# Exhibit F-3
# Draft Environmental Impact Report
# Appendices Volume 2: J-M

**PUBLIC REVIEW DRAFT**

# ENVIRONMENTAL IMPACT REPORT

# TECHNICAL APPENDICES – VOLUME II – APPENDICES J – M

**2740 WEST NIELSEN AVENUE OFFICE/WAREHOUSE PROJECT**

**FRESNO, CALIFORNIA**

LSA

February 2023

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J: PHASE II ENVIRONMENTAL SITE ASSESSMENT

K: WATER SUPPLY ASSESSMENT

L: NOISE IMPACT ANALYSIS MEMORANDUM

M: TRAFFIC IMPACT STUDY

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# APPENDIX J

# PHASE II ENVIRONMENTAL SITE ASSESSMENT

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SALEM
engineering group, inc.

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February 3, 2021 **Job No. 1-420-1016**

Mr. Jake Kurth
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**Subject:** **PHASE II ENVIRONMENTAL SITE ASSESSMENT**
FORMER CALIFORNIA COMPRESS FACILITY
2740 WEST NIELSON AVENUE
FRESNO, CALIFORNIA

Dear Mr. Kurth:

At your request and authorization, SALEM Engineering Group, Inc. (SALEM) has prepared this Phase II Environmental Site Assessment (ESA) for the Former California Compress Facility property located at 2740 West Nielson Avenue in Fresno, California.

We appreciate the opportunity to assist you with this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (559) 271-9700.

Respectfully submitted,

**SALEM Engineering Group, Inc.**

Shannon Lodge, PG, QSD
Senior Project Manager

GEOTECHNICAL • ENVIRONMENTAL • GEOLOGY • MATERIALS TESTING & INSPECTION • FORENSIC • LABORATORY

SALEM
engineering group, inc.

# PHASE II ENVIRONMENTAL SITE ASSESSMENT

**FORMER CALIFORNIA COMPRESS FACILITY**
**2740 WEST NIELSON AVENUE**
**FRESNO, CALIFORNIA**

**SALEM PROJECT NO. 1-420-1016**
**FEBRUARY 3, 2021**

***PREPARED FOR:***

**MR. JAKE KURTH**
**SCANNELL PROPERTIES**
**294 GROVE LANE EAST, SUITE 140**
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February 3, 2021 **Job No. 1-420-1016**

**PHASE II ENVIRONMENTAL SITE ASSESSMENT**

**FORMER CALIFORNIA COMPRESS FACILITY**
**2740 WEST NIELSON AVENUE**
**FRESNO, CALIFORNIA**

## 1.0 EXECUTIVE SUMMARY

Salem Engineering Group, Inc. (SALEM) performed a Phase II Environmental Site Assessment (ESA) to investigate the Former California Compress Facility property located at 2740 West Nielson Avenue in Fresno, California (subject property). The subject property comprises an approximately 44.95-acre rectangular-shaped subject property and consists of two parcels (Fresno County Assessor's Parcel Numbers [APNs] 458-020-71 and 458-020-72). The investigation was performed in accordance with SALEM's Proposal No. P1-420-1899 dated December 15, 2020.

During the course of SALEM's January 29, 2021 Phase I ESA, SALEM identified the following evidence of Recognized Environmental Conditions (RECs) in connection with the subject property as defined by ASTM E1527-13:

- At least three known septic systems were associated with the former structures on the subject property, two of which were visually identified during SALEM's November 19, 2020 site reconnaissance as remaining at the subject property. The former septic systems may have acted as a conduit for contaminants to enter on-site soil from potential past unauthorized disposal of hazardous substances and/or petroleum products utilized for vehicle maintenance into drains, sinks and toilets. SALEM recommended conducting a Limited Soil Assessment (LSA) in the vicinity of the septic systems to determine if on-site soils have been impacted by unauthorized releases of the constituents of concern into the septic systems.

- Historic operations at the subject property included the handling and storage of cotton which required an extensive fire suppression system. Two water basins were historically located in the southern portion of the subject property. SALEM personnel located more than 25 features across the subject property indicative of a fire suppression system including stand pipes, traffic bollards, and fire hydrants. The system reportedly included diesel-powered water pumps supplied from an aboveground storage tank (AST) historically located in the south-central portion of the subject property. The former diesel AST location was identifiable by concrete footings and a fire extinguisher. Additional concrete footings indicative of propane ASTs were observed in the north-central portion of the subject property. No staining or signs of leakage were observed in the vicinity of the former ASTs. However, SALEM recommended conducting a LSA to assess on-site shallow soils for potential petroleum hydrocarbon impacts in the vicinity of the former diesel AST.

- A soil mound was observed in the southern portion of the subject property and was reported to have been excavation dirt and asphalt produced when the floor of a warehouse was switched from asphalt to concrete to accommodate heavy machinery. No obvious visual evidence of hazardous substances and/or petroleum products or staining was observed on the surface of the stockpile. Based upon the absence of documentation regarding the source of the stockpiled soil, SALEM recommended

collecting samples of the stockpiled soil in order to determine if the soil had been impacted by constituents of concern prior to either transporting the soil off-site for disposal or utilizing the soil on-site as clean-fill if needed during the redevelopment of the subject property.

The following Historical Recognized Environmental Condition (HREC) was identified:

- The former California Compress facility operated four underground storage tanks (USTs) consisting of a 10,000-gallon fuel oil UST historically located on what is now the north adjacent property; a 4,000-gallon double-walled steel diesel UST; a 4,000-gallon single-walled steel diesel UST; and a 1,000-gallon single-walled steel regular unleaded gasoline UST historically located in the southwest portion of the subject property. Records indicate all UST were properly permitted and removed under the regulatory agency oversight of Fresno County Environmental Health Division (FCEHD). A record of a "Hazardous Material Release" was recorded on June 5, 1995 indicating soil contamination from petroleum products discovered during removal of a UST. California Regional Water Quality Control Board (RWQCB) records indicate that FCEHD issued a "case closed" designation for the California Compress leaking underground storage tank (LUST) site on July 3, 1996.

Scannell Properties requested that SALEM perform a Phase II ESA to address the RECs and HREC identified in SALEM's January 29, 2021 Phase I ESA, to gather data regarding current site conditions, to establish baseline soil and soil vapor concentrations, and to evaluate if soil vapor conditions pose a potential vapor intrusion risk to future occupants at the subject property.

The following data summary is based on a review of field and laboratory data obtained during SALEM's investigation at the subject property:

- According to RWQCB records for the Fresno Drum, Eastern Parcel facility, located at 733 South Hughes Avenue, approximately 0.65-mile south of the subject property, groundwater in the vicinity of the subject property was reported at a depth of approximately 65 to 80 feet below ground surface (bgs) with a general direction of flow toward the northeast. However, local groundwater level and flow direction may vary due to seasonal fluctuations in precipitation, usage demands, geology, and/or surface topography. Groundwater was not encountered during the course of this investigation.

- A geophysical survey was conducted on January 4, 2021 which identified the suspected former UST pit. The pit displayed a different soil density compared to the surrounding areas and the surface area of this location displayed patched/cut concrete and asphalt. Additionally, two of the three suspected septic systems were positively identified. No other anomalies indicative of potential buried fuel USTs and associated appurtenances, additional backfilled UST cavities, or other sub-grade structures of environmental concern (hoists, clarifiers, and sumps) were identified during the performance of the geophysical survey.

- SALEM installed eight soil borings (SV-1 through SV-6, SB-7, and SB-8) to depths ranging from 10 to 15 feet bgs. Borings SV-1 through SV-6 were converted to dual-completion soil vapor sample points with probes at 5 and 10 feet bgs. Borings SV-1, SV-3, and SV-6 were located near the former and suspect septic tank locations; SV-2 and SB-7 were located near the former UST pit in the southwest portion of the subject property; SV-4 and SV-5 were located near the former diesel and propane AST locations, respectively; and SB-8 was located adjacent to a ring of traffic bollards historically associated with the fire suppression system in the south portion of the subject property.

- Generally, soil types consisted of light brown, well sorted, medium- to fine-grained sand (SP) sand to approximately 10 feet bgs, underlain by brown silt with sparse very fine-grained sand (ML) to the maximum depth drilled of 15 feet bgs. Drilling refusal was met at a depth of 7 feet bgs at location SB-8 near the fire suppression equipment in the south portion of the subject property. A subsurface manmade feature is the suspected cause; however, due to the absence of apparent contamination the area was not investigated further.

- Total petroleum hydrocarbons (TPH) were identified above laboratory method detection limits in 16 of the 18 soil samples analyzed. TPH as diesel (TPHd, carbon range C10-C24) was identified at concentrations ranging from 6.6 milligrams per kilogram (mg/kg) to 24 mg/kg. Additional TPH detected was consistent with mostly oil range hydrocarbons (TPHo) at concentrations ranging from 5.8 mg/kg to 360 mg/kg. TPH concentrations were below their respective established San Francisco Regional Water Quality Control Board (RWQCB-SF) Commercial/Industrial Environmental Screening Levels (ESLs) set at 260 mg/kg for TPHd and 1,600 mg/kg for TPHo.

- Volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBs) were not identified above laboratory method detection limits in any of the soil samples analyzed. Data suggests that VOCs and PCBs are not constituents of potential concern (COPCs) in soil at the subject property.

- Semi-volatile organic compounds (SVOCs) detected in the composite soil samples collected from the soil stockpile located in the south portion of the subject property consisted of benzo(a)anthracene (0.41 to 0.49 mg/kg), chrysene (0.38 mg/kg), fluoranthene (0.49 mg/kg), phenanthrene (0.57 mg/kg), and pyrene (1.3 mg/kg). All detected concentrations of SVOCs were below their respective RWQCB-SF Commercial/Industrial ESLs.

- Arsenic was detected in soil samples collected at 5 feet bgs in SV-4 (11 mg/kg), SB-7 (14 mg/kg), and SB-8 (45 mg/kg). These values exceed the RWQCB-SF Commercial/Industrial ESL set at 0.31 mg/kg for cancer risk and appear to be slightly elevated in comparison to arsenic concentrations in Fresno County (1.8 to 6.0 mg/kg) and to regional arsenic concentrations in the San Joaquin Valley (Wilson, et al, 1990) that range from 0.8 to 20 mg/kg.

- Additional Title 22 metals detected included barium, cobalt, chromium, copper, nickel, lead, vanadium, and zinc at concentrations below their respective established RWQCB-SF Commercial/Industrial ESLs. No other Title 22/CAM 17 metals were detected above laboratory detection limits.

- VOCs were not identified above laboratory method detection limits in any of the soil vapor samples.

Based on these results, SALEM believes that no additional assessment activities are required. The subject property is suitable for unrestricted use and no engineering controls (i.e. VOC vapor barrier) are required. In the event the subject property will undergo any redevelopment which would include soil disturbance, SALEM recommends that a Soil Management Plan (SMP) be prepared to address soil management procedures that may arise based on historical use of the subject property and the known TPH and arsenic impacts.

## 2.0 INTRODUCTION AND PROJECT OBJECTIVES

SALEM conducted a Phase II ESA on behalf of Scannell Properties to investigate the Former California Compress Facility property located at 2740 West Nielson Avenue in Fresno, California (subject property – see Figure 1). The investigation was performed in accordance with SALEM's Proposal No. P1-420-1899 dated December 15, 2020.

The subject property comprises an approximately 44.95-acre rectangular-shaped subject property that consists of two parcels (Fresno County APNs 458-020-71 and 458-020-72), at 2740 West Nielsen Avenue, located on the north side of West Nielsen Avenue between North Marks Avenue and South Hughes Avenue in Fresno, California.

SALEM's January 29, 2021 Phase I ESA identified the following evidence of RECs in connection with the subject property as defined by ASTM E1527-13:

- At least three known septic systems were associated with the former structures on the subject property, two of which were visually identified during SALEM's November 19, 2020 site reconnaissance as remaining at the subject property. The former septic systems may have acted as a conduit for contaminants to enter on-site soil from potential past unauthorized disposal of hazardous substances and/or petroleum products utilized for vehicle maintenance into drains, sinks and toilets. SALEM recommended conducting an LSA in the vicinity of the septic systems to determine if on-site soils have been impacted by unauthorized releases of the COPCs into the septic systems.

- Historic operations at the subject property included the handling and storage of cotton which required an extensive fire suppression system. Two water basins were historically located in the southern portion of the subject property. SALEM personnel located more than 25 features across the subject property indicative of a fire suppression system including stand pipes, traffic bollards, and fire hydrants. The system reportedly included diesel-powered water pumps supplied from an AST historically located in the south-central portion of the subject property. The former diesel AST location was identifiable by concrete footings and a fire extinguisher. Additional concrete footings indicative of propane ASTs were observed in the north-central portion of the subject property. No staining or signs of leakage were observed in the vicinity of the former ASTs. However, SALEM recommended conducting an LSA to assess on-site shallow soils for potential petroleum hydrocarbon impacts in the vicinity of the former diesel AST.

- A soil mound was observed in the southern portion of the subject property and was reported to have been excavation dirt and asphalt produced when the floor of a warehouse was switched from asphalt to concrete to accommodate heavy machinery. No obvious visual evidence of hazardous substances and/or petroleum products or staining was observed on the surface of the stockpile. Based upon the absence of documentation regarding the source of the stockpiled soil, SALEM recommended collecting samples of the stockpiled soil in order to determine if the soil had been impacted by constituents of concern prior to either transporting the soil off-site for disposal or utilizing the soil on-site as clean-fill if needed during the redevelopment of the subject property.

The following HREC was identified:

- The former California Compress facility operated four USTs consisting of a 10,000-gallon fuel oil UST historically located on what is now the north adjacent property; a 4,000-gallon double-walled steel diesel UST; a 4,000-gallon single-walled steel diesel UST; and a 1,000-gallon single-walled steel regular unleaded gasoline UST historically located in the southwest portion of the subject property. Records indicate all USTs were properly permitted and removed under the regulatory agency oversight of FCEHD. A record of a "Hazardous Material Release" was recorded on June 5, 1995 indicating soil contamination from petroleum products discovered during removal of a UST. RWQCB records indicate that FCEHD issued a "case closed" designation for the California Compress LUST site on July 3, 1996.

SALEM recommended conducting a Phase II ESA to determine if the subject property has been negatively impacted by the historical facility operations, if soil vapor conditions pose a potential vapor intrusion risk to future occupants at the subject property, and to evaluate potential construction concerns (vapor barrier engineering, design, and installation and off-haul of potentially-contaminated soils) associated with the redevelopment process. In addition, SALEM recommended conducting a geophysical survey at the subject property to confirm the presence or absence of sub-grade structures of environmental concern, including the USTs associated with the former site operations.

## 3.0 SCOPE OF WORK

The Phase II ESA scope of services included the following:

- Coordination of pre-field activities including procurement of any necessary permits, evaluation of groundwater data, and access permission;
- Development of a site-specific Health and Safety Plan (HSP);
- Performance of private subsurface utility screening;
- Advancement of eight soil borings (SV-1 through SV-6, SB-7, and SB-8) to depths ranging from 10 to 15 feet bgs, with the collection of soil samples at 5-foot intervals from each boring;
- Installation of vapor probes at depths of 5 and 10 feet bgs in borings SV-1 through SV-6;
- Collection of twelve primary and one duplicate soil vapor sample;
- Analytical testing of soil and soil vapor; and
- Preparation of a report that documents field activities, analytical results, and summarizes the findings.

### 3.1 Pre Field Activities

#### 3.1.1 Site Safety

SALEM completed a Site HSP for the work proposed at the subject property. A copy of the HSP was kept on-site during field activities. The HSP detailed the work to be performed, safety precautions, emergency response procedures, nearest hospital information, hospital route maps, emergency contact numbers, and onsite personnel responsible for managing emergency situations (intended to protect on-site workers and the public).

#### 3.1.2 Permits

Permits for the soil borings were not required for this scope of work.

#### 3.1.3 Utility Clearance and Geophysical Survey

The proposed soil boring locations were marked with white paint and Underground Service Alert (USA) was notified at least 48 hours before beginning field activities. USA notified its subscribed members, requesting them to mark their underground utility locations near marked boring locations as required by California State law.

On January 4, 2021 SALEM utilized GPRS of Modesto, California to conduct a private utility survey and locate potential buried fuel USTs of 500-gallon capacity or greater and associated appurtenances, or a backfilled UST cavity, as well as other sub-grade structures of environmental concern (hoists, clarifiers, and sumps). GPRS employed electromagnetic magnetic induction (EMI) and ground penetrating radar (GPR) investigation methods. The surface trace of detected features was marked on the ground with spray paint.

## 4.0 SOIL AND SOIL VAPOR INVESTIGATION METHODOLOGY

Field work for the soil sampling, nested vapor well installation, and soil vapor sampling was performed on January 7-8, 2021. Soil boring and vapor probe locations are shown on Figure 2.

Before arriving at the subject property, the drill rig, tools, and accessories were thoroughly decontaminated with a steam cleaner. Downhole drilling tools and sampling equipment, such as bits, rods, and sample barrels were manually washed/rinsed, pressure washed, and/or steam cleaned between borings and sample intervals at the designated decontamination area.

### 4.1 Soil Sampling and Soil Vapor Probe Installation Procedures

SALEM installed eight soil borings to depths ranging from 10 to 15 feet bgs depending on the feature being investigated. Borings SV-1, SV-3, and SV-6 were located near the former and suspect septic tank locations; SV-2 and SB-7 were located near the former UST pit in the southwest portion of the subject property; SV-4 and SV-5 were located near the former diesel and propane AST locations, respectively; and SB-8 was located adjacent to a ring of traffic bollards historically associated with the fire suppression system in the south portion of the subject property. The borings were advanced using an AMS Powerprobe™ direct-push rig operated by TEG of Northern California of Rancho Cordova, California. A 4-foot long Long-Bore Soil Sampler, lined with acetate sleeves, was attached to the bottom of the drive rod. Soil samples were continuously collected at each boring location and retained at 5-foot intervals for laboratory analysis. At each sample interval, the sampler was retrieved, and the acetate sleeve was removed. A portion of the acetate sleeve was cut away from the soil core, capped with Teflon sheets and rubber end caps, and labelled with the sample name, sample date and time, and sampler's initials. The samples were recorded on a chain-of-custody document, sealed in a zip-lock bag, and placed in cold storage pending submittal to Sierra Analytical Laboratory of Laguna Hills, California, for chemical analysis. A description of the soil was recorded on field boring logs in general accordance with the Unified Soil Classification System (USCS). Two soil samples from each boring location were analyzed for total petroleum hydrocarbons – carbon range analysis (TPH-CRA), VOCs and fuel oxygenates, and Title 22 metals using EPA Methods 8015B, 8260B, and 6010B/7471A, respectively.

Additionally, eight surface soil samples from the soil and asphalt debris stockpile located near the southern boundary of the subject property were collected and composited into two soil samples (SS-1 and SS-2). Each composite soil sample was analyzed for TPH-CRA, VOCs, Title 22 metals, PCBs, and SVOCs using EPA Methods 8015B, 8260B, 6010B/7471A, 8082A, and 8270C, respectively.

Soil analytical results are summarized in Tables 1 and 2. Laboratory analytical results and chain-of-custody documentation are provided in Appendix A.

Borings SV-1 through SV-6 were converted into dual-completion soil vapor sample points. Nested soil vapor probes were installed at depths of 5 and 10 feet bgs in each soil vapor sample location. A 1/8-inch diameter Nylaflow tube, attached to a sample port, was inserted into the open boring and set approximately 3 inches off the bottom. Number 3 washed aquarium sand was poured into the borehole until the sand extended from approximately 3 inches below and 3 inches above the slotted portion of the tube. Approximately 6 inches of fine bentonite crumble was placed in the hole as an annular seal and hydrated with water. Additional bentonite crumble was alternately placed in the hole and hydrated in intervals, to the ground surface. Each Nylaflow tube was labeled with the sample point identification and sample depth.

### 4.2 Soil Vapor Sampling

Soil vapor samples were collected from the soil vapor probes on January 7, 2021 by SALEM personnel. Soil vapor sample procedures were completed in accordance with the July 2015 Advisory, Active Soil Gas Investigations, published jointly by the Department of Toxic Substances Control (DTSC), California Environmental Protection Agency (CalEPA), and the Los Angeles and San Francisco Regional Water Quality Control Boards.

#### 4.2.1 Shut-in Testing

Before purging and sampling of the soil vapor probes, a shut-in test was conducted on the sampling train to check for leaks in the above-ground fittings. The shut-in test was conducted by attaching the complete sample train assembly to the termination valve on the soil vapor probe. With the valve attached to the soil vapor probe in the "off" position, a plastic syringe was used to evacuate the sample train of air to a minimum measured vacuum of approximately 100 inches of water. The vacuum was observed using an in-line vacuum gauge which was positioned before the purge point. The vacuum gauge was observed for approximately 1 minute and all above ground connections were considered "air-tight" when the pressure on the gauge did not noticeably dissipate. Sampling did not commence until the above-ground fittings were deemed air-tight.

#### 4.2.2 Leak Testing

Leak testing, using a liquid tracer, was performed on each individual soil vapor probe in order to test the integrity of the entire sampling system. Its purpose was to evaluate whether an adequate seal was established at the soil vapor probe interface with the ground surface, as well as a leak check of all above ground fittings to ensure that the samples collected are not being diluted by ambient air. The leak check compound isopropyl alcohol was used to evaluate sample integrity. The leak check compound was applied to a paper towel and kept in a closed plastic zip closure bag until it was ready to be used.

Before purging and sampling of the soil vapor probe, the zip closure bag was opened and placed directly at the point of entry of the soil vapor probe into the borehole. Additional saturated towels were also placed near the above-ground sample train connections to ensure there were no leaks in the fittings.

#### 4.2.3 Soil Vapor Sample Collection and Analysis

A plastic syringe was used to purge each probe. The syringe was attached to a 3-way valve, which was then connected to the on/off valve on the soil vapor probe. This 3-way valve allows the sample train to be connected to one port on the valve, and the purge equipment to be attached to the other. This ensured that all of the sample train assembly being used for the collection of the sample was upstream of the purging device. Three purge volumes (calculated to include the sand pack, dry bentonite, and vapor tubing volume) were removed from probes that were able to provide a vapor response to ensure that ambient air from the sampling system was removed, and to demonstrate that samples collected were representative of subsurface conditions.

SALEM personnel practiced careful monitoring of purge volumes and flow rates. An air-tight 3-way valve was attached to the syringe that allowed the purge air to be drawn into the system and then evacuated out the syringe's side port. The syringe was attached to an in-line vacuum gauge so that probe vacuum could be monitored as the syringe drew in the purge vapor. The in-line vacuum gauge ensured that probe vacuum pressures were less than 100 inches of water during purging. During purging, the flow rate was timed so that it did not exceed 200 milliliters per minute. Please note that the syringe was used only for purging the soil vapor probes and was not used in the collection of the soil vapor samples.

Soil vapor samples were collected using appropriate gas-tight containers required for the specified analyses. The sample collection assemblies and containers were attached to the soil vapor probe via a 3-way valve before purging the device to avoid cross-contamination. SALEM utilized airtight calibrated Summa

canisters to collect vapor samples from each probe. The Summa canister was attached via a luer lock connection to a 3-way valve, which allowed the sample to be drawn into the canister and then sealed off by rotating the valve. The canister was attached to the 3-way valve connected to the soil vapor probe on/off valve, and before the purging device. After purging of the soil vapor probe was complete, the valve was rotated so that the flow path of the soil vapor probe was diverted to the Summa canister. The valve on the Summa canister was opened slowly to allow the soil vapor to flow into the canister at a rate of 200 milliliters per minute or less. When the Summa canister was full, as indicated by a negative pressure gauge, the valve on the canister was closed and the canister was then disconnected and immediately placed into a storage container to prevent photo-degradation of the target analytes from direct sunlight.

For each sample, the sample name, date, and time of collection, vapor flow information and results of QA/QC inspections were recorded on field data sheets. Sample name, date, and time were recorded on a chain-of-custody document and transferred to the stationary laboratory for analysis.

Upon submittal to H&P's analytical laboratory, the samples were injected into a gas chromatograph/mass spectrometer (GC/MS) and analyzed for VOCs and fuel oxygenates using EPA Method 8260SV. Gasoline fuel additives, and solvents that may have been utilized during auto servicing operations, contain VOCs.

Laboratory analytical results for soil vapor samples are summarized in Table 3. Laboratory analytical results and chain-of-custody documentation are provided in Appendix A.

### 4.2.4 Vapor Probe Abandonment

The soil vapor probe tubing was pulled from each boring after the completion of soil vapor sampling activities. Each location was resurfaced to match existing grade.

## 5.0 FINDINGS

### 5.1 Geology and Hydrogeology

The subject property is located within the San Joaquin Valley. The San Joaquin Valley, which includes the Fresno area, is a topographic and structural basin that is bounded on the east by the Sierra Nevada and on the west by the Coast Ranges. The Sierra Nevada, a fault block dipping gently southwestward, is composed of igneous and metamorphic rocks of pre-Tertiary age that form the basement complex beneath the San Joaquin Valley. The Coast Ranges contain folded and faulted sedimentary rocks of Mesozoic and Cenozoic age, which are similar to those rocks that underlie the Valley at depth and non-conformably overlie the basement complex; gently dipping to nearly horizontal sedimentary rocks of Tertiary and Quaternary age overlie the older rocks. These younger rocks are mostly of continental origin and in the Fresno area they were derived from the Sierra Nevada. The Coast Ranges evolved as a result of folding, faulting and accretion of diverse geologic terrains. They are broken by numerous faults, the San Andreas Fault being the most notable feature.

The San Joaquin Valley represents the southern portion of the Central Valley of California, also referred to as the Great Valley geomorphic province. The most extensive geomorphic units in the province include dissected uplands, low alluvial plains and fans, river floodplains and channels, and overflow lands and lake bottoms. The valley represents the alluvial, flood, and delta plains of two major rivers (the Sacramento and San Joaquin rivers) and their tributaries. The high alluvial fans are the largest geomorphic features in the Fresno area. These fans lie from 10 to 90 feet above the channels of the present day rivers and are not subject to inundation by the rivers. The Merced area alluvial fans form part of a continuum of fans along the eastern margin of the San Joaquin Valley structural trough. The sediments are derived from the Sierra

Nevada to the east — most of the sediment is of probable glacial origin. The east side fans are formed by meandering or braided stream floodplain processes that contain more well-sorted, fine-grained material and have gentler slopes than the semiarid fans on the west side of the San Joaquin Valley. The east side fans have low relief with very gentle gradients.

According to RWQCB records for the Fresno Drum, Eastern Parcel facility, located at 733 South Hughes Avenue, approximately 0.65-mile south of the subject property, groundwater in the vicinity of the subject property was reported at a depth of approximately 65 to 80 feet bgs with a general direction of flow toward the northeast. However, local groundwater level and flow direction may vary due to seasonal fluctuations in precipitation, usage demands, geology, and/or surface topography.

### 5.2 Field Observations

At the time of SALEM's January 2021 Phase II ESA, the subject property observed to be vacant land mostly covered in asphalt and concrete with areas of grass and remnants of former landscaping.

Exposed surface soils did not exhibit obvious signs of discoloration at the subject property. No additional obvious evidence (fill pipes, dispensers, etc.) of USTs was noted within the area observed. No standing water or major depressions were observed on the subject property. Two areas exhibited patched/cut concrete and asphalt.

The geophysical survey conducted on January 4, 2021 identified the suspected former UST pit. The pit displayed a different soil density compared to the surrounding areas and the surface area of this location displayed patched/cut concrete and asphalt. Additionally, two of the three suspected septic systems were positively identified. No other anomalies indicative of potential buried fuel USTs and associated appurtenances, additional backfilled UST cavities, or other sub-grade structures of environmental concern (hoists, clarifiers, and sumps) were identified during the performance of the geophysical survey.

Soil boring locations are shown on Figure 2. Generally, soil types consisted of light brown, well sorted, medium- to fine-grained sand (SP) to approximately 10 feet bgs, underlain by brown silt with sparse very fine-grained sand (ML) to the maximum depth drilled of 15 feet bgs. Drilling refusal was met at a depth of 7 feet bgs at location SB-8 near the fire suppression equipment in the south portion of the subject property, a subsurface manmade feature is the suspected cause; however, due to the absence of apparent contamination the area was not investigated further.

### 5.3 Analytical Results

Soil analytical results are summarized in Tables 1 and 2, and soil vapor analytical results are summarized in Table 3. Copies of the laboratory reports and chain-of-custody documentation are included in Appendix A.

#### 5.3.1 Soil Analytical Results

Laboratory analytical results for soil were as follows:

- TPH was identified above laboratory method detection limits as diesel (TPHd, carbon range C10-C24) at concentrations ranging from 6.6 mg/kg to 24 mg/kg. Additional TPH detected was consistent with mostly oil range hydrocarbons (TPHo) at concentrations ranging from 5.8 mg/kg to 360 mg/kg.
- PCBs were not identified above laboratory method detection limits in the analyzed soil samples.
- VOCs were not identified above laboratory method detection limits in the analyzed soil samples.
- SVOCs detected included: benzo(a)anthracene at concentrations ranging from 0.41 to 0.49 mg/kg; chrysene at concentrations ranging from below laboratory detection limits (0.33 mg/kg) to 0.38

mg/kg; fluoranthene at concentrations ranging from below laboratory detection limits (0.33 mg/kg) to 0.49 mg/kg; phenanthrene at concentrations ranging from below laboratory detection limits (0.33 mg/kg) to 0.57 mg/kg; and pyrene at concentrations ranging from below laboratory detection limits (0.33 mg/kg) to 1.3 mg/kg.

- Title 22/CAM 17 metals detected included: arsenic at concentrations ranging from below laboratory detection limits (4.0 mg/kg) to 45 mg/kg; barium at concentrations ranging from 22 to 110 mg/kg; cobalt at concentrations ranging from 2.2 to 13 mg/kg; chromium at concentrations ranging from 5.3 to 36 mg/kg; copper at concentrations ranging from below laboratory detection limits (9.0 mg/kg) to 120 mg/kg; nickel at concentrations ranging from 5.8 to 42 mg/kg; lead at concentrations ranging from below laboratory detection limits (3.1 mg/kg) to 12 mg/kg; vanadium at concentrations ranging from 8.4 to 38 mg/kg; and zinc at concentrations ranging from 9.3 to 38 mg/kg.

### 5.3.2 Soil Vapor Analytical Results

Laboratory analytical results for soil vapor were as follows:

- VOCs were not identified above laboratory method detection limits in soil vapor samples.
- The sampling tracer compound isopropyl alcohol was not detected above laboratory method detection limits in any of the samples.

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

The following data summary is based on a review of field and laboratory data obtained during SALEM's January 7 and 8, 2020 investigation at the subject property:

- According to RWQCB records for the Fresno Drum, Eastern Parcel facility, located at 733 South Hughes Avenue, approximately 0.65-mile south of the subject property, groundwater in the vicinity of the subject property was reported at a depth of approximately 65 to 80 feet bgs with a general direction of flow toward the northeast. However, local groundwater level and flow direction may vary due to seasonal fluctuations in precipitation, usage demands, geology, and/or surface topography. Groundwater was not encountered during the course of this investigation.

- A geophysical survey was conducted on January 4, 2021 which identified the suspected former UST pit. The pit displayed a different soil density compared to the surrounding areas and the surface area of this location displayed patched/cut concrete and asphalt. Additionally, two of the three suspected septic systems were positively identified. No other anomalies indicative of potential buried fuel USTs and associated appurtenances, additional backfilled UST cavities, or other sub-grade structures of environmental concern (hoists, clarifiers, and sumps) were identified during the performance of the geophysical survey.

- SALEM installed eight soil borings (SV-1 through SV-6, SB-7, and SB-8) to depths ranging from 10 to 15 feet bgs. Borings SV-1 through SV-6 were completed converted to dual-completion soil vapor sample points with probes at 5 and 10 feet bgs. Borings SV-1, SV-3, and SV-6 were located near the former and suspect septic tank locations; SV-2 and SB-7 were located near the former UST pit in the southwest portion of the subject property; SV-4 and SV-5 were located near the former diesel and propane AST locations, respectively; and SB-8 was located adjacent to a ring of traffic bollards historically associated with the fire suppression system in the south portion of the subject property.

- Generally, soil types consisted of light brown, well sorted, medium- to fine-grained sand (SP), to approximately 10 feet bgs, underlain by brown silt with sparse very fine-grained sand (ML) to the maximum depth drilled of 15 feet bgs. Drilling refusal was met at a depth of 7 feet bgs at location SB-8 near the fire suppression equipment in the south portion of the subject property, a subsurface manmade feature is the suspected cause; however, due to the absence of apparent contamination the area was not investigated further.

- TPH was identified above laboratory method detection limits in 16 of the 18 soil samples analyzed. TPH as diesel (TPHd, carbon range C10-C24) was identified at concentrations ranging from 6.6 mg/kg to 24 mg/kg. Additional TPH detected was consistent with mostly oil range hydrocarbons (TPHo) at concentrations ranging from 5.8 mg/kg to 360 mg/kg. TPH concentrations were below their respective established RWQCB-SF Commercial/Industrial ESLs set at 260 mg/kg for TPHd and 1,600 mg/kg for TPHo.

- VOCs and PCBs were not identified above laboratory method detection limits in any of the soil samples analyzed. Data suggests that VOCs and PCBs are not COPCs in soil at the subject property.

- SVOCs detected in the composite soil samples collected from the soil stockpile located in the south portion of the subject property consisted of benzo(a)anthracene (0.41 to 0.49 mg/kg), chrysene (0.38 mg/kg), fluoranthene (0.49 mg/kg), phenanthrene (0.57 mg/kg), and pyrene 1.3 mg/kg). All detected concentrations of SVOCs were below their respective RWQCB-SF Commercial/Industrial ESLs.

- Arsenic was detected in soil samples collected at 5 feet bgs at SV-4 (11 mg/kg), SB-7 (14 mg/kg), and SB-8 (45 mg/kg). These values exceed the RWQCB-SF Commercial/Industrial ESL set at 0.31 mg/kg for cancer risk and appear to be slightly elevated in comparison to arsenic concentrations in Fresno County (1.8 to 6.0 mg/kg) and to regional arsenic concentrations in the San Joaquin Valley (Wilson, et al, 1990) that range from 0.8 to 20 mg/kg.

- Additional Title 22 metals detected included barium, cobalt, chromium, copper, nickel, lead, vanadium, and zinc at concentrations below their respective established RWQCB-SF Commercial/Industrial ESLs. No other Title 22/CAM 17 metals were detected above laboratory detection limits.

- VOCs were not identified above laboratory method detection limits in any of the soil vapor samples.

Based on these results, SALEM believes that no additional assessment activities are required. The subject property is suitable for unrestricted use and no engineering controls (i.e. VOC vapor barrier) are required. In the event the subject property will undergo any redevelopment which would include soil disturbance, SALEM recommends that an SMP be prepared to address soil management procedures that may arise based on historical use of the subject property and the known TPH and arsenic impacts.

## 7.0 LIMITATIONS

This Phase II ESA Report has been prepared for the exclusive use of Scannell Properties and its affiliates. Unauthorized use of or reliance on the information contained in this report, unless given express written consent by SALEM, is strictly prohibited.

The purpose of an environmental site assessment is to reasonably evaluate the potential for adverse impact from past practices at a given property or neighboring properties. In performing an environmental site assessment, it is understood that a balance must be struck between a reasonable inquiry into the environmental issues and an exhaustive analysis of each conceivable issue of potential concern. The professional opinions in this report are based in part on the interpretation of data from discrete sampling locations that may not represent conditions at locations not sampled.

The property owners are solely responsible for notifying all governmental agencies and the public of the existence, release, or disposal of any hazardous materials/wastes or petroleum products at the subject property, whether before, during, or after the performance of SALEM's services. SALEM assumes neither responsibility nor liability for any claim, loss of property value, damage, or injury which results from hazardous materials, wastes or petroleum products being present or encountered at a given site.

## 8.0 REFERENCES

The following list summarizes the references utilized in preparing this report:


- Department of Toxic Substances Control and Regional Water Quality Control Board, *Soil Gas Advisory*, July 2015.
- California Regional Water Quality Control Board, *Environmental Screening Levels Table*, January 2019.
- SALEM Engineering Group, Inc., *Phase I Environmental Site Assessment, Former California Compress Facility, 2740 West Nielson Avenue, Fresno, California*, January 29, 2021.
- USEPA Region 9, November 2020. *Regional Screening Levels (RSL) Summary Table*.
- Wilson, S.A., Kennedy, K.A., Gent, C.A., Briggs, P.H., Tidball, R.R., and McNeal, J.M., 1990, *Analysis of Soil Samples From the San Joaquin Valley of California, US Geological Survey Open File Report 90-214*.


If you have any questions, or if we can be of further assistance, please do not hesitate to contact our office at (559) 271-9700.

Respectfully submitted,

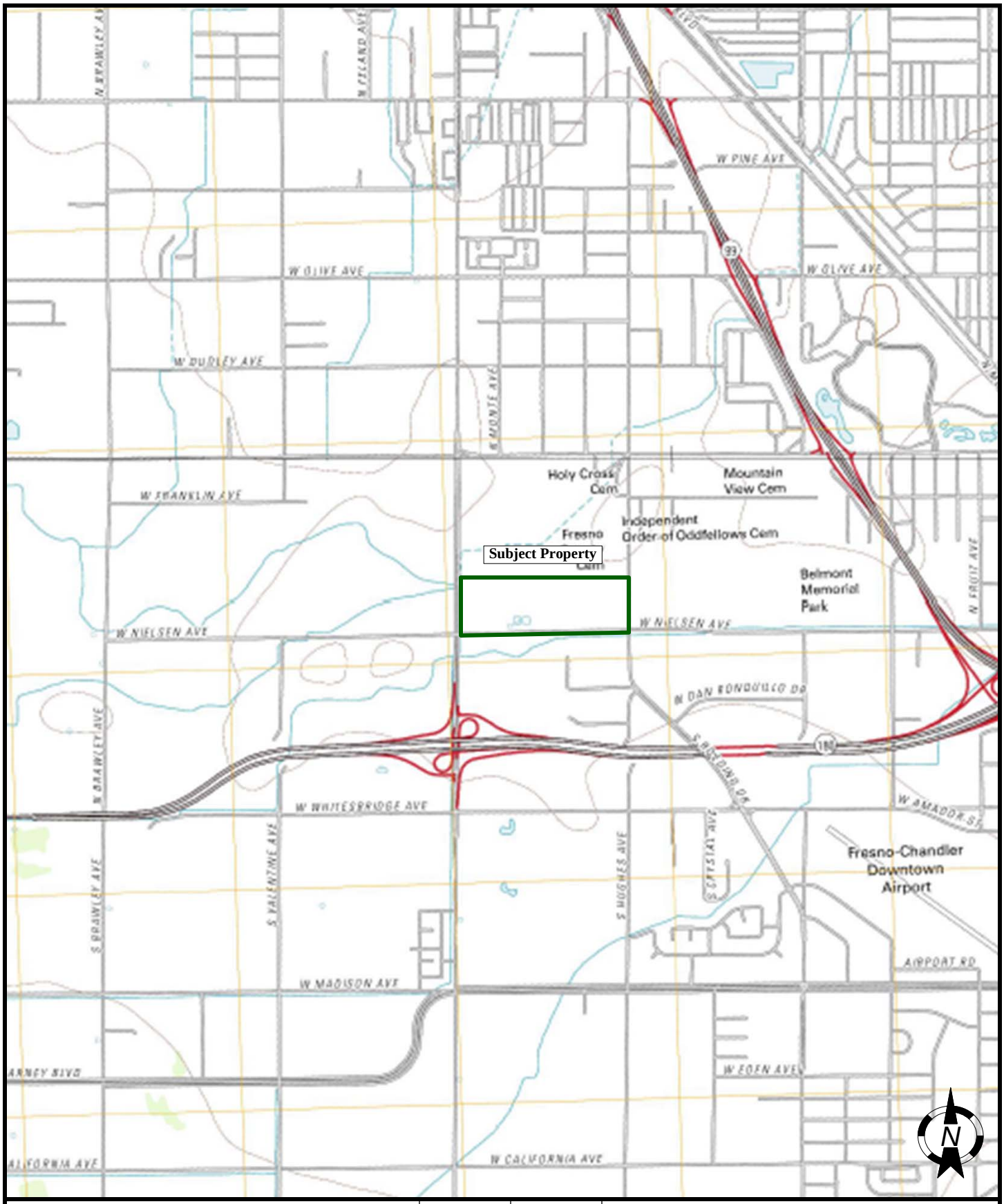
**SALEM Engineering Group, Inc.**



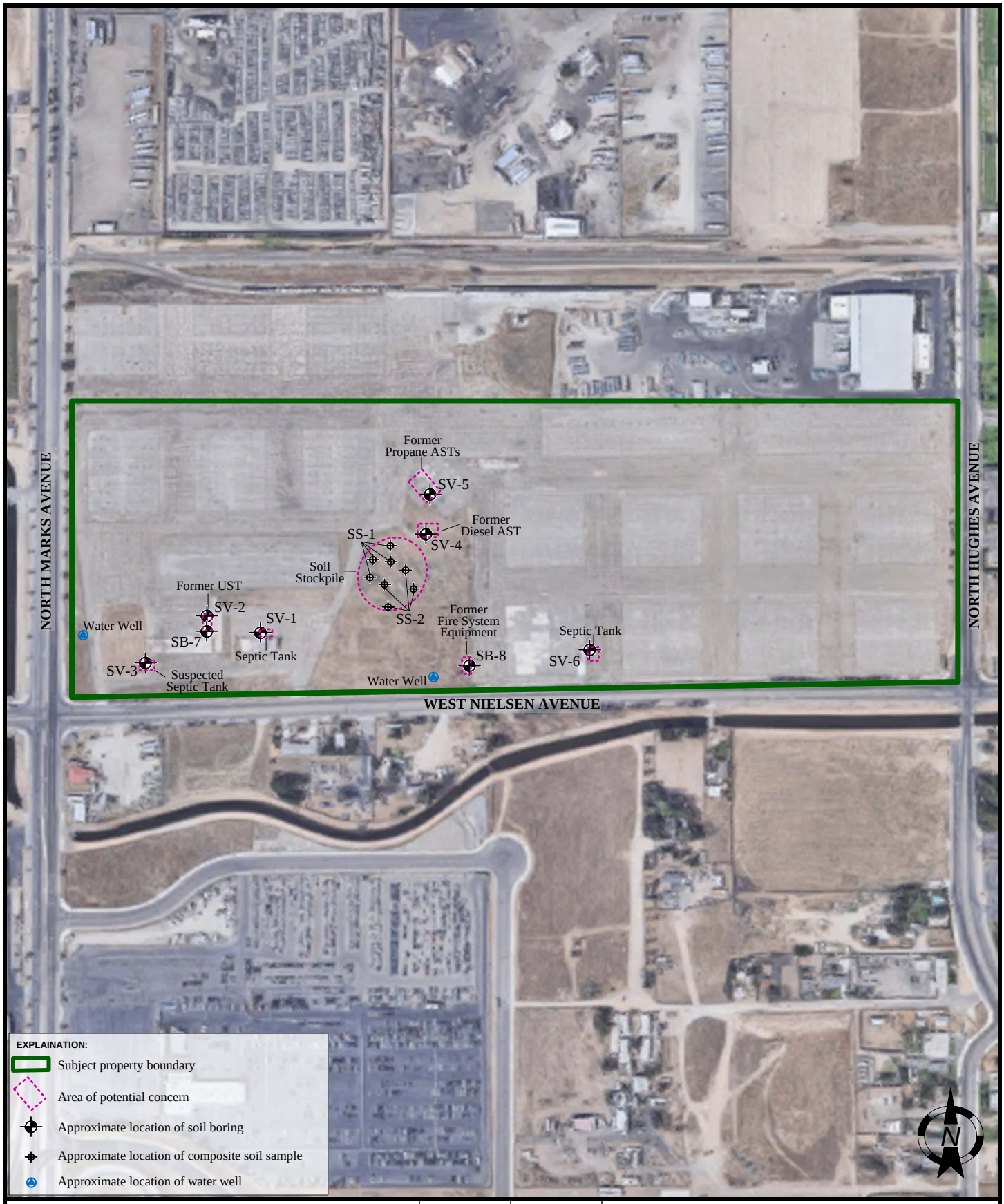

Shannon Lodge, PG, QSD
Senior Project Manager

James S. Robert, L.G., L.H.G.
Senior Hydrogeologist

# Figures




| SITE LOCATION | SCALE: NTS | DATE: Feb. 2021 | SALEM engineering group, inc. |
|---|---|---|---|
| FORMER CALIFORNIA COMPRESS FACILITY<br>2740 WEST NIELSEN AVENUE<br>FRESNO, CALIFORNIA | DRAWN BY: BR | APPROVED BY: SL | |
| | PROJECT NO.: 1-420-1016 | FIGURE NO.: 1 | |




| SITE MAP WITH SAMPLE LOCATIONS | SCALE: NTS | DATE: fEB. 2021 |
|---|---|---|
| FORMER CALIFORNIA COMPRESS FACILITY<br>2740 WEST NIELSEN AVENUE<br>FRESNO, CALIFORNIA | DRAWN BY: BR | APPROVED BY: SL |
| | PROJECT NO.: 1-420-1016 | FIGURE NO.: 2 |

SALEM engineering group, inc.

# Tables

**TABLE 1**
SOIL DATA, TPH-CRA AND VOCS
Former California Compress Facility
2740 West Nielson Avenue

| Soil Sampling Date | Soil Sample Identification | TPH-CRA by EPA Method 8015B (mg/kg) | PCBs by EPA Method 8015B (mg/kg) | VOCs by EPA Method 8260B (µg/kg) | Benzo (a) anthracene by EPA Method 8270C (mg/kg) | Chrysene by EPA Method 8270C (mg/kg) | Fluoranthene by EPA Method 8270C (mg/kg) | Phenanthrene by EPA Method 8270C (mg/kg) | Pyrene by EPA Method 8270C (mg/kg) | SVOCs* by EPA Method 8270C (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| CRWQCB Commercial/Industrial Environmental Screening Level | | Diesel Fuel 260 mg/kg; Motor Oil 1,600 mg/kg | Varies | Varies | 200 mg/kg | 2,100 mg/kg | 30,000 mg/kg | NE | 23,000 | Varies |
| 1/7/2021 | SS-1 | 9.8; 360 | ND (0.050) | ND (5.0) | 0.41 | 0.38 | 0.49 | 0.57 | 1.3 | ND (5.0) |
| 1/7/2021 | SS-2 | 8.1; 78 | ND (0.050) | ND (5.0) | 0.49 | ND (0.33) | ND (0.33) | ND (0.33) | ND (0.33) | ND (5.0) |
| 1/7/2021 | SV-1 @5' | 24; 38 | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/7/2021 | SV-1 @15' | ND (5.0) | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/8/2021 | SV-2 @10' | 9.5; 10 | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/8/2021 | SV-2 @15' | ND (5.0) | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/8/2021 | SV-3 @5' | 7.6; 5.8 | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/8/2021 | SV-3 @15' | 7.4; 6.6 | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/8/2021 | SV-4 @5' | 8.2; 6.2 | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/8/2021 | SV-4 @10' | 6.6; ND (5.0) | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/8/2021 | SV-5 @5' | 10; 8.9 | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/8/2021 | SV-5 @10' | 8.6; ND (5.0) | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/8/2021 | SV-6 @5' | 10; 8.6 | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/8/2021 | SV-6 @15' | 19; 16 | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/8/2021 | SB-7 @5' | 11; 6.2 | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/8/2021 | SB-7 @10' | 13; 12 | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/8/2021 | SB-8 @410' | 6.6; 11 | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |
| 1/8/2021 | SB-8 @7' | 7.7; ND (5.0) | NA | ND (5.0) | NA | NA | NA | NA | NA | ND (5.0) |

@#' = depth of sample collection in feet below ground surface
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
NE = Not established
ND = not identified above stated method detection limit
TPH-CRA = Total Petroleum Hydrocarbons - Carbon Range Analysis
; = reported as: Diesel Range Organics; TPH
PCBs = Polychlorinated Biphenyls
VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds
* = all other SVOCs not otherwise listed
RWQCB-SF = San Francisco Regional Water Quality Control Board
ESL = Environmental Screening Level

**TABLE 2**
SOIL DATA, TITLE 22 METALS*
Former California Compress Facility
2740 West Nielson Avenue
Fresno, California

| Date Sampled | Sample Collection Point | Arsenic (mg/kg) | Barium (mg/kg) | Cobalt (mg/kg) | Chromium (mg/kg) | Copper (mg/kg) | Nickel (mg/kg) | Lead (mg/kg) | Vanadium (mg/kg) | Zinc (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1/7/2021 | SS-1 | ND (4.0) | 52 | 5.2 | 12 | 120 | 12 | 12 | 19 | 39 |
| 1/7/2021 | SS-2 | ND (4.0) | 53 | 4.7 | 13 | 14 | 15 | 7.7 | 18 | 29 |
| 1/7/2021 | SV-1 @5' | ND (4.0) | 22 | 2.3 | 6.1 | ND (9.0) | 5.8 | ND (3.1) | 8.7 | 9.9 |
| 1/7/2021 | SV-1 @10' | ND (4.0) | 82 | 8.2 | 21 | 16 | 26 | ND (3.1) | 27 | 29 |
| 1/8/2021 | SV-2 @10' | ND (4.0) | 36 | 3.6 | 9.0 | ND (9.0) | 12 | ND (3.1) | 13 | 12 |
| 1/8/2021 | SV-2 @15' | ND (4.0) | 78 | 7.2 | 16 | 16 | 10 | 4.3 | 32 | 29 |
| 1/8/2021 | SV-3 @5' | ND (4.0) | 24 | 2.2 | 5.3 | ND (9.0) | 5.6 | ND (3.1) | 8.4 | 9.3 |
| 1/8/2021 | SV-3 @15' | ND (4.0) | 29 | 2.8 | 6.5 | ND (9.0) | 5.1 | ND (3.1) | 14 | 11 |
| 1/8/2021 | SV-4 @5' | **11** | 25 | 2.4 | 6.4 | ND (9.0) | 6.0 | ND (3.1) | 9.7 | 9.3 |
| 1/8/2021 | SV-4 @10' | ND (4.0) | 110 | 11 | 21 | 16 | 23 | ND (3.1) | 33 | 35 |
| 1/8/2021 | SV-5 @5' | ND (4.0) | 43 | 4.9 | 12 | ND (9.0) | 14 | ND (3.1) | 16 | 17 |
| 1/8/2021 | SV-5 @10' | ND (4.0) | 110 | 11 | 31 | 20 | 35 | ND (3.1) | 38 | 37 |
| 1/8/2021 | SV-6 @5' | ND (4.0) | 78 | 8.2 | 23 | 15 | 18 | ND (3.1) | 31 | 30 |
| 1/8/2021 | SV-6 @15' | ND (4.0) | 32 | 3.3 | 10 | ND (9.0) | 9.2 | ND (3.1) | 17 | 13 |
| 1/8/2021 | SB-7 @5' | **14** | 33 | 3.2 | 8.4 | ND (9.0) | 10 | ND (3.1) | 10 | 13 |
| 1/8/2021 | SB-7 @10' | ND (4.0) | 84 | 9.6 | 24 | 16 | 32 | ND (3.1) | 28 | 30 |
| 1/8/2021 | SB-8 @5' | **45** | 100 | 8.8 | 22 | 14 | 24 | 3.9 | 31 | 39 |
| 1/8/2021 | SB-8 @7' | ND (4.0) | 100 | 13 | 36 | 19 | 42 | ND (3.1) | 37 | 38 |
| RWQCB-SF Commercial/Industrial ESL: | | 0.31 | 220,000 | 350 | 1,800,000 | 47,000 | 11,000 | 320 | 5,800 | 350,000 |

* = metals not listed were ND
@#' = depth of sample collection in feet below ground surface
mg/kg = milligrams per kilogram
ND = not detected above analytical method detection limit
(#) = analytical method detection limit
**BOLD** = concentration exceeds ESL
RWQCB-SF = San Francisco Regional Water Quality Control Board
ESL = Environmental Screening Level

**TABLE 3**

SOIL VAPOR QUALITY DATA

Former California Compress Facility

2740 West Nielson Avenue

Fresno, California

| Date Sampled | Sample Collection Point | Volatile Organic Compounds |
|---|---|---|
| 1/7/21 | SV-1 @5' | ND |
| 1/7/21 | SV-1 @10' | ND |
| 1/7/21 | SV-2 @5' | ND |
| 1/7/21 | SV-2 @10' DUP | ND |
| 1/7/21 | SV-2 @10' DUP | ND |
| 1/7/21 | SV-3 @5' | ND |
| 1/7/21 | SV-3 @10' | ND |
| 1/7/21 | SV-4 @5' | ND |
| 1/7/21 | SV-4 @10' | ND |
| 1/7/21 | SV-5 @5' | ND |
| 1/7/21 | SV-5 @10' | ND |
| 1/7/21 | SV-6 @5' | ND |
| 1/7/21 | SV-6 @10' | ND |
| RWQCB-SF Commercial/Industrial Soil Vapor ESL | | Varies |

All samples analyzed by EPA Method 8260SV by gas chromatograph/mass spectrometer

µg/L = micrograms per liter air

ND = not detected above analytical method detection limit

DUP = duplicate sample

RWQCB-SF = San Francisco Regional Water Quality Control Board

ESL= Environmental Screening Level

APPENDIX

# A

22 January 2021

Shannon Lodge
SALEM Engineering Group - Fresno
4729 West Jacquelyn Avenue
Fresno, CA 93722

RE:Former Fresno Compress

Work Order No.: 2101114

Attached are the results of the analyses for samples received by the laboratory on 01/11/21 10:30.

The samples were received by Sierra Analytical Labs, Inc. with a chain of custody record attached or completed at the submittal of the samples.

The analyses were performed according to the prescribed method as outlined by EPA, Standard Methods, and A.S.T.M.

The remaining portions of the samples will be disposed of within 30 days from the date of this report.
If you require any additional retaining time, please advise us.

Sincerely,

Richard K. Forsyth

Laboratory Director

Sierra Analytical Labs, Inc. is certified by the California Department of Health Services (DOHS),
Environmental Laboratory Accredidation Program (ELAP) No. 2320.

SIERRA ANALYTICAL

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| SS-1 | 2101114-01 | Soil | 01/07/21 10:45 | 01/11/21 10:30 |
| SS-2 | 2101114-02 | Soil | 01/07/21 10:50 | 01/11/21 10:30 |
| SV-1@5 | 2101114-03 | Soil | 01/07/21 08:25 | 01/11/21 10:30 |
| SV-1@10 | 2101114-04 | Soil | 01/07/21 08:40 | 01/11/21 10:30 |
| SV-2@10 | 2101114-05 | Soil | 01/08/21 08:15 | 01/11/21 10:30 |
| SV-2@15 | 2101114-06 | Soil | 01/08/21 08:20 | 01/11/21 10:30 |
| SV-3@5 | 2101114-07 | Soil | 01/08/21 08:55 | 01/11/21 10:30 |
| SV-3@10 | 2101114-08 | Soil | 01/08/21 09:00 | 01/11/21 10:30 |
| SV-4@5 | 2101114-09 | Soil | 01/08/21 09:15 | 01/11/21 10:30 |
| SV-4@10 | 2101114-10 | Soil | 01/08/21 09:20 | 01/11/21 10:30 |
| SV-5@5' | 2101114-11 | Soil | 01/08/21 09:35 | 01/11/21 10:30 |
| SV-5@10' | 2101114-12 | Soil | 01/08/21 09:40 | 01/11/21 10:30 |
| SV-6@5' | 2101114-13 | Soil | 01/08/21 10:00 | 01/11/21 10:30 |
| SV-6@15' | 2101114-14 | Soil | 01/08/21 10:05 | 01/11/21 10:30 |
| SV-7@5' | 2101114-15 | Soil | 01/08/21 08:30 | 01/11/21 10:30 |
| SV-7@10' | 2101114-16 | Soil | 01/08/21 08:35 | 01/11/21 10:30 |
| SV-8@4' | 2101114-17 | Soil | 01/08/21 10:20 | 01/11/21 10:30 |
| SV-8@7' | 2101114-18 | Soil | 01/08/21 10:25 | 01/11/21 10:30 |

## CASE NARRATIVE

| | |
|---|---|
| SAMPLE RECEIPT: | Samples were received intact, at 6 °C, and accompanied by chain of custody documentation. |
| PRESERVATION: | Samples requiring preservation were verified prior to sample preparation and analysis. |
| HOLDING TIMES: | All holding times were met, unless otherwise noted in the report with data qualifiers. |
| QA/QC CRITERIA: | All quality objective criteria were met, except as noted in the report with data qualifiers. |

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. This report and all associated analytical data will be retained by Sierra Analytical Labs, Inc. for five years from the date reported. Requests for additional storage time must be made in writing prior to the expiration of the five year retaining period and are subject to approval by Sierra Analytical Labs, Inc.*

26052 Merit Circle Suite 104, Laguna Hills, California 92653
Telephone: (949) 348-9389 Fax: (949) 348-9115
E-Mail: sierralabs @ sierralabs.net

SIERRA ANALYTICAL

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Metals by EPA 6000/7000 Series Methods

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SS-1 (2101114-01) Soil Sampled: 01/07/21 10:45 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **52** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **5.2** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **12** | 1.2 | " | " | " | " | " | " | |
| **Copper** | **120** | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **12** | 3.4 | " | " | " | " | " | " | |
| **Lead** | **12** | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **19** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **39** | 2.0 | " | " | " | " | " | " | |
| **SS-2 (2101114-02) Soil Sampled: 01/07/21 10:50 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **53** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **4.7** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **13** | 1.2 | " | " | " | " | " | " | |
| **Copper** | **14** | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **15** | 3.4 | " | " | " | " | " | " | |
| **Lead** | **7.7** | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **18** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **29** | 2.0 | " | " | " | " | " | " | |

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E-Mail: sierralabs @ sierralabs.net

SIERRA ANALYTICAL

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Metals by EPA 6000/7000 Series Methods

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-1@5 (2101114-03) Soil Sampled: 01/07/21 08:25 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **22** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **2.3** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **6.1** | 1.2 | " | " | " | " | " | " | |
| Copper | ND | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **5.8** | 3.4 | " | " | " | " | " | " | |
| Lead | ND | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **8.7** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **9.9** | 2.0 | " | " | " | " | " | " | |
| **SV-1@10 (2101114-04) Soil Sampled: 01/07/21 08:40 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **82** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **8.2** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **21** | 1.2 | " | " | " | " | " | " | |
| **Copper** | **16** | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **26** | 3.4 | " | " | " | " | " | " | |
| Lead | ND | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **27** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **29** | 2.0 | " | " | " | " | " | " | |

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E-Mail: sierralabs @ sierralabs.net

SIERRA ANALYTICAL

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Metals by EPA 6000/7000 Series Methods

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-2@10 (2101114-05) Soil Sampled: 01/08/21 08:15 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **36** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **3.6** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **9.0** | 1.2 | " | " | " | " | " | " | |
| Copper | ND | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.20 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **12** | 3.4 | " | " | " | " | " | " | |
| Lead | ND | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **13** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **12** | 2.0 | " | " | " | " | " | " | |
| **SV-2@15 (2101114-06) Soil Sampled: 01/08/21 08:20 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **78** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **7.2** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **16** | 1.2 | " | " | " | " | " | " | |
| **Copper** | **16** | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.20 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **10** | 3.4 | " | " | " | " | " | " | |
| **Lead** | **4.3** | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **32** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **29** | 2.0 | " | " | " | " | " | " | |

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SIERRA ANALYTICAL

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Metals by EPA 6000/7000 Series Methods

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-3@5 (2101114-07) Soil Sampled: 01/08/21 08:55 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **24** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **2.2** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **5.3** | 1.2 | " | " | " | " | " | " | |
| Copper | ND | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **5.6** | 3.4 | " | " | " | " | " | " | |
| Lead | ND | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **8.4** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **9.3** | 2.0 | " | " | " | " | " | " | |
| **SV-3@10 (2101114-08) Soil Sampled: 01/08/21 09:00 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **29** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **2.8** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **6.5** | 1.2 | " | " | " | " | " | " | |
| Copper | ND | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **5.1** | 3.4 | " | " | " | " | " | " | |
| Lead | ND | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **14** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **11** | 2.0 | " | " | " | " | " | " | |

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SIERRA ANALYTICAL

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Metals by EPA 6000/7000 Series Methods

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-4@5 (2101114-09) Soil Sampled: 01/08/21 09:15 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Arsenic** | **11** | 4.0 | " | " | " | " | " | " | |
| **Barium** | **25** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **2.4** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **6.4** | 1.2 | " | " | " | " | " | " | |
| Copper | ND | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **6.0** | 3.4 | " | " | " | " | " | " | |
| Lead | ND | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **9.7** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **9.3** | 2.0 | " | " | " | " | " | " | |
| **SV-4@10 (2101114-10) Soil Sampled: 01/08/21 09:20 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **110** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **11** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **21** | 1.2 | " | " | " | " | " | " | |
| **Copper** | **16** | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **23** | 3.4 | " | " | " | " | " | " | |
| Lead | ND | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **33** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **35** | 2.0 | " | " | " | " | " | " | |

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SIERRA ANALYTICAL

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Metals by EPA 6000/7000 Series Methods

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-5@5' (2101114-11) Soil Sampled: 01/08/21 09:35 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **43** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **4.9** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **12** | 1.2 | " | " | " | " | " | " | |
| Copper | ND | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **14** | 3.4 | " | " | " | " | " | " | |
| Lead | ND | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **16** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **17** | 2.0 | " | " | " | " | " | " | |
| **SV-5@10' (2101114-12) Soil Sampled: 01/08/21 09:40 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **110** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **11** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **31** | 1.2 | " | " | " | " | " | " | |
| **Copper** | **20** | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **35** | 3.4 | " | " | " | " | " | " | |
| Lead | ND | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **38** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **37** | 2.0 | " | " | " | " | " | " | |

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SIERRA ANALYTICAL

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Metals by EPA 6000/7000 Series Methods

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-6@5' (2101114-13) Soil Sampled: 01/08/21 10:00 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **78** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **8.2** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **23** | 1.2 | " | " | " | " | " | " | |
| **Copper** | **15** | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **18** | 3.4 | " | " | " | " | " | " | |
| Lead | ND | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **31** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **30** | 2.0 | " | " | " | " | " | " | |
| **SV-6@15' (2101114-14) Soil Sampled: 01/08/21 10:05 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **32** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **3.3** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **10** | 1.2 | " | " | " | " | " | " | |
| Copper | ND | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **9.2** | 3.4 | " | " | " | " | " | " | |
| Lead | ND | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **17** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **13** | 2.0 | " | " | " | " | " | " | |

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SIERRA ANALYTICAL

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Metals by EPA 6000/7000 Series Methods

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-7@5' (2101114-15) Soil Sampled: 01/08/21 08:30 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Arsenic** | **14** | 4.0 | " | " | " | " | " | " | |
| **Barium** | **33** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **3.2** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **8.4** | 1.2 | " | " | " | " | " | " | |
| Copper | ND | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **10** | 3.4 | " | " | " | " | " | " | |
| Lead | ND | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **10** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **13** | 2.0 | " | " | " | " | " | " | |
| **SV-7@10' (2101114-16) Soil Sampled: 01/08/21 08:35 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **84** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **9.6** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **24** | 1.2 | " | " | " | " | " | " | |
| **Copper** | **16** | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **32** | 3.4 | " | " | " | " | " | " | |
| Lead | ND | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **28** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **30** | 2.0 | " | " | " | " | " | " | |

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SIERRA ANALYTICAL

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Metals by EPA 6000/7000 Series Methods

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-8@4' (2101114-17) Soil Sampled: 01/08/21 10:20 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Arsenic** | **45** | 4.0 | " | " | " | " | " | " | |
| **Barium** | **100** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **8.8** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **22** | 1.2 | " | " | " | " | " | " | |
| **Copper** | **14** | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **24** | 3.4 | " | " | " | " | " | " | |
| **Lead** | **3.9** | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **31** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **39** | 2.0 | " | " | " | " | " | " | |
| **SV-8@7' (2101114-18) Soil Sampled: 01/08/21 10:25 Received: 01/11/21 10:30** | | | | | | | | | |
| Silver | ND | 1.0 | mg/kg | 1 | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| Arsenic | ND | 4.0 | " | " | " | " | " | " | |
| **Barium** | **100** | 1.0 | " | " | " | " | " | " | |
| Beryllium | ND | 1.2 | " | " | " | " | " | " | |
| Cadmium | ND | 1.7 | " | " | " | " | " | " | |
| **Cobalt** | **13** | 0.80 | " | " | " | " | " | " | |
| **Chromium** | **36** | 1.2 | " | " | " | " | " | " | |
| **Copper** | **19** | 9.0 | " | " | " | " | " | " | |
| Mercury | ND | 0.23 | " | " | B1A1213 | 01/12/21 | 01/12/21 14:07 | EPA 7471A | |
| Molybdenum | ND | 1.0 | " | " | B1A1211 | 01/12/21 | 01/12/21 19:36 | EPA 6010B | |
| **Nickel** | **42** | 3.4 | " | " | " | " | " | " | |
| Lead | ND | 3.1 | " | " | " | " | " | " | |
| Antimony | ND | 9.0 | " | " | " | " | " | " | |
| Selenium | ND | 6.2 | " | " | " | " | " | " | |
| Thallium | ND | 4.0 | " | " | " | " | " | " | |
| **Vanadium** | **37** | 3.9 | " | " | " | " | " | " | |
| **Zinc** | **38** | 2.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Total Petroleum Hydrocarbons Carbon Range Analysis by GC-FID

