future Vol, veh/h	279	126	47	133	137	38	56	118	45	47	164	180
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	307	138	52	146	151	42	62	130	49	52	180	198
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	106.1	37.1	24.7	56.8
HCM LOS	F	E	C	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	26%	62%	43%	12%
Vol Thru, %	54%	28%	44%	42%
Vol Right, %	21%	10%	12%	46%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	219	452	308	391
LT Vol	56	279	133	47
Through Vol	118	126	137	164
RT Vol	45	47	38	180
Lane Flow Rate	241	497	338	430
Geometry Grp	1	1	1	1
Degree of Util (X)	0.586	1.115	0.784	0.932
Departure Headway (Hd)	9.306	8.079	8.796	8.255
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	390	447	413	443
Service Time	7.306	6.179	6.796	6.255
HCM Lane V/C Ratio	0.618	1.112	0.818	0.971
HCM Control Delay	24.7	106.1	37.1	56.8
HCM Lane LOS	C	F	E	F
HCM 95th-tile Q	3.6	17.1	6.8	10.6

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	66	94	85	153	241	108
Future Vol, veh/h	66	94	85	153	241	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	72	102	92	166	262	117

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	671	321	379	0	-	0
Stage 1	321	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	422	720	1179	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	386	720	1179	-	-	-
Mov Cap-2 Maneuver	386	-	-	-	-	-
Stage 1	672	-	-	-	-	-
Stage 2	713	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15	3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1179	-	531	-	-
HCM Lane V/C Ratio	0.078	-	0.328	-	-
HCM Control Delay (s)	8.3	0	15	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.3	-	1.4	-	-

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	11.7	5.4
Total Del/Veh (s)	4.4	2.1	54.2	26.3

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.8	0.0	0.5
Total Del/Veh (s)	9.8	1.2	6.0

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	23.4	0.0	0.8	5.5
Total Del/Veh (s)	437.6	2.8	10.3	103.9

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	41.4	0.3	12.8	0.0	15.7
Total Del/Veh (s)	23.0	11.9	30.9	51.9	32.4

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	NB	SB	All
Denied Del/Veh (s)	0.4	0.0	0.2
Total Del/Veh (s)	4.0	1.8	2.9

Total Network Performance

Denied Del/Veh (s)	19.6
Total Del/Veh (s)	112.4

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	93	95	549
Average Queue (ft)	13	33	228
95th Queue (ft)	55	74	573
Link Distance (ft)	785	95	626
Upstream Blk Time (%)		0	11
Queuing Penalty (veh)		1	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	LT
Maximum Queue (ft)	108	49
Average Queue (ft)	69	2
95th Queue (ft)	137	19
Link Distance (ft)	95	126
Upstream Blk Time (%)	14	0
Queuing Penalty (veh)	70	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	1782	6	277
Average Queue (ft)	981	0	74
95th Queue (ft)	2165	4	232
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)	16		1
Queuing Penalty (veh)	0		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	158	139	269	441
Average Queue (ft)	126	68	154	261
95th Queue (ft)	171	116	282	484
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	22		3	5
Queuing Penalty (veh)	111		14	28
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	NB
Directions Served	LT
Maximum Queue (ft)	136
Average Queue (ft)	19
95th Queue (ft)	110
Link Distance (ft)	352
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 224

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.0	12.9	11.6	5.4
Total Del/Veh (s)	5.2	1.6	2.3	1.3	62.2	53.7	26.3

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	WBT	All
Denied Del/Veh (s)	0.8	0.0	0.5
Total Del/Veh (s)	9.8	1.2	6.0

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	24.5	22.5	0.0	0.0	0.9	0.7	5.5
Total Del/Veh (s)	440.8	437.5	3.0	2.2	14.5	9.7	103.9

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	40.2	32.4	53.4	0.3	0.2	0.3	8.6	13.2	20.6	0.0	0.0	0.0
Total Del/Veh (s)	24.0	22.8	21.3	12.2	13.8	10.8	32.8	30.5	28.0	52.3	53.6	50.2

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	15.7
Total Del/Veh (s)	32.4

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.4	0.0	0.2
Total Del/Veh (s)	4.0	1.8	2.9

Total Network Performance

Denied Del/Veh (s)	19.6
Total Del/Veh (s)	112.4

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	93	95	549
Average Queue (ft)	13	33	228
95th Queue (ft)	55	74	573
Link Distance (ft)	785	95	626
Upstream Blk Time (%)		0	11
Queuing Penalty (veh)		1	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	LT
Maximum Queue (ft)	108	49
Average Queue (ft)	69	2
95th Queue (ft)	137	19
Link Distance (ft)	95	126
Upstream Blk Time (%)	14	0
Queuing Penalty (veh)	70	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	1782	6	277
Average Queue (ft)	981	0	74
95th Queue (ft)	2165	4	232
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)	16		1
Queuing Penalty (veh)	0		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	158	139	269	441
Average Queue (ft)	126	68	154	261
95th Queue (ft)	171	116	282	484
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	22		3	5
Queuing Penalty (veh)	111		14	28
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	NB
Directions Served	LT
Maximum Queue (ft)	136
Average Queue (ft)	19
95th Queue (ft)	110
Link Distance (ft)	352
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 224

Intersection	
Int Delay, s/veh	12.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	85	20	345	70	25	415
Future Vol, veh/h	85	20	345	70	25	415
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	105	25	426	86	31	512

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	130	0	1056	118
Stage 1	-	-	-	-	118	-
Stage 2	-	-	-	-	938	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1455	-	250	934
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	381	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1455	-	173	934
Mov Cap-2 Maneuver	-	-	-	-	173	-
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	264	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.1	21.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	747	-	-	1455	-
HCM Lane V/C Ratio	0.727	-	-	0.293	-
HCM Control Delay (s)	21.5	-	-	8.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	6.4	-	-	1.2	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	500	0	0	415	0	0
Future Vol, veh/h	500	0	0	415	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	543	0	0	451	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	543	0	994	543
Stage 1	-	-	-	-	543	-
Stage 2	-	-	-	-	451	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1026	-	272	540
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	642	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1026	-	272	540
Mov Cap-2 Maneuver	-	-	-	-	272	-
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	642	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1026	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	79.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	145	165	520	110	55	400
Future Vol, veh/h	145	165	520	110	55	400
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	179	204	642	136	68	494

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1340	710	0	0	778	0
Stage 1	710	-	-	-	-	-
Stage 2	630	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 168	434	-	-	839	-
Stage 1	487	-	-	-	-	-
Stage 2	531	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 149	434	-	-	839	-
Mov Cap-2 Maneuver	~ 149	-	-	-	-	-
Stage 1	487	-	-	-	-	-
Stage 2	472	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 357.9	0	1.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	229	839	-
HCM Lane V/C Ratio	-	-	1.671	0.081	-
HCM Control Delay (s)	-	-	$ 357.9	9.7	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	25	0.3	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	241.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	250	120	130	75	50	105	115	275	45	80	215	250
Future Vol, veh/h	250	120	130	75	50	105	115	275	45	80	215	250
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	309	148	160	93	62	130	142	340	56	99	265	309
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	277.6	49.8	203	320.7
HCM LOS	F	E	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	26%	50%	33%	15%
Vol Thru, %	63%	24%	22%	39%
Vol Right, %	10%	26%	46%	46%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	435	500	230	545
LT Vol	115	250	75	80
Through Vol	275	120	50	215
RT Vol	45	130	105	250
Lane Flow Rate	537	617	284	673
Geometry Grp	1	1	1	1
Degree of Util (X)	1.33	1.52	0.743	1.622
Departure Headway (Hd)	12.286	11.281	14.367	11.189
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	301	327	256	330
Service Time	10.286	9.281	12.367	9.189
HCM Lane V/C Ratio	1.784	1.887	1.109	2.039
HCM Control Delay	203	277.6	49.8	320.7
HCM Lane LOS	F	F	E	F
HCM 95th-tile Q	19.6	27.4	5.2	31.3

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	435	420	0
Future Vol, veh/h	0	0	0	435	420	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	473	457	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	930	457	457	0	-	0
Stage 1	457	-	-	-	-	-
Stage 2	473	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	297	604	1104	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	627	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	297	604	1104	-	-	-
Mov Cap-2 Maneuver	297	-	-	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	627	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1104	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	1.0	0.0	762.1	366.1
Total Del/Veh (s)	99.5	2.0	259.9	114.2

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.3	0.0	0.2
Total Del/Veh (s)	21.0	1.4	11.5

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	367.9	0.0	8.8	60.5
Total Del/Veh (s)	1560.8	2.7	48.2	197.5

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	10.0	0.4	8.6	2.5	5.6
Total Del/Veh (s)	32.9	28.2	72.8	108.3	63.6

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	NB	SB	All
Denied Del/Veh (s)	303.6	0.0	166.2
Total Del/Veh (s)	99.3	1.9	51.3

Total Network Performance

Denied Del/Veh (s)	292.0
Total Del/Veh (s)	266.4

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	558	90	674
Average Queue (ft)	162	34	646
95th Queue (ft)	510	69	670
Link Distance (ft)	785	95	626
Upstream Blk Time (%)	2	0	99
Queuing Penalty (veh)	0	1	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	LT
Maximum Queue (ft)	107	16
Average Queue (ft)	98	0
95th Queue (ft)	103	9
Link Distance (ft)	95	126
Upstream Blk Time (%)	34	
Queuing Penalty (veh)	233	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	1995	18	456
Average Queue (ft)	1548	1	234
95th Queue (ft)	2492	10	531
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)	53		15
Queuing Penalty (veh)	0		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	154	292	274	444
Average Queue (ft)	139	138	268	431
95th Queue (ft)	147	253	275	462
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	39	1	33	21
Queuing Penalty (veh)	267	0	188	130
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	NB
Directions Served	LT
Maximum Queue (ft)	410
Average Queue (ft)	360
95th Queue (ft)	465
Link Distance (ft)	352
Upstream Blk Time (%)	93
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 819

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	1.0	2.0	0.0	0.0	790.2	761.4	366.1
Total Del/Veh (s)	98.7	102.4	2.3	1.3	269.5	259.6	114.2

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	WBT	All
Denied Del/Veh (s)	0.3	0.0	0.2
Total Del/Veh (s)	21.0	1.4	11.5

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	358.4	394.9	0.0	0.0	12.7	8.5	60.5
Total Del/Veh (s)	1566.3	1544.7	2.8	2.3	50.8	48.0	197.5

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	11.8	6.7	8.2	0.4	0.4	0.4	3.7	11.9	4.7	9.9	0.9	2.7
Total Del/Veh (s)	33.5	34.3	30.4	28.8	30.6	26.8	72.7	73.4	68.7	109.8	110.0	106.5

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	5.6
Total Del/Veh (s)	63.6

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	303.6	0.0	166.2
Total Del/Veh (s)	99.3	1.9	51.3

Total Network Performance

Denied Del/Veh (s)	292.0
Total Del/Veh (s)	266.4

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	558	90	674
Average Queue (ft)	162	34	646
95th Queue (ft)	510	69	670
Link Distance (ft)	785	95	626
Upstream Blk Time (%)	2	0	99
Queuing Penalty (veh)	0	1	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	LT
Maximum Queue (ft)	107	16
Average Queue (ft)	98	0
95th Queue (ft)	103	9
Link Distance (ft)	95	126
Upstream Blk Time (%)	34	
Queuing Penalty (veh)	233	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	1995	18	456
Average Queue (ft)	1548	1	234
95th Queue (ft)	2492	10	531
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)	53		15
Queuing Penalty (veh)	0		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	154	292	274	444
Average Queue (ft)	139	138	268	431
95th Queue (ft)	147	253	275	462
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	39	1	33	21
Queuing Penalty (veh)	267	0	188	130
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	NB
Directions Served	LT
Maximum Queue (ft)	410
Average Queue (ft)	360
95th Queue (ft)	465
Link Distance (ft)	352
Upstream Blk Time (%)	93
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 819

Intersection	
Int Delay, s/veh	13.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	160	10	340	165	15	530
Future Vol, veh/h	160	10	340	165	15	530
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	176	11	374	181	16	582

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	187	0	1111	182
Stage 1	-	-	-	-	182	-
Stage 2	-	-	-	-	929	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1387	-	231	861
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	385	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1387	-	162	861
Mov Cap-2 Maneuver	-	-	-	-	162	-
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	270	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.8	24
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	770	-	-	1387	-
HCM Lane V/C Ratio	0.778	-	-	0.269	-
HCM Control Delay (s)	24	-	-	8.6	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	7.7	-	-	1.1	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	690	0	0	505	0	0
Future Vol, veh/h	690	0	0	505	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	750	0	0	549	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	750	0	1299	750
Stage 1	-	-	-	-	750	-
Stage 2	-	-	-	-	549	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	859	-	178	411
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	579	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	859	-	178	411
Mov Cap-2 Maneuver	-	-	-	-	178	-
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	579	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	859	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	50.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	165	55	750	145	40	450
Future Vol, veh/h	165	55	750	145	40	450
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	181	60	824	159	44	495

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1487	904	0	0	983	0
Stage 1	904	-	-	-	-	-
Stage 2	583	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 137	335	-	-	703	-
Stage 1	395	-	-	-	-	-
Stage 2	558	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 125	335	-	-	703	-
Mov Cap-2 Maneuver	~ 125	-	-	-	-	-
Stage 1	395	-	-	-	-	-
Stage 2	510	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 367.3	0	0.9
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	148	703	-
HCM Lane V/C Ratio	-	-	1.634	0.063	-
HCM Control Delay (s)	-	-	$ 367.3	10.5	0
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	17	0.2	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	374.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	395	120	175	140	60	165	165	340	65	60	275	280
Future Vol, veh/h	395	120	175	140	60	165	165	340	65	60	275	280
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	434	132	192	154	66	181	181	374	71	66	302	308
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	502.7	128.4	357.5	393
HCM LOS	F	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	29%	57%	38%	10%
Vol Thru, %	60%	17%	16%	45%
Vol Right, %	11%	25%	45%	46%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	570	690	365	615
LT Vol	165	395	140	60
Through Vol	340	120	60	275
RT Vol	65	175	165	280
Lane Flow Rate	626	758	401	676
Geometry Grp	1	1	1	1
Degree of Util (X)	1.674	2.021	1.051	1.761
Departure Headway (Hd)	15.881	14.004	18.828	15.255
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	238	265	197	243
Service Time	13.881	12.004	16.828	13.255
HCM Lane V/C Ratio	2.63	2.86	2.036	2.782
HCM Control Delay	357.5	502.7	128.4	393
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	24.8	37.9	9.3	28

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	570	590	0
Future Vol, veh/h	0	0	0	570	590	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	620	641	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1261	641	641	0	-	0
Stage 1	641	-	-	-	-	-
Stage 2	620	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	188	475	943	-	-	-
Stage 1	525	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	188	475	943	-	-	-
Mov Cap-2 Maneuver	188	-	-	-	-	-
Stage 1	525	-	-	-	-	-
Stage 2	536	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	943	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.2	0.0	137.8	66.0
Total Del/Veh (s)	13.4	2.0	138.1	66.1

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	2.1	0.0	424.6	52.0
Total Del/Veh (s)	15.3	1.5	276.8	34.8

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	503.2	0.0	6.0	116.0
Total Del/Veh (s)	1051.4	2.9	41.8	183.6

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	52.8	0.3	43.8	2.0	27.9
Total Del/Veh (s)	29.2	15.3	49.8	97.2	52.6

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	159.3	4.2	0.0	24.8
Total Del/Veh (s)	83.1	19.3	2.4	21.3

Total Network Performance

Denied Del/Veh (s)	143.1
Total Del/Veh (s)	192.6

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	144	89	678
Average Queue (ft)	33	33	478
95th Queue (ft)	99	75	857
Link Distance (ft)	785	95	626
Upstream Blk Time (%)		0	56
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	115	77	241
Average Queue (ft)	97	11	199
95th Queue (ft)	112	46	272
Link Distance (ft)	95	126	210
Upstream Blk Time (%)	30	0	70
Queuing Penalty (veh)	158	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	2006	18	500
Average Queue (ft)	1478	1	207
95th Queue (ft)	2630	12	514
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)	58		13
Queuing Penalty (veh)	0		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	155	200	274	443
Average Queue (ft)	140	79	226	409
95th Queue (ft)	147	144	327	518
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	35	0	12	16
Queuing Penalty (veh)	194	0	57	100
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	193	333	15
Average Queue (ft)	118	118	1
95th Queue (ft)	212	319	8
Link Distance (ft)	155	352	263
Upstream Blk Time (%)	47	10	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 509

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.0	130.6	138.2	66.0
Total Del/Veh (s)	14.9	5.8	2.2	1.2	133.6	137.7	66.1

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	2.2	1.4	0.0	0.0	425.9	424.0	52.0
Total Del/Veh (s)	15.9	9.8	3.0	1.4	280.7	279.1	34.8

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	497.2	509.3	0.0	0.0	6.1	6.0	116.0
Total Del/Veh (s)	1084.6	1015.4	3.0	2.3	42.4	41.7	183.6

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	53.5	45.4	59.8	0.3	0.3	0.3	38.9	46.7	40.5	0.0	3.0	1.5
Total Del/Veh (s)	30.1	29.0	27.5	15.6	18.3	13.5	50.0	49.7	48.8	102.2	99.0	93.8

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	27.9
Total Del/Veh (s)	52.6

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	155.0	162.1	4.0	4.2	0.0	0.0	24.8
Total Del/Veh (s)	97.3	73.9	19.4	19.2	2.5	2.0	21.3

Total Network Performance

Denied Del/Veh (s)	143.1
Total Del/Veh (s)	192.6

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	144	89	678
Average Queue (ft)	33	33	478
95th Queue (ft)	99	75	857
Link Distance (ft)	785	95	626
Upstream Blk Time (%)		0	56
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	115	77	241
Average Queue (ft)	97	11	199
95th Queue (ft)	112	46	272
Link Distance (ft)	95	126	210
Upstream Blk Time (%)	30	0	70
Queuing Penalty (veh)	158	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	2006	18	500
Average Queue (ft)	1478	1	207
95th Queue (ft)	2630	12	514
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)	58		13
Queuing Penalty (veh)	0		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	155	200	274	443
Average Queue (ft)	140	79	226	409
95th Queue (ft)	147	144	327	518
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	35	0	12	16
Queuing Penalty (veh)	194	0	57	100
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	193	333	15
Average Queue (ft)	118	118	1
95th Queue (ft)	212	319	8
Link Distance (ft)	155	352	263
Upstream Blk Time (%)	47	10	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 509

Intersection	
Int Delay, s/veh	14.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	97	20	363	82	25	434
Future Vol, veh/h	97	20	363	82	25	434
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	120	25	448	101	31	536

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	145	0	1130	133
Stage 1	-	-	-	-	133	-
Stage 2	-	-	-	-	997	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1437	-	225	916
Stage 1	-	-	-	-	893	-
Stage 2	-	-	-	-	357	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1437	-	151	916
Mov Cap-2 Maneuver	-	-	-	-	151	-
Stage 1	-	-	-	-	893	-
Stage 2	-	-	-	-	239	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7	26.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	718	-	-	1437	-
HCM Lane V/C Ratio	0.789	-	-	0.312	-
HCM Control Delay (s)	26.1	-	-	8.6	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	7.9	-	-	1.3	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	481	50	39	404	41	78
Future Vol, veh/h	481	50	39	404	41	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	523	54	42	439	45	85