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SS-1 (2101114-01) Soil Sampled: 01/07/21 10:45 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *107 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| C8 <= HC < C9 | ND | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| C10 <= HC < C11 | ND | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| C12 <= HC < C14 | ND | 1.0 | " | " | " | " | " | " | |
| C14 <= HC < C16 | ND | 1.0 | " | " | " | " | " | " | |
| **C16 <= HC < C18** | **1.2** | 1.0 | " | " | " | " | " | " | |
| **C18 <= HC < C20** | **4.8** | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **7.7** | 1.0 | " | " | " | " | " | " | |
| **C24 <= HC < C28** | **90** | 1.0 | " | " | " | " | " | " | |
| **C28 <= HC < C32** | **130** | 1.0 | " | " | " | " | " | " | |
| **HC >= C32** | **130** | 1.0 | " | " | " | " | " | " | |
| **Total Petroleum Hydrocarbons (C7-C36)** | **360** | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **9.8** | 5.0 | " | " | " | " | " | " | |
| **SS-2 (2101114-02) Soil Sampled: 01/07/21 10:50 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *151 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| C8 <= HC < C9 | ND | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| C10 <= HC < C11 | ND | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| C12 <= HC < C14 | ND | 1.0 | " | " | " | " | " | " | |
| C14 <= HC < C16 | ND | 1.0 | " | " | " | " | " | " | |
| **C16 <= HC < C18** | **2.9** | 1.0 | " | " | " | " | " | " | |
| **C18 <= HC < C20** | **2.8** | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **1.1** | 1.0 | " | " | " | " | " | " | |
| **C24 <= HC < C28** | **12** | 1.0 | " | " | " | " | " | " | |
| **C28 <= HC < C32** | **29** | 1.0 | " | " | " | " | " | " | |
| **HC >= C32** | **30** | 1.0 | " | " | " | " | " | " | |
| **Total Petroleum Hydrocarbons (C7-C36)** | **78** | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **8.1** | 5.0 | " | " | " | " | " | " | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Total Petroleum Hydrocarbons Carbon Range Analysis by GC-FID

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-1@5 (2101114-03) Soil Sampled: 01/07/21 08:25 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *108 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| **C8 <= HC < C9** | **1.8** | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| **C10 <= HC < C11** | **2.6** | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| **C12 <= HC < C14** | **2.8** | 1.0 | " | " | " | " | " | " | |
| **C14 <= HC < C16** | **2.9** | 1.0 | " | " | " | " | " | " | |
| **C16 <= HC < C18** | **1.2** | 1.0 | " | " | " | " | " | " | |
| **C18 <= HC < C20** | **1.3** | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **12** | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| **C28 <= HC < C32** | **3.7** | 1.0 | " | " | " | " | " | " | |
| **HC >= C32** | **9.6** | 1.0 | " | " | " | " | " | " | |
| **Total Petroleum Hydrocarbons (C7-C36)** | **38** | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **24** | 5.0 | " | " | " | " | " | " | |
| **SV-1@10 (2101114-04) Soil Sampled: 01/07/21 08:40 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *77.8 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| C8 <= HC < C9 | ND | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| C10 <= HC < C11 | ND | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| C12 <= HC < C14 | ND | 1.0 | " | " | " | " | " | " | |
| C14 <= HC < C16 | ND | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| C18 <= HC < C20 | ND | 1.0 | " | " | " | " | " | " | |
| C20 <= HC < C24 | ND | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| C28 <= HC < C32 | ND | 1.0 | " | " | " | " | " | " | |
| HC >= C32 | ND | 1.0 | " | " | " | " | " | " | |
| Total Petroleum Hydrocarbons (C7-C36) | ND | 5.0 | " | " | " | " | " | " | |
| Diesel Range Organics (C10-C24) | ND | 5.0 | " | " | " | " | " | " | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Total Petroleum Hydrocarbons Carbon Range Analysis by GC-FID

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-2@10 (2101114-05) Soil Sampled: 01/08/21 08:15 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *79.7 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| **C8 <= HC < C9** | **1.1** | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| **C10 <= HC < C11** | **2.1** | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| **C12 <= HC < C14** | **2.1** | 1.0 | " | " | " | " | " | " | |
| **C14 <= HC < C16** | **1.3** | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| C18 <= HC < C20 | ND | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **3.0** | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| C28 <= HC < C32 | ND | 1.0 | " | " | " | " | " | " | |
| HC >= C32 | ND | 1.0 | " | " | " | " | " | " | |
| **Total Petroleum Hydrocarbons (C7-C36)** | **9.5** | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **10** | 5.0 | " | " | " | " | " | " | |
| **SV-2@15 (2101114-06) Soil Sampled: 01/08/21 08:20 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *73.2 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| C8 <= HC < C9 | ND | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| C10 <= HC < C11 | ND | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| C12 <= HC < C14 | ND | 1.0 | " | " | " | " | " | " | |
| C14 <= HC < C16 | ND | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| C18 <= HC < C20 | ND | 1.0 | " | " | " | " | " | " | |
| C20 <= HC < C24 | ND | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| C28 <= HC < C32 | ND | 1.0 | " | " | " | " | " | " | |
| HC >= C32 | ND | 1.0 | " | " | " | " | " | " | |
| Total Petroleum Hydrocarbons (C7-C36) | ND | 5.0 | " | " | " | " | " | " | |
| Diesel Range Organics (C10-C24) | ND | 5.0 | " | " | " | " | " | " | |

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E-Mail: sierralabs @ sierralabs.net

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Total Petroleum Hydrocarbons Carbon Range Analysis by GC-FID

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-3@5 (2101114-07) Soil Sampled: 01/08/21 08:55 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *97.0 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| C8 <= HC < C9 | ND | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| **C10 <= HC < C11** | **1.5** | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| C12 <= HC < C14 | ND | 1.0 | " | " | " | " | " | " | |
| **C14 <= HC < C16** | **1.3** | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| C18 <= HC < C20 | ND | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **3.0** | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| C28 <= HC < C32 | ND | 1.0 | " | " | " | " | " | " | |
| HC >= C32 | ND | 1.0 | " | " | " | " | " | " | |
| **Total Petroleum Hydrocarbons (C7-C36)** | **5.8** | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **7.6** | 5.0 | " | " | " | " | " | " | |
| **SV-3@10 (2101114-08) Soil Sampled: 01/08/21 09:00 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *86.5 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| **C8 <= HC < C9** | **1.1** | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| **C10 <= HC < C11** | **1.6** | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| **C12 <= HC < C14** | **1.2** | 1.0 | " | " | " | " | " | " | |
| **C14 <= HC < C16** | **1.0** | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| C18 <= HC < C20 | ND | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **1.7** | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| C28 <= HC < C32 | ND | 1.0 | " | " | " | " | " | " | |
| HC >= C32 | ND | 1.0 | " | " | " | " | " | " | |
| **Total Petroleum Hydrocarbons (C7-C36)** | **6.6** | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **7.4** | 5.0 | " | " | " | " | " | " | |

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| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Total Petroleum Hydrocarbons Carbon Range Analysis by GC-FID

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-4@5 (2101114-09) Soil Sampled: 01/08/21 09:15 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *73.1 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| C8 <= HC < C9 | ND | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| **C10 <= HC < C11** | **2.2** | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| **C12 <= HC < C14** | **2.1** | 1.0 | " | " | " | " | " | " | |
| C14 <= HC < C16 | ND | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| C18 <= HC < C20 | ND | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **1.9** | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| C28 <= HC < C32 | ND | 1.0 | " | " | " | " | " | " | |
| HC >= C32 | ND | 1.0 | " | " | " | " | " | " | |
| **Total Petroleum Hydrocarbons (C7-C36)** | **6.2** | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **8.2** | 5.0 | " | " | " | " | " | " | |
| **SV-4@10 (2101114-10) Soil Sampled: 01/08/21 09:20 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *61.8 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| **C8 <= HC < C9** | **1.8** | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| **C10 <= HC < C11** | **1.3** | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| C12 <= HC < C14 | ND | 1.0 | " | " | " | " | " | " | |
| C14 <= HC < C16 | ND | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| C18 <= HC < C20 | ND | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **1.2** | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| C28 <= HC < C32 | ND | 1.0 | " | " | " | " | " | " | |
| HC >= C32 | ND | 1.0 | " | " | " | " | " | " | |
| Total Petroleum Hydrocarbons (C7-C36) | ND | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **6.6** | 5.0 | " | " | " | " | " | " | |

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| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Total Petroleum Hydrocarbons Carbon Range Analysis by GC-FID

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-5@5' (2101114-11) Soil Sampled: 01/08/21 09:35 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *118 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| C8 <= HC < C9 | ND | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| **C10 <= HC < C11** | **1.8** | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| **C12 <= HC < C14** | **2.3** | 1.0 | " | " | " | " | " | " | |
| **C14 <= HC < C16** | **1.4** | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| C18 <= HC < C20 | ND | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **3.5** | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| C28 <= HC < C32 | ND | 1.0 | " | " | " | " | " | " | |
| HC >= C32 | ND | 1.0 | " | " | " | " | " | " | |
| **Total Petroleum Hydrocarbons (C7-C36)** | **8.9** | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **10** | 5.0 | " | " | " | " | " | " | |
| **SV-5@10' (2101114-12) Soil Sampled: 01/08/21 09:40 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *83.1 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| C8 <= HC < C9 | ND | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| **C10 <= HC < C11** | **2.0** | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| **C12 <= HC < C14** | **1.7** | 1.0 | " | " | " | " | " | " | |
| C14 <= HC < C16 | ND | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| C18 <= HC < C20 | ND | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **2.1** | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| C28 <= HC < C32 | ND | 1.0 | " | " | " | " | " | " | |
| HC >= C32 | ND | 1.0 | " | " | " | " | " | " | |
| Total Petroleum Hydrocarbons (C7-C36) | ND | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **8.6** | 5.0 | " | " | " | " | " | " | |

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| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Total Petroleum Hydrocarbons Carbon Range Analysis by GC-FID

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-6@5' (2101114-13) Soil Sampled: 01/08/21 10:00 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *64.0 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| **C8 <= HC < C9** | **1.1** | 1.0 | " | " | " | " | " | " | |
| **C9 <= HC < C10** | **1.1** | 1.0 | " | " | " | " | " | " | |
| **C10 <= HC < C11** | **2.3** | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| **C12 <= HC < C14** | **3.2** | 1.0 | " | " | " | " | " | " | |
| C14 <= HC < C16 | ND | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| C18 <= HC < C20 | ND | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **1.0** | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| C28 <= HC < C32 | ND | 1.0 | " | " | " | " | " | " | |
| HC >= C32 | ND | 1.0 | " | " | " | " | " | " | |
| **Total Petroleum Hydrocarbons (C7-C36)** | **8.6** | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **10** | 5.0 | " | " | " | " | " | " | |
| **SV-6@15' (2101114-14) Soil Sampled: 01/08/21 10:05 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *107 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| C8 <= HC < C9 | ND | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| **C10 <= HC < C11** | **3.8** | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| **C12 <= HC < C14** | **3.4** | 1.0 | " | " | " | " | " | " | |
| **C14 <= HC < C16** | **2.9** | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| C18 <= HC < C20 | ND | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **6.0** | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| C28 <= HC < C32 | ND | 1.0 | " | " | " | " | " | " | |
| HC >= C32 | ND | 1.0 | " | " | " | " | " | " | |
| **Total Petroleum Hydrocarbons (C7-C36)** | **16** | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **19** | 5.0 | " | " | " | " | " | " | |

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| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Total Petroleum Hydrocarbons Carbon Range Analysis by GC-FID

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-7@5' (2101114-15) Soil Sampled: 01/08/21 08:30 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *89.9 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| C8 <= HC < C9 | ND | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| **C10 <= HC < C11** | **2.6** | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| **C12 <= HC < C14** | **2.5** | 1.0 | " | " | " | " | " | " | |
| **C14 <= HC < C16** | **1.8** | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| C18 <= HC < C20 | ND | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **1.9** | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| C28 <= HC < C32 | ND | 1.0 | " | " | " | " | " | " | |
| HC >= C32 | ND | 1.0 | " | " | " | " | " | " | |
| **Total Petroleum Hydrocarbons (C7-C36)** | **6.2** | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **11** | 5.0 | " | " | " | " | " | " | |
| **SV-7@10' (2101114-16) Soil Sampled: 01/08/21 08:35 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *73.0 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| C8 <= HC < C9 | ND | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| **C10 <= HC < C11** | **1.7** | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| **C12 <= HC < C14** | **1.7** | 1.0 | " | " | " | " | " | " | |
| **C14 <= HC < C16** | **1.4** | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| **C18 <= HC < C20** | **1.0** | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **5.8** | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| C28 <= HC < C32 | ND | 1.0 | " | " | " | " | " | " | |
| HC >= C32 | ND | 1.0 | " | " | " | " | " | " | |
| **Total Petroleum Hydrocarbons (C7-C36)** | **12** | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **13** | 5.0 | " | " | " | " | " | " | |

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| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Total Petroleum Hydrocarbons Carbon Range Analysis by GC-FID

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-8@4' (2101114-17) Soil Sampled: 01/08/21 10:20 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *77.3 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| C8 <= HC < C9 | ND | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| **C10 <= HC < C11** | **1.0** | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| C12 <= HC < C14 | ND | 1.0 | " | " | " | " | " | " | |
| C14 <= HC < C16 | ND | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| C18 <= HC < C20 | ND | 1.0 | " | " | " | " | " | " | |
| **C20 <= HC < C24** | **3.3** | 1.0 | " | " | " | " | " | " | |
| **C24 <= HC < C28** | **2.8** | 1.0 | " | " | " | " | " | " | |
| **C28 <= HC < C32** | **2.1** | 1.0 | " | " | " | " | " | " | |
| **HC >= C32** | **1.9** | 1.0 | " | " | " | " | " | " | |
| **Total Petroleum Hydrocarbons (C7-C36)** | **11** | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **6.6** | 5.0 | " | " | " | " | " | " | |
| **SV-8@7' (2101114-18) Soil Sampled: 01/08/21 10:25 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: o-Terphenyl* | | *78.9 %* | *60-175* | | *B1A1808* | *01/18/21* | *01/18/21 14:45* | *EPA 8015B* | |
| HC < C8 | ND | 1.0 | " | " | " | " | " | " | |
| C8 <= HC < C9 | ND | 1.0 | " | " | " | " | " | " | |
| C9 <= HC < C10 | ND | 1.0 | " | " | " | " | " | " | |
| C10 <= HC < C11 | ND | 1.0 | " | " | " | " | " | " | |
| C11 <= HC < C12 | ND | 1.0 | " | " | " | " | " | " | |
| C12 <= HC < C14 | ND | 1.0 | " | " | " | " | " | " | |
| C14 <= HC < C16 | ND | 1.0 | " | " | " | " | " | " | |
| C16 <= HC < C18 | ND | 1.0 | " | " | " | " | " | " | |
| C18 <= HC < C20 | ND | 1.0 | " | " | " | " | " | " | |
| C20 <= HC < C24 | ND | 1.0 | " | " | " | " | " | " | |
| C24 <= HC < C28 | ND | 1.0 | " | " | " | " | " | " | |
| C28 <= HC < C32 | ND | 1.0 | " | " | " | " | " | " | |
| HC >= C32 | ND | 1.0 | " | " | " | " | " | " | |
| Total Petroleum Hydrocarbons (C7-C36) | ND | 5.0 | " | " | " | " | " | " | |
| **Diesel Range Organics (C10-C24)** | **7.7** | 5.0 | " | " | " | " | " | " | |

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. This report and all associated analytical data will be retained by Sierra Analytical Labs, Inc. for five years from the date reported. Requests for additional storage time must be made in writing prior to the expiration of the five year retaining period and are subject to approval by Sierra Analytical Labs, Inc.*

26052 Merit Circle Suite 104, Laguna Hills, California 92653
Telephone: (949) 348-9389 Fax: (949) 348-9115
E-Mail: sierralabs @ sierralabs.net

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Polychlorinated Biphenyls by EPA Method 8082

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SS-1 (2101114-01) Soil Sampled: 01/07/21 10:45 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Decachlorobiphenyl* | | *59.2 %* | *42-147* | | *B1A1406* | *01/11/21* | *01/15/21 08:21* | *EPA 8082* | |
| *Surrogate: Tetrachloro-meta-xylene* | | *65.1 %* | *42-147* | | *"* | *"* | *"* | *"* | |
| PCB-1016 | ND | 0.050 | " | " | " | " | " | " | |
| PCB-1221 | ND | 0.050 | " | " | " | " | " | " | |
| PCB-1232 | ND | 0.050 | " | " | " | " | " | " | |
| PCB-1242 | ND | 0.050 | " | " | " | " | " | " | |
| PCB-1248 | ND | 0.050 | " | " | " | " | " | " | |
| PCB-1254 | ND | 0.050 | " | " | " | " | " | " | |
| PCB-1260 | ND | 0.050 | " | " | " | " | " | " | |
| **SS-2 (2101114-02) Soil Sampled: 01/07/21 10:50 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Decachlorobiphenyl* | | *55.1 %* | *42-147* | | *B1A1406* | *01/11/21* | *01/15/21 08:21* | *EPA 8082* | |
| *Surrogate: Tetrachloro-meta-xylene* | | *103 %* | *42-147* | | *"* | *"* | *"* | *"* | |
| PCB-1016 | ND | 0.050 | " | " | " | " | " | " | |
| PCB-1221 | ND | 0.050 | " | " | " | " | " | " | |
| PCB-1232 | ND | 0.050 | " | " | " | " | " | " | |
| PCB-1242 | ND | 0.050 | " | " | " | " | " | " | |
| PCB-1248 | ND | 0.050 | " | " | " | " | " | " | |
| PCB-1254 | ND | 0.050 | " | " | " | " | " | " | |
| PCB-1260 | ND | 0.050 | " | " | " | " | " | " | |

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E-Mail: sierralabs @ sierralabs.net

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SS-1 (2101114-01) Soil Sampled: 01/07/21 10:45 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *96.8 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 11:47* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *87.0 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *94.1 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SS-1 (2101114-01) Soil Sampled: 01/07/21 10:45 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 11:47 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SS-2 (2101114-02) Soil Sampled: 01/07/21 10:50 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *109 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *87.4 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *94.0 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SS-2 (2101114-02) Soil Sampled: 01/07/21 10:50 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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E-Mail: sierralabs @ sierralabs.net

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-1@5 (2101114-03) Soil Sampled: 01/07/21 08:25 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *104 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *91.9 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *90.7 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-1@5 (2101114-03) Soil Sampled: 01/07/21 08:25 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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E-Mail: sierralabs @ sierralabs.net

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-1@10 (2101114-04) Soil Sampled: 01/07/21 08:40 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *110 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *91.3 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *89.0 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-1@10 (2101114-04) Soil Sampled: 01/07/21 08:40 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-2@10 (2101114-05) Soil Sampled: 01/08/21 08:15 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *99.2 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *84.4 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *88.6 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-2@10 (2101114-05) Soil Sampled: 01/08/21 08:15 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-2@15 (2101114-06) Soil Sampled: 01/08/21 08:20 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *99.0 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *89.3 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *105 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-2@15 (2101114-06) Soil Sampled: 01/08/21 08:20 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-3@5 (2101114-07) Soil Sampled: 01/08/21 08:55 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *96.7 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *92.6 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *102 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-3@5 (2101114-07) Soil Sampled: 01/08/21 08:55 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-3@10 (2101114-08) Soil Sampled: 01/08/21 09:00 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *115 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *90.0 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *104 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-3@10 (2101114-08) Soil Sampled: 01/08/21 09:00 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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SIERRA ANALYTICAL

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-4@5 (2101114-09) Soil Sampled: 01/08/21 09:15 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *109 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *96.5 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *104 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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E-Mail: sierralabs @ sierralabs.net

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-4@5 (2101114-09) Soil Sampled: 01/08/21 09:15 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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E-Mail: sierralabs @ sierralabs.net

| | | | |
|---|---|---|---|
| SALEM Engineering Group - Fresno | Project: | Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: | 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: | Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-4@10 (2101114-10) Soil Sampled: 01/08/21 09:20 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *120 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *98.9 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *102 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-4@10 (2101114-10) Soil Sampled: 01/08/21 09:20 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-5@5' (2101114-11) Soil Sampled: 01/08/21 09:35 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *113 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *96.6 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *100 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-5@5' (2101114-11) Soil Sampled: 01/08/21 09:35 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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Telephone: (949) 348-9389 Fax: (949) 348-9115
E-Mail: sierralabs @ sierralabs.net

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-5@10' (2101114-12) Soil Sampled: 01/08/21 09:40 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *114 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *88.0 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *107 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-5@10' (2101114-12) Soil Sampled: 01/08/21 09:40 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-6@5' (2101114-13) Soil Sampled: 01/08/21 10:00 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *104 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *85.5 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *87.4 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-6@5' (2101114-13) Soil Sampled: 01/08/21 10:00 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-6@15' (2101114-14) Soil Sampled: 01/08/21 10:05 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *106 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *91.0 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *88.7 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-6@15' (2101114-14) Soil Sampled: 01/08/21 10:05 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-7@5' (2101114-15) Soil Sampled: 01/08/21 08:30 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *102 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *103 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *90.7 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-7@5' (2101114-15) Soil Sampled: 01/08/21 08:30 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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E-Mail: sierralabs @ sierralabs.net

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-7@10' (2101114-16) Soil Sampled: 01/08/21 08:35 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *94.8 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *87.4 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *89.4 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-7@10' (2101114-16) Soil Sampled: 01/08/21 08:35 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-8@4' (2101114-17) Soil Sampled: 01/08/21 10:20 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *114 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *86.3 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *87.8 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-8@4' (2101114-17) Soil Sampled: 01/08/21 10:20 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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E-Mail: sierralabs @ sierralabs.net

SIERRA ANALYTICAL

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-8@7' (2101114-18) Soil Sampled: 01/08/21 10:25 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: Dibromofluoromethane* | | *108 %* | | *80-120* | *B1A1404* | *01/14/21* | *01/14/21 12:25* | *EPA 8260B* | |
| *Surrogate: Toluene-d8* | | *92.7 %* | | *81-117* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *89.3 %* | | *74-121* | " | " | " | " | |
| Benzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 5.0 | " | " | " | " | " | " | |
| Bromoform | ND | 5.0 | " | " | " | " | " | " | |
| Bromomethane | ND | 5.0 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 5.0 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Chloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Chloroform | ND | 5.0 | " | " | " | " | " | " | |
| Chloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 5.0 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | " | " | " | " | " | |
| Dibromomethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| Dichlorodifluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 5.0 | " | " | " | " | " | " | |
| Di-isopropyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Ethyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-8@7' (2101114-18) Soil Sampled: 01/08/21 10:25 Received: 01/11/21 10:30** | | | | | | | | | |
| Ethylbenzene | ND | 5.0 | µg/kg | 1 | B1A1404 | 01/14/21 | 01/14/21 12:25 | EPA 8260B | |
| Hexachlorobutadiene | ND | 5.0 | " | " | " | " | " | " | |
| Isopropylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 5.0 | " | " | " | " | " | " | |
| Methylene chloride | ND | 5.0 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Naphthalene | ND | 5.0 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Styrene | ND | 5.0 | " | " | " | " | " | " | |
| Tert-amyl methyl ether | ND | 5.0 | " | " | " | " | " | " | |
| Tert-butyl alcohol | ND | 25 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Toluene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | " | " | " | " | " | |
| Trichloroethene | ND | 5.0 | " | " | " | " | " | " | |
| Trichlorofluoromethane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 5.0 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 5.0 | " | " | " | " | " | " | |
| o-Xylene | ND | 5.0 | " | " | " | " | " | " | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Semivolatile Organic Compounds by EPA Method 8270C

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SS-1 (2101114-01) Soil Sampled: 01/07/21 10:45 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: 2-Fluorophenol* | | *116 %* | | *25-121* | *B1A1405* | *01/14/21* | *01/14/21 09:42* | *EPA 8270C* | |
| *Surrogate: Phenol-d6* | | *53.7 %* | | *24-113* | " | " | " | " | |
| *Surrogate: Nitrobenzene-d5* | | *56.3 %* | | *23-120* | " | " | " | " | |
| *Surrogate: 2-Fluorobiphenyl* | | *44.6 %* | | *30-115* | " | " | " | " | |
| *Surrogate: 2,4,6-Tribromophenol* | | *60.3 %* | | *19-122* | " | " | " | " | |
| *Surrogate: Terphenyl-d14* | | *93.9 %* | | *18-137* | " | " | " | " | |
| Acenaphthene | ND | 0.33 | " | " | " | " | " | " | |
| Acenaphthylene | ND | 0.33 | " | " | " | " | " | " | |
| Anthracene | ND | 0.33 | " | " | " | " | " | " | |
| Benzidine | ND | 0.33 | " | " | " | " | " | " | |
| **Benzo (a) anthracene** | **0.41** | 0.33 | " | " | " | " | " | " | |
| Benzo (b) fluoranthene | ND | 0.33 | " | " | " | " | " | " | |
| Benzo (k) fluoranthene | ND | 0.33 | " | " | " | " | " | " | |
| Benzo (a) pyrene | ND | 0.33 | " | " | " | " | " | " | |
| Benzo (g,h,i) perylene | ND | 0.33 | " | " | " | " | " | " | |
| Benzyl alcohol | ND | 0.33 | " | " | " | " | " | " | |
| Bis(2-chloroethyl)ether | ND | 0.33 | " | " | " | " | " | " | |
| Bis(2-chloroethoxy)methane | ND | 0.33 | " | " | " | " | " | " | |
| Bis(2-ethylhexyl)phthalate | ND | 0.33 | " | " | " | " | " | " | |
| Bis(2-chloroisopropyl)ether | ND | 0.33 | " | " | " | " | " | " | |
| 4-Bromophenyl phenyl ether | ND | 0.33 | " | " | " | " | " | " | |
| Butyl benzyl phthalate | ND | 0.33 | " | " | " | " | " | " | |
| 4-Chloroaniline | ND | 0.33 | " | " | " | " | " | " | |
| 2-Chlorophenol | ND | 0.33 | " | " | " | " | " | " | |
| 4-Chloro-3-methylphenol | ND | 0.33 | " | " | " | " | " | " | |
| 2-Chloronaphthalene | ND | 0.33 | " | " | " | " | " | " | |
| 4-Chlorophenyl phenyl ether | ND | 0.33 | " | " | " | " | " | " | |
| **Chrysene** | **0.38** | 0.33 | " | " | " | " | " | " | |
| Dibenz (a,h) anthracene | ND | 0.33 | " | " | " | " | " | " | |
| Dibenzofuran | ND | 0.33 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.33 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.33 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.33 | " | " | " | " | " | " | |
| 3,3´-Dichlorobenzidine | ND | 0.33 | " | " | " | " | " | " | |
| 2,4-Dichlorophenol | ND | 0.33 | " | " | " | " | " | " | |
| Diethyl phthalate | ND | 0.33 | " | " | " | " | " | " | |
| 2,4-Dimethylphenol | ND | 0.33 | " | " | " | " | " | " | |
| Dimethyl phthalate | ND | 0.33 | " | " | " | " | " | " | |
| Di-n-butyl phthalate | ND | 0.33 | " | " | " | " | " | " | |
| 2,4-Dinitrophenol | ND | 0.33 | " | " | " | " | " | " | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Semivolatile Organic Compounds by EPA Method 8270C

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SS-1 (2101114-01) Soil Sampled: 01/07/21 10:45 Received: 01/11/21 10:30** | | | | | | | | | |
| 4,6-Dinitro-2-methylphenol | ND | 0.33 | mg/kg | 1 | B1A1405 | 01/14/21 | 01/14/21 09:42 | EPA 8270C | |
| 2,4-Dinitrotoluene | ND | 0.33 | " | " | " | " | " | " | |
| 2,6-Dinitrotoluene | ND | 0.33 | " | " | " | " | " | " | |
| Di-n-octyl phthalate | ND | 0.33 | " | " | " | " | " | " | |
| 1,2-Diphenylhydrazine | ND | 0.33 | " | " | " | " | " | " | |
| **Fluoranthene** | **0.49** | 0.33 | " | " | " | " | " | " | |
| Fluorene | ND | 0.33 | " | " | " | " | " | " | |
| Hexachlorobenzene | ND | 0.33 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.33 | " | " | " | " | " | " | |
| Hexachlorocyclopentadiene | ND | 0.33 | " | " | " | " | " | " | |
| Hexachloroethane | ND | 0.33 | " | " | " | " | " | " | |
| Indeno (1,2,3-cd) pyrene | ND | 0.33 | " | " | " | " | " | " | |
| Isophorone | ND | 0.33 | " | " | " | " | " | " | |
| 2-Methylnaphthalene | ND | 0.33 | " | " | " | " | " | " | |
| 2-Methylphenol | ND | 0.33 | " | " | " | " | " | " | |
| 4-Methylphenol | ND | 0.33 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.33 | " | " | " | " | " | " | |
| 2-Nitroaniline | ND | 0.33 | " | " | " | " | " | " | |
| 3-Nitroaniline | ND | 0.33 | " | " | " | " | " | " | |
| 4-Nitroaniline | ND | 0.33 | " | " | " | " | " | " | |
| Nitrobenzene | ND | 0.33 | " | " | " | " | " | " | |
| 2-Nitrophenol | ND | 0.33 | " | " | " | " | " | " | |
| 4-Nitrophenol | ND | 0.33 | " | " | " | " | " | " | |
| N-Nitrosodimethylamine | ND | 0.33 | " | " | " | " | " | " | |
| Diphenylamine | ND | 0.33 | " | " | " | " | " | " | |
| N-Nitrosodi-n-propylamine | ND | 0.33 | " | " | " | " | " | " | |
| Pentachlorophenol | ND | 0.33 | " | " | " | " | " | " | |
| **Phenanthrene** | **0.57** | 0.33 | " | " | " | " | " | " | |
| Phenol | ND | 0.33 | " | " | " | " | " | " | |
| **Pyrene** | **1.3** | 0.33 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.33 | " | " | " | " | " | " | |
| 2,4,5-Trichlorophenol | ND | 0.33 | " | " | " | " | " | " | |
| 2,4,6-Trichlorophenol | ND | 0.33 | " | " | " | " | " | " | |

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SIERRA ANALYTICAL

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Semivolatile Organic Compounds by EPA Method 8270C

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SS-2 (2101114-02) Soil Sampled: 01/07/21 10:50 Received: 01/11/21 10:30** | | | | | | | | | |
| *Surrogate: 2-Fluorophenol* | | *55.7 %* | | *25-121* | *B1A1405* | *01/14/21* | *01/14/21 10:22* | *EPA 8270C* | |
| *Surrogate: Phenol-d6* | | *55.5 %* | | *24-113* | " | " | " | " | |
| *Surrogate: Nitrobenzene-d5* | | *29.1 %* | | *23-120* | " | " | " | " | |
| *Surrogate: 2-Fluorobiphenyl* | | *57.7 %* | | *30-115* | " | " | " | " | |
| *Surrogate: 2,4,6-Tribromophenol* | | *56.3 %* | | *19-122* | " | " | " | " | |
| *Surrogate: Terphenyl-d14* | | *46.3 %* | | *18-137* | " | " | " | " | |
| Acenaphthene | ND | 0.33 | " | " | " | " | " | " | |
| Acenaphthylene | ND | 0.33 | " | " | " | " | " | " | |
| Anthracene | ND | 0.33 | " | " | " | " | " | " | |
| Benzidine | ND | 0.33 | " | " | " | " | " | " | |
| Benzo (a) anthracene | ND | 0.33 | " | " | " | " | " | " | |
| Benzo (b) fluoranthene | ND | 0.33 | " | " | " | " | " | " | |
| Benzo (k) fluoranthene | ND | 0.33 | " | " | " | " | " | " | |
| Benzo (a) pyrene | ND | 0.33 | " | " | " | " | " | " | |
| Benzo (g,h,i) perylene | ND | 0.33 | " | " | " | " | " | " | |
| Benzyl alcohol | ND | 0.33 | " | " | " | " | " | " | |
| Bis(2-chloroethyl)ether | ND | 0.33 | " | " | " | " | " | " | |
| Bis(2-chloroethoxy)methane | ND | 0.33 | " | " | " | " | " | " | |
| Bis(2-ethylhexyl)phthalate | ND | 0.33 | " | " | " | " | " | " | |
| Bis(2-chloroisopropyl)ether | ND | 0.33 | " | " | " | " | " | " | |
| 4-Bromophenyl phenyl ether | ND | 0.33 | " | " | " | " | " | " | |
| Butyl benzyl phthalate | ND | 0.33 | " | " | " | " | " | " | |
| 4-Chloroaniline | ND | 0.33 | " | " | " | " | " | " | |
| 2-Chlorophenol | ND | 0.33 | " | " | " | " | " | " | |
| 4-Chloro-3-methylphenol | ND | 0.33 | " | " | " | " | " | " | |
| 2-Chloronaphthalene | ND | 0.33 | " | " | " | " | " | " | |
| 4-Chlorophenyl phenyl ether | ND | 0.33 | " | " | " | " | " | " | |
| Chrysene | ND | 0.33 | " | " | " | " | " | " | |
| Dibenz (a,h) anthracene | ND | 0.33 | " | " | " | " | " | " | |
| Dibenzofuran | ND | 0.33 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.33 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.33 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.33 | " | " | " | " | " | " | |
| 3,3´-Dichlorobenzidine | ND | 0.33 | " | " | " | " | " | " | |
| 2,4-Dichlorophenol | ND | 0.33 | " | " | " | " | " | " | |
| Diethyl phthalate | ND | 0.33 | " | " | " | " | " | " | |
| 2,4-Dimethylphenol | ND | 0.33 | " | " | " | " | " | " | |
| Dimethyl phthalate | ND | 0.33 | " | " | " | " | " | " | |
| Di-n-butyl phthalate | ND | 0.33 | " | " | " | " | " | " | |
| 2,4-Dinitrophenol | ND | 0.33 | " | " | " | " | " | " | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Semivolatile Organic Compounds by EPA Method 8270C

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SS-2 (2101114-02) Soil Sampled: 01/07/21 10:50 Received: 01/11/21 10:30** | | | | | | | | | |
| 4,6-Dinitro-2-methylphenol | ND | 0.33 | mg/kg | 1 | B1A1405 | 01/14/21 | 01/14/21 10:22 | EPA 8270C | |
| 2,4-Dinitrotoluene | ND | 0.33 | " | " | " | " | " | " | |
| 2,6-Dinitrotoluene | ND | 0.33 | " | " | " | " | " | " | |
| Di-n-octyl phthalate | ND | 0.33 | " | " | " | " | " | " | |
| 1,2-Diphenylhydrazine | ND | 0.33 | " | " | " | " | " | " | |
| Fluoranthene | ND | 0.33 | " | " | " | " | " | " | |
| Fluorene | ND | 0.33 | " | " | " | " | " | " | |
| Hexachlorobenzene | ND | 0.33 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.33 | " | " | " | " | " | " | |
| Hexachlorocyclopentadiene | ND | 0.33 | " | " | " | " | " | " | |
| Hexachloroethane | ND | 0.33 | " | " | " | " | " | " | |
| Indeno (1,2,3-cd) pyrene | ND | 0.33 | " | " | " | " | " | " | |
| Isophorone | ND | 0.33 | " | " | " | " | " | " | |
| 2-Methylnaphthalene | ND | 0.33 | " | " | " | " | " | " | |
| 2-Methylphenol | ND | 0.33 | " | " | " | " | " | " | |
| 4-Methylphenol | ND | 0.33 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.33 | " | " | " | " | " | " | |
| 2-Nitroaniline | ND | 0.33 | " | " | " | " | " | " | |
| 3-Nitroaniline | ND | 0.33 | " | " | " | " | " | " | |
| 4-Nitroaniline | ND | 0.33 | " | " | " | " | " | " | |
| Nitrobenzene | ND | 0.33 | " | " | " | " | " | " | |
| 2-Nitrophenol | ND | 0.33 | " | " | " | " | " | " | |
| 4-Nitrophenol | ND | 0.33 | " | " | " | " | " | " | |
| N-Nitrosodimethylamine | ND | 0.33 | " | " | " | " | " | " | |
| Diphenylamine | ND | 0.33 | " | " | " | " | " | " | |
| N-Nitrosodi-n-propylamine | ND | 0.33 | " | " | " | " | " | " | |
| Pentachlorophenol | ND | 0.33 | " | " | " | " | " | " | |
| Phenanthrene | ND | 0.33 | " | " | " | " | " | " | |
| Phenol | ND | 0.33 | " | " | " | " | " | " | |
| Pyrene | ND | 0.33 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.33 | " | " | " | " | " | " | |
| 2,4,5-Trichlorophenol | ND | 0.33 | " | " | " | " | " | " | |
| 2,4,6-Trichlorophenol | ND | 0.33 | " | " | " | " | " | " | |

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SIERRA ANALYTICAL

| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Metals by EPA 6000/7000 Series Methods - Quality Control

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch B1A1211 - EPA 3050B** | | | | | | | | | | |
| **Blank (B1A1211-BLK1)** | | | | Prepared & Analyzed: 01/12/21 | | | | | | |
| Cadmium | ND | 1.7 | mg/kg | | | | | | | |
| Silver | ND | 1.0 | " | | | | | | | |
| Nickel | ND | 3.4 | " | | | | | | | |
| Copper | ND | 9.0 | " | | | | | | | |
| Lead | ND | 3.1 | " | | | | | | | |
| Antimony | ND | 9.0 | " | | | | | | | |
| Cobalt | ND | 0.80 | " | | | | | | | |
| Chromium | ND | 1.2 | " | | | | | | | |
| Selenium | ND | 6.2 | " | | | | | | | |
| Molybdenum | ND | 1.0 | " | | | | | | | |
| Thallium | ND | 4.0 | " | | | | | | | |
| Beryllium | ND | 1.2 | " | | | | | | | |
| Vanadium | ND | 3.9 | " | | | | | | | |
| Barium | ND | 1.0 | " | | | | | | | |
| Zinc | ND | 2.0 | " | | | | | | | |
| Arsenic | ND | 4.0 | " | | | | | | | |
| **LCS (B1A1211-BS1)** | | | | Prepared & Analyzed: 01/12/21 | | | | | | |
| Beryllium | 107 | 1.2 | mg/kg | 100 | | 107 | 80-120 | | | |
| Barium | 105 | 1.0 | " | 100 | | 105 | 80-120 | | | |
| Cobalt | 106 | 0.80 | " | 100 | | 106 | 80-120 | | | |
| Chromium | 105 | 1.2 | " | 100 | | 105 | 80-120 | | | |
| Arsenic | 95.4 | 4.0 | " | 100 | | 95.4 | 78-122 | | | |
| Copper | 105 | 9.0 | " | 100 | | 105 | 78-122 | | | |
| Silver | 100 | 1.0 | " | 100 | | 100 | 60-140 | | | |
| Cadmium | 103 | 1.7 | " | 100 | | 103 | 80-120 | | | |
| Selenium | 98.2 | 6.2 | " | 100 | | 98.2 | 76-124 | | | |
| Nickel | 102 | 3.4 | " | 100 | | 102 | 80-120 | | | |
| Zinc | 106 | 2.0 | " | 100 | | 106 | 80-120 | | | |
| Lead | 92.3 | 3.1 | " | 100 | | 92.3 | 80-120 | | | |
| Antimony | 104 | 9.0 | " | 100 | | 104 | 75-125 | | | |
| Vanadium | 102 | 3.9 | " | 100 | | 102 | 80-120 | | | |
| Molybdenum | 94.0 | 1.0 | " | 100 | | 94.0 | 80-120 | | | |
| Thallium | 95.9 | 4.0 | " | 100 | | 95.9 | 80-120 | | | |

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SIERRA ANALYTICAL

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Metals by EPA 6000/7000 Series Methods - Quality Control

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch B1A1211 - EPA 3050B** | | | | | | | | | | |
| **LCS Dup (B1A1211-BSD1)** | | | | Prepared & Analyzed: 01/12/21 | | | | | | |
| Zinc | 104 | 2.0 | mg/kg | 100 | | 104 | 80-120 | 2.52 | 20 | |
| Silver | 97.4 | 1.0 | " | 100 | | 97.4 | 60-140 | 2.76 | 40 | |
| Vanadium | 100 | 3.9 | " | 100 | | 100 | 80-120 | 1.26 | 20 | |
| Arsenic | 98.7 | 4.0 | " | 100 | | 98.7 | 78-122 | 3.32 | 20 | |
| Thallium | 105 | 4.0 | " | 100 | | 105 | 80-120 | 9.23 | 20 | |
| Barium | 105 | 1.0 | " | 100 | | 105 | 80-120 | 0.310 | 20 | |
| Copper | 107 | 9.0 | " | 100 | | 107 | 78-122 | 1.67 | 20 | |
| Beryllium | 107 | 1.2 | " | 100 | | 107 | 80-120 | 0.257 | 20 | |
| Antimony | 107 | 9.0 | " | 100 | | 107 | 75-125 | 3.27 | 20 | |
| Cadmium | 102 | 1.7 | " | 100 | | 102 | 80-120 | 0.878 | 20 | |
| Lead | 96.3 | 3.1 | " | 100 | | 96.3 | 80-120 | 4.22 | 20 | |
| Cobalt | 106 | 0.80 | " | 100 | | 106 | 80-120 | 0.0942 | 20 | |
| Chromium | 107 | 1.2 | " | 100 | | 107 | 80-120 | 1.91 | 20 | |
| Nickel | 103 | 3.4 | " | 100 | | 103 | 80-120 | 0.730 | 20 | |
| Molybdenum | 97.2 | 1.0 | " | 100 | | 97.2 | 80-120 | 3.29 | 20 | |
| Selenium | 99.7 | 6.2 | " | 100 | | 99.7 | 76-124 | 1.49 | 20 | |
| **Matrix Spike (B1A1211-MS1)** | | **Source: 2101114-01** | | Prepared & Analyzed: 01/12/21 | | | | | | |
| Barium | 174 | 1.0 | mg/kg | 99.2 | 51.7 | 123 | 70-130 | | | |
| Silver | 93.3 | 1.0 | " | 99.2 | ND | 94.1 | 60-140 | | | |
| Arsenic | 107 | 4.0 | " | 99.2 | 1.86 | 106 | 70-130 | | | |
| Beryllium | 104 | 1.2 | " | 99.2 | ND | 104 | 70-130 | | | |
| Cadmium | 101 | 1.7 | " | 99.2 | ND | 102 | 70-130 | | | |
| Cobalt | 108 | 0.80 | " | 99.2 | 5.16 | 104 | 70-130 | | | |
| Chromium | 117 | 1.2 | " | 99.2 | 11.6 | 106 | 70-130 | | | |
| Copper | 237 | 9.0 | " | 99.2 | 117 | 121 | 70-130 | | | |
| Molybdenum | 92.7 | 1.0 | " | 99.2 | 0.855 | 92.6 | 70-130 | | | |
| Nickel | 114 | 3.4 | " | 99.2 | 11.8 | 103 | 70-130 | | | |
| Lead | 113 | 3.1 | " | 99.2 | 12.1 | 102 | 70-130 | | | |
| Antimony | 105 | 9.0 | " | 99.2 | ND | 105 | 60-140 | | | |
| Selenium | 104 | 6.2 | " | 99.2 | 0.635 | 104 | 70-130 | | | |
| Thallium | 100 | 4.0 | " | 99.2 | ND | 101 | 70-130 | | | |
| Vanadium | 120 | 3.9 | " | 99.2 | 19.2 | 101 | 70-130 | | | |
| Zinc | 152 | 2.0 | " | 99.2 | 39.4 | 114 | 70-130 | | | |

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SIERRA ANALYTICAL

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Metals by EPA 6000/7000 Series Methods - Quality Control

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch B1A1211 - EPA 3050B** | | | | | | | | | | |
| **Matrix Spike Dup (B1A1211-MSD1)** | **Source: 2101114-01** | | | Prepared & Analyzed: 01/12/21 | | | | | | |
| Cadmium | 104 | 1.7 | mg/kg | 99.3 | ND | 105 | 70-130 | 2.78 | 20 | |
| Vanadium | 122 | 3.9 | " | 99.3 | 19.2 | 104 | 70-130 | 2.17 | 20 | |
| Chromium | 120 | 1.2 | " | 99.3 | 11.6 | 109 | 70-130 | 2.07 | 20 | |
| Zinc | 155 | 2.0 | " | 99.3 | 39.4 | 116 | 70-130 | 1.83 | 20 | |
| Arsenic | 108 | 4.0 | " | 99.3 | 1.86 | 107 | 70-130 | 1.14 | 20 | |
| Thallium | 98.7 | 4.0 | " | 99.3 | ND | 99.4 | 70-130 | 1.42 | 20 | |
| Copper | 239 | 9.0 | " | 99.3 | 117 | 123 | 70-130 | 0.841 | 30 | |
| Antimony | 105 | 9.0 | " | 99.3 | ND | 106 | 60-140 | 0.856 | 20 | |
| Nickel | 116 | 3.4 | " | 99.3 | 11.8 | 105 | 70-130 | 1.41 | 20 | |
| Silver | 90.7 | 1.0 | " | 99.3 | ND | 91.3 | 60-140 | 2.89 | 40 | |
| Lead | 114 | 3.1 | " | 99.3 | 12.1 | 103 | 70-130 | 1.08 | 30 | |
| Beryllium | 106 | 1.2 | " | 99.3 | ND | 107 | 70-130 | 2.44 | 20 | |
| Cobalt | 110 | 0.80 | " | 99.3 | 5.16 | 106 | 70-130 | 1.71 | 20 | |
| Barium | 178 | 1.0 | " | 99.3 | 51.7 | 127 | 70-130 | 1.89 | 20 | |
| Selenium | 105 | 6.2 | " | 99.3 | 0.635 | 105 | 70-130 | 0.718 | 20 | |
| Molybdenum | 94.5 | 1.0 | " | 99.3 | 0.855 | 94.3 | 70-130 | 1.96 | 20 | |
| **Batch B1A1213 - EPA 7471A** | | | | | | | | | | |
| **Blank (B1A1213-BLK1)** | | | | Prepared & Analyzed: 01/12/21 | | | | | | |
| Mercury | ND | 0.23 | mg/kg | | | | | | | |
| **LCS (B1A1213-BS1)** | | | | Prepared & Analyzed: 01/12/21 | | | | | | |
| Mercury | 0.17 | 0.23 | mg/kg | 0.167 | | 99.9 | 70-130 | | | |
| **Matrix Spike (B1A1213-MS1)** | **Source: 2101114-01** | | | Prepared & Analyzed: 01/12/21 | | | | | | |
| Mercury | 0.19 | 0.23 | mg/kg | 0.158 | 0.03 | 96.3 | 70-130 | | | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Metals by EPA 6000/7000 Series Methods - Quality Control

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch B1A1213 - EPA 7471A** | | | | | | | | | | |
| **Matrix Spike Dup (B1A1213-MSD1)** | **Source: 2101114-01** | | | Prepared & Analyzed: 01/12/21 | | | | | | |
| Mercury | 0.19 | 0.23 | mg/kg | 0.161 | 0.03 | 99.5 | 70-130 | 4.50 | 30 | |

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|---|---|---|---|
| SALEM Engineering Group - Fresno | Project: | Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: | 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: | Shannon Lodge | 01/22/21 12:05 |

## Total Petroleum Hydrocarbons Carbon Range Analysis by GC-FID - Quality Control

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch B1A1808 - EPA 3550B Solid Ext** | | | | | | | | | | |
| **Blank (B1A1808-BLK1)** | | | | Prepared & Analyzed: 01/18/21 | | | | | | |
| *Surrogate: o-Terphenyl* | *2.85* | | *mg/kg* | *2.50* | | *114* | *60-175* | | | |
| HC < C8 | ND | 1.0 | " | | | | | | | |
| C8 <= HC < C9 | ND | 1.0 | " | | | | | | | |
| C9 <= HC < C10 | ND | 1.0 | " | | | | | | | |
| C10 <= HC < C11 | ND | 1.0 | " | | | | | | | |
| C11 <= HC < C12 | ND | 1.0 | " | | | | | | | |
| C12 <= HC < C14 | ND | 1.0 | " | | | | | | | |
| C14 <= HC < C16 | ND | 1.0 | " | | | | | | | |
| C16 <= HC < C18 | ND | 1.0 | " | | | | | | | |
| C18 <= HC < C20 | ND | 1.0 | " | | | | | | | |
| C20 <= HC < C24 | ND | 1.0 | " | | | | | | | |
| C24 <= HC < C28 | ND | 1.0 | " | | | | | | | |
| C28 <= HC < C32 | ND | 1.0 | " | | | | | | | |
| HC >= C32 | ND | 1.0 | " | | | | | | | |
| Total Petroleum Hydrocarbons (C7-C36) | ND | 5.0 | " | | | | | | | |
| Diesel Range Organics (C10-C24) | ND | 5.0 | " | | | | | | | |
| **LCS (B1A1808-BS1)** | | | | Prepared & Analyzed: 01/18/21 | | | | | | |
| Diesel Range Organics (C10-C24) | 17.9 | 5.0 | mg/kg | 20.0 | | 89.5 | 80-120 | | | |
| **Matrix Spike (B1A1808-MS1)** | | **Source: 2101114-06** | | Prepared & Analyzed: 01/18/21 | | | | | | |
| Diesel Range Organics (C10-C24) | 22.2 | 5.0 | mg/kg | 20.0 | ND | 111 | 50-150 | | | |
| **Matrix Spike Dup (B1A1808-MSD1)** | | **Source: 2101114-06** | | Prepared & Analyzed: 01/18/21 | | | | | | |
| Diesel Range Organics (C10-C24) | 20.4 | 5.0 | mg/kg | 20.0 | ND | 102 | 50-150 | 8.41 | 30 | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch B1A1406 - EPA 3550B Solid Ext** | | | | | | | | | | |
| **Blank (B1A1406-BLK1)** | | | | Prepared: 01/11/21 Analyzed: 01/15/21 | | | | | | |
| *Surrogate: Decachlorobiphenyl* | *ND* | | *mg/kg* | *0.00833* | | *53.4* | *42-147* | | | |
| *Surrogate: Tetrachloro-meta-xylene* | *ND* | | *"* | *0.00833* | | *48.8* | *42-147* | | | |
| PCB-1016 | ND | 0.050 | " | | | | | | | |
| PCB-1221 | ND | 0.050 | " | | | | | | | |
| PCB-1232 | ND | 0.050 | " | | | | | | | |
| PCB-1242 | ND | 0.050 | " | | | | | | | |
| PCB-1248 | ND | 0.050 | " | | | | | | | |
| PCB-1254 | ND | 0.050 | " | | | | | | | |
| PCB-1260 | ND | 0.050 | " | | | | | | | |
| **LCS (B1A1406-BS1)** | | | | Prepared: 01/11/21 Analyzed: 01/15/21 | | | | | | |
| *Surrogate: Decachlorobiphenyl* | *0.00833* | | *mg/kg* | *0.00833* | | *100* | *42-147* | | | |
| *Surrogate: Tetrachloro-meta-xylene* | *0.00833* | | *"* | *0.00833* | | *100* | *42-147* | | | |
| PCB-1260 | 0.0536 | 0.050 | " | 0.0667 | | 80.3 | 80-120 | | | |
| **Matrix Spike (B1A1406-MS1)** | | **Source: 2101023-01** | | Prepared: 01/11/21 Analyzed: 01/15/21 | | | | | | |
| *Surrogate: Decachlorobiphenyl* | *0.00833* | | *mg/kg* | *0.00833* | | *100* | *42-147* | | | |
| *Surrogate: Tetrachloro-meta-xylene* | *0.00833* | | *"* | *0.00833* | | *100* | *42-147* | | | |
| PCB-1260 | 0.0662 | 0.050 | " | 0.0667 | ND | 99.3 | 50-150 | | | |
| **Matrix Spike Dup (B1A1406-MSD1)** | | **Source: 2101023-01** | | Prepared: 01/11/21 Analyzed: 01/15/21 | | | | | | |
| *Surrogate: Decachlorobiphenyl* | *0.00833* | | *mg/kg* | *0.00833* | | *100* | *42-147* | | | |
| *Surrogate: Tetrachloro-meta-xylene* | *0.00833* | | *"* | *0.00833* | | *100* | *42-147* | | | |
| PCB-1260 | 0.0715 | 0.050 | " | 0.0667 | ND | 107 | 50-150 | 7.71 | 30 | |

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| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B - Quality Control

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch B1A1404 - EPA 5035 P & T** | | | | | | | | | | |
| **Blank (B1A1404-BLK1)** | | | | Prepared & Analyzed: 01/14/21 | | | | | | |
| *Surrogate: Dibromofluoromethane* | *52.7* | | *µg/kg* | *50.0* | | *105* | *80-120* | | | |
| *Surrogate: Toluene-d8* | *42.0* | | *"* | *50.0* | | *84.0* | *81-117* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *46.4* | | *"* | *50.0* | | *92.9* | *74-121* | | | |
| Benzene | ND | 5.0 | " | | | | | | | |
| Bromobenzene | ND | 5.0 | " | | | | | | | |
| Bromochloromethane | ND | 5.0 | " | | | | | | | |
| Bromodichloromethane | ND | 5.0 | " | | | | | | | |
| Bromoform | ND | 5.0 | " | | | | | | | |
| Bromomethane | ND | 5.0 | " | | | | | | | |
| n-Butylbenzene | ND | 5.0 | " | | | | | | | |
| sec-Butylbenzene | ND | 5.0 | " | | | | | | | |
| tert-Butylbenzene | ND | 5.0 | " | | | | | | | |
| Carbon tetrachloride | ND | 5.0 | " | | | | | | | |
| Chlorobenzene | ND | 5.0 | " | | | | | | | |
| Chloroethane | ND | 5.0 | " | | | | | | | |
| Chloroform | ND | 5.0 | " | | | | | | | |
| Chloromethane | ND | 5.0 | " | | | | | | | |
| 2-Chlorotoluene | ND | 5.0 | " | | | | | | | |
| 4-Chlorotoluene | ND | 5.0 | " | | | | | | | |
| Dibromochloromethane | ND | 5.0 | " | | | | | | | |
| 1,2-Dibromo-3-chloropropane | ND | 5.0 | " | | | | | | | |
| 1,2-Dibromoethane (EDB) | ND | 5.0 | " | | | | | | | |
| Dibromomethane | ND | 5.0 | " | | | | | | | |
| 1,2-Dichlorobenzene | ND | 5.0 | " | | | | | | | |
| 1,3-Dichlorobenzene | ND | 5.0 | " | | | | | | | |
| 1,4-Dichlorobenzene | ND | 5.0 | " | | | | | | | |
| Dichlorodifluoromethane | ND | 5.0 | " | | | | | | | |
| 1,1-Dichloroethane | ND | 5.0 | " | | | | | | | |
| 1,2-Dichloroethane | ND | 5.0 | " | | | | | | | |
| 1,1-Dichloroethene | ND | 5.0 | " | | | | | | | |
| cis-1,2-Dichloroethene | ND | 5.0 | " | | | | | | | |
| trans-1,2-Dichloroethene | ND | 5.0 | " | | | | | | | |
| 1,2-Dichloropropane | ND | 5.0 | " | | | | | | | |
| 1,3-Dichloropropane | ND | 5.0 | " | | | | | | | |
| 2,2-Dichloropropane | ND | 5.0 | " | | | | | | | |
| 1,1-Dichloropropene | ND | 5.0 | " | | | | | | | |
| cis-1,3-Dichloropropene | ND | 5.0 | " | | | | | | | |

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| | | | |
|---|---|---|---|
| SALEM Engineering Group - Fresno | Project: | Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: | 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: | Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B - Quality Control

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch B1A1404 - EPA 5035 P & T** | | | | | | | | | | |
| **Blank (B1A1404-BLK1)** | | | | Prepared & Analyzed: 01/14/21 | | | | | | |
| trans-1,3-Dichloropropene | ND | 5.0 | µg/kg | | | | | | | |
| Di-isopropyl ether | ND | 5.0 | " | | | | | | | |
| Ethyl tert-butyl ether | ND | 5.0 | " | | | | | | | |
| Ethylbenzene | ND | 5.0 | " | | | | | | | |
| Hexachlorobutadiene | ND | 5.0 | " | | | | | | | |
| Isopropylbenzene | ND | 5.0 | " | | | | | | | |
| p-Isopropyltoluene | ND | 5.0 | " | | | | | | | |
| Methylene chloride | ND | 5.0 | " | | | | | | | |
| Methyl tert-butyl ether | ND | 5.0 | " | | | | | | | |
| Naphthalene | ND | 5.0 | " | | | | | | | |
| n-Propylbenzene | ND | 5.0 | " | | | | | | | |
| Styrene | ND | 5.0 | " | | | | | | | |
| Tert-amyl methyl ether | ND | 5.0 | " | | | | | | | |
| Tert-butyl alcohol | ND | 25 | " | | | | | | | |
| 1,1,1,2-Tetrachloroethane | ND | 5.0 | " | | | | | | | |
| 1,1,2,2-Tetrachloroethane | ND | 5.0 | " | | | | | | | |
| Tetrachloroethene | ND | 5.0 | " | | | | | | | |
| Toluene | ND | 5.0 | " | | | | | | | |
| 1,2,3-Trichlorobenzene | ND | 5.0 | " | | | | | | | |
| 1,2,4-Trichlorobenzene | ND | 5.0 | " | | | | | | | |
| 1,1,1-Trichloroethane | ND | 5.0 | " | | | | | | | |
| 1,1,2-Trichloroethane | ND | 5.0 | " | | | | | | | |
| Trichloroethene | ND | 5.0 | " | | | | | | | |
| Trichlorofluoromethane | ND | 5.0 | " | | | | | | | |
| 1,2,3-Trichloropropane | ND | 5.0 | " | | | | | | | |
| 1,2,4-Trimethylbenzene | ND | 5.0 | " | | | | | | | |
| 1,3,5-Trimethylbenzene | ND | 5.0 | " | | | | | | | |
| Vinyl chloride | ND | 5.0 | " | | | | | | | |
| m,p-Xylene | ND | 5.0 | " | | | | | | | |
| o-Xylene | ND | 5.0 | " | | | | | | | |

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E-Mail: sierralabs @ sierralabs.net

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B - Quality Control

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch B1A1404 - EPA 5035 P & T** | | | | | | | | | | |
| **LCS (B1A1404-BS1)** | | | | Prepared & Analyzed: 01/14/21 | | | | | | |
| *Surrogate: Dibromofluoromethane* | *50.0* | | *µg/kg* | *50.0* | | *100* | *80-120* | | | |
| *Surrogate: Toluene-d8* | *50.0* | | *"* | *50.0* | | *100* | *81-117* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *50.0* | | *"* | *50.0* | | *100* | *74-121* | | | |
| Benzene | 52.2 | 5.0 | " | 50.0 | | 104 | 80-120 | | | |
| Chlorobenzene | 47.4 | 5.0 | " | 50.0 | | 94.8 | 80-120 | | | |
| 1,1-Dichloroethene | 48.5 | 5.0 | " | 50.0 | | 97.0 | 80-120 | | | |
| Toluene | 48.6 | 5.0 | " | 50.0 | | 97.1 | 80-120 | | | |
| Trichloroethene | 53.4 | 5.0 | " | 50.0 | | 107 | 80-120 | | | |
| **Matrix Spike (B1A1404-MS1)** | | **Source: 2101114-01** | | Prepared & Analyzed: 01/14/21 | | | | | | |
| *Surrogate: Dibromofluoromethane* | *50.0* | | *µg/kg* | *50.0* | | *100* | *80-120* | | | |
| *Surrogate: Toluene-d8* | *50.0* | | *"* | *50.0* | | *100* | *81-117* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *50.0* | | *"* | *50.0* | | *100* | *74-121* | | | |
| Benzene | 49.8 | 5.0 | " | 50.0 | ND | 99.6 | 37-151 | | | |
| Chlorobenzene | 42.8 | 5.0 | " | 50.0 | ND | 85.6 | 37-160 | | | |
| 1,1-Dichloroethene | 48.6 | 5.0 | " | 50.0 | ND | 97.1 | 50-150 | | | |
| Toluene | 59.3 | 5.0 | " | 50.0 | ND | 119 | 47-150 | | | |
| Trichloroethene | 49.1 | 5.0 | " | 50.0 | ND | 98.2 | 71-157 | | | |
| **Matrix Spike Dup (B1A1404-MSD1)** | | **Source: 2101114-01** | | Prepared & Analyzed: 01/14/21 | | | | | | |
| *Surrogate: Dibromofluoromethane* | *50.0* | | *µg/kg* | *50.0* | | *100* | *80-120* | | | |
| *Surrogate: Toluene-d8* | *50.0* | | *"* | *50.0* | | *100* | *81-117* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *50.0* | | *"* | *50.0* | | *100* | *74-121* | | | |
| Benzene | 53.8 | 5.0 | " | 50.0 | ND | 108 | 37-151 | 7.67 | 30 | |
| Chlorobenzene | 43.0 | 5.0 | " | 50.0 | ND | 86.1 | 37-160 | 0.559 | 30 | |
| 1,1-Dichloroethene | 52.1 | 5.0 | " | 50.0 | ND | 104 | 50-150 | 7.11 | 30 | |
| Toluene | 61.5 | 5.0 | " | 50.0 | ND | 123 | 47-150 | 3.71 | 30 | |
| Trichloroethene | 48.2 | 5.0 | " | 50.0 | ND | 96.5 | 71-157 | 1.75 | 30 | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch B1A1405 - EPA 3550B Solid Ext** | | | | | | | | | | |
| **Blank (B1A1405-BLK1)** | | | | Prepared & Analyzed: 01/14/21 | | | | | | |
| *Surrogate: 2-Fluorophenol* | *0.283* | | *mg/kg* | *0.500* | | *56.5* | *25-121* | | | |
| *Surrogate: Phenol-d6* | *0.232* | | *"* | *0.500* | | *46.5* | *24-113* | | | |
| *Surrogate: Nitrobenzene-d5* | *0.267* | | *"* | *0.500* | | *53.4* | *23-120* | | | |
| *Surrogate: 2-Fluorobiphenyl* | *0.227* | | *"* | *0.500* | | *45.5* | *30-115* | | | |
| *Surrogate: 2,4,6-Tribromophenol* | *0.188* | | *"* | *0.500* | | *37.6* | *19-122* | | | |
| *Surrogate: Terphenyl-d14* | *0.215* | | *"* | *0.500* | | *42.9* | *18-137* | | | |
| Acenaphthene | ND | 0.33 | " | | | | | | | |
| Acenaphthylene | ND | 0.33 | " | | | | | | | |
| Anthracene | ND | 0.33 | " | | | | | | | |
| Benzidine | ND | 0.33 | " | | | | | | | |
| Benzo (a) anthracene | ND | 0.33 | " | | | | | | | |
| Benzo (b) fluoranthene | ND | 0.33 | " | | | | | | | |
| Benzo (k) fluoranthene | ND | 0.33 | " | | | | | | | |
| Benzo (a) pyrene | ND | 0.33 | " | | | | | | | |
| Benzo (g,h,i) perylene | ND | 0.33 | " | | | | | | | |
| Benzyl alcohol | ND | 0.33 | " | | | | | | | |
| Bis(2-chloroethyl)ether | ND | 0.33 | " | | | | | | | |
| Bis(2-chloroethoxy)methane | ND | 0.33 | " | | | | | | | |
| Bis(2-ethylhexyl)phthalate | ND | 0.33 | " | | | | | | | |
| Bis(2-chloroisopropyl)ether | ND | 0.33 | " | | | | | | | |
| 4-Bromophenyl phenyl ether | ND | 0.33 | " | | | | | | | |
| Butyl benzyl phthalate | ND | 0.33 | " | | | | | | | |
| 4-Chloroaniline | ND | 0.33 | " | | | | | | | |
| 2-Chlorophenol | ND | 0.33 | " | | | | | | | |
| 4-Chloro-3-methylphenol | ND | 0.33 | " | | | | | | | |
| 2-Chloronaphthalene | ND | 0.33 | " | | | | | | | |
| 4-Chlorophenyl phenyl ether | ND | 0.33 | " | | | | | | | |
| Chrysene | ND | 0.33 | " | | | | | | | |
| Dibenz (a,h) anthracene | ND | 0.33 | " | | | | | | | |
| Dibenzofuran | ND | 0.33 | " | | | | | | | |
| 1,3-Dichlorobenzene | ND | 0.33 | " | | | | | | | |
| 1,2-Dichlorobenzene | ND | 0.33 | " | | | | | | | |
| 1,4-Dichlorobenzene | ND | 0.33 | " | | | | | | | |
| 3,3′-Dichlorobenzidine | ND | 0.33 | " | | | | | | | |
| 2,4-Dichlorophenol | ND | 0.33 | " | | | | | | | |
| Diethyl phthalate | ND | 0.33 | " | | | | | | | |
| 2,4-Dimethylphenol | ND | 0.33 | " | | | | | | | |

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|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch B1A1405 - EPA 3550B Solid Ext** | | | | | | | | | | |
| **Blank (B1A1405-BLK1)** | | | | Prepared & Analyzed: 01/14/21 | | | | | | |
| Dimethyl phthalate | ND | 0.33 | mg/kg | | | | | | | |
| Di-n-butyl phthalate | ND | 0.33 | " | | | | | | | |
| 2,4-Dinitrophenol | ND | 0.33 | " | | | | | | | |
| 4,6-Dinitro-2-methylphenol | ND | 0.33 | " | | | | | | | |
| 2,4-Dinitrotoluene | ND | 0.33 | " | | | | | | | |
| 2,6-Dinitrotoluene | ND | 0.33 | " | | | | | | | |
| Di-n-octyl phthalate | ND | 0.33 | " | | | | | | | |
| 1,2-Diphenylhydrazine | ND | 0.33 | " | | | | | | | |
| Fluoranthene | ND | 0.33 | " | | | | | | | |
| Fluorene | ND | 0.33 | " | | | | | | | |
| Hexachlorobenzene | ND | 0.33 | " | | | | | | | |
| Hexachlorobutadiene | ND | 0.33 | " | | | | | | | |
| Hexachlorocyclopentadiene | ND | 0.33 | " | | | | | | | |
| Hexachloroethane | ND | 0.33 | " | | | | | | | |
| Indeno (1,2,3-cd) pyrene | ND | 0.33 | " | | | | | | | |
| Isophorone | ND | 0.33 | " | | | | | | | |
| 2-Methylnaphthalene | ND | 0.33 | " | | | | | | | |
| 2-Methylphenol | ND | 0.33 | " | | | | | | | |
| 4-Methylphenol | ND | 0.33 | " | | | | | | | |
| Naphthalene | ND | 0.33 | " | | | | | | | |
| 2-Nitroaniline | ND | 0.33 | " | | | | | | | |
| 3-Nitroaniline | ND | 0.33 | " | | | | | | | |
| 4-Nitroaniline | ND | 0.33 | " | | | | | | | |
| Nitrobenzene | ND | 0.33 | " | | | | | | | |
| 2-Nitrophenol | ND | 0.33 | " | | | | | | | |
| 4-Nitrophenol | ND | 0.33 | " | | | | | | | |
| N-Nitrosodimethylamine | ND | 0.33 | " | | | | | | | |
| Diphenylamine | ND | 0.33 | " | | | | | | | |
| N-Nitrosodi-n-propylamine | ND | 0.33 | " | | | | | | | |
| Pentachlorophenol | ND | 0.33 | " | | | | | | | |
| Phenanthrene | ND | 0.33 | " | | | | | | | |
| Phenol | ND | 0.33 | " | | | | | | | |
| Pyrene | ND | 0.33 | " | | | | | | | |
| 1,2,4-Trichlorobenzene | ND | 0.33 | " | | | | | | | |
| 2,4,5-Trichlorophenol | ND | 0.33 | " | | | | | | | |
| 2,4,6-Trichlorophenol | ND | 0.33 | " | | | | | | | |

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| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

## Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch B1A1405 - EPA 3550B Solid Ext** | | | | | | | | | | |
| **LCS (B1A1405-BS1)** | | | | Prepared & Analyzed: 01/14/21 | | | | | | |
| *Surrogate: 2-Fluorophenol* | *0.500* | | *mg/kg* | *0.500* | | *100* | *25-121* | | | |
| *Surrogate: Phenol-d6* | *0.500* | | *"* | *0.500* | | *100* | *24-113* | | | |
| *Surrogate: Nitrobenzene-d5* | *0.333* | | *"* | *0.500* | | *66.7* | *23-120* | | | |
| *Surrogate: 2-Fluorobiphenyl* | *0.333* | | *"* | *0.500* | | *66.7* | *30-115* | | | |
| *Surrogate: 2,4,6-Tribromophenol* | *0.500* | | *"* | *0.500* | | *100* | *19-122* | | | |
| *Surrogate: Terphenyl-d14* | *0.333* | | *"* | *0.500* | | *66.7* | *18-137* | | | |
| Acenaphthene | 0.362 | 0.33 | " | 0.333 | | 109 | 47-145 | | | |
| 2-Chlorophenol | 0.790 | 0.33 | " | 0.667 | | 118 | 23-134 | | | |
| 4-Chloro-3-methylphenol | 0.644 | 0.33 | " | 0.667 | | 96.5 | 22-147 | | | |
| 1,4-Dichlorobenzene | 0.343 | 0.33 | " | 0.333 | | 103 | 20-124 | | | |
| 2,4-Dinitrotoluene | 0.202 | 0.33 | " | 0.333 | | 60.7 | 39-139 | | | |
| 4-Nitrophenol | ND | 0.33 | " | 0.667 | | | 0-132 | | | |
| N-Nitrosodi-n-propylamine | 0.304 | 0.33 | " | 0.333 | | 91.3 | 0-230 | | | |
| Pentachlorophenol | 0.179 | 0.33 | " | 0.667 | | 26.9 | 14-176 | | | |
| Phenol | 0.702 | 0.33 | " | 0.667 | | 105 | 5-112 | | | |
| Pyrene | 0.367 | 0.33 | " | 0.333 | | 110 | 52-115 | | | |
| 1,2,4-Trichlorobenzene | 0.350 | 0.33 | " | 0.333 | | 105 | 44-142 | | | |
| **Matrix Spike (B1A1405-MS1)** | **Source: 2101140-01** | | | Prepared & Analyzed: 01/14/21 | | | | | | |
| *Surrogate: 2-Fluorophenol* | *0.596* | | *mg/kg* | *0.500* | | *119* | *25-121* | | | |
| *Surrogate: Phenol-d6* | *0.271* | | *"* | *0.500* | | *54.2* | *24-113* | | | |
| *Surrogate: Nitrobenzene-d5* | *0.269* | | *"* | *0.500* | | *53.7* | *23-120* | | | |
| *Surrogate: 2-Fluorobiphenyl* | *0.215* | | *"* | *0.500* | | *43.0* | *30-115* | | | |
| *Surrogate: 2,4,6-Tribromophenol* | *0.192* | | *"* | *0.500* | | *38.4* | *19-122* | | | |
| *Surrogate: Terphenyl-d14* | *0.472* | | *"* | *0.500* | | *94.4* | *18-137* | | | |
| Acenaphthene | 0.361 | 0.33 | " | 0.333 | ND | 108 | 47-145 | | | |
| 2-Chlorophenol | 0.782 | 0.33 | " | 0.667 | ND | 117 | 23-134 | | | |
| 4-Chloro-3-methylphenol | 0.625 | 0.33 | " | 0.667 | ND | 93.8 | 22-147 | | | |
| 1,4-Dichlorobenzene | 0.326 | 0.33 | " | 0.333 | ND | 97.7 | 20-124 | | | |
| 2,4-Dinitrotoluene | 0.159 | 0.33 | " | 0.333 | ND | 47.6 | 39-139 | | | |
| 4-Nitrophenol | ND | 0.33 | " | 0.667 | ND | | 0-132 | | | |
| N-Nitrosodi-n-propylamine | 0.280 | 0.33 | " | 0.333 | ND | 84.1 | 0-230 | | | |
| Pentachlorophenol | 0.183 | 0.33 | " | 0.667 | ND | 27.4 | 14-176 | | | |
| Phenol | 0.636 | 0.33 | " | 0.667 | ND | 95.4 | 5-112 | | | |
| Pyrene | 0.377 | 0.33 | " | 0.333 | ND | 113 | 52-115 | | | |
| 1,2,4-Trichlorobenzene | 0.343 | 0.33 | " | 0.333 | ND | 103 | 44-142 | | | |

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. This report and all associated analytical data will be retained by Sierra Analytical Labs, Inc. for five years from the date reported. Requests for additional storage time must be made in writing prior to the expiration of the five year retaining period and are subject to approval by Sierra Analytical Labs, Inc.*

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| | | | |
|---|---|---|---|
| SALEM Engineering Group - Fresno | Project: | Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: | 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: | Shannon Lodge | 01/22/21 12:05 |

## Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

## Sierra Analytical Labs, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch B1A1405 - EPA 3550B Solid Ext** | | | | | | | | | | |
| **Matrix Spike Dup (B1A1405-MSD1)** | **Source: 2101140-01** | | Prepared & Analyzed: 01/14/21 | | | | | | | |
| *Surrogate: 2-Fluorophenol* | *0.500* | | *mg/kg* | *0.500* | | *100* | *25-121* | | | |
| *Surrogate: Phenol-d6* | *0.500* | | *"* | *0.500* | | *100* | *24-113* | | | |
| *Surrogate: Nitrobenzene-d5* | *0.333* | | *"* | *0.500* | | *66.7* | *23-120* | | | |
| *Surrogate: 2-Fluorobiphenyl* | *0.333* | | *"* | *0.500* | | *66.7* | *30-115* | | | |
| *Surrogate: 2,4,6-Tribromophenol* | *0.500* | | *"* | *0.500* | | *100* | *19-122* | | | |
| *Surrogate: Terphenyl-d14* | *0.333* | | *"* | *0.500* | | *66.7* | *18-137* | | | |
| Acenaphthene | 0.372 | 0.33 | " | 0.333 | ND | 112 | 47-145 | 3.09 | 30 | |
| 2-Chlorophenol | 0.776 | 0.33 | " | 0.667 | ND | 116 | 23-134 | 0.727 | 30 | |
| 4-Chloro-3-methylphenol | 0.653 | 0.33 | " | 0.667 | ND | 97.9 | 22-147 | 4.28 | 30 | |
| 1,4-Dichlorobenzene | 0.355 | 0.33 | " | 0.333 | ND | 107 | 20-124 | 8.71 | 30 | |
| 2,4-Dinitrotoluene | 0.175 | 0.33 | " | 0.333 | ND | 52.4 | 39-139 | 9.60 | 30 | |
| 4-Nitrophenol | ND | 0.33 | " | 0.667 | ND | | 0-132 | | 30 | |
| N-Nitrosodi-n-propylamine | 0.303 | 0.33 | " | 0.333 | ND | 91.0 | 0-230 | 7.88 | 30 | |
| Pentachlorophenol | 0.192 | 0.33 | " | 0.667 | ND | 28.8 | 14-176 | 4.98 | 30 | |
| Phenol | 0.663 | 0.33 | " | 0.667 | ND | 99.5 | 5-112 | 4.15 | 30 | |
| Pyrene | 0.336 | 0.33 | " | 0.333 | ND | 101 | 52-115 | 11.5 | 30 | |
| 1,2,4-Trichlorobenzene | 0.356 | 0.33 | " | 0.333 | ND | 107 | 44-142 | 3.53 | 30 | |

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| | | |
|---|---|---|
| SALEM Engineering Group - Fresno | Project: Former Fresno Compress | |
| 4729 West Jacquelyn Avenue | Project Number: 1-420-1016 | **Reported:** |
| Fresno CA, 93722 | Project Manager: Shannon Lodge | 01/22/21 12:05 |

**Notes and Definitions**

| | |
|---|---|
| DET | Analyte DETECTED |
| ND | Analyte NOT DETECTED at or above the reporting limit |
| NR | Not Reported |
| dry | Sample results reported on a dry weight basis |
| RPD | Relative Percent Difference |

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. This report and all associated analytical data will be retained by Sierra Analytical Labs, Inc. for five years from the date reported. Requests for additional storage time must be made in writing prior to the expiration of the five year retaining period and are subject to approval by Sierra Analytical Labs, Inc.*

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Mobile Geochemistry Inc.