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	577	0	1073	550
Stage 1	-	-	-	-	550	-
Stage 2	-	-	-	-	523	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	996	-	244	535
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	595	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	996	-	230	535
Mov Cap-2 Maneuver	-	-	-	-	230	-
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	562	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	20.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	367	-	-	996	-
HCM Lane V/C Ratio	0.352	-	-	0.043	-
HCM Control Delay (s)	20.1	-	-	8.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.6	-	-	0.1	-

Intersection	
Int Delay, s/veh	133.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	176	165	550	140	55	431
Future Vol, veh/h	176	165	550	140	55	431
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	217	204	679	173	68	532

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1434	766	0	0	852	0
Stage 1	766	-	-	-	-	-
Stage 2	668	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 147	403	-	-	787	-
Stage 1	459	-	-	-	-	-
Stage 2	510	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 129	403	-	-	787	-
Mov Cap-2 Maneuver	~ 129	-	-	-	-	-
Stage 1	459	-	-	-	-	-
Stage 2	447	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 592.9	0	1.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	192	787	-
HCM Lane V/C Ratio	-	-	2.193	0.086	-
HCM Control Delay (s)	-	-	$ 592.9	10	0
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	33.4	0.3	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	334.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	285	134	136	108	48	105	129	296	61	80	262	265
Future Vol, veh/h	285	134	136	108	48	105	129	296	61	80	262	265
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	352	165	168	133	59	130	159	365	75	99	323	327
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	381.2	74.4	294.3	435.3
HCM LOS	F	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	27%	51%	41%	13%
Vol Thru, %	61%	24%	18%	43%
Vol Right, %	13%	25%	40%	44%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	486	555	261	607
LT Vol	129	285	108	80
Through Vol	296	134	48	262
RT Vol	61	136	105	265
Lane Flow Rate	600	685	322	749
Geometry Grp	1	1	1	1
Degree of Util (X)	1.536	1.75	0.848	1.874
Departure Headway (Hd)	14.323	12.886	17.336	12.952
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	258	288	213	292
Service Time	12.323	10.886	15.336	10.952
HCM Lane V/C Ratio	2.326	2.378	1.512	2.565
HCM Control Delay	294.3	381.2	74.4	435.3
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	23.1	31.9	6.4	35.8

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	65	97	95	421	404	101
Future Vol, veh/h	65	97	95	421	404	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	71	105	103	458	439	110

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1158	494	549	0	-	0
Stage 1	494	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	217	575	1021	-	-	-
Stage 1	613	-	-	-	-	-
Stage 2	512	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	188	575	1021	-	-	-
Mov Cap-2 Maneuver	188	-	-	-	-	-
Stage 1	530	-	-	-	-	-
Stage 2	512	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	30	1.6	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1021	-	315	-	-
HCM Lane V/C Ratio	0.101	-	0.559	-	-
HCM Control Delay (s)	8.9	0	30	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.3	-	3.2	-	-

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.2	0.0	977.5	480.5
Total Del/Veh (s)	35.9	2.1	300.4	111.3

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.3	0.0	923.5	113.7
Total Del/Veh (s)	20.7	1.4	413.9	40.8

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	683.4	0.0	18.9	121.1
Total Del/Veh (s)	2038.4	2.7	69.4	229.9

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	12.0	0.5	13.6	1.7	7.1
Total Del/Veh (s)	33.4	31.5	72.6	113.3	65.1

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	1401.1	414.8	0.0	374.8
Total Del/Veh (s)	460.5	91.7	2.3	68.3

Total Network Performance

Denied Del/Veh (s)	477.8
Total Del/Veh (s)	287.2

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	358	86	679
Average Queue (ft)	91	36	645
95th Queue (ft)	269	69	663
Link Distance (ft)	785	95	626
Upstream Blk Time (%)		0	99
Queuing Penalty (veh)		1	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	110	53	240
Average Queue (ft)	99	7	203
95th Queue (ft)	104	31	258
Link Distance (ft)	95	126	210
Upstream Blk Time (%)	37		86
Queuing Penalty (veh)	265		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	1989	6	516
Average Queue (ft)	1706	0	309
95th Queue (ft)	2458	4	616
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)	66		27
Queuing Penalty (veh)	0		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	147	292	274	446
Average Queue (ft)	139	156	269	437
95th Queue (ft)	143	276	272	445
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	39	2	32	25
Queuing Penalty (veh)	288	0	202	172
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	180	401	20
Average Queue (ft)	160	373	1
95th Queue (ft)	184	402	10
Link Distance (ft)	155	352	263
Upstream Blk Time (%)	99	98	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 927

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.0	1035.1	975.8	480.5
Total Del/Veh (s)	36.6	23.6	2.5	1.3	312.7	300.1	111.3

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.3	0.1	0.0	0.0	880.0	942.3	113.7
Total Del/Veh (s)	21.4	13.9	2.6	1.4	426.0	417.3	40.8

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	679.2	698.2	0.0	0.0	21.5	18.7	121.1
Total Del/Veh (s)	2079.6	1968.6	2.8	2.3	67.0	69.5	229.9

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	11.9	14.5	10.2	0.6	0.5	0.5	11.0	11.5	27.9	6.4	2.4	0.0
Total Del/Veh (s)	34.0	34.8	31.3	31.9	37.0	29.4	73.0	73.1	68.1	115.3	114.6	111.6

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	7.1
Total Del/Veh (s)	65.1

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	1375.2	1419.8	421.9	413.8	0.0	0.0	374.8
Total Del/Veh (s)	461.9	474.3	88.6	92.3	2.4	2.0	68.3

Total Network Performance

Denied Del/Veh (s)	477.8
Total Del/Veh (s)	287.2

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	358	86	679
Average Queue (ft)	91	36	645
95th Queue (ft)	269	69	663
Link Distance (ft)	785	95	626
Upstream Blk Time (%)		0	99
Queuing Penalty (veh)		1	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	110	53	240
Average Queue (ft)	99	7	203
95th Queue (ft)	104	31	258
Link Distance (ft)	95	126	210
Upstream Blk Time (%)	37		86
Queuing Penalty (veh)	265		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	1989	6	516
Average Queue (ft)	1706	0	309
95th Queue (ft)	2458	4	616
Link Distance (ft)	1971	432	495
Upstream Blk Time (%)	66		27
Queuing Penalty (veh)	0		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	147	292	274	446
Average Queue (ft)	139	156	269	437
95th Queue (ft)	143	276	272	445
Link Distance (ft)	126	298	263	432
Upstream Blk Time (%)	39	2	32	25
Queuing Penalty (veh)	288	0	202	172
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	180	401	20
Average Queue (ft)	160	373	1
95th Queue (ft)	184	402	10
Link Distance (ft)	155	352	263
Upstream Blk Time (%)	99	98	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 927

Intersection	
Int Delay, s/veh	14.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	172	10	358	177	15	548
Future Vol, veh/h	172	10	358	177	15	548
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	189	11	393	195	16	602

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	200	0	1176	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	981	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1372	-	211	846
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	363	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1372	-	143	846
Mov Cap-2 Maneuver	-	-	-	-	143	-
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	246	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.8	28.4
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	748	-	-	1372	-
HCM Lane V/C Ratio	0.827	-	-	0.287	-
HCM Control Delay (s)	28.4	-	-	8.7	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	9.2	-	-	1.2	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	660	61	29	496	39	81
Future Vol, veh/h	660	61	29	496	39	81
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	717	66	32	539	42	88

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	783	0	1353	750
Stage 1	-	-	-	-	750	-
Stage 2	-	-	-	-	603	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	835	-	165	411
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	546	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	835	-	156	411
Mov Cap-2 Maneuver	-	-	-	-	156	-
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	516	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	30.5
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	268	-	-	835	-
HCM Lane V/C Ratio	0.487	-	-	0.038	-
HCM Control Delay (s)	30.5	-	-	9.5	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	2.5	-	-	0.1	-

Intersection	
Int Delay, s/veh	85.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	195	55	780	175	40	480
Future Vol, veh/h	195	55	780	175	40	480
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	214	60	857	192	44	527

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1568	953	0	0	1049	0
Stage 1	953	-	-	-	-	-
Stage 2	615	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 122	314	-	-	663	-
Stage 1	375	-	-	-	-	-
Stage 2	539	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 111	314	-	-	663	-
Mov Cap-2 Maneuver	~ 111	-	-	-	-	-
Stage 1	375	-	-	-	-	-
Stage 2	488	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 589.3	0	0.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	129	663	-
HCM Lane V/C Ratio	-	-	2.13	0.066	-
HCM Control Delay (s)	-	-	$ 589.3	10.8	0
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	22.7	0.2	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	443.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	429	132	180	179	49	165	180	365	82	60	322	293
Future Vol, veh/h	429	132	180	179	49	165	180	365	82	60	322	293
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	471	145	198	197	54	181	198	401	90	66	354	322
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	573.3	164.2	433.6	473.3
HCM LOS	F	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	29%	58%	46%	9%
Vol Thru, %	58%	18%	12%	48%
Vol Right, %	13%	24%	42%	43%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	627	741	393	675
LT Vol	180	429	179	60
Through Vol	365	132	49	322
RT Vol	82	180	165	293
Lane Flow Rate	689	814	432	742
Geometry Grp	1	1	1	1
Degree of Util (X)	1.839	2.172	1.136	1.935
Departure Headway (Hd)	17.659	15.522	21.47	16.977
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	214	244	173	223
Service Time	15.659	13.522	19.47	14.977
HCM Lane V/C Ratio	3.22	3.336	2.497	3.327
HCM Control Delay	433.6	573.3	164.2	473.3
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	26.7	38.8	10	29.9

Intersection	
Int Delay, s/veh	8.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	66	94	85	561	572	108
Future Vol, veh/h	66	94	85	561	572	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	72	102	92	610	622	117

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1475	681	739	0	-	0
Stage 1	681	-	-	-	-	-
Stage 2	794	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	139	450	867	-	-	-
Stage 1	503	-	-	-	-	-
Stage 2	445	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	117	450	867	-	-	-
Mov Cap-2 Maneuver	117	-	-	-	-	-
Stage 1	423	-	-	-	-	-
Stage 2	445	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	75.1	1.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	867	-	207	-	-
HCM Lane V/C Ratio	0.107	-	0.84	-	-
HCM Control Delay (s)	9.6	0	75.1	-	-
HCM Lane LOS	A	A	F	-	-
HCM 95th %tile Q(veh)	0.4	-	6.3	-	-

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.1
Total Del/Veh (s)	1.3	1.5	6.4	3.6

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.2	1.8	1.5

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.2	0.1
Total Del/Veh (s)	10.3	4.2	3.8	4.7

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	1.2	0.0	0.0	0.3
Total Del/Veh (s)	15.5	18.4	15.9	13.7	15.7

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.0
Total Del/Veh (s)	0.2	1.7	1.2

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	21.3

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	4	73	139
Average Queue (ft)	0	20	61
95th Queue (ft)	4	55	104
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	T
Maximum Queue (ft)	89	12
Average Queue (ft)	13	0
95th Queue (ft)	59	9
Link Distance (ft)	93	120
Upstream Blk Time (%)	1	
Queuing Penalty (veh)	2	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	85	125	97
Average Queue (ft)	36	34	32
95th Queue (ft)	70	85	77
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	134	123	95	159	67	86	91	157
Average Queue (ft)	85	55	39	74	20	34	35	71
95th Queue (ft)	134	102	75	130	50	68	69	127
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	4	1						
Queuing Penalty (veh)	7	1						
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)				0				0
Queuing Penalty (veh)				0				0

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 11

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.0	0.3	0.3	0.1
Total Del/Veh (s)	1.4	0.2	2.0	0.4	12.0	6.1	3.6

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	WBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.2	1.8	1.5

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.2	0.1	0.0	0.0	0.3	0.2	0.1
Total Del/Veh (s)	13.9	5.7	5.1	2.7	5.2	3.7	4.7

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.7	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	18.4	13.7	6.6	22.0	20.4	9.7	23.4	15.9	4.5	24.2	16.3	8.0

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	15.7

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0
Total Del/Veh (s)	0.2	1.7	1.2

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	21.3

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	4	73	139
Average Queue (ft)	0	20	61
95th Queue (ft)	4	55	104
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	T
Maximum Queue (ft)	89	12
Average Queue (ft)	13	0
95th Queue (ft)	59	9
Link Distance (ft)	93	120
Upstream Blk Time (%)	1	
Queuing Penalty (veh)	2	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	85	125	97
Average Queue (ft)	36	34	32
95th Queue (ft)	70	85	77
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	134	123	95	159	67	86	91	157
Average Queue (ft)	85	55	39	74	20	34	35	71
95th Queue (ft)	134	102	75	130	50	68	69	127
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	4	1						
Queuing Penalty (veh)	7	1						
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)				0				0
Queuing Penalty (veh)				0				0

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 11

Intersection	
Int Delay, s/veh	7.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	89	6	225	107	20	281
Future Vol, veh/h	89	6	225	107	20	281
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	98	7	247	118	22	309

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	105	0	714	102
Stage 1	-	-	-	-	102	-
Stage 2	-	-	-	-	612	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1486	-	398	953
Stage 1	-	-	-	-	922	-
Stage 2	-	-	-	-	541	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1486	-	332	953
Mov Cap-2 Maneuver	-	-	-	-	393	-
Stage 1	-	-	-	-	922	-
Stage 2	-	-	-	-	451	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.4	11.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	871	-	-	1486	-
HCM Lane V/C Ratio	0.38	-	-	0.166	-
HCM Control Delay (s)	11.6	-	-	7.9	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	1.8	-	-	0.6	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	370	0	0	332	0	0
Future Vol, veh/h	370	0	0	332	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	402	0	0	361	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	402	0	763	402
Stage 1	-	-	-	-	402	-
Stage 2	-	-	-	-	361	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1157	-	372	648
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	705	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1157	-	372	648
Mov Cap-2 Maneuver	-	-	-	-	485	-
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	705	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1157	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	77	362	349
v/c Ratio	0.11	0.28	0.30
Control Delay	8.0	3.8	4.6
Queue Delay	0.0	0.0	0.0
Total Delay	8.0	3.8	4.6
Queue Length 50th (ft)	1	0	0
Queue Length 95th (ft)	34	67	79
Internal Link Dist (ft)	1920	414	1305
Turn Bay Length (ft)			
Base Capacity (vph)	1408	1674	1553
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.05	0.22	0.22

Intersection Summary



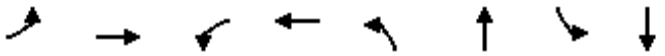
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	40	30	220	109	40	278
Future Volume (veh/h)	40	30	220	109	40	278
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	44	33	242	120	44	305
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	100	75	452	224	243	633
Arrive On Green	0.10	0.10	0.38	0.38	0.38	0.38
Sat Flow, veh/h	955	717	1180	585	119	1652
Grp Volume(v), veh/h	78	0	0	362	349	0
Grp Sat Flow(s),veh/h/ln	1694	0	0	1765	1771	0
Q Serve(g_s), s	0.9	0.0	0.0	3.3	0.0	0.0
Cycle Q Clear(g_c), s	0.9	0.0	0.0	3.3	2.9	0.0
Prop In Lane	0.56	0.42		0.33	0.13	
Lane Grp Cap(c), veh/h	178	0	0	676	876	0
V/C Ratio(X)	0.44	0.00	0.00	0.54	0.40	0.00
Avail Cap(c_a), veh/h	1610	0	0	2581	2703	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.6	0.0	0.0	4.9	4.8	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.0	0.7	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.2	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.3	0.0	0.0	5.6	5.1	0.0
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h	78		362			349
Approach Delay, s/veh	10.3		5.6			5.1
Approach LOS	B		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		13.3			13.3	7.3
Change Period (Y+Rc), s		5.4			5.4	5.1
Max Green Setting (Gmax), s		30.0			30.0	19.5
Max Q Clear Time (g_c+I1), s		5.3			4.9	2.9
Green Ext Time (p_c), s		2.1			2.1	0.1

Intersection Summary	
HCM 6th Ctrl Delay	5.8
HCM 6th LOS	A

Notes

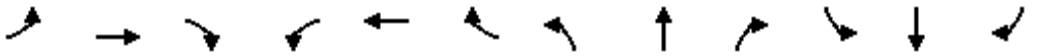
User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	234	173	75	220	32	86	71	278
v/c Ratio	0.61	0.24	0.30	0.52	0.18	0.23	0.35	0.57
Control Delay	34.6	15.0	29.9	23.1	32.8	18.5	34.8	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.6	15.0	29.9	23.1	32.8	18.5	34.8	17.3
Queue Length 50th (ft)	68	34	22	55	10	19	21	39
Queue Length 95th (ft)	#255	99	76	140	43	59	#87	138
Internal Link Dist (ft)		97		819		245		414
Turn Bay Length (ft)			200				200	
Base Capacity (vph)	381	880	312	816	173	787	204	819
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.20	0.24	0.27	0.18	0.11	0.35	0.34

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	213	100	57	68	143	57	29	59	19	65	93	160
Future Volume (veh/h)	213	100	57	68	143	57	29	59	19	65	93	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	234	110	63	75	157	63	32	65	21	71	102	176
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	295	311	178	120	229	92	65	266	86	116	139	239
Arrive On Green	0.17	0.28	0.28	0.07	0.18	0.18	0.04	0.20	0.20	0.06	0.22	0.22
Sat Flow, veh/h	1781	1116	639	1781	1269	509	1781	1354	437	1781	616	1063
Grp Volume(v), veh/h	234	0	173	75	0	220	32	0	86	71	0	278
Grp Sat Flow(s),veh/h/ln	1781	0	1755	1781	0	1779	1781	0	1792	1781	0	1679
Q Serve(g_s), s	5.8	0.0	3.6	1.9	0.0	5.3	0.8	0.0	1.9	1.8	0.0	7.0
Cycle Q Clear(g_c), s	5.8	0.0	3.6	1.9	0.0	5.3	0.8	0.0	1.9	1.8	0.0	7.0
Prop In Lane	1.00		0.36	1.00		0.29	1.00		0.24	1.00		0.63
Lane Grp Cap(c), veh/h	295	0	489	120	0	321	65	0	352	116	0	378
V/C Ratio(X)	0.79	0.00	0.35	0.63	0.00	0.69	0.49	0.00	0.24	0.61	0.00	0.74
Avail Cap(c_a), veh/h	428	0	958	350	0	893	194	0	864	229	0	843
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.4	0.0	13.2	20.8	0.0	17.6	21.7	0.0	15.5	20.9	0.0	16.5
Incr Delay (d2), s/veh	6.4	0.0	0.4	5.3	0.0	2.6	5.7	0.0	0.4	5.2	0.0	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	1.2	0.8	0.0	2.0	0.4	0.0	0.7	0.8	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.8	0.0	13.7	26.1	0.0	20.2	27.3	0.0	15.9	26.1	0.0	19.3
LnGrp LOS	C	A	B	C	A	C	C	A	B	C	A	B
Approach Vol, veh/h		407			295			118			349	
Approach Delay, s/veh		20.1			21.7			19.0			20.7	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.5	13.5	7.6	17.3	6.2	14.8	12.1	12.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.9	22.1	9.0	25.0	5.0	23.0	11.0	23.0
Max Q Clear Time (g_c+I1), s	3.8	3.9	3.9	5.6	2.8	9.0	7.8	7.3
Green Ext Time (p_c), s	0.0	0.3	0.1	0.8	0.0	1.3	0.2	1.0