15 January 2021

Shannon Lodge
SALEM Engineering Grp, Inc. - Fresno
4729 W. Jacquelyn Ave.
Fresno, CA 93722

H&P Project: SLM010821-12
Client Project: Former Compress

Dear Shannon Lodge:

Enclosed is the analytical report for the above referenced project. The data herein applies to samples as received by H&P Mobile Geochemistry, Inc. on 08-Jan-21 which were analyzed in accordance with the attached Chain of Custody record(s).

The results for all sample analyses and required QA/QC analyses are presented in the following sections and summarized in the documents:

- Sample Summary
- Case Narrative (if applicable)
- Sample Results
- Quality Control Summary
- Notes and Definitions / Appendix
- Chain of Custody
- Sampling Logs (if applicable)

Unless otherwise noted, I certify that all analyses were performed and reviewed in compliance with our Quality Systems Manual and Standard Operating Procedures. This report shall not be reproduced, except in full, without the written approval of H&P Mobile Geochemistry, Inc.

We at H&P Mobile Geochemistry, Inc. sincerely appreciate the opportunity to provide analytical services to you on this project. If you have any questions or concerns regarding this analytical report, please contact me at your convenience at 760-804-9678.

Sincerely,

Lisa Eminhizer
Laboratory Director

H&P Mobile Geochemistry, Inc. is certified under the California ELAP and the National Environmental Laboratory Accreditation Conference (NELAC) for the fields of proficiency and analytes listed on those certificates. H& P is approved as an Environmental Testing Laboratory in accordance with the DoD-ELAP Program and ISO/IEC 17025:2005 programs for the fields of proficiency and analytes included in the certification process and to the extent offered by the accreditation agency . Unless otherwise noted, accreditation certificate numbers, expiration of certificates, and scope of accreditation can be found at: www.handpmg.com/about/certifications. Fields of services and analytes contained in this report that are not listed on the certificates should be considered uncertified or unavailable for certification.

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| SALEM Engineering Grp, Inc. - Fresno | Project: SLM010821-12 | |
| 4729 W. Jacquelyn Ave. | Project Number: Former Compress | Reported: |
| Fresno, CA 93722 | Project Manager: Shannon Lodge | 15-Jan-21 15:55 |

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| SV-1 @ 5 | E101012-01 | Vapor | 07-Jan-21 | 08-Jan-21 |
| SV-1 @ 10 | E101012-02 | Vapor | 07-Jan-21 | 08-Jan-21 |
| SV-2 @ 5 | E101012-03 | Vapor | 07-Jan-21 | 08-Jan-21 |
| SV-2 @ 10 | E101012-04 | Vapor | 07-Jan-21 | 08-Jan-21 |
| SV-2 @ 10 DUP | E101012-05 | Vapor | 07-Jan-21 | 08-Jan-21 |
| SV-3 @ 5 | E101012-06 | Vapor | 07-Jan-21 | 08-Jan-21 |
| SV-3 @ 10 | E101012-07 | Vapor | 07-Jan-21 | 08-Jan-21 |
| SV-4 @ 5 | E101012-08 | Vapor | 07-Jan-21 | 08-Jan-21 |
| SV-4 @ 10 | E101012-09 | Vapor | 07-Jan-21 | 08-Jan-21 |
| SV-5 @ 5 | E101012-10 | Vapor | 07-Jan-21 | 08-Jan-21 |
| SV-5 @ 10 | E101012-11 | Vapor | 07-Jan-21 | 08-Jan-21 |
| SV-6 @ 5 | E101012-12 | Vapor | 07-Jan-21 | 08-Jan-21 |
| SV-6 @ 10 | E101012-13 | Vapor | 07-Jan-21 | 08-Jan-21 |

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## DETECTIONS SUMMARY

Sample ID: **SV-1 @ 5** Laboratory ID: **E101012-01**

| Analyte | Result | Reporting Limit | Units | Method | Notes |
|---|---|---|---|---|---|
| **No Detections Reported** | | | | | |

Sample ID: **SV-1 @ 10** Laboratory ID: **E101012-02**

| Analyte | Result | Reporting Limit | Units | Method | Notes |
|---|---|---|---|---|---|
| **No Detections Reported** | | | | | |

Sample ID: **SV-2 @ 5** Laboratory ID: **E101012-03**

| Analyte | Result | Reporting Limit | Units | Method | Notes |
|---|---|---|---|---|---|
| **No Detections Reported** | | | | | |

Sample ID: **SV-2 @ 10** Laboratory ID: **E101012-04**

| Analyte | Result | Reporting Limit | Units | Method | Notes |
|---|---|---|---|---|---|
| **No Detections Reported** | | | | | |

Sample ID: **SV-2 @ 10 DUP** Laboratory ID: **E101012-05**

| Analyte | Result | Reporting Limit | Units | Method | Notes |
|---|---|---|---|---|---|
| **No Detections Reported** | | | | | |

Sample ID: **SV-3 @ 5** Laboratory ID: **E101012-06**

| Analyte | Result | Reporting Limit | Units | Method | Notes |
|---|---|---|---|---|---|
| **No Detections Reported** | | | | | |

Sample ID: **SV-3 @ 10** Laboratory ID: **E101012-07**

| Analyte | Result | Reporting Limit | Units | Method | Notes |
|---|---|---|---|---|---|
| **No Detections Reported** | | | | | |

Sample ID: **SV-4 @ 5** Laboratory ID: **E101012-08**

| Analyte | Result | Reporting Limit | Units | Method | Notes |
|---|---|---|---|---|---|
| **No Detections Reported** | | | | | |

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Sample ID: **SV-4 @ 10** Laboratory ID: **E101012-09**

| Analyte | Result | Reporting Limit | Units | Method | Notes |
|---|---|---|---|---|---|
| **No Detections Reported** | | | | | |

Sample ID: **SV-5 @ 5** Laboratory ID: **E101012-10**

| Analyte | Result | Reporting Limit | Units | Method | Notes |
|---|---|---|---|---|---|
| **No Detections Reported** | | | | | |

Sample ID: **SV-5 @ 10** Laboratory ID: **E101012-11**

| Analyte | Result | Reporting Limit | Units | Method | Notes |
|---|---|---|---|---|---|
| **No Detections Reported** | | | | | |

Sample ID: **SV-6 @ 5** Laboratory ID: **E101012-12**

| Analyte | Result | Reporting Limit | Units | Method | Notes |
|---|---|---|---|---|---|
| **No Detections Reported** | | | | | |

Sample ID: **SV-6 @ 10** Laboratory ID: **E101012-13**

| Analyte | Result | Reporting Limit | Units | Method | Notes |
|---|---|---|---|---|---|
| **No Detections Reported** | | | | | |

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| Fresno, CA 93722 | Project Manager: Shannon Lodge | 15-Jan-21 15:55 |

## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-1 @ 5 (E101012-01) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| Isopropyl alcohol (LCC) | ND | 8.0 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Dichlorodifluoromethane (F12) | ND | 0.40 | " | " | " | " | " | " | |
| Chloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 0.040 | " | " | " | " | " | " | |
| Bromomethane | ND | 0.40 | " | " | " | " | " | " | |
| Chloroethane | ND | 0.40 | " | " | " | " | " | " | |
| Trichlorofluoromethane (F11) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2 Trichlorotrifluoroethane (F113) | ND | 0.40 | " | " | " | " | " | " | |
| Methylene chloride (Dichloromethane) | ND | 0.40 | " | " | " | " | " | " | |
| Methyl tertiary-butyl ether (MTBE) | ND | 0.40 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| Chloroform | ND | 0.080 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloroethane (EDC) | ND | 0.080 | " | " | " | " | " | " | |
| Benzene | ND | 0.080 | " | " | " | " | " | " | |
| Trichloroethene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Dibromomethane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Toluene | ND | 0.80 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 0.080 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 0.080 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 0.40 | " | " | " | " | " | " | |

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| 4729 W. Jacquelyn Ave. | Project Number: Former Compress | Reported: |
| Fresno, CA 93722 | Project Manager: Shannon Lodge | 15-Jan-21 15:55 |

## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-1 @ 5 (E101012-01) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| o-Xylene | ND | 0.40 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Styrene | ND | 0.40 | " | " | " | " | " | " | |
| Bromoform | ND | 0.40 | " | " | " | " | " | " | |
| Isopropylbenzene (Cumene) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| Bromobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 4.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.40 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| *Surrogate: Dibromofluoromethane* | | *122 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 1,2-Dichloroethane-d4* | | *107 %* | | *75-125* | " | " | " | " | |
| *Surrogate: Toluene-d8* | | *103 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *98.4 %* | | *75-125* | " | " | " | " | |

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| 4729 W. Jacquelyn Ave. | Project Number: Former Compress | Reported: |
| Fresno, CA 93722 | Project Manager: Shannon Lodge | 15-Jan-21 15:55 |

## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-1 @ 10 (E101012-02) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| Isopropyl alcohol (LCC) | ND | 8.0 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Dichlorodifluoromethane (F12) | ND | 0.40 | " | " | " | " | " | " | |
| Chloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 0.040 | " | " | " | " | " | " | |
| Bromomethane | ND | 0.40 | " | " | " | " | " | " | |
| Chloroethane | ND | 0.40 | " | " | " | " | " | " | |
| Trichlorofluoromethane (F11) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2 Trichlorotrifluoroethane (F113) | ND | 0.40 | " | " | " | " | " | " | |
| Methylene chloride (Dichloromethane) | ND | 0.40 | " | " | " | " | " | " | |
| Methyl tertiary-butyl ether (MTBE) | ND | 0.40 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| Chloroform | ND | 0.080 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloroethane (EDC) | ND | 0.080 | " | " | " | " | " | " | |
| Benzene | ND | 0.080 | " | " | " | " | " | " | |
| Trichloroethene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Dibromomethane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Toluene | ND | 0.80 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 0.080 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 0.080 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 0.40 | " | " | " | " | " | " | |

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| 4729 W. Jacquelyn Ave. | Project Number: Former Compress | Reported: |
| Fresno, CA 93722 | Project Manager: Shannon Lodge | 15-Jan-21 15:55 |

## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-1 @ 10 (E101012-02) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| o-Xylene | ND | 0.40 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Styrene | ND | 0.40 | " | " | " | " | " | " | |
| Bromoform | ND | 0.40 | " | " | " | " | " | " | |
| Isopropylbenzene (Cumene) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| Bromobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 4.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.40 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| *Surrogate: Dibromofluoromethane* | | *121 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 1,2-Dichloroethane-d4* | | *110 %* | | *75-125* | " | " | " | " | |
| *Surrogate: Toluene-d8* | | *104 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *101 %* | | *75-125* | " | " | " | " | |

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| 4729 W. Jacquelyn Ave. | Project Number: Former Compress | Reported: |
| Fresno, CA 93722 | Project Manager: Shannon Lodge | 15-Jan-21 15:55 |

## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-2 @ 5 (E101012-03) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| Isopropyl alcohol (LCC) | ND | 8.0 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Dichlorodifluoromethane (F12) | ND | 0.40 | " | " | " | " | " | " | |
| Chloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 0.040 | " | " | " | " | " | " | |
| Bromomethane | ND | 0.40 | " | " | " | " | " | " | |
| Chloroethane | ND | 0.40 | " | " | " | " | " | " | |
| Trichlorofluoromethane (F11) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2 Trichlorotrifluoroethane (F113) | ND | 0.40 | " | " | " | " | " | " | |
| Methylene chloride (Dichloromethane) | ND | 0.40 | " | " | " | " | " | " | |
| Methyl tertiary-butyl ether (MTBE) | ND | 0.40 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| Chloroform | ND | 0.080 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloroethane (EDC) | ND | 0.080 | " | " | " | " | " | " | |
| Benzene | ND | 0.080 | " | " | " | " | " | " | |
| Trichloroethene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Dibromomethane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Toluene | ND | 0.80 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 0.080 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 0.080 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 0.40 | " | " | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-2 @ 5 (E101012-03) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| o-Xylene | ND | 0.40 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Styrene | ND | 0.40 | " | " | " | " | " | " | |
| Bromoform | ND | 0.40 | " | " | " | " | " | " | |
| Isopropylbenzene (Cumene) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| Bromobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 4.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.40 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| *Surrogate: Dibromofluoromethane* | | *118 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 1,2-Dichloroethane-d4* | | *105 %* | | *75-125* | " | " | " | " | |
| *Surrogate: Toluene-d8* | | *103 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *97.1 %* | | *75-125* | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-2 @ 10 (E101012-04) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| Isopropyl alcohol (LCC) | ND | 8.0 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Dichlorodifluoromethane (F12) | ND | 0.40 | " | " | " | " | " | " | |
| Chloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 0.040 | " | " | " | " | " | " | |
| Bromomethane | ND | 0.40 | " | " | " | " | " | " | |
| Chloroethane | ND | 0.40 | " | " | " | " | " | " | |
| Trichlorofluoromethane (F11) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2 Trichlorotrifluoroethane (F113) | ND | 0.40 | " | " | " | " | " | " | |
| Methylene chloride (Dichloromethane) | ND | 0.40 | " | " | " | " | " | " | |
| Methyl tertiary-butyl ether (MTBE) | ND | 0.40 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| Chloroform | ND | 0.080 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloroethane (EDC) | ND | 0.080 | " | " | " | " | " | " | |
| Benzene | ND | 0.080 | " | " | " | " | " | " | |
| Trichloroethene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Dibromomethane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Toluene | ND | 0.80 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 0.080 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 0.080 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 0.40 | " | " | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-2 @ 10 (E101012-04) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| o-Xylene | ND | 0.40 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Styrene | ND | 0.40 | " | " | " | " | " | " | |
| Bromoform | ND | 0.40 | " | " | " | " | " | " | |
| Isopropylbenzene (Cumene) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| Bromobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 4.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.40 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| *Surrogate: Dibromofluoromethane* | | *124 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 1,2-Dichloroethane-d4* | | *113 %* | | *75-125* | " | " | " | " | |
| *Surrogate: Toluene-d8* | | *102 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *102 %* | | *75-125* | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-2 @ 10 DUP (E101012-05) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| Isopropyl alcohol (LCC) | ND | 8.0 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Dichlorodifluoromethane (F12) | ND | 0.40 | " | " | " | " | " | " | |
| Chloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 0.040 | " | " | " | " | " | " | |
| Bromomethane | ND | 0.40 | " | " | " | " | " | " | |
| Chloroethane | ND | 0.40 | " | " | " | " | " | " | |
| Trichlorofluoromethane (F11) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2 Trichlorotrifluoroethane (F113) | ND | 0.40 | " | " | " | " | " | " | |
| Methylene chloride (Dichloromethane) | ND | 0.40 | " | " | " | " | " | " | |
| Methyl tertiary-butyl ether (MTBE) | ND | 0.40 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| Chloroform | ND | 0.080 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloroethane (EDC) | ND | 0.080 | " | " | " | " | " | " | |
| Benzene | ND | 0.080 | " | " | " | " | " | " | |
| Trichloroethene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Dibromomethane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Toluene | ND | 0.80 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 0.080 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 0.080 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 0.40 | " | " | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-2 @ 10 DUP (E101012-05) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| o-Xylene | ND | 0.40 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Styrene | ND | 0.40 | " | " | " | " | " | " | |
| Bromoform | ND | 0.40 | " | " | " | " | " | " | |
| Isopropylbenzene (Cumene) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| Bromobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 4.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.40 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| *Surrogate: Dibromofluoromethane* | | *122 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 1,2-Dichloroethane-d4* | | *108 %* | | *75-125* | " | " | " | " | |
| *Surrogate: Toluene-d8* | | *102 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *97.9 %* | | *75-125* | " | " | " | " | |

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| 4729 W. Jacquelyn Ave. | Project Number: Former Compress | Reported: |
| Fresno, CA 93722 | Project Manager: Shannon Lodge | 15-Jan-21 15:55 |

## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-3 @ 5 (E101012-06) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| Isopropyl alcohol (LCC) | ND | 8.0 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Dichlorodifluoromethane (F12) | ND | 0.40 | " | " | " | " | " | " | |
| Chloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 0.040 | " | " | " | " | " | " | |
| Bromomethane | ND | 0.40 | " | " | " | " | " | " | |
| Chloroethane | ND | 0.40 | " | " | " | " | " | " | |
| Trichlorofluoromethane (F11) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2 Trichlorotrifluoroethane (F113) | ND | 0.40 | " | " | " | " | " | " | |
| Methylene chloride (Dichloromethane) | ND | 0.40 | " | " | " | " | " | " | |
| Methyl tertiary-butyl ether (MTBE) | ND | 0.40 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| Chloroform | ND | 0.080 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloroethane (EDC) | ND | 0.080 | " | " | " | " | " | " | |
| Benzene | ND | 0.080 | " | " | " | " | " | " | |
| Trichloroethene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Dibromomethane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Toluene | ND | 0.80 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 0.080 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 0.080 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 0.40 | " | " | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-3 @ 5 (E101012-06) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| o-Xylene | ND | 0.40 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Styrene | ND | 0.40 | " | " | " | " | " | " | |
| Bromoform | ND | 0.40 | " | " | " | " | " | " | |
| Isopropylbenzene (Cumene) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| Bromobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 4.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.40 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| *Surrogate: Dibromofluoromethane* | | *120 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 1,2-Dichloroethane-d4* | | *112 %* | | *75-125* | " | " | " | " | |
| *Surrogate: Toluene-d8* | | *99.6 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *98.6 %* | | *75-125* | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-3 @ 10 (E101012-07) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| Isopropyl alcohol (LCC) | ND | 8.0 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Dichlorodifluoromethane (F12) | ND | 0.40 | " | " | " | " | " | " | |
| Chloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 0.040 | " | " | " | " | " | " | |
| Bromomethane | ND | 0.40 | " | " | " | " | " | " | |
| Chloroethane | ND | 0.40 | " | " | " | " | " | " | |
| Trichlorofluoromethane (F11) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2 Trichlorotrifluoroethane (F113) | ND | 0.40 | " | " | " | " | " | " | |
| Methylene chloride (Dichloromethane) | ND | 0.40 | " | " | " | " | " | " | |
| Methyl tertiary-butyl ether (MTBE) | ND | 0.40 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| Chloroform | ND | 0.080 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloroethane (EDC) | ND | 0.080 | " | " | " | " | " | " | |
| Benzene | ND | 0.080 | " | " | " | " | " | " | |
| Trichloroethene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Dibromomethane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Toluene | ND | 0.80 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 0.080 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 0.080 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 0.40 | " | " | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-3 @ 10 (E101012-07) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| o-Xylene | ND | 0.40 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Styrene | ND | 0.40 | " | " | " | " | " | " | |
| Bromoform | ND | 0.40 | " | " | " | " | " | " | |
| Isopropylbenzene (Cumene) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| Bromobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 4.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.40 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| *Surrogate: Dibromofluoromethane* | | *121 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 1,2-Dichloroethane-d4* | | *105 %* | | *75-125* | " | " | " | " | |
| *Surrogate: Toluene-d8* | | *103 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *98.6 %* | | *75-125* | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-4 @ 5 (E101012-08) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| Isopropyl alcohol (LCC) | ND | 8.0 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Dichlorodifluoromethane (F12) | ND | 0.40 | " | " | " | " | " | " | |
| Chloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 0.040 | " | " | " | " | " | " | |
| Bromomethane | ND | 0.40 | " | " | " | " | " | " | |
| Chloroethane | ND | 0.40 | " | " | " | " | " | " | |
| Trichlorofluoromethane (F11) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2 Trichlorotrifluoroethane (F113) | ND | 0.40 | " | " | " | " | " | " | |
| Methylene chloride (Dichloromethane) | ND | 0.40 | " | " | " | " | " | " | |
| Methyl tertiary-butyl ether (MTBE) | ND | 0.40 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| Chloroform | ND | 0.080 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloroethane (EDC) | ND | 0.080 | " | " | " | " | " | " | |
| Benzene | ND | 0.080 | " | " | " | " | " | " | |
| Trichloroethene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Dibromomethane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Toluene | ND | 0.80 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 0.080 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 0.080 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 0.40 | " | " | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-4 @ 5 (E101012-08) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| o-Xylene | ND | 0.40 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Styrene | ND | 0.40 | " | " | " | " | " | " | |
| Bromoform | ND | 0.40 | " | " | " | " | " | " | |
| Isopropylbenzene (Cumene) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| Bromobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 4.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.40 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| *Surrogate: Dibromofluoromethane* | | *122 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 1,2-Dichloroethane-d4* | | *114 %* | | *75-125* | " | " | " | " | |
| *Surrogate: Toluene-d8* | | *101 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *99.9 %* | | *75-125* | " | " | " | " | |

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| SALEM Engineering Grp, Inc. - Fresno | Project: SLM010821-12 | |
| 4729 W. Jacquelyn Ave. | Project Number: Former Compress | Reported: |
| Fresno, CA 93722 | Project Manager: Shannon Lodge | 15-Jan-21 15:55 |

## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-4 @ 10 (E101012-09) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| Isopropyl alcohol (LCC) | ND | 8.0 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Dichlorodifluoromethane (F12) | ND | 0.40 | " | " | " | " | " | " | |
| Chloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 0.040 | " | " | " | " | " | " | |
| Bromomethane | ND | 0.40 | " | " | " | " | " | " | |
| Chloroethane | ND | 0.40 | " | " | " | " | " | " | |
| Trichlorofluoromethane (F11) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2 Trichlorotrifluoroethane (F113) | ND | 0.40 | " | " | " | " | " | " | |
| Methylene chloride (Dichloromethane) | ND | 0.40 | " | " | " | " | " | " | |
| Methyl tertiary-butyl ether (MTBE) | ND | 0.40 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| Chloroform | ND | 0.080 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloroethane (EDC) | ND | 0.080 | " | " | " | " | " | " | |
| Benzene | ND | 0.080 | " | " | " | " | " | " | |
| Trichloroethene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Dibromomethane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Toluene | ND | 0.80 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 0.080 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 0.080 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 0.40 | " | " | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-4 @ 10 (E101012-09) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| o-Xylene | ND | 0.40 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Styrene | ND | 0.40 | " | " | " | " | " | " | |
| Bromoform | ND | 0.40 | " | " | " | " | " | " | |
| Isopropylbenzene (Cumene) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| Bromobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 4.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.40 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| *Surrogate: Dibromofluoromethane* | | *125 %* | | *75-125* | " | " | " | " | *S-GC* |
| *Surrogate: 1,2-Dichloroethane-d4* | | *119 %* | | *75-125* | " | " | " | " | |
| *Surrogate: Toluene-d8* | | *102 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *101 %* | | *75-125* | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-5 @ 5 (E101012-10) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| Isopropyl alcohol (LCC) | ND | 8.0 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Dichlorodifluoromethane (F12) | ND | 0.40 | " | " | " | " | " | " | |
| Chloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 0.040 | " | " | " | " | " | " | |
| Bromomethane | ND | 0.40 | " | " | " | " | " | " | |
| Chloroethane | ND | 0.40 | " | " | " | " | " | " | |
| Trichlorofluoromethane (F11) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2 Trichlorotrifluoroethane (F113) | ND | 0.40 | " | " | " | " | " | " | |
| Methylene chloride (Dichloromethane) | ND | 0.40 | " | " | " | " | " | " | |
| Methyl tertiary-butyl ether (MTBE) | ND | 0.40 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| Chloroform | ND | 0.080 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloroethane (EDC) | ND | 0.080 | " | " | " | " | " | " | |
| Benzene | ND | 0.080 | " | " | " | " | " | " | |
| Trichloroethene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Dibromomethane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Toluene | ND | 0.80 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 0.080 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 0.080 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 0.40 | " | " | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-5 @ 5 (E101012-10) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| o-Xylene | ND | 0.40 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Styrene | ND | 0.40 | " | " | " | " | " | " | |
| Bromoform | ND | 0.40 | " | " | " | " | " | " | |
| Isopropylbenzene (Cumene) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| Bromobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 4.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.40 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| *Surrogate: Dibromofluoromethane* | | *124 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 1,2-Dichloroethane-d4* | | *111 %* | | *75-125* | " | " | " | " | |
| *Surrogate: Toluene-d8* | | *100 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *101 %* | | *75-125* | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-5 @ 10 (E101012-11) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| Isopropyl alcohol (LCC) | ND | 8.0 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Dichlorodifluoromethane (F12) | ND | 0.40 | " | " | " | " | " | " | |
| Chloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 0.040 | " | " | " | " | " | " | |
| Bromomethane | ND | 0.40 | " | " | " | " | " | " | |
| Chloroethane | ND | 0.40 | " | " | " | " | " | " | |
| Trichlorofluoromethane (F11) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2 Trichlorotrifluoroethane (F113) | ND | 0.40 | " | " | " | " | " | " | |
| Methylene chloride (Dichloromethane) | ND | 0.40 | " | " | " | " | " | " | |
| Methyl tertiary-butyl ether (MTBE) | ND | 0.40 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| Chloroform | ND | 0.080 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloroethane (EDC) | ND | 0.080 | " | " | " | " | " | " | |
| Benzene | ND | 0.080 | " | " | " | " | " | " | |
| Trichloroethene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Dibromomethane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Toluene | ND | 0.80 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 0.080 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 0.080 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 0.40 | " | " | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-5 @ 10 (E101012-11) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| o-Xylene | ND | 0.40 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Styrene | ND | 0.40 | " | " | " | " | " | " | |
| Bromoform | ND | 0.40 | " | " | " | " | " | " | |
| Isopropylbenzene (Cumene) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| Bromobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 4.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.40 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| *Surrogate: Dibromofluoromethane* | | *124 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 1,2-Dichloroethane-d4* | | *113 %* | | *75-125* | " | " | " | " | |
| *Surrogate: Toluene-d8* | | *100 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *100 %* | | *75-125* | " | " | " | " | |

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Carlsbad, CA 92010
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|---|---|---|
| SALEM Engineering Grp, Inc. - Fresno | Project: SLM010821-12 | |
| 4729 W. Jacquelyn Ave. | Project Number: Former Compress | Reported: |
| Fresno, CA 93722 | Project Manager: Shannon Lodge | 15-Jan-21 15:55 |

## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-6 @ 5 (E101012-12) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| Isopropyl alcohol (LCC) | ND | 8.0 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Dichlorodifluoromethane (F12) | ND | 0.40 | " | " | " | " | " | " | |
| Chloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 0.040 | " | " | " | " | " | " | |
| Bromomethane | ND | 0.40 | " | " | " | " | " | " | |
| Chloroethane | ND | 0.40 | " | " | " | " | " | " | |
| Trichlorofluoromethane (F11) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2 Trichlorotrifluoroethane (F113) | ND | 0.40 | " | " | " | " | " | " | |
| Methylene chloride (Dichloromethane) | ND | 0.40 | " | " | " | " | " | " | |
| Methyl tertiary-butyl ether (MTBE) | ND | 0.40 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| Chloroform | ND | 0.080 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloroethane (EDC) | ND | 0.080 | " | " | " | " | " | " | |
| Benzene | ND | 0.080 | " | " | " | " | " | " | |
| Trichloroethene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Dibromomethane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Toluene | ND | 0.80 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 0.080 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 0.080 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 0.40 | " | " | " | " | " | " | |

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| 4729 W. Jacquelyn Ave. | Project Number: Former Compress | Reported: |
| Fresno, CA 93722 | Project Manager: Shannon Lodge | 15-Jan-21 15:55 |

## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-6 @ 5 (E101012-12) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| o-Xylene | ND | 0.40 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Styrene | ND | 0.40 | " | " | " | " | " | " | |
| Bromoform | ND | 0.40 | " | " | " | " | " | " | |
| Isopropylbenzene (Cumene) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| Bromobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 4.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.40 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| *Surrogate: Dibromofluoromethane* | | *129 %* | | *75-125* | " | " | " | " | *S-GC* |
| *Surrogate: 1,2-Dichloroethane-d4* | | *116 %* | | *75-125* | " | " | " | " | |
| *Surrogate: Toluene-d8* | | *99.5 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *101 %* | | *75-125* | " | " | " | " | |

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| Fresno, CA 93722 | Project Manager: Shannon Lodge | 15-Jan-21 15:55 |

## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-6 @ 10 (E101012-13) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| Isopropyl alcohol (LCC) | ND | 8.0 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Dichlorodifluoromethane (F12) | ND | 0.40 | " | " | " | " | " | " | |
| Chloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Vinyl chloride | ND | 0.040 | " | " | " | " | " | " | |
| Bromomethane | ND | 0.40 | " | " | " | " | " | " | |
| Chloroethane | ND | 0.40 | " | " | " | " | " | " | |
| Trichlorofluoromethane (F11) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2 Trichlorotrifluoroethane (F113) | ND | 0.40 | " | " | " | " | " | " | |
| Methylene chloride (Dichloromethane) | ND | 0.40 | " | " | " | " | " | " | |
| Methyl tertiary-butyl ether (MTBE) | ND | 0.40 | " | " | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 2,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | 0.40 | " | " | " | " | " | " | |
| Chloroform | ND | 0.080 | " | " | " | " | " | " | |
| Bromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,1-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Carbon tetrachloride | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloroethane (EDC) | ND | 0.080 | " | " | " | " | " | " | |
| Benzene | ND | 0.080 | " | " | " | " | " | " | |
| Trichloroethene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Bromodichloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Dibromomethane | ND | 0.40 | " | " | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| Toluene | ND | 0.80 | " | " | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| Tetrachloroethene | ND | 0.080 | " | " | " | " | " | " | |
| Dibromochloromethane | ND | 0.40 | " | " | " | " | " | " | |
| Chlorobenzene | ND | 0.080 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| m,p-Xylene | ND | 0.40 | " | " | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Dilution Factor | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **SV-6 @ 10 (E101012-13) Vapor Sampled: 07-Jan-21 Received: 08-Jan-21** | | | | | | | | | |
| o-Xylene | ND | 0.40 | ug/l | 0.04 | EA11402 | 14-Jan-21 | 14-Jan-21 | H&P 8260SV | |
| Styrene | ND | 0.40 | " | " | " | " | " | " | |
| Bromoform | ND | 0.40 | " | " | " | " | " | " | |
| Isopropylbenzene (Cumene) | ND | 0.40 | " | " | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | 0.40 | " | " | " | " | " | " | |
| n-Propylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| Bromobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 2-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| 4-Chlorotoluene | ND | 0.40 | " | " | " | " | " | " | |
| tert-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| sec-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| p-Isopropyltoluene | ND | 0.40 | " | " | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| n-Butylbenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | 4.0 | " | " | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| Hexachlorobutadiene | ND | 0.40 | " | " | " | " | " | " | |
| Naphthalene | ND | 0.080 | " | " | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | 0.40 | " | " | " | " | " | " | |
| *Surrogate: Dibromofluoromethane* | | *122 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 1,2-Dichloroethane-d4* | | *112 %* | | *75-125* | " | " | " | " | |
| *Surrogate: Toluene-d8* | | *99.7 %* | | *75-125* | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *103 %* | | *75-125* | " | " | " | " | |

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## Volatile Organic Compounds by H&P 8260SV - Quality Control

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch EA11402 - EPA 5030** | | | | | | | | | | |
| **Blank (EA11402-BLK1)** | | | | Prepared & Analyzed: 14-Jan-21 | | | | | | |
| Isopropyl alcohol (LCC) | ND | 8.0 | ug/l | | | | | | | |
| Dichlorodifluoromethane (F12) | ND | 0.40 | " | | | | | | | |
| Chloromethane | ND | 0.40 | " | | | | | | | |
| Vinyl chloride | ND | 0.040 | " | | | | | | | |
| Bromomethane | ND | 0.40 | " | | | | | | | |
| Chloroethane | ND | 0.40 | " | | | | | | | |
| Trichlorofluoromethane (F11) | ND | 0.40 | " | | | | | | | |
| 1,1-Dichloroethene | ND | 0.40 | " | | | | | | | |
| 1,1,2 Trichlorotrifluoroethane (F113) | ND | 0.40 | " | | | | | | | |
| Methylene chloride (Dichloromethane) | ND | 0.40 | " | | | | | | | |
| Methyl tertiary-butyl ether (MTBE) | ND | 0.40 | " | | | | | | | |
| trans-1,2-Dichloroethene | ND | 0.40 | " | | | | | | | |
| 1,1-Dichloroethane | ND | 0.40 | " | | | | | | | |
| 2,2-Dichloropropane | ND | 0.40 | " | | | | | | | |
| cis-1,2-Dichloroethene | ND | 0.40 | " | | | | | | | |
| Chloroform | ND | 0.080 | " | | | | | | | |
| Bromochloromethane | ND | 0.40 | " | | | | | | | |
| 1,1,1-Trichloroethane | ND | 0.40 | " | | | | | | | |
| 1,1-Dichloropropene | ND | 0.40 | " | | | | | | | |
| Carbon tetrachloride | ND | 0.080 | " | | | | | | | |
| 1,2-Dichloroethane (EDC) | ND | 0.080 | " | | | | | | | |
| Benzene | ND | 0.080 | " | | | | | | | |
| Trichloroethene | ND | 0.080 | " | | | | | | | |
| 1,2-Dichloropropane | ND | 0.40 | " | | | | | | | |
| Bromodichloromethane | ND | 0.40 | " | | | | | | | |
| Dibromomethane | ND | 0.40 | " | | | | | | | |
| cis-1,3-Dichloropropene | ND | 0.40 | " | | | | | | | |
| Toluene | ND | 0.80 | " | | | | | | | |
| trans-1,3-Dichloropropene | ND | 0.40 | " | | | | | | | |
| 1,1,2-Trichloroethane | ND | 0.40 | " | | | | | | | |
| 1,2-Dibromoethane (EDB) | ND | 0.40 | " | | | | | | | |
| 1,3-Dichloropropane | ND | 0.40 | " | | | | | | | |
| Tetrachloroethene | ND | 0.080 | " | | | | | | | |
| Dibromochloromethane | ND | 0.40 | " | | | | | | | |

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## Volatile Organic Compounds by H&P 8260SV - Quality Control

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch EA11402 - EPA 5030** | | | | | | | | | | |
| **Blank (EA11402-BLK1)** | | | | Prepared & Analyzed: 14-Jan-21 | | | | | | |
| Chlorobenzene | ND | 0.080 | ug/l | | | | | | | |
| Ethylbenzene | ND | 0.40 | " | | | | | | | |
| 1,1,1,2-Tetrachloroethane | ND | 0.40 | " | | | | | | | |
| m,p-Xylene | ND | 0.40 | " | | | | | | | |
| o-Xylene | ND | 0.40 | " | | | | | | | |
| Styrene | ND | 0.40 | " | | | | | | | |
| Bromoform | ND | 0.40 | " | | | | | | | |
| Isopropylbenzene (Cumene) | ND | 0.40 | " | | | | | | | |
| 1,1,2,2-Tetrachloroethane | ND | 0.40 | " | | | | | | | |
| 1,2,3-Trichloropropane | ND | 0.40 | " | | | | | | | |
| n-Propylbenzene | ND | 0.40 | " | | | | | | | |
| Bromobenzene | ND | 0.40 | " | | | | | | | |
| 1,3,5-Trimethylbenzene | ND | 0.40 | " | | | | | | | |
| 2-Chlorotoluene | ND | 0.40 | " | | | | | | | |
| 4-Chlorotoluene | ND | 0.40 | " | | | | | | | |
| tert-Butylbenzene | ND | 0.40 | " | | | | | | | |
| 1,2,4-Trimethylbenzene | ND | 0.40 | " | | | | | | | |
| sec-Butylbenzene | ND | 0.40 | " | | | | | | | |
| p-Isopropyltoluene | ND | 0.40 | " | | | | | | | |
| 1,3-Dichlorobenzene | ND | 0.40 | " | | | | | | | |
| 1,4-Dichlorobenzene | ND | 0.40 | " | | | | | | | |
| n-Butylbenzene | ND | 0.40 | " | | | | | | | |
| 1,2-Dichlorobenzene | ND | 0.40 | " | | | | | | | |
| 1,2-Dibromo-3-chloropropane | ND | 4.0 | " | | | | | | | |
| 1,2,4-Trichlorobenzene | ND | 0.40 | " | | | | | | | |
| Hexachlorobutadiene | ND | 0.40 | " | | | | | | | |
| Naphthalene | ND | 0.080 | " | | | | | | | |
| 1,2,3-Trichlorobenzene | ND | 0.40 | " | | | | | | | |
| *Surrogate: Dibromofluoromethane* | *2.45* | | *"* | *2.00* | | *123* | *75-125* | | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *2.16* | | *"* | *2.00* | | *108* | *75-125* | | | |
| *Surrogate: Toluene-d8* | *2.05* | | *"* | *2.00* | | *102* | *75-125* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *2.08* | | *"* | *2.00* | | *104* | *75-125* | | | |

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## Volatile Organic Compounds by H&P 8260SV - Quality Control

## H&P Mobile Geochemistry, Inc.

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch EA11402 - EPA 5030** | | | | | | | | | | |
| **LCS (EA11402-BS1)** | | | | Prepared & Analyzed: 14-Jan-21 | | | | | | |
| Dichlorodifluoromethane (F12) | 3.7 | 0.50 | ug/l | 5.00 | | 74.6 | 70-130 | | | |
| Vinyl chloride | 4.3 | 0.050 | " | 5.00 | | 86.7 | 70-130 | | | |
| Chloroethane | 4.6 | 0.50 | " | 5.00 | | 91.8 | 70-130 | | | |
| Trichlorofluoromethane (F11) | 4.5 | 0.50 | " | 5.00 | | 90.2 | 70-130 | | | |
| 1,1-Dichloroethene | 5.2 | 0.50 | " | 5.00 | | 105 | 70-130 | | | |
| 1,1,2 Trichlorotrifluoroethane (F113) | 4.8 | 0.50 | " | 5.00 | | 96.1 | 70-130 | | | |
| Methylene chloride (Dichloromethane) | 4.2 | 0.50 | " | 5.00 | | 84.6 | 70-130 | | | |
| trans-1,2-Dichloroethene | 4.6 | 0.50 | " | 5.00 | | 91.3 | 70-130 | | | |
| 1,1-Dichloroethane | 4.5 | 0.50 | " | 5.00 | | 89.2 | 70-130 | | | |
| cis-1,2-Dichloroethene | 5.0 | 0.50 | " | 5.00 | | 100 | 70-130 | | | |
| Chloroform | 4.5 | 0.10 | " | 5.00 | | 90.1 | 70-130 | | | |
| 1,1,1-Trichloroethane | 4.7 | 0.50 | " | 5.00 | | 93.4 | 70-130 | | | |
| Carbon tetrachloride | 4.9 | 0.10 | " | 5.00 | | 97.6 | 70-130 | | | |
| 1,2-Dichloroethane (EDC) | 4.7 | 0.10 | " | 5.00 | | 94.0 | 70-130 | | | |
| Benzene | 4.6 | 0.10 | " | 5.00 | | 92.5 | 70-130 | | | |
| Trichloroethene | 4.9 | 0.10 | " | 5.00 | | 97.6 | 70-130 | | | |
| Toluene | 4.5 | 1.0 | " | 5.00 | | 90.0 | 70-130 | | | |
| 1,1,2-Trichloroethane | 4.5 | 0.50 | " | 5.00 | | 89.6 | 70-130 | | | |
| Tetrachloroethene | 4.5 | 0.10 | " | 5.00 | | 91.0 | 70-130 | | | |
| Ethylbenzene | 4.7 | 0.50 | " | 5.00 | | 93.1 | 70-130 | | | |
| 1,1,1,2-Tetrachloroethane | 4.6 | 0.50 | " | 5.00 | | 91.0 | 70-130 | | | |
| m,p-Xylene | 9.5 | 0.50 | " | 10.0 | | 94.6 | 70-130 | | | |
| o-Xylene | 4.6 | 0.50 | " | 5.00 | | 91.1 | 70-130 | | | |
| 1,1,2,2-Tetrachloroethane | 4.0 | 0.50 | " | 5.00 | | 80.4 | 70-130 | | | |
| *Surrogate: Dibromofluoromethane* | *2.88* | | *"* | *2.50* | | *115* | *75-125* | | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *2.50* | | *"* | *2.50* | | *100* | *75-125* | | | |
| *Surrogate: Toluene-d8* | *2.65* | | *"* | *2.50* | | *106* | *75-125* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *2.51* | | *"* | *2.50* | | *100* | *75-125* | | | |

H&P Mobile
Geochemistry Inc.

2470 Impala Drive
Carlsbad, CA 92010
760-804-9678 Phone
760-804-9159 Fax

| | | | |
|---|---|---|---|
| SALEM Engineering Grp, Inc. - Fresno | Project: | SLM010821-12 | |
| 4729 W. Jacquelyn Ave. | Project Number: | Former Compress | Reported: |
| Fresno, CA 93722 | Project Manager: | Shannon Lodge | 15-Jan-21 15:55 |

## Notes and Definitions

| | |
|---|---|
| S-GC | Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate(s). |
| LCC | Leak Check Compound |
| ND | Analyte NOT DETECTED at or above the reporting limit |
| MDL | Method Detection Limit |
| %REC | Percent Recovery |
| RPD | Relative Percent Difference |

All soil results are reported in wet weight.

## Appendix

H&P Mobile Geochemistry, Inc. is approved as an Environmental Testing Laboratory and Mobile Laboratory in accordance with the DoD-ELAP Program and ISO/IEC 17025:2005 programs through PJLA, accreditation number 69070 for EPA Method TO-15, EPA Method 8260B and H&P 8260SV.

H&P is approved by the State of California as an Environmental Laboratory and Mobile Laboratory in conformance with the Environmental Laboratory Accreditation Program (ELAP) for the category of Volatile and Semi-Volatile Organic Chemistry of Hazardous Waste, certification numbers 2740, 2741, 2743 & 2745.

H&P is approved by the State of Louisiana Department of Environmental Quality under the National Environmental Laboratory Accreditation Conference (NELAC) certification number 04138

The complete list of stationary and mobile laboratory certifications along with the fields of testing (FOTs) and analyte lists are available at www.handpmg.com/about/certifications.

Mobile Geochemistry, Inc.
2470 Impala Drive, Carlsbad, CA 92010
& Field Office - Signal Hill, CA
W handpmg.com E info@handpmg.com
P 760.804.9678 F 760.804.9159

# VAPOR / AIR Chain of Custody

DATE: 1/7/21
Page 1 of 2

## Lab Client and Project Information

| | |
|---|---|
| Lab Client/Consultant: Salem Engineering Group | Project Name / #: Former Compress |
| Lab Client Project Manager: Shannon Lodge | Project Location: Fresno |
| Lab Client Address: 4729 W. Jacquelyn Ave | Report E-Mail(s): shannon@salemnet |
| Lab Client City, State, Zip: Fresno, CA 93711 | |
| Phone Number: (559) 907-9742 | |

### Reporting Requirements

- [x] Standard Report ☐ Level III ☐ Level IV
- ☐ Excel EDD ☐ Other EDD:
- ☐ CA Geotracker Global ID:

### Turnaround Time

- [x] **Standard** (7 days for preliminary report, 10 days for final report)
- ☐ **Rush** (specify):

### Sampler Information

Sampler(s): S. Lodge
Signature:
Date: 1/7/21

## Sample Receipt (Lab Use Only)

| | |
|---|---|
| Date Rec'd: 1/8/21 | Control #: 210001.01 |
| H&P Project # | SLM010821-12 |
| Lab Work Order # | E101012 |
| Sample Intact: [x] Yes ☐ No ☐ See Notes Below | |
| Receipt Gauge ID: 30005 | Temp: RT |
| Outside Lab: | |
| Receipt Notes/Tracking #: 1Z93TT619050941995 1Z93TT619049389201 | |
| Lab PM Initials: SM | |

**Additional Instructions to Laboratory:** LRLs

** Preferred VOC units (please choose one):*
- [x] µg/L ☐ µg/m³ ☐ ppbv ☐ ppmv

| SAMPLE NAME | FIELD POINT NAME (if applicable) | DATE mm/dd/yy | TIME 24hr clock | SAMPLE TYPE Indoor Air (IA), Ambient Air (AA), Subslab (SS), Soil Vapor (SV) | CONTAINER SIZE & TYPE 400mL/1L/6L Summa, Tedlar, Tube, etc. | CONTAINER ID (###) | Lab use only: Receipt Vac | VOCs Standard Full List [x] 8260SV ☐ TO-15 | VOCs Short List / Project List ☐ 8260SV ☐ TO-15 | Oxygenates ☐ 8260SV ☐ TO-15 | Naphthalene ☐ 8260SV ☐ TO-15 | TPHv as Gas ☐ 8260SV/m ☐ TO-15m | Aromatic/Aliphatic Fractions ☐ 8260SV/m ☐ TO-15m | Leak Check Compound ☐ DFA [x] IPA ☐ He | Methane by EPA 8015m | Fixed Gases by ASTM D1945 ☐ CO2 ☐ O2 ☐ N2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SV-1 @ 5 | | 1/7/21 | 12:20 | SV | 400mL | 004 | .70 | X | | | | | | X | | |
| SV-1 @ 10 | | | 12:30 | | | 038 | .39 | | | | | | | | | |
| SV-2 @ 5 | | | 12:40 | | | 140 | .43 | | | | | | | | | |
| SV-2 @ 10 | | | 12:45 | | | 015 | .17 | | | | | | | | | |
| SV-2 @ 10 Dup | | | 12:50 | | | 238 | .24 | | | | | | | | | |
| SV-3 @ 5 | | | 13:00 | | | 069 | .39 | | | | | | | | | |
| SV-3 @ 10 | | | 13:05 | | | 050 | .56 | | | | | | | | | |
| SV-4 @ 5 | | | 13:20 | | | 147 | .15 | | | | | | | | | |
| SV-4 @ 10 | | | 13:25 | | | 156 | .08 | | | | | | | | | |
| SV-5 @ 5 | | | 13:35 | | | 231 | .51 | | | | | | | | | |

| | Company | Date | Time |
|---|---|---|---|
| Approved/Relinquished by: | Salem | 1/7/21 | 3:00 |
| Approved/Relinquished by: | | | |
| Approved/Relinquished by: | | | |

| | Company | Date | Time |
|---|---|---|---|
| Received by: | | | |
| Received by: | H&P | 1/8/2021 | 1200 |
| Received by: | | | |

**Approval constitutes as authorization to proceed with analysis and acceptance of conditions on back*

H&P Mobile Geochemistry, Inc.
2470 Impala Drive, Carlsbad, CA 92010
& Field Office - Signal Hill, CA
W handpmg.com E info@handpmg.com
P 760.804.9678 F 760.804.9159

# VAPOR / AIR Chain of Custody

DATE: 1/7/21
Page 2 of 2

## Lab Client and Project Information

| | |
|---|---|
| Lab Client/Consultant: Salem Engineering Group | Project Name / #: 1-420-1016 Former compressor |
| Lab Client Project Manager: Shannon Lodge | Project Location: Fresno |
| Lab Client Address: 4729 W. Jacquelyn Ave | Report E-Mail(s): shannon@salem.net |
| Lab Client City, State, Zip: Fresno, CA 93722 | |
| Phone Number: (559) 907-9742 | |

### Reporting Requirements

☒ Standard Report ☐ Level III ☐ Level IV
☐ Excel EDD ☐ Other EDD: _____
☐ CA Geotracker Global ID: _____

### Turnaround Time

☒ **Standard** (7 days for preliminary report, 10 days for final report)
☐ **Rush** (specify): _____

### Sampler Information

Sampler(s): S. Lodge
Signature: [signature]
Date: 1/7/21

## Sample Receipt (Lab Use Only)

| | |
|---|---|
| Date Rec'd: 1/8/21 | Control #: 210001.01 |
| H&P Project # | SLM 010821-12 |
| Lab Work Order # | E101012 |
| Sample Intact: ☑ Yes ☐ No ☐ See Notes Below | |
| Receipt Gauge ID: 30005 | Temp: RT |
| Outside Lab: | |
| Receipt Notes/Tracking #: | |
| Lab PM Initials: SM | |

**Additional Instructions to Laboratory:** LRLs

***Preferred VOC units (please choose one):***
☒ µg/L ☐ µg/m³ ☐ ppbv ☐ ppmv

| SAMPLE NAME | FIELD POINT NAME (if applicable) | DATE mm/dd/yy | TIME 24hr clock | SAMPLE TYPE Indoor Air (IA), Ambient Air (AA), Subslab (SS), Soil Vapor (SV) | CONTAINER SIZE & TYPE 400mL/1L/6L Summa, Tedlar, Tube, etc. | CONTAINER ID (###) | Lab use only: Receipt Vac | VOCs Standard Full List ☒ 8260SV ☐ TO-15 | VOCs Short List / Project List ☐ 8260SV ☐ TO-15 | Oxygenates ☐ 8260SV ☐ TO-15 | Naphthalene ☐ 8260SV ☐ TO-15 | TPHv as Gas ☐ 8260SVm ☐ TO-15m | Aromatic/Aliphatic Fractions ☐ 8260SVm ☐ TO-15m | Leak Check Compound ☐ DFA ☒ IPA ☐ He | Methane by EPA 8015m | Fixed Gases by ASTM D1945 ☐ CO2 ☐ O2 ☐ N2 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SV-5@10 | | 1/7/21 | 13:45 | SV | 400mL | 0558 | .09 | X | | | | | | X | | | | | | |
| SV-6@5 | | ↓ | 14:00 | ↓ | ↓ | 199 | -.35 | X | | | | | | X | | | | | | |
| SV-6@10 | | ↓ | 14:10 | ↓ | ↓ | 2226 | .40 | X | | | | | | X | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Approved/Relinquished by: [signature] | Company: Salem | Date: 1/7/21 | Time: 3:00 | Received by: UPS | Company: | Date: | Time: |
| Approved/Relinquished by: | Company: | Date: | Time: | Received by: [signature] | Company: H&P | Date: 1/8/21 | Time: 1200 |
| Approved/Relinquished by: | Company: | Date: | Time: | Received by: | Company: | Date: | Time: |

*Approval constitutes as authorization to proceed with analysis and acceptance of conditions on back

# Job Summary

**Job Date : 1/4/2021**

| | | | |
|---|---|---|---|
| **Customer** | Salem Engineering Group | **Phone Number** | (559) 907-9742 |

| Billing Address | City | State | Zip |
|---|---|---|---|
| 4729 W. Jacquelyn Ave. | Fresno | CA | 93722 |

**Job Details**

| | |
|---|---|
| **Jobsite Location** | 2740 WEST NEILSON AVENUE |
| **City** | FRESNO |
| **State** | CA |

| | |
|---|---|
| **WA Number** | 238455 |
| **Job Num** | |
| **PO Num** | 1-420-1016 |

| | | | | | |
|---|---|---|---|---|---|
| **Lead Technician** | TOLLESON, KODY | **Phone** | 510-468-8610 | **Email** | kody.tolleson@gprsinc.com |

Thank you for using GPRS on your project. We appreciate the opportunity to work with you. If you have questions regarding the results of this scanning, please contact the lead GPRS technician on this project.

**EQUIPMENT USED**

The following equipment was used on this project:

- Underground Scanning GPR antenna. Typically capable of detecting objects up to 8' deep or more in ideal conditions but maximum effective depth can vary widely and depends on site and soil conditions. Depth penetration is most commonly limited by moisture and clay/conductive soils. Depths provided should always be treated as estimates as their accuracy can be affected by multiple factors.
- Electromagnetic Pipe and Cable Locator. Detects electromagnetic fields. Used to actively trace conductive pipes and tracer wires, or passively detect power and radio signals traveling along conductive pipes and utilities. Depths provided should always be treated as estimates as their accuracy can be affected by multiple factors.
- Magnetometer. Detects ferromagnetic objects at depths up to 8' by detecting their magnetic fields. Effective at detecting well heads, buried manholes, and other iron objects.

**Work Performed**

Ground Penetrating Radar Systems performed the following work on this project:

**Underground Utility**

The scope of work included scanning the specified area to locate underground utilities. A tracer signal was sent along any accessible metallic utility or tracer wire, and the area was scanned with GPR to locate any additional targets. The locations of any detected utilities and anomalies were marked directly at the site with paint, flags, stakes, or other appropriate means, and results were reviewed with onsite personnel unless otherwise noted.

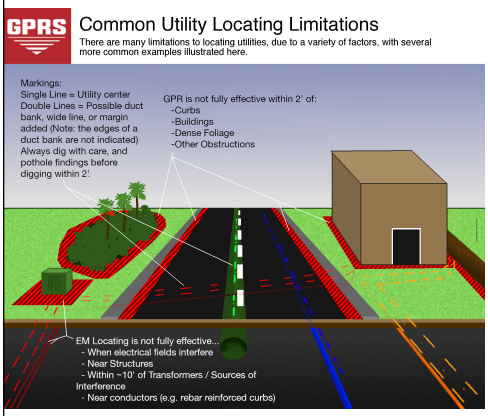
- The scope of work included scanning the areas around proposed soil borings. A radius of approximately 10' around each proposed soil boring was scanned unless otherwise noted. A total of 7 boring locations were scanned.
- The customer requested to have 7 location scanned prior to soil borings. The customer also requested to search for 3 septic tanks and a UST.

# Job Summary

**Job Date : 1/4/2021**

- The effective depth of GPR will vary throughout a site depending on surface and soil conditions. In this area, the maximum effective GPR depth was approximately 1-4 feet.
- 2 out of 3 septic tanks were located and there was no data circular that was consistent with that of a UST. Unknown objects were located across the site and marked out. Please avoid all markings by a minimum of 2' when working.

## Pictures




Utility Limitations

## TERMS & CONDITIONS

http://www.gprsinc.com/termsandconditions.html

**SIGNATURE**



**Contact Name**

**Shannon Lodge (559) 907-9742 Shannon@salem.net**

# Job Summary

**Job Date : 1/4/2021**



# APPENDIX K

# WATER SUPPLY ASSESSMENT

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# SB 610 WATER SUPPLY ASSESSMENT

## 2740 WEST NIELSEN AVENUE OFFICE/WAREHOUSE PROJECT

## FRESNO, CALIFORNIA

LSA

October 2022

# SB 610 WATER SUPPLY ASSESSMENT

## 2740 WEST NIELSEN AVENUE OFFICE/WAREHOUSE PROJECT

## FRESNO, CALIFORNIA

Submitted to:

City of Fresno
Planning and Development Department
2600 Fresno Street
Fresno, California 93721

Prepared by:

LSA
2565 Alluvial Avenue, Suite 172
Clovis, California 93611
(559) 490-1210

Project No. SNN2102

LSA

October 2022

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# LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| 1,2,3-TCP | 1,2,3-trichloropropane |
| AF | acre-feet |
| AFY | acre-feet per year |
| CALGreen Code | California Green Building Standards Code |
| CEQA | California Environmental Quality Act |
| City | City of Fresno |
| County | County of Fresno |
| CPC | California Plumbing Code |
| CVP | Central Valley Project |
| CVPIA | Central Valley Project Improvement Act |
| CY | calendar year |
| DBCP | 1,2-dibromo-3-chloropropane |
| DDR | Department of Drinking Water |
| DPU | Department of Public Utilities |
| DWR | Department of Water Resources |
| FID | Fresno Irrigation District |
| FMFCD | Fresno Metropolitan Flood Control District |
| GIS | Geographic Information System |
| gpm | gallons per minute |
| GSA | Groundwater Sustainability Agency |
| GSP | Groundwater Sustainability Plan |
| IGSM | Integrated Groundwater and Surface Water Model |
| Metro Plan | Fresno Metropolitan Water Resource Management Plan |
| mg/L | milligrams per liter |
| mgd | million gallons per day |
| NESWTF | Northeast Surface Water Treatment Facility |
| NFWRF | North Fresno Wastewater Reclamation Facility |

| | |
|---|---|
| PCE | perchloroethylene |
| PFAS | per- and polyfluoroalkyl substances |
| PG&E | Pacific Gas and Electric Company |
| project | 2740 West Nielsen Avenue Office/Warehouse Project |
| RWMP | Recycled Water Master Plan |
| RWRF | Regional Wastewater Reclamation Facility |
| SB | Senate Bill |
| SESWTF | Southeast Surface Water Treatment Facility |
| SOI | Sphere of Influence |
| SR | State Route |
| SWRCB | State Water Resources Control Board |
| SWTF | surface water treatment facility |
| TCE | trichloroethylene |
| TDS | total dissolved solids |
| TTDF | Tertiary Treatment and Disinfection Facility |
| USBR | United States Bureau of Reclamation |
| UV | ultraviolet |
| UWMP | Urban Water Management Plan |
| WRF | Wastewater Reclamation Facility |
| WSA | Water Supply Assessment |
| WSCP | Water Shortage Contingency Plan |
| WSIP | Water Storage Investment Program |
| WY | water year |

# INTRODUCTION

The City of Fresno (City) is conducting an environmental review under the requirements of the California Environmental Quality Act (CEQA) for the proposed 2740 West Nielsen Avenue Office/Warehouse Project (project) in Fresno, Fresno County, California. This Water Supply Assessment (WSA) has been prepared pursuant to the requirements of Senate Bill (SB) 610, which requires public water agencies, parties, or purveyors that may supply water to certain proposed development projects to prepare a WSA for use in environmental documentation for such projects, pursuant to CEQA. This WSA contains information from the City of Fresno 2020 Urban Water Management Plan (UWMP),[1] which was adopted by the City in June 2021. A WSA is required for any project that is subject to CEQA and includes an industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupy more than 40 acres of land, or having more than 650,000 square feet of floor area.