Intersection Summary	
HCM 6th Ctrl Delay	20.5
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	107	198	0
Future Vol, veh/h	0	0	0	107	198	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	116	215	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	331	215	215	0	-	0
Stage 1	215	-	-	-	-	-
Stage 2	116	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	664	825	1355	-	-	-
Stage 1	821	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	664	825	1355	-	-	-
Mov Cap-2 Maneuver	693	-	-	-	-	-
Stage 1	821	-	-	-	-	-
Stage 2	909	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1355	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

MOVEMENT SUMMARY

Site: 4 [Franklin Rd / Ashby Rd Existing Midday (Site Folder: General)]

Existing Midday
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Franklin Rd														
3	L2	29	3.0	32	3.0	0.136	5.5	LOS A	0.6	14.5	0.51	0.42	0.51	34.2
8	T1	59	3.0	65	3.0	0.136	5.5	LOS A	0.6	14.5	0.51	0.42	0.51	34.2
18	R2	19	3.0	21	3.0	0.136	5.5	LOS A	0.6	14.5	0.51	0.42	0.51	33.2
Approach		107	3.0	118	3.0	0.136	5.5	LOS A	0.6	14.5	0.51	0.42	0.51	34.0
East: Ashby Rd														
1	L2	68	3.0	75	3.0	0.311	7.1	LOS A	1.5	39.2	0.53	0.45	0.53	33.5
6	T1	143	3.0	157	3.0	0.311	7.1	LOS A	1.5	39.2	0.53	0.45	0.53	33.4
16	R2	57	3.0	63	3.0	0.311	7.1	LOS A	1.5	39.2	0.53	0.45	0.53	32.5
Approach		268	3.0	295	3.0	0.311	7.1	LOS A	1.5	39.2	0.53	0.45	0.53	33.2
North: Franklin Rd														
7	L2	65	3.0	71	3.0	0.342	7.1	LOS A	1.8	45.9	0.50	0.39	0.50	33.6
4	T1	93	3.0	102	3.0	0.342	7.1	LOS A	1.8	45.9	0.50	0.39	0.50	33.5
14	R2	160	3.0	176	3.0	0.342	7.1	LOS A	1.8	45.9	0.50	0.39	0.50	32.6
Approach		318	3.0	349	3.0	0.342	7.1	LOS A	1.8	45.9	0.50	0.39	0.50	33.0
West: Ashby Rd														
5	L2	213	3.0	234	3.0	0.389	7.6	LOS A	2.2	55.2	0.51	0.39	0.51	32.4
2	T1	100	3.0	110	3.0	0.389	7.6	LOS A	2.2	55.2	0.51	0.39	0.51	32.3
12	R2	57	3.0	63	3.0	0.389	7.6	LOS A	2.2	55.2	0.51	0.39	0.51	31.5
Approach		370	3.0	407	3.0	0.389	7.6	LOS A	2.2	55.2	0.51	0.39	0.51	32.2
All Vehicles		1063	3.0	1168	3.0	0.389	7.1	LOS A	2.2	55.2	0.51	0.41	0.51	32.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.1
Total Del/Veh (s)	1.2	1.5	6.1	3.4

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.1	1.2	1.1

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.3	0.2
Total Del/Veh (s)	12.3	8.5	11.4	10.7

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.2	1.5	0.0	0.0	0.3
Total Del/Veh (s)	15.8	19.1	15.6	15.0	16.0

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.1
Total Del/Veh (s)	0.4	2.2	1.5

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	23.5

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	4	74	143
Average Queue (ft)	0	18	54
95th Queue (ft)	5	53	110
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB
Directions Served	TR
Maximum Queue (ft)	80
Average Queue (ft)	9
95th Queue (ft)	51
Link Distance (ft)	93
Upstream Blk Time (%)	1
Queuing Penalty (veh)	2
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	198	170	218
Average Queue (ft)	93	70	84
95th Queue (ft)	167	134	167
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	127	120	84	122	71	132	158	233
Average Queue (ft)	72	53	35	51	27	55	46	94
95th Queue (ft)	120	98	68	95	59	106	105	179
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	3	0						
Queuing Penalty (veh)	4	1						
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)							0	1
Queuing Penalty (veh)							0	1

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 8

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.2	0.3	0.1
Total Del/Veh (s)	1.4	0.1	1.9	0.3	11.5	5.8	3.4

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	WBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.1	1.2	1.1

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.3	0.3	0.0	0.0	0.3	0.3	0.2
Total Del/Veh (s)	15.1	10.0	9.6	5.7	13.2	11.1	10.7

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.1	0.3	3.9	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	18.8	14.1	7.1	24.1	22.9	8.7	23.2	14.0	6.9	24.8	17.1	9.6

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	16.0

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.2	0.0	0.1
Total Del/Veh (s)	0.4	2.2	1.5

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	23.5

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	4	74	143
Average Queue (ft)	0	18	54
95th Queue (ft)	5	53	110
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB
Directions Served	TR
Maximum Queue (ft)	80
Average Queue (ft)	9
95th Queue (ft)	51
Link Distance (ft)	93
Upstream Blk Time (%)	1
Queuing Penalty (veh)	2
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	198	170	218
Average Queue (ft)	93	70	84
95th Queue (ft)	167	134	167
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	127	120	84	122	71	132	158	233
Average Queue (ft)	72	53	35	51	27	55	46	94
95th Queue (ft)	120	98	68	95	59	106	105	179
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	3	0						
Queuing Penalty (veh)	4	1						
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)							0	1
Queuing Penalty (veh)							0	1

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 8

Intersection	
Int Delay, s/veh	7.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	49	10	259	56	14	241
Future Vol, veh/h	49	10	259	56	14	241
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	12	320	69	17	298

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	72	0	775	66
Stage 1	-	-	-	-	66	-
Stage 2	-	-	-	-	709	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1528	-	366	998
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	488	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1528	-	290	998
Mov Cap-2 Maneuver	-	-	-	-	341	-
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	386	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.6	11.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	903	-	-	1528	-
HCM Lane V/C Ratio	0.349	-	-	0.209	-
HCM Control Delay (s)	11.1	-	-	8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	1.6	-	-	0.8	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	290	0	0	315	0	0
Future Vol, veh/h	290	0	0	315	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	315	0	0	342	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	315	0	657	315
Stage 1	-	-	-	-	315	-
Stage 2	-	-	-	-	342	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1245	-	430	725
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	719	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1245	-	430	725
Mov Cap-2 Maneuver	-	-	-	-	529	-
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	719	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1245	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	412	436	437
v/c Ratio	0.68	0.58	0.66
Control Delay	15.8	11.9	15.5
Queue Delay	0.0	0.0	0.0
Total Delay	15.8	11.9	15.5
Queue Length 50th (ft)	50	58	70
Queue Length 95th (ft)	135	126	148
Internal Link Dist (ft)	1920	414	1305
Turn Bay Length (ft)			
Base Capacity (vph)	932	1395	1257
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.44	0.31	0.35

Intersection Summary



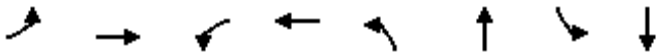
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	143	190	255	98	54	300
Future Volume (veh/h)	143	190	255	98	54	300
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	177	235	315	121	67	370
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	220	292	505	194	167	543
Arrive On Green	0.31	0.31	0.39	0.39	0.39	0.39
Sat Flow, veh/h	713	947	1287	494	124	1384
Grp Volume(v), veh/h	413	0	0	436	437	0
Grp Sat Flow(s),veh/h/ln	1664	0	0	1781	1509	0
Q Serve(g_s), s	8.0	0.0	0.0	6.9	2.3	0.0
Cycle Q Clear(g_c), s	8.0	0.0	0.0	6.9	9.2	0.0
Prop In Lane	0.43	0.57		0.28	0.15	
Lane Grp Cap(c), veh/h	513	0	0	699	710	0
V/C Ratio(X)	0.80	0.00	0.00	0.62	0.62	0.00
Avail Cap(c_a), veh/h	925	0	0	1523	1464	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.2	0.0	0.0	8.6	8.8	0.0
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.9	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	0.0	1.7	1.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.2	0.0	0.0	9.5	9.7	0.0
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h	413		436			437
Approach Delay, s/veh	14.2		9.5			9.7
Approach LOS	B		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		19.2			19.2	15.9
Change Period (Y+Rc), s		5.4			5.4	5.1
Max Green Setting (Gmax), s		30.0			30.0	19.5
Max Q Clear Time (g_c+I1), s		8.9			11.2	10.0
Green Ext Time (p_c), s		2.6			2.6	1.0

Intersection Summary	
HCM 6th Ctrl Delay	11.1
HCM 6th LOS	B

Notes

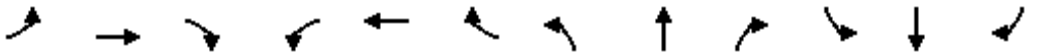
User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	207	150	70	151	52	181	102	445
v/c Ratio	0.59	0.26	0.35	0.42	0.30	0.34	0.49	0.71
Control Delay	37.0	17.5	37.0	21.2	37.0	21.0	41.7	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	17.5	37.0	21.2	37.0	21.0	41.7	23.9
Queue Length 50th (ft)	75	40	26	37	19	51	38	122
Queue Length 95th (ft)	#190	75	#67	74	55	109	#111	237
Internal Link Dist (ft)		97		819		245		414
Turn Bay Length (ft)			200				200	
Base Capacity (vph)	360	969	202	803	171	801	209	822
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.15	0.35	0.19	0.30	0.23	0.49	0.54

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	89	32	57	71	51	42	133	14	83	159	202
Future Volume (veh/h)	168	89	32	57	71	51	42	133	14	83	159	202
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	207	110	40	70	88	63	52	164	17	102	196	249
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	260	285	104	110	135	97	91	489	51	133	237	302
Arrive On Green	0.15	0.22	0.22	0.06	0.13	0.13	0.05	0.29	0.29	0.07	0.32	0.32
Sat Flow, veh/h	1781	1309	476	1781	1014	726	1781	1667	173	1781	748	951
Grp Volume(v), veh/h	207	0	150	70	0	151	52	0	181	102	0	445
Grp Sat Flow(s),veh/h/ln	1781	0	1785	1781	0	1740	1781	0	1839	1781	0	1699
Q Serve(g_s), s	5.7	0.0	3.7	2.0	0.0	4.2	1.5	0.0	3.9	2.9	0.0	12.4
Cycle Q Clear(g_c), s	5.7	0.0	3.7	2.0	0.0	4.2	1.5	0.0	3.9	2.9	0.0	12.4
Prop In Lane	1.00		0.27	1.00		0.42	1.00		0.09	1.00		0.56
Lane Grp Cap(c), veh/h	260	0	389	110	0	232	91	0	540	133	0	539
V/C Ratio(X)	0.80	0.00	0.39	0.64	0.00	0.65	0.57	0.00	0.34	0.77	0.00	0.83
Avail Cap(c_a), veh/h	366	0	964	206	0	783	174	0	806	213	0	781
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.1	0.0	17.1	23.4	0.0	21.0	23.7	0.0	14.1	23.2	0.0	16.1
Incr Delay (d2), s/veh	7.9	0.0	0.6	6.0	0.0	3.1	5.5	0.0	0.4	8.8	0.0	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	1.3	0.9	0.0	1.7	0.7	0.0	1.4	1.4	0.0	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.0	0.0	17.7	29.4	0.0	24.1	29.2	0.0	14.5	32.0	0.0	21.0
LnGrp LOS	C	A	B	C	A	C	C	A	B	C	A	C
Approach Vol, veh/h		357			221			233			547	
Approach Delay, s/veh		24.2			25.8			17.8			23.0	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	19.5	7.6	15.6	7.1	20.7	12.0	11.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.1	22.4	5.9	27.6	5.0	23.5	10.5	23.0
Max Q Clear Time (g_c+I1), s	4.9	5.9	4.0	5.7	3.5	14.4	7.7	6.2
Green Ext Time (p_c), s	0.0	0.8	0.0	0.7	0.0	1.8	0.1	0.6

Intersection Summary	
HCM 6th Ctrl Delay	22.9
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	189	248	0
Future Vol, veh/h	0	0	0	189	248	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	205	270	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	475	270	270	0	-	0
Stage 1	270	-	-	-	-	-
Stage 2	205	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	548	769	1293	-	-	-
Stage 1	775	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	548	769	1293	-	-	-
Mov Cap-2 Maneuver	615	-	-	-	-	-
Stage 1	775	-	-	-	-	-
Stage 2	829	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1293	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

MOVEMENT SUMMARY

Site: 4 [Franklin Rd / Ashby Rd Existing AM (Site Folder: General)]

Existing AM
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Franklin Rd														
3	L2	42	3.0	52	3.0	0.271	7.1	LOS A	1.2	31.8	0.56	0.51	0.56	33.6
8	T1	133	3.0	164	3.0	0.271	7.1	LOS A	1.2	31.8	0.56	0.51	0.56	33.5
18	R2	14	3.0	17	3.0	0.271	7.1	LOS A	1.2	31.8	0.56	0.51	0.56	32.6
Approach		189	3.0	233	3.0	0.271	7.1	LOS A	1.2	31.8	0.56	0.51	0.56	33.5
East: Ashby Rd														
1	L2	57	3.0	70	3.0	0.257	6.9	LOS A	1.2	29.9	0.56	0.50	0.56	33.3
6	T1	71	3.0	88	3.0	0.257	6.9	LOS A	1.2	29.9	0.56	0.50	0.56	33.3
16	R2	51	3.0	63	3.0	0.257	6.9	LOS A	1.2	29.9	0.56	0.50	0.56	32.4
Approach		179	3.0	221	3.0	0.257	6.9	LOS A	1.2	29.9	0.56	0.50	0.56	33.0
North: Franklin Rd														
7	L2	83	3.0	102	3.0	0.497	8.9	LOS A	3.2	82.1	0.54	0.40	0.54	32.7
4	T1	159	3.0	196	3.0	0.497	8.9	LOS A	3.2	82.1	0.54	0.40	0.54	32.7
14	R2	202	3.0	249	3.0	0.497	8.9	LOS A	3.2	82.1	0.54	0.40	0.54	31.8
Approach		444	3.0	548	3.0	0.497	8.9	LOS A	3.2	82.1	0.54	0.40	0.54	32.3
West: Ashby Rd														
5	L2	168	3.0	207	3.0	0.392	8.5	LOS A	2.0	52.1	0.60	0.53	0.60	32.0
2	T1	89	3.0	110	3.0	0.392	8.5	LOS A	2.0	52.1	0.60	0.53	0.60	31.9
12	R2	32	3.0	40	3.0	0.392	8.5	LOS A	2.0	52.1	0.60	0.53	0.60	31.1
Approach		289	3.0	357	3.0	0.392	8.5	LOS A	2.0	52.1	0.60	0.53	0.60	31.9
All Vehicles		1101	3.0	1359	3.0	0.497	8.2	LOS A	3.2	82.1	0.56	0.47	0.56	32.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.1
Total Del/Veh (s)	1.6	1.7	7.5	4.0

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.8	1.8	1.8

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.1
Total Del/Veh (s)	10.1	4.5	3.6	4.5

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	1.5	0.0	0.0	0.4
Total Del/Veh (s)	18.0	20.9	15.8	14.6	17.5

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.1
Total Del/Veh (s)	0.4	1.8	1.3

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	23.9

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	18	83	184
Average Queue (ft)	1	27	63
95th Queue (ft)	12	65	143
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	T
Maximum Queue (ft)	93	14
Average Queue (ft)	19	0
95th Queue (ft)	72	8
Link Distance (ft)	93	120
Upstream Blk Time (%)	2	
Queuing Penalty (veh)	6	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	70	118	102
Average Queue (ft)	29	35	32
95th Queue (ft)	58	90	79
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	133	121	121	165	83	110	69	179
Average Queue (ft)	92	61	52	78	26	47	28	85
95th Queue (ft)	138	107	96	134	62	90	60	148
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	6	1						
Queuing Penalty (veh)	13	2						
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)				0				0
Queuing Penalty (veh)				0				0

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 21

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.0	0.3	0.3	0.1
Total Del/Veh (s)	1.7	0.1	2.2	0.4	11.3	7.5	4.0

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	WBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.8	1.8	1.8

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.2	0.3	0.1
Total Del/Veh (s)	12.5	4.6	5.1	2.9	5.2	3.4	4.5

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.6	0.5	0.5	0.0	0.0	0.0	0.1	0.0	0.0
Total Del/Veh (s)	20.9	16.2	7.0	23.3	21.8	10.9	24.9	15.4	6.1	25.0	18.6	9.1

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	17.5

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.2	0.0	0.1
Total Del/Veh (s)	0.4	1.8	1.3

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	23.9

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	18	83	184
Average Queue (ft)	1	27	63
95th Queue (ft)	12	65	143
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	T
Maximum Queue (ft)	93	14
Average Queue (ft)	19	0
95th Queue (ft)	72	8
Link Distance (ft)	93	120
Upstream Blk Time (%)	2	
Queuing Penalty (veh)	6	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	70	118	102
Average Queue (ft)	29	35	32
95th Queue (ft)	58	90	79
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	133	121	121	165	83	110	69	179
Average Queue (ft)	92	61	52	78	26	47	28	85
95th Queue (ft)	138	107	96	134	62	90	60	148
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	6	1						
Queuing Penalty (veh)	13	2						
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)				0				0
Queuing Penalty (veh)				0				0

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 21

Intersection	
Int Delay, s/veh	7.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	7	241	113	8	308
Future Vol, veh/h	93	7	241	113	8	308
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	102	8	265	124	9	338

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	110	0	760	106
Stage 1	-	-	-	-	106	-
Stage 2	-	-	-	-	654	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1480	-	374	948
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	517	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1480	-	307	948
Mov Cap-2 Maneuver	-	-	-	-	370	-
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	424	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.4	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	912	-	-	1480	-
HCM Lane V/C Ratio	0.381	-	-	0.179	-
HCM Control Delay (s)	11.4	-	-	8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	1.8	-	-	0.7	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	401	0	0	354	0	0
Future Vol, veh/h	401	0	0	354	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	436	0	0	385	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	436	0	821	436
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	385	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1124	-	344	620
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	688	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1124	-	344	620
Mov Cap-2 Maneuver	-	-	-	-	462	-
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	688	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1124	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	62	412	347
v/c Ratio	0.10	0.30	0.26
Control Delay	8.8	4.0	4.2
Queue Delay	0.0	0.0	0.0
Total Delay	8.8	4.0	4.2
Queue Length 50th (ft)	1	0	0
Queue Length 95th (ft)	31	81	74
Internal Link Dist (ft)	1920	414	1305
Turn Bay Length (ft)			
Base Capacity (vph)	1418	1690	1635
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.04	0.24	0.21