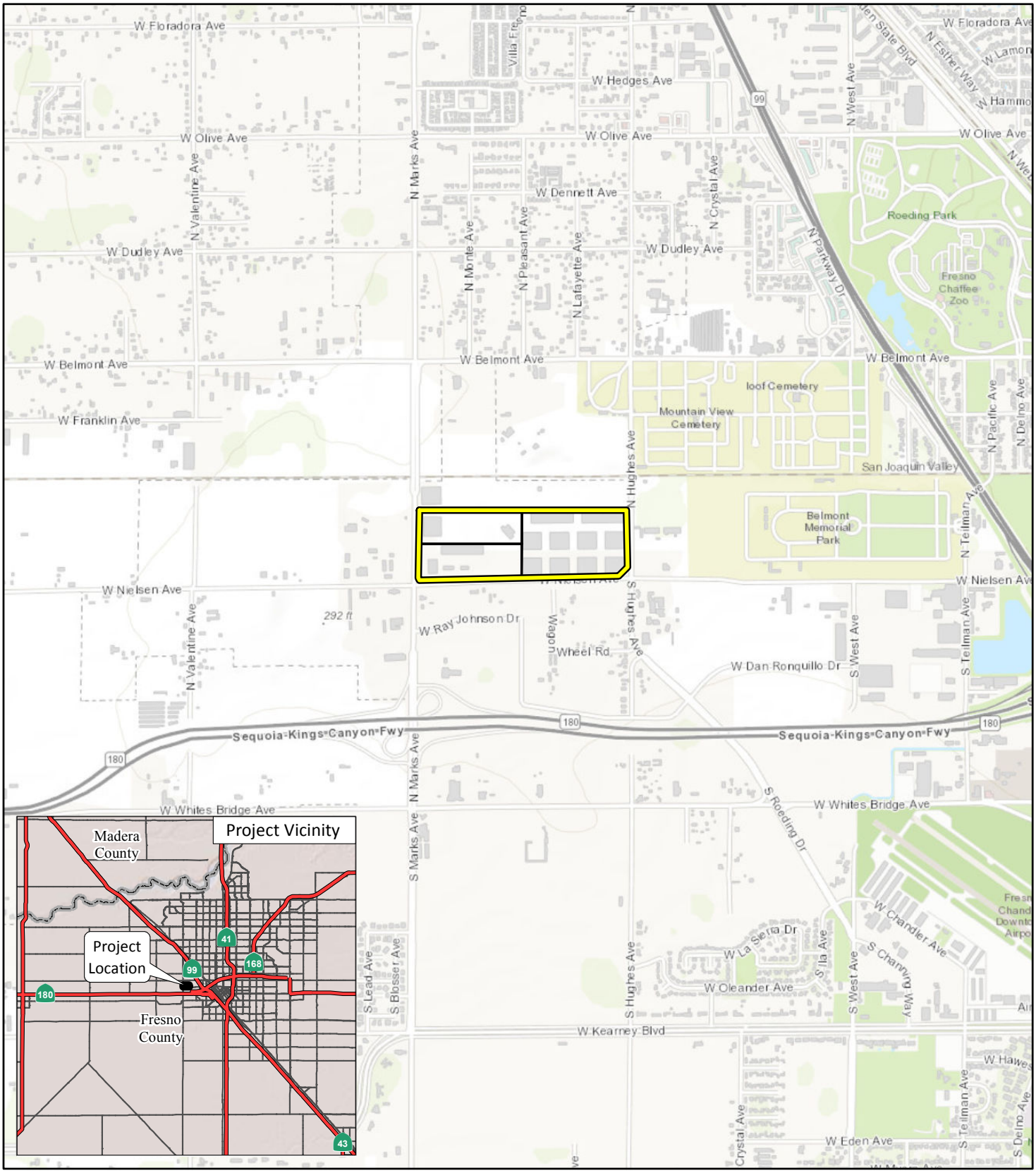
## PROJECT DESCRIPTION

The 48.03-acre project site is currently vacant but previously consisted of an industrial warehouse that has since been demolished. The project site is bounded to the north by vacant, undeveloped land, to the east by North Hughes Avenue, to the south by West Nielsen Avenue, and to the west by North Marks Avenue. Regional access to the site is provided by State Route (SR) 180, which is located approximately 0.3 mile south of the project site, and SR-99, which is located approximately 0.8 mile east of the project site. Figure 1 shows the site's regional and local context. Figure 2 depicts an aerial photograph of the project site and surrounding land uses.

The project would result in the construction of four office/warehouse buildings that would be configured for heavy industrial uses by tenants that have not been identified. The proposed buildings would result in a total gross floor area of approximately 901,438 square feet. The buildings' exterior would be up to 44 feet high, with an interior height of up to 36 feet, and designed with a total of 201 loading dock doors on the north and south sides of the buildings. The four buildings would consist of the following: Building 1 would be 468,812 square feet and would provide 122 loading dock doors; Building 2 would be 248,786 square feet and would provide 46 loading dock doors; Building 3 would be 93,074 square feet and would provide 18 loading dock doors; and Building 4 would be 90,766 square feet and would provide 15 loading dock doors. Figure 3 shows the project site plan.

The proposed project would comply with the latest California Green Building Standards Code (CALGreen Code) building measures and Title 24 standards.

[1] Fresno, City of. 2021. *City of Fresno 2020 Urban Water Management Plan*. June.




LSA

LEGEND

Project Location

Proposed Parcels

FIGURE 1

N

0 1000 2000

FEET

*2740 West Nielsen Avenue Office/Warehouse Project*

Regional Project Location

SOURCE: Esri Topographic Map (2021)

I:\SNN2102\GIS\MXD\Project_Location.mxd (6/7/2021)




LSA

FIGURE 2

Project Site

Proposed Parcels

N

0 500 1000

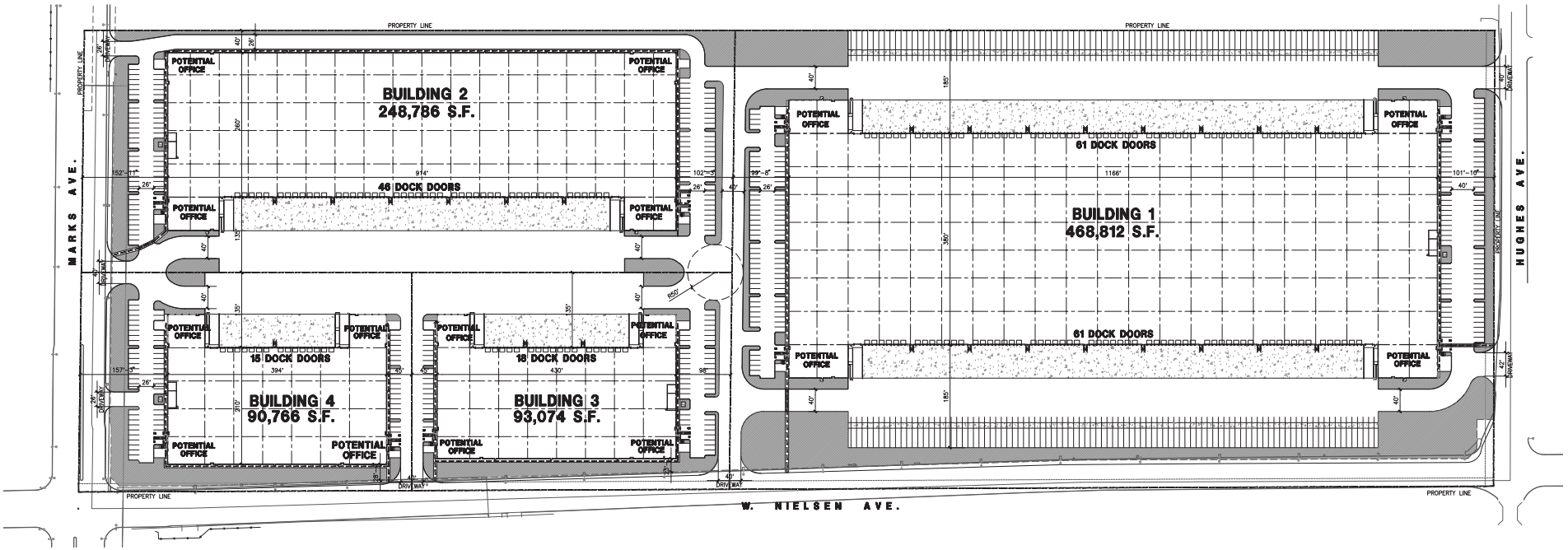
FEET

*2740 West Nielsen Office/Warehouse Project*

Aerial Photograph of Project Site and Surrounding Land Uses

SOURCES: Google Earth, 9/9/2019; LSA 2021

FreP:\SNN2102 2740 W. Nielsen\PRODUCTS\Graphics\Figure 2.ai (1/20/2022)




LSA

FIGURE 3

0 120 240

FEET

N

*2740 West Nielsen Office/Warehouse Project*
Site Plan

SOURCE: HPA Architecture, Inc., 2021

FreP:\SNN2102 2740 W. Nielsen\PRODUCTS\Graphics\Figure 3.ai (10/5/2021)

As shown in Figure 3, vehicular access to the site would be provided by North Hughes Avenue, West Nielsen Avenue, and North Marks Avenue.

A total of 594 on-site parking spaces would be provided for vehicles and trucks. Of the 594 parking spaces, 385 spaces would be dedicated for standard vehicles, 11 spaces would be dedicated for accessible standard vehicles, and 10 spaces would be dedicated for accessible vans. The remaining 188 spaces would be dedicated for trailers, would be located along the eastern and western edges of the project site, and would be behind two 8-foot-tall gates, which would be installed to separate the general parking area from the truck storage and dock loading area.

Consistent with City requirements, drought-tolerant landscaping would be provided throughout the project site.

The project site is located in an urban area and is currently served by existing utilities, including: water, sanitary sewer, storm drainage, electricity, and natural gas infrastructure. Water service to the project site would be provided by the City. New water within the project site would connect to the existing 14-inch main located on North Marks Avenue and the 16-inch main on North Hughes Avenue. The project would also include an on-site 12-inch main. The City would provide wastewater collection and treatment for the proposed project, and maintains an existing 12- to 18-inch line located in West Nielsen Avenue. The proposed project includes the installation of a new on-site 8-inch wastewater line that would connect to the City's existing line. The proposed project would include construction of a new curb and gutter along North Marks Avenue, West Nielsen Avenue, and North Hughes Avenue that would connect to the existing Fresno Metropolitan Flood Control District (FMFCD) stormwater system.

Electricity and natural gas services to the site are provided by Pacific Gas and Electric Company (PG&E). Existing underground utility connections and gas mains provide electricity and gas to the project site. New underground electrical lines would be installed.

Construction of the proposed project is anticipated to occur in two phases over a total 24-month period. The first phase would include the construction of Buildings 2, 3, and 4 and would occur for 12 months. The second phase would include the construction of Building 1 and would occur for 12 months. The proposed project would comply with City standards, including the City's current building code, landscape standards, and lighting standards. In addition, the proposed project would be graded similar to other developments throughout Fresno.

# WATER SUPPLY RIGHTS AND ENTITLEMENTS

The City of Fresno relies on groundwater from the North Kings Subbasin; surface water from the Central Valley Project (CVP), through a contract with the United States Bureau of Reclamation (USBR); Kings River water, through a contract with Fresno Irrigation District (FID); and recycled water to meet current and future water demands. The following pages are extracted directly from the 2020 UWMP (Pages 6-1 through 6-32) in satisfaction of Water Code sections 10910(A)(1) and 10910(D)(2). This information is applicable to the entire City of Fresno municipal water service area, including the project site.

## GROUNDWATER

The City overlies the Kings Subbasin, which is part of the greater San Joaquin Valley Groundwater Basin. The City is one of many water purveyors that use groundwater from the Kings Subbasin.

The City has a network of over 270 municipal wells and currently operates approximately 202 municipal supply wells within the Kings Subbasin. Until late 2004, the City relied solely on groundwater to meet the water demands. The City's desire is to continue to use groundwater within a larger conjunctive use program that maximizes its existing water rights and surface water supply sources.

### Basin Description

The Department of Water Resources (DWR) has partitioned the State into 10 major hydrologic regions (also referred to as "basins") and then further divided each basin into subbasins. The City is located in the Kings Subbasin (DWR Groundwater Subbasin Number 5-22.08) and lies within the larger San Joaquin Valley Groundwater Basin in the Central Valley of California. The Kings Subbasin covers approximately 1,530 square miles.

#### *Basin Location*

The San Joaquin Valley Groundwater Basin is bounded to the north by the Sacramento-San Joaquin Delta and Sacramento Valley, to the east by the Sierra Nevada, to the south by the San Emigdio and Tehachapi mountains, and to the west by the Coast Ranges. The Kings Subbasin, located within the southern half of the San Joaquin Valley Groundwater Basin, is bounded to the north by the San Joaquin River, to the east by the alluvium-granite rock interface of the Sierra Nevada foothills, to the south by the southern fork of the Kings River, and to the west by the Delta-Mendota and Westside Subbasins. The Kings Subbasin is split into seven Groundwater Sustainability Agency (GSA) management areas, with Fresno located in the North Kings GSA. Figure 6-1 of the 2020 UWMP illustrates the location of Fresno within the Kings Subbasin.

### *Area Geology*

The upper several hundred feet of geology within the Kings Subbasin generally consists of highly permeable, coarse-grained deposits, which are termed older alluvium. Figure 6-2 of the 2020 UWMP presents an idealized hydrogeologic cross-section that illustrates the general depth of various lithologic features within the Kings Subbasin, near Fresno.

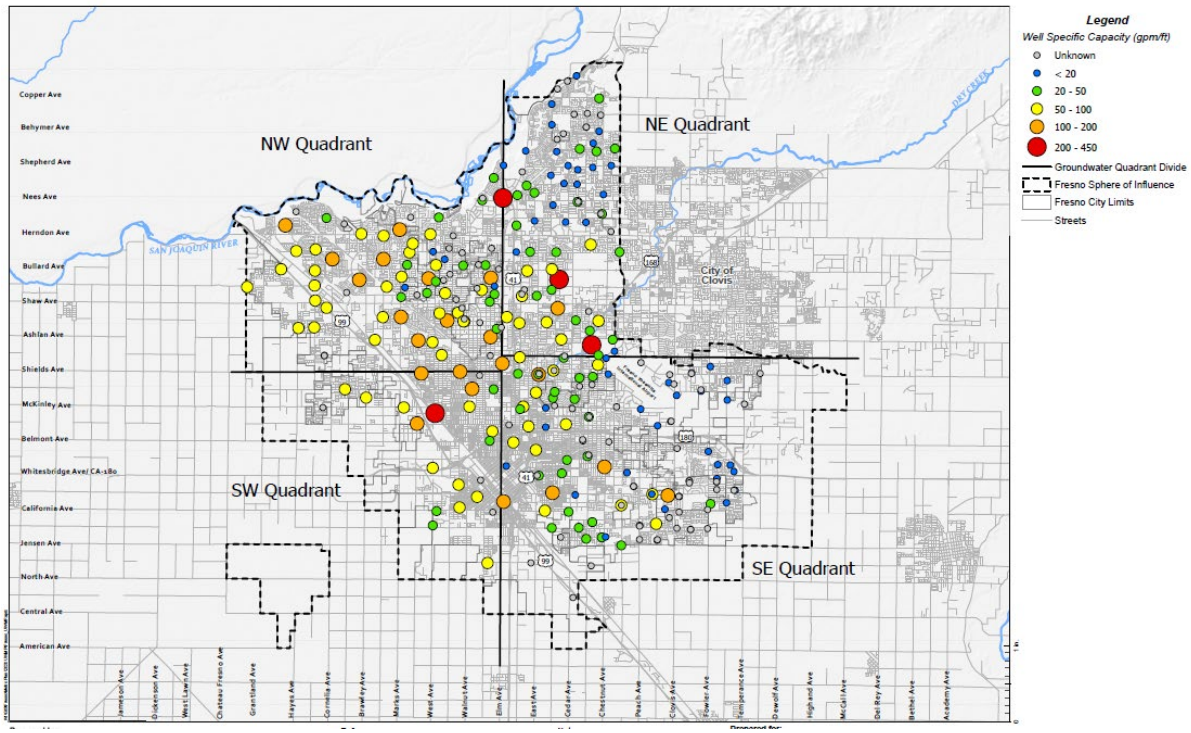
Coarse-grained stream channel deposits, associated with deposits by the ancestral San Joaquin and Kings Rivers, underlie much of northwest Fresno. There is a laterally extensive clay layer, at an average depth of approximately 250 feet below the ground surface, beneath most of the south and southeastern portions of Fresno.

Below the older alluvium, to depths ranging about 600–1,200 feet below ground surface, the finer-grained sediments of the tertiary-quaternary continental deposits are typically encountered. Substantial groundwater has been produced and utilized from these depths by the City. However, deeper deposits located in the southeastern and northern portions of Fresno have produced less groundwater.

There are also reduced deposits in the northern and eastern portions of Fresno, at depths generally below 700 or 800 feet, which are associated with high concentrations of iron, manganese, arsenic, hydrogen sulfide, and methane gas. Groundwater at these depths does not generally provide a significant source for municipal supply wells.

### *Aquifer Characteristics*

The aquifer beneath Fresno was characterized using data compiled during aquifer tests performed at the City's production wells. As part of updating the detailed hydrogeologic evaluation, aquifer test data (pump tests) were reviewed to update the hydrogeologic analysis and evaluate the specific capacity data. The specific capacity indicates the ability of a particular well to produce water. Figure 4 shows the estimated specific capacity of each active well from early 2020 pump test data. As shown in the figure, the northwestern and southwestern portions of Fresno have wells with higher specific capacities.




Source: 2020 Urban Water Management Plan, Figure 6-3 (City of Fresno 2021).

**Figure 4: City Wells Specific Capacity**

## Groundwater Management

In 2014, a three-bill legislative package was signed into law, composed of Assembly Bill 1739, SB 1168, and SB 1319, collectively known as the Sustainable Groundwater Management Act (SGMA) of 2014, which is codified in Section 10720 et seq. of the California Water Code. This legislation created a statutory framework for groundwater management in California that can be sustained during the planning and implementation horizon without causing undesirable results. SGMA requires governments and water agencies of "critically overdrafted" basins to reach sustainability by 2040. The Kings Subbasin was designated a critically overdrafted basin in the DWR's Bulletin 118. The North Kings GSA is working within the SGMA framework to reach groundwater sustainability.

The City was a founding member of the North Kings GSA, which consists of the following public agencies:

- FID
- City of Fresno
- City of Clovis
- City of Kerman
- County of Fresno

- Biola Community Services District
- Garfield Water District
- International Water District

The Kings Subbasin contains seven GSAs, including the North Kings GSA, as listed below and shown in Figure 6-1 of the 2020 UWMP:

- Central Kings GSA
- James Irrigation District GSA
- Kings River East GSA
- McMullin Area GSA
- North Kings GSA
- North Fork Kings GSA
- South Kings GSA

The seven GSAs operate cooperatively across the basin via a coordination agreement that ensures common approaches to sustainability items such as similarity of data usage and methodologies, consistent interpretations of the basin setting, and common assumptions and development of water budgets, monitoring networks, sustainable management criteria, and data management systems.

As required by SGMA, the North Kings GSA considers six sustainability indicators:

- Chronic lowering of groundwater levels, indicating significant and unreasonable depletion of supply
- Significant and unreasonable reduction of groundwater storage
- Significant and unreasonable seawater intrusion
- Significant and unreasonable degraded water quality
- Significant and unreasonable land subsidence
- Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water

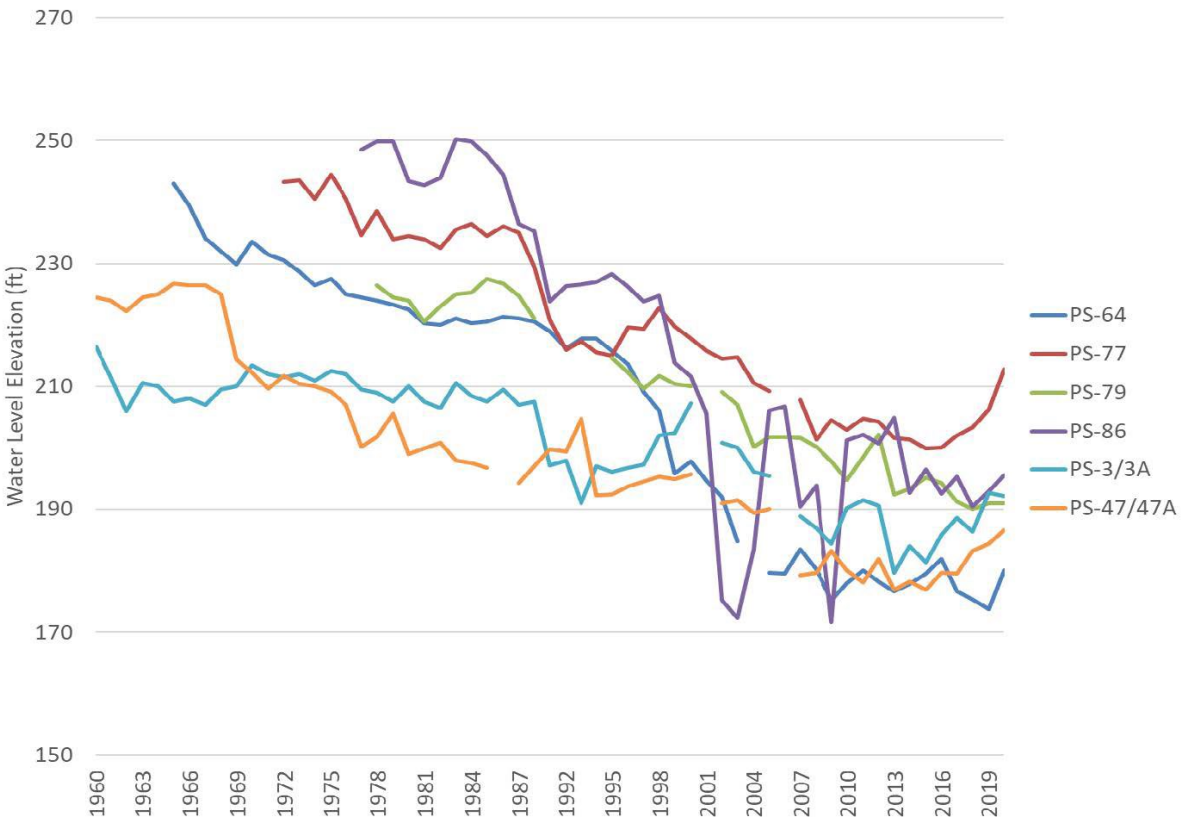
Each indicator has an identified undesirable result, measurable objective, and minimum threshold. The measurable objective and minimum threshold allow the North Kings GSA to evaluate their progress for the subject indicator and determine if conditions are improving, remaining stable or degrading. The sustainability indicators of primary concern within the City are groundwater levels, groundwater storage, and groundwater quality. The methodology for the water quality indicators has been developed and the methodology is

still being developed for the groundwater levels and groundwater storage indicators. A copy of the Groundwater Sustainability Plan (GSP) is provided in Appendix G of the 2020 UWMP.

## Overdraft Conditions

SGMA directs DWR to identify groundwater basins and subbasins in conditions of critical overdraft. As defined by SGMA, "A basin is subject to critical overdraft when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts." As mentioned, DWR classifies the Kings Basin as being in a state of critical overdraft in its Bulletin 118, and the future of the groundwater basin has been projected to see continued overdraft conditions.

The Kings Subbasin groundwater aquifer supplies the City, other municipalities, agriculture, and rural residential areas with a consistent source of water. Like much of the Kings Subbasin, groundwater levels beneath Fresno were relatively shallow at 25 feet below ground surface in 1940, prior to the start of World War II. After the war, the State, including the City, began growing at a rapid rate. For the period from 1959 to 1968, it was reported groundwater levels declined at a rate of 2.8 feet per year. The City continued to rely on the groundwater aquifer for decades, monitoring groundwater levels continuously. Groundwater levels since 1990 have declined at a lower rate than previously. Rates of decline slowed further starting in 2004, when the Northeast Surface Water Treatment Facility (NESWTF) started operations and the City renewed focus on increasing groundwater recharge. In 2019 and 2020, surface water accounted for more than half of the total water supply in Fresno. With the reduced pumping due to higher reliance on surface water, the groundwater levels have begun to increase in certain areas of Fresno in the last few years. Figure 5 provides a depiction of the City's depth to groundwater for six representative wells across the Sphere of Influence (SOI) since 1960.




Source: 2020 Urban Water Management Plan, Figure 6-4 (City of Fresno 2021).

**Figure 5: Time Series of Groundwater Levels at Representative Wells**

The City expects to continue to operate its three surface water treatment facilities (SWTFs) and pump groundwater at a lower rate than historically so that the groundwater basin can recover. According to the 2020 UWMP, one of the City's primary objectives is to maximize the use of available surface water treatment supplies to reduce overall reliance on groundwater. Additionally, the City plans to continue its groundwater recharge program to protect the groundwater basin. Figure 6-5 of the 2020 UWMP shows the active and proposed recharge basins and FID Canals the City utilizes as part of groundwater recharge program.

## Groundwater Quality

Groundwater within the North Kings Subbasin generally meets primary and secondary drinking water standards for municipal water use and is described as being bicarbonate-type water, including calcium, magnesium, and sodium as the dominant ions. Total dissolved solids (TDS) concentrations rarely exceed 600 milligrams per liter (mg/L) and range from 200 to 700 mg/L. However, the groundwater basin has been impacted by multiple chemical contaminants that affect the City's ability to fully utilize the groundwater basin resources without some type of wellhead treatment in certain areas.

Figure 6-6 of the 2020 UWMP presents the general location of regional plumes and major point sources within Fresno. The primary contaminants are nitrate, 1,2-dibromo-3-chloropropane (DBCP), 1,2,3-trichloropropane (1,2,3-TCP), and other volatile organic compounds like trichloroethylene (TCE) and perchloroethylene (PCE). The City has received settlements in a number of lawsuits related to these contaminants and has constructed wellhead treatment systems and implemented blending plans for a number of wells. Approximately 40 City wells are being treated for contaminants such as PCE, DBCP, TCE, 1,2,3-TCP, perfluorooctanoic acid, perfluorooctanesulfonic acid, ethylene dibromide, and nitrate, and an additional 20 wells include treatment for iron, manganese, and hydrogen sulfide removal or corrosion control.

As shown in Figure 6-6 of the 2020 UWMP, extensive groundwater contamination nearly covers the City's entire water service area; only areas located in the northwest appear to be relatively unaffected by regional groundwater contamination. Also, many of the City's wells are impacted by one or more of the contaminant plumes (indicated by the presence of overlapping plumes on the figure). The figure also shows the approximately 93 existing active wells that are impacted by at least one contaminant plume and the 60 existing wells with wellhead treatment. The City is also managing contamination from spreading by pumping specific wells to control the plume.

### Estimated Groundwater Yield

As part of the City's ongoing preparation of the Fresno Metropolitan Water Resource Management Plan (Metro Plan) update, the City is developing a storage accounting framework to estimate groundwater yield. The storage framework will track the City's groundwater recharge, pumping, and flows into and out of the City's SOI and incorporate bi-annual monitoring of well water level readings on a grid basis.

The most recent available information on the City's groundwater yield is from a hydrologic groundwater and surface water model that was prepared for the Upper Kings Basin Integrated Regional Water Management Authority. The City contributed additional funding to the effort so the model would be more refined for its service area and capable of assisting in the development of the City's previous Metro Plan. The Kings Basin Integrated Groundwater and Surface Water Model (IGSM) was completed in 2007 and provided outputs specific to the City's SOI. The IGSM was developed and calibrated utilizing data for the period of 1964–2004. Building off the calibrated IGSM, additional modeling was conducted in 2008 to evaluate the City's proposed water supply plan and its ability to attain the balanced use of groundwater by the buildout year of 2025. The estimated groundwater yield within the City's SOI presented in this section is based on the modeling efforts to establish the various natural elements of the underlying aquifer.

### *Natural Recharge*

As a result of the IGSM effort, the long-term average deep percolation from rainfall and irrigation-applied water for the period of 1964–2004 was found to be 42,700 acre-feet per year (AFY) for the entire SOI. However, as urbanization continues within the SOI, the amount of deep percolation will decline because of increased runoff and less open land for natural recharge. For 2005, it was estimated deep percolation would be about 37,000 AFY and would reduce annually, ultimately declining to and remaining at 27,000 AFY by buildout in 2025. The current General Plan anticipates SOI buildout will occur in 2056. Holding the 2005 value of 37,000 AFY and extending the 27,000 AFY to 2056, intermediate values were straight-line interpolated. Additionally, the City currently covers 73,500 acres of the 100,277 acres within its SOI, representing 73 percent urbanization, which would approximate the City's water system service area. Table A shows estimated natural recharge through 2045.

**Table A: Normal Year Supply and Demand Comparison (acre-feet per year)**

| | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Natural Recharge[1] | 24,970 | 25,480 | 25,910 | 26,280 | 26,570 | 26,790 |
| Net Subsurface Inflow[1] | 47,510 | 49,910 | 52,320 | 54,720 | 57,120 | 59,530 |
| **Sustainable Yield** | **72,480** | **75,390** | **78,230** | **81,000** | **83,690** | **86,320** |
| Intentional Recharge[2] | 60,000 | 62,700 | 65,400 | 68,100 | 70,800 | 73,500 |
| **Total Estimated Groundwater Yield** | **132,480** | **138,090** | **143,630** | **149,100** | **154,490** | **159,820** |

Source: 2020 Urban Water Management Plan, Table 6-1 (City of Fresno 2021).

[1] Based on the Kings Basin Integrated Groundwater and Surface Water Model and projected City land growth.

[2] Projected normal year intentional recharge from Table 4-7 of the 2020 Urban Water Management Plan.

### *Net Subsurface Inflow*

Again, utilizing information developed from the IGSM, average net subsurface inflow into the SOI was characterized as being 64,800 acre-feet (AF) annually for the period of 1964–2004. Applying the previously described 73 percent proportioning factor of the developed SOI area to overall SOI area, approximately 47,510 AFY would be attributed to the City's water service area in 2020. This value will increase in future years as the City annexes more land until the SOI is built out. Table A shows the estimated subsurface inflows for future

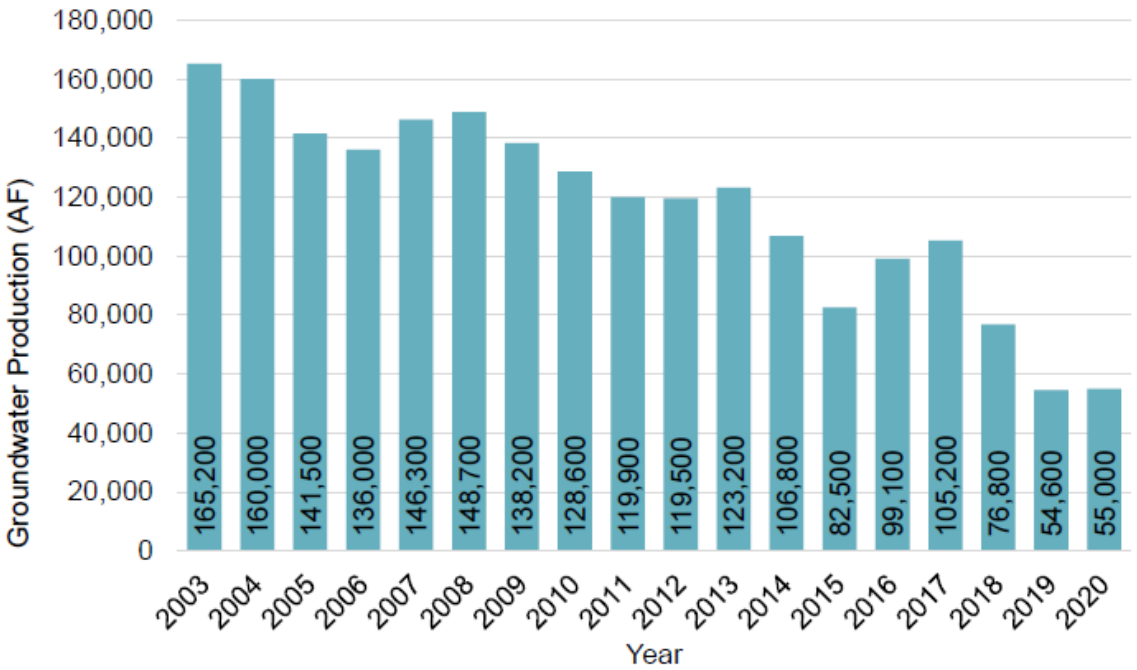
years. The City has historically benefited from the net subsurface inflows and requires these flows for replenishment necessary to maintain the sustainable yield of the groundwater aquifer system.

### *Intentional Groundwater Recharge*

The City has long made efforts toward offsetting the decline of groundwater levels and minimizing overdraft conditions through an active intentional recharge program that started in 1971. Through cooperative agreements with FMFCD and FID, the City has access to not only City-owned basins, but also those of these two agencies. Utilizing available surface water supplies, the City recharged on average approximately 60,000 AFY from 2000 to 2019; however, with the reduction in available surface water supplies, intentional recharge declined to 34,700 AF in 2014 and 19,800 AF in 2015, followed by an increase in recharge in years 2016, 2017, and 2019 to help replenish the aquifer. In 2019, the City's recharge of 82,993 AF was the maximum annual recharge attained during this period. The City has averaged over 60,000 AFY the previous 5 years and plans to gradually increase recharge by about 540 AFY each year. However, during wet years, the City will recharge more water when it is available to allow to the City to draw on additional groundwater during dry years, when surface water is not available. Intentional recharge is included in the non-potable demand projections as well as contributing to the estimated groundwater yield presented in Table A.

## Historic Groundwater Pumping

The City has historically relied on groundwater as its main supply source prior to the construction of its SWTFs. With the recent investments in surface water infrastructure, the City has been able to drastically reduce its groundwater pumping. Figure 6 shows the historic groundwater pumping since 2003. As shown, pumping has dropped significantly since 2003, the City's peak year for groundwater production.




Source: 2020 Urban Water Management Plan, Figure 6-7 (City of Fresno 2021).

**Figure 6: Historic Groundwater Production**

## SURFACE WATER

With the completion and operation of the Southeast Surface Water Treatment Facility (SESWTF), surface water is now a primary water supply used to meet potable demands within Fresno. The City contracts with FID for Kings River water and with the USBR for CVP water from the Friant-Kern Canal. The surface water supply is used either for potable uses through treatment and distribution or delivery to recharge basins for groundwater recharge. The Kings River water year (WY) is October through September, while USBR uses a WY of March through February. The City has historically used a calendar year (CY) for its analysis, so monthly water supply information was compiled in CY format for this report.

### USBR Friant Division Contract Supply

The City, through an agreement originally executed in January 1961, secured a surface water supply from the USBR CVP Friant Division. This agreement, for an annual water supply of 60,000 AF of Class 1 water, was last renewed in 2010 as a Section 9(d) contract that provides water from the San Joaquin River in perpetuity. A copy of the renewed contract is provided in Appendix H of the UWMP. The USBR CVP Friant Division facilities generally include Friant Dam (Millerton Reservoir), the Friant-Kern Canal, and the Madera Canal. The Friant-Kern Canal is maintained and operated by the Friant Water Authority. The USBR water supply is a wholesale supply.

Construction of Friant Dam was completed in 1947, and the dam began making diversions to the Friant-Kern Canal in 1949. Full operations of the CVP Friant Division did not commence until the Madera Canal was completed in 1951. Class 1 water was intended to be a supply that would be dependable in practically every year, regardless of the type of hydrologic WY. Class 2 water is essentially excess water available as determined by USBR and is less reliable than Class 1 water.

Class 1 water was historically very reliable until the 2006 San Joaquin River Restoration Settlement Agreement between the departments of the Interior and Commerce, the Natural Resources Defense Council, and the Friant Water Users Authority (which is now the Friant Water Authority). The City is a member of the Friant Water Authority. The settlement ended an 18-year legal dispute over the operation of Friant Dam brought by a coalition of conservation and fishing groups. The agreement characterized Class 1 deliveries by six hydrologic year types based on a recurrence over an 82-year simulation (1922–2003): wet, normal-wet, normal-dry, dry, critical-high, and critical-low. The projected surface water available for the City from USBR during each hydrologic year defined by the 2006 Settlement Agreement is summarized in Table B. As shown in the table, the average simulated delivery is 53,680 AFY and the median simulated delivery, which is similar to normal year delivery, is 60,000 AFY. The median value is higher than the average value because 100% allocation of 60,000 AF is simulated in 50 of 82 years but the dry and critical years result in substantial reductions, which bring down the average allocation.

**Table B: Available USBR Simulated Allocation (1922-2003)**

| Water Year Type | Percent of Years over Simulation Period of Deliveries[1] | Number of Years in that Year Type | Range of Allocation to City (AF) | Average Allocation to City (AF) |
|---|---|---|---|---|
| Wet | Highest 20% | 16 | 60,000 | 60,000 |
| Normal-Wet | 50% to 80% | 25 | 60,000 | 60,000 |
| Normal-Dry | 20% to 50% | 25 | 47,500 to 60,000 | 57,060 |
| Dry | 5% to 20% | 12 | 28,100 to 46,800 | 36,575 |
| Critical[2] | Lowest 5% | 4 | 13,900 to 24,700 | 19,025 |
| **Total** | | **82** | **Average** | **53,680** |
| | | | **Median** | **60,000** |

Source: 2020 Urban Water Management Plan, Table 6-2 (City of Fresno 2021).

[1] As defined in 2006 Settlement Agreement

[2] Includes both critical-high and critical-low, which are differentiated by the amount of unimpaired runoff. The simulation uses deliveries through 2006 and does not include the zero allocation years in 2014 and 2015.

AF = acre-feet

The Settlement Agreement estimates the reduced supply available to the City compared to historic supplies, most evident in dry years. Restrictions on exports from the Delta have hindered the USBR from making deliveries to the Exchange Contractors via the Delta-Mendota Canal. The Exchange Contractors allowed the formation of the CVP Friant Division by agreeing to not exercise their historic pre-1914 water rights to the San Joaquin and Kings rivers if guaranteed water deliveries continued through the Delta-Mendota Canal or other facilities. If USBR is unable to deliver water to the Exchange Contractors, they have the right to receive their water from the San Joaquin River, which reduces the Class 1 water availability.

Reduced deliveries from the Delta to the Exchange Contractors resulted in the CVP Friant Division contractors with zero allocations of Class 1 water in USBR WY 2014 and 2015, though the City received USBR deliveries in CY 2014 (prior to the USBR WY starting in March). Annual USBR deliveries since 2007 are shown in Figure 6-6 of the 2020 UWMP.

In addition to the Class 1 water available to the City, the USBR contract also makes available water classified as: recovered water account water; Section 215 water; and unreleased

restoration flows, unreleased recirculation flows, and uncontrolled season flows. The complexities of each water type are beyond the scope of this report but are mentioned here to reflect the other water acquisition opportunities afforded to the City through this contract. The San Joaquin River water supply has excellent water quality as it originates from snowmelt from the high Sierras and has not been detrimentally impacted.

### Fresno Irrigation District Supply

FID is one of 28 agencies that receives an entitlement of water from the Kings River through the Kings River Water Association. Water entitlements for Kings River Water Association contract members are determined based on a methodology that was initially developed in 1917–1919 to establish entitlements for early claimed rights holders. The methodology was based on historic mean daily natural flow conditions at Piedra, which is approximately 3 miles downstream from the then yet to be built Pine Flat Dam and "at the heart of Kings River uses, regulation, and stream control and storage."

On December 20, 2016, the Revised, Amended, and Restated Cooperative Agreement was executed between FID and the City for Water Utilization and Conveyance (2016 FID Agreement). The 2016 FID Agreement replaces the 1976 Cooperative Agreement and ends in 2035. The agreement identifies the City's contracted percentage of FID's Kings River water based on the City's water service area located within the FID service area as a percentage of the FID land area. FID land area varies slightly every year because it is dependent on the acreage receiving water deliveries for that year rather than the total acreage within FID (roughly 200,000 acres). As the City incorporates new land area into its service area, the percentage of FID supply increases. However, the 2016 FID Agreement sets the maximum percentage as 29.0 percent, although the City's service area is anticipated to expand and encompass more than 29.0 percent of FID's service area between 2025 and 2030. In 2020, the City's percentage of overall FID Kings River deliveries was 25.79 percent. The FID Agreement identifies that the 29.0 percent maximum was based on moderate growth in Growth Area 1 of the City's SOI (shown in Exhibit C in the 2016 Agreement). As such, the supply projections in this plan limit the City's FID supply with the 29.0 percent cap, but if the agreement were revised in the future the City's FID allocation percentage could grow beyond 29.0 percent as the water service area expands.

The City has historically not used all of its available allocation in any given year, although it pays a flat rate for its total allocation regardless of use. Water unused by the City is reallocated by FID to its other customers.

The City's potential supply from FID was summarized using actual Kings River deliveries for CYs 1964–2019, then categorized by the same WY types used for the USBR Friant supply. The range and average FID deliveries by WY type are shown in Table C. The average of all 56 CY delivery totals of FID Kings River deliveries is 452,541 AF, which equates to an average potential City supply of 131,237 AF, assuming the maximum 29.0 percent City supply

percentage. Table D lists the historic and projected allocation of FID's Kings River water for the City in normal (average) CYs. The City percentage of FID supplies was estimated assuming the City's water service area will grow from 59,100 acres to 84,300 acres by buildout.

**Table C: FID Diversions by Water Year Type (1964 to 2019)**

| Water Year Type | Percent of Years[1] | Number of Years between 194 and 2019 | Total FID Deliveries (AF)[2] | | Example Average Available to City[3] |
|---|---|---|---|---|---|
| | | | Range | Average | |
| Wet | Highest 20% | 11 | 563,500 to 644,600 | 590,700 | 171,300 |
| Normal-Wet | 50% to 80% | 17 | 452,800 to 563,300 | 513,700 | 149,000 |
| Normal-Dry | 20% to 50% | 17 | 362,600 to 448,000 | 415,000 | 120,400 |
| Dry | 5% to 20% | 8 | 253,700 to 362,000 | 315,700 | 91,600 |
| Critical | Lowest 5% | 3 | 158,100 to 253,300 | 210,200 | 61,000 |
| | | **56** | **Average** | **453,800** | **131,600** |

Source: 2020 Urban Water Management Plan, Table 6-3 (City of Fresno 2021).

1 As defined in the 2006 Settlement Agreement

2 Assigns water year type defined in the 2006 Settlement Agreement to FID deliveries from 1964 to 2019.

3 Based on the maximum 29.0 percent City supply percentage to provide an example City supply amount.

AF = acre-feet

**Table D: Projected FID Kings River Allocation for City, Normal Years**

| Year | Projected Total FID Allocation, AFY | Projected Allocation to City, AFY[1] |
|---|---|---|
| 2025 | 27.55% | 125,030 |
| 2030 | 29.00% | 131,600 |
| 2035 | 29.00% | 131,600 |
| 2040 | 29.00% | 131,600 |
| 2045 | 29.00% | 131,600 |

Source: 2020 Urban Water Management Plan, Table 6-4 (City of Fresno 2021).

[1] Projected City Allocation (%) x 453,800 AFY (estimated normal year diversion by FID, per Table 6-3 of the 2020 Urban Water Management Plan [Table G])

AFY = acre-feet per year

FID = Fresno Irrigation Dis

## STORMWATER

The Fresno-Clovis Metropolitan Area and surrounding rural vicinities are within the service area boundaries of the FMFCD, which has primary responsibility for managing the local stormwater flows. Most stormwater in Fresno drains to urban stormwater basins, where the water is retained to attenuate peak-flow runoff and recharge stormwater, or is pumped to local irrigation canals for conveyance away from the municipal areas. FMFCD's operation of stormwater basins is predicated on maintaining storage capacity for rain events, which limits accessibility for recharge activities during the rainy season. FMFCD estimates the amount of stormwater that is recharged each wet season. However, recharge attained with the FMFCD basins largely occurs in May through October, when limited storage capacity is required. Dry-season recharge is accomplished by diverting surface waters from the Kings River and Millerton Reservoir using City-allocated surface water. It is difficult to estimate stormwater recharge volumes as there is no physical measurement of stormwater flows into the basins, and infiltration rates can vary with water elevation and degree of siltation in the basin. However, FMFCD estimates that stormwater recharge in urban basins during the winter months may range from 7,000 AF per year to 22,200 AF per year.

## WASTEWATER AND RECYCLED WATER

### Recycled Water Coordination

The City is currently expanding its recycled water supplies to increase offset use of potable water for landscape irrigation. In 2010, the City completed a Recycled Water Master Plan (adopted by the City Council in 2013) to evaluate and plan for increased recycled water use in Fresno. The City's last Metro Plan, adopted in 2014, also outlined projects to increase the use of recycled water to offset potable demands. The City is currently updating the Metro

Plan and will reevaluate recommendations and projects to increase recycled water use. The City owns and operates two water reclamation facilities (WRFs): (1) the Fresno-Clovis Regional Wastewater Reclamation Facility (RWRF) and (2) the North Fresno Wastewater Reclamation Facility (NFWRF), both of which can produce Title 22 recycled water for use within the City's service area.

Coordination with other water agencies and potential consumers within the planning area is inherently within the purview of the City's Department of Public Utilities (DPU) as this department provides both water and wastewater services. DPU has been on the forefront of numerous water supply preservation, enhancement, and development projects and programs for decades. The concept of multiagency coordination is fully embraced by the department, as is evident with the previously discussed joint agency agreements and the commitment to construct new infrastructure to further develop new resources. The endeavor to develop recycled water as a resource was a requirement of a development in north Fresno, where the developer was conditioned to have a net-zero impact on water resources. The fundamental component of this development was the construction and dedication of the NFWRF to the City.

There are only a few agencies besides the City that have wastewater collection and treatment facilities within and immediately adjacent to the plan area. These agencies include the City of Clovis, Malaga County Water District, Pinedale County Water District, and Pinedale Public Utility District.

As the City is the primary responsible agency for wastewater collection and treatment for its annexed areas and certain County islands, it has taken the lead role of developing and implementing recycled water facilities to serve the same area.

### *City of Clovis*

The RWRF was developed under a Joint Powers Authority agreement executed in 1977 among the City of Fresno, the City of Clovis, and the County of Fresno. Both of the cities contribute to the cost of operations and maintenance and capital expenditures for the RWRF based on formulas in the agreement. This facility provides service for most of Clovis' sewer flows.

The City of Clovis recently constructed its own wastewater treatment facility that produces tertiary-level effluent and is distributed in a dedicated purple pipe system within portions of its service area.

### *County of Fresno*

The County of Fresno, like the City of Clovis, is a party to the RWRF Joint Powers Authority for treatment of flows from unincorporated areas encompassed by the City's service area.

### *Malaga County Water District*

Malaga County Water District provides water and sewer service to an unincorporated County area of about 2.25 square miles, which covers a small portion of the City's SOI. The district provides wastewater collection and treatment for residential and non-residential customers.

### *Pinedale County Water District*

Pinedale County Water District provides water, sewer, and solid waste service to an area of about 2 square miles, which covers an unincorporated County island and a portion of Fresno. The district provides wastewater collection to an area of 699 acres and diverts the flow to the City's collection system for treatment at the RWRF.

### *Pinedale Public Utility District*

Pinedale Public Utility District provides wastewater, street lighting, street sweeping, and landscape maintenance. The district services an area of 362 acres in the northern portion of Fresno, serving both an unincorporated County island and portions of the city. The collected wastewater is diverted to the City's collection system for treatment at the RWRF.

## Wastewater Collection, Treatment, and Disposal

The City's wastewater collection system was originally developed in 1891 with the installation of a 24-inch outfall sewer that discharged to a 40-acre sewer farm located southwest of town. The amount of land and number of facilities at this location continued to be expanded as Fresno grew over the years. Today, the City's wastewater collection system consists of about 1,630 miles of pipes ranging in size from 4 inches in diameter to 84 inches in diameter. This collection system also utilizes 15 lift stations throughout Fresno, ranging in pumping capacity from 0.25 million gallons per day (mgd) to 2.2 mgd.

### *Wastewater Treatment and Discharge Within Service Area*

The City is served by two wastewater treatment plants, briefly described below.

**Fresno-Clovis Regional Wastewater Reclamation Facility.**The RWRF has developed from what was once a sewer farm to a state-of-the-art wastewater treatment facility. In 1966, the City of Fresno was appointed the sewering agency for the local metropolitan region and shortly after began long-range planning and construction of new facilities to handle increasing flows and regulatory requirements. The RWRF treats flows from not only Fresno, but also sewered County areas (some County areas remain unsewered), the City of Clovis, Pinedale County Water District, and Pinedale Public Utility District.

Flows received at this facility peaked at 81,100 AF in 2006 and have been steadily decreasing since, with the average influent flow about 63,000 AF over the last 5 years. The

RWRF includes preliminary, primary, secondary, and tertiary treatment units with disinfection. Secondary treatment consists of three treatment trains with an annual average capacity of 87 mgd, consisting of 30 mgd for Train A and 57 mgd for Trains B and C combined. In 2017, a 5 mgd tertiary treatment system—the Tertiary Treatment and Disinfection Facility (TTDF)—was completed. The system can be expanded to 15 mgd and ultimately to 30 mgd.

The City has three primary means of effluent disposal:

1. Undisinfected secondary effluent to on-site and off-site farmland for restricted irrigation
2. Undisinfected secondary effluent to percolation ponds
3. Disinfected tertiary effluent to the recycled water distribution system

The percolated effluent has been deemed equivalent to Title 22 tertiary-treated water by the State Water Resources Control Board (SWRCB) Department of Drinking Water (DDW). The City has been extracting this water for reuse in areas within and surrounding the RWRF, as well as to FID's canals, through an exchange agreement for delivery to FID agricultural customers.

The discharged effluent is within the City boundaries and located just southwest of the metropolitan area. The treated effluent percolation ponds are within the City's SOI and hydrologic sphere that benefit the City's overall regional water budget.

**North Fresno Wastewater Reclamation Facility.**The NFWRF was constructed as part of a residential, commercial, and golf course master planned development located in the northern portion of Fresno. As a condition of the planned community, the developer was required to construct a wastewater treatment facility that would produce tertiary-level effluent for use within the development to ensure the overall project had a net-zero impact on water resources. This facility is presently rated at 0.71 mgd (average monthly flow) and 1.07 mgd (maximum daily flow). However, the ultraviolet (UV) light disinfection system was only validated for 300 gallons per minute (gpm) (0.43 mgd), which is the current flow limit until the DDW approves a higher flow. This facility is expandable to 1.25 mgd (average monthly flow). The disinfected tertiary effluent from the plant is largely used to irrigate the Copper River Ranch Golf Course. Of the 325 AF of wastewater treated in 2020, 54 AF was used for irrigation of turf. Treated but unused effluent is diverted to the City's collection system to the RWRF.

### Recycled Water System Description

The 2014 Metro Plan recommended expanding reuse by: (1) using the NFWRF effluent to irrigate the Copper River Ranch Golf Course; and (2) deriving up to 25,000 AFY of recycled water for landscape irrigation or other non-potable uses from the RWRF or new satellite WRFs. Since then, the City has irrigated the Copper River Ranch Golf Course with recycled

water and has constructed much of the southwest recycled water distribution system. However, the City is currently updating the Metro Plan and reevaluating the target volume of reuse in Fresno beyond the southwest system considering new conditions and regulations, including the potential for potable reuse in the future.

### *Fresno-Clovis Regional Wastewater Reclamation Facility*

As mentioned above, the RWRF produces undisinfected secondary effluent for restricted irrigation to on-site and off-site farmlands and disinfected tertiary-treated effluent for the recycled water distribution system.

The City's RWRF diverts a portion of the undisinfected secondary effluent to irrigate non-food crops grown adjacent to this facility. The practice of using the secondary effluent to irrigate non-food crops has been carried out for decades and is expected to continue for the foreseeable future. The City owns nearly 3,300 acres of land for and around the RWRF, consisting of percolation ponds (1,750 acres) and other land available to farm non-food crops. Table E provides the annual quantities of recycled water applied to these crops for the period from 2015 to 2019.

**Table E: Historic Recycled Water Used Within Service Area (AF)**

| Recycle Water Facility | 2015 | 2015 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| RWRF, Secondary Effluent (Non-Food Crop Irrigation) | 8,688 | 7,329 | 4,540 | 7,031 | 3,652 | 3,845 |
| RWRF, Tertiary Effluent | 531 | 485 | 423 | 867 | 912 | 858 |
| NFWRF | 62 | 110 | 0 | 0 | 19 | 54 |
| **Total** | **9,281** | **7,924** | **4,963** | **7,898** | **4,583** | **4,757** |

Source: 2020 Urban Water Management Plan, Table 6-5 (City of Fresno 2021).
Note: Reuse at the NFWRF was zero in 2017 and 2018 because the recycled water delivery system was offline for system repairs.
AF = acre-feet
NFWRF = North Fresno Wastewater Reclamation Facility
RWRF = Regional Wastewater Reclamation Facility

Additionally, the RWRF produces Title 22 disinfected tertiary-treated effluent through the TTDF completed in 2017 and through tertiary-equivalent soil aquifer-treated recycled water recovered from the percolated secondary effluent. A series of 15 groundwater wells located

at the RWRF are used to extract previously percolated effluent groundwater from beneath the facility. The extracted groundwater has the potential to be used for higher beneficial use if it can be demonstrated this water has attained a level of treatment satisfactory to meet disinfected tertiary levels. The City embarked on a joint project with the WateReuse Research Foundation to demonstrate to State regulatory agencies the soil aquifer-treated recycled water met Title 22 levels. The culmination of this study is presented in a final report entitled "Demonstration of Filtration and Disinfection Compliance Through Soil-Aquifer Treatment," which was completed in 2013. This study concluded that, based on the documented sampled water quality data, the extracted groundwater met requirements for classification as disinfected tertiary-level recycled water. The SWRCB DDW stated that the percolated effluent water meets the tertiary treatment classification, and the City is making plans for its use as part of its recycled water production and distribution system. The combined rated production yield of the 15 wells, if run year-round, would be approximately 32,000 AFY. The City plans to blend the recycled extraction well water with the disinfected tertiary-level recycled water produced from the 5 mgd TTDF to feed the southwest recycled water distribution system. As new sales grow for the recycled water, additional recycled extraction of well water will be utilized to feed the City's southwest recycled water system.

The tertiary-equivalent soil aquifer-treated recycled water (recovered groundwater) is also used for on-site irrigation and transport to FID canals for delivery to customers during the irrigation season, as facilitated through an exchange agreement with FID.

Since the completion of the 2010 Recycled Water Master Plan (RWMP), the City has constructed most of the southwest recycled water system, shown in Figure 6-9 of the UWMP. The southwest recycled water system consists of a 3.2-million-gallon recycled water reservoir located at the RWRF, a 6,000 gpm (8.64 mgd) recycled water pump station located at the RWRF, a 640 gpm booster pump station (Roeding Park Booster), and 15.7 miles of 10-inch to 54-inch recycled water pipeline. Roughly 7.5 miles of pipeline remain to be constructed. The City also updated the demand and distribution system from the 2010 RWMP with the 2019 Citywide Recycled Water Demand and Southwest Recycled Water System Analysis to identify potential recycled water customers. This recent analysis will be incorporated into the latest Metro Plan update.

### *North Fresno Water Reclamation Facility*

As described earlier, the City has an existing recycled water plant in the northern portion of Fresno that receives and treats sewage from the residential, commercial, and golf course master-planned community. The NFWRF was constructed in 2008 but was not fully operational until 2009 due to the inability to run properly in extremely low-flow conditions. Subsequent modifications at the plant allowed it to run on a regular basis in 2010 and again in 2014 for UV approval. The amount of reuse has varied substantially since 2016 because the delivery system was offline in 2017 and 2018 for treated water basin slope repairs. City

staff indicated that 2016 is representative of operations going forward. The disinfected tertiary effluent is conveyed in a dedicated pipeline to an adjacent golf course for irrigation purposes. The quantities used for irrigation purposes are shown in Table E for the period of 2015–2019.

### Potential, Current, and Project Recycled Water Rates

The 2020 actual recycled water use and projected recycled water use in Fresno's service area is included in Table F. Secondary undisinfected reuse is projected to continue to be used to irrigate non-food crops adjacent to the RWRF in the future. The projected secondary undisinfected use going forward is based on the average use from 2015 to 2020. Additionally, the amount of tertiary recycled water from the RWRF is projected to increase to provide 6,210 AF for landscape and agricultural irrigation as the southwest recycled water system is built out. Projected tertiary recycled water from the NFWRF for golf course irrigation is projected to be 110 AF annually through 2045.

The 2015 UWMP anticipated that 21,200 AFY of recycled water would be produced and utilized in 2020. The previous projected increases in recycled water were based on recommendations from the 2010 RWMP, which included projects to increase recycled water use for landscape irrigation, agricultural irrigation, industrial use, and blending with raw surface water for groundwater recharge. Since the 2010 RWMP, the City has focused on constructing the southwest recycled water system to increase landscape and agricultural irrigation in the southwest portion of Fresno. The City is also currently updating the Metro Plan that is evaluating recycled water alternatives in Fresno and is expected to update its RWMP following the Metro Plan update to serve as a new guiding planning document for recycled water use by the City.

## Table F: Recycled Water within Service Area

| Beneficial Use Type | Potential Beneficial Uses of Recycled Water | Number of Potential Uses of Recycled Water (AF) | General Description of 2020 Uses | Level of Treatment | 2020 (AF) | 2025 (AF) | 2030 (AF) | 2035 (AF) | 2040 (AF) | 2045 (AF) |
|---|---|---|---|---|---|---|---|---|---|---|
| Agricultural irrigation[1] | Non-food crop irrigation | 7,900 | Irrigate non-food crops | Secondary, Undisinfected | 3,845 | 7,900 | 7,900 | 7,900 | 7,900 | 7,900 |
| Landscape irrigation (excludes golf course) | Landscape irrigation | 5,800 | Landscape irrigation; distributed through the southwest recycled water distribution system | Tertiary | 858 | 5,800 | 5,800 | 5,800 | 5,800 | 5,800 |
| Agricultural irrigation[1] | Food crop irrigation | 410 | Irrigate limited food crops; distributed through the southwest recycled water distribution system | Tertiary | - | 410 | 410 | 410 | 410 | 410 |
| Golf course irrigation | Landscape irrigation | 110 | Copper River Golf Course | Tertiary | 54 | 110 | 110 | 110 | 110 | 110 |
| - | | | | **Total:** | **4,757** | **14,220** | **14,220** | **14,220** | **14,220** | **14,220** |

Source: 2020 Urban Water Management Plan, Table 6-6 (City of Fresno 2021).

*Table footnotes continued on next page.*

Notes: Name of Supplier Producing (Treating) the Recycled Water: City of Fresno
Name of Supplier Operating the Recycled Water Distribution System: City of Fresno
Supplemental Volume of Water Added in 2020: 0%
Source of 2020 Supplemental Water: N/A

[1] Recycled water for agricultural irrigation does not offset the City's potable water demands, and as such, is excluded from projected recycled water in subsequent tables.

AF = acre-feet

### Actions to Encourage and Optimize Future Water Use

The 2010 RWMP identified the need for the City to adopt an ordinance to establish a recycled water policy and criteria for its use within the City's SOI. On July 14, 2014, the Recycled Water Ordinance was adopted by the City Council, laying the foundation for the expanded use of recycled water within Fresno.

The focus of the ordinance includes the following:

- Establish an Administrative Authority.
- Establish approved uses of recycled water.
- Define areas of potential eligibility for recycled water service.
- Specify voluntary uses of recycled water, depending on user classifications.
- Require installation of a transmission and distribution infrastructure.
- Encourage the use of voluntary retrofits for existing users that may not be addressed in the ordinance.
- Require the City of Fresno to prepare Rules and Regulations.
- Provide enforcement and severability clauses.
- Establishing a means for the City to provide recycled water at a negotiated price.

Efforts to further the use of recycled water include the requirement that new developments within planned major recycled water distribution mains must install purple pipe. Then, as the City's capital projects construct a distribution infrastructure, these segments will be in place to facilitate connections to new customers, reduce program costs by avoiding digging up new street improvements, and reduce disruption to vehicular traffic.

Most of the southwest recycled water distribution system from the RWRF completed construction in 2021. The City has identified potential customers to connect to the recycled water system once it is completed to offset potable demand and increase recycled water use in Fresno.

## DESALINATED WATER OPPORTUNITIES

Fresno is located in the central San Joaquin Valley; therefore, seawater desalination is not applicable to the City. Additionally, the groundwater that exists within the immediate area of Fresno is not brackish in nature and does not require desalination treatment.

# WATER EXCHANGES AND TRANSFERS

## Exchanges and Transfer Opportunities

### *USBRR Supply*

The Central Valley Project Improvement Act (CVPIA) of 1992 authorized the transfer of all or a portion of a CVP contractor's water supply to any other California water users or water agencies. The CVPIA allows water transfers as long as they are consistent with federal and State water laws. The primary component of the CVPIA that specifies water transfer provisions for federal water supplies is Section 3405(a), which includes provisions regarding maximum annual water transfer, beneficial use, and approvals.

As part of the City's current Metro Plan update, the City is evaluating potential future water transfers and exchanges of its periodically available USBR water. Currently, the City does not have any plans to transfer its USBR water to other California water users.

### *FID/RWRF Groundwater Exchange Supply*

Since 1974, the City has had an agreement with FID to exchange recycled water for the delivery of surface water east of Fresno (Appendix I of the 2020 UWMP). The agreement between fid and the city for exchange of recycled water allows for water pumped from beneath the RWRF to be conveyed to FID's Dry Creek and Houghton canals for delivery to growers west of Fresno. In exchange for the water delivered to FID by the City, FID agreed to deliver 46% of the total from either its Kings River entitlement or USBR Class II supply to growers or basins in the eastern portion of FID "insofar as is feasible and practical." The water is to be considered additional to the water that would have been delivered to the eastern portion of FID, such that the additional delivered water used by growers is assumed to offset groundwater pumping in the area and, therefore, provide a groundwater basin benefit. This is an indirect benefit to the City.

The agreement includes a minimum of 100,000 AF delivered over a 10-year period and no more than 30,000 AF in any given year. As shown in Figure 6-10 of the 2020 UWMP, the City exceeded the maximum yearly delivery in 2003 and 2004 and has maintained more than 100,000 AF of deliveries over a 10-year period. However, since 2016, the City has reduced RWRF groundwater exchange deliveries. The City is currently discussing an update to the agreement with FID, while the 2020 Metro Plan will identify and recommend other beneficial uses for the City's percolated effluent.

## Emergency Interties

In 2007, the cities of Fresno and Clovis executed an agreement for interconnection of their potable water systems to provide service during emergencies and other times of hardship in either community. The agreement covers interconnections, including apportionment of

capital costs, at two locations: Leonard Avenue at the Gould Canal alignment and Behymer Avenue at Willow Avenue.

The agreement provided for temporary deliveries from Clovis to southeast Fresno through the Leonard Avenue connection through 2013. The Leonard Avenue interconnection was constructed and remains in place for emergency uses through manual operation.

The agreement also provided for temporary deliveries from Fresno to northern Clovis through the Behymer Avenue connection through 2015. However, the Behymer Avenue interconnection has yet to be constructed and, if constructed in the future, would serve only for emergency use.

## FUTURE WATER PROJECTS

The City is currently updating its Metro Plan, which will recommend programs and projects to improve the City's water supply portfolio and continue providing a safe, reliable, and sustainable water supply. While the outcomes of the Metro Plan update are currently being developed, the City's ongoing and future projects to improve its supply portfolio include:

- Expansion of the recycled water distribution system
- Expansion of the groundwater recharge program
- Expansion of surface water treatment capacity
- Beneficial transfers and exchanges

### Expand Recycled Water Distribution System

As described above, the City has made significant improvements to its recycled water system over the last 5 years and is currently expanding its recycled water distribution system. The expanded distribution system allows an additional 5,000 AF of recycled water use in the City to offset potable demands that can be used in all hydrological year types. The expansion is projected to be completed by 2025.

### Expand Groundwater Recharge Capacity

With the acknowledgement that the groundwater aquifer is and will remain an integral resource, the City is currently evaluating an expanded recharge program as part of the Metro Plan update. Expanding intentional recharge may include the development of new dedicated intentional recharge facilities and/or joint projects for basins with FMFCD and potentially FID. The target for recharge expansion is to maximize storage within the groundwater basin and optimize use of available surface water supplies in normal years. The stored water will be used more in the single-dry-year and consecutive-dry-years scenarios, when surface water supplies are less available. The timing for groundwater recharge capacity expansion will be examined as part of the Metro Plan update and, for the

UWMP, is assumed to increase to allow for an additional 540 AFY of recharge to occur on average each year.

### Expand Surface Water Treatment Capacity

A key component to the success of the City's ability to reverse the long-time overreliance on groundwater is the construction of its surface water treatment facilities. These have allowed the City to optimize the use of available surface water supplies. The City's NESWTF currently has a 30 mgd capacity and the capability to expand up to 60 mgd. The SESWTF is currently permitted to produce up to 54 mgd but, with the subsequent rerating of the media filters, will be capable of operating at a rated capacity of 80 mgd. The timing for the SWTF expansion will be examined as part of the Metro Plan update and determined based on need as the City grows and demands increase.

### Beneficial Transfers and Exchanges

The City is evaluating future beneficial transfers and exchanges of the City's USBR water in normal water years when available water supplies exceed demands.

## SUMMARY OF EXISTING AND PLANNED SOURCES OF WATER

Summaries of the above-discussed existing and planned sources of water are provided in Table G and Table H below.

### Table G: Actual Water Supplies

| Water Supply | 2020 | |
|---|---|---|
| | Actual Volume, AFY | Water Quality |
| Groundwater | 55,028 | Drinking Water |
| USBR CVP | 37,447 | Drinking Water |
| FID Kings River | 71,292 | Drinking Water |
| Recycled Water, RWRF | 858 | Recycled Water |
| Recycled Water, NFWRF | 54 | Recycled Water |
| **Total** | **164,679** | |

Source: 2020 Urban Water Management Plan, Table 6-7 (City of Fresno 2021).
AFY = acre-feet per year
CVP = Central Valley Project
FID = Fresno Irrigation District
NFWRF = North Fresno Wastewater Reclamation Facility
RWRF = Regional Wastewater Reclamation Facility
USBR = United States Bureau of Reclamation

### Table H: Projected Water Supplies

| Water Supply | Reasonably Available Volume, AFY | | | | |
|---|---|---|---|---|---|
| | 2025 | 2030 | 2035 | 2040 | 2045 |
| Groundwater | 138,090 | 143,630 | 149,100 | 154,490 | 159,820 |
| USBR CVP | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 |
| FID Kings River | 125,030 | 131,600 | 131,600 | 131,600 | 131,600 |
| Recycled Water, RWRF | 5,800 | 5,800 | 5,800 | 5,800 | 5,800 |
| Recycled Water, NFWRF | 110 | 110 | 110 | 110 | 110 |
| **Total** | **329,030** | **341,140** | **346,610** | **352,000** | **357,330** |

Source: 2020 Urban Water Management Plan, Table 6-8 (City of Fresno 2021).
AFY = acre-feet per year
CVP = Central Valley Project
FID = Fresno Irrigation District
NFWRF = North Fresno Wastewater Reclamation Facility
RWRF = Regional Wastewater Reclamation Facility
USBR = United States Bureau of Reclamation

## Supply Management

The City currently balances its surface water supplies and groundwater based on minimum production for operation of the SWTFs and minimum groundwater pumping to manage and control contamination plumes and prevent their spread. The minimum operation conditions typically occur in the low-demand winter months, and the City can increase surface water production during peak-demand months when surface water is available. In normal and wet years, the City intends to rely on more surface water supply and recharge raw surface water to replenish the groundwater basin and build storage for dry years. In dry years, when surface water is less available, the City will ramp up well production to meet demands. The City is expected to continue this supply management strategy in the future.

## Special Conditions

This section details climate change and future regulatory conditions that impact the City's supply sources.

### *Climate Change Effects*

Climate models disagree on average annual precipitation projections but agree on other hydrologic metrics relevant to water resources management, including:

- Snowpack declines
- Increased fraction of precipitation on extreme rainfall days
- Shorter, sharper rainy season
- Increased evapotranspiration
- Higher frequency of extremely wet and extremely dry years
- Higher incidence of an extreme dry year followed by an extreme wet year or vice versa

Climate change impacts were evaluated in the North Kings GSP using DWR climate change datasets, which were developed for the California Water Commission's Water Storage Investment Program (WSIP). The North Kings GSP analyzed WSIP water supply projections and found climate change will have no significant impact on the FID Kings River diversions. The North Kings GSP estimates the timing of the inflows to water reservoir and surface water supplies is anticipated to shift significantly due to warmer temperatures causing precipitation to arrive as rainfall instead of snowmelt. The warmer temperatures are also predicted to cause the snowmelt to turn to runoff earlier each spring. These climate impacts are estimated in the North Kings GSP to slightly increase inflows to the Kings River (0.6% in 2040 and 0.3% in 2070); however, they are not expected to impact the Kings River diversions significantly, and the timing will have a greater impact on water management, including a possible greater need for additional storage. The North Kings GSP also estimated climate impacts to the San Joaquin River supplies available to the CVP Friant Division Contractors, including the City's USBR Class I supplies, and found the WSIP dataset estimates a slight reduction in future water supplies. The 2020 UWMP considers water supply during an extreme-dry-year or multi-dry-year scenario, which may occur more often due to climate change.

### *Regulatory Conditions*

The City has existing contracts for its surface water supplies that are not facing any reduction due to forthcoming regulation. The City's groundwater supply is from an unadjudicated basin and is also considered reliable. The GSA is currently working toward determining a safe yield for the Kings Subbasin, which is the amount of water than can be pumped from the basin over a long-term period without producing undesirable results. The City is an active member of the GSA, working collaboratively to bring the basin into balance while protecting the City's groundwater supply.

Additionally, forthcoming California regulations for per- and polyfluoroalkyl substances (PFAS) may impact certain wells within Fresno. The City is currently monitoring and treating

some groundwater wells for PFAS. These regulations are not expected to impact the City's ability to use its full groundwater supply.

## ENERGY INTENSITY

Pursuant to California Water Code Section 10631.2(a), readily available information regarding energy intensity shall be reported in the 2020 UWMP. For the City, this includes the total energy usage at each production facility, including each well site and the three SWTFs. The electrical usage includes the energy to produce, treat, and pump the water into the distribution system. Because the City's distribution system includes over 200 groundwater wells, Table I presents the total energy usage, water produced, and average energy intensity for all groundwater wells and for each SWTF following the methodology presented in Appendix O of the DWR 2020 UWMP Guidebook. The energy intensity varies significantly among groundwater wells depending on the depth to the groundwater table, if the well includes treatment beyond disinfection, and other local conditions. The total energy intensity for all production and treatment in the City's distribution system in 2020 was 384 kilowatt-hours per AF.

### Table I: Water System Energy Intensity in 2020

| | Wells | NESWTF | SESWTF | T-3 SWTF | Total |
|---|---|---|---|---|---|
| Groundwater | 27,667,366 | 5,845,314 | 13,416,000 | 454,470 | **47,386,150** |
| USBR CVP | 56,445 | 20,724 | 45,367 | 875 | **123,411** |
| FID Kings River | 490 | 282 | 296 | 520 | **384** |

Source: 2020 Urban Water Management Plan, Table 6-9 (City of Fresno 2021).
CVP = Central Valley Project
FID = Fresno Irrigation District
NESWTF = Northeast Surface Water Treatment Facility
SESWTF = Southeast Surface Water Treatment Facility
T-3 SWTF T-3 = Water Storage and Modular Surface Water Treatment Facility
USBR = United States Bureau of Reclamation

# WATER SUPPLY

This section discusses projected supplies and demands for a normal year, single dry year, and 5-year consecutive drought. As shown in Table J, the City is projected to have greater than 100,000 AF of available supply after meeting demands in normal years. As shown in Table K, the City's surface water supplies are reduced in a single dry year, but all potable demands are met and groundwater recharge of raw surface water is reduced. As shown in Table L, the City is projected to meet all demands during a 5-year drought with its existing supplies. Potable demands are unrestricted, and non-potable water used for groundwater recharge is reduced in years 3 and 4 of a 5-year drought.

## Table J: Normal Year Supply and Demand Comparison (acre-feet per year)

| | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|
| Groundwater | 138,090 | 143,630 | 149,100 | 154,490 | 159,820 |
| Surface Water – USBR | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 |
| Surface Water – FID | 125,030 | 131,600 | 131,600 | 131,600 | 131,600 |
| Recycled Water | 5,910 | 5,910 | ,5910 | 5,910 | 5,910 |
| **Supply Totals** | **329,030** | **341,140** | **346,610** | **352,000** | **357,330** |
| Potable Demand | 136,504 | 147,356 | 154,210 | 161,076 | 167,947 |
| Non-Potable Demand | 62,700 | 65,400 | 68,100 | 70,800 | 73,500 |
| **Demand Totals** | **199,204** | **212,756** | **222,310** | **231,876** | **241,447** |
| **Difference** | **129,826** | **128,384** | **124,300** | **120,124** | **115,883** |

Source: 2020 Urban Water Management Plan, Table 7-1 (City of Fresno 2021).
FID = Fresno Irrigation District
USBR = United States Bureau of Reclamation

## Table K: Single Dry Year Supply and Demand Comparison (acre-feet per year)

| | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|
| Groundwater | 138,090 | 143,630 | 149,100 | 154,490 | 159,820 |
| Surface Water – USBR | 0 | 0 | 0 | 0 | 0 |
| Surface Water – FID | 45,852 | 45,852 | 45,852 | 45,852 | 45,852 |
| Recycled Water | 5,910 | 5,910 | 5,910 | 5,910 | 5,910 |
| **Supply Totals** | **189,852** | **159,392** | **200,862** | **206,252** | **211,582** |
| Potable Demand | 136,504 | 147,356 | 154,210 | 161,076 | 167,947 |
| Non-Potable Demand | 27,588 | 28,776 | 29,964 | 31,152 | 32,340 |
| **Demand Totals** | **164,092** | **176,132** | **184,174** | **192,228** | **200,287** |
| **Difference** | **25,760** | **19,260** | **16,668** | **14,024** | **11,295** |

Source: 2020 Urban Water Management Plan, Table 7-2 (City of Fresno 2021).
FID = Fresno Irrigation District
USBR = United States Bureau of Reclamation

## Table L: Multiple Dry Years Supply and Demand Comparison

| | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|
| **First Year** | | | | | |
| Groundwater | 138,090 | 143,630 | 149,100 | 154,490 | 159,820 |
| Surface Water – USBR | 30,000 | 30,000 | 30,000 | 30,000 | 30,000 |
| Surface Water – FID | 99,725 | 99,725 | 99,725 | 99,725 | 99,725 |
| Recycled Water | 5,910 | 5,910 | 5,910 | 5,910 | 5,910 |
| **Supply Totals** | **273,725** | **279,265** | **284,735** | **290,125** | **295,455** |
| Potable Demand | 136,504 | 147,356 | 154,210 | 161,076 | 167,947 |
| Non-Potable Demand | 62,700 | 65,400 | 68,100 | 70,800 | 73,500 |
| **Demand Totals** | **199,204** | **212,756** | **222,310** | **231,876** | **241,447** |
| **Difference** | **74,521** | **66,509** | **62,425** | **58,249** | **54,008** |
| **Second Year** | | | | | |
| Groundwater | 138,090 | 143,630 | 149,100 | 154,490 | 159,820 |
| Surface Water – USBR | 37,200 | 37,200 | 37,200 | 37,200 | 37,200 |

## Table L: Multiple Dry Years Supply and Demand Comparison

| | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|
| Surface Water – FID | 93,426 | 93,426 | 93,426 | 93,426 | 93,426 |
| Recycled Water | 5,910 | 5,910 | 5,910 | 5,910 | 5,910 |
| **Supply Totals** | **274,626** | **280,166** | **285,636** | **291,026** | **296,356** |
| Potable Demand | 136,504 | 147,356 | 154,210 | 161,076 | 167,947 |
| Non-Potable Demand | 62,700 | 65,400 | 68,100 | 70,800 | 73,500 |
| **Demand Totals** | **199,204** | **212,756** | **222,310** | **231,876** | **241,447** |
| **Difference** | **75,422** | **67,410** | **63,326** | **59,150** | **54,909** |
| **Third Year** | | | | | |
| Groundwater | 138,090 | 143,630 | 149,100 | 154,490 | 159,820 |
| Surface Water – USBR | 0 | 0 | 0 | 0 | 0 |
| Surface Water – FID | 73,568 | 73,568 | 73,568 | 73,568 | 73,568 |
| Recycled Water | 5,910 | 5,910 | 5,910 | 5,910 | 5,910 |
| **Supply Totals** | **217,568** | **223,108** | **228,578** | **233,968** | **239,298** |
| Potable Demand | 136,504 | 147,356 | 154,210 | 161,076 | 167,947 |
| Non-Potable Demand | 53,763 | 46,281 | 43,526 | 40,677 | 37,761 |
| **Demand Totals** | **190,267** | **193,637** | **197,736** | **201,753** | **205,708** |
| **Difference** | **27,301** | **29,471** | **30,842** | **32,215** | **33,589** |
| **Fourth Year** | | | | | |
| Groundwater | 138,090 | 143,630 | 149,100 | 154,490 | 159,820 |
| Surface Water – USBR | 0 | 0 | 0 | 0 | 0 |
| Surface Water – FID | 45,852 | 45,852 | 45,852 | 45,852 | 45,852 |
| Recycled Water | 5,910 | 5,910 | 5,910 | 5,910 | 5,910 |
| **Supply Totals** | **189,852** | **195,392** | **200,862** | **206,252** | **211,582** |
| Potable Demand | 136,504 | 147,356 | 154,210 | 161,076 | 167,947 |
| Non-Potable Demand | 26,047 | 18,564 | 15,810 | 12,960 | 10,045 |
| **Demand Totals** | **162,551** | **165,920** | **170,020** | **174,036** | **177,992** |
| **Difference** | **27,301** | **29,471** | **30,842** | **32,215** | **33,589** |
| **Fifth Year** | | | | | |
| Groundwater | 138,090 | 143,630 | 149,100 | 154,490 | 159,820 |

## Table L: Multiple Dry Years Supply and Demand Comparison

| | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|
| Surface Water – USBR | 45,000 | 45,000 | 45,000 | 45,000 | 45,000 |
| Surface Water – FID | 125,840 | 125,840 | 125,840 | 125,840 | 125,840 |
| Recycled Water | 5,910 | 5,910 | 5,910 | 5,910 | 5,910 |
| **Supply Totals** | **314,840** | **320,380** | **325,580** | **331,240** | **336,570** |
| Potable Demand | 136,504 | 147,356 | 154,210 | 161,076 | 167,947 |
| Non-Potable Demand | 62,700 | 65,400 | 68,100 | 70,800 | 73,500 |
| **Demand Totals** | **199,204** | **212,756** | **222,310** | **231,876** | **241,449** |
| **Difference** | **115,636** | **107,624** | **103,540** | **99,364** | **95,123** |

Source: 2020 Urban Water Management Plan, Table 7-3 (City of Fresno 2021).
FID = Fresno Irrigation District
USBR = United States Bureau of Reclamation

## CONTINGENCY ANALYSIS APPLICABLITY

The City's adopted 2020 UWMP contains an overview of the City's Water Shortage Contingency Plan (WSCP). The City's WSCP is used to provide guidance to the City's governing body and staff and the public by identifying response actions to allow for efficient management of any water shortage with predictability and accountability. Preparation provides the tools to maintain reliable supplies and reduce the impacts of supply interruptions due to extended drought and catastrophic supply interruptions. The WSCP, applicable to the entire City of Fresno municipal water service area, is fully applicable to the project and protective of the adequacy of the project's water supply.

As discussed in the 2020 UWMP, the WSCP describes the following:

1. **Water Supply Reliability Analysis:** Summarizes the City's water supply analysis and reliability and identifies any key issues that may trigger a shortage condition

2. **Annual Water Supply and Demand Assessment Procedures:** Describes the key data inputs, evaluation criteria, and methodology for assessing the system's reliability for the coming year and the steps to formally declare any water shortage levels and response actions

3. **Six Standard Shortage Stages:** Establishes water shortage levels to clearly identify and prepare for shortages

4. **Shortage Response Actions:** Describes the response actions that may be implemented or considered for each stage to reduce gaps between supply and demand as well as minimize social and economic impacts to the community

5. **Communication Protocols:** Describes communication protocols under each stage to ensure customers, the public, and government agencies are informed of shortage conditions and requirements

6. **Compliance and Enforcement:** Defines compliance and enforcement actions available to administer demand reductions

7. **Legal Authority:** Lists the legal documents that grant the City the authority to declare a water shortage and implement and enforce response actions

8. **Financial Consequences of WSCP Implementation:** Describes the anticipated financial impact of implementing water shortage stages and identifies mitigation strategies to offset financial burdens

9. **Monitoring and Reporting:** Summarizes the monitoring and reporting techniques to evaluate the effectiveness of shortage response actions and overall WSCP implementation, with results used to determine if additional shortage response actions should be activated or if efforts are successful and response actions should be reduced

10. **WSCP Refinement Procedures:** Describes the factors that may trigger updates to the WSCP and outlines how to complete an update

11. **Special Water Features Distinctions:** Identifies exemptions for ponds, lakes, fountains, pools, and spas, etc.

12. **Plan Adoption, Submittal, and Availability:** Describes the process for the WSCP adoption, submittal, and availability after each revision

As identified in the 2020 UWMP, the 2020 WSCP is included as Appendix J to the 2020 UWMP.

# WATER DEMAND

This section discusses the citywide future estimated water use and estimated water demand associated with the proposed project.

## CITYWIDE DEMAND FACTORS FOR WATER USE

The City's 2020 UWMP estimated future water demands based on land use demand factors using 2018 metered consumption data. These demand factors were applied to the 2020 land use acreage by category to develop the demand projection beginning in 2020. Demand factors for land uses that grow over time and represent new developments were assigned a lower demand factor than the demand factors for existing development. Additionally, demand factors were assumed to slowly reduce over time due to passive conservation, which includes the replacement of older water fixtures and appliances with more efficient types. Table M shows the projected annual water use by land use type for 2025, 2030, 2035, 2040, and 2045.

### Table M: Citywide Demands for Potable and Non-Potable Water (acre-feet per year)

| Use Type | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|
| Single-Family | 76,255 | 80,429 | 82,934 | 85,437 | 87,936 |
| Multi-Family | 19,000 | 20,654 | 21,737 | 22,831 | 23,935 |
| Commercial[1] | 19,052 | 21,135 | 22,587 | 24,041 | 25,496 |
| Industrial | 7,410 | 9,003 | 9,922 | 10,841 | 11,758 |
| Landscape | 4,490 | 5,035 | 5,422 | 5,809 | 6,196 |
| Groundwater Recharge[2] | 62,700 | 65,400 | 68,100 | 70,800 | 73,500 |
| Other[3] | 200 | 200 | 200 | 200 | 200 |
| Losses | 10,097 | 10,900 | 11,408 | 11,917 | 12,426 |
| **Total** | **199,204** | **212,756** | **222,310** | **231,876** | **241,447** |

Source: 2020 Urban Water Management Plan, Tables 4-6 and 4-7 (City of Fresno 2021).
Notes:
[1] Includes industrial/governmental uses.
[2] Raw water.
[3] Travel meters.

As shown in Table M, overall water demands are projected to increase from 199,204 AFY in 2025 to 241,447 AFY in 2045, an increase of approximately 21 percent. The increase in water use for industrial uses is projected to increase at a faster rate of approximately 59 percent over the same period, from 7,410 AFY in 2025 to 11,758 AFY in 2045. Based on Table 4-3 of the 2020 UWMP, industrial acreage is expected to increase from 4,500 acres in

2020 to 9,300 acres in 2056, an increase of approximately 107 percent. As discussed above, demand factors for land uses that grow over time and represent new developments were assigned a lower demand factor than the demand factors for existing development.

## PROPOSED PROJECT WATER DEMAND

### Methodology

The potable demand projections in the 2020 UWMP for normal water use utilize land use-based projections. Under this methodology, existing land use and demand was accounted separately from future land use and demand. This allows different demand factors to be applied to current land use areas and future land use areas. Future land use areas represent future customers and developments that are expected to be more water-efficient than existing land uses and buildings due to the California Plumbing Code (CPC) and use of higher-efficiency appliances and landscapes.

The existing and future land use acreage was sourced from the City's Geographic Information System (GIS) database and the City's General Plan. The existing land use shapefile and associated acreage for each land use classification were used to represent 2020 land use data. Areas not served by the City were excluded from the existing land use shapefile. The future land use shapefile corresponds with the planned land use at buildout as described in the City's General Plan representing the year 2056. Although the City does not have any plans to serve areas currently served by others within the City limits, all areas within the City's SOI were assumed to be served by the City by buildout for conservative planning purposes. Table N lists the land use acreage by land use category for the 2020 and buildout 2056 water service areas used in the City's 2020 UWMP.

## Table N: Existing and Future Water Service Area Acreage

| Land Use Category | 2020 Water Service Area [1,3,4] | | 2056 Water Service Area[2] | |
|---|---|---|---|---|
| | Acres | Percent | Acres | Percent |
| Single-Family Residential | 27,700 | 47% | 40,000 | 47% |
| Multifamily Residential | 3,700 | 6% | 3,800 | 5% |
| Commercial | 4,500 | 8% | 8,600 | 10% |
| Public Facility | 5,600 | 9% | 7,200 | 9% |
| Industrial | 4,500 | 8% | 9,300 | 11% |
| Open Space/Landscape Irrigation | 13,100 | 22% | 11,000 | 13% |
| Mixed Use[3] | 0 | 0% | 3,900 | 5% |
| Downtown[3] | 0 | 0% | 600 | 1% |
| **Total** | **59,100** | **100%** | **84,300** | **100%** |

Source: 2020 Urban Water Management Plan, Table 4-3 (City of Fresno 2021).
Notes:

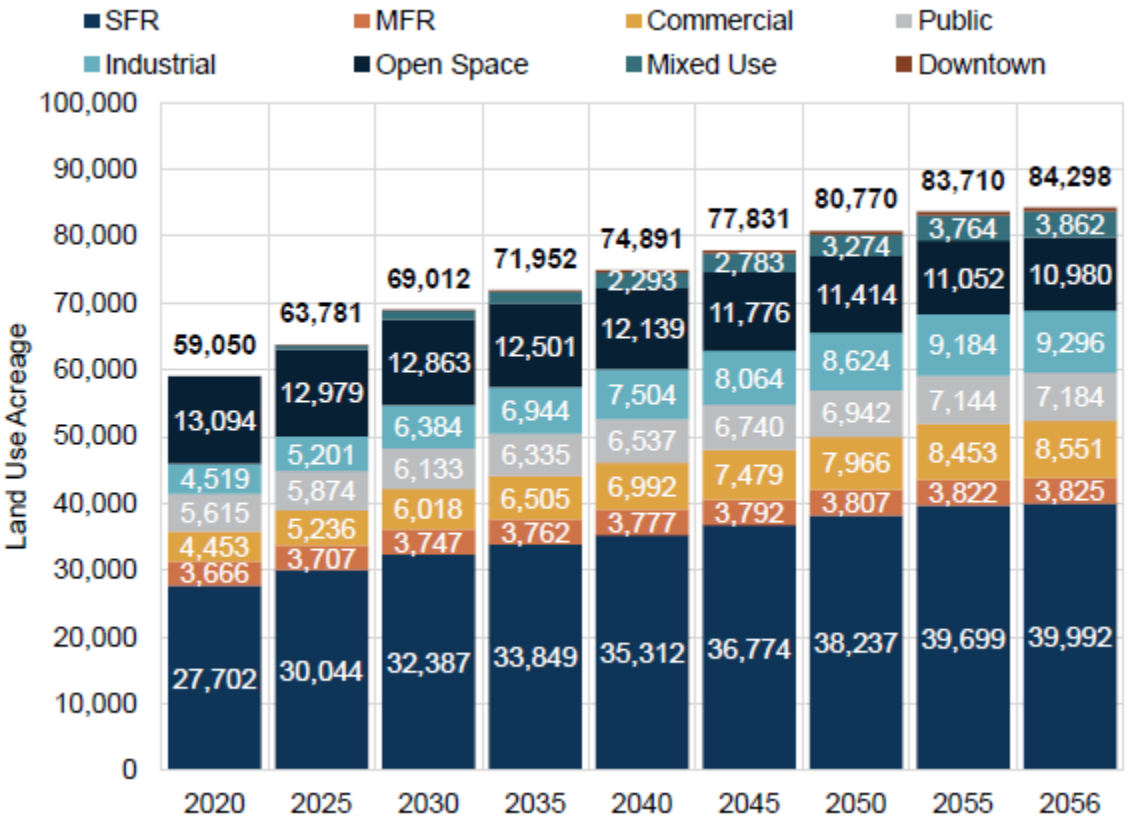
1 Acreage from City of Fresno GIS Shapefile of Land Uses provided 8/12/20 and reduced to the City's water service area (excludes Pinedale, Bakman, and California State University, Fresno, as well as unserved areas outside the City limits and SOI).

2 Future land use shapefile provided by the City on 8/12/20 and aligns with the General Plan for buildout in year 2056. The buildout service area acreage listed excludes the Fresno-Clovis Regional Wastewater Reclamation Facility; land used for road, highways, and railroads; and the north area outside of the SOI.

3 Mixed use and downtown land use categories are not in the existing land use shapefile. They are described in the General Plan as new designations for redevelopment of existing areas that contain a mix of land uses.

4 Approximately 11,300 acres of non-water-demanding vacant/partially vacant land is excluded from the 2020 water service area acreage.

The land use acreage between 2020 and 2056 was estimated in 5-year increments based on areas planned to be developed by 2030 from the City's Planning Department, and by linearly interpolating the remainder of the change in acreage for each land use category between 2030 and 2056. Figure 7 shows the existing and projected land use by customer class used to develop the projections.




Source: 2020 Urban Water Management Plan, Figure 4-3 (City of Fresno 2021).

**Figure 7: Existing and Projected Land Use**

## Assumptions

Project-specific water demand was calculated using the methodology from the 2020 UWMP, as described above, based on the following assumptions:

- Figure 7 above (Figure 4-3 of the 2020 UWMP) indicates there will be 5,201 acres of industrial uses in Fresno in 2025.
- Table M above (Table 4-6 of the 2020 UWMP) indicates the projected water demand for industrial land uses in 2025 will be 7,410 AFY.

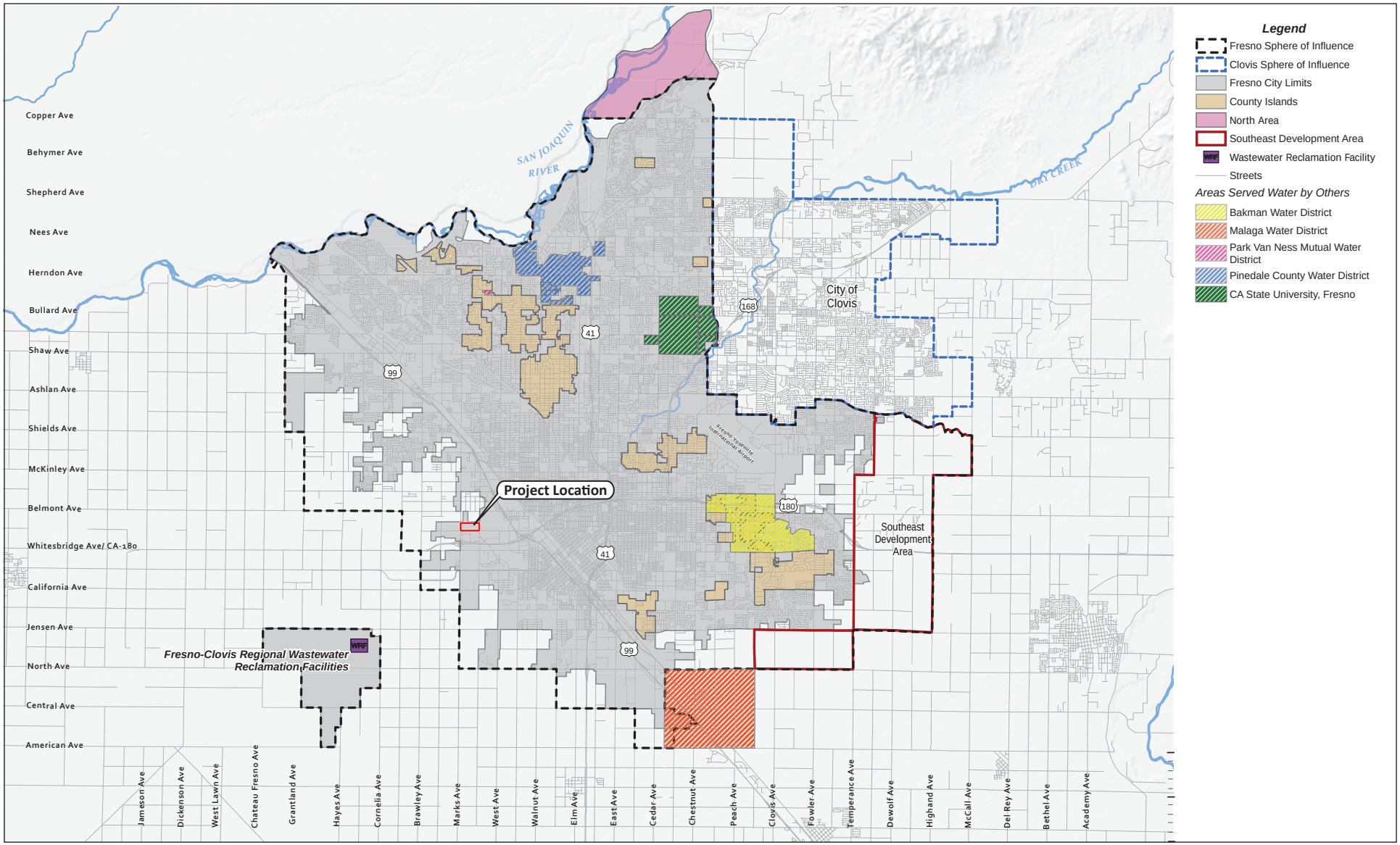
Therefore, it is assumed that industrial land uses, such as the proposed project, will demand approximately 1.42 AFY per acre in 2025.

## Proposed Project Water Demand

The total project site is 48.03 acres. Therefore, based on the assumptions identified above, the proposed project is estimated to demand approximately 68.2 AFY.

## APPLICABILITY OF THE URBAN WATER MANAGEMENT PLAN

The proposed project site is included in the land use area covered by the City's 2020 UWMP. Figure 8 shows the location of the project site in relation to the water service area boundaries covered by the 2020 UWMP. In addition, Figure 9 shows the proposed project's designation of Heavy Industrial. As shown in Table 4-3 of the 2020 UWMP, land use acreages and water demand in the 2020 UWMP were based on the City's General Plan land use designations for 2020 and buildout in 2056. As such, as shown in Figure 9, the acreage associated with the proposed project was assumed Industrial in the 2020 UWMP; therefore, it is assumed that demand for water was accounted for in the 2020 UWMP. There is no evidence, in consideration of the calculated project water demand, that such demand exceeds that estimated in the 2020 UWMP. The adequacy of the water supply for the project is thus consistent with the basis of the analysis of the City's water supply in the adopted 2020 UWMP.




LSA

Project Site Boundary

N

0 1.5 3

MILES

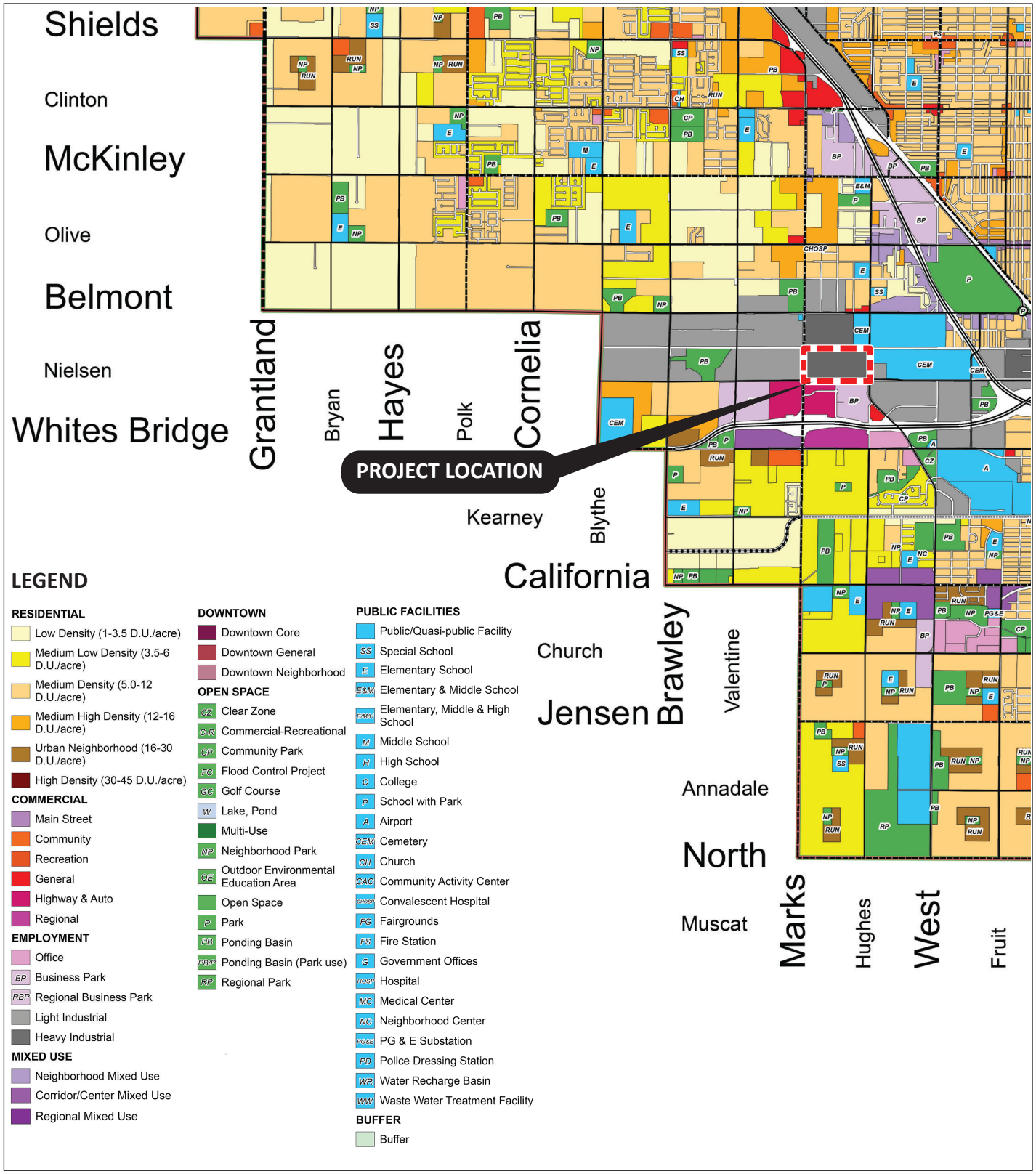
FIGURE 8

*2740 West Nielsen Office/Warehouse Project*

Project Site in Relation to the 2020 UWMP Water Service Area Boundaries

SOURCE: Source: 2020 Urban Water Management Plan, Figure 3-1 (City of Fresno 2021).

I:\SNN2102\G\Fig 8_Proj Site Relation to UWMP Boundaries.ai (7/20/2022)




LSA

FIGURE 9

N

NOT TO SCALE

SOURCE: City of Fresno, 2022

*2740 West Nielsen Office/Warehouse Project*
Project Site General Plan Land Use Designation

I:\SNN2102\G\Figure 9_Project Site General Plan Land Use Designation.ai (7/20/2022)

## ASSESSMENT FINDINGS

It is concluded that the City of Fresno's water system has sufficient capacity to supply the proposed 2740 West Nielsen Avenue Office/Warehouse Project and other projected demands within the City's service area through the year 2045. Therefore, it is recommended that the City of Fresno Water Division approve this assessment and forward the report to the City of Fresno Planning Department for inclusion in the CEQA documentation for the proposed project.

# APPENDIX L

# NOISE IMPACT ANALYSIS MEMORANDUM

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CARLSBAD
CLOVIS
IRVINE
LOS ANGELES
PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROSEVILLE
SAN LUIS OBISPO

# MEMORANDUM

**DATE:** February 3, 2023

**TO:** Jake Kurth, Scannell Properties

**FROM:** JT Stephens, Principal

**SUBJECT:** Noise Impact Analysis Memorandum for the 2740 West Nielsen Avenue Office/Warehouse Project

LSA has prepared a technical noise impact analysis memorandum for the proposed 2740 West Nielsen Avenue Office/Warehouse Project (project) in Fresno, Fresno County, California. This technical noise impact analysis memorandum evaluates the potential noise and vibration impacts and noise reduction measures associated with the project. This analysis includes a description of existing regulatory framework and an assessment of project-related construction and operational noise and vibration emissions. Measures to reduce or eliminate significant impacts are discussed.

## PROJECT DESCRIPTION

The currently vacant 48.03-acre project site is at 2740 West Nielsen (Assessor's Parcel Numbers 458-020-71 and 458-020-72) in the Fresno, in Fresno County, California. The project site is bounded to the north by vacant, undeveloped land, to the east by North Hughes Avenue, to the south by West Nielsen Avenue, and to the east by North Marks Avenue. The project location map is shown as Figure 1 (all figures are provided in Attachment A).

The project would result in the construction of four office/warehouse buildings that would be configured for heavy industrial uses by tenants that have not been identified. The proposed buildings would result in a total gross floor area of 907,780 square feet. The buildings' exteriors would be up to 44 feet high with an interior height of up to 36 feet and designed with a total of 193 loading dock doors on the north and south sides of the buildings. Building 1 would be 468,760 square feet and would provide 122 loading dock doors, Building 2 would be 248,820 square feet and would provide 45 loading dock doors, Building 3 would be 96,250 square feet and would provide 14 loading dock doors, and Building 4 would be 93,850 square feet and would provide 11 loading dock doors. The project site plan is shown in Figure 2.

As identified above, future tenants have not been identified. Therefore, this analysis assumes that the proposed project would be operational 24 hours per day, 7 days per week; however, it is possible that future tenants may operate fewer hours than covered in this analysis.

Construction of the proposed project is anticipated in two phases taking place over a total 24-month period starting in the third quarter of 2023 and ending in 2025. The first phase would include the construction of Buildings 2, 3, and 4 and would last 12 months. The second phase would include the construction of Building 1 and would last for 12 months. The proposed project would comply with City

standards, including the City's current building code, landscape standards, and lighting standards. In addition, the proposed project would be graded similar to other developments throughout Fresno.

### Sensitive Receptors and Land Uses in the Project Vicinity

Sensitive receptors include residences, schools, hospitals, and similar uses that are sensitive to noise and vibration. Adjacent parcels consist mostly of residential, light and heavy industrial, cemetery, and vacant, undeveloped uses. The closest sensitive receptors to the proposed project include the single-family residences approximately 110 feet south of the project site across West Nielsen Avenue.

## BACKGROUND

### Characteristics of Sound

Noise is usually defined as unwanted sound and consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, or sleep. To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally related to annoyance, while loudness can affect our ability to hear through hearing damage. Pitch is the number of complete vibrations, or cycles per second, of a wave, resulting in the tone's range from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment and is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves, combined with the reception characteristics of the human ear. Sound pressure refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be measured precisely with instruments. The project analysis defines the noise environment of the planning area in terms of sound pressure levels and the project's effect on sensitive land uses.

### Measurement of Sound

Sound intensity is measured with the A-weighted decibel scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound, similar to the human ear's de-emphasis of these frequencies. Decibels, unlike linear units (e.g., inches or pounds), are measured on a logarithmic scale representing points on a sharply rising curve.

For example, 10 decibels (dB) is 10 times more intense than 1 dB, 20 dB is 100 times more intense than 1 dB, and 30 dB is 1,000 times more intense than 1 dB. Thirty decibels (30 dB) represents 1,000 times as much acoustic energy as 1 dB. The decibel scale increases as the square of the change, representing the sound pressure energy. A sound as soft as human breathing is about 10 times greater than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the sound's loudness. Ambient sounds generally range from 30 dB (very quiet) to 100 dB (very loud).

Sound levels generate from a source, and their decibel level decreases as the distance from that source increases. Sound levels dissipate exponentially with distance from their noise sources. For a single point source, sound levels decrease approximately 6 dB for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source (e.g., highway traffic or railroad operations) the sound decreases 3 dB for each doubling of distance

in a hard site environment. Line source sound levels decrease 4.5 dB for each doubling of distance in a relatively flat environment with absorptive vegetation.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The equivalent continuous sound level ($L_{eq}$) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the $L_{eq}$ and Community Noise Equivalent Level (CNEL) or the day-night average noise level ($L_{dn}$) based on A-weighted decibels (dBA). CNEL is the time-varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly $L_{eq}$ for noise occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). $L_{dn}$ is similar to the CNEL scale but without the adjustment for events occurring during the relaxation and sleeping hours. CNEL and $L_{dn}$ are within 1 dBA of each other and are normally interchangeable. The City uses the CNEL noise scale for long-term noise impact assessment.

Other noise rating scales of importance when assessing the annoyance factor include the maximum instantaneous noise level ($L_{max}$), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis for short-term noise impacts are specified in terms of maximum levels denoted by $L_{max}$, which reflects peak operating conditions and addresses the annoying aspects of intermittent noise. It is often used together with another noise scale, or noise standards in terms of percentile noise levels, in noise ordinances for enforcement purposes. For example, the $L_{10}$ noise level represents the noise level exceeded 10 percent of the time during a stated period. The $L_{50}$ noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The $L_{90}$ noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the $L_{eq}$ and $L_{50}$ are approximately the same.

Noise impacts can be described in three categories. The first category includes audible impacts that refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater because this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1 dB and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category includes changes in noise levels of less than 1 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

Table A lists definitions of acoustical terms, and Table B shows common sound levels and their sources.

## Table A: Definitions of Acoustical Terms

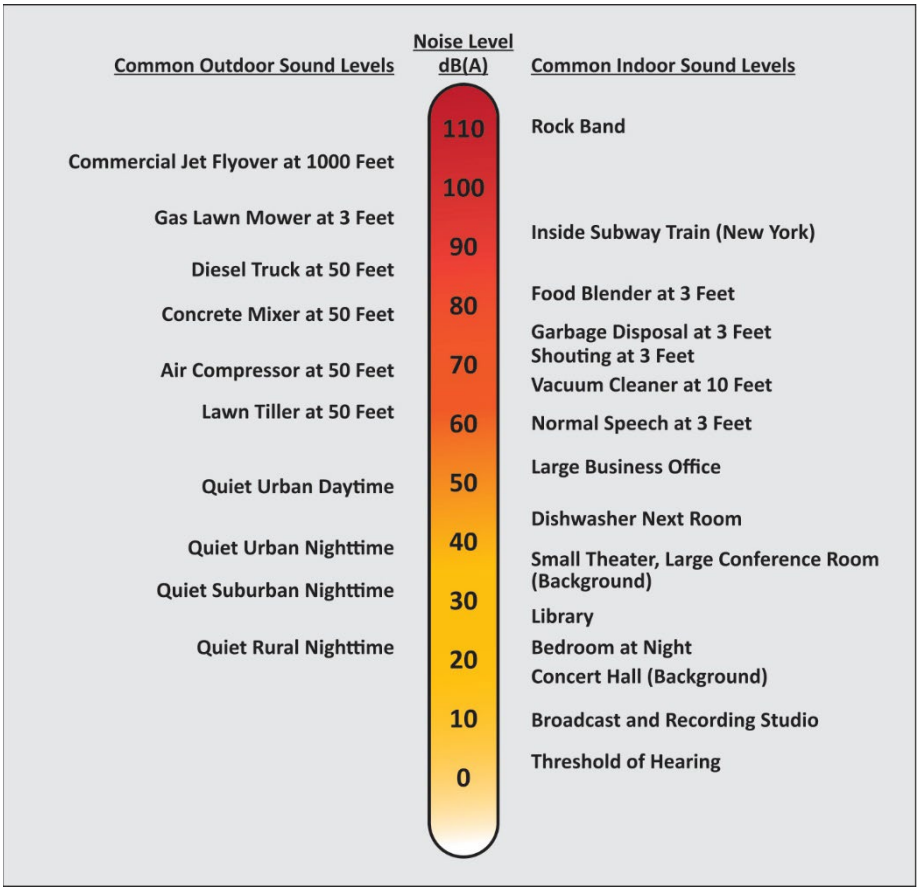
| Term | Definitions |
|---|---|
| Decibel, dB | A unit of sound level that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio. |
| Frequency, Hz | Of a function periodic in time, the number of times that the quantity repeats itself in 1 second (i.e., the number of cycles per second). |
| A-Weighted Sound Level, dBA | The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. (All sound levels in this report are A-weighted unless reported otherwise.) |
| $L_{01}$, $L_{10}$, $L_{50}$, $L_{90}$ | The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 1%, 10%, 50%, and 90% of a stated time period, respectively. |
| Equivalent Continuous Noise Level, $L_{eq}$ | The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time varying sound. |
| Community Noise Equivalent Level, CNEL | The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 dBA to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m. |
| Day/Night Noise Level, $L_{dn}$ | The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m. |
| $L_{max}$, $L_{min}$ | The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging. |
| Ambient Noise Level | The all-encompassing noise associated with a given environment at a specified time. It is usually a composite of sound from many sources from many directions, near and far; no particular sound is dominant. |
| Intrusive | The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content, as well as the prevailing ambient noise level. |

Source: *Handbook of Acoustical Measurements and Noise Control* (Harris 1991).

## Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to sound levels higher than 85 dBA. Exposure to high sound levels affects the entire system, with prolonged sound exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of sound exposure above 90 dBA would result in permanent cell damage. When the sound level reaches 120 dBA, a tickling sensation occurs in the human ear, even with short-term exposure. This level of sound is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by a feeling of pain in the ear (i.e., the threshold of pain). A sound level of 160–165 dBA will result in dizziness or a loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less-developed areas.

## Table B: Typical A-Weighted Sound Levels




Source: Compiled by LSA (2016).

## Fundamentals of Vibration

Vibration refers to ground-borne noise and perceptible motion. Ground-borne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernible, but without the effects associated with the shaking of a building there is less adverse reaction. Vibration energy propagates from a source through intervening soil and rock layers to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by occupants as the motion of building surfaces, the rattling of items sitting on shelves or hanging on walls, or a low-frequency rumbling noise. The rumbling noise is caused by the vibration of walls, floors, and ceilings that radiate sound waves. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by 10 dB or less. This is an order of magnitude below the damage threshold for normal buildings.

Typical sources of ground-borne vibration are construction activities (e.g., blasting, pile-driving, and operating heavy-duty earthmoving equipment), steel-wheeled trains, and occasional traffic on rough roads. Problems with both ground-borne vibration and noise from these sources are usually localized to

areas within approximately 100 feet (ft) from the vibration source, although there are examples of ground-borne vibration causing interference out to distances greater than 200 ft. When roadways are smooth, vibration from traffic, even heavy trucks, is rarely perceptible. It is assumed for most projects that the roadway surface will be smooth enough that ground-borne vibration from street traffic will not exceed the impact criteria; however, both construction of the project and the freight train operations could result in ground-borne vibration that may be perceptible and annoying.

Ground-borne noise is not likely to be a problem because noise arriving via the normal airborne path will usually be greater than ground-borne noise.

Ground-borne vibration has the potential to disturb people and damage buildings. Although it is very rare for train-induced ground-borne vibration to cause even cosmetic building damage, it is not uncommon for construction processes such as blasting and pile-driving to cause vibration of sufficient amplitudes to damage nearby buildings. Ground-borne vibration is usually measured in terms of vibration velocity, either the root-mean-square (RMS) velocity or peak particle velocity (PPV). The RMS is best for characterizing human response to building vibration, and PPV is used to characterize potential for damage. Decibel notation acts to compress the range of numbers required to describe vibration. Vibration velocity level in decibels is defined as:

$$L_v = 20 \log_{10} [V/V_{ref}]$$

where "$L_v$" is the vibration velocity in decibels (VdB), "V" is the RMS velocity amplitude, and "$V_{ref}$" is the reference velocity amplitude, or 1 x $10^{-6}$ inches/second (in/sec) used in the United States. Table C illustrates human response to various vibration levels, as described in the *Federal Transit Administration (FTA) Noise and Vibration Impact Assessment Manual* (FTA Manual) (2018).

Factors that influence ground-borne vibration and noise include:

- **Vibration Source:** Vehicle suspension, wheel types and condition, railroad track/roadway surface, railroad track support system, speed, transit structure, and depth of vibration source.
- **Vibration Path:** Soil type, rock layers, soil layering, depth to water table, and frost depth.
- **Vibration Receiver:** Foundation type, building construction, and acoustical absorption.

Among the factors listed above, there are significant differences in the vibration characteristics when the source is underground compared to at the ground surface. In addition, soil conditions are known to have a strong influence on the levels of ground-borne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock.

## Table C: Human Response to Different Levels of Ground-Borne Noise and Vibration

| Vibration Velocity Level | Noise Level | | Human Response |
|---|---|---|---|
| | Low Frequency[1] | Mid Frequency[2] | |
| 65 VdB | 25 dBA | 40 dBA | Approximate threshold of perception for many humans. Low-frequency sound is usually inaudible; mid-frequency sound is excessive for quiet sleeping areas. |
| 75 VdB | 35 dBA | 50 dBA | Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level unacceptable. Low-frequency noise is acceptable for sleeping areas; mid-frequency noise is annoying in most quiet occupied areas. |
| 85 VdB | 45 dBA | 60 dBA | Vibration is acceptable only if there are an infrequent number of events per day. Low-frequency noise is unacceptable for sleeping areas; mid-frequency noise is unacceptable even for infrequent events with institutional land uses, such as schools and churches. |

Source: *Transit Noise and Vibration Impact Assessment* (FTA 2018).
[1] Approximate noise level when vibration spectrum peak is near 30 Hz.
[2] Approximate noise level when vibration spectrum peak is near 60 Hz.
dBA = A-weighted decibels
FTA = Federal Transit Administration
Hz = Hertz
VdB = vibration velocity decibels

Experience with ground-borne vibration indicates (1) vibration propagation is more efficient in stiff, clay soils than in loose, sandy soils; and (2) shallow rock seems to concentrate the vibration energy close to the surface and can result in ground-borne vibration problems at large distances from a railroad track. Factors such as layering of the soil and the depth to the water table can have significant effects on the propagation of ground-borne vibration. Soft, loose, sandy soils tend to attenuate more vibration energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils.

## REGULATORY SETTING

Noise and vibration regulations are addressed through the efforts of various federal, State, and local government agencies. The agencies responsible for regulating noise are discussed below.

### Federal Regulations

#### *United States Environmental Protection Agency*

In 1972, Congress enacted the United States Noise Control Act. This act authorized the United States Environmental Protection Agency (USEPA) to publish descriptive data on the effects of noise and establish levels of sound "requisite to protect the public welfare with an adequate margin of safety." These levels are separated into health (hearing loss levels) and welfare (annoyance levels). For protection against hearing loss, 96 percent of the population would be protected if sound levels are less than or equal to 70 dBA during a 24-hour period of time. At 55 dBA $L_{dn}$, 95 percent sentence clarity (intelligibility) may be expected at 11 ft, with no community reaction. However, 1 percent of the population may complain about noise at this level and 17 percent may indicate annoyance. The USEPA cautions that these identified levels are guidelines, not standards (USEPA 1974).

*Federal Transit Administration*

Vibration standards included in the FTA Manual are used in this analysis for ground-borne vibration impacts on human annoyance, as shown in Table C. The criteria presented in Table D account for the variations in project types, which differ widely among projects.

## Table D: Interpretation of Vibration Criteria for Detailed Analysis

| Land Use | Max $L_v$ (VdB)[1] | Description of Use |
|---|---|---|
| Workshop | 90 | Vibration that is distinctly felt. Appropriate for workshops and similar areas not as sensitive to vibration. |
| Office | 84 | Vibration that can be felt. Appropriate for offices and similar areas not as sensitive to vibration. |
| Residential Day | 78 | Vibration that is barely felt. Adequate for computer equipment and low-power optical microscopes (up to 20×). |
| Residential Night and Operating Rooms | 72 | Vibration is not felt, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power microscopes (100×) and other equipment of low sensitivity. |

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] As measured in 1/3-Octave bands of frequency over the frequency range 8 to 80 Hertz.
FTA = Federal Transit Administration
VdB = vibration velocity decibels
$L_V$ = velocity in decibels
Max = maximum

The criteria for environmental impact from ground-borne vibration and noise are based on the maximum levels for a single event. Table E lists the potential vibration building damage criteria associated with construction activities, as suggested in the FTA Manual.

## Table E: Construction Vibration Damage Criteria

| Building Category | PPV (in/sec) | Approximate $L_V$ (VdB)[1] |
|---|---|---|
| Reinforced concrete, steel, or timber (no plaster) | 0.50 | 102 |
| Engineered concrete and masonry (no plaster) | 0.30 | 98 |
| Non-engineered timber and masonry buildings | 0.20 | 94 |
| Buildings extremely susceptible to vibration damage | 0.12 | 90 |

Source: *Transit Noise and Vibration Impact Assessment* (FTA 2018).
[1] RMS vibration velocity in decibels (VdB) re 1 µin/sec.
µin/sec = microinches per second
FTA = Federal Transit Administration
in/sec = inch/inches per second
$L_V$ = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

FTA Manual guidelines show that for potential annoyance thresholds, a level of up to 78 VdB is acceptable during the daytime hours at residential uses while a level of 87 VdB is appropriate for office uses, and a level of 90 VdB is appropriate for workshop uses. To assess damage potential, a vibration level of up to 102 VdB (equivalent to 0.5 in/sec in PPV) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster) and would not result in any construction vibration damage. For a non-

engineered timber and masonry building, the construction building vibration damage criterion is 94 VdB (0.2 in/sec in PPV).

## State Regulations

The State of California has established regulations that help prevent adverse impacts to occupants of buildings near noise sources. Referred to as the *State Noise Insulation Standard*, it requires buildings to meet performance standards through design and/or building materials that would offset any noise source in the vicinity of the receptor. State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are found in California Code of Regulations, Title 24 (known as the Building Standards Administrative Code), Part 2 (known as the California Building Code), Appendix Chapters 12 and 12A.

The State has also established land use compatibility guidelines for determining acceptable noise levels for specified land uses.

## Local Regulations

The following is a summary of the applicable policies included in the City's General Plan and Municipal Code that are related to noise and applicable to the proposed project.

### *City of Fresno General Plan*

The City's General Plan (2014) includes a set of policies (detailed below) and programs that form a blueprint for the physical development of the city. The following policies related to noise and applicable to the proposed project are presented in the Noise Element of the General Plan. In addition, the Noise Element sets noise standards for transportation and stationary noise sources as shown in Table F and Table G, below.

## Table F: Transportation (Non-Aircraft) Noise Sources

| Noise-Sensitive Land Use[1] | Outdoor Activity Areas[2] | Interior Spaces | |
|---|---|---|---|
| | $L_{dn}$/CNEL, dB | $L_{dn}$/CNEL, dB | $L_{eq}$ dB[2] |
| Residential | 65 | 45 | - |
| Transient Lodging | 65 | 45 | - |
| Hospitals, Nursing Homes | 65 | 45 | - |
| Theaters, Auditoriums, Music Halls | - | - | 35 |
| Churches, Meeting Halls | 65 | - | 45 |
| Office Buildings | - | - | 45 |
| Schools, Libraries, Museums | - | - | 45 |

Source: General Plan (City of Fresno, 2014).

[1] Where the location of outdoor activity areas is unknown or is not applicable, the exterior noise level standard shall be applied to the property line of the receiving land use.

[2] As determined for a typical worst-case hour during periods of use.

CNEL = Community Noise Equivalent Level

dB = decibels

$L_{dn}$ = day-night average noise level

## Table G: Stationary Noise Sources

| | Daytime (7:00 a.m. – 10:00 p.m.) | Nighttime (10:00 p.m. to 7:00 a.m.) |
|---|---|---|
| Hourly Equivalent Sound Level ($L_{eq}$), dBA | 50 | 45 |
| Maximum Sound Level ($L_{max}$), dBA | 70 | 60 |

Source: General Plan (City of Fresno, 2014).

[1] The Planning and Development Director, on a case-by-case basis, may designate land uses other than those shown in this table to be noise-sensitive, and may require appropriate noise mitigation measures.

[2] As determined at outdoor activity areas. Where the location of outdoor activity areas is unknown or not applicable, the noise exposure standard shall be applied at the property line of the receiving land use. When ambient noise levels exceed or equal the levels in this table, mitigation shall only be required to limit noise to the ambient plus five dB.

dB = decibels

dBA = A-weighted decibels

- **Policy NS-1-b: Conditionally Acceptable Exterior Noise Exposure Range.** Establish the conditionally acceptable noise exposure level range for residential and other noise sensitive uses to be 65 dB $L_{dn}$ or require appropriate noise reducing mitigation measures as determined by a site-specific acoustical analysis to comply with the desirable and conditionally acceptable exterior noise level and the required interior noise level standards set in Table F.

- **Policy NS-1-c: Generally Unacceptable Exterior Noise Exposure Range.** Establish the exterior noise exposure of greater than 65 dB $L_{dn}$ or CNEL to be generally unacceptable for residential and other noise sensitive uses for noise generated by sources in Policy NS-1-a, and study alternative less noise-sensitive uses for these areas if otherwise appropriate. Require appropriate noise reducing mitigation measures as determined by a site-specific acoustical analysis to comply with the generally desirable or generally acceptable exterior noise level and the required 45 dB interior noise level standards set in Table F as conditions of permit approval.

- **Policy NS-1-g:** Noise mitigation measures which help achieve the noise level targets of this plan include, but are not limited to, the following:

    - Façades with substantial weight and insulation;
    - Installation of sound-rated windows for primary sleeping and activity areas;
    - Installation of sound-rated doors for all exterior entries at primary sleeping and activity areas;
    - Greater building setbacks and exterior barriers;
    - Acoustic baffling of vents for chimneys, attic and gable ends;
    - Installation of mechanical ventilation systems that provide fresh air under closed window conditions.

    The aforementioned measures are not exhaustive and alternative designs may be approved by the City, provided that a qualified Acoustical Consultant submits information demonstrating that the alternative design(s) will achieve and maintain the specific targets for outdoor activity areas and interior spaces.

- **Policy NS-1-i: Mitigation by New Development.** Require an acoustical analysis where new development of industrial, commercial, or other noise generating land uses (including transportation facilities such as roadways, railroads, and airports) may result in noise levels that exceed the noise level exposure criteria established by Tables F and G to determine impacts and require developers to mitigate these impacts in conformance with Tables F and G as a condition of permit approval through appropriate means. Noise mitigation measures may include:

    - The screening of noise sources such as parking and loading facilities, outdoor activities, and mechanical equipment;
    - Providing increased setbacks for noise sources from adjacent dwellings;
    - Installation of walls and landscaping that serve as noise buffers;
    - Installation of soundproofing materials and double-glazed windows; and
    - Regulating operations, such as hours of operation, including deliveries and trash pickup.

    Alternative acoustical designs that achieve the prescribed noise level reduction may be approved by the City, provided a qualified Acoustical Consultant submits information demonstrating that the alternative designs will achieve and maintain the specific targets for outdoor activity areas and interior spaces. As a last resort, developers may propose to construct noise walls along roadways when compatible with aesthetic concerns and neighborhood character. This would be a developer responsibility, with no City funding.

- **Policy NS-1-j: Significance Threshold.** Establish, as a threshold of significance for the City's environmental review process, that a significant increase in ambient noise levels is assumed if the project would increase noise levels in the immediate vicinity by 3 dB $L_{dn}$ or CNEL or more above the ambient noise limits established in this General Plan Update.

- **Policy NS-1-m: Transportation Related Noise Impacts.** For projects subject to City approval, require that the project sponsor mitigate noise created by new transportation and transportation-related stationary noise sources, including roadway improvement projects, so that resulting noise levels do not exceed the City's adopted standards for noise-sensitive land uses.

- **Policy NS-1-o: Sound Wall Guidelines.** Acoustical studies and noise mitigation measures for projects shall specify the heights, materials, and design for sound walls and other noise barriers. Aesthetic considerations shall also be addressed in these studies and mitigation measures such as variable noise barrier heights, a combination of a landscaped berm with wall, and reduced barrier height in combination with increased distance or elevation differences between noise source and noise receptor, with a maximum allowable height of 15 feet. The City will develop guidelines for aesthetic design measures of sound walls, and may commission area wide noise mitigation studies that can serve as templates for acoustical treatment that can be applied to similar situations in the urban area.

### *City of Fresno Municipal Code*

Chapter 10, Article 1 (Noise Regulations), of the Fresno Municipal Code (2022) establishes excessive noise guidelines and exemptions. The following portions of the Municipal Code are applicable to the proposed project.

**SEC. 10-102. Definitions.** (b) Ambient Noise. "Ambient noise" is the all-encompassing noise associated with a given environment, being usually a composite of sounds from many sources near and far. For the purpose of this ordinance, ambient noise level is the level obtained when the noise level is averaged over a period of 15 minutes, without inclusion of the offending noise, at the location and time of day at which a comparison with the offending noise is to be made. Where the ambient noise level is less than that designated in this section, the noise level specified in Table H shall be deemed to be the ambient noise level for that location.

**Table H: Ambient Noise Levels**

| District | Time | Sound Level Decibels |
|---|---|---|
| Residential | 10:00 p.m. to 7:00 a.m. | 50 |
| Residential | 7:00 p.m. to 10:00 p.m. | 55 |
| Residential | 7:00 a.m. to 7:00 p.m. | 60 |
| Commercial | 10:00 p.m. to 7:00 a.m. | 60 |
| Commercial | 7:00 a.m. to 10:00 p.m. | 65 |
| Industrial | anytime | 70 |

Source: Chapter 10, Article 1 (Noise Regulations) (City of Fresno, 2022).

**SEC. 10-105. Excessive Noise Prohibited.** No person shall make, cause, or suffer or permit to be made or caused upon any premises or upon any public street, alley, or place within the city, any sound or noise

which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing or working in the area, unless such noise or sound is specifically authorized by or in accordance with this article. The provisions of this section shall apply to, but shall be limited to, the control, use, and operation of the following noise sources:

(a) Radios, musical instruments, phonographs, television sets, or other machines or devices used for the amplification, production, or reproduction of sound or the human voice.

(b) Animals or fowl creating, generating, or emitting any cry or behavioral sound.

(c) Machinery or equipment, such as fans, pumps, air conditioning units, engines, turbines, compressors, generators, motors or similar devices, equipment, or apparatus.

(d) Construction equipment or work, including the operation, use or employment of pile drivers, hammers, saws, drills, derricks, hoists, or similar construction equipment or tools.

**SEC. 10-109. Exceptions.** The provisions of this article shall not apply to:

(a) Construction, repair or remodeling work accomplished pursuant to a building, electrical, plumbing, mechanical, or other construction permit issued by the city or other governmental agency, or to site preparation and grading, provided such work takes place between the hours of 7:00 a.m. and 10:00 p.m. on any day except Sunday.

(b) Emergency work.

(c) Any act or acts which are prohibited by any law of the State of California or the United States.

## OVERVIEW OF THE EXISTING NOISE ENVIRONMENT

This section describes the existing noise environment in the project site vicinity. Noise monitoring and traffic noise modeling were used to quantify existing and future noise levels at the project site.

In Fresno, vehicle traffic is the primary source of noise. Other significant local noise sources include airport noise, railroad operations, and stationary source noise.

### Existing Noise Level Measurements

To assess existing noise levels, LSA conducted two long-term and four short-term noise measurements at the proposed project site. The long-term noise measurements were recorded on September 28, 2022 and on September 29, 2022. The long-term noise measurements captured data to calculate the hourly $L_{eq}$ and CNEL at each location, which incorporate the nighttime hours. Sources that dominate the existing noise environment include traffic on West Nielsen Avenue and Hughes Avenue, as well as railway activities and nearby aircraft operations. Noise measurement data collected during long-term noise monitoring are summarized in Table I and shown in Figure 3. Noise measurement sheets are provided in Attachment B.

## Table I: Long-Term Noise Level Measurements

| Location | Daytime Hours Noise Levels[1] (dBA $L_{eq}$) | Evening Hours Noise Levels[2] (dBA $L_{eq}$) | Nighttime Hours Noise Levels[3] (dBA $L_{eq}$) | Average Daily Noise Level (dBA CNEL) | Average Noise Level 7 a.m. to 10 p.m. (dBA $L_{eq}$) | Average Noise Level 10 p.m. to 7 a.m. (dBA $L_{eq}$) |
|---|---|---|---|---|---|---|
| LT-1: West of 2625 W Nielsen Avenue. On a tree, approximately 40 feet away from W Neilson centerline | 61.0-68.3 | 56.2-61.4 | 52.0-66.2 | 67.6 | 62.3 | 59.1 |
| LT-2: North of site, near rail tracks, approximately 30 feet from track closest to site. | 46.6-66.6 | 55.8-65.3 | 50.2-56.4 | 62.0 | 56.7 | 53.3 |
| ST-1[4]: Between second and third tree north of cemetery entrance. Approximately 35 feet from N Hughes Avenue centerline | 58.8-66.1 | 54.0-59.2 | 49.8-64.0 | 65.4 | 60.1 | 56.9 |
| ST-2[4]: North of Belmont Avenue. Approximately 40 feet away from centerline. By 2560 Belmont Avenue entrance (AAA Welding). | 61.6-68.9 | 56.8-62.0 | 52.6-66.8 | 68.2 | 62.9 | 59.7 |
| ST-3[4]: West of N Marks Avenue, south of overpass entrance, by power pole. Approximately 50 feet away from Marks Ave. centerline | 62.8-70.1 | 58.0-63.2 | 53.8-68.0 | 69.4 | 64.1 | 60.9 |
| ST-4[4]: South of Nielsen Avenue, approximately 40 feet away from centerline. East of 2307 W Nielsen Ave entrance. | 61.5-68.8 | 56.7-61.9 | 52.5-66.7 | 68.1 | 62.8 | 59.6 |

Source: Compiled by LSA. (October 2022).

[1] Daytime Noise Levels = noise levels during the hours of 7:00 a.m. to 7:00 p.m.

[2] Evening Noise Levels = noise levels during the hours of 7:00 p.m. to 10:00 p.m.

[3] Nighttime Noise Levels = noise levels during the hours of 10:00 p.m. to 7:00 a.m.

[4] Hourly and daily noise levels at short-term noise monitoring locations were estimated by the noise profile of nearby long-term measurements

dBA = A-weighted decibels

CNEL = Community Noise Equivalent Level

$L_{eq}$ = equivalent continuous sound level

## Existing Traffic Noise

The guidelines included in the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) were used to evaluate traffic-related noise conditions along roadway segments in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resultant noise levels are weighted and summed over 24-hour periods to determine the CNEL values.

Traffic volumes were obtained from the *Traffic Impact Analysis* (LSA 2022). A specific breakdown of the vehicle percentages based on type and time of day is provided in Attachment C. Table J provides the existing traffic noise levels in the project vicinity. These traffic noise levels are representative of a worst-case scenario that assumes a flat terrain and no shielding between the traffic and the noise contours.