Intersection Summary



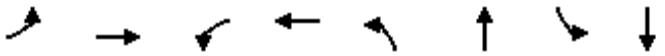
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	37	19	273	102	26	289
Future Volume (veh/h)	37	19	273	102	26	289
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	41	21	300	112	29	318
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	98	50	514	192	220	686
Arrive On Green	0.09	0.09	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1114	571	1298	485	71	1734
Grp Volume(v), veh/h	63	0	0	412	347	0
Grp Sat Flow(s),veh/h/ln	1712	0	0	1783	1805	0
Q Serve(g_s), s	0.7	0.0	0.0	3.7	0.0	0.0
Cycle Q Clear(g_c), s	0.7	0.0	0.0	3.7	2.8	0.0
Prop In Lane	0.65	0.33		0.27	0.08	
Lane Grp Cap(c), veh/h	151	0	0	706	906	0
V/C Ratio(X)	0.42	0.00	0.00	0.58	0.38	0.00
Avail Cap(c_a), veh/h	1640	0	0	2628	2778	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.8	0.0	0.0	4.8	4.6	0.0
Incr Delay (d2), s/veh	1.8	0.0	0.0	0.8	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.2	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.6	0.0	0.0	5.6	4.8	0.0
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h	63		412			347
Approach Delay, s/veh	10.6		5.6			4.8
Approach LOS	B		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		13.5			13.5	6.9
Change Period (Y+Rc), s		5.4			5.4	5.1
Max Green Setting (Gmax), s		30.0			30.0	19.5
Max Q Clear Time (g_c+I1), s		5.7			4.8	2.7
Green Ext Time (p_c), s		2.5			2.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	5.7
HCM 6th LOS	A

Notes

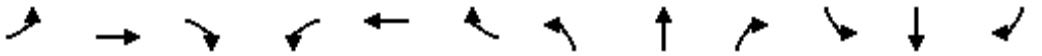
User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	269	171	103	202	45	133	52	313
v/c Ratio	0.76	0.28	0.43	0.50	0.27	0.30	0.31	0.66
Control Delay	44.1	17.2	35.3	24.1	34.7	19.1	35.8	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.1	17.2	35.3	24.1	34.7	19.1	35.8	22.2
Queue Length 50th (ft)	91	42	34	58	15	33	18	69
Queue Length 95th (ft)	#304	101	#118	131	54	86	#67	170
Internal Link Dist (ft)		97		819		245		414
Turn Bay Length (ft)			200				200	
Base Capacity (vph)	356	906	251	805	169	820	169	815
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.19	0.41	0.25	0.27	0.16	0.31	0.38

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	114	42	94	146	38	41	93	28	47	117	167
Future Volume (veh/h)	245	114	42	94	146	38	41	93	28	47	117	167
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	269	125	46	103	160	42	45	102	31	52	129	184
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	327	352	130	136	234	61	83	326	99	92	169	240
Arrive On Green	0.18	0.27	0.27	0.08	0.16	0.16	0.05	0.24	0.24	0.05	0.24	0.24
Sat Flow, veh/h	1781	1304	480	1781	1428	375	1781	1377	418	1781	697	994
Grp Volume(v), veh/h	269	0	171	103	0	202	45	0	133	52	0	313
Grp Sat Flow(s),veh/h/ln	1781	0	1784	1781	0	1803	1781	0	1795	1781	0	1691
Q Serve(g_s), s	7.2	0.0	3.8	2.8	0.0	5.2	1.2	0.0	3.0	1.4	0.0	8.5
Cycle Q Clear(g_c), s	7.2	0.0	3.8	2.8	0.0	5.2	1.2	0.0	3.0	1.4	0.0	8.5
Prop In Lane	1.00		0.27	1.00		0.21	1.00		0.23	1.00		0.59
Lane Grp Cap(c), veh/h	327	0	482	136	0	295	83	0	425	92	0	409
V/C Ratio(X)	0.82	0.00	0.35	0.75	0.00	0.69	0.54	0.00	0.31	0.57	0.00	0.77
Avail Cap(c_a), veh/h	379	0	943	267	0	840	180	0	855	180	0	805
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.4	0.0	14.5	22.3	0.0	19.4	23.0	0.0	15.5	22.9	0.0	17.4
Incr Delay (d2), s/veh	12.2	0.0	0.4	8.2	0.0	2.8	5.4	0.0	0.4	5.4	0.0	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	1.3	1.3	0.0	2.1	0.6	0.0	1.1	0.7	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.6	0.0	15.0	30.5	0.0	22.3	28.4	0.0	15.9	28.2	0.0	20.4
LnGrp LOS	C	A	B	C	A	C	C	A	B	C	A	C
Approach Vol, veh/h		440			305			178			365	
Approach Delay, s/veh		25.1			25.0			19.1			21.5	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.0	16.2	8.3	17.8	6.8	16.4	13.6	12.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	23.5	7.4	26.1	5.0	23.5	10.5	23.0
Max Q Clear Time (g_c+I1), s	3.4	5.0	4.8	5.8	3.2	10.5	9.2	7.2
Green Ext Time (p_c), s	0.0	0.6	0.0	0.8	0.0	1.4	0.1	0.9

Intersection Summary	
HCM 6th Ctrl Delay	23.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	162	253	0
Future Vol, veh/h	0	0	0	162	253	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	176	275	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	451	275	275	0	-	0
Stage 1	275	-	-	-	-	-
Stage 2	176	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	566	764	1288	-	-	-
Stage 1	771	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	566	764	1288	-	-	-
Mov Cap-2 Maneuver	626	-	-	-	-	-
Stage 1	771	-	-	-	-	-
Stage 2	855	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1288	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

MOVEMENT SUMMARY

Site: 4 [Franklin Rd / Ashby Rd Existing PM (Site Folder: General)]

Existing PM
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Franklin Rd														
3	L2	41	3.0	45	3.0	0.212	6.5	LOS A	0.9	23.7	0.55	0.49	0.55	33.8
8	T1	93	3.0	102	3.0	0.212	6.5	LOS A	0.9	23.7	0.55	0.49	0.55	33.7
18	R2	28	3.0	31	3.0	0.212	6.5	LOS A	0.9	23.7	0.55	0.49	0.55	32.7
Approach		162	3.0	178	3.0	0.212	6.5	LOS A	0.9	23.7	0.55	0.49	0.55	33.5
East: Ashby Rd														
1	L2	94	3.0	103	3.0	0.353	8.2	LOS A	1.7	44.3	0.60	0.55	0.60	32.7
6	T1	146	3.0	160	3.0	0.353	8.2	LOS A	1.7	44.3	0.60	0.55	0.60	32.7
16	R2	38	3.0	42	3.0	0.353	8.2	LOS A	1.7	44.3	0.60	0.55	0.60	31.8
Approach		278	3.0	305	3.0	0.353	8.2	LOS A	1.7	44.3	0.60	0.55	0.60	32.6
North: Franklin Rd														
7	L2	47	3.0	52	3.0	0.375	7.8	LOS A	2.0	50.6	0.55	0.46	0.55	33.4
4	T1	117	3.0	129	3.0	0.375	7.8	LOS A	2.0	50.6	0.55	0.46	0.55	33.3
14	R2	167	3.0	184	3.0	0.375	7.8	LOS A	2.0	50.6	0.55	0.46	0.55	32.4
Approach		331	3.0	364	3.0	0.375	7.8	LOS A	2.0	50.6	0.55	0.46	0.55	32.8
West: Ashby Rd														
5	L2	245	3.0	269	3.0	0.439	8.5	LOS A	2.5	64.1	0.57	0.46	0.57	31.9
2	T1	114	3.0	125	3.0	0.439	8.5	LOS A	2.5	64.1	0.57	0.46	0.57	31.8
12	R2	42	3.0	46	3.0	0.439	8.5	LOS A	2.5	64.1	0.57	0.46	0.57	31.0
Approach		401	3.0	441	3.0	0.439	8.5	LOS A	2.5	64.1	0.57	0.46	0.57	31.8
All Vehicles		1172	3.0	1288	3.0	0.439	8.0	LOS A	2.5	64.1	0.57	0.49	0.57	32.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.1
Total Del/Veh (s)	1.5	1.6	5.8	3.2

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	1.6	1.4	8.0	2.4

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.3	0.2
Total Del/Veh (s)	14.4	9.3	13.7	12.4

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	1.8	0.0	0.0	0.3
Total Del/Veh (s)	19.1	22.2	17.9	18.6	19.2

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.1
Total Del/Veh (s)	8.0	1.7	2.9	3.6

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	25.0

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	9	73	116
Average Queue (ft)	1	19	53
95th Queue (ft)	10	57	96
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	89	42	14	112
Average Queue (ft)	14	10	1	38
95th Queue (ft)	61	35	8	75
Link Distance (ft)	93	120	120	454
Upstream Blk Time (%)	1			
Queuing Penalty (veh)	4			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	245	197	224
Average Queue (ft)	108	85	99
95th Queue (ft)	188	157	190
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	133	115	114	132	94	162	210	312
Average Queue (ft)	87	57	52	56	37	67	54	132
95th Queue (ft)	134	103	95	102	78	127	133	247
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	5	1				0		0
Queuing Penalty (veh)	9	1				0		0
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)								3
Queuing Penalty (veh)								3

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	NB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	112	58	4	13
Average Queue (ft)	49	21	0	1
95th Queue (ft)	86	50	4	7
Link Distance (ft)	384	730	730	255
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 17

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.3	0.3	0.1
Total Del/Veh (s)	1.7	0.1	1.9	0.4	10.8	5.6	3.2

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.1	0.0
Total Del/Veh (s)	1.7	0.8	2.7	1.2	9.6	7.2	2.4

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.3	0.3	0.0	0.0	0.3	0.3	0.2
Total Del/Veh (s)	17.1	11.8	10.7	6.1	16.1	13.3	12.4

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.1	0.3	3.8	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	22.0	16.9	9.8	25.1	25.7	11.4	28.3	15.8	9.1	27.6	20.7	13.1

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	19.2

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.2	0.1	0.2	0.0	0.0	0.1
Total Del/Veh (s)	11.0	6.0	3.7	0.6	3.4	1.8	3.6

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	25.0

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	9	73	116
Average Queue (ft)	1	19	53
95th Queue (ft)	10	57	96
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	89	42	14	112
Average Queue (ft)	14	10	1	38
95th Queue (ft)	61	35	8	75
Link Distance (ft)	93	120	120	454
Upstream Blk Time (%)	1			
Queuing Penalty (veh)	4			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	245	197	224
Average Queue (ft)	108	85	99
95th Queue (ft)	188	157	190
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	133	115	114	132	94	162	210	312
Average Queue (ft)	87	57	52	56	37	67	54	132
95th Queue (ft)	134	103	95	102	78	127	133	247
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	5	1				0		0
Queuing Penalty (veh)	9	1				0		0
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)								3
Queuing Penalty (veh)								3

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	NB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	112	58	4	13
Average Queue (ft)	49	21	0	1
95th Queue (ft)	86	50	4	7
Link Distance (ft)	384	730	730	255
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 17

Intersection	
Int Delay, s/veh	7.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	61	10	277	68	14	260
Future Vol, veh/h	61	10	277	68	14	260
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	75	12	342	84	17	321

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	87	0	849	81
Stage 1	-	-	-	-	81	-
Stage 2	-	-	-	-	768	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1509	-	331	979
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	458	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1509	-	256	979
Mov Cap-2 Maneuver	-	-	-	-	312	-
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	354	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.5	11.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	883	-	-	1509	-
HCM Lane V/C Ratio	0.383	-	-	0.227	-
HCM Control Delay (s)	11.6	-	-	8.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	1.8	-	-	0.9	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	271	50	39	304	41	78
Future Vol, veh/h	271	50	39	304	41	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	295	54	42	330	45	85

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	349	0	736	322
Stage 1	-	-	-	-	322	-
Stage 2	-	-	-	-	414	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1210	-	386	719
Stage 1	-	-	-	-	735	-
Stage 2	-	-	-	-	667	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1210	-	372	719
Mov Cap-2 Maneuver	-	-	-	-	481	-
Stage 1	-	-	-	-	735	-
Stage 2	-	-	-	-	644	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	12.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	614	-	-	1210	-
HCM Lane V/C Ratio	0.211	-	-	0.035	-
HCM Control Delay (s)	12.4	-	-	8.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	450	510	486
v/c Ratio	0.73	0.65	0.76
Control Delay	19.9	13.8	19.8
Queue Delay	0.0	0.0	0.0
Total Delay	19.9	13.8	19.8
Queue Length 50th (ft)	72	84	97
Queue Length 95th (ft)	172	151	174
Internal Link Dist (ft)	1920	414	1305
Turn Bay Length (ft)			
Base Capacity (vph)	840	1283	1087
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.54	0.40	0.45

Intersection Summary



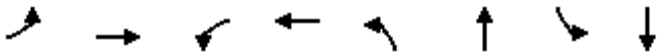
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	174	190	285	128	54	339
Future Volume (veh/h)	174	190	285	128	54	339
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	215	235	352	158	67	419
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	255	279	523	235	142	570
Arrive On Green	0.32	0.32	0.43	0.43	0.43	0.43
Sat Flow, veh/h	798	872	1223	549	103	1332
Grp Volume(v), veh/h	451	0	0	510	486	0
Grp Sat Flow(s),veh/h/ln	1674	0	0	1772	1435	0
Q Serve(g_s), s	10.4	0.0	0.0	9.6	3.5	0.0
Cycle Q Clear(g_c), s	10.4	0.0	0.0	9.6	13.1	0.0
Prop In Lane	0.48	0.52		0.31	0.14	
Lane Grp Cap(c), veh/h	535	0	0	758	712	0
V/C Ratio(X)	0.84	0.00	0.00	0.67	0.68	0.00
Avail Cap(c_a), veh/h	784	0	0	1277	1188	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	13.2	0.0	0.0	9.6	9.9	0.0
Incr Delay (d2), s/veh	5.6	0.0	0.0	1.0	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	0.0	2.6	2.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.7	0.0	0.0	10.6	11.1	0.0
LnGrp LOS	B	A	A	B	B	A
Approach Vol, veh/h	451		510			486
Approach Delay, s/veh	18.7		10.6			11.1
Approach LOS	B		B			B

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		23.2			23.2	18.4
Change Period (Y+Rc), s		5.4			5.4	5.1
Max Green Setting (Gmax), s		30.0			30.0	19.5
Max Q Clear Time (g_c+I1), s		11.6			15.1	12.4
Green Ext Time (p_c), s		3.0			2.7	1.0

Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

Notes

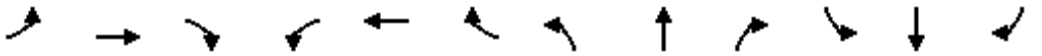
User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	256	174	111	148	69	227	102	522
v/c Ratio	0.82	0.40	0.51	0.44	0.46	0.41	0.60	0.78
Control Delay	53.7	22.8	40.8	22.3	44.9	20.4	50.0	28.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.7	22.8	40.8	22.3	44.9	20.4	50.0	28.8
Queue Length 50th (ft)	103	54	43	38	28	63	41	163
Queue Length 95th (ft)	#248	91	#104	72	#79	131	#116	#346
Internal Link Dist (ft)		97		819		245		414
Turn Bay Length (ft)			200				200	
Base Capacity (vph)	314	794	230	707	149	709	171	724
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.22	0.48	0.21	0.46	0.32	0.60	0.72

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	103	38	90	69	51	56	154	30	83	206	217
Future Volume (veh/h)	207	103	38	90	69	51	56	154	30	83	206	217
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	256	127	47	111	85	63	69	190	37	102	254	268
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	304	281	104	143	125	93	102	498	97	131	286	302
Arrive On Green	0.17	0.22	0.22	0.08	0.13	0.13	0.06	0.33	0.33	0.07	0.34	0.34
Sat Flow, veh/h	1781	1302	482	1781	998	740	1781	1521	296	1781	833	879
Grp Volume(v), veh/h	256	0	174	111	0	148	69	0	227	102	0	522
Grp Sat Flow(s),veh/h/ln	1781	0	1784	1781	0	1737	1781	0	1817	1781	0	1712
Q Serve(g_s), s	8.3	0.0	5.0	3.6	0.0	4.8	2.3	0.0	5.7	3.3	0.0	17.1
Cycle Q Clear(g_c), s	8.3	0.0	5.0	3.6	0.0	4.8	2.3	0.0	5.7	3.3	0.0	17.1
Prop In Lane	1.00		0.27	1.00		0.43	1.00		0.16	1.00		0.51
Lane Grp Cap(c), veh/h	304	0	385	143	0	218	102	0	595	131	0	588
V/C Ratio(X)	0.84	0.00	0.45	0.78	0.00	0.68	0.68	0.00	0.38	0.78	0.00	0.89
Avail Cap(c_a), veh/h	315	0	775	231	0	673	150	0	698	171	0	678
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.9	0.0	20.2	26.8	0.0	24.8	27.5	0.0	15.3	27.0	0.0	18.4
Incr Delay (d2), s/veh	17.8	0.0	0.8	8.7	0.0	3.7	7.6	0.0	0.4	15.6	0.0	12.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	1.9	1.7	0.0	2.0	1.1	0.0	2.1	1.9	0.0	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.7	0.0	21.1	35.5	0.0	28.5	35.1	0.0	15.7	42.6	0.0	30.8
LnGrp LOS	D	A	C	D	A	C	D	A	B	D	A	C
Approach Vol, veh/h		430			259			296			624	
Approach Delay, s/veh		33.3			31.5			20.2			32.7	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	24.0	9.3	17.3	7.9	24.9	14.6	11.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.7	22.8	7.7	25.8	5.0	23.5	10.5	23.0
Max Q Clear Time (g_c+I1), s	5.3	7.7	5.6	7.0	4.3	19.1	10.3	6.8
Green Ext Time (p_c), s	0.0	1.0	0.0	0.8	0.0	1.3	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	30.4
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	65	97	95	175	232	101
Future Vol, veh/h	65	97	95	175	232	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	71	105	103	190	252	110

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	703	307	362	0	-	0
Stage 1	307	-	-	-	-	-
Stage 2	396	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	404	733	1197	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	680	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	369	733	1197	-	-	-
Mov Cap-2 Maneuver	479	-	-	-	-	-
Stage 1	682	-	-	-	-	-
Stage 2	680	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.4	2.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1197	-	604	-	-
HCM Lane V/C Ratio	0.086	-	0.292	-	-
HCM Control Delay (s)	8.3	-	13.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.3	-	1.2	-	-

MOVEMENT SUMMARY

Site: 4 [Franklin Rd / Ashby Rd EPP AM (Site Folder: General)]