### Table J: Existing Traffic Noise Levels Without Project

| Roadway Segment | ADT | Centerline to 70 dBA CNEL (feet) | Centerline to 65 dBA CNEL (feet) | Centerline to 60 dBA CNEL (feet) | CNEL (dBA) 50 feet from Centerline of Outermost Lane |
|---|---|---|---|---|---|
| Marks Avenue between Belmont Avenue and Nielsen Avenue | 10,190 | 158 | 486 | 1,532 | 72.8 |
| Marks Avenue between Nielsen Avenue and Ray Johnson Drive | 11,554 | 178 | 551 | 1,737 | 73.3 |
| Marks Avenue between Ray Johnson Drive and SR-180 Westbound Ramps | 12,019 | 185 | 573 | 1,807 | 73.5 |
| Belmont Avenue between Marks Avenue and Hughes Avenue | 7,240 | 92 | 280 | 881 | 71.0 |
| Nielsen Avenue between Marks Avenue and Hughes Avenue | 1,614 | < 50 | 71 | 199 | 64.0 |
| Hughes Avenue between Nielsen Avenue and Belmont Avenue | 2,604 | < 50 | 105 | 318 | 66.3 |

Source: Compiled by LSA (October 2022).
Notes: Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
SR- = State Route

## Airport Operations

There are currently three airports within the City of Fresno: Fresno Yosemite International Airport, Fresno-Chandler Executive Airport, and Sierra Sky Park Airport. Commercial jet aircraft operations are limited to Fresno Yosemite International Airport. The Air National Guard is also stationed there and

operates military jets and other aircraft. Private and commercial operations with smaller aircraft use Fresno Chandler Downtown Airport, while only small private aircraft use Sierra Sky Park Airport.

The nearest airports to the project site include Fresno Chandler Executive Airport, located 0.8 mile from the project site, the Sierra Sky Airport, 6.7 miles from the project site, and Fresno International Airport, 7.1 miles from the project site. Each of these airports is included in the Fresno County Airport Land Use Compatibility Plan (ALUCP), which guides approximate compatible land uses. The City of Fresno General Plan, other City land use plans, and all City land use decisions must be compatible with the adopted ALUCP. The ALUCP includes CNEL noise contours based on projected airport and aircraft operations. The project site is not within an ALUCP.

### Railroad Operations

The two major rail lines that traverse the city are the Union Pacific Railroad line, which is generally runs along State Route (SR) 99, and the BNSF Railway, which diverges from SR-99 in the southwest and travels through downtown (behind City Hall) to the northwest. The Union Pacific line is generally within a heavy commercial and industrial corridor, although residential uses occur in the vicinity of the line north of Shaw Avenue. The Union Pacific line limits its use to only freight traffic. South of downtown, BNSF Railway is bounded by industrial uses, while north of downtown, the line is generally within a residential area. The BNSF Railway carries both freight and passenger traffic (Amtrak).

The closest rail line to the project site is 315 feet north of the project site.

### Stationary Noise Sources

Stationary noise sources can also have an effect on the population, and unlike mobile, transportation-related noise sources, these sources generally have a more permanent and consistent impact on people. These stationary noise sources involve a wide spectrum of uses and activities, including various industrial uses, commercial operations, agricultural production, school playgrounds, high school football games, on-site heating, ventilation, and air conditioning (HVAC) units, generators, lawn maintenance equipment, and swimming pool pumps.

Even with incorporation of the best available noise control technology, noise emanating from industrial uses can be substantial and exceed local noise standards. These noise sources can be continuous and may contain tonal components that may be annoying to nearby receptors. Although industrial uses in Fresno are typically in industrial districts near freeways and commercial uses and away from residences and other sensitive noise receptors, noise sources associated with commercial uses such as automotive repair facilities, recycling centers, and loading docks may occur in the vicinity of residential uses.

## IMPACT ANALYSIS

### Short-Term Construction Noise Impacts

Project construction would result in short-term noise impacts on the nearby sensitive receptors. Maximum construction noise would be short-term, generally intermittent depending on the construction phase, and variable depending on receiver distance from the active construction zone. The duration of noise impacts generally would be from 1 day to several days, depending on the phase

of construction. The level and types of noise impacts that would occur during construction are described below.

Construction is completed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table K lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 ft between the equipment and a noise receptor, taken from the Federal Highway Administration (FHWA) *Roadway Construction Noise Model User's Guide* (FHWA 2006).

## Table K: Typical Construction Equipment Noise Levels

| Equipment Description | Acoustical Usage Factor (%) | Maximum Noise Level ($L_{max}$) at 50 Feet[1] |
|---|---|---|
| Backhoes | 40 | 80 |
| Compactor (ground) | 20 | 80 |
| Compressor | 40 | 80 |
| Cranes | 16 | 85 |
| Dozers | 40 | 85 |
| Dump Trucks | 40 | 84 |
| Excavators | 40 | 85 |
| Flat Bed Trucks | 40 | 84 |
| Forklift | 20 | 85 |
| Front-end Loaders | 40 | 80 |
| Graders | 40 | 85 |
| Impact Pile Drivers | 20 | 95 |
| Jackhammers | 20 | 85 |
| Pick-up Truck | 40 | 55 |
| Pneumatic Tools | 50 | 85 |
| Pumps | 50 | 77 |
| Rock Drills | 20 | 85 |
| Rollers | 20 | 85 |
| Scrapers | 40 | 85 |
| Tractors | 40 | 84 |
| Welder | 40 | 73 |

Source: Roadway Construction Noise Model (Federal Highway Administration 2006).
Note: Noise levels reported in this table are rounded to the nearest whole number.
[1] Maximum noise levels were developed based on Spec 721.560 from the Central Artery/Tunnel (CA/T) program to be consistent with the City of Boston's Noise Code for the "Big Dig" project.
$L_{max}$ = maximum instantaneous sound level

Two types of short-term noise impacts could occur during construction of the proposed project. The first type involves construction crew commutes and the transport of construction equipment and materials to the site, which would incrementally increase noise levels on roads leading to the site. As shown in Table K, there would be a relatively high single-event noise exposure potential at a maximum level of 84 dBA $L_{max}$ with trucks passing at 50 feet.

In addition to the reference maximum noise level, the usage factor provided in Table K is used to calculate the hourly noise level impact for each piece of equipment based on the following equation:

$$L_{eq}(equip) = E.L. + 10\log(U.F.) - 20\log\left(\frac{D}{50}\right)$$

where: $L_{eq}(equip)$ = $L_{eq}$ at a receiver resulting from the operation of a single piece of equipment over a specified time period

E.L. = noise emission level of the particular piece of equipment at a reference distance of 50 ft

U.F. = usage factor that accounts for the fraction of time that the equipment is in use over the specified period of time

D = distance from the receiver to the piece of equipment

Each piece of construction equipment operates as an individual point source. Using the following equation, a composite noise level can be calculated when multiple sources of noise operate simultaneously:

$$Leq\ (composite) = 10 * \log_{10}\left(\sum_{1}^{n} 10^{\frac{Ln}{10}}\right)$$

Using the equations from the methodology above, the reference information in Table K, and the construction equipment list provided, the composite noise level of the two loudest pieces of equipment for each construction phase was calculated. The project construction composite noise levels at a distance of 50 ft for would range from 74 dBA $L_{eq}$ to 84 dBA $L_{eq}$, with the highest noise levels occurring during the grading phase.

Once composite noise levels are calculated, reference noise levels can then be adjusted for distance using the following equation:

$$Leq\ (at\ distance\ X) = Leq\ (at\ 50\ feet) - 20 * \log_{10}\left(\frac{X}{50}\right)$$

In general, this equation shows that doubling the distance would decrease noise levels by 6 dBA, while halving the distance would increase noise levels by 6 dBA.

To determine the applicable distance, the acoustical average distance is utilized. The acoustical average distance is used to represent noise sources that are mobile or distributed over an area. The average acoustical distance is calculated by multiplying the shortest distance between the receiver and the noise source area by the farthest distance, and then taking the square root of the product.

While construction noise will vary, it is expected that composite noise levels during construction at the nearest off-site sensitive residential use to the south would reach an average noise level of 64 dBA $L_{eq}$ during daytime hours. While construction-related, short-term noise levels have the potential to be higher than quieter daytime ambient noise levels in the project area under existing conditions, the construction noise impacts would be approximately 1.7 dBA greater than the existing average daytime noise level of 64.7 dBA $L_{eq}$ during the allowable hour of construction. When logarithmically combined with the existing average ambient noise level, the total noise level would be 66.2 dBA $L_{eq}$ resulting in an increase of 3.9 dBA $L_{eq}$. Because the increase would be less than 5 dBA, construction noise would be considered less than significant.

Consistent with the applicable noise provisions of the Fresno Municipal Code, construction work would only take place between the hours of 7:00 a.m. and 10:00 p.m. Monday through Saturday. No construction work would take place on Sundays.

Although the project's potential construction-related noise level increase would be less than 5 dBA, project construction noise would result in a potentially significant impact at the nearest off-site sensitive residential use. As such, Mitigation Measure NOI-1 would be required to ensure that all construction equipment, fixed or mobile, is equipped with properly operating and maintained mufflers consistent with manufacturers' standards, which would reduce the potential impacts associated with construction equipment. Additionally, Mitigation Measure NOI-1 requires the project to designate a "disturbance coordinator" at the City who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler) and would determine and implement reasonable measures warranted to correct the problem.

**Mitigation Measure NOI-1** The project contractor shall implement the following measures during construction of the project:

- Equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- Designate a "disturbance coordinator" at the City who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler) and would determine and implement reasonable measures warranted to correct the problem.

With implementation of Mitigation Measure NOI-1, the proposed project would result in a less than significant impact associated with the generation of a substantial temporary increase in ambient noise levels in the vicinity during construction.

## Short-Term Construction Vibration Impacts

This construction vibration impact analysis assesses the potential for building damages using vibration levels in PPV (in/sec). This is because vibration levels calculated in RMS are best for characterizing human response to building vibration, while vibration level in PPV is best for characterizing potential for damage.

Table L shows the PPV and VdB values at 25 ft from the construction vibration source. As shown in Table L, bulldozers and other heavy-tracked construction equipment (expected to be used for this project) generate 0.089 PPV in/sec or 87 VdB of ground-borne vibration when measured at 25 ft, based on the FTA Manual. The distance to the nearest buildings for vibration impact analysis is measured between the nearest off-site buildings and the project construction boundary (assuming the construction equipment would be used at or near the project setback line).

The formulae for vibration transmission are provided below, and Table M, provides a summary of off-site construction vibration levels.

$$L_v dB\ (D) = L_v dB\ (25\ ft) - 30\ Log\ (D/25)$$

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

### Table L: Vibration Source Amplitudes for Construction Equipment

| Equipment | Reference PPV/$L_V$ at 25 ft | |
|---|---|---|
| | PPV (in/sec) | $L_V$ (VdB)[1] |
| Pile Driver (Impact), Typical | 0.644 | 104 |
| Pile Driver (Sonic), Typical | 0.170 | 93 |
| Vibratory Roller | 0.210 | 94 |
| Hoe Ram | 0.089 | 87 |
| **Large Bulldozer**[2] | **0.089** | **87** |
| Caisson Drilling | 0.089 | 87 |
| **Loaded Trucks**[2] | **0.076** | **86** |
| Jackhammer | 0.035 | 79 |
| Small Bulldozer | 0.003 | 58 |

Source: Transit Noise and Vibration Impact Assessment Manual (FTA 2018).

[1] RMS vibration velocity in decibels (VdB) is 1 µin/sec.

[2] Equipment shown in **bold** is expected to be used on site.

µin/sec = microinches per second
ft = foot/feet
FTA = Federal Transit Administration
in/sec = inch/inches per second
$L_V$ = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

## Table M: Potential Construction Vibration Damage Impacts at Nearest Receptor

| Receptor (Location) | Reference Vibration Level (PPV) at 25 feet[1] | Distance (feet)[2] | Vibration Level (PPV) |
|---|---|---|---|
| Residential Uses (South) | 0.089 | 110 | 0.010 |
| Industrial Uses (North) | | 30 | 0.068 |
| Industrial Uses / Cemetery (East) | | 120 | 0.009 |
| Industrial Uses (West) | | 300 | 0.002 |

Source: Compiled by LSA (2022).

[1] The reference vibration level is associated with a large bulldozer, which is expected to be representative of the heavy equipment used during construction.

[2] The reference distance is associated with the peak condition, identified by the distance from the perimeter of construction activities to surrounding structures

ft = foot/feet

in/sec = inch/inches per second

PPV = peak particle velocity

Based on the information provided in Table M, vibration levels are expected to approach 0.068 PPV in/sec at the surrounding structures and would be below the 0.2 PPV in/sec damage threshold.

Based on the information provided in Table N, vibration levels are expected to approach 85 VdB at the closest industrial uses north of the project site and 68 VdB at the closest residential use to the south, which are below the 90 VdB and 78 VdB annoyance threshold for workshop or industrial types uses and for daytime residential uses, respectively.

## Table N: Potential Construction Vibration Annoyance Impacts at Nearest Receptor

| Receptor (Location) | Reference Vibration Level (VdB) at 25 feet[1] | Distance (feet)[2] | Vibration Level (VdB) |
|---|---|---|---|
| Residential Uses (South) | 87 | 110 | 68 |
| Industrial Uses (North) | | 30 | 85 |
| Industrial Uses / Cemetery (East) | | 120 | 67 |
| Industrial Uses (West) | | 300 | 55 |

Source: Compiled by LSA (2022).

[1] The reference vibration level is associated with a large bulldozer, which is expected to be representative of the heavy equipment used during construction.

[2] The reference distance is associated with the average condition, identified by the distance from the center of construction activities to surrounding uses

ft = foot/feet

VdB = vibration velocity decibels

Because construction activities are regulated by the City's Code of Ordinance that states temporary construction, maintenance, or demolition activities are not allowed between the 7:00 p.m. on one day and 7:00 a.m. of the following day, vibration impacts would not occur during the more sensitive nighttime hours.

Other building structures surrounding the project site are farther away and would experience further reduced vibration. Therefore, no construction vibration impacts would occur.

## Long Term Noise Impacts

### *Traffic Noise Impacts to Off-Site Receivers*

The guidelines included in the FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77-108) were used to evaluate highway traffic-related noise conditions along roadway segments in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resultant noise levels are weighted and summed over 24-hour periods to determine the CNEL values. Table O provides the traffic noise levels for the existing with and without project, and opening year with and without project scenarios. These noise levels represent the worst-case scenario, which assumes no shielding is provided between the traffic and the location where the noise contours are drawn.

The without and with project scenario traffic volumes were obtained from the *Traffic Impact Analysis* (LSA 2021).

Table O shows that the increase in project-related traffic noise would be no greater than 2.1 dBA. Noise level increases less than 3.0 dBA are not considered perceptible to most people in an outdoor environment. Because this is also consistent with General Plan Policy NS-1-j: Significance Threshold which states that an increase of 3 dBA CNEL or more is considered significant, traffic noise impacts from project-related traffic on off-site sensitive receptors would be less than significant.

## Table O: Traffic Noise Levels Without and With Proposed Project

| Roadway Segment | Existing | | Existing With Project | | | Opening Year | | Opening Year with Project | | | Year 2035 | | Year 2035 With Project | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ADT | CNEL (dBA) 50 feet from Centerline of Nearest Lane | ADT | CNEL (dBA) 50 feet from Centerline of Nearest Lane | Increase from Existing Conditions | ADT | CNEL (dBA) 50 feet from Centerline of Nearest Lane | ADT | CNEL (dBA) 50 feet from Centerline of Nearest Lane | Increase from Near-Term Conditions | ADT | CNEL (dBA) 50 feet from Centerline of Nearest Lane | ADT | CNEL (dBA) 50 feet from Centerline of Nearest Lane | Increase from Year 2035 Conditions |
| Marks Avenue between Belmont Avenue and Nielsen Avenue | 10,190 | 72.8 | 11,228 | 73.9 | 1.1 | 10,938 | 73.1 | 11,976 | 74.1 | 1.0 | 11,651 | 73.4 | 12,689 | 74.4 | 1.0 |
| Marks Avenue between Nielsen Avenue and Ray Johnson Drive | 11,554 | 73.3 | 12,146 | 74.2 | 0.9 | 12,408 | 73.6 | 13,000 | 74.5 | 0.9 | 13,244 | 73.9 | 13,836 | 74.8 | 0.9 |
| Marks Avenue between Ray Johnson Drive and SR-180 Westbound Ramps | 12,019 | 73.5 | 12,611 | 74.4 | 0.9 | 12,933 | 73.8 | 13,525 | 74.7 | 0.9 | 13,706 | 74.1 | 14,298 | 74.9 | 0.8 |
| Belmont Avenue between Marks Avenue and Hughes Avenue | 7,240 | 71.0 | 7,550 | 71.8 | 0.8 | 7,905 | 71.3 | 8,215 | 72.1 | 0.8 | 8,846 | 71.8 | 9,156 | 72.6 | 0.8 |
| Nielsen Avenue between Marks Avenue and Hughes Avenue | 1,614 | 64.0 | 2,230 | 66.1 | 2.1 | 1,767 | 64.4 | 2,383 | 66.4 | 2.0 | 1,772 | 64.4 | 2,388 | 66.4 | 2.0 |
| Hughes Avenue between Nielsen Avenue and Belmont Avenue | 2,604 | 66.3 | 3,060 | 67.6 | 1.3 | 2,796 | 66.6 | 3,252 | 67.9 | 1.3 | 3,531 | 67.6 | 3,987 | 68.8 | 1.2 |

Source: Compiled by LSA (October 2022).
Note: Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.
Shaded cells indicate roadway segments adjacent to the project site.
ADT = average daily traffic
CNEL= Community Noise Equivalent Level
dBA = A-weighted decibels
SR = State Route

*Stationary Operational Noise Impacts to Off-Site Receivers*

Noise impacts associated with the long-term operation of the project must comply with the noise standards specified in the City's General Plan and the Municipal Code, as described above. Adjacent off-site land uses would be potentially exposed to stationary-source noise impacts from the proposed HVAC equipment, truck deliveries, and loading and unloading activities. The potential noise impacts to off-site sensitive land uses from the proposed operations are discussed below. To provide a conservative analysis, it is assumed that operations would occur equally during all hours of the day and that half the 192 loading docks would be active at all times. Additionally, the analysis assumed that within any given hour, 48 heavy trucks would maneuver to park near or back into one of the proposed trailer parking stalls. HVAC equipment is expected to run continuously for the duration of a 24-hour period. To determine the future noise impacts from project operations to the noise sensitive uses, the 3-D noise model, SoundPLAN, was used for the evaluation. The model incorporates the site topography as well as the shielding from the proposed building on-site. The model output, which includes a graphic representation of the operational noise impacts is presented in Attachment D. Results from the model analysis for each of the anticipated stationary sources are summarized below.

**Heating, Ventilation, and Air Conditioning Equipment.** it is estimated that the project would have four rooftop HVAC units on each of the proposed buildings to provide ventilation to the proposed office and warehouse spaces. The analysis assumes that the HVAC equipment would operate 24 hours per day and would generate sound power levels (SPL) of up to 87 dBA SPL or 72 dBA $L_{eq}$ at 5 feet, based on manufacturer data (Trane).

**Truck Deliveries and Truck Loading and Unloading Activities.** Noise levels generated by delivery trucks would be similar to noise readings from truck loading and unloading activities, which generate a noise level of 75 dBA $L_{eq}$ at 20 ft based on measurements taken by LSA (*Operational Noise Impact Analysis for Richmond Wholesale Meat Distribution Center* [LSA 2016]). Delivery trucks would arrive on site and maneuver their trailers so that trailers would be parked within the loading docks. During this process, noise would be associated with the truck engine, air brakes, and back-up alarms while the truck is backing into the dock. These noise sources would occur for a short period of time (less than 5 minutes). After a truck enters the loading dock, the doors would be closed, and the remainder of the truck loading activities would be enclosed and therefore much less perceptible. To present a conservative assessment, the model analysis assumes that unloading activities would occur at half of the 192 docks simultaneously for a period of more than 30 minutes in a given hour. Maximum noise levels that occur during the docking process were measured to be 86 dBA $L_{max}$ at a distance of 20 feet.

Tables P shows the combined hourly noise levels generated by the proposed project at the closest off-site land uses. The project-related hourly noise level impacts would be 58.2 dBA $L_{eq}$ at the outdoor activity area of the residence south of Building 1. When propagated to the outdoor activity area of the residential property south of Building 1, the average daytime noise level is 56.8 dBA $L_{eq}$ and the average nighttime noise level is 53.6 dBA $L_{eq}$. As specified in the City's Noise Element, if existing ambient noise level exceed the City's noise standards, a project impact would occur when project related noise levels cause a 5 dBA or more increase. When compared to existing noise levels, project operations would not create an impact during daytime hours, but would generate an increase of greater than 5 dBA during nighttime hours, resulting in a potentially significant impact.

## Table P: Hourly Exterior Noise Level Impacts

| Receptor | Direction | Existing Daytime Noise Level (dBA $L_{eq}$) | Existing Nighttime Noise Level (dBA $L_{eq}$) | Project Noise Level (dBA $L_{eq}$) | Daytime Noise Level Increase (dBA $L_{eq}$) | Nighttime Noise Level Increase (dBA $L_{eq}$) | Potential Operational Noise Impact? (Daytime / Nighttime)[1] |
|---|---|---|---|---|---|---|---|
| Residential | South | 56.8 | 53.6 | 58.2 | 3.8 | 5.9 | No / Yes |

Source: Compiled by LSA (2022).

[1] Because ambient noise levels exceed the City of Fresno's stationary noise criteria, a potential operational noise impact would occur if operational noise would increase ambient noise by 5 dBA or more.

dBA = A-weighted decibels

$L_{eq}$ = equivalent noise level

Table Q shows the modeled maximum exterior noise levels. The maximum noise levels generated would approach 66.5 dBA $L_{max}$ at the surrounding sensitive receptors. This noise level would be below the City's exterior maximum daytime noise standard of 70 dBA $L_{max}$ but would exceed the 60 dBA $L_{max}$ for nighttime hours. Similar to the hourly noise impacts, project operations would not generate a significant impact related to maximum noise levels during daytime hours but would generate a significant impact during nighttime hours.

## Table Q: Maximum Exterior Noise Level Impacts

| Receptor | Direction | Project Maximum Noise Level (dBA $L_{max}$) | Daytime Maximum Noise Level Standard (dBA $L_{max}$) | Nighttime Maximum Noise Level Standard (dBA $L_{max}$) | Potential Operational Noise Impact? (Daytime / Nighttime)[1] |
|---|---|---|---|---|---|
| Residential | South | 66.5 | 70 | 60 | No / Yes |

Source: Compiled by LSA (2022).

dBA = A-weighted decibels

$L_{max}$ = maximum noise level

Implementation of Mitigation Measure NOI-2 would reduce potential impacts related to loading dock and delivery noise by prohibiting loading dock activities at the loading dock doors and trailer parking activities south of Building 1 during nighttime hours. Loading dock and parking activities at all other locations would be shielded by the proposed buildings and would not exceed the City's nighttime noise standards.

**Mitigation Measure NOI-2** All loading dock activities shall be prohibited at the loading dock doors on the south end of Building 1 during the nighttime hours (10:00 p.m. to 7:00 a.m.) or once operational, the project proponent shall provide documentation to the City of Fresno Planning and Development Department that demonstrates that nighttime loading dock activities would comply with the noise level specifications of the City's Municipal Code.

With implementation of Mitigation Measure NOI-2, the proposed project would result in a less than significant impact associated with the generation of a substantial permanent increase in ambient stationary source noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or in other applicable local, State, or federal standards.

### Long-Term Vibration Impacts

Once operational, the proposed project would not generate vibration levels related to on-site operations. In addition, vibration levels generated from project-related traffic on the adjacent roadways are unusual for on-road vehicles because the rubber tires and suspension systems of on-road vehicles provide vibration isolation. Vibration levels generated from project-related traffic on the adjacent roadways would be less than significant.

## CONCLUSION

Project-related impacts associated with short-term construction vibration, long-term off-site traffic increases, and long-term vibration impacts would be less than significant. The following presents a summary of the potentially significant impacts and associated mitigation measures for short-term construction and long-term operational noise impacts.

### Short-term Construction Noise Impacts

As stated above, the closest off-site sensitive receptors may be subject to short-term construction noise reaching 81 dBA $L_{max}$ during construction. However, construction equipment would operate at various locations within the 48.03-acre project site and would only generate maximum noise levels when operations take place closest to the receptor. Nevertheless, to ensure that the project's potential construction-related noise impacts are less than significant, Mitigation Measure NOI-1 requires the project to equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards, which would reduce the potential impacts associated with construction equipment. Additionally, Mitigation Measure NOI-1 requires the project to designate a "disturbance coordinator" at the City who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler) and would determine and implement reasonable measures warranted to correct the problem. These measures would ensure that the project's potential construction-related noise impacts are mitigated to less-than-significant levels.

**Mitigation Measure NOI-1** The project contractor shall implement the following measures during construction of the project:

- Equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- Designate a "disturbance coordinator" at the City who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine

the cause of the noise complaint (e.g., starting too early, bad muffler) and would determine and implement reasonable measures warranted to correct the problem.

With implementation of Mitigation Measure NOI-1, the proposed project would result in a less-than-significant impact associated with the generation of a substantial temporary 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 other applicable local, State, or federal standards.

### Long-term Operational Noise Impacts

Noise impacts associated with the long-term operation of the project must comply with the noise standards specified in the City's General Plan and Municipal Code, as described above.

As specified in the City's Noise Element, if existing ambient noise level exceed the City's noise standards, a project impact would occur when project-related noise levels cause a 5 dBA or more increase. When compared to existing hourly noise levels, project operations would not create an impact during daytime hours, but would generate an increase of greater than 5 dBA during nighttime hours, resulting in a significant impact. Similar to the hourly noise impacts, project operations would not generate a significant maximum noise level impact during daytime hours but would generate a significant impact during nighttime hours.

Implementation of Mitigation Measure NOI-2 would reduce potential impacts related to loading dock and delivery noise by prohibiting loading dock activities at the loading dock doors and trailer parking activities south of Building 1 during the nighttime hours. Loading dock and parking activities at all other locations would be shielded by the proposed buildings and would not exceed the City's nighttime noise standards.

**Mitigation Measure NOI-2** All loading dock activities shall be prohibited at the loading dock doors on the south end of Building 1 during the nighttime hours (10:00 p.m. to 7:00 a.m.) or once operational, the project proponent would provide documentation to the City of Fresno Planning and Development Department that demonstrates that nighttime loading dock activities would comply with the noise level specifications of the City's Municipal Code.

With implementation of Mitigation Measure NOI-2, the proposed project would result in a less-than-significant impact associated with the generation of a substantial permanent increase in ambient stationary source noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or in other applicable local, State, or federal standards.

## REFERENCES

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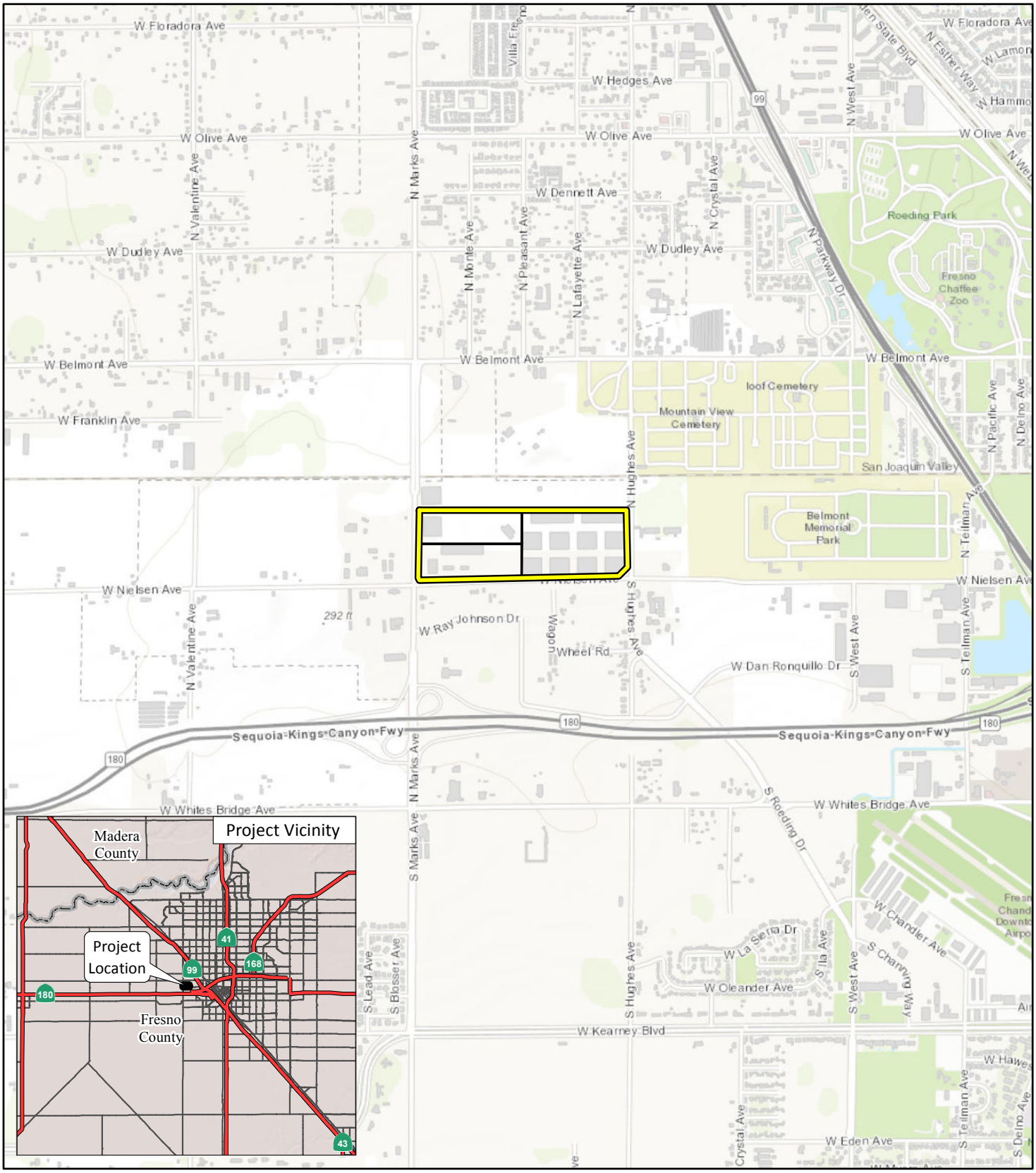
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United States Environmental Protection Agency (USEPA). 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*.

Attachments: A: Figures 1-3
B: Noise Measurement Sheets
C: FHWA Traffic Noise Model Printouts
D: Soundplan Noise Model Printouts

# ATTACHMENT A

# FIGURES 1–3




LSA

LEGEND

Project Location

Proposed Parcels

FIGURE 1

N

0 1000 2000

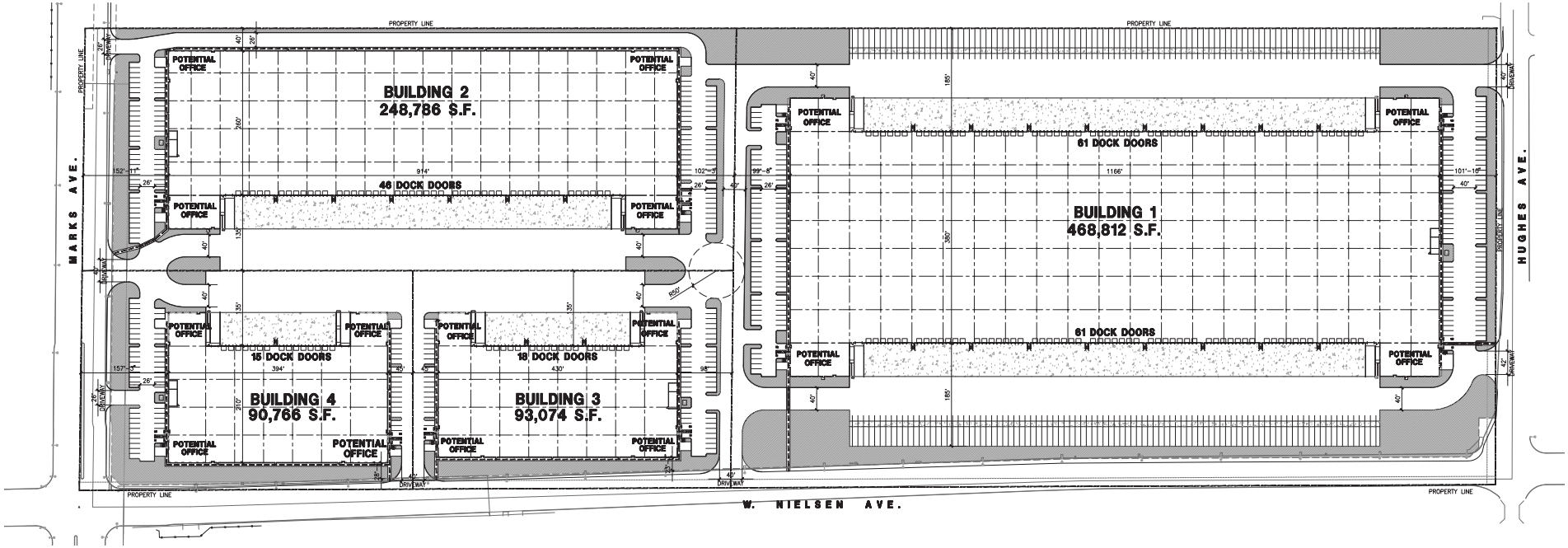
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*2740 West Nielsen Avenue Office/Warehouse Project*

Regional Project Location

SOURCE: Esri Topographic Map (2021)

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LSA

FIGURE 2

N

0 150 300

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SOURCE: HPA Architecture, Inc., 2021

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*2740 West Nielsen Avenue Warehouse*

Site Plan




LSA

LEGEND

- Project Site Boundary
- ST-1 - Short-term Noise Monitoring Location
- LT-1 - Long-term Noise Monitoring Location

FIGURE 3

0 500 1000

FEET

SOURCES: Google Earth, 2019

*2740 West Nielsen Avenue Warehouse*

Noise Monitoring Locations

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# ATTACHMENT B

# NOISE MEASUREMENT SHEETS

# Noise Measurement Survey – 24 HR

Project Number: SNN2101
Project Name: 2740 West Nielson

Test Personnel: Moe Abushanab
Equipment: Spark 706RC (SN:903)

Site Number: LT-1 Date: 9/28/2022

Time: From 1:00 p.m. To 1:00 p.m.

Site Location: West of 2625 W Nielson Avenue. On a tree, approximately 40 ft away from W Neilson centerline

Primary Noise Sources: Regular traffic noise on W Nielson Ave.
Occasional aircraft noise
Occasional dog barking

Comments:

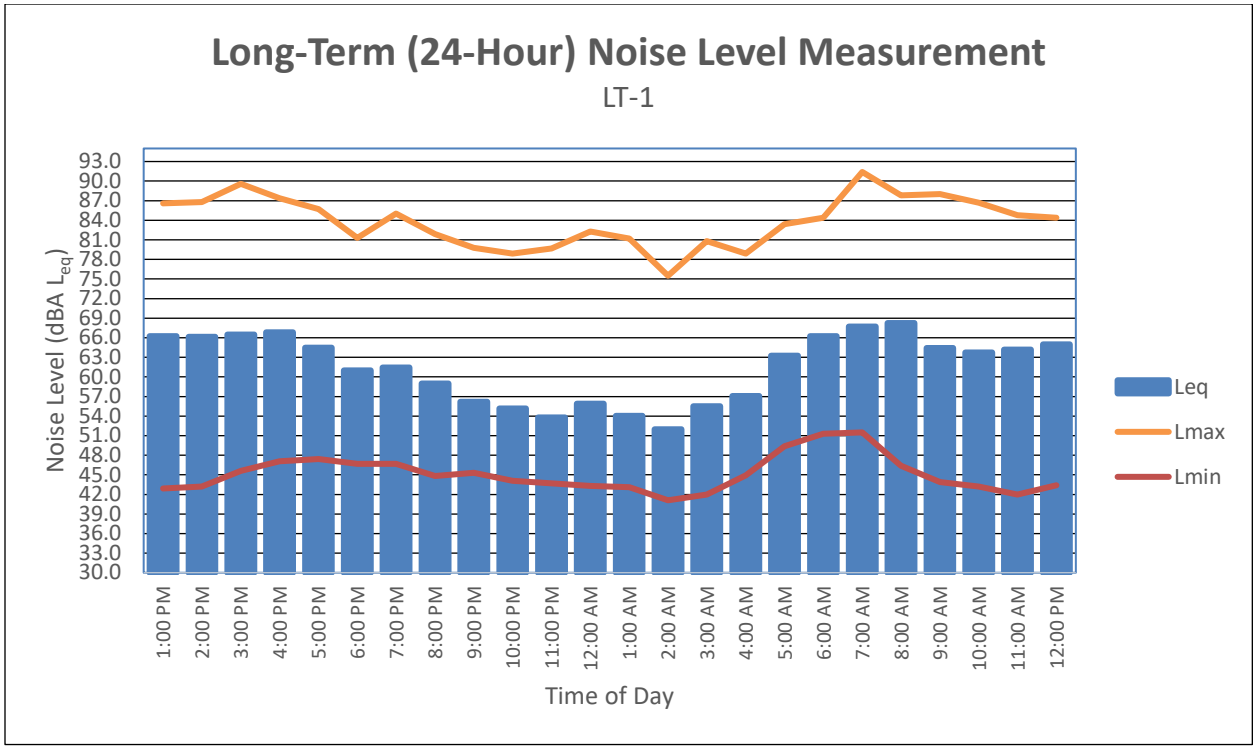
Photo:



## Long-Term (24-Hour) Noise Level Measurement Results at LT-1

| Start Time | Date | Noise Level (dBA) | | |
|---|---|---|---|---|
| | | $L_{eq}$ | $L_{max}$ | $L_{min}$ |
| 1:00 PM | 9/28/22 | 66.3 | 86.6 | 42.9 |
| 2:00 PM | 9/28/22 | 66.2 | 86.8 | 43.2 |
| 3:00 PM | 9/28/22 | 66.5 | 89.6 | 45.6 |
| 4:00 PM | 9/28/22 | 66.8 | 87.4 | 47.1 |
| 5:00 PM | 9/28/22 | 64.5 | 85.7 | 47.4 |
| 6:00 PM | 9/28/22 | 61.0 | 81.3 | 46.7 |
| 7:00 PM | 9/28/22 | 61.4 | 85.0 | 46.7 |
| 8:00 PM | 9/28/22 | 59.0 | 81.9 | 44.8 |
| 9:00 PM | 9/28/22 | 56.2 | 79.8 | 45.3 |
| 10:00 PM | 9/28/22 | 55.2 | 78.9 | 44.1 |
| 11:00 PM | 9/28/22 | 53.8 | 79.7 | 43.7 |
| 12:00 AM | 9/29/22 | 55.9 | 82.3 | 43.3 |
| 1:00 AM | 9/29/22 | 54.0 | 81.2 | 43.1 |
| 2:00 AM | 9/29/22 | 52.0 | 75.5 | 41.1 |
| 3:00 AM | 9/29/22 | 55.5 | 80.8 | 42.0 |
| 4:00 AM | 9/29/22 | 57.1 | 78.9 | 44.9 |
| 5:00 AM | 9/29/22 | 63.2 | 83.4 | 49.4 |
| 6:00 AM | 9/29/22 | 66.2 | 84.4 | 51.3 |
| 7:00 AM | 9/29/22 | 67.7 | 91.4 | 51.5 |
| 8:00 AM | 9/29/22 | 68.3 | 87.8 | 46.4 |
| 9:00 AM | 9/29/22 | 64.4 | 88.0 | 43.9 |
| 10:00 AM | 9/29/22 | 63.7 | 86.7 | 43.2 |
| 11:00 AM | 9/29/22 | 64.2 | 84.8 | 42.0 |
| 12:00 PM | 9/29/22 | 65.0 | 84.4 | 43.4 |

Source: Compiled by LSA Associates, Inc. (2022).
dBA = A-weighted decibel
$L_{eq}$ = equivalent continuous sound level
$L_{max}$ = maximum instantaneous noise level
$L_{min}$ = minimum measured sound level


Long-Term (24-Hour) Noise Level Measurement
LT-1
Noise Level (dBA Leq)
93.0
90.0
87.0
84.0
81.0
78.0
75.0
72.0
69.0
66.0
63.0
60.0
57.0
54.0
51.0
48.0
45.0
42.0
39.0
36.0
33.0
30.0
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
Time of Day
Leq
Lmax
Lmin

# Noise Measurement Survey – 24 HR

Project Number: SNN2101
Project Name: 2740 West Nielson

Test Personnel: Moe Abushanab
Equipment: Spark 706RC (SN:904)

Site Number: LT-2 Date: 9/28/2022

Time: From 2:00 p.m. To 2:00 p.m.

Site Location: North of site, near rail tracks, approximately 30 feet from track closest to site . On a blue painted pole

Primary Noise Sources: Rail activity (idling, moving into adjacent site)
Occasional aircraft
Faint road traffic

Comments:

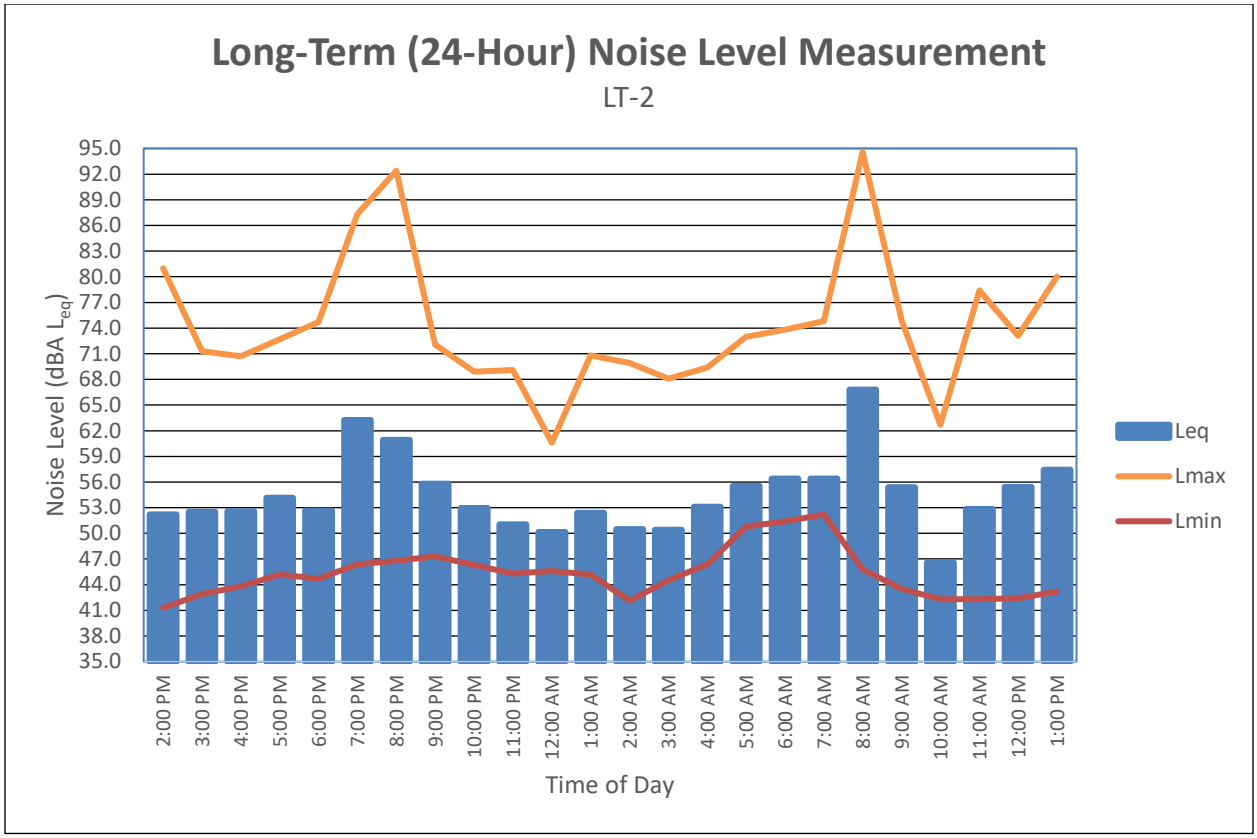
Photo:



## Long-Term (24-Hour) Noise Level Measurement Results at LT-2

| Start Time | Date | Noise Level (dBA) | | |
|---|---|---|---|---|
| | | $L_{eq}$ | $L_{max}$ | $L_{min}$ |
| 2:00 PM | 9/28/22 | 52.2 | 81.0 | 41.3 |
| 3:00 PM | 9/28/22 | 52.5 | 71.3 | 42.9 |
| 4:00 PM | 9/28/22 | 52.6 | 70.7 | 43.8 |
| 5:00 PM | 9/28/22 | 54.2 | 72.7 | 45.2 |
| 6:00 PM | 9/28/22 | 52.7 | 74.7 | 44.7 |
| 7:00 PM | 9/28/22 | 63.3 | 87.3 | 46.4 |
| 8:00 PM | 9/28/22 | 60.9 | 92.4 | 46.8 |
| 9:00 PM | 9/28/22 | 55.8 | 72.1 | 47.3 |
| 10:00 PM | 9/28/22 | 53.0 | 68.9 | 46.3 |
| 11:00 PM | 9/28/22 | 51.1 | 69.1 | 45.3 |
| 12:00 AM | 9/29/22 | 50.2 | 60.6 | 45.6 |
| 1:00 AM | 9/29/22 | 52.4 | 70.8 | 45.2 |
| 2:00 AM | 9/29/22 | 50.5 | 69.9 | 42.1 |
| 3:00 AM | 9/29/22 | 50.4 | 68.1 | 44.5 |
| 4:00 AM | 9/29/22 | 53.1 | 69.4 | 46.4 |
| 5:00 AM | 9/29/22 | 55.5 | 73.0 | 50.8 |
| 6:00 AM | 9/29/22 | 56.4 | 73.8 | 51.4 |
| 7:00 AM | 9/29/22 | 56.4 | 74.8 | 52.2 |
| 8:00 AM | 9/29/22 | 66.8 | 94.6 | 45.8 |
| 9:00 AM | 9/29/22 | 55.4 | 74.9 | 43.5 |
| 10:00 AM | 9/29/22 | 46.6 | 62.7 | 42.3 |
| 11:00 AM | 9/29/22 | 52.8 | 78.4 | 42.3 |
| 12:00 PM | 9/29/22 | 55.4 | 73.1 | 42.4 |
| 1:00 PM | 9/29/22 | 57.4 | 80.0 | 43.2 |

Source: Compiled by LSA Associates, Inc. (2022).
dBA = A-weighted decibel
$L_{eq}$ = equivalent continuous sound level
$L_{max}$ = maximum instantaneous noise level
$L_{min}$ = minimum measured sound level


Long-Term (24-Hour) Noise Level Measurement
LT-2
Noise Level (dBA Leq)
95.0
92.0
89.0
86.0
83.0
80.0
77.0
74.0
71.0
68.0
65.0
62.0
59.0
56.0
53.0
50.0
47.0
44.0
41.0
38.0
35.0
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
Time of Day
Leq
Lmax
Lmin

# Noise Measurement Survey

Project Number: SNN2101
Project Name: 2740 West Nielson

Test Personnel: Moe Abushanab
Equipment: Larson Davis LxT

Site Number: ST-1 Date: 9/28/2022

Time: From 1:30 p.m. To 1:50 p.m.

Site Location: Between 2nd and 3rd tree north of cemetery entrance. Approximately 35 feet away from N Hughes centerline

Primary Noise Sources: traffic noise on N Hughes Ave
Rail crossing gate at 1:35 pm w/ train passby
Faint operations noise from adjacent site (forklift)

**Measurement Results**

| | dBA |
|---|---|
| $L_{eq}$ | 63.5 |
| $L_{max}$ | 77.6 |
| $L_{min}$ | 43.1 |
| $L_{peak}$ | 95.4 |
| $L_2$ | 72.0 |
| $L_8$ | 69.0 |
| $L_{25}$ | 63.6 |
| $L_{50}$ | 57.4 |
| SEL | |

**Atmospheric Conditions:**

| | |
|---|---|
| Maximum Wind Velocity (mph) | 3.6 |
| Average Wind Velocity (mph) | 2.3 |
| Temperature (F) | 92 |
| Relative Humidity (%) | 30 |
| Comments: | |

Comments: File # 1

Location Photo:



# Noise Measurement Survey

Project Number: SNN2101
Project Name: 2740 West Nielson

Test Personnel: Moe Abushanab
Equipment: Larson Davis LxT

Site Number: ST-2 Date: 9/28/2022

Time: From 1:56 p.m. To 2:16 p.m.

Site Location: North of Belmont Avenue. Approximately 40 feet away from centerline. By 2560 Belmont avenue entrance (AAA Welding)

Primary Noise Sources: traffic noise on Belmont Avenue
Occasional aircraft

**Measurement Results**

| | dBA |
|---|---|
| $L_{eq}$ | 66.7 |
| $L_{max}$ | 80.2 |
| $L_{min}$ | 45.6 |
| $L_{peak}$ | 98.0 |
| $L_2$ | 75.3 |
| $L_8$ | 71.9 |
| $L_{25}$ | 67.1 |
| $L_{50}$ | 60.7 |
| SEL | |

**Atmospheric Conditions:**

| | |
|---|---|
| Maximum Wind Velocity (mph) | 3.6 |
| Average Wind Velocity (mph) | 2.3 |
| Temperature (F) | 92 |
| Relative Humidity (%) | 30 |
| Comments: | |

Comments: File # 2

Location Photo:



# Noise Measurement Survey

Project Number: SNN2101
Project Name: 2740 West Nielson

Test Personnel: Moe Abushanab
Equipment: Larson Davis LxT

Site Number: ST-3 Date: 9/28/2022

Time: From 2:25 p.m. To 2:45 p.m.

Site Location: West of N Marks Avenue, south of overpass entrance, by powerline pole. Approximately 50 feet away from Marks Ave. centerline

Primary Noise Sources: traffic noise on Marks
Faint operational noise from adjacent site, trucks leaving/entering site.

**Measurement Results**

| | dBA |
|---|---|
| $L_{eq}$ | 68.9 |
| $L_{max}$ | 83.9 |
| $L_{min}$ | 43.3 |
| $L_{peak}$ | 98.6 |
| $L_2$ | 77.2 |
| $L_8$ | 73.9 |
| $L_{25}$ | 69.0 |
| $L_{50}$ | 63.8 |
| SEL | |

**Atmospheric Conditions:**

| | |
|---|---|
| Maximum Wind Velocity (mph) | 3.6 |
| Average Wind Velocity (mph) | 2.3 |
| Temperature (F) | 92 |
| Relative Humidity (%) | 30 |
| Comments: | |

Comments: File # 3

Location Photo:



# Noise Measurement Survey

Project Number: SNN2101
Project Name: 2740 West Nielson

Test Personnel: Moe Abushanab
Equipment: Larson Davis LxT

Site Number: ST-4 Date: 9/28/2022

Time: From 2:50 p.m. To 3:10 p.m.

Site Location: South of Nielson Avenue, approximately 40 feet away from centerline. East of 2307 W Nielson Ave entrance.

Primary Noise Sources: traffic noise on Nielson
Occasional aircraft

**Measurement Results**

| | dBA |
|---|---|
| $L_{eq}$ | 66.7 |
| $L_{max}$ | 80.2 |
| $L_{min}$ | 45.6 |
| $L_{peak}$ | 98.0 |
| $L_2$ | 75.3 |
| $L_8$ | 71.9 |
| $L_{25}$ | 67.1 |
| $L_{50}$ | 60.7 |
| SEL | |

**Atmospheric Conditions:**

| | |
|---|---|
| Maximum Wind Velocity (mph) | 3.6 |
| Average Wind Velocity (mph) | 2.3 |
| Temperature (F) | 92 |
| Relative Humidity (%) | 30 |
| Comments: | |

Comments: File # 4
Generally quiet without traffic

Location Photo:



# ATTACHMENT C

# FHWA TRAFFIC NOISE MODEL PRINTOUTS

TABLE Existing -01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Belmont Avenue and Nielson Avenue
NOTES: 2740 West Nielson Warehouse Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10190  SPEED (MPH): 45  GRADE: .5

| TRAFFIC DISTRIBUTION PERCENTAGES | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.79

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL | | | |
|---|---|---|---|
| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
| 158.3 | 486.1 | 1532.3 | 4843.5 |

---

TABLE Existing -02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Nielsen Avenue and Ray Johnson Drive
NOTES: 2740 West Nielson Warehouse Project - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11554  SPEED (MPH): 45  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.33

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 178.3 | 550.7 | 1737.2 | 5491.8 |

---

TABLE Existing -03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Ray Johnson Drive and SR-180 Westbound Ramps
NOTES: 2740 West Nielson Warehouse Project - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12019  SPEED (MPH): 45  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.51

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 185.1 | 572.8 | 1807.1 | 5712.8 |

---

TABLE Existing -04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Belmont Avenue between Marks Avenue and Hughes Avenue
NOTES: 2740 West Nielson Warehouse Project - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7240  SPEED (MPH): 40  GRADE: .5

| | TRAFFIC DISTRIBUTION PERCENTAGES DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 25  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.96

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 91.6 | 279.7 | 881.2 | 2785.5 |

---

TABLE Existing -05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Nielson Avenue between Marks Avenue and Hughes Avenue
NOTES: 2740 West Nielson Warehouse Project - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1614  SPEED (MPH): 40  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 35  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.04

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 0.0 | 71.2 | 199.2 | 621.2 |

---

TABLE Existing -06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Hughes Avenue between Nielson Avenue and Belmont Avenue
NOTES: 2740 West Nielson Warehouse Project - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2604  SPEED (MPH): 40  GRADE: .5

| | TRAFFIC DISTRIBUTION PERCENTAGES | | |
|---|---|---|---|
| | DAY | EVENING | NIGHT |
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 30  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.31

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL | | | |
|---|---|---|---|
| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
| 0.0 | 104.5 | 318.1 | 1001.7 |

---

TABLE Existing - With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Belmont Avenue and Nielson Avenue
NOTES: 2740 West Nielson Warehouse Project - Existing - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11228  SPEED (MPH): 45  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.85

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 199.7 | 619.9 | 1956.4 | 6184.9 |

---

TABLE Existing - With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Nielsen Avenue and Ray Johnson Drive
NOTES: 2740 West Nielson Warehouse Project - Existing - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12146  SPEED (MPH): 45  GRADE: .5

| TRAFFIC DISTRIBUTION PERCENTAGES | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.19

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL | 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|---|
| | 215.4 | 670.3 | 2116.2 | 6690.5 |

---

TABLE Existing - With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Ray Johnson Drive and SR-180 Westbound Ramps
NOTES: 2740 West Nielson Warehouse Project - Existing - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12611  SPEED (MPH): 45  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.36

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 223.3 | 695.9 | 2197.2 | 6946.6 |

---

TABLE Existing - With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Belmont Avenue between Marks Avenue and Hughes Avenue
NOTES: 2740 West Nielson Warehouse Project - Existing - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7550  SPEED (MPH): 40  GRADE: .5

| TRAFFIC DISTRIBUTION PERCENTAGES | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 25  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.77

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL | | | |
|---|---|---|---|
| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
| 109.2 | 337.2 | 1063.6 | 3362.3 |

---

TABLE Existing - With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Nielson Avenue between Marks Avenue and Hughes Avenue
NOTES: 2740 West Nielson Warehouse Project - Existing - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2230  SPEED (MPH): 40  GRADE: .5

| | TRAFFIC DISTRIBUTION PERCENTAGES | | |
|---|---|---|---|
| | DAY | EVENING | NIGHT |
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 35  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.08

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL | | | |
|---|---|---|---|
| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
| 0.0 | 105.2 | 315.6 | 992.5 |

---

TABLE Existing - With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Hughes Avenue between Nielson Avenue and Belmont Avenue
NOTES: 2740 West Nielson Warehouse Project - Existing - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3060  SPEED (MPH): 40  GRADE: .5

| TRAFFIC DISTRIBUTION PERCENTAGES | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 30  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.64

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL | | | |
|---|---|---|---|
| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
| 0.0 | 139.5 | 431.8 | 1362.3 |

---

TABLE Opening Year - No Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Belmont Avenue and Nielson Avenue
NOTES: 2740 West Nielson Warehouse Project - Opening Year - No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10938  SPEED (MPH): 45  GRADE: .5

| TRAFFIC DISTRIBUTION PERCENTAGES | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.10

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL | | | |
|---|---|---|---|
| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
| 169.2 | 521.5 | 1644.7 | 5199.1 |

---

TABLE Opening Year - No Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Nielsen Avenue and Ray Johnson Drive
NOTES: 2740 West Nielson Warehouse Project - Opening Year - No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12408  SPEED (MPH): 45  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.64

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 190.8 | 591.2 | 1865.6 | 5897.7 |

---

TABLE Opening Year - No Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Ray Johnson Drive and SR-180 Westbound Ramps
NOTES: 2740 West Nielson Warehouse Project - Opening Year - No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12933  SPEED (MPH): 45  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.82

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 198.5 | 616.1 | 1944.5 | 6147.2 |

---

TABLE Opening Year - No Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Belmont Avenue between Marks Avenue and Hughes Avenue
NOTES: 2740 West Nielson Warehouse Project - Opening Year - No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7905  SPEED (MPH): 40  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 25  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.34

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 99.4 | 305.2 | 962.1 | 3041.3 |

---

TABLE Opening Year - No Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Nielson Avenue between Marks Avenue and Hughes Avenue
NOTES: 2740 West Nielson Warehouse Project - Opening Year - No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1767  SPEED (MPH): 40  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 35  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.43

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 0.0 | 76.4 | 217.6 | 679.9 |

---

TABLE Opening Year - No Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Hughes Avenue between Nielson Avenue and Belmont Avenue
NOTES: 2740 West Nielson Warehouse Project - Opening Year - No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2796  SPEED (MPH): 40  GRADE: .5

| | TRAFFIC DISTRIBUTION PERCENTAGES | | |
|---|---|---|---|
| | DAY | EVENING | NIGHT |
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 30  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.61

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL | | | |
|---|---|---|---|
| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
| 0.0 | 111.6 | 341.3 | 1075.5 |

---

TABLE Opening Year - With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Belmont Avenue and Nielson Avenue
NOTES: 2740 West Nielson Warehouse Project - Opening Year - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11976  SPEED (MPH): 45  GRADE: .5

| TRAFFIC DISTRIBUTION PERCENTAGES | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.13

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL | | | |
|---|---|---|---|
| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
| 212.5 | 661.0 | 2086.6 | 6596.8 |

---

TABLE Opening Year - With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Nielsen Avenue and Ray Johnson Drive
NOTES: 2740 West Nielson Warehouse Project - Opening Year - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13000  SPEED (MPH): 45  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.49

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 230.0 | 717.3 | 2265.0 | 7160.9 |

---

TABLE Opening Year - With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Ray Johnson Drive and SR-180 Westbound Ramps
NOTES: 2740 West Nielson Warehouse Project - Opening Year - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13525  SPEED (MPH): 45  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 239.0 | 746.2 | 2356.4 | 7450.0 |

---

TABLE Opening Year - With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Belmont Avenue between Marks Avenue and Hughes Avenue
NOTES: 2740 West Nielson Warehouse Project - Opening Year - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8215  SPEED (MPH): 40  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 25  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.14

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 118.4 | 366.7 | 1157.2 | 3658.4 |

---

TABLE Opening Year - With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Nielson Avenue between Marks Avenue and Hughes Avenue
NOTES: 2740 West Nielson Warehouse Project - Opening Year - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2383  SPEED (MPH): 40  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 35  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.36

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 0.0 | 111.6 | 337.0 | 1060.5 |

---

TABLE Opening Year - With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Hughes Avenue between Nielson Avenue and Belmont Avenue
NOTES: 2740 West Nielson Warehouse Project - Opening Year - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3252  SPEED (MPH): 40  GRADE: .5

| | TRAFFIC DISTRIBUTION PERCENTAGES | | |
|---|---|---|---|
| | DAY | EVENING | NIGHT |
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 30  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.91

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL | | | |
|---|---|---|---|
| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
| 0.0 | 147.8 | 458.7 | 1447.7 |

---

TABLE Year 2035 - No Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Belmont Avenue and Nielson Avenue
NOTES: 2740 West Nielson Warehouse Project - Year 2035 - No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11651  SPEED (MPH): 45  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.37

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 179.7 | 555.3 | 1751.8 | 5537.9 |

---

TABLE Year 2035 - No Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Nielsen Avenue and Ray Johnson Drive
NOTES: 2740 West Nielson Warehouse Project - Year 2035 - No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13244  SPEED (MPH): 45  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.93

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 203.1 | 630.9 | 1991.2 | 6295.0 |

---

TABLE Year 2035 - No Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Ray Johnson Drive and SR-180 Westbound Ramps
NOTES: 2740 West Nielson Warehouse Project - Year 2035 - No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13706  SPEED (MPH): 45  GRADE: .5

| TRAFFIC DISTRIBUTION PERCENTAGES | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.08

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL | | | |
|---|---|---|---|
| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
| 209.9 | 652.8 | 2060.6 | 6514.6 |

---

TABLE Year 2035 - No Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Belmont Avenue between Marks Avenue and Hughes Avenue
NOTES: 2740 West Nielson Warehouse Project - Year 2035 - No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8846  SPEED (MPH): 40  GRADE: .5

| TRAFFIC DISTRIBUTION PERCENTAGES | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 25  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.83

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL | | | |
|---|---|---|---|
| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
| 110.5 | 341.3 | 1076.6 | 3403.3 |

---

TABLE Year 2035 - No Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Nielson Avenue between Marks Avenue and Hughes Avenue
NOTES: 2740 West Nielson Warehouse Project - Year 2035 - No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1772  SPEED (MPH): 40  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 35  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.44

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 0.0 | 76.6 | 218.2 | 681.8 |

---

TABLE Year 2035 - No Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Hughes Avenue between Nielson Avenue and Belmont Avenue
NOTES: 2740 West Nielson Warehouse Project - Year 2035 - No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3531  SPEED (MPH): 40  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 58.45 | 7.80 | 11.70 |
| M-TRUCKS | 8.24 | 1.11 | 1.67 |
| H-TRUCKS | 8.25 | 1.11 | 1.67 |

ACTIVE HALF-WIDTH (FT): 30  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.63

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 0.0 | 139.1 | 430.4 | 1358.0 |

---

TABLE Year 2035 - With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Belmont Avenue and Nielson Avenue
NOTES: 2740 West Nielson Warehouse Project - Year 2035 - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12689  SPEED (MPH): 45  GRADE: .5

| TRAFFIC DISTRIBUTION PERCENTAGES | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.38

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL | | | |
|---|---|---|---|
| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
| 224.7 | 700.2 | 2210.8 | 6989.6 |

---

TABLE Year 2035 - With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Nielsen Avenue and Ray Johnson Drive
NOTES: 2740 West Nielson Warehouse Project - Year 2035 - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13836  SPEED (MPH): 45  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.76

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 244.4 | 763.3 | 2410.6 | 7621.3 |

---

TABLE Year 2035 - With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Marks Avenue between Ray Johnson Drive and SR-180 Westbound Ramps
NOTES: 2740 West Nielson Warehouse Project - Year 2035 - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14298  SPEED (MPH): 45  GRADE: .5

| TRAFFIC DISTRIBUTION PERCENTAGES | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 40  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.90

| DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL | | | |
|---|---|---|---|
| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
| 252.3 | 788.7 | 2491.1 | 7875.8 |

---

TABLE Year 2035 - With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Belmont Avenue between Marks Avenue and Hughes Avenue
NOTES: 2740 West Nielson Warehouse Project - Year 2035 - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9156  SPEED (MPH): 40  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 25  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.61

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 131.4 | 408.6 | 1289.7 | 4077.4 |

---

TABLE Year 2035 - With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Nielson Avenue between Marks Avenue and Hughes Avenue
NOTES: 2740 West Nielson Warehouse Project - Year 2035 - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2388  SPEED (MPH): 40  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 35  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.37

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 0.0 | 111.8 | 337.7 | 1062.7 |

---

TABLE Year 2035 - With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/07/2022
ROADWAY SEGMENT: Hughes Avenue between Nielson Avenue and Belmont Avenue
NOTES: 2740 West Nielson Warehouse Project - Year 2035 - With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3987  SPEED (MPH): 40  GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

| | DAY | EVENING | NIGHT |
|---|---|---|---|
| AUTOS | 49.84 | 13.18 | 16.00 |
| M-TRUCKS | 6.77 | 1.61 | 2.06 |
| H-TRUCKS | 6.82 | 1.66 | 2.06 |

ACTIVE HALF-WIDTH (FT): 30  SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.79

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

| 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL |
|---|---|---|---|
| 63.6 | 180.0 | 561.9 | 1774.6 |

---

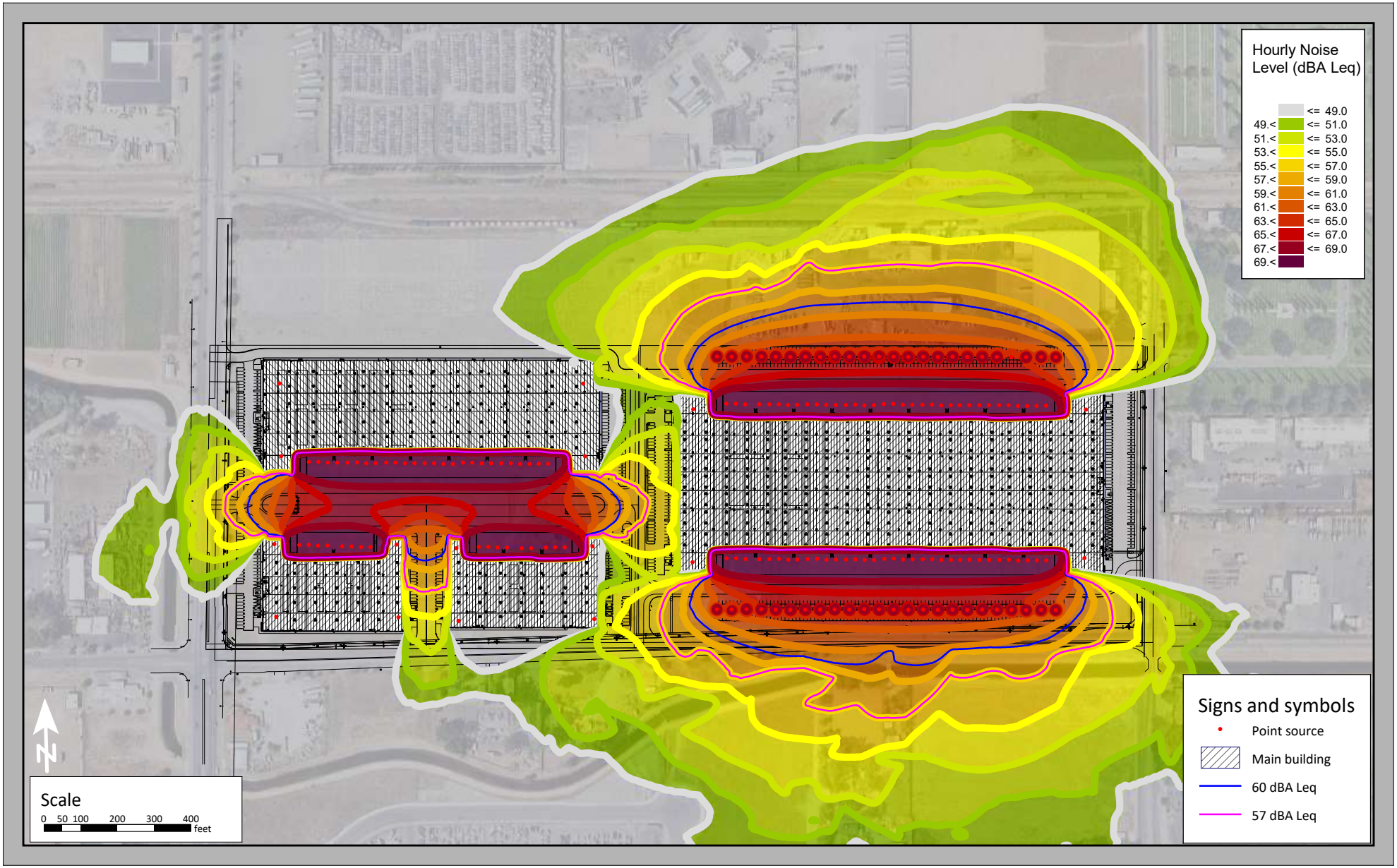
# ATTACHMENT D

# SOUNDPLAN NOISE MODEL PRINTOUTS

# 2740 W Nielsen

Project No. SNN2102

Project Operational Noise Levels

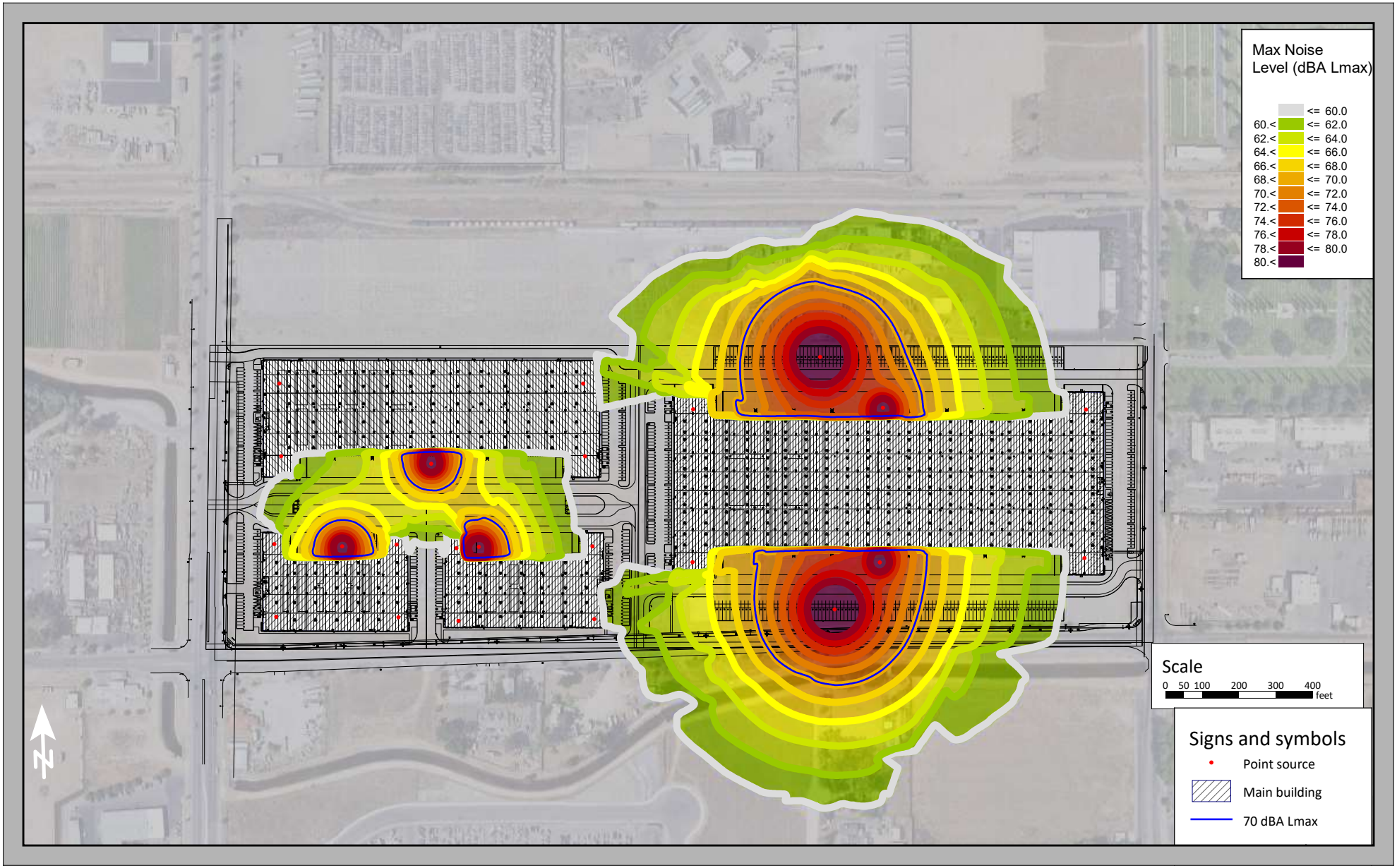



C:\Users\JStephens\OneDrive - LSA Associates\DESKTOP\SOUNDPLAN\SNN2102 - 2740 W Nielsen\Ops.sgs - last edit 10/12/2022

# 2740 W Nielsen

Project No. SNN2102

Project Operational Noise Levels - Max



# APPENDIX M

# TRAFFIC IMPACT STUDY

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# TRAFFIC IMPACT STUDY

## 2740 WEST NIELSEN AVENUE WAREHOUSE PROJECT

## CITY OF FRESNO

## FRESNO COUNTY, CALIFORNIA

This Traffic Impact Study has been prepared under the supervision of
Ambarish Mukherjee, P.E.