Existing plus Project AM
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Franklin Rd														
3	L2	56	3.0	69	3.0	0.368	8.9	LOS A	1.8	45.5	0.64	0.62	0.64	32.7
8	T1	154	3.0	190	3.0	0.368	8.9	LOS A	1.8	45.5	0.64	0.62	0.64	32.6
18	R2	30	3.0	37	3.0	0.368	8.9	LOS A	1.8	45.5	0.64	0.62	0.64	31.7
Approach		240	3.0	296	3.0	0.368	8.9	LOS A	1.8	45.5	0.64	0.62	0.64	32.5
East: Ashby Rd														
1	L2	90	3.0	111	3.0	0.332	8.6	LOS A	1.5	39.3	0.63	0.62	0.63	32.3
6	T1	69	3.0	85	3.0	0.332	8.6	LOS A	1.5	39.3	0.63	0.62	0.63	32.2
16	R2	51	3.0	63	3.0	0.332	8.6	LOS A	1.5	39.3	0.63	0.62	0.63	31.4
Approach		210	3.0	259	3.0	0.332	8.6	LOS A	1.5	39.3	0.63	0.62	0.63	32.1
North: Franklin Rd														
7	L2	83	3.0	102	3.0	0.602	11.6	LOS B	6.1	156.2	0.67	0.65	0.88	31.6
4	T1	206	3.0	254	3.0	0.602	11.6	LOS B	6.1	156.2	0.67	0.65	0.88	31.5
14	R2	217	3.0	268	3.0	0.602	11.6	LOS B	6.1	156.2	0.67	0.65	0.88	30.7
Approach		506	3.0	625	3.0	0.602	11.6	LOS B	6.1	156.2	0.67	0.65	0.88	31.2
West: Ashby Rd														
5	L2	207	3.0	256	3.0	0.524	11.8	LOS B	4.0	101.2	0.71	0.82	1.01	30.6
2	T1	103	3.0	127	3.0	0.524	11.8	LOS B	4.0	101.2	0.71	0.82	1.01	30.5
12	R2	38	3.0	47	3.0	0.524	11.8	LOS B	4.0	101.2	0.71	0.82	1.01	29.7
Approach		348	3.0	430	3.0	0.524	11.8	LOS B	4.0	101.2	0.71	0.82	1.01	30.4
All Vehicles		1304	3.0	1610	3.0	0.602	10.6	LOS B	6.1	156.2	0.67	0.68	0.83	31.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.2	0.0	0.3	0.1
Total Del/Veh (s)	2.7	1.7	11.5	5.7

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.0
Total Del/Veh (s)	3.8	1.8	18.2	4.8

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.1
Total Del/Veh (s)	11.3	5.5	4.8	5.8

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	1.9	0.0	0.0	0.4
Total Del/Veh (s)	22.7	24.7	17.8	16.7	20.7

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.2	0.1	0.0	0.1
Total Del/Veh (s)	7.7	1.5	2.7	3.4

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	26.8

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	64	77	250
Average Queue (ft)	4	27	80
95th Queue (ft)	28	63	179
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	100	44	25	150
Average Queue (ft)	39	10	1	48
95th Queue (ft)	108	35	16	110
Link Distance (ft)	93	120	120	454
Upstream Blk Time (%)	6		0	
Queuing Penalty (veh)	25		0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	80	129	121
Average Queue (ft)	38	51	45
95th Queue (ft)	68	110	97
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	136	125	148	170	86	157	92	211
Average Queue (ft)	106	73	74	79	37	60	31	103
95th Queue (ft)	145	120	129	135	74	115	69	172
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	16	2						
Queuing Penalty (veh)	36	4						
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)			0					0
Queuing Penalty (veh)			1					0

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	SB
Directions Served	LR	L	TR
Maximum Queue (ft)	97	60	6
Average Queue (ft)	48	20	0
95th Queue (ft)	78	48	4
Link Distance (ft)	384	730	255
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 66

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.0	0.3	0.3	0.1
Total Del/Veh (s)	2.8	0.2	2.3	0.4	14.0	11.4	5.7

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.2	0.0
Total Del/Veh (s)	4.1	2.5	3.7	1.7	18.6	17.6	4.8

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.3	0.3	0.1
Total Del/Veh (s)	12.8	6.6	6.4	3.5	7.7	4.5	5.8

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.6	0.6	0.6	0.0	0.0	0.0	0.1	0.0	0.0
Total Del/Veh (s)	26.8	19.2	10.3	28.3	24.7	13.0	28.0	16.4	8.1	27.9	20.0	11.2

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	20.7

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.2	0.1	0.2	0.0	0.0	0.1
Total Del/Veh (s)	10.6	5.7	3.3	0.5	3.1	1.7	3.4

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	26.8

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	64	77	250
Average Queue (ft)	4	27	80
95th Queue (ft)	28	63	179
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	100	44	25	150
Average Queue (ft)	39	10	1	48
95th Queue (ft)	108	35	16	110
Link Distance (ft)	93	120	120	454
Upstream Blk Time (%)	6		0	
Queuing Penalty (veh)	25		0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	80	129	121
Average Queue (ft)	38	51	45
95th Queue (ft)	68	110	97
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	136	125	148	170	86	157	92	211
Average Queue (ft)	106	73	74	79	37	60	31	103
95th Queue (ft)	145	120	129	135	74	115	69	172
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	16	2						
Queuing Penalty (veh)	36	4						
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)			0					0
Queuing Penalty (veh)			1					0

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	SB
Directions Served	LR	L	TR
Maximum Queue (ft)	97	60	6
Average Queue (ft)	48	20	0
95th Queue (ft)	78	48	4
Link Distance (ft)	384	730	255
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 66

Intersection	
Int Delay, s/veh	7.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	105	7	259	125	8	326
Future Vol, veh/h	105	7	259	125	8	326
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	115	8	285	137	9	358

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	123	0	826	119
Stage 1	-	-	-	-	119	-
Stage 2	-	-	-	-	707	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1464	-	342	933
Stage 1	-	-	-	-	906	-
Stage 2	-	-	-	-	489	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1464	-	275	933
Mov Cap-2 Maneuver	-	-	-	-	342	-
Stage 1	-	-	-	-	906	-
Stage 2	-	-	-	-	394	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.4	11.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	896	-	-	1464	-
HCM Lane V/C Ratio	0.41	-	-	0.194	-
HCM Control Delay (s)	11.8	-	-	8.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	2	-	-	0.7	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	371	61	29	345	39	81
Future Vol, veh/h	371	61	29	345	39	81
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	403	66	32	375	42	88

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	469	0	875	436
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	439	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1093	-	320	620
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	650	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1093	-	311	620
Mov Cap-2 Maneuver	-	-	-	-	435	-
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	631	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	13.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	545	-	-	1093	-
HCM Lane V/C Ratio	0.239	-	-	0.029	-
HCM Control Delay (s)	13.7	-	-	8.4	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.9	-	-	0.1	-



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	95	478	380
v/c Ratio	0.15	0.41	0.34
Control Delay	10.4	6.1	6.2
Queue Delay	0.0	0.0	0.0
Total Delay	10.4	6.1	6.2
Queue Length 50th (ft)	9	44	38
Queue Length 95th (ft)	44	108	91
Internal Link Dist (ft)	1920	414	1305
Turn Bay Length (ft)			
Base Capacity (vph)	1286	1635	1585
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.07	0.29	0.24

Intersection Summary



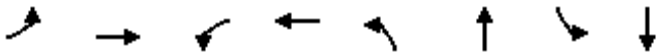
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	67	19	303	132	26	319
Future Volume (veh/h)	67	19	303	132	26	319
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	74	21	333	145	29	351
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	160	45	525	229	194	742
Arrive On Green	0.12	0.12	0.43	0.43	0.43	0.43
Sat Flow, veh/h	1338	380	1236	538	61	1746
Grp Volume(v), veh/h	96	0	0	478	380	0
Grp Sat Flow(s),veh/h/ln	1735	0	0	1774	1807	0
Q Serve(g_s), s	1.2	0.0	0.0	4.9	0.0	0.0
Cycle Q Clear(g_c), s	1.2	0.0	0.0	4.9	3.4	0.0
Prop In Lane	0.77	0.22		0.30	0.08	
Lane Grp Cap(c), veh/h	207	0	0	754	936	0
V/C Ratio(X)	0.46	0.00	0.00	0.63	0.41	0.00
Avail Cap(c_a), veh/h	1467	0	0	2307	2454	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	9.5	0.0	0.0	5.2	4.8	0.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	0.9	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.4	0.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.1	0.0	0.0	6.1	5.1	0.0
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h	96		478			380
Approach Delay, s/veh	11.1		6.1			5.1
Approach LOS	B		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		15.2			15.2	7.9
Change Period (Y+Rc), s		5.4			5.4	5.1
Max Green Setting (Gmax), s		30.0			30.0	19.5
Max Q Clear Time (g_c+I1), s		6.9			5.4	3.2
Green Ext Time (p_c), s		3.0			2.3	0.2

Intersection Summary	
HCM 6th Ctrl Delay	6.2
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

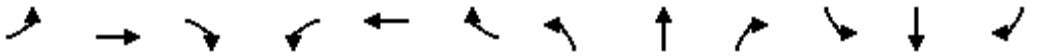


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	307	190	146	193	62	179	52	378
v/c Ratio	0.99	0.42	0.40	0.49	0.38	0.35	0.29	0.72
Control Delay	82.2	20.6	35.8	24.4	39.4	18.7	35.1	25.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.2	20.6	35.8	24.4	39.4	18.7	35.1	25.0
Queue Length 50th (ft)	~130	51	52	57	22	45	18	100
Queue Length 95th (ft)	#364	115	#180	125	#83	111	61	227
Internal Link Dist (ft)		97		819		245		414
Turn Bay Length (ft)			200				200	
Base Capacity (vph)	311	846	362	777	163	806	180	816
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.22	0.40	0.25	0.38	0.22	0.29	0.46

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	279	126	47	133	137	38	56	118	45	47	164	180
Future Volume (veh/h)	279	126	47	133	137	38	56	118	45	47	164	180
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	307	138	52	146	151	42	62	130	49	52	180	198
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	316	294	111	186	217	60	100	364	137	90	224	246
Arrive On Green	0.18	0.23	0.23	0.10	0.15	0.15	0.06	0.28	0.28	0.05	0.28	0.28
Sat Flow, veh/h	1781	1295	488	1781	1408	392	1781	1295	488	1781	814	895
Grp Volume(v), veh/h	307	0	190	146	0	193	62	0	179	52	0	378
Grp Sat Flow(s),veh/h/ln	1781	0	1783	1781	0	1800	1781	0	1783	1781	0	1709
Q Serve(g_s), s	9.2	0.0	4.9	4.3	0.0	5.4	1.8	0.0	4.3	1.5	0.0	11.0
Cycle Q Clear(g_c), s	9.2	0.0	4.9	4.3	0.0	5.4	1.8	0.0	4.3	1.5	0.0	11.0
Prop In Lane	1.00		0.27	1.00		0.22	1.00		0.27	1.00		0.52
Lane Grp Cap(c), veh/h	316	0	405	186	0	278	100	0	501	90	0	470
V/C Ratio(X)	0.97	0.00	0.47	0.78	0.00	0.69	0.62	0.00	0.36	0.58	0.00	0.80
Avail Cap(c_a), veh/h	316	0	840	243	0	774	167	0	800	183	0	783
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.8	0.0	17.9	23.4	0.0	21.4	24.7	0.0	15.4	24.8	0.0	18.0
Incr Delay (d2), s/veh	42.4	0.0	0.8	11.7	0.0	3.1	6.1	0.0	0.4	5.8	0.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	0.0	1.8	2.2	0.0	2.2	0.9	0.0	1.5	0.7	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.2	0.0	18.7	35.1	0.0	24.5	30.7	0.0	15.8	30.7	0.0	21.3
LnGrp LOS	E	A	B	D	A	C	C	A	B	C	A	C
Approach Vol, veh/h		497			339			241			430	
Approach Delay, s/veh		46.8			29.1			19.6			22.4	
Approach LOS		D			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	19.5	10.1	16.7	7.5	19.2	14.0	12.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	24.0	7.3	25.2	5.0	24.5	9.5	23.0
Max Q Clear Time (g_c+I1), s	3.5	6.3	6.3	6.9	3.8	13.0	11.2	7.4
Green Ext Time (p_c), s	0.0	0.8	0.0	0.9	0.0	1.7	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	31.5
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	66	94	85	153	241	108
Future Vol, veh/h	66	94	85	153	241	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	72	102	92	166	262	117

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	671	321	379	0	-	0
Stage 1	321	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	422	720	1179	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	389	720	1179	-	-	-
Mov Cap-2 Maneuver	495	-	-	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	713	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.3	3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1179	-	606	-	-
HCM Lane V/C Ratio	0.078	-	0.287	-	-
HCM Control Delay (s)	8.3	-	13.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.3	-	1.2	-	-

MOVEMENT SUMMARY

Site: 4 [Franklin Rd / Ashby Rd EPP PM (Site Folder: General)]

Existing plus Project PM
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Franklin Rd														
3	L2	56	3.0	62	3.0	0.303	8.0	LOS A	1.4	35.3	0.61	0.59	0.61	33.0
8	T1	118	3.0	130	3.0	0.303	8.0	LOS A	1.4	35.3	0.61	0.59	0.61	33.0
18	R2	45	3.0	49	3.0	0.303	8.0	LOS A	1.4	35.3	0.61	0.59	0.61	32.0
Approach		219	3.0	241	3.0	0.303	8.0	LOS A	1.4	35.3	0.61	0.59	0.61	32.8
East: Ashby Rd														
1	L2	133	3.0	146	3.0	0.426	10.0	LOS A	2.5	62.7	0.67	0.71	0.80	31.7
6	T1	137	3.0	151	3.0	0.426	10.0	LOS A	2.5	62.7	0.67	0.71	0.80	31.6
16	R2	38	3.0	42	3.0	0.426	10.0	LOS A	2.5	62.7	0.67	0.71	0.80	30.8
Approach		308	3.0	338	3.0	0.426	10.0	LOS A	2.5	62.7	0.67	0.71	0.80	31.5
North: Franklin Rd														
7	L2	47	3.0	52	3.0	0.466	9.6	LOS A	2.9	75.1	0.63	0.60	0.71	32.6
4	T1	164	3.0	180	3.0	0.466	9.6	LOS A	2.9	75.1	0.63	0.60	0.71	32.5
14	R2	180	3.0	198	3.0	0.466	9.6	LOS A	2.9	75.1	0.63	0.60	0.71	31.6
Approach		391	3.0	430	3.0	0.466	9.6	LOS A	2.9	75.1	0.63	0.60	0.71	32.1
West: Ashby Rd														
5	L2	279	3.0	307	3.0	0.549	11.4	LOS B	4.6	118.7	0.70	0.75	0.96	30.6
2	T1	126	3.0	138	3.0	0.549	11.4	LOS B	4.6	118.7	0.70	0.75	0.96	30.6
12	R2	47	3.0	52	3.0	0.549	11.4	LOS B	4.6	118.7	0.70	0.75	0.96	29.8
Approach		452	3.0	497	3.0	0.549	11.4	LOS B	4.6	118.7	0.70	0.75	0.96	30.5
All Vehicles		1370	3.0	1505	3.0	0.549	10.0	LOS B	4.6	118.7	0.66	0.67	0.80	31.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.4	0.2
Total Del/Veh (s)	3.5	2.0	22.7	11.3

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.1	0.0	0.1
Total Del/Veh (s)	4.6	1.1	3.0

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.4	0.2
Total Del/Veh (s)	17.1	11.9	39.0	22.0

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.6	1.5	0.2	0.0	0.4
Total Del/Veh (s)	24.0	25.7	24.8	31.9	26.9

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.1
Total Del/Veh (s)	1.2	2.1	1.7

Total Network Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	45.4

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	64	86	4	396
Average Queue (ft)	8	31	0	139
95th Queue (ft)	37	74	3	331
Link Distance (ft)	786	93	93	981
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	T
Maximum Queue (ft)	98	42
Average Queue (ft)	53	2
95th Queue (ft)	124	19
Link Distance (ft)	93	120
Upstream Blk Time (%)	9	0
Queuing Penalty (veh)	50	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	233	284	769
Average Queue (ft)	107	132	218
95th Queue (ft)	187	236	555
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	135	131	137	191	169	233	221	426
Average Queue (ft)	106	94	52	70	75	123	75	212
95th Queue (ft)	147	142	100	135	140	208	185	405
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	16	8			0	0		2
Queuing Penalty (veh)	40	21			0	1		9
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)				0			0	13
Queuing Penalty (veh)				0			0	11

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	NB
Directions Served	T
Maximum Queue (ft)	18
Average Queue (ft)	2
95th Queue (ft)	23
Link Distance (ft)	730
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 133

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.0	0.4	0.4	0.2
Total Del/Veh (s)	4.1	0.7	2.3	0.4	26.8	22.4	11.3

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	WBT	All
Denied Del/Veh (s)	0.1	0.0	0.1
Total Del/Veh (s)	4.6	1.1	3.0

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.2	0.3	0.0	0.0	0.3	0.4	0.2
Total Del/Veh (s)	19.6	14.7	12.7	8.7	40.1	38.8	22.0

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.6	0.6	0.4	3.8	0.4	0.4	0.1	0.2	0.3	0.0	0.0	0.0
Total Del/Veh (s)	29.4	22.9	14.4	34.6	34.2	15.1	39.6	20.5	13.7	43.2	35.5	25.5

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	26.9

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.3	0.0	0.1
Total Del/Veh (s)	1.2	2.1	1.7

Total Network Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	45.4

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	64	86	4	396
Average Queue (ft)	8	31	0	139
95th Queue (ft)	37	74	3	331
Link Distance (ft)	786	93	93	981
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	T
Maximum Queue (ft)	98	42
Average Queue (ft)	53	2
95th Queue (ft)	124	19
Link Distance (ft)	93	120
Upstream Blk Time (%)	9	0
Queuing Penalty (veh)	50	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	233	284	769
Average Queue (ft)	107	132	218
95th Queue (ft)	187	236	555
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	135	131	137	191	169	233	221	426
Average Queue (ft)	106	94	52	70	75	123	75	212
95th Queue (ft)	147	142	100	135	140	208	185	405
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	16	8			0	0		2
Queuing Penalty (veh)	40	21			0	1		9
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)				0			0	13
Queuing Penalty (veh)				0			0	11

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	NB
Directions Served	T
Maximum Queue (ft)	18
Average Queue (ft)	2
95th Queue (ft)	23
Link Distance (ft)	730
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 133

Intersection	
Int Delay, s/veh	11.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	85	20	345	70	25	415
Future Vol, veh/h	85	20	345	70	25	415
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	105	25	426	86	31	512