LSA

December 2021

# TRAFFIC IMPACT STUDY

## 2740 WEST NIELSEN AVENUE WAREHOUSE PROJECT

## CITY OF FRESNO

## FRESNO COUNTY, CALIFORNIA

Prepared for:

Jill Gormley, City Traffic Engineer
City of Fresno
Room 4016
Fresno, California 93721

Prepared by:

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Riverside, California 92507
(951) 781-9310

Project No. SNN2101

LSA

December 2021

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# 1.0 INTRODUCTION

The Traffic Impact Study (TIS) has been prepared for the proposed 2740 West Nielsen Avenue Warehouse project (project) to be located at the northeast corner of the intersection of Marks Avenue and Nielsen Avenue in the City of Fresno. Figure 1-1 illustrates the regional and project location. (Figures and tables are located at the end of each chapter.)

This report is intended to satisfy the requirements established by the City of Fresno *Traffic Impact Study Report Guidelines* (updated February 2, 2009), the *City of Fresno CEQA Guidelines for Vehicle Miles Traveled Thresholds* (adopted on June 25, 2020), the California Department of Transportation (Caltrans), as well as the requirements for the disclosure of potential impacts and mitigation measures pursuant to the California Environmental Quality Act (CEQA). The scope of work for this TIS, including trip generation, trip distribution, study area, and analysis methodologies, has been approved by City staff via the Scoping Agreement process. A copy of the Scoping Agreement is included in Appendix A.

This study examines traffic operations in the vicinity of the proposed project under the following five scenarios:

- Existing Conditions;
- Existing plus Project Conditions;
- Existing plus Project and Near-term approved and pending projects Conditions;
- Cumulative Year (2035) no Project Conditions; and
- Cumulative Year (2035) plus Project Conditions.

Traffic conditions were examined for the weekday daily, a.m., and p.m. peak hour conditions. The a.m. peak hour is defined as the one hour of highest traffic volumes occurring between 7:00 and 9:00 a.m. The p.m. peak hour is the one hour of highest traffic volumes occurring between 4:00 and 6:00 p.m. Roadway segments were analyzed using daily volume counts and comparisons were made to the daily service volume standards provided in the City's TIS Guidelines.

## 1.1 PROJECT DESCRIPTION

The proposed project consists of four buildings with a total area of 901,438 sf, all of which will be High Cube Fulfilment Center warehouses. The project site designation in the City of Fresno Official Zoning Map is IH – Heavy Industrial. As such, the proposed project is consistent with the designated zoning. The project is anticipated to be completed by the year 2023. Figure 1-2 illustrates the conceptual site plan for the proposed project.

As illustrated in Figure 1-2, access to the project will be provided via the following seven driveways:

### Driveways on Marks Avenue

- Driveway 1: This full access driveway near the northwest corner of the site will be used by passenger vehicles only.
- Driveway 2: This driveway will be used by trucks only. This driveway will allow all movements except for left-turn egress from the project site.
- Driveway 3: This right-in-right-out driveway near the southwest corner of the site will be used by passenger vehicles only.

#### Driveways on Nielsen Avenue

- Driveway 4: This right-in-right-out driveway will be used by passenger vehicles only.
- Driveway 5: This full access driveway will be used by both passenger vehicles and trucks.

#### Driveways on Hughes Avenue

- Driveway 6: This full access driveway near the northeast corner of the site will be used by both passenger vehicles and trucks.
- Driveway 7: This full access driveway will be used by both passenger vehicles and trucks.

Additionally, as part of project design feature, the project will also construct sidewalks along the project frontages on Marks Avenue, Nielsen Avenue and Hughes Avenue.

## 1.2 STUDY AREA

Based on the City's TIS Guidelines, the study intersections for the TIS will be identified on a case-by-case basis for each project. Study intersections and roadway segments considered for the analysis were finalized during the TIS scoping agreement process and based on discussion with City staff.

### 1.2.1 Study Intersections

Per the Scoping Agreement (Appendix A), intersections analyzed in this study and their jurisdictions are as follows:

1. Marks Avenue/Belmont Avenue (City of Fresno, County of Fresno);
2. Marks Avenue/Nielsen Avenue (City of Fresno);
3. Marks Avenue/Ray Johnson Drive (City of Fresno);
4. Marks Avenue/SR-180 Westbound Ramps (Caltrans);
5. Marks Avenue/SR-180 Eastbound Ramps (Caltrans);
6. Hughes Avenue/Belmont Avenue (City of Fresno, County of Fresno); and
7. Hughes Avenue/Nielsen Avenue (City of Fresno).

It should be noted that based upon recommendation by City staff during the scoping agreement process, a LOS analysis was not required at the project driveway intersections. As such, the project driveway intersections have been included for project trip distribution, and trip assignment purposes only.

Figure 1-3 illustrates the locations of all study intersections.

### 1.2.2 Roadway Segments

Per the Scoping Agreement (Appendix A), roadway segments analyzed in this study are as follows:

1. Marks Avenue, between Belmont Avenue and Nielsen Avenue;
2. Marks Avenue, between Nielsen Avenue and Ray Johnson Drive;
3. Marks Avenue, between Ray Johnson Drive and SR-180 Westbound Ramps;
4. Marks Avenue, between SR-180 Westbound Ramps and SR-180 Eastbound Ramps;
5. Belmont Avenue, between Marks Avenue and Hughes Avenue;
6. Nielsen Avenue, between Marks Avenue and Hughes Avenue; and
7. Hughes Avenue, between Belmont Avenue and Nielsen Avenue.

For each roadway segment, the highest volume on any part of the segment will be considered as the analysis volume for the entire segment.

### 1.2.3 Worst Case Scenario Study Area

During the Scoping Agreement process, California Department of Transportation (Caltrans) recommended to evaluate the project under a worst case scenario with 60% of project traffic using Caltrans facilities (ramps and freeway segments). This evaluation included intersections 3, 4, and 5 as listed above, as well as the following freeway basic and merge/diverge areas for the SR-180 and Marks Avenue interchange:

**SR-180 Eastbound**

1. West of Marks Avenue Off-Ramp (Basic);
2. Marks Avenue Off-Ramp (Diverge);
3. Between Marks Avenue Off-Ramp and Marks Avenue Loop-On Ramp (Basic);
4. Marks Avenue Loop-On Ramp (Merge);
5. Between Marks Avenue Loop-On Ramp and Marks Avenue Slip-On Ramp (Basic);
6. Marks Avenue Slip-On Ramp(Merge); and
7. East of Marks Avenue (Basic).

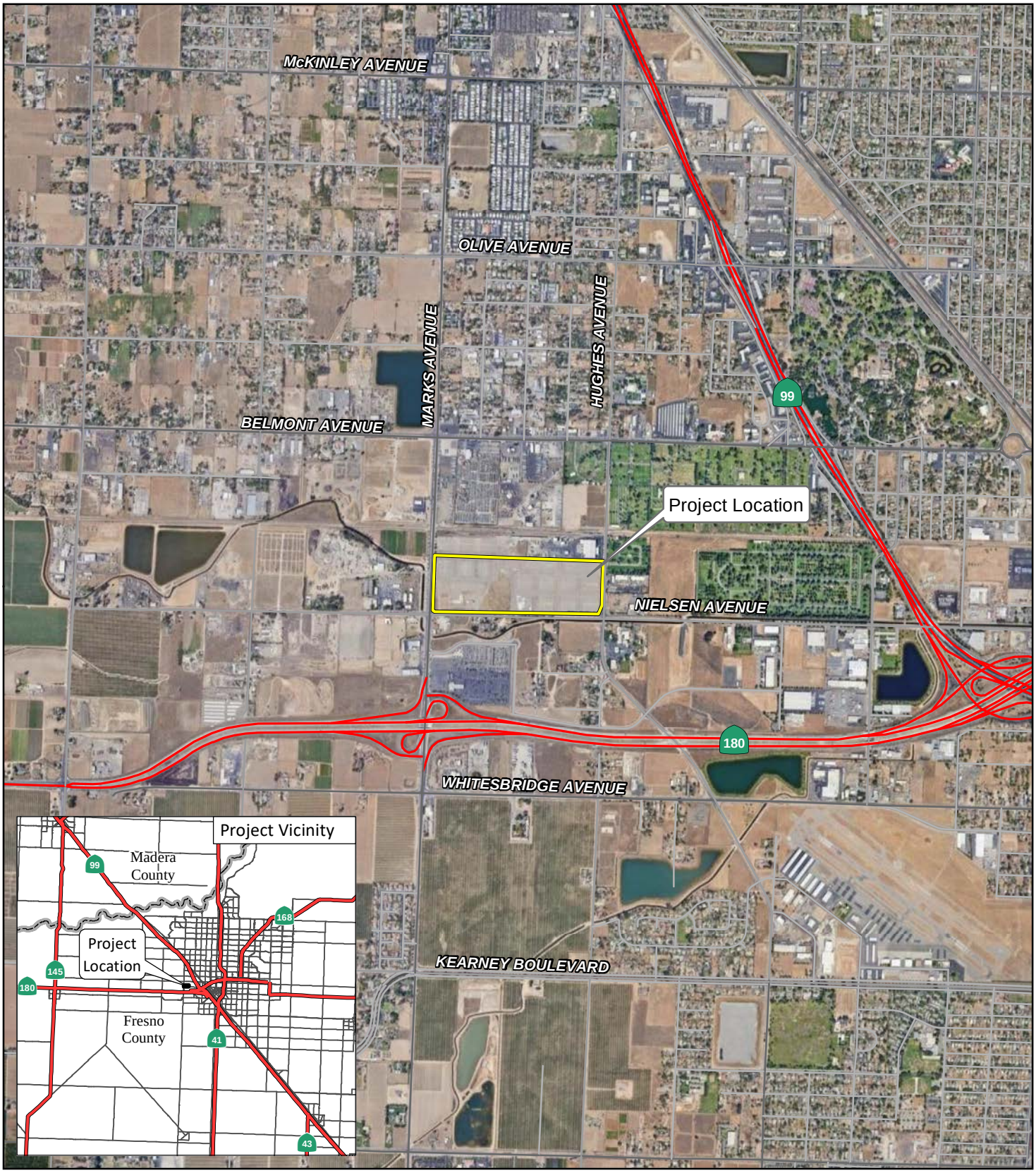
**SR-180 Westbound**

8. East of Marks Avenue (Basic);
9. Marks Avenue Off-Ramp (Diverge);
10. Between Marks Avenue Off-Ramp and Marks Avenue Loop-On Ramp (Basic);
11. Marks Avenue Loop-On Ramp(Merge);
12. Between Marks Avenue Loop-On Ramp and Marks Avenue Slip-On Ramp (Basic);

13. Marks Avenue Slip-On Ramp(Merge); and
14. West of Marks Avenue (Basic).

## 1.3 LIST OF CHAPTER 1.0 FIGURES


- Figure 1-1: Regional and Project Location
- Figure 1-2: Conceptual Site Plan
- Figure 1-3: Study Area Intersections




LSA

FIGURE 1-1

N

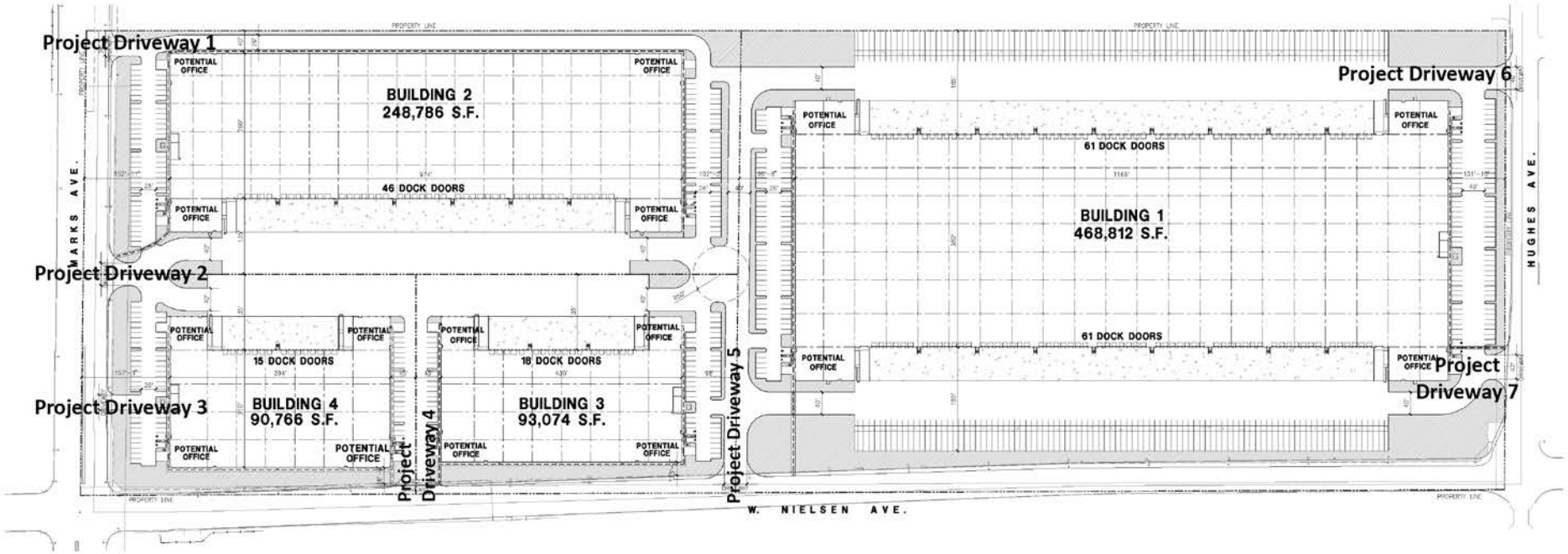
0 1000 2000
FEET

SOURCE: ESRI Streetmap, 2021; Google Earth, 2019.

R:\SNN2101\TIS\GIS\Reports\fig1-1_Reg_ProjLoc.mxd (11/20/2021)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Regional and Project Location




LSA

FIGURE 1-2

N

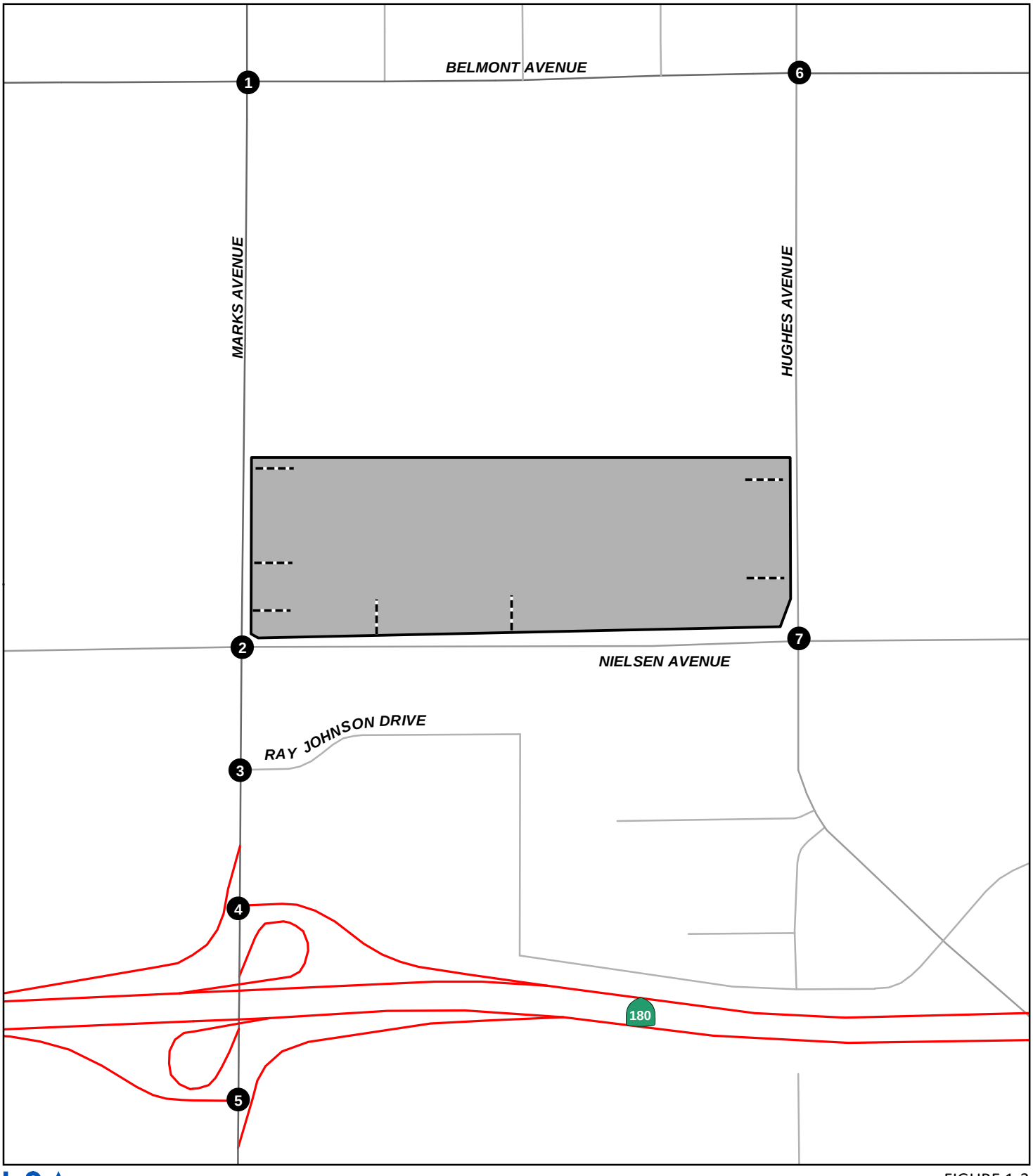
0 120 240
FEET

SOURCE: HPA architecture; April 2021

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*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Conceptual Site Plan




LSA

FIGURE 1-3

LEGEND

Project Site

Study Intersection

Project Driveway

N

0 300 600

FEET

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Study Area Intersections

SOURCE: County of Fresno Streets Data, 2021.

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# 2.0 ANALYSIS METHODOLOGY AND THRESHOLDS

## 2.1 LEVEL OF SERVICE DEFINITIONS

LOS can be characterized for the whole intersection, each intersection approach, and by each lane group. Control delay alone is used to characterize LOS for the entire intersection. Control delay quantifies the increase in travel time due to the traffic signal control, and is a surrogate measure of driver discomfort and fuel consumption.

A complete description of the meaning of LOS can be found in the Transportation Research Board Special Report 209, *Highway Capacity Manual* (HCM). The HCM establishes LOS A through F for intersections. A description of LOS for signalized and unsignalized intersections is summarized in Table 2-A. A description of LOS for roadway segments is summarized in Table 2-B.

Table 2-C shows the LOS criteria for unsignalized and signalized intersections. The TIS Guidelines recommend using Florida LOS tables to be used for roadway segment analysis. Table 2-D summarizes the LOS criteria used to evaluate roadway segments based on the Florida LOS Tables for urbanized areas, which was adapted from Table 1 of the *2020 Quality/Level of Service Handbook*, dated June 2020. The daily traffic volumes represent the total vehicles (both directions) traveling on a roadway segment within 24 hours.

Basic freeway segments have uniform traffic conditions and roadway characteristics. The measure used to provide an estimate of LOS is density, where density is calculated from the average vehicle flow rate per lane and the average speed. Table 2-E shows the correlation between LOS and flow density. LOS A represents a freeway segment with density less than or equal to 11 passenger cars per mile per lane (pc/mi/ln). LOS F represents a freeway segment with density greater than 45 pc/mi/ln.

Based on the HCM, the LOS for freeway ramps is determined by traffic flow density. Table 2-F shows the correlation between LOS and traffic flow density defined in the HCM. LOS A represents traffic flow density less than or equal to 10 pc/mi/ln. LOS F represents overflow conditions with high density and congestion.

For all study area intersections, the *Highway Capacity Manual 6$^{th}$ Edition* (HCM 6) analysis methodologies were used to determine intersection LOS. Intersection LOS was calculated using the Synchro 10 software, which uses the HCM 6 methodologies. Roadway segment LOS was calculated based on the Florida LOS tables as described above. For basic freeway segments and ramp merge/diverge segments, the Highway Capacity 7 Software (HCS 7) was used. The software calculates LOS using the HCM 6 methodologies.

## 2.2 LEVEL OF SERVICE PROCEDURES AND THRESHOLDS

Study intersections and roadway segments analyzed in this report are under the jurisdiction of the City of Fresno or on the border of both the City and County of Fresno. However, intersections located at freeway on-ramps and off-ramps are under the jurisdiction of Caltrans. Based on the City of Fresno General Plan Circulation Element, the City uses Traffic Impact Zone (TIZ) boundaries within the City to identify acceptable LOS for each TIZ. The majority of the study area is within TIZ III, or

along the border of TIZ II and TIZ III. TIZ II has a LOS standard of E, while within TIZ III has a LOS standard of D. Therefore, as a conservative estimate, LOS D was considered as the minimum level of service criterion for all intersections. As such, an operational deficiency occurs when the project causes an unsatisfactory condition (deteriorate from LOS A through D to E or F) for intersections or when the project contributes to an existing or forecast deficiency. The project needs to identify improvements to improve the intersection LOS to an acceptable level.

For intersections under the jurisdictions of Caltrans, Caltrans considers an acceptable LOS to be between LOS C and D at all intersections under its jurisdiction (delay of 45 seconds at signalized intersections and delay of 30 seconds at unsignalized intersections).

Caltrans does not have any operational deficiency criteria for study intersections. Therefore, an operational deficiency occurs when the project causes an unsatisfactory condition (deteriorate from LOS A through D to E or F) for intersections or when the project contributes to an existing or forecast deficiency. The project needs to identify improvements to improve the intersection LOS to an acceptable level.

## 2.3 LIST OF CHAPTER 2.0 TABLES

- Table 2-A: Intersection Level of Service Definitions
- Table 2-B: Roadway Segment Level of Service Definitions
- Table 2-C: Level of Service Criteria for Unsignalized and Signalized Intersections
- Table 2-D: Roadway Segment Capacity and Levels of Service
- Table 2-E: Level of Service Criteria for Freeway Segments
- Table 2-F: Level Of Service Criteria for Ramps and Ramp Junctions

## Table 2-A: Intersection Level of Service Definitions

| LOS | Description |
|---|---|
| A | Traffic operations with a control delay of 10 seconds per vehicle or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If LOS A is the result of favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping. |
| B | Traffic operations with control delay between 10 seconds per vehicle and 20 seconds per vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A. |
| C | Traffic operations with control delay between 20 and 35 seconds per vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of the insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping. |
| D | Traffic operations with control delay between 35 and 55 seconds per vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable. |
| E | Traffic operations with control delay between 55 and 80 seconds per vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent. |
| F | Traffic operations with control delay exceeding 80 seconds per vehicle or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue. |

Source: *Highway Capacity Manual* (6th Edition)

## Table 2-B: Roadway Segment Level of Service Definitions

| LOS | Description |
|---|---|
| A | Describes primarily free-flow operation. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control Delay at the boundary intersection is minimal. The travel speed exceeds 80% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0. |
| B | Describes reasonably unimpeded operation. The ability to maneuver within the traffic stream is only slightly restricted, and control delay at the boundary is not significant. The travel speed is between 67% and 80% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0. |
| C | Describes stable operation. The ability to maneuver and change lanes at mid-segment locations may be more restricted than at LOS B. Longer queues at the boundary intersection may contribute to lower travel speeds. The travel speed is between 50% and 67% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0. |
| D | Indicates a less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed. This operation may be due to adverse signal progression, high volume, or inappropriate signal timing at the boundary intersections. The travel speed is between 40% and 50% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0. |
| E | Characterized by unstable operation and significant delay. Such operations may be due to some combination of adverse progression, high volume, and inappropriate signal timing at the boundary intersections. The travel speed is between 30% and 40% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0. |
| F | Characterized by flow at extremely low speed. Congestion is likely occurring at the boundary intersections, as indicated by high delay and extensive queuing. The travel speed is between 30% or less of the base free-flow speed, and the volume-to-capacity ratio is greater than 1.0. |

Source: *Highway Capacity Manual* (6th Edition)

## Table 2-C: Level of Service Criteria for Unsignalized and Signalized Intersections

| Level of Service | Unsignalized Intersection Average Delay per Vehicle (sec.) | Signalized Intersection Average Delay per Vehicle (sec.) |
|---|---|---|
| A | ≤ 10 | ≤ 10 |
| B | > 10 and ≤ 15 | > 10 and ≤ 20 |
| C | > 15 and ≤ 25 | > 20 and ≤ 35 |
| D | > 25 and ≤ 35 | > 35 and ≤ 55 |
| E | > 35 and ≤ 50 | > 55 and ≤ 80 |
| F | > 50 | > 80 |

Source: *Highway Capacity Manual* (6th Edition)

## Table 2-D: Roadway Segment Capacity and Levels of Service

| Class I (40 MPH or Higher Posted Speed Limit) | | | | | |
|---|---|---|---|---|---|
| | | Level of Service | | | |
| Lanes | Median | B | C | D | E |
| 2 | Undivided | * | 15,120 | 15,930 | * |
| 4 | Divided | * | 34,110 | 35,820 | * |
| 6 | Divided | * | 52,560 | 53,910 | * |
| 8 | Divided | * | 70,920 | 72,090 | * |
| **Class II (35 MPH or Slower Posted Speed Limit)** | | | | | |
| 2 | Undivided | * | 6,570 | 13,320 | 14,040 |
| 4 | Divided | * | 13,050 | 29,160 | 30,420 |
| 6 | Divided | * | 20,970 | 45,000 | 45,810 |
| 8 | Divided | * | 28,800 | 60,570 | 61,290 |

[1] The Florida LOS Tables includes the LOS capacities for State Signalized Arterials, and recommends a 10% adjustment for non-state signalized roadway system. Therefore, the roadway capacities have been calculated using a 10% adjustment to the values provided within the Florida LOS Table for urbanized area for State Signalized arterials.

Source: State of Florida *2020 Quality/level of Service Handbook, June 2020*.

## Table 2-E: Level of Service Criteria for Freeway Segments

| LOS | Density (v/c) |
|---|---|
| A | ≤ 0.30 |
| B | > 0.30–0.50 |
| C | > 0.50–0.71 |
| D | > 0.71–0.89 |
| E | > 0.89–1.00 |
| F | > 1.00 |

## Table 2-F: Level Of Service Criteria for Ramps and Ramp Junctions

| LOS | Density (pc/mi/ln) |
|---|---|
| A | ≤ 10 |
| B | > 10–20 |
| C | > 20–28 |
| D | > 28–35 |
| E | > 35 |
| F | Demand exceeds capacity |

# 3.0 CIRCULATION NETWORK SETTING

## 3.1 EXISTING ROADWAY NETWORK

This section provides a description of the circulation network within the study area. Within the City of Fresno, all major roadways are classified based on the Major Street Circulation Diagram provided in the Mobility and Transportation Element of the City of Fresno *General Plan*. Following is a brief description of major roadways within the study area:

- **Marks Avenue**: Marks Avenue is designated as an Arterial in the City's General Plan. Within the study area, Marks Avenue is a 4-lane divided roadway. There is no provision for continuous sidewalks within the study area. Class II bike lanes are present on both sides of Marks Avenue within the study area. There is no provision for on-street parking within the study area.
- **Belmont Avenue**: Belmont Avenue is designated as a collector street in the City's General Plan. Between Marks Avenue and Hughes Avenue, Belmont Avenue is a 4-lane undivided roadway. There is no provision for continuous sidewalks within the study area. There are no bike facilities along either direction of this segment. There is no provision for on-street parking within the study area.
- **Nielsen Avenue**: Nielsen Avenue is designated as a collector street in the City's General Plan. Between Marks Avenue and Hughes Avenue, Nielsen Avenue is a 2-lane undivided roadway with a two-way left-turn lane (TWLTL). There is no provision for sidewalks within the study area. Class II bike lanes are present on both sides of Nielsen Avenue within the study area. There is no provision for on-street parking within the study area.
- **Hughes Avenue**: Hughes Avenue is designated as a collector street in the City's General Plan. Between Belmont Avenue and Nielsen Avenue, Hughes Avenue is a 2-lane undivided roadway. There is no provision for continuous sidewalks within the study area. There are no bike facilities along either direction of this segment. There is no provision for on-street parking within the study area.

Figure 3-1 illustrates existing study intersection geometrics and traffic control. Figure 3-2 illustrates the Major Street Circulation Diagram for the City.

## 3.2 EXISTING BICYCLE, PEDESTRIAN, AND TRANSIT FACILITIES

### 3.2.1 Bicycle Facilities

The City of Fresno is committed to improving non-motorized travel. Bicycling can be a viable alternative to local work commutes and offers children a healthy way to get to school. To facilitate and encourage bicycle trips among other non-motorized mods of travel, the City has adopted its Active Transportation Plan in 2016 that includes a network of proposed facilities and implementation plan for the future. The *City of Fresno Active Transportation Plan* (adopted December 2016) provides an inventory of all existing bicycle infrastructure improvements to be implemented in the future.

According to the *City of Fresno Active Transportation Plan,* the bikeway network within the City is classified into four categories: Class I – Bike Paths, Class II – Bike Lanes, and Class III – Bike Routes, and Class IV – Separated Bikeways. Class I bikeways provide bicycle travel on a paved right-of-way completely separated from any street or highway. Class II bikeways provide a striped and stenciled lane for one-way travel on a street or highway. Class III bikeways provide for shared use with motor vehicle traffic and are identified only by signing. Class IV bikeways are physically separated bikeway facilities distinct from the sidewalks and designated for exclusive use of the bikers.

Currently, Class II bike lanes exists along Marks Avenue and Nielsen Avenue within the study area. Proposed future Class II bike lanes will be added along the Belmont Avenue and Hughes Avenue within the study area. Figure 3-3 illustrates the existing and proposed bike lanes within the project vicinity.

### 3.2.2 Pedestrian Facilities

The implementation of enhanced pedestrian linkage with a comprehensive trails system links residential areas, schools, parks, and commercial centers so that residents can travel within the community without driving. Safe and attractive sidewalks and walkways improve the walkability of the City. Sidewalks are generally provided on both sides of the streets throughout the City. Additionally, standard paved trails and non-standard unpaved trails are frequently used by bicyclists and pedestrians in the City. The existence of trails and sidewalks provides accessible facilities, provides safety features, and improves walkability in the City.

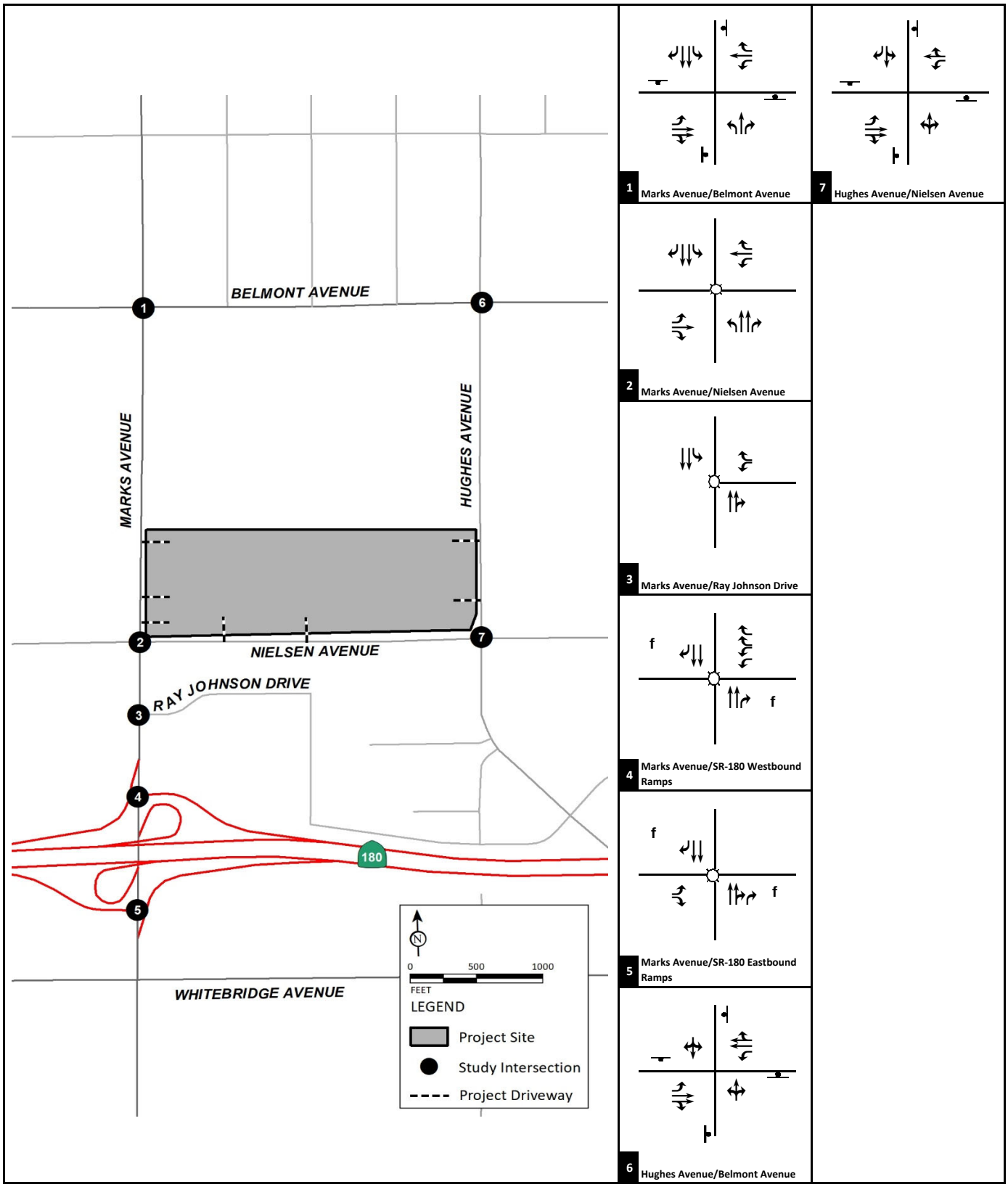
Paved sidewalks are present intermittently on both sides of Belmont Avenue and Marks Avenue. Sidewalks are proposed on Marks Avenue, Nielsen Avenue, Belmont Avenue and Hughes Avenue within the study area. Additionally, as previously mentioned, the project will be constructing sidewalks along the project frontage on Marks Avenue, Nielsen Avenue and Hughes Avenue. Figure 3-4 illustrates the existing and planned sidewalks within the City.

### 3.2.3 Transit Facilities

Fresno Area Express (FAX) is the Transportation Service Agency within the City and is responsible for coordinating transit services within its service area. FAX provides services via Route 1/Q (Bus Rapid Transit) as well as 17 other routes throughout the City, and four routes for Clovis Transit. There are currently no transit routes present within the study area.

## 3.3 LIST OF CHAPTER 3.0 FIGURES

- Figure 3-1: Existing Study Intersection Geometrics and Traffic Control
- Figure 3-2: City of Fresno Roadway Classification
- Figure 3-3: City of Fresno Existing and Proposed Bikeway Network
- Figure 3-4: City of Fresno Existing and Proposed Sidewalks




LSA

FIGURE 3-1

Legend

Signal

Stop Sign

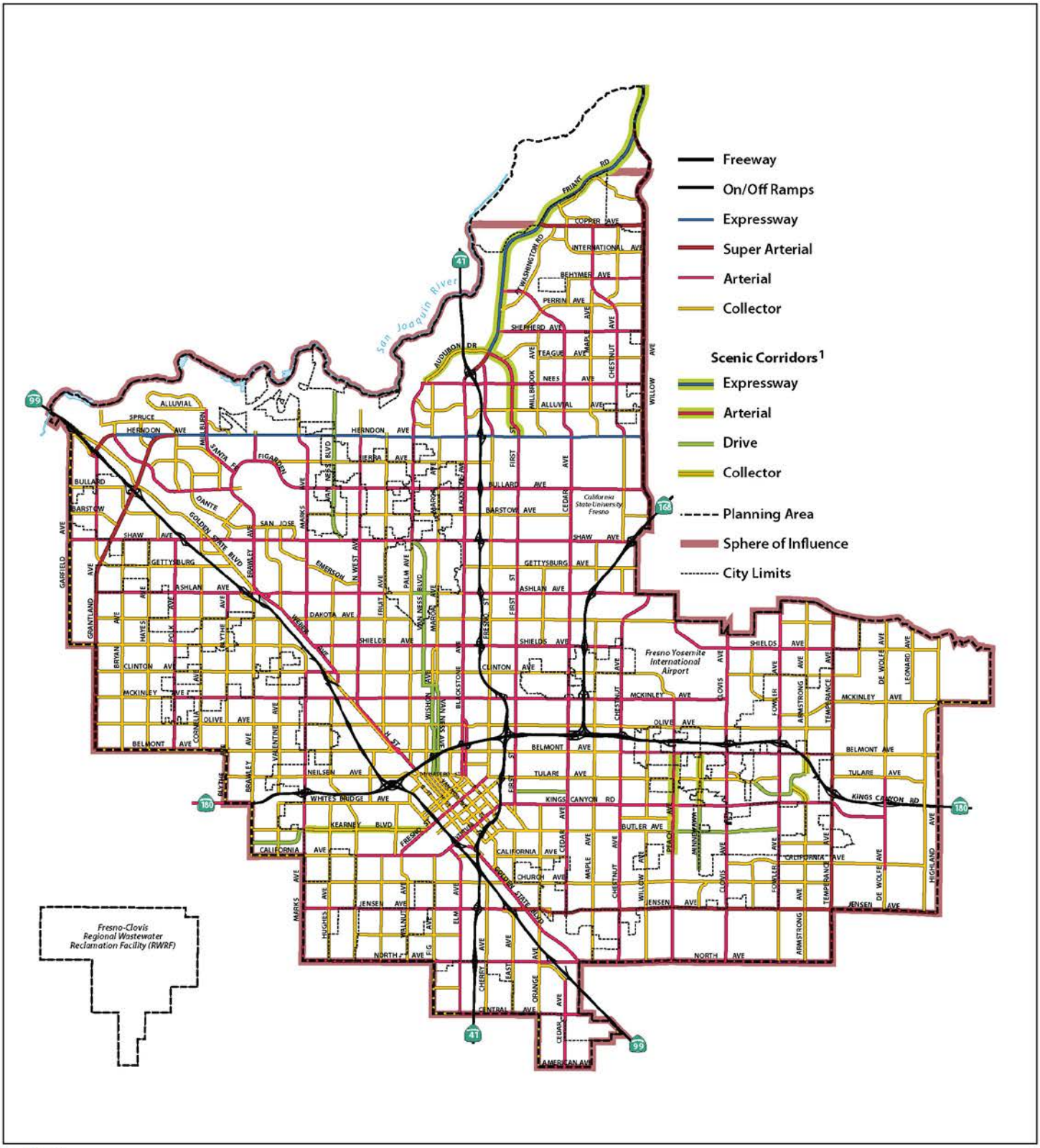
f Free Right Turn

*2740 West Nielsen Warehouse Project*

*Traffic Impact Study*

Existing Study Intersection Geometrics and Traffic Control

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LSA

FIGURE 3-2

N

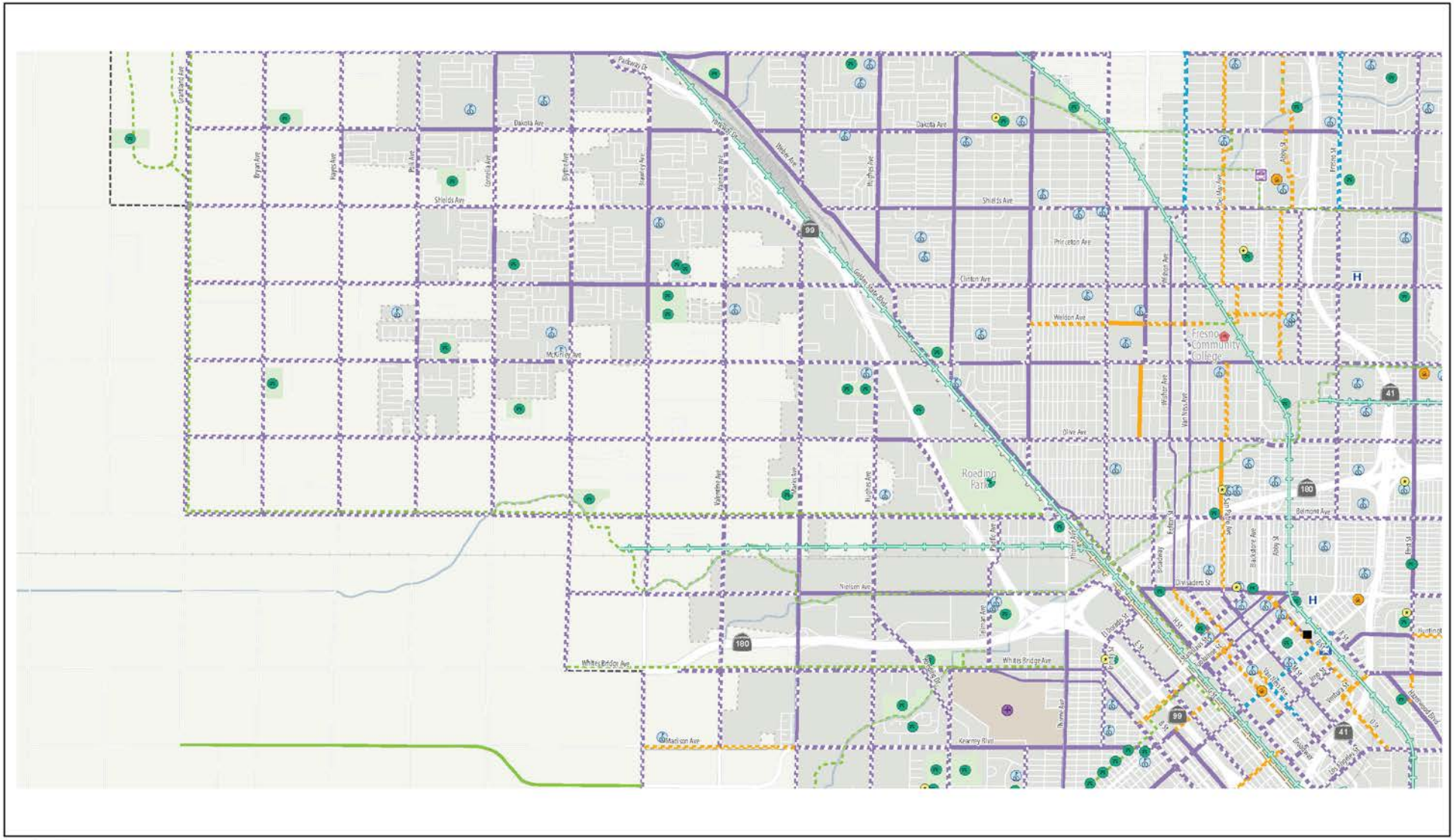
0 1 2
MILE

SOURCE: City of Fresno General Plan, 2014

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*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

City of Fresno Roadway Classification




LSA

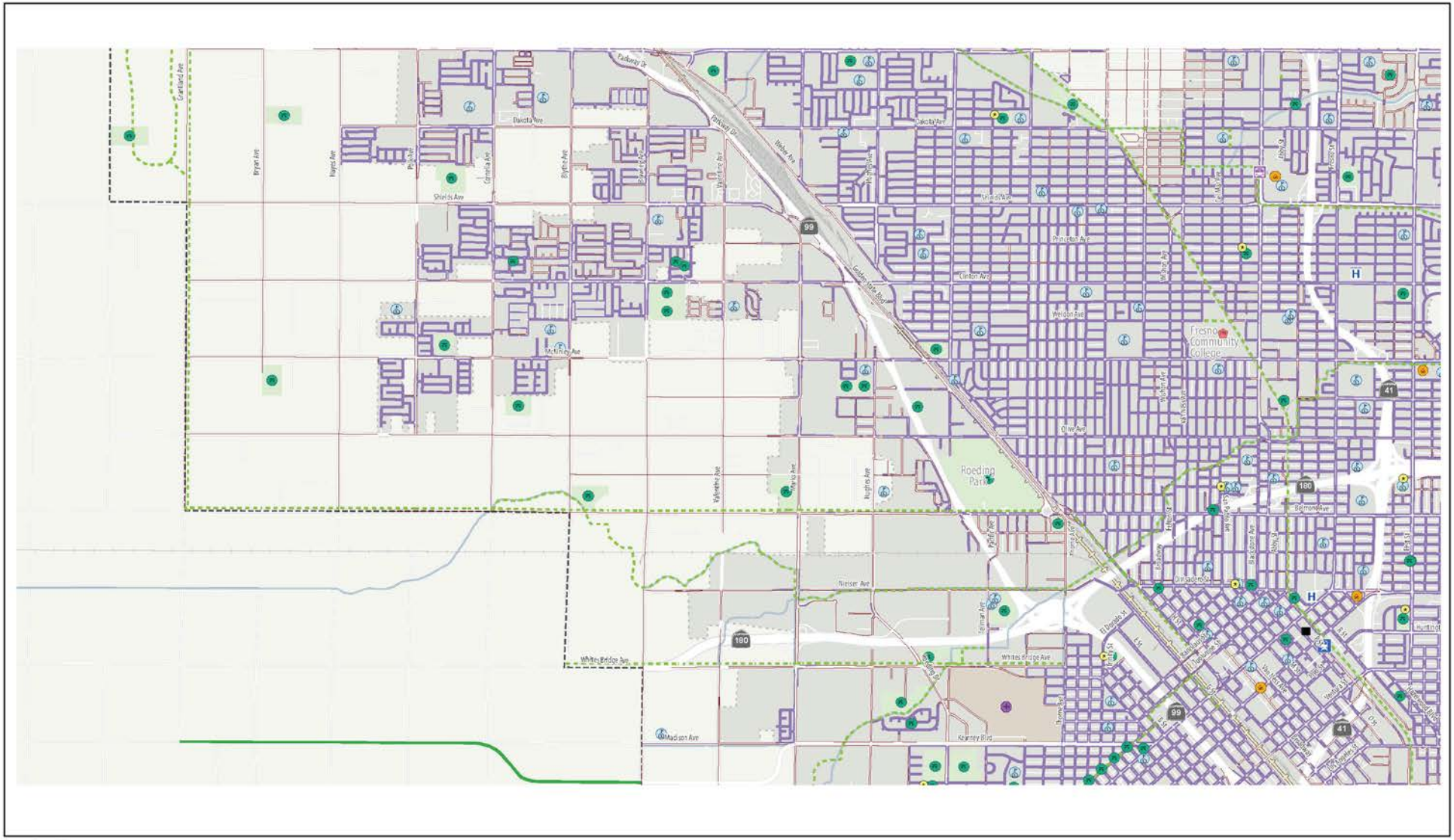
FIGURE 3-3

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

City of Fresno Existing and Proposed Bikeway Network

SOURCE: Fresno Active Transportation Plan, December 2016

R:\SNN2101\TIS\GIS\Reports\fig3-3_Bike.ai (11/11/2021)




LSA

Legend

- Class I Bike Path
- Class I Bike Path
- Existing Sidewalk
- Planned Sidewalks

N

0 2,500 5,000

FEET

SOURCE: Fresno Active Transportation Plan, December 2016

R:\SNN2101\TIS\GIS\Reports\fig3-4-Sidewalks.ai (11/11/2021)

FIGURE 3-4

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

City of Fresno Existing and Proposed Sidewalks

# 4.0 TRAFFIC VOLUMES FOR WITHOUT PROJECT SCENARIOS

## 4.1 EXISTING TRAFFIC VOLUMES

Traffic volumes for existing year traffic conditions are typically developed using existing count data collected at study intersections and roadway segments. Due to the current statewide school and office closures/restrictions for the COVID-19 pandemic, new traffic counts will not reflect realistic traffic conditions at the study intersections. Traffic counts were collected in August 2021. However, LSA consulted traffic counters to obtain historic traffic counts at study intersections wherever available to identify the differences between COVID time and historical traffic counts. Existing counts were adjusted accordingly based on the difference between these two counts. Following is a brief description of the development of existing traffic volumes from historic and COVID counts.

**Step 1:** For the intersection of Marks Avenue/Belmont Avenue, historic counts were available for the year 2016. To develop the existing 2021 traffic counts, a 2 percent per annum growth was applied to these counts and compared to the 2021 counts by turning movements. The higher of the turning movements was taken as the adjusted 2021 volumes.

**Step 2:** All other study intersections did not have any historic counts available. Therefore, to develop existing traffic volumes at these intersections, a percentage growth adjustment was applied to the counts collected in August 2021 to reflect existing conditions. The percentage difference between the COVID counts and the adjusted existing volumes on all four approaches at the intersection of Marks Avenue/Belmont Avenue was developed for the percentage growth adjustment to be used at the remaining study intersections. It was observed that the north-south direction has a higher traffic volume based on the comparison of the adjusted historical counts to the August 2021 counts, while the east-west direction has a higher traffic volumes for the August 2021 counts. Therefore, the percentage growth adjustment was applied for only the north-south direction/approaches along Marks Avenue.

**Step 3:** For other intersections along Marks Avenue, August 2021 traffic counts were adjusted based on the growth rate developed in Step 2.

**Step 4:** Vehicle classification counts were collected at the intersections of Marks Avenue/Belmont Avenue, Marks Avenue/Nielsen Avenue, Marks Avenue/SR-180 Westbound Ramps, and Marks Avenue/SR-180 Eastbound Ramps. At these locations, counts were converted to Passenger Car Equivalent (PCE) volumes. The concept of PCEs accounts for the larger impact of trucks on traffic operations. It does so by assigning each type of truck a PCE factor that represents the number of passenger vehicles that could travel through an intersection in the same time that a particular type of truck could. PCE volumes at study intersections were computed using a factor of 2.0, consistent with the HCM 6 methodologies.

**Step 5:** The percentage of trucks at the remaining study intersections without classification counts was determined based on truck percentages derived from adjacent intersections with classification counts. At these locations, PCE volumes were computed using a PCE factor of 2.0, consistent with the HCM 6 methodologies.

Figure 4-1 illustrates existing peak hour traffic volumes at study intersections. Table 4-A illustrates existing daily traffic volumes at the study roadway segments. Detailed counts are included in Appendix B. Detailed volume development worksheets are included in Appendix C.

## 4.2 NEAR-TERM APPROVED AND PENDING (2023) WITHOUT PROJECT TRAFFIC VOLUMES

Traffic volumes for Near-term approved and pending (2023) conditions were developed by applying a growth rate of 2 percent per annum to the existing without project traffic volumes and adding trips from approved and pending cumulative projects in the area.

Information concerning cumulative projects in the vicinity of the proposed project was obtained from both the City of Fresno and County of Fresno. Figure 4-2 illustrates the cumulative project locations. The trip generation for cumulative projects was developed using trip generation rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (10th Edition), and/or using information from approved traffic studies where available.

Table 4-B lists the approved and pending projects included in this analysis, and shows the cumulative projects are estimated to generate 330 new a.m. peak hour trips, 389 new p.m. peak hour trips, and 4,450 daily trips.

Cumulative project trips were assigned to the roadway network based on their locations in relation to surrounding land uses and regional arterials, and/or using information from approved traffic studies where available. Figure 4-3 illustrates the peak hour cumulative project trip assignment at the study area intersections. Figure 4-4 illustrates the peak hour traffic volumes at study intersections under Near-term approved and pending (2023) without project conditions. Table 4-C shows Near-term approved and pending (2023) daily volumes at the study area roadway segments.

It should be noted that the volume development for this scenario was prepared to develop the volumes for Near-term approved and pending (2023) with project scenario. As such, this scenario was not evaluated for operational performances.

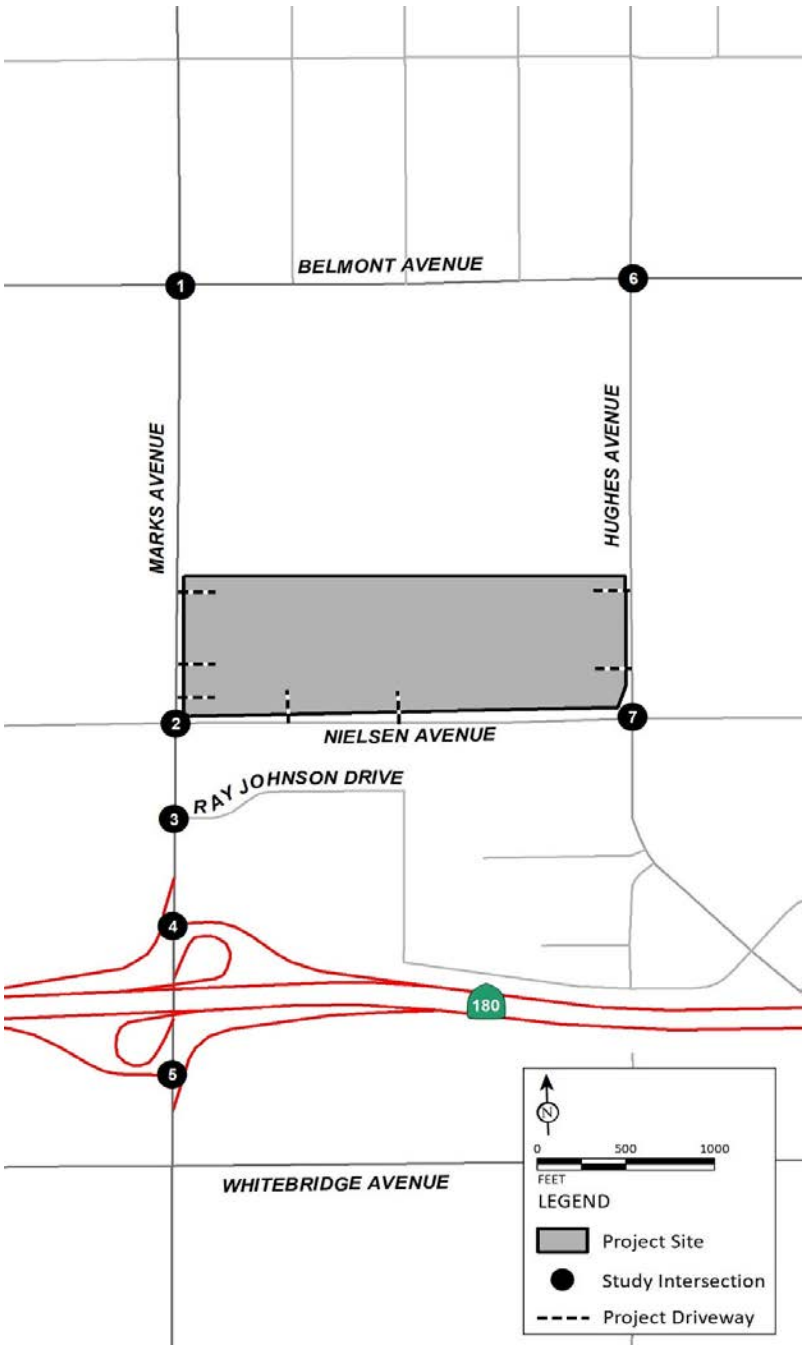
## 4.3 CUMULATIVE YEAR (2035) WITHOUT PROJECT TRAFFIC VOLUMES

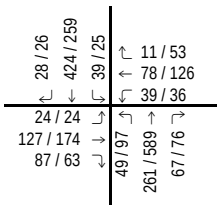
Cumulative Year (2035) no Project volume was developed using forecast volumes obtained from the latest version of the Fresno Council of Governments (Fresno COG) Activity Based Model (ABM) and by applying the Fresno COG recommended post-processing methodologies. Figure 4-5 illustrates the peak hour traffic volumes at study intersections under Cumulative Year (2035) without project conditions. Table 4-D shows Cumulative Year (2035) daily volumes at the study area roadway segments.