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	130	0	1056	118
Stage 1	-	-	-	-	118	-
Stage 2	-	-	-	-	938	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1455	-	250	934
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	381	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1455	-	177	934
Mov Cap-2 Maneuver	-	-	-	-	236	-
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	269	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.1	18.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	800	-	-	1455	-
HCM Lane V/C Ratio	0.679	-	-	0.293	-
HCM Control Delay (s)	18.5	-	-	8.5	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	5.4	-	-	1.2	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	500	0	0	415	0	0
Future Vol, veh/h	500	0	0	415	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	543	0	0	451	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	543	0	994	543
Stage 1	-	-	-	-	543	-
Stage 2	-	-	-	-	451	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1026	-	272	540
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	642	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1026	-	272	540
Mov Cap-2 Maneuver	-	-	-	-	402	-
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	642	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1026	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	383	778	562
v/c Ratio	0.75	0.77	0.80
Control Delay	23.4	17.9	23.8
Queue Delay	0.0	0.0	0.0
Total Delay	23.4	17.9	23.8
Queue Length 50th (ft)	82	174	134
Queue Length 95th (ft)	135	299	#297
Internal Link Dist (ft)	1920	414	1305
Turn Bay Length (ft)			
Base Capacity (vph)	668	1010	699
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.57	0.77	0.80

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



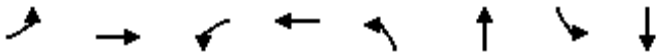
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	145	165	520	110	55	400
Future Volume (veh/h)	145	165	520	110	55	400
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	179	204	642	136	68	494
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	210	239	793	168	111	591
Arrive On Green	0.27	0.27	0.53	0.53	0.53	0.53
Sat Flow, veh/h	779	888	1496	317	62	1116
Grp Volume(v), veh/h	384	0	0	778	562	0
Grp Sat Flow(s),veh/h/ln	1672	0	0	1813	1179	0
Q Serve(g_s), s	11.4	0.0	0.0	18.4	5.9	0.0
Cycle Q Clear(g_c), s	11.4	0.0	0.0	18.4	24.3	0.0
Prop In Lane	0.47	0.53		0.17	0.12	
Lane Grp Cap(c), veh/h	449	0	0	960	702	0
V/C Ratio(X)	0.85	0.00	0.00	0.81	0.80	0.00
Avail Cap(c_a), veh/h	625	0	0	1044	773	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	18.1	0.0	0.0	10.1	9.8	0.0
Incr Delay (d2), s/veh	8.2	0.0	0.0	4.6	5.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	0.0	5.9	3.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.3	0.0	0.0	14.7	15.4	0.0
LnGrp LOS	C	A	A	B	B	A
Approach Vol, veh/h	384		778			562
Approach Delay, s/veh	26.3		14.7			15.4
Approach LOS	C		B			B

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		33.0			33.0	19.1
Change Period (Y+Rc), s		5.4			5.4	5.1
Max Green Setting (Gmax), s		30.0			30.0	19.5
Max Q Clear Time (g_c+I1), s		20.4			26.3	13.4
Green Ext Time (p_c), s		3.6			1.3	0.7

Intersection Summary	
HCM 6th Ctrl Delay	17.5
HCM 6th LOS	B

Notes

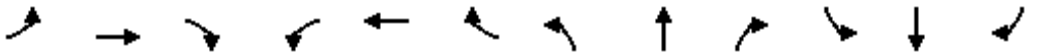
User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	309	308	93	192	142	396	99	574
v/c Ratio	0.85	0.62	0.49	0.61	0.81	0.56	0.59	0.89
Control Delay	58.1	31.2	47.9	26.4	75.5	27.2	55.5	43.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.1	31.2	47.9	26.4	75.5	27.2	55.5	43.4
Queue Length 50th (ft)	165	132	49	49	78	170	53	260
Queue Length 95th (ft)	#307	192	95	94	#179	275	#106	#452
Internal Link Dist (ft)		97		819		245		414
Turn Bay Length (ft)			200				200	
Base Capacity (vph)	365	609	237	510	175	707	179	667
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.51	0.39	0.38	0.81	0.56	0.55	0.86

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	120	130	75	50	105	115	275	45	80	215	250
Future Volume (veh/h)	250	120	130	75	50	105	115	275	45	80	215	250
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	309	148	160	93	62	130	142	340	56	99	265	309
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	345	222	239	120	77	161	174	602	99	126	281	328
Arrive On Green	0.19	0.27	0.27	0.07	0.14	0.14	0.10	0.38	0.38	0.07	0.36	0.36
Sat Flow, veh/h	1781	822	889	1781	538	1129	1781	1566	258	1781	787	918
Grp Volume(v), veh/h	309	0	308	93	0	192	142	0	396	99	0	574
Grp Sat Flow(s),veh/h/ln	1781	0	1710	1781	0	1667	1781	0	1824	1781	0	1705
Q Serve(g_s), s	14.7	0.0	13.9	4.5	0.0	9.7	6.8	0.0	14.8	4.7	0.0	28.3
Cycle Q Clear(g_c), s	14.7	0.0	13.9	4.5	0.0	9.7	6.8	0.0	14.8	4.7	0.0	28.3
Prop In Lane	1.00		0.52	1.00		0.68	1.00		0.14	1.00		0.54
Lane Grp Cap(c), veh/h	345	0	461	120	0	238	174	0	701	126	0	610
V/C Ratio(X)	0.89	0.00	0.67	0.78	0.00	0.81	0.81	0.00	0.56	0.78	0.00	0.94
Avail Cap(c_a), veh/h	372	0	578	243	0	443	179	0	701	183	0	634
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.1	0.0	28.2	39.8	0.0	36.0	38.3	0.0	21.0	39.6	0.0	27.0
Incr Delay (d2), s/veh	22.2	0.0	2.1	10.2	0.0	6.3	23.8	0.0	1.1	12.8	0.0	22.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.1	0.0	5.6	2.2	0.0	4.2	4.0	0.0	6.0	2.4	0.0	14.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.2	0.0	30.3	50.0	0.0	42.3	62.1	0.0	22.0	52.3	0.0	49.0
LnGrp LOS	E	A	C	D	A	D	E	A	C	D	A	D
Approach Vol, veh/h		617			285			538			673	
Approach Delay, s/veh		43.3			44.8			32.6			49.5	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.7	37.8	10.3	27.9	13.0	35.5	21.3	16.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.9	32.0	11.8	29.3	8.7	32.2	18.1	23.0
Max Q Clear Time (g_c+I1), s	6.7	16.8	6.5	15.9	8.8	30.3	16.7	11.7
Green Ext Time (p_c), s	0.0	2.0	0.1	1.4	0.0	0.7	0.1	0.7

Intersection Summary	
HCM 6th Ctrl Delay	42.7
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	434	420	0
Future Vol, veh/h	0	0	0	434	420	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	472	457	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	929	457	457	0	-	0
Stage 1	457	-	-	-	-	-
Stage 2	472	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	297	604	1104	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	628	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	297	604	1104	-	-	-
Mov Cap-2 Maneuver	424	-	-	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	628	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1104	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

MOVEMENT SUMMARY

Site: 4 [Franklin Rd / Ashby Rd Cumulative AM (Site Folder: General)]

Cumulative AM
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Franklin Rd														
3	L2	115	3.0	142	3.0	0.719	19.7	LOS B	8.2	210.7	0.87	1.17	1.71	28.2
8	T1	275	3.0	340	3.0	0.719	19.7	LOS B	8.2	210.7	0.87	1.17	1.71	28.2
18	R2	45	3.0	56	3.0	0.719	19.7	LOS B	8.2	210.7	0.87	1.17	1.71	27.5
Approach		435	3.0	537	3.0	0.719	19.7	LOS B	8.2	210.7	0.87	1.17	1.71	28.1
East: Ashby Rd														
1	L2	75	3.0	93	3.0	0.486	14.3	LOS B	2.8	71.7	0.76	0.87	1.12	30.1
6	T1	50	3.0	62	3.0	0.486	14.3	LOS B	2.8	71.7	0.76	0.87	1.12	30.0
16	R2	105	3.0	130	3.0	0.486	14.3	LOS B	2.8	71.7	0.76	0.87	1.12	29.3
Approach		230	3.0	284	3.0	0.486	14.3	LOS B	2.8	71.7	0.76	0.87	1.12	29.7
North: Franklin Rd														
7	L2	80	3.0	99	3.0	0.670	13.9	LOS B	9.0	231.4	0.76	0.85	1.20	30.6
4	T1	215	3.0	265	3.0	0.670	13.9	LOS B	9.0	231.4	0.76	0.85	1.20	30.6
14	R2	250	3.0	309	3.0	0.670	13.9	LOS B	9.0	231.4	0.76	0.85	1.20	29.8
Approach		545	3.0	673	3.0	0.670	13.9	LOS B	9.0	231.4	0.76	0.85	1.20	30.2
West: Ashby Rd														
5	L2	250	3.0	309	3.0	0.740	19.2	LOS B	10.3	263.8	0.88	1.21	1.74	27.9
2	T1	120	3.0	148	3.0	0.740	19.2	LOS B	10.3	263.8	0.88	1.21	1.74	27.9
12	R2	130	3.0	160	3.0	0.740	19.2	LOS B	10.3	263.8	0.88	1.21	1.74	27.2
Approach		500	3.0	617	3.0	0.740	19.2	LOS B	10.3	263.8	0.88	1.21	1.74	27.7
All Vehicles		1710	3.0	2111	3.0	0.740	17.0	LOS B	10.3	263.8	0.82	1.04	1.48	28.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.2	0.0	542.9	241.6
Total Del/Veh (s)	13.6	2.0	338.5	131.8

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	14.3	1.1	7.8

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	2.0	0.7
Total Del/Veh (s)	26.4	16.6	103.1	46.0

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	1.8	0.2	0.1	0.4
Total Del/Veh (s)	33.4	31.1	45.0	59.3	43.8

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.2
Total Del/Veh (s)	6.9	2.3	4.6

Total Network Performance

Denied Del/Veh (s)	125.6
Total Del/Veh (s)	139.6

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	150	97	1029
Average Queue (ft)	56	38	987
95th Queue (ft)	122	80	1094
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	90
Queuing Penalty (veh)		1	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	T
Maximum Queue (ft)	101	48
Average Queue (ft)	96	2
95th Queue (ft)	100	24
Link Distance (ft)	93	120
Upstream Blk Time (%)	41	0
Queuing Penalty (veh)	284	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	228	407	1033
Average Queue (ft)	103	201	449
95th Queue (ft)	183	354	1000
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)		0	3
Queuing Penalty (veh)		3	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	137	133	205	247	260	258	225	431
Average Queue (ft)	125	91	93	104	165	162	97	364
95th Queue (ft)	138	145	166	191	276	264	244	510
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	46	12			7	2		14
Queuing Penalty (veh)	160	40			19	5		86
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)			0	1			0	45
Queuing Penalty (veh)			0	2			0	27

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	NB
Directions Served	T
Maximum Queue (ft)	254
Average Queue (ft)	41
95th Queue (ft)	226
Link Distance (ft)	730
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 627

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.0	584.4	541.9	241.6
Total Del/Veh (s)	14.2	4.9	2.7	0.5	354.2	338.9	131.8

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	WBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	14.3	1.1	7.8

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.0	3.2	1.9	0.7
Total Del/Veh (s)	28.5	19.9	17.2	13.0	111.0	102.4	46.0

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.2	3.6	0.7	0.6	0.7	0.0	0.0	0.0	0.1	0.1
Total Del/Veh (s)	39.9	35.2	17.5	38.0	40.0	22.1	96.2	24.7	17.9	66.5	63.4	53.9

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	43.8

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.3	0.0	0.2
Total Del/Veh (s)	6.9	2.3	4.6

Total Network Performance

Denied Del/Veh (s)	125.6
Total Del/Veh (s)	139.6

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	150	97	1029
Average Queue (ft)	56	38	987
95th Queue (ft)	122	80	1094
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	90
Queuing Penalty (veh)		1	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB
Directions Served	TR	T
Maximum Queue (ft)	101	48
Average Queue (ft)	96	2
95th Queue (ft)	100	24
Link Distance (ft)	93	120
Upstream Blk Time (%)	41	0
Queuing Penalty (veh)	284	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	228	407	1033
Average Queue (ft)	103	201	449
95th Queue (ft)	183	354	1000
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)		0	3
Queuing Penalty (veh)		3	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	137	133	205	247	260	258	225	431
Average Queue (ft)	125	91	93	104	165	162	97	364
95th Queue (ft)	138	145	166	191	276	264	244	510
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	46	12			7	2		14
Queuing Penalty (veh)	160	40			19	5		86
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)			0	1			0	45
Queuing Penalty (veh)			0	2			0	27

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	NB
Directions Served	T
Maximum Queue (ft)	254
Average Queue (ft)	41
95th Queue (ft)	226
Link Distance (ft)	730
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 627

Intersection	
Int Delay, s/veh	11.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	160	10	340	165	15	530
Future Vol, veh/h	160	10	340	165	15	530
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	176	11	374	181	16	582

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	187	0	1111	182
Stage 1	-	-	-	-	182	-
Stage 2	-	-	-	-	929	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1387	-	231	861
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	385	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1387	-	169	861
Mov Cap-2 Maneuver	-	-	-	-	242	-
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	281	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.8	21.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	804	-	-	1387	-
HCM Lane V/C Ratio	0.745	-	-	0.269	-
HCM Control Delay (s)	21.3	-	-	8.6	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	6.9	-	-	1.1	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	690	0	0	505	0	0
Future Vol, veh/h	690	0	0	505	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	750	0	0	549	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	750	0	1299	750
Stage 1	-	-	-	-	750	-
Stage 2	-	-	-	-	549	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	859	-	178	411
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	579	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	859	-	178	411
Mov Cap-2 Maneuver	-	-	-	-	316	-
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	579	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	859	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	241	983	539
v/c Ratio	0.59	0.93	0.86
Control Delay	22.0	29.4	28.6
Queue Delay	0.0	0.0	0.0
Total Delay	22.0	29.4	28.6
Queue Length 50th (ft)	58	232	119
Queue Length 95th (ft)	114	#580	#353
Internal Link Dist (ft)	1920	414	1305
Turn Bay Length (ft)			
Base Capacity (vph)	667	1059	629
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.36	0.93	0.86

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



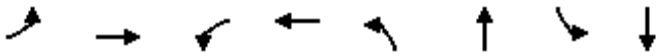
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	165	55	750	145	40	450
Future Volume (veh/h)	165	55	750	145	40	450
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	181	60	824	159	44	495
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	231	77	923	178	98	737
Arrive On Green	0.18	0.18	0.61	0.61	0.61	0.61
Sat Flow, veh/h	1293	429	1523	294	30	1217
Grp Volume(v), veh/h	242	0	0	983	539	0
Grp Sat Flow(s),veh/h/ln	1729	0	0	1817	1247	0
Q Serve(g_s), s	6.5	0.0	0.0	22.6	4.5	0.0
Cycle Q Clear(g_c), s	6.5	0.0	0.0	22.6	27.1	0.0
Prop In Lane	0.75	0.25		0.16	0.08	
Lane Grp Cap(c), veh/h	309	0	0	1101	835	0
V/C Ratio(X)	0.78	0.00	0.00	0.89	0.65	0.00
Avail Cap(c_a), veh/h	693	0	0	1121	852	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.1	0.0	0.0	8.2	6.5	0.0
Incr Delay (d2), s/veh	4.4	0.0	0.0	9.2	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	0.0	7.1	1.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.5	0.0	0.0	17.5	8.2	0.0
LnGrp LOS	C	A	A	B	A	A
Approach Vol, veh/h	242		983			539
Approach Delay, s/veh	23.5		17.5			8.2
Approach LOS	C		B			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		34.9			34.9	13.8
Change Period (Y+Rc), s		5.4			5.4	5.1
Max Green Setting (Gmax), s		30.0			30.0	19.5
Max Q Clear Time (g_c+I1), s		24.6			29.1	8.5
Green Ext Time (p_c), s		3.1			0.3	0.5

Intersection Summary	
HCM 6th Ctrl Delay	15.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

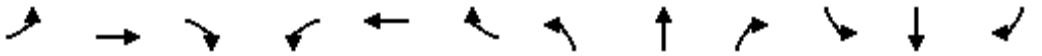


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	434	324	154	247	181	445	66	610
v/c Ratio	1.13	0.72	0.70	0.72	1.08	0.62	0.53	0.97
Control Delay	121.0	33.6	56.3	29.6	134.8	28.2	58.6	58.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	121.0	33.6	56.3	29.6	134.8	28.2	58.6	58.2
Queue Length 50th (ft)	~285	133	83	63	~114	201	37	310
Queue Length 95th (ft)	#538	224	#186	141	#277	361	#98	#626
Internal Link Dist (ft)		97		819		245		414
Turn Bay Length (ft)			200				200	
Base Capacity (vph)	384	621	242	520	167	723	128	629
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.13	0.52	0.64	0.47	1.08	0.62	0.52	0.97

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	395	120	175	140	60	165	165	340	65	60	275	280
Future Volume (veh/h)	395	120	175	140	60	165	165	340	65	60	275	280
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	434	132	192	154	66	181	181	374	71	66	302	308
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	372	192	279	187	77	212	162	574	109	85	282	288
Arrive On Green	0.21	0.28	0.28	0.11	0.17	0.17	0.09	0.38	0.38	0.05	0.33	0.33
Sat Flow, veh/h	1781	689	1002	1781	442	1211	1781	1528	290	1781	849	866
Grp Volume(v), veh/h	434	0	324	154	0	247	181	0	445	66	0	610
Grp Sat Flow(s),veh/h/ln	1781	0	1690	1781	0	1652	1781	0	1818	1781	0	1715
Q Serve(g_s), s	19.5	0.0	16.0	7.9	0.0	13.5	8.5	0.0	18.9	3.4	0.0	31.0
Cycle Q Clear(g_c), s	19.5	0.0	16.0	7.9	0.0	13.5	8.5	0.0	18.9	3.4	0.0	31.0
Prop In Lane	1.00		0.59	1.00		0.73	1.00		0.16	1.00		0.50
Lane Grp Cap(c), veh/h	372	0	471	187	0	289	162	0	683	85	0	570
V/C Ratio(X)	1.17	0.00	0.69	0.82	0.00	0.86	1.12	0.00	0.65	0.78	0.00	1.07
Avail Cap(c_a), veh/h	372	0	547	235	0	407	162	0	683	124	0	570
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.9	0.0	30.0	40.9	0.0	37.4	42.4	0.0	24.1	43.9	0.0	31.2
Incr Delay (d2), s/veh	100.0	0.0	3.0	17.0	0.0	11.9	105.0	0.0	2.2	16.8	0.0	58.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.4	0.0	6.5	4.2	0.0	6.2	8.3	0.0	8.0	1.9	0.0	21.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	136.9	0.0	33.0	57.9	0.0	49.3	147.4	0.0	26.3	60.8	0.0	89.2
LnGrp LOS	F	A	C	E	A	D	F	A	C	E	A	F
Approach Vol, veh/h		758			401			626			676	
Approach Delay, s/veh		92.5			52.6			61.3			86.5	
Approach LOS		F			D			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	39.6	14.3	30.5	13.0	35.5	24.0	20.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	33.0	12.3	30.2	8.5	31.0	19.5	23.0
Max Q Clear Time (g_c+I1), s	5.4	20.9	9.9	18.0	10.5	33.0	21.5	15.5
Green Ext Time (p_c), s	0.0	2.1	0.1	1.5	0.0	0.0	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	76.4
HCM 6th LOS	E

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	570	590	0
Future Vol, veh/h	0	0	0	570	590	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	620	641	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1261	641	641	0	-	0
Stage 1	641	-	-	-	-	-
Stage 2	620	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	188	475	943	-	-	-
Stage 1	525	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	188	475	943	-	-	-
Mov Cap-2 Maneuver	328	-	-	-	-	-
Stage 1	525	-	-	-	-	-
Stage 2	536	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	943	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

MOVEMENT SUMMARY

Site: 4 [Franklin Rd / Ashby Rd Cumulative PM (Site Folder: General)]

Cumulative PM
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Franklin Rd														
3	L2	165	3.0	181	3.0	0.908	39.7	LOS D	17.4	446.5	1.00	1.71	3.08	22.6
8	T1	340	3.0	374	3.0	0.908	39.7	LOS D	17.4	446.5	1.00	1.71	3.08	22.6
18	R2	65	3.0	71	3.0	0.908	39.7	LOS D	17.4	446.5	1.00	1.71	3.08	22.2
Approach		570	3.0	626	3.0	0.908	39.7	LOS D	17.4	446.5	1.00	1.71	3.08	22.5
East: Ashby Rd														
1	L2	140	3.0	154	3.0	0.846	41.2	LOS D	8.7	222.8	0.91	1.38	2.51	22.1
6	T1	60	3.0	66	3.0	0.846	41.2	LOS D	8.7	222.8	0.91	1.38	2.51	22.1
16	R2	165	3.0	181	3.0	0.846	41.2	LOS D	8.7	222.8	0.91	1.38	2.51	21.7
Approach		365	3.0	401	3.0	0.846	41.2	LOS D	8.7	222.8	0.91	1.38	2.51	21.9
North: Franklin Rd														
7	L2	60	3.0	66	3.0	0.758	19.3	LOS B	12.2	312.4	0.89	1.22	1.77	28.6
4	T1	275	3.0	302	3.0	0.758	19.3	LOS B	12.2	312.4	0.89	1.22	1.77	28.6
14	R2	280	3.0	308	3.0	0.758	19.3	LOS B	12.2	312.4	0.89	1.22	1.77	27.9
Approach		615	3.0	676	3.0	0.758	19.3	LOS B	12.2	312.4	0.89	1.22	1.77	28.3
West: Ashby Rd														
5	L2	395	3.0	434	3.0	0.970	48.1	LOS D	28.5	728.6	1.00	2.02	3.77	20.6
2	T1	120	3.0	132	3.0	0.970	48.1	LOS D	28.5	728.6	1.00	2.02	3.77	20.6
12	R2	175	3.0	192	3.0	0.970	48.1	LOS D	28.5	728.6	1.00	2.02	3.77	20.2
Approach		690	3.0	758	3.0	0.970	48.1	LOS D	28.5	728.6	1.00	2.02	3.77	20.5
All Vehicles		2240	3.0	2462	3.0	0.970	36.9	LOS D	28.5	728.6	0.95	1.62	2.84	23.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.2	0.0	17.3	7.7
Total Del/Veh (s)	7.3	2.0	143.2	65.3

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.3	0.0	0.2	0.2
Total Del/Veh (s)	10.5	1.4	68.8	12.8

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	1.4	0.5
Total Del/Veh (s)	25.4	15.2	100.2	44.9

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.9	1.8	0.2	0.0	0.6
Total Del/Veh (s)	28.7	31.0	28.0	43.1	33.3

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.2	0.3	0.0	0.1
Total Del/Veh (s)	16.3	2.1	3.0	4.4

Total Network Performance

Denied Del/Veh (s)	4.1
Total Del/Veh (s)	86.1

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	94	91	956
Average Queue (ft)	23	34	547
95th Queue (ft)	66	75	1121
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	22
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	101	52	32	222
Average Queue (ft)	88	12	1	91
95th Queue (ft)	127	40	19	205
Link Distance (ft)	93	120	120	454
Upstream Blk Time (%)	30		0	
Queuing Penalty (veh)	160		0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	340	352	1111
Average Queue (ft)	136	165	437
95th Queue (ft)	280	293	1072
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)		0	3
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	138	134	171	158	189	258	225	428
Average Queue (ft)	121	98	71	77	92	136	92	282
95th Queue (ft)	143	148	134	138	168	227	218	483
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	38	12			0	1		6
Queuing Penalty (veh)	107	33			0	1		36
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)			0	0				26
Queuing Penalty (veh)			0	0				21

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	NB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	163	62	40	20
Average Queue (ft)	61	24	3	1
95th Queue (ft)	117	53	39	11
Link Distance (ft)	384	730	730	255
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 359

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.0	16.3	17.4	7.7
Total Del/Veh (s)	8.4	2.4	2.4	0.5	146.8	143.0	65.3

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.3	0.3	0.0	0.0	0.2	0.2	0.2
Total Del/Veh (s)	10.6	8.3	4.8	1.1	62.4	71.3	12.8

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.3	0.3	0.0	0.0	1.7	1.4	0.5
Total Del/Veh (s)	28.5	22.3	16.1	11.9	99.2	100.1	44.9

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.9	0.8	0.7	3.7	0.5	0.5	0.2	0.2	0.5	0.0	0.0	0.0
Total Del/Veh (s)	36.7	25.5	15.3	40.1	38.5	18.0	49.3	21.6	14.6	54.4	46.4	36.9

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	0.6
Total Del/Veh (s)	33.3

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.2	0.2	0.3	0.0	0.0	0.1
Total Del/Veh (s)	20.8	12.8	4.6	1.6	3.3	1.7	4.4

Total Network Performance

Denied Del/Veh (s)	4.1
Total Del/Veh (s)	86.1

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	94	91	956
Average Queue (ft)	23	34	547
95th Queue (ft)	66	75	1121
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	22
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	101	52	32	222
Average Queue (ft)	88	12	1	91
95th Queue (ft)	127	40	19	205
Link Distance (ft)	93	120	120	454
Upstream Blk Time (%)	30		0	
Queuing Penalty (veh)	160		0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	340	352	1111
Average Queue (ft)	136	165	437
95th Queue (ft)	280	293	1072
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)		0	3
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	138	134	171	158	189	258	225	428
Average Queue (ft)	121	98	71	77	92	136	92	282
95th Queue (ft)	143	148	134	138	168	227	218	483
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	38	12			0	1		6
Queuing Penalty (veh)	107	33			0	1		36
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)			0	0				26
Queuing Penalty (veh)			0	0				21

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	NB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	163	62	40	20
Average Queue (ft)	61	24	3	1
95th Queue (ft)	117	53	39	11
Link Distance (ft)	384	730	730	255
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 359

Intersection	
Int Delay, s/veh	12.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	97	20	363	82	25	434
Future Vol, veh/h	97	20	363	82	25	434
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	120	25	448	101	31	536

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	145	0	1130	133
Stage 1	-	-	-	-	133	-
Stage 2	-	-	-	-	997	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1437	-	225	916
Stage 1	-	-	-	-	893	-
Stage 2	-	-	-	-	357	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1437	-	155	916
Mov Cap-2 Maneuver	-	-	-	-	215	-
Stage 1	-	-	-	-	893	-
Stage 2	-	-	-	-	246	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7	21
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	778	-	-	1437	-
HCM Lane V/C Ratio	0.728	-	-	0.312	-
HCM Control Delay (s)	21	-	-	8.6	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	6.5	-	-	1.3	-

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	481	50	39	404	41	78
Future Vol, veh/h	481	50	39	404	41	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	523	54	42	439	45	85

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	577	0	1073	550
Stage 1	-	-	-	-	550	-
Stage 2	-	-	-	-	523	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	996	-	244	535
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	595	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	996	-	234	535
Mov Cap-2 Maneuver	-	-	-	-	369	-
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	570	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	15.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	463	-	-	996	-
HCM Lane V/C Ratio	0.279	-	-	0.043	-
HCM Control Delay (s)	15.8	-	-	8.8	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1.1	-	-	0.1	-



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	421	852	600
v/c Ratio	0.79	0.87	1.10
Control Delay	26.8	24.8	87.7
Queue Delay	0.0	0.0	0.0
Total Delay	26.8	24.8	87.7
Queue Length 50th (ft)	103	230	~248
Queue Length 95th (ft)	161	#408	#376
Internal Link Dist (ft)	1920	414	1305
Turn Bay Length (ft)			
Base Capacity (vph)	645	983	547
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.65	0.87	1.10

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



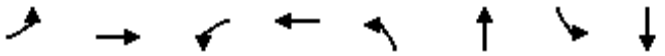
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	176	165	550	140	55	431
Future Volume (veh/h)	176	165	550	140	55	431
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	217	204	679	173	68	532
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	246	231	762	194	90	487
Arrive On Green	0.28	0.28	0.53	0.53	0.53	0.53
Sat Flow, veh/h	864	813	1438	366	36	919
Grp Volume(v), veh/h	422	0	0	852	600	0
Grp Sat Flow(s),veh/h/ln	1681	0	0	1804	955	0
Q Serve(g_s), s	13.6	0.0	0.0	23.8	6.2	0.0
Cycle Q Clear(g_c), s	13.6	0.0	0.0	23.8	30.0	0.0
Prop In Lane	0.51	0.48		0.20	0.11	
Lane Grp Cap(c), veh/h	479	0	0	956	577	0
V/C Ratio(X)	0.88	0.00	0.00	0.89	1.04	0.00
Avail Cap(c_a), veh/h	579	0	0	956	577	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.3	0.0	0.0	11.9	12.8	0.0
Incr Delay (d2), s/veh	12.9	0.0	0.0	10.5	48.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	0.0	0.0	9.4	11.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.3	0.0	0.0	22.4	61.2	0.0
LnGrp LOS	C	A	A	C	F	A
Approach Vol, veh/h	422		852			600
Approach Delay, s/veh	32.3		22.4			61.2
Approach LOS	C		C			E

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		35.4			35.4	21.2
Change Period (Y+Rc), s		5.4			5.4	5.1
Max Green Setting (Gmax), s		30.0			30.0	19.5
Max Q Clear Time (g_c+I1), s		25.8			32.0	15.6
Green Ext Time (p_c), s		2.2			0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	37.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

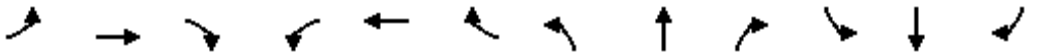


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	352	333	133	189	159	440	99	650
v/c Ratio	1.03	0.77	0.67	0.56	0.96	0.61	0.60	0.98
Control Delay	95.5	39.7	57.2	23.0	104.8	28.8	57.6	59.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.5	39.7	57.2	23.0	104.8	28.8	57.6	59.7
Queue Length 50th (ft)	~219	154	74	45	93	205	55	341
Queue Length 95th (ft)	#374	212	#133	89	#205	307	#106	#550
Internal Link Dist (ft)		97		819		245		414
Turn Bay Length (ft)			200				200	
Base Capacity (vph)	342	593	217	501	166	718	173	662
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.56	0.61	0.38	0.96	0.61	0.57	0.98

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	285	134	136	108	48	105	129	296	61	80	262	265
Future Volume (veh/h)	285	134	136	108	48	105	129	296	61	80	262	265
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	352	165	168	133	59	130	159	365	75	99	323	327
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	348	206	210	165	73	161	169	591	121	126	314	318
Arrive On Green	0.20	0.24	0.24	0.09	0.14	0.14	0.09	0.39	0.39	0.07	0.37	0.37
Sat Flow, veh/h	1781	850	865	1781	520	1145	1781	1505	309	1781	852	863
Grp Volume(v), veh/h	352	0	333	133	0	189	159	0	440	99	0	650
Grp Sat Flow(s),veh/h/ln	1781	0	1715	1781	0	1664	1781	0	1815	1781	0	1715
Q Serve(g_s), s	17.5	0.0	16.3	6.6	0.0	9.9	7.9	0.0	17.4	4.9	0.0	33.0
Cycle Q Clear(g_c), s	17.5	0.0	16.3	6.6	0.0	9.9	7.9	0.0	17.4	4.9	0.0	33.0
Prop In Lane	1.00		0.50	1.00		0.69	1.00		0.17	1.00		0.50
Lane Grp Cap(c), veh/h	348	0	416	165	0	234	169	0	712	126	0	632
V/C Ratio(X)	1.01	0.00	0.80	0.80	0.00	0.81	0.94	0.00	0.62	0.78	0.00	1.03
Avail Cap(c_a), veh/h	348	0	563	221	0	427	169	0	712	177	0	632
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.0	0.0	31.9	39.8	0.0	37.3	40.3	0.0	21.8	40.9	0.0	28.3
Incr Delay (d2), s/veh	51.1	0.0	5.8	14.5	0.0	6.6	51.9	0.0	1.6	14.0	0.0	43.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.2	0.0	7.1	3.4	0.0	4.3	5.8	0.0	7.2	2.6	0.0	20.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	87.2	0.0	37.7	54.3	0.0	43.9	92.2	0.0	23.4	55.0	0.0	71.6
LnGrp LOS	F	A	D	D	A	D	F	A	C	D	A	F
Approach Vol, veh/h		685			322			599			749	
Approach Delay, s/veh		63.1			48.2			41.7			69.4	
Approach LOS		E			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	39.7	12.8	26.3	13.0	37.5	22.0	17.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.9	32.6	11.1	29.4	8.5	33.0	17.5	23.0
Max Q Clear Time (g_c+I1), s	6.9	19.4	8.6	18.3	9.9	35.0	19.5	11.9
Green Ext Time (p_c), s	0.0	2.1	0.1	1.4	0.0	0.0	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	57.6
HCM 6th LOS	E

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	65	97	95	421	404	101
Future Vol, veh/h	65	97	95	421	404	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	71	105	103	458	439	110

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1158	494	549	0	-	0
Stage 1	494	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	217	575	1021	-	-	-
Stage 1	613	-	-	-	-	-
Stage 2	512	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	195	575	1021	-	-	-
Mov Cap-2 Maneuver	331	-	-	-	-	-
Stage 1	551	-	-	-	-	-
Stage 2	512	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.3	1.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1021	-	444	-	-
HCM Lane V/C Ratio	0.101	-	0.397	-	-
HCM Control Delay (s)	8.9	-	18.3	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.3	-	1.9	-	-

MOVEMENT SUMMARY

Site: 4 [Franklin Rd / Ashby Rd CPP AM (Site Folder: General)]

Cumulative plus Project AM
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Franklin Rd														
3	L2	129	3.0	159	3.0	0.855	32.0	LOS C	13.8	353.5	0.97	1.53	2.57	24.5
8	T1	296	3.0	365	3.0	0.855	32.0	LOS C	13.8	353.5	0.97	1.53	2.57	24.5
18	R2	61	3.0	75	3.0	0.855	32.0	LOS C	13.8	353.5	0.97	1.53	2.57	24.0
Approach		486	3.0	600	3.0	0.855	32.0	LOS C	13.8	353.5	0.97	1.53	2.57	24.4
East: Ashby Rd														
1	L2	108	3.0	133	3.0	0.604	19.5	LOS B	4.0	102.5	0.81	1.00	1.43	28.0
6	T1	48	3.0	59	3.0	0.604	19.5	LOS B	4.0	102.5	0.81	1.00	1.43	27.9
16	R2	105	3.0	130	3.0	0.604	19.5	LOS B	4.0	102.5	0.81	1.00	1.43	27.3
Approach		261	3.0	322	3.0	0.604	19.5	LOS B	4.0	102.5	0.81	1.00	1.43	27.7
North: Franklin Rd														
7	L2	80	3.0	99	3.0	0.792	20.5	LOS C	15.6	400.0	0.92	1.27	1.90	28.1
4	T1	262	3.0	323	3.0	0.792	20.5	LOS C	15.6	400.0	0.92	1.27	1.90	28.1
14	R2	265	3.0	327	3.0	0.792	20.5	LOS C	15.6	400.0	0.92	1.27	1.90	27.4
Approach		607	3.0	749	3.0	0.792	20.5	LOS C	15.6	400.0	0.92	1.27	1.90	27.8
West: Ashby Rd														
5	L2	285	3.0	352	3.0	0.914	38.4	LOS D	20.1	514.6	1.00	1.75	3.10	22.6
2	T1	134	3.0	165	3.0	0.914	38.4	LOS D	20.1	514.6	1.00	1.75	3.10	22.6
12	R2	136	3.0	168	3.0	0.914	38.4	LOS D	20.1	514.6	1.00	1.75	3.10	22.2
Approach		555	3.0	685	3.0	0.914	38.4	LOS D	20.1	514.6	1.00	1.75	3.10	22.5
All Vehicles		1909	3.0	2357	3.0	0.914	28.5	LOS C	20.1	514.6	0.94	1.44	2.35	25.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.2	0.0	755.5	339.5
Total Del/Veh (s)	16.0	2.0	405.7	141.3

2: PROJECT DWY & ASHBY RD Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.2	0.0	46.6	5.0
Total Del/Veh (s)	16.9	1.2	315.7	42.9

3: FRANKLIN RD & LOBO AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	29.6	9.6
Total Del/Veh (s)	33.1	18.2	178.3	72.2

4: ASHBY RD & FRANKLIN RD Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	2.0	1.1	0.0	0.7
Total Del/Veh (s)	35.1	31.0	58.3	62.8	49.1

5: FRANKLIN RD & PROJECT DWY Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.2	8.0	0.0	3.6
Total Del/Veh (s)	64.1	42.2	3.2	27.8

Total Network Performance

Denied Del/Veh (s)	161.6
Total Del/Veh (s)	171.3

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	164	87	1036
Average Queue (ft)	62	34	992
95th Queue (ft)	132	73	1065
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	93
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	102	47	42	414
Average Queue (ft)	96	7	2	286
95th Queue (ft)	100	30	18	547
Link Distance (ft)	93	120	120	454
Upstream Blk Time (%)	46			23
Queuing Penalty (veh)	330			0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	288	423	1166
Average Queue (ft)	128	219	710
95th Queue (ft)	235	378	1450
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)		0	15
Queuing Penalty (veh)		5	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	137	134	210	227	271	269	225	431
Average Queue (ft)	124	92	107	97	204	168	103	388
95th Queue (ft)	136	146	181	181	319	296	252	491
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	53	13			26	5		18
Queuing Penalty (veh)	196	49			82	17		118
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)			1	0			0	51
Queuing Penalty (veh)			2	1			0	30

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	NB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	325	326	572	23
Average Queue (ft)	122	128	221	1
95th Queue (ft)	270	536	694	12
Link Distance (ft)	384	730	730	255
Upstream Blk Time (%)	0	9	12	
Queuing Penalty (veh)	0	0	0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 830

1: FRANKLIN RD OVERCROSSING & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.0	753.8	755.5	339.5
Total Del/Veh (s)	16.4	7.7	2.7	0.5	395.3	404.8	141.3

2: PROJECT DWY & ASHBY RD Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.0	50.3	44.8	5.0
Total Del/Veh (s)	17.5	11.1	4.1	1.0	309.7	318.4	42.9

3: FRANKLIN RD & LOBO AVE Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.0	38.3	28.9	9.6
Total Del/Veh (s)	34.7	27.5	19.1	14.3	208.5	175.4	72.2

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.1	3.6	0.7	0.6	2.2	0.8	0.0	0.0	0.0	0.0
Total Del/Veh (s)	41.6	35.2	19.6	38.1	40.2	20.7	132.9	27.6	20.4	71.8	67.2	56.1

4: ASHBY RD & FRANKLIN RD Performance by movement

Movement	All
Denied Del/Veh (s)	0.7
Total Del/Veh (s)	49.1

5: FRANKLIN RD & PROJECT DWY Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.2	7.8	8.0	0.0	0.0	3.6
Total Del/Veh (s)	72.0	59.3	10.2	46.8	3.4	1.9	27.8

Total Network Performance

Denied Del/Veh (s)	161.6
Total Del/Veh (s)	171.3

Intersection: 1: FRANKLIN RD OVERCROSSING & ASHBY RD

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	164	87	1036
Average Queue (ft)	62	34	992
95th Queue (ft)	132	73	1065
Link Distance (ft)	786	93	981
Upstream Blk Time (%)		0	93
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: PROJECT DWY & ASHBY RD

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	102	47	42	414
Average Queue (ft)	96	7	2	286
95th Queue (ft)	100	30	18	547
Link Distance (ft)	93	120	120	454
Upstream Blk Time (%)	46			23
Queuing Penalty (veh)	330			0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: FRANKLIN RD & LOBO AVE

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	288	423	1166
Average Queue (ft)	128	219	710
95th Queue (ft)	235	378	1450
Link Distance (ft)	1966	415	1362
Upstream Blk Time (%)		0	15
Queuing Penalty (veh)		5	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: ASHBY RD & FRANKLIN RD

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	137	134	210	227	271	269	225	431
Average Queue (ft)	124	92	107	97	204	168	103	388
95th Queue (ft)	136	146	181	181	319	296	252	491
Link Distance (ft)	120	120		864	255	255		415
Upstream Blk Time (%)	53	13			26	5		18
Queuing Penalty (veh)	196	49			82	17		118
Storage Bay Dist (ft)			200				200	
Storage Blk Time (%)			1	0			0	51
Queuing Penalty (veh)			2	1			0	30

Intersection: 5: FRANKLIN RD & PROJECT DWY

Movement	EB	NB	NB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	325	326	572	23
Average Queue (ft)	122	128	221	1
95th Queue (ft)	270	536	694	12
Link Distance (ft)	384	730	730	255
Upstream Blk Time (%)	0	9	12	
Queuing Penalty (veh)	0	0	0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 830

Intersection	
Int Delay, s/veh	13.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	172	10	358	177	15	548
Future Vol, veh/h	172	10	358	177	15	548
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	189	11	393	195	16	602

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	200	0	1176	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	981	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1372	-	211	846
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	363	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1372	-	151	846
Mov Cap-2 Maneuver	-	-	-	-	223	-
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	259	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.8	24.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	787	-	-	1372	-
HCM Lane V/C Ratio	0.786	-	-	0.287	-
HCM Control Delay (s)	24.2	-	-	8.7	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	8	-	-	1.2	-

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	660	61	29	496	39	81
Future Vol, veh/h	660	61	29	496	39	81
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	717	66	32	539	42	88

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	783	0	1353	750
Stage 1	-	-	-	-	750	-
Stage 2	-	-	-	-	603	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	835	-	165	411
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	546	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	835	-	159	411
Mov Cap-2 Maneuver	-	-	-	-	298	-
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	525	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	20.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	366	-	-	835	-
HCM Lane V/C Ratio	0.356	-	-	0.038	-
HCM Control Delay (s)	20.2	-	-	9.5	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1.6	-	-	0.1	-



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	274	1049	571
v/c Ratio	0.63	1.02	1.31
Control Delay	23.1	48.5	173.2
Queue Delay	0.0	0.0	0.0
Total Delay	23.1	48.5	173.2
Queue Length 50th (ft)	70	~302	~242
Queue Length 95th (ft)	131	#665	#329
Internal Link Dist (ft)	1920	414	1305
Turn Bay Length (ft)			
Base Capacity (vph)	651	1033	437
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.42	1.02	1.31

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



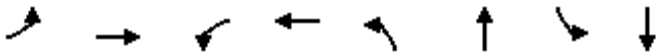
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	195	55	780	175	40	480
Future Volume (veh/h)	195	55	780	175	40	480
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	214	60	857	192	44	527
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	267	75	879	197	81	566
Arrive On Green	0.20	0.20	0.59	0.59	0.59	0.59
Sat Flow, veh/h	1350	378	1479	331	7	952
Grp Volume(v), veh/h	275	0	0	1049	571	0
Grp Sat Flow(s),veh/h/ln	1735	0	0	1811	960	0
Q Serve(g_s), s	7.6	0.0	0.0	28.2	1.8	0.0
Cycle Q Clear(g_c), s	7.6	0.0	0.0	28.2	30.0	0.0
Prop In Lane	0.78	0.22		0.18	0.08	
Lane Grp Cap(c), veh/h	343	0	0	1076	647	0
V/C Ratio(X)	0.80	0.00	0.00	0.98	0.88	0.00
Avail Cap(c_a), veh/h	670	0	0	1076	647	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.3	0.0	0.0	9.9	11.1	0.0
Incr Delay (d2), s/veh	4.3	0.0	0.0	21.5	13.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	0.0	12.3	5.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.6	0.0	0.0	31.4	24.6	0.0
LnGrp LOS	C	A	A	C	C	A
Approach Vol, veh/h	275		1049			571
Approach Delay, s/veh	23.6		31.4			24.6
Approach LOS	C		C			C

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		35.4			35.4	15.1
Change Period (Y+Rc), s		5.4			5.4	5.1
Max Green Setting (Gmax), s		30.0			30.0	19.5
Max Q Clear Time (g_c+I1), s		30.2			32.0	9.6
Green Ext Time (p_c), s		0.0			0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	28.3
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

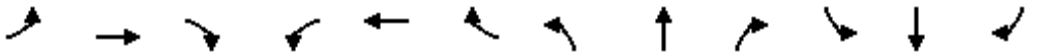


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	471	343	197	235	198	491	66	676
v/c Ratio	1.33	0.80	0.77	0.58	1.21	0.68	0.55	1.07
Control Delay	198.7	42.1	60.2	18.5	179.9	30.8	62.6	86.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	198.7	42.1	60.2	18.5	179.9	30.8	62.6	86.2
Queue Length 50th (ft)	~370	157	113	40	~147	244	39	~436
Queue Length 95th (ft)	#605	258	#232	110	#304	#414	#100	#714
Internal Link Dist (ft)		97		819		245		414
Turn Bay Length (ft)			200				200	
Base Capacity (vph)	355	545	278	528	163	726	121	631
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.33	0.63	0.71	0.45	1.21	0.68	0.55	1.07

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	429	132	180	179	49	165	180	365	82	60	322	293
Future Volume (veh/h)	429	132	180	179	49	165	180	365	82	60	322	293
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	471	145	198	197	54	181	198	401	90	66	354	322
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	356	171	233	232	64	213	163	576	129	85	312	283
Arrive On Green	0.20	0.24	0.24	0.13	0.17	0.17	0.09	0.39	0.39	0.05	0.35	0.35
Sat Flow, veh/h	1781	716	978	1781	377	1265	1781	1479	332	1781	902	821
Grp Volume(v), veh/h	471	0	343	197	0	235	198	0	491	66	0	676
Grp Sat Flow(s),veh/h/ln	1781	0	1694	1781	0	1643	1781	0	1811	1781	0	1723
Q Serve(g_s), s	18.5	0.0	17.9	10.0	0.0	12.9	8.5	0.0	21.0	3.4	0.0	32.0
Cycle Q Clear(g_c), s	18.5	0.0	17.9	10.0	0.0	12.9	8.5	0.0	21.0	3.4	0.0	32.0
Prop In Lane	1.00		0.58	1.00		0.77	1.00		0.18	1.00		0.48
Lane Grp Cap(c), veh/h	356	0	404	232	0	277	163	0	705	85	0	595
V/C Ratio(X)	1.32	0.00	0.85	0.85	0.00	0.85	1.21	0.00	0.70	0.78	0.00	1.14
Avail Cap(c_a), veh/h	356	0	494	279	0	408	163	0	705	121	0	595
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.1	0.0	33.7	39.4	0.0	37.3	42.1	0.0	23.7	43.6	0.0	30.3
Incr Delay (d2), s/veh	164.1	0.0	11.3	18.5	0.0	10.5	138.4	0.0	3.0	18.0	0.0	80.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	23.9	0.0	8.2	5.4	0.0	5.8	9.9	0.0	8.9	1.9	0.0	25.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	201.2	0.0	45.0	57.9	0.0	47.9	180.5	0.0	26.7	61.6	0.0	110.7
LnGrp LOS	F	A	D	E	A	D	F	A	C	E	A	F
Approach Vol, veh/h		814			432			689			742	
Approach Delay, s/veh		135.4			52.4			70.9			106.3	
Approach LOS		F			D			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	40.6	16.6	26.6	13.0	36.5	23.0	20.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.3	34.2	14.5	27.0	8.5	32.0	18.5	23.0
Max Q Clear Time (g_c+I1), s	5.4	23.0	12.0	19.9	10.5	34.0	20.5	14.9
Green Ext Time (p_c), s	0.0	2.2	0.1	1.1	0.0	0.0	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	97.3
HCM 6th LOS	F

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	66	94	85	561	572	108
Future Vol, veh/h	66	94	85	561	572	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	72	102	92	610	622	117

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1475	681	739	0	-	0
Stage 1	681	-	-	-	-	-
Stage 2	794	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	139	450	867	-	-	-
Stage 1	503	-	-	-	-	-
Stage 2	445	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	124	450	867	-	-	-
Mov Cap-2 Maneuver	261	-	-	-	-	-
Stage 1	450	-	-	-	-	-
Stage 2	445	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.5	1.3	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	867	-	346	-	-
HCM Lane V/C Ratio	0.107	-	0.503	-	-
HCM Control Delay (s)	9.6	-	25.5	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0.4	-	2.7	-	-

MOVEMENT SUMMARY

Site: 4 [Franklin Rd / Ashby Rd CPP PM (Site Folder: General)]

Cumulative plus Project PM
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Franklin Rd														
3	L2	180	3.0	198	3.0	0.969	50.5	LOS D	24.8	635.2	1.00	1.98	3.82	20.4
8	T1	365	3.0	401	3.0	0.969	50.5	LOS D	24.8	635.2	1.00	1.98	3.82	20.4
18	R2	82	3.0	90	3.0	0.969	50.5	LOS D	24.8	635.2	1.00	1.98	3.82	20.1
Approach		627	3.0	689	3.0	0.969	50.5	LOS D	24.8	635.2	1.00	1.98	3.82	20.4
East: Ashby Rd														
1	L2	179	3.0	197	3.0	0.930	55.8	LOS E	12.5	320.7	0.95	1.65	3.32	19.3
6	T1	49	3.0	54	3.0	0.930	55.8	LOS E	12.5	320.7	0.95	1.65	3.32	19.3
16	R2	165	3.0	181	3.0	0.930	55.8	LOS E	12.5	320.7	0.95	1.65	3.32	19.0
Approach		393	3.0	432	3.0	0.930	55.8	LOS E	12.5	320.7	0.95	1.65	3.32	19.2
North: Franklin Rd														
7	L2	60	3.0	66	3.0	0.874	29.9	LOS C	19.8	506.1	1.00	1.63	2.63	25.2
4	T1	322	3.0	354	3.0	0.874	29.9	LOS C	19.8	506.1	1.00	1.63	2.63	25.2
14	R2	293	3.0	322	3.0	0.874	29.9	LOS C	19.8	506.1	1.00	1.63	2.63	24.7
Approach		675	3.0	742	3.0	0.874	29.9	LOS C	19.8	506.1	1.00	1.63	2.63	25.0
West: Ashby Rd														
5	L2	429	3.0	471	3.0	1.155	107.0	LOS F	55.3	1416.9	1.00	3.13	7.17	13.5
2	T1	132	3.0	145	3.0	1.155	107.0	LOS F	55.3	1416.9	1.00	3.13	7.17	13.5
12	R2	180	3.0	198	3.0	1.155	107.0	LOS F	55.3	1416.9	1.00	3.13	7.17	13.3
Approach		741	3.0	814	3.0	1.155	107.0	LOS F	55.3	1416.9	1.00	3.13	7.17	13.4
All Vehicles		2436	3.0	2677	3.0	1.155	62.8	LOS E	55.3	1416.9	0.99	2.18	4.43	18.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

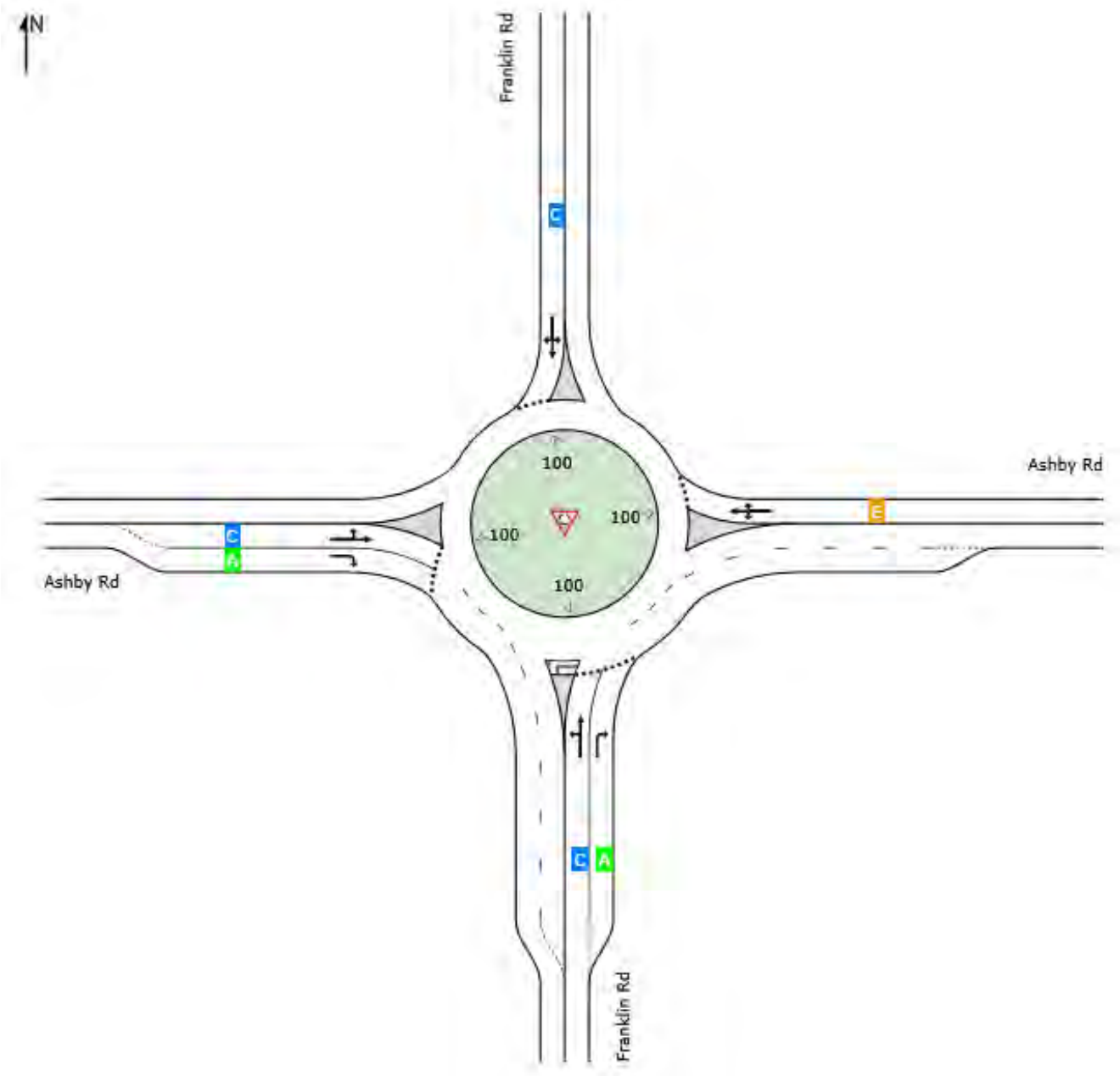
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 4 [Franklin Rd / Ashby Rd CPP PM - MIT (Site Folder: General)]

Mitigated Cumulative plus Project PM
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	E	C	B	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

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MOVEMENT SUMMARY

Site: 4 [Franklin Rd / Ashby Rd CPP PM - MIT (Site Folder: General)]

Mitigated Cumulative plus Project PM
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Franklin Rd														
3	L2	180	3.0	198	3.0	0.824	27.8	LOS C	11.3	289.5	0.92	1.40	2.33	25.6
8	T1	365	3.0	401	3.0	0.824	27.8	LOS C	11.3	289.5	0.92	1.40	2.33	25.6
18	R2	82	3.0	90	3.0	0.124	9.4	LOS A	0.5	11.7	0.57	0.55	0.57	33.3
Approach		627	3.0	689	3.0	0.824	25.4	LOS C	11.3	289.5	0.88	1.29	2.10	26.4
East: Ashby Rd														
1	L2	179	3.0	197	3.0	0.992	76.3	LOS E	16.1	413.4	0.98	1.89	4.14	16.9
6	T1	49	3.0	54	3.0	0.992	72.3	LOS E	16.1	413.4	0.98	1.89	4.14	16.9
16	R2	165	3.0	181	3.0	0.992	72.3	LOS E	16.1	413.4	0.98	1.89	4.14	16.7
Approach		393	3.0	432	3.0	0.992	74.1	LOS E	16.1	413.4	0.98	1.89	4.14	16.8
North: Franklin Rd														
7	L2	60	3.0	66	3.0	0.875	30.1	LOS C	19.8	507.4	1.00	1.63	2.63	25.2
4	T1	322	3.0	354	3.0	0.875	30.1	LOS C	19.8	507.4	1.00	1.63	2.63	25.2
14	R2	293	3.0	322	3.0	0.875	30.1	LOS C	19.8	507.4	1.00	1.63	2.63	24.6
Approach		675	3.0	742	3.0	0.875	30.1	LOS C	19.8	507.4	1.00	1.63	2.63	24.9
West: Ashby Rd														
5	L2	429	3.0	471	3.0	0.797	24.2	LOS C	10.9	278.4	0.90	1.33	2.13	26.0
2	T1	132	3.0	145	3.0	0.797	27.3	LOS C	10.9	278.4	0.90	1.33	2.13	26.0
12	R2	180	3.0	198	3.0	0.256	7.5	LOS A	1.0	26.4	0.59	0.59	0.59	32.6
Approach		741	3.0	814	3.0	0.797	20.7	LOS C	10.9	278.4	0.83	1.15	1.76	27.3
All Vehicles		2436	3.0	2677	3.0	0.992	33.1	LOS C	19.8	507.4	0.91	1.44	2.47	24.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
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Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.