## 4.4 LIST OF CHAPTER 4.0 FIGURES AND TABLES

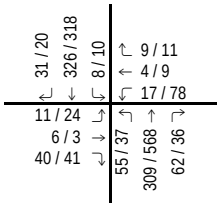
- Figure 4-1: Existing Peak Hour Traffic Volumes
- Figure 4-2: Cumulative Project Locations
- Figure 4-3: Cumulative Projects Trip Assignment

- Figure 4-4: Near-term approved and pending (2023) without Project Peak Hour Traffic Volumes
- Figure 4-5: Cumulative Year (2035) without Project Peak Hour Traffic Volumes
- Table 4-A: Existing Roadway Segment Daily Traffic Volumes
- Table 4-B: Cumulative Projects Trip Generation
- Table 4-C: Near term approved and pending (2023) Roadway Segment Daily Traffic Volumes
- Table 4-D: Cumulative Year (2035) Roadway Segment Daily Traffic Volumes

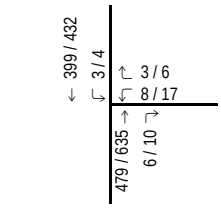


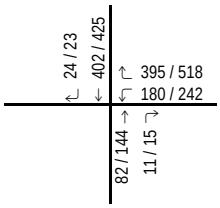

1 Marks Avenue/Belmont Avenue



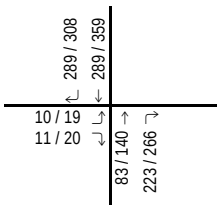

2 Marks Avenue/Nielsen Avenue



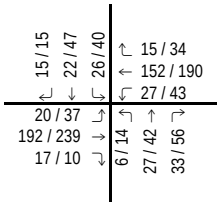

3 Marks Avenue/Ray Johnson Drive



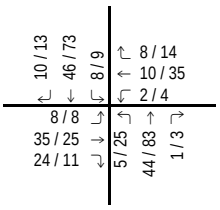

4 Marks Avenue/SR-180 Westbound Ramps




5 Marks Avenue/SR-180 Eastbound Ramps




6 Hughes Avenue/Belmont Avenue




7 Hughes Avenue/Nielsen Avenue

LSA

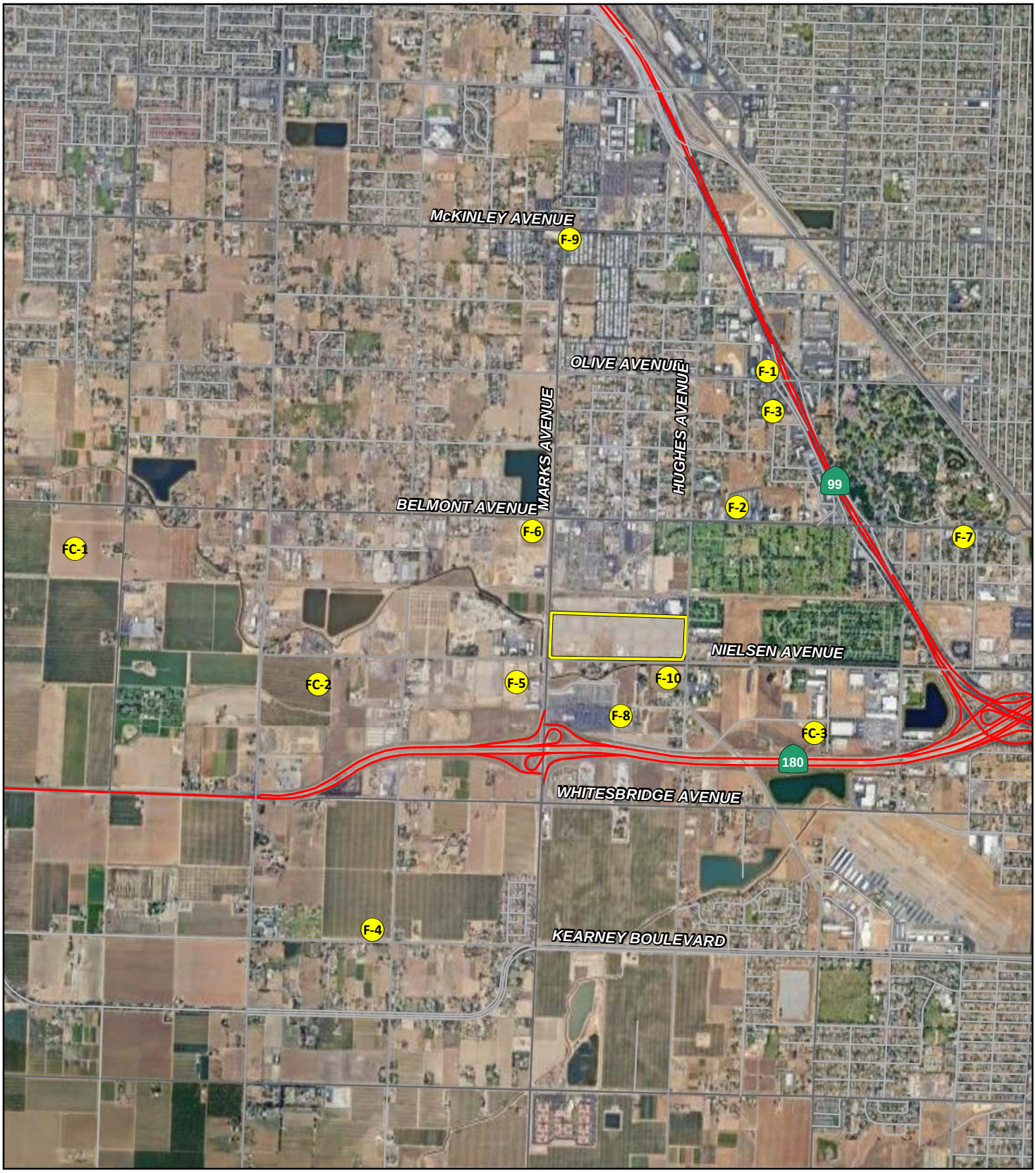
FIGURE 4-1

XXX / YYY
AM / PM Peak Hour Traffic Volumes (In PCE)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Existing Peak Hour Traffic Volumes

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LSA

LEGEND

Project Location

Cumulative Project Location

FIGURE 4-2

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0 1250 2500

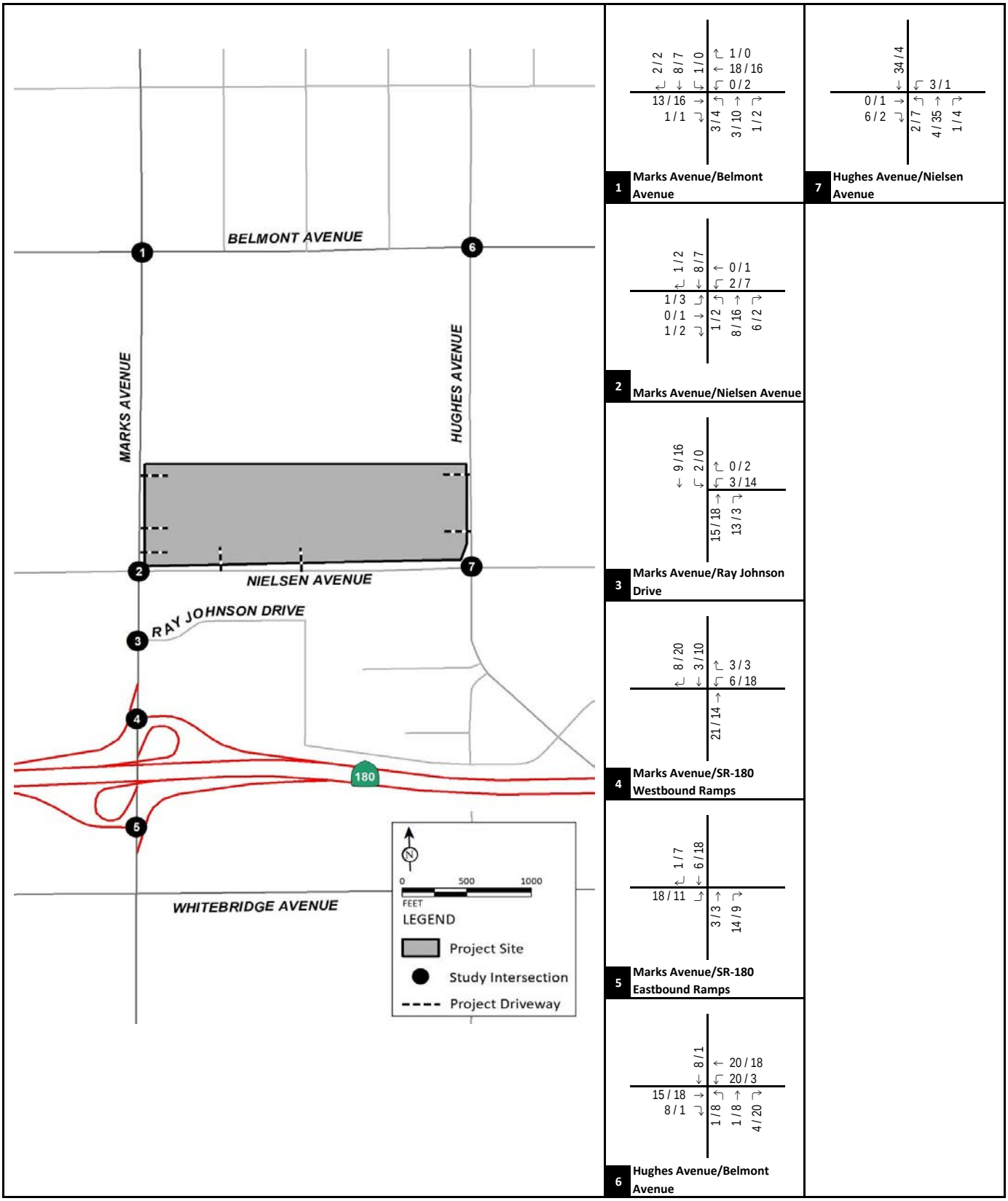
FEET

SOURCE: ESRI Streetmap, 2021; Google Earth, 2019.

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*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Cumulative Project Location




LSA

FIGURE 4-3

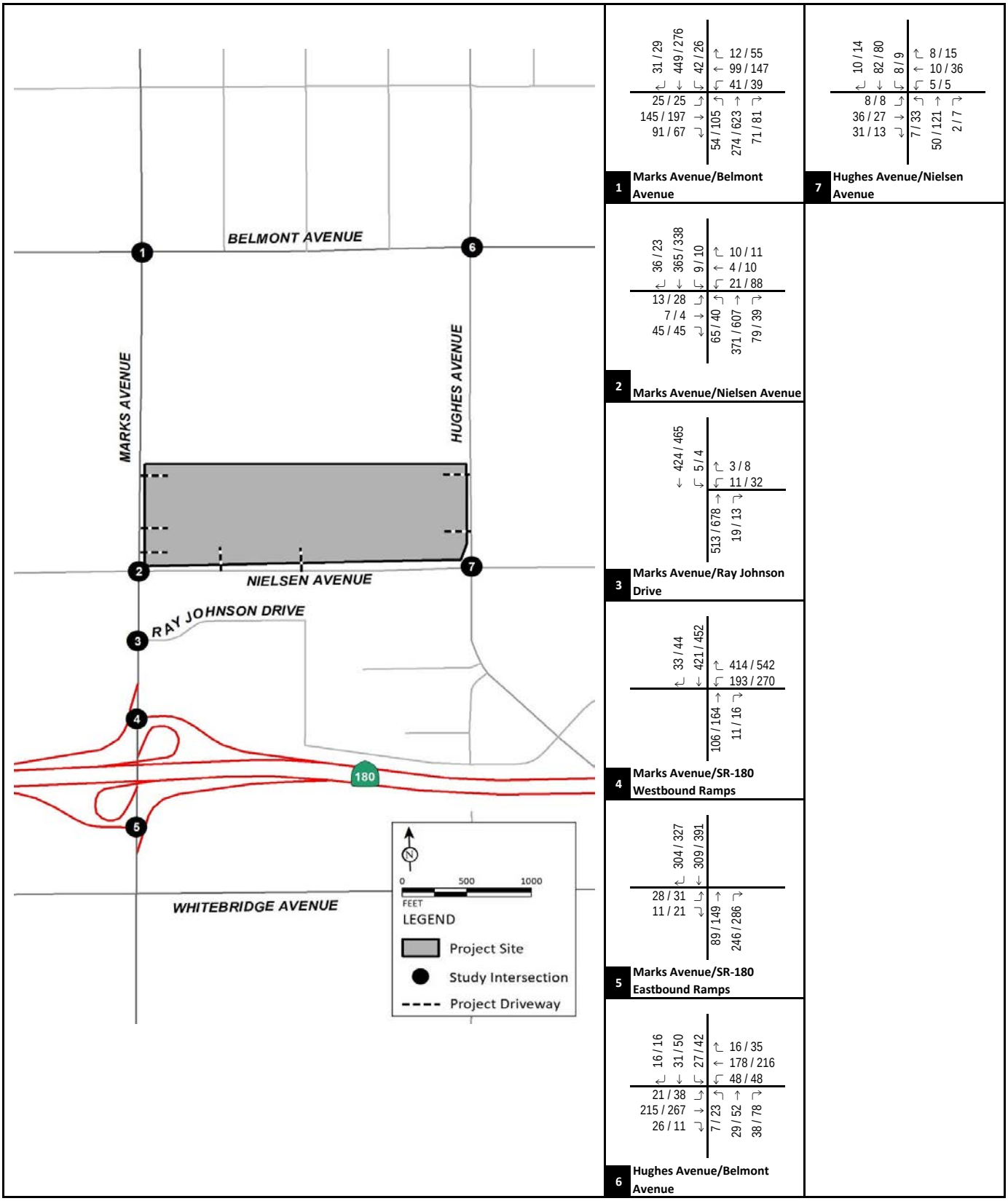
XXX / YYY

AM / PM Peak Hour Traffic Volumes (In PCE)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Cumulative Project Trip Assignment

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LSA

FIGURE 4-4

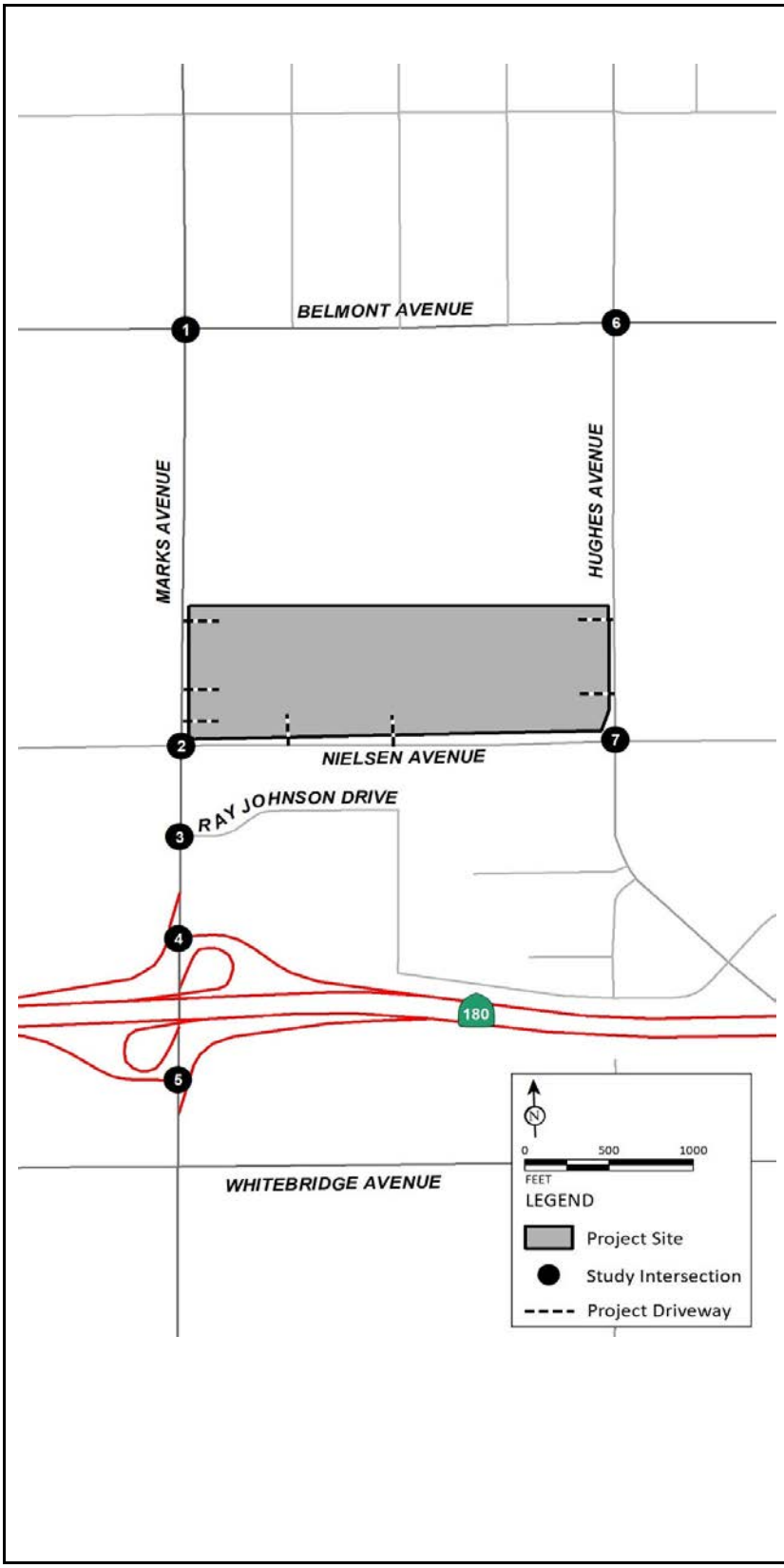
XXX / YYY

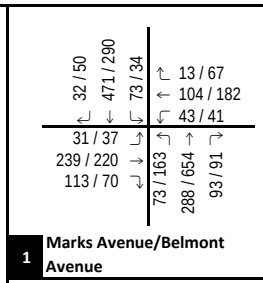
AM / PM Peak Hour Traffic Volumes (In PCE)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

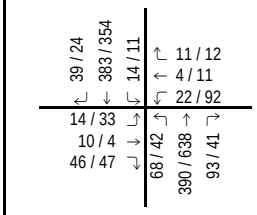
Near-term approved and pending (2023) without Project Peak Hour Traffic Volumes

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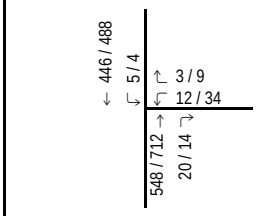


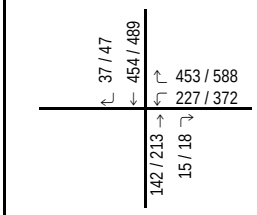

1 Marks Avenue/Belmont Avenue



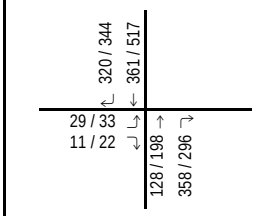

2 Marks Avenue/Nielsen Avenue



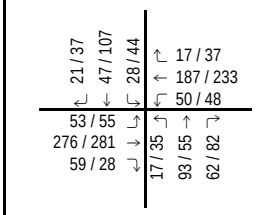

3 Marks Avenue/Ray Johnson Drive



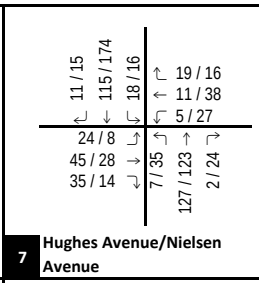

4 Marks Avenue/SR-180 Westbound Ramps




5 Marks Avenue/SR-180 Eastbound Ramps




6 Hughes Avenue/Belmont Avenue




7 Hughes Avenue/Nielsen Avenue

LSA

FIGURE 4-5

XXX / YYY
AM / PM Peak Hour Traffic Volumes (In PCE)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Cumulative Year (2035) without Project Peak Hour Traffic Volumes

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LSA

## Table 4-A - Existing Daily Traffic Volumes

| Roadway | # | Segment | Existing ADT | Project Trips | Existing With Project ADT |
|---|---|---|---|---|---|
| Marks Avenue | 1 | Marks Avenue, between Belmont Avenue and Nielsen Avenue | 10,190 | 1,038 | 11,228 |
| | 2 | Marks Avenue, between Nielsen Avenue and Ray Johnson Drive | 11,554 | 592 | 12,146 |
| | 3 | Marks Avenue, between Ray Johnson Drive and SR-180 Westbound Ramps | 12,019 | 592 | 12,611 |
| | 4 | Marks Avenue, between SR-180 Westbound Ramps and SR-180 Eastbound Ramps | 10,651 | 326 | 10,977 |
| Belmont Avenue | 5 | Belmont Avenue, between Marks Avenue and Hughes Avenue | 7,240 | 310 | 7,550 |
| Nielsen Avenue | 6 | Nielsen Avenue, between Marks Avenue and Hughes Avenue | 1,614 | 616 | 2,230 |
| Hughes Avenue | 7 | Hughes Avenue, between Belmont Avenue and Nielsen Avenue | 2,604 | 456 | 3,060 |

LSA

## Table 4-B - Cumulative Projects Trip Generation

| Project No. | Project Name/Land Use/Builder/Applicant | Units | | A.M. Peak Hour In | A.M. Peak Hour Out | A.M. Peak Hour Total | P.M. Peak Hour In | P.M. Peak Hour Out | P.M. Peak Hour Total | Daily |
|---|---|---|---|---|---|---|---|---|---|---|
| **F-1** | **P21-02291/Step Up on 99** | | | | | | | | | |
| | **1240 N Crystal Avenue** | | | | | | | | | |
| | **Proposed Use - Affordable Housing** | 98 | DU | | | | | | | |
| | Trips/Unit[1] | | | 0.11 | 0.35 | 0.46 | 0.35 | 0.21 | 0.56 | 7.32 |
| | Trip Generation | | | 11 | 34 | 45 | 34 | 21 | 55 | 717 |
| | **Proposed Use - Multifamily Housing** | 63 | DU | | | | | | | |
| | Trips/Unit[1] | | | 0.11 | 0.35 | 0.46 | 0.35 | 0.21 | 0.56 | 7.32 |
| | Trip Generation | | | 7 | 22 | 29 | 22 | 13 | 35 | 461 |
| | **Existing Use - Motel** | 98 | RM | | | | | | | |
| | Trips/Unit[2] | | | 0.14 | 0.24 | 0.38 | 0.21 | 0.17 | 0.38 | 3.35 |
| | Trip Generation | | | 14 | 24 | 38 | 21 | 17 | 38 | 328 |
| | **Total Net Trip Generation (Proposed - Existing)** | | | **4** | **32** | **36** | **35** | **17** | **52** | **850** |
| **F-2** | **P19-00662/Derrel's Mini Storage West Belmont Expansion** | | | | | | | | | |
| | **1800 W Belmont Avenue, 1827 W Dudley Avenue** | | | | | | | | | |
| | **Replacement of existing office/residential building with a new office/caretake** | 105.525 | TSF | | | | | | | |
| | Trips/Unit[3] | | | 0.06 | 0.04 | 0.10 | 0.08 | 0.09 | 0.17 | 1.51 |
| | **Trip Generation** | | | **6** | **4** | **10** | **8** | **9** | **17** | **159** |
| **F-3** | **P21-02299/Sun Lodge** | | | | | | | | | |
| | **1101 N Parkway Drive** | | | | | | | | | |
| | **Proposed Use - Affordable Housing** | 97 | DU | | | | | | | |
| | Trips/Unit[1] | | | 0.11 | 0.35 | 0.46 | 0.35 | 0.21 | 0.56 | 7.32 |
| | Trip Generation | | | 11 | 34 | 45 | 34 | 20 | 54 | 710 |
| | **Proposed Use - Multifamily Housing** | 63 | DU | | | | | | | |
| | Trips/Unit[1] | | | 0.11 | 0.35 | 0.46 | 0.35 | 0.21 | 0.56 | 7.32 |
| | Trip Generation | | | 7 | 22 | 29 | 22 | 13 | 35 | 461 |
| | **Existing Use - Motel** | 97 | RM | | | | | | | |
| | Trips/Unit[2] | | | 0.14 | 0.24 | 0.38 | 0.21 | 0.17 | 0.38 | 3.35 |
| | Trip Generation | | | 14 | 23 | 37 | 20 | 16 | 36 | 325 |
| | **Total Net Trip Generation (Proposed - Existing)** | | | **4** | **33** | **37** | **36** | **17** | **53** | **846** |
| **F-4** | **P19-04220, P19-04222/The OASIS Project** | | | | | | | | | |
| | **Northwest and Northeast corners of intersection of Madison Avenue and Valentina Avenue** | | | | | | | | | |
| | **84 Single-Family Lots** | 84 | SFDU | | | | | | | |
| | Trips/Unit[4] | | | 0.19 | 0.55 | 0.74 | 0.62 | 0.37 | 0.99 | 9.44 |
| | Trip Generation | | | **16** | **46** | **62** | **52** | **31** | **83** | **793** |
| **F-5** | **P19-06300** | | | | | | | | | |
| | **3075 W Nielsen Avenue** | | | | | | | | | |
| | **Replacing a 7,000 sf fire damaged metal building with a new 4,920 sf metal bu** | 4.920 | TSF | | | | | | | |
| | Trips/Unit[5] | | | 0.58 | 0.36 | 0.94 | 1.83 | 1.98 | 3.81 | 37.75 |
| | Trip Generation | | | 3 | 2 | 5 | 9 | 10 | 19 | 186 |
| | Pass-by Trips[6] | | | 0 | 0 | 0 | (3) | (3) | (6) | (63) |
| | **Net Trip Generation** | | | **3** | **2** | **5** | **6** | **7** | **13** | **123** |
| **F-6** | **P21-03628** | | | | | | | | | |
| | **963 N Marks Avenue** | | | | | | | | | |
| | **Subdivide industrial parcel** | 148 | TSF | | | | | | | |
| | Trips/Unit[7] | | | | | | | | | |
| | **Trip Generation** | | | **17** | **3** | **20** | **22** | **4** | **26** | **402** |

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## Table 4-B - Cumulative Projects Trip Generation

| Project No. | Project Name/Land Use/Builder/Applicant | Units | | A.M. Peak Hour In | A.M. Peak Hour Out | A.M. Peak Hour Total | P.M. Peak Hour In | P.M. Peak Hour Out | P.M. Peak Hour Total | Daily |
|---|---|---|---|---|---|---|---|---|---|---|
| **F-7** | **P19-02847/Red Onion Drive Thru** | | | | | | | | | |
| | **555 W Belmont Avenue** | | | | | | | | | |
| | **Proposed Use - Fast-Food Restaurant w/ Drive-Through** | 3.500 | TSF | | | | | | | |
| | Trips/Unit[8] | | | 20.50 | 19.69 | 40.19 | 16.99 | 15.68 | 32.67 | 470.95 |
| | Trip Generation | | | 72 | 69 | 141 | 59 | 55 | 114 | 1,648 |
| | Pass-by Trips[9] | | | (35) | (34) | (69) | (30) | (28) | (58) | (816) |
| | **Net Trip Generation** | | | **37** | **35** | **72** | **29** | **27** | **56** | **832** |
| | **Existing Use - Fast-Food Restaurant** | 3.500 | TSF | | | | | | | |
| | Trips/Unit[10] | | | 15.06 | 10.04 | 25.10 | 14.17 | 14.17 | 28.34 | 346.23 |
| | Trip Generation | | | 53 | 35 | 88 | 50 | 50 | 100 | 1,212 |
| | Pass-by Trips[11] | | | (26) | (17) | (43) | (25) | (25) | (50) | (600) |
| | **Net Trip Generation** | | | **27** | **18** | **45** | **25** | **25** | **50** | **612** |
| | **Net Gross Trip Generation (Proposed - Existing)** | | | **19** | **34** | **53** | **9** | **5** | **14** | **436** |
| | **Net Pass-By Trips (Proposed - Existing)** | | | **(9)** | **(17)** | **(26)** | **(5)** | **(3)** | **(8)** | **(216)** |
| | **Net Project Trip Generation (Proposed - Existing)** | | | **10** | **17** | **27** | **4** | **2** | **6** | **220** |
| **F-8** | **P20-03068/Truck Wash and Lube Building** | | | | | | | | | |
| | **125 S Pleasant Avenue** | | | | | | | | | |
| | **8,100 sf metal building containing 2 truck wash bays, 1 truck lube bay** | 3 | Bay | | | | | | | |
| | Trips/Unit[12] | | | 1.92 | 0.69 | 2.62 | 0.69 | 2.23 | 2.92 | 23.08 |
| | **Trip Generation** | | | **6** | **2** | **8** | **2** | **7** | **9** | **69** |
| **F-9 .** | **P19-04564/McKinley Ave Retail & Residential Complex** | | | | | | | | | |
| | **2809 W McKinley Avenue** | | | | | | | | | |
| | **Retail Building** | 5.480 | TSF | | | | | | | |
| | Trips/Unit[5] | | | 0.58 | 0.36 | 0.94 | 1.83 | 1.98 | 3.81 | 37.75 |
| | Trip Generation | | | 3 | 2 | 5 | 10 | 11 | 21 | 207 |
| | Pass-by Trips[6] | | | 0 | 0 | 0 | (3) | (4) | (7) | (70) |
| | **Net Trip Generation** | | | **3** | **2** | **5** | **7** | **7** | **14** | **137** |
| | **Multifamily Housing** | 6 | DU | | | | | | | |
| | Trips/Unit[1] | | | 0.11 | 0.35 | 0.46 | 0.35 | 0.21 | 0.56 | 7.32 |
| | Trip Generation | | | 1 | 2 | 3 | 2 | 1 | 3 | 44 |
| | **Project Gross Trip Generation** | | | **4** | **4** | **8** | **12** | **12** | **24** | **251** |
| | **Pass-By Trips** | | | **0** | **0** | **0** | **(3)** | **(4)** | **(7)** | **(70)** |
| | **Net Project Trip Generation** | | | **4** | **4** | **8** | **9** | **8** | **17** | **181** |
| **F-10 .** | **P19-02113/Royalty Freight Trucking Service** | | | | | | | | | |
| | **50 S Hughes Avenue** | | | | | | | | | |
| | **The applicant is proposing to develop a new 26,143 sf truck-service facility for** | 6 | Bay | | | | | | | |
| | Trips/Unit[12] | | | 1.92 | 0.69 | 2.62 | 0.69 | 2.23 | 2.92 | 23.08 |
| | **Trip Generation** | | | **12** | **4** | **16** | **4** | **13** | **17** | **138** |
| **FC-1 .** | **AA3752** | | | | | | | | | |
| | **Rezoning of 0.75 acre to commercial/light manufacturing use** | | | | | | | | | |
| | **South of Belmont between North Brawley and North Valentine Avenu** | 8.17 | TSF | | | | | | | |
| | Trips/Unit[13] | | | 0.48 | 0.14 | 0.62 | 0.21 | 0.46 | 0.67 | 3.93 |
| | **Trip Generation** | | | **4** | **1** | **5** | **2** | **4** | **6** | **32** |
| **FC-2 .** | **CUP3066** | | | | | | | | | |
| | **Kochergen Tranefer Facility** | | | | | | | | | |
| | **East of Brawley Avenue and North of Nieslen Avenue** | 7.00 | Ac | | | | | | | |
| | Trip Generation[14] | | | **33** | **26** | **53** | **26** | **33** | **53** | **530** |
| **FC-3 .** | **CUP3629** | | | | | | | | | |
| | **2.67 acre waste transfer station** | | | | | | | | | |
| | **310 S. West Avenue** | 2.67 | Ac | | | | | | | |
| | Trip Generation[15] | | | **39** | **4** | **43** | **4** | **39** | **43** | **170** |

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## Table 4-B - Cumulative Projects Trip Generation

| Project No. | Project Name/Land Use/Builder/Applicant | Units | A.M. Peak Hour | | | P.M. Peak Hour | | | Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| | **Total Gross Trip Generation** | | 167 | 195 | 356 | 218 | 198 | 410 | 4,799 |
| | **Total Pass-By Trips** | | (9) | (17) | (26) | (11) | (10) | (21) | (349) |
| | **Total Net Trip Generation** | | **158** | **178** | **330** | **207** | **188** | **389** | **4,450** |

**Notes:**

DU = Dwelling Units; VFP = Vehicle Fueling Positions; TSF = Thousand Square Feet.

[1] Rates based on Land Use 220 - "Multifamily Housing (Low-Rise)" from Institute of Transportation Engineers (ITE) *Trip Generation Manual,* 10th Edition. Setting/Location used is General

[2] Rates based on Land Use 320 - "Motel" from Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. Setting/Location used is General Urban/Suburban.

[3] Rates based on Land Use 151 - "Mini-Warehouse" from Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. Setting/Location used is General Urban/Suburban.

[4] Rates based on Land Use 210 - "Single-Family Detached Housing" from Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. Setting/Location used is General Urban/Suburban.

[5] Rates based on Land Use 820 - "Shopping Center" from Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. Setting/Location used is General Urban/Suburban.

[6] Pass-by rates obtained from the ITE Trip Generation Handbook (3rd Edition) for Land Use 820. A.m. and p.m. peak period pass-by rates for this land use in the ITE handbook are 0 percent and 34 percent respectively. No daily pass-by rates are provided. Therefore, the daily pass-by rate was obtained as an average of the a.m. and p.m. peak period pass-by rates.

[7] Rates are based on WRCOG TUMF Warehosue facilities Trip generation rates.

[8] Rates based on Land Use 934 - "Fast-Food Restaurant with Drive-Through Window" from Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. Setting/Location used is General Urban/Suburban.

[9] Pass-by rates obtained from the ITE Trip Generation Handbook (3rd Edition) for Land Use 934. A.m. and p.m. peak period pass-by rates for this land use in the ITE handbook are 49 percent and 50 percent respectively. No daily pass-by rates are provided. Therefore, the daily pass-by rate was obtained as an average of the a.m. and p.m. peak period pass-by rates.

[10] Rates based on Land Use 933 - "Fast-Food Restaurant without Drive-Through Window" from ITE Trip Generation Manual, 10th Edition. Setting/Location used is General Urban/Suburban.

[11] Pass-by rates obtained from the ITE Trip Generation Handbook (3rd Edition) for Land Use 934. A.m. and p.m. peak period pass-by rates for this land use in the ITE handbook are 49 percent and 50 percent respectively. No daily pass-by rates are provided. Therefore, the daily pass-by rate was obtained as an average of the a.m. and p.m. peak period pass-by rates.

[12] Rates are based on Driveway Survey Counts for Truck Maintenance facilities

[13] Rates based on Land Use 150 - "Warehouse" from Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. Setting/Location used is General Urban/Suburban.

[14] Trip generation and distribution obtained from Proposed Kochergen Transfer facility Traffic Impact Study Prepared by Peter's Engineering Group.

[15] Trip generation Obtained from the Operational Statement for County of Fresno Regional Environmental Complience Center.

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## Table 4-C - Near-term Approved and Pending (2023) Daily Traffic Volumes

| Roadway | # | Segment | Existing (2021) ADT | 2021-23 Growth | Cumulative Projects Trips | Near-term (2023) ADT | Project Trips | Near-term (2023) With Project ADT |
|---|---|---|---|---|---|---|---|---|
| Marks Avenue | 1 | Marks Avenue, between Belmont Avenue and Nielsen Avenue | 10,190 | 408 | 340 | 10,938 | 1,038 | 11,976 |
| | 2 | Marks Avenue, between Nielsen Avenue and Ray Johnson Drive | 11,554 | 462 | 392 | 12,408 | 592 | 13,000 |
| | 3 | Marks Avenue, between Ray Johnson Drive and SR-180 Westbound Ramps | 12,019 | 481 | 433 | 12,933 | 592 | 13,525 |
| | 4 | Marks Avenue, between SR-180 Westbound Ramps and SR-180 Eastbound Ramps | 10,651 | 426 | 386 | 11,463 | 326 | 11,789 |
| Belmont Avenue | 5 | Belmont Avenue, between Marks Avenue and Hughes Avenue | 7,240 | 290 | 375 | 7,905 | 310 | 8,215 |
| Nielsen Avenue | 6 | Nielsen Avenue, between Marks Avenue and Hughes Avenue | 1,614 | 65 | 88 | 1,767 | 616 | 2,383 |
| Hughes Avenue | 7 | Hughes Avenue, between Belmont Avenue and Nielsen Avenue | 2,604 | 104 | 88 | 2,796 | 456 | 3,252 |

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## Table 4-D - Cumulative Year (2035) Daily Traffic Volumes

| Roadway | # | Segment | Cumulative Year (2035) ADT | Project Trips | Cumulative Year (2035) With Project ADT |
|---|---|---|---|---|---|
| Marks Avenue | 1 | Marks Avenue, between Belmont Avenue and Nielsen Avenue | 11,651 | 1,038 | 12,689 |
| | 2 | Marks Avenue, between Nielsen Avenue and Ray Johnson Drive | 13,244 | 592 | 13,836 |
| | 3 | Marks Avenue, between Ray Johnson Drive and SR-180 Westbound Ramps | 13,706 | 592 | 14,298 |
| | 4 | Marks Avenue, between SR-180 Westbound Ramps and SR-180 Eastbound Ramps | 13,065 | 326 | 13,391 |
| Belmont Avenue | 5 | Belmont Avenue, between Marks Avenue and Hughes Avenue | 8,846 | 310 | 9,156 |
| Nielsen Avenue | 6 | Nielsen Avenue, between Marks Avenue and Hughes Avenue | 1,772 | 616 | 2,388 |
| Hughes Avenue | 7 | Hughes Avenue, between Belmont Avenue and Nielsen Avenue | 3,531 | 456 | 3,987 |

# 5.0 PROJECT TRAFFIC

## 5.1 PROJECT TRIP GENERATION

The trip generation rates from Institute of Transportation Engineers (ITE) *Trip Generation Manual* (10th Edition) Land Use 155 – "High-Cube Fulfillment Center Warehouse" has a small sample size. Recently, Western Riverside Council of Governments (WRCOG) facilitated a Trip Generation Study for such facilities. Therefore, the trip generation for the proposed project was developed using rates from the WRCOG *Transportation Uniform Mitigation Fee (TUMF) High-Cube Warehouse Trip Generation Study* (dated January 29, 2019) prepared by WSP. The study is included within Appendix A. The study provides separate trip generation rates for passenger vehicles, 2-4 axle trucks, and 5+ axle trucks. The truck trips were converted to PCE trips using a PCE factor of 2.0 for 2-4 axle trucks, consistent with HCM recommendations. However, as a conservative approach, a PCE factor of 3.0 was used for 5+ axle trucks, consistent with the practices in several regions within the State. Table 5-A illustrates the project trip generation.

As shown in Table 5-A, the project is estimated to generate 2,458 daily PCE trips, with 137 PCE trips occurring during the a.m. peak hour and 176 PCE trips occurring during the p.m. peak hour.

## 5.2 PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

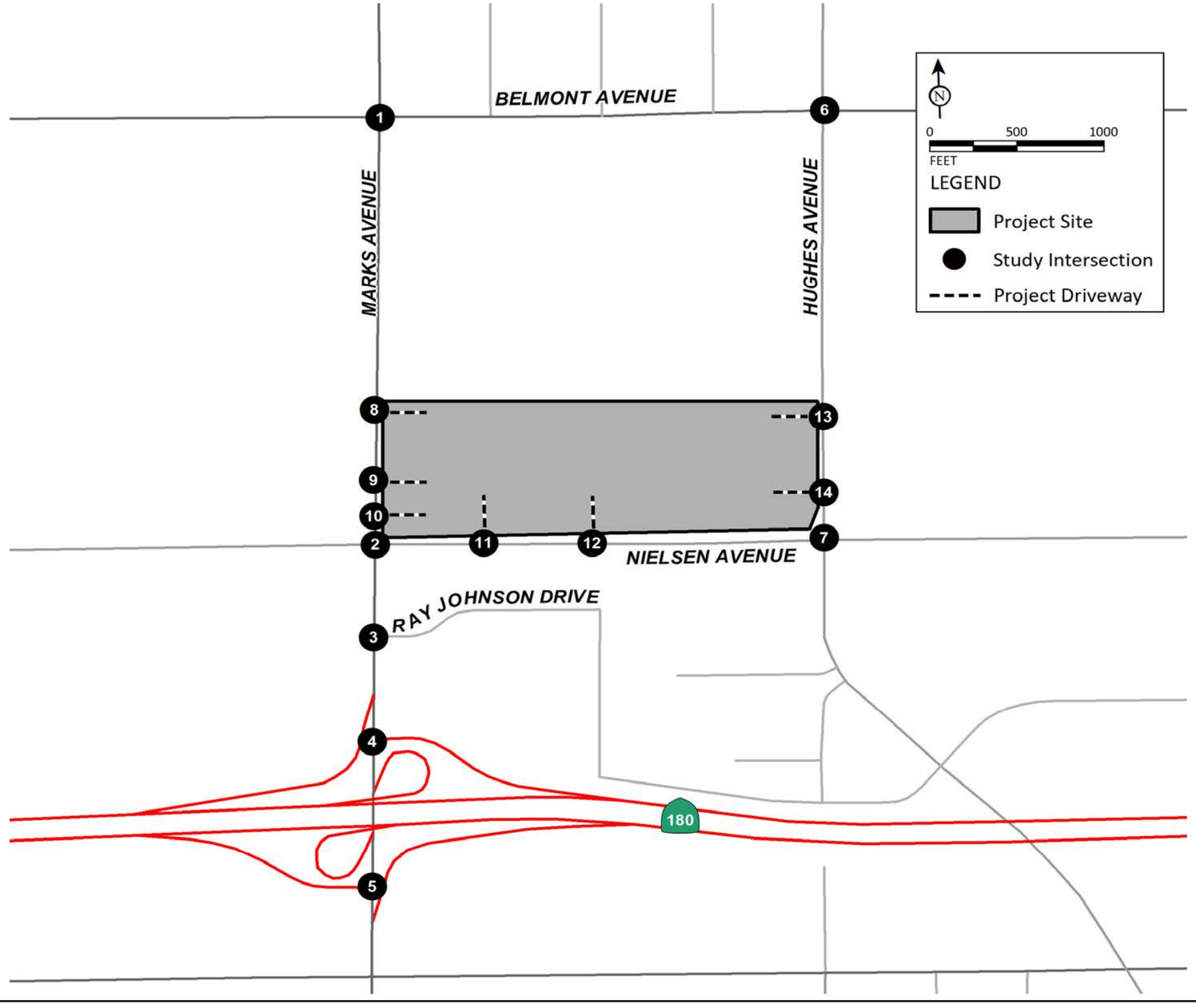
Trip distribution patterns were obtained from select zone model runs of the Fresno COG ABM, which take into account the location of the proposed project in relation to surrounding land uses and the regional roadway network. Separate select zone trip distributions for passenger car and truck trips were obtained from the Fresno COG ABM. The select zone distribution plots are included in Appendix C. However, the model does not account for driveway location, driveway access configuration, or the internal site circulation pattern. Therefore, the distribution was manually adjusted to reflect the project driveway locations and access patterns. Figures 5-1 and 5-2 illustrate the trip distributions at study intersections and project driveways for passenger car and truck trips, respectively.

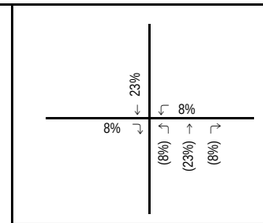
The project trip assignment is the product of the project trip generation and the trip distribution percentages. Figures 5-3 and 5-4 illustrate the trip assignments at study intersections for passenger car and truck PCE trips respectively. Figure 5-5 illustrates the total project PCE trip assignment. It should be noted that these figures also include trip distribution and assignment at all the project driveways. These figures help demonstrate the volume development methodology under plus project conditions with addition of project traffic.

## 5.3 LIST OF CHAPTER 5.0 FIGURES AND TABLES

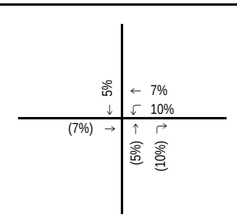
- Figure 5-1: Project Trip Distribution – Passenger Car
- Figure 5-2: Project Trip Distribution – Truck
- Figure 5-3: Project Trip Assignment – Passenger Car
- Figure 5-4: Project Trip Assignment – Truck

- Figure 5-5: Total Project PCE Trip Assignment
- Table 5-A: Project Trip Generation

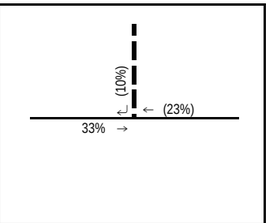


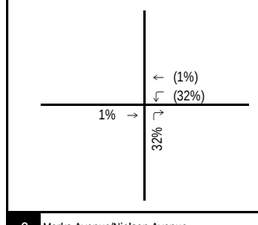

1 Marks Avenue/Belmont Avenue



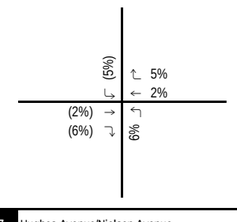

6 Hughes Avenue/Belmont Avenue



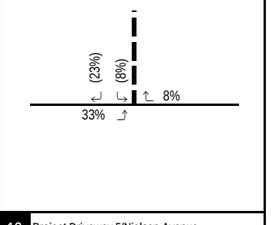

11 Project Driveway 4/Nielsen Avenue



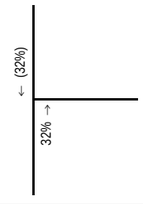

2 Marks Avenue/Nielsen Avenue



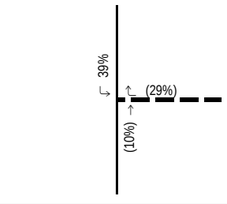

7 Hughes Avenue/Nielsen Avenue



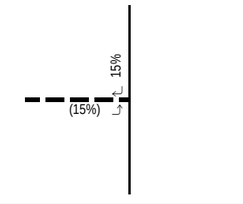

12 Project Driveway 5/Nielsen Avenue



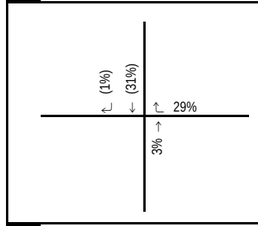

3 Marks Avenue/Ray Johnson Drive



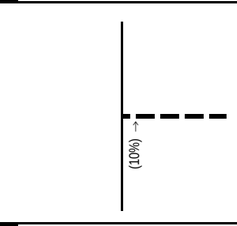

8 Marks Avenue/Project Driveway 1



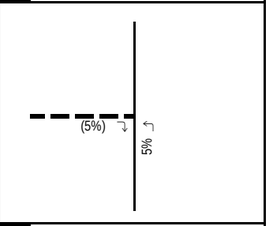

13 Hughes Avenue/Project Driveway 6



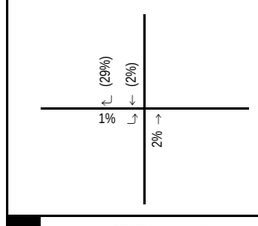

4 Marks Avenue/SR-180 Westbound Ramps



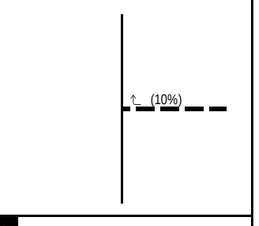

9 Marks Avenue/Project Driveway 2




14 Hughes Avenue/Project Driveway 7




5 Marks Avenue/SR-180 Eastbound Ramps




10 Marks Avenue/Project Driveway 3

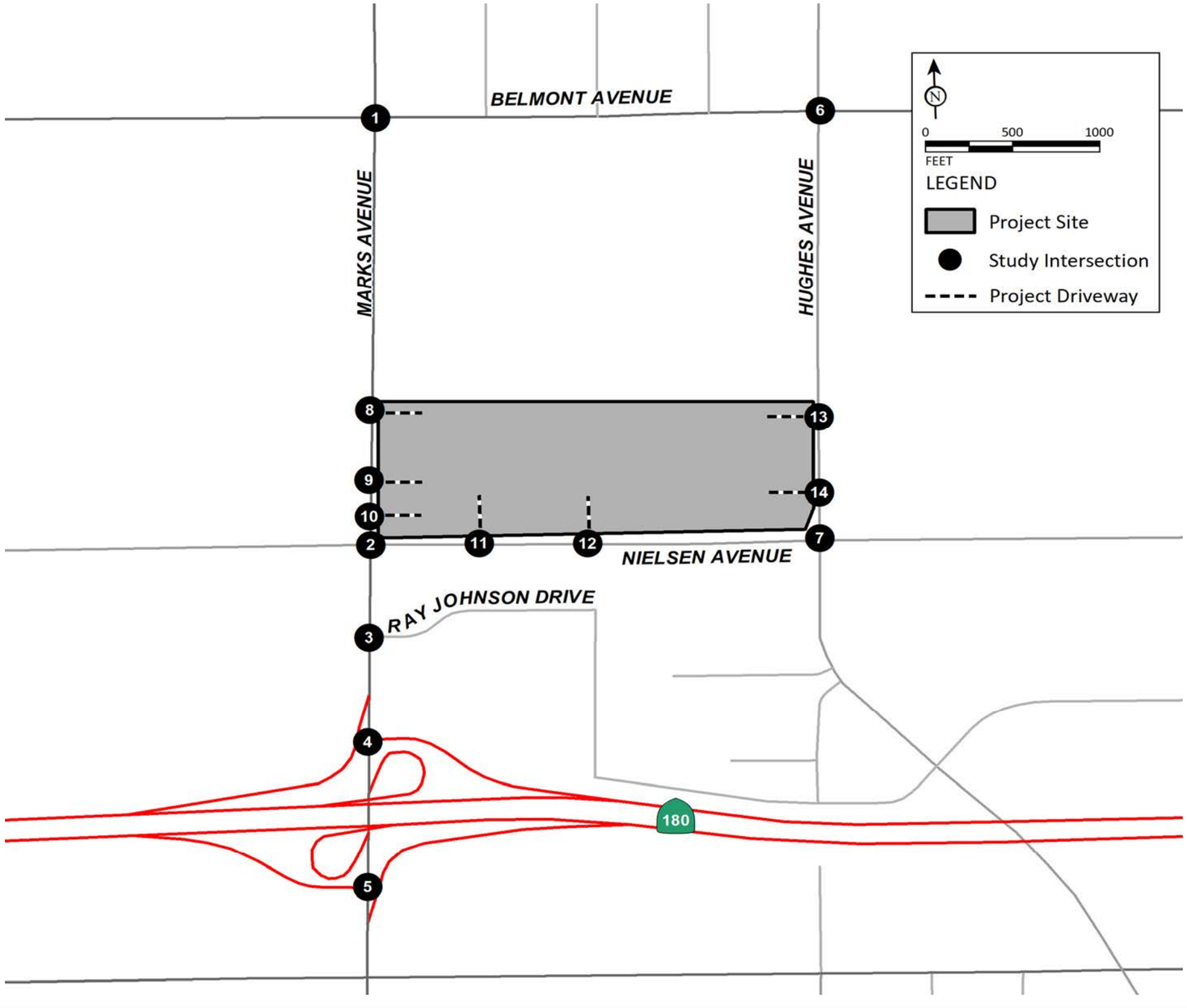
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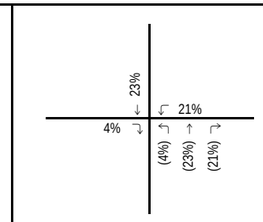
FIGURE 5-1

XX% (YY%)
Inbound (Outbound) Distribution
– – – – Project Driveway

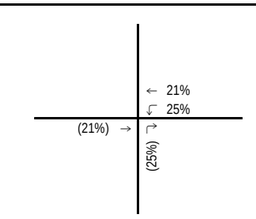
*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*
Project Trip Distribution - Passenger Vehicles

R:\SNN2101\TIS\z45_Dist_PV.xlsx (11/22/2021)

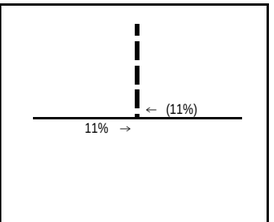


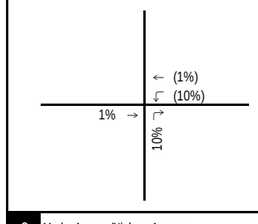

1 Marks Avenue/Belmont Avenue



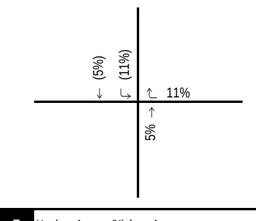

6 Hughes Avenue/Belmont Avenue



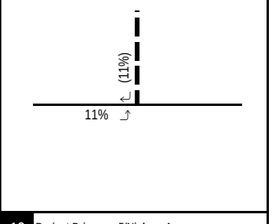

11 Project Driveway 4/Nielsen Avenue



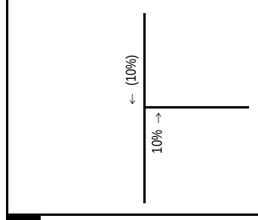

2 Marks Avenue/Nielsen Avenue



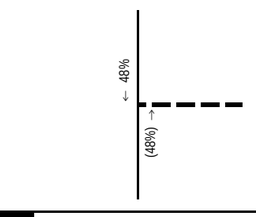

7 Hughes Avenue/Nielsen Avenue



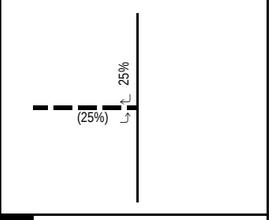

12 Project Driveway 5/Nielsen Avenue



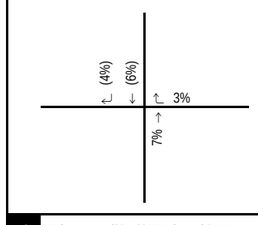

3 Marks Avenue/Ray Johnson Drive



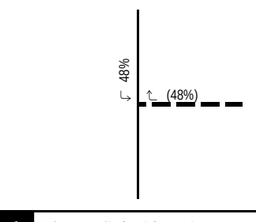

8 Marks Avenue/Project Driveway 1



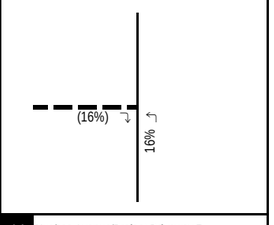

13 Hughes Avenue/Project Driveway 6



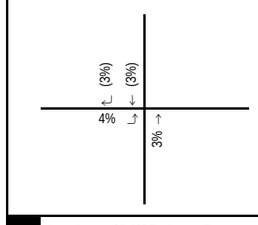

4 Marks Avenue/SR-180 Westbound Ramps



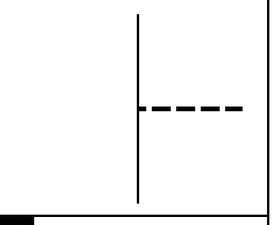

9 Marks Avenue/Project Driveway 2




14 Hughes Avenue/Project Driveway 7




5 Marks Avenue/SR-180 Eastbound Ramps



10 Marks Avenue/Project Driveway 3

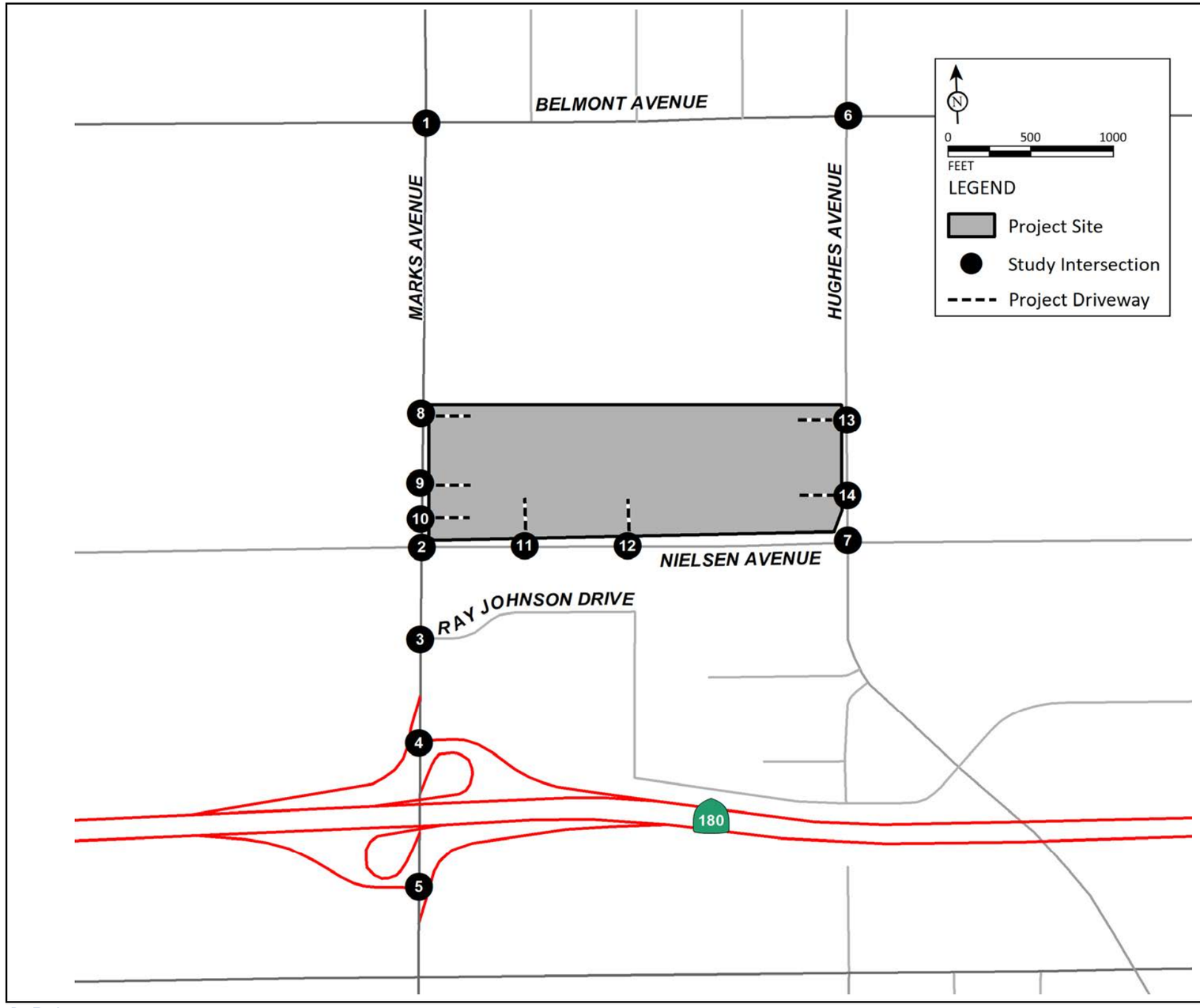
LSA

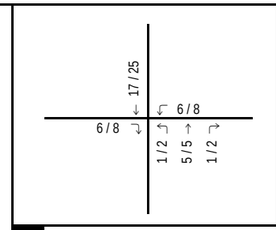
FIGURE 5-2

XX% (YY%)
Inbound (Outbound) Distribution
– – – – Project Driveway

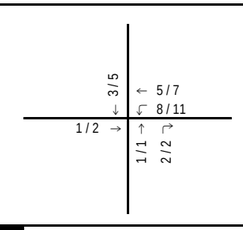
*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*
Project Trip Distribution - Trucks

R:\SNN2101\TIS\z45_Dist_TR.xlsx (11/22/2021)

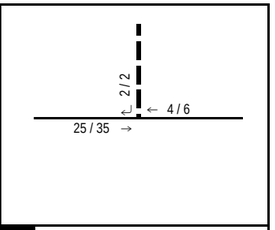


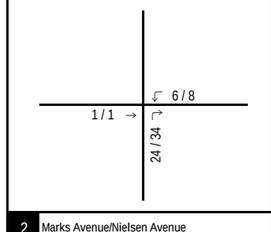

1 Marks Avenue/Belmont Avenue



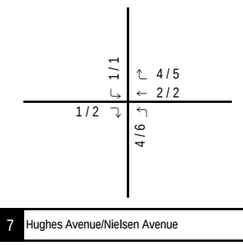

6 Hughes Avenue/Belmont Avenue



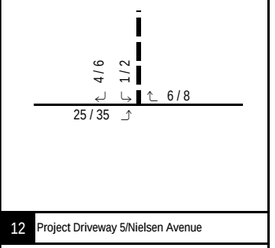

11 Project Driveway 4/Nielsen Avenue



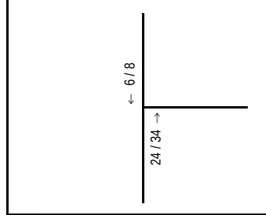

2 Marks Avenue/Nielsen Avenue



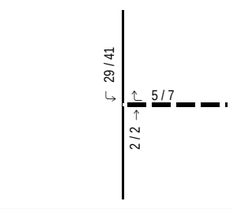

7 Hughes Avenue/Nielsen Avenue



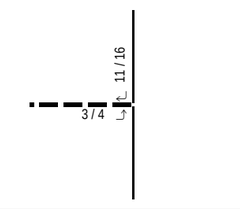

12 Project Driveway 5/Nielsen Avenue



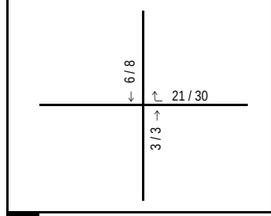

3 Marks Avenue/Ray Johnson Drive



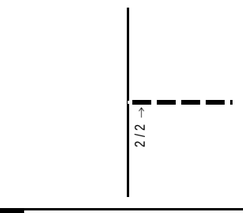

8 Marks Avenue/Project Driveway 1



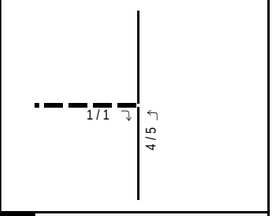

13 Hughes Avenue/Project Driveway 6



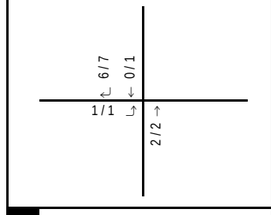

4 Marks Avenue/SR-180 Westbound Ramps




9 Marks Avenue/Project Driveway 2




14 Hughes Avenue/Project Driveway 7




5 Marks Avenue/SR-180 Eastbound Ramps



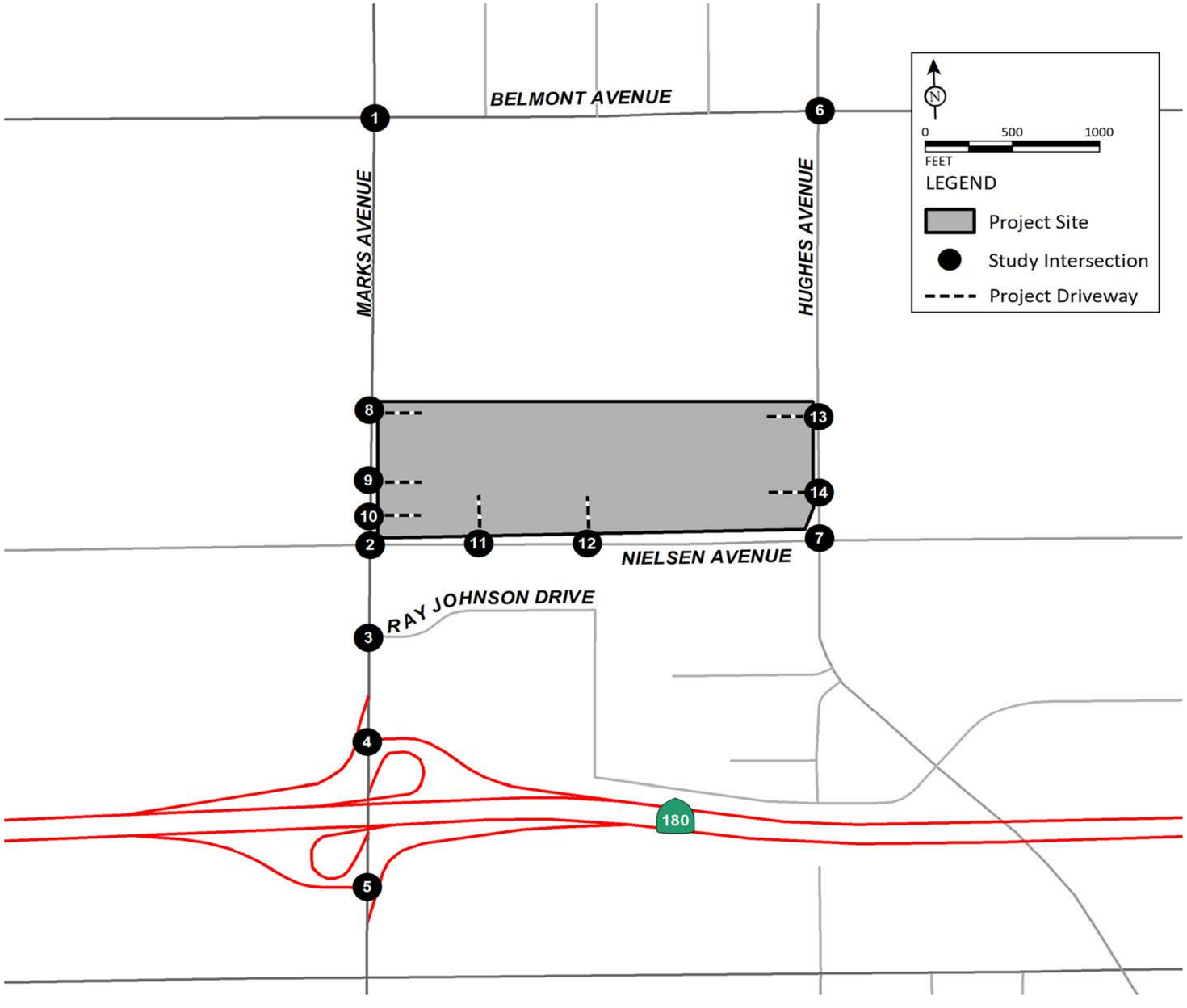

10 Marks Avenue/Project Driveway 3

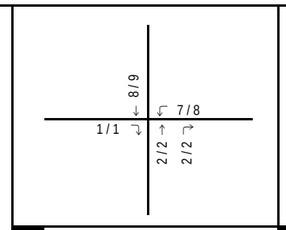
LSA

FIGURE 5-3

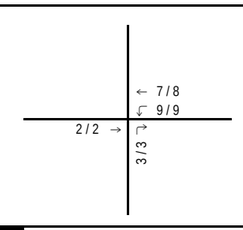
XX / YY
AM / PM Peak Hour Traffic Volumes

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*
Project Trip Assignment - Passenger Vehicles

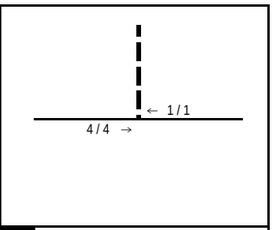


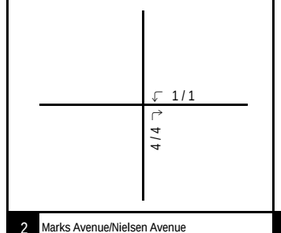

1 Marks Avenue/Belmont Avenue



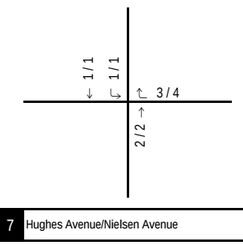

6 Hughes Avenue/Belmont Avenue



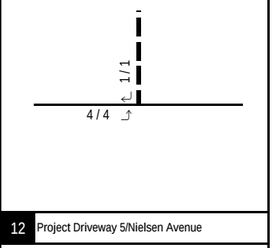

11 Project Driveway 4/Nielsen Avenue



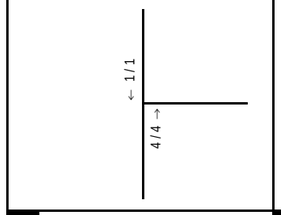

2 Marks Avenue/Nielsen Avenue



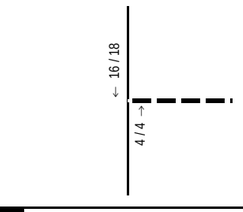

7 Hughes Avenue/Nielsen Avenue



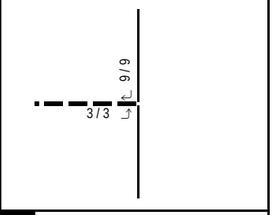

12 Project Driveway 5/Nielsen Avenue



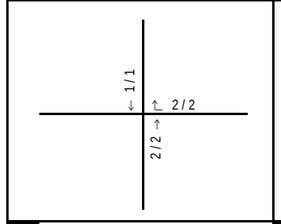

3 Marks Avenue/Ray Johnson Drive



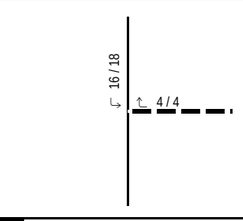

8 Marks Avenue/Project Driveway 1



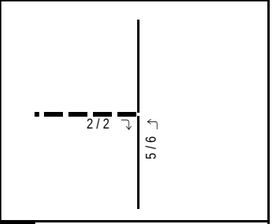

13 Hughes Avenue/Project Driveway 6



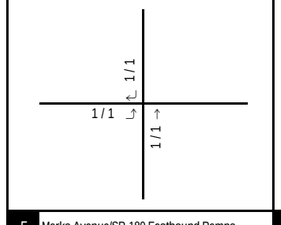

4 Marks Avenue/SR-180 Westbound Ramps



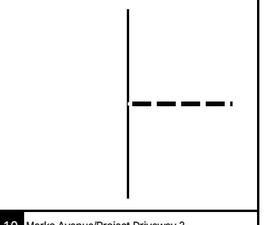

9 Marks Avenue/Project Driveway 2




14 Project Driveway 7/Hughes Avenue




5 Marks Avenue/SR-180 Eastbound Ramps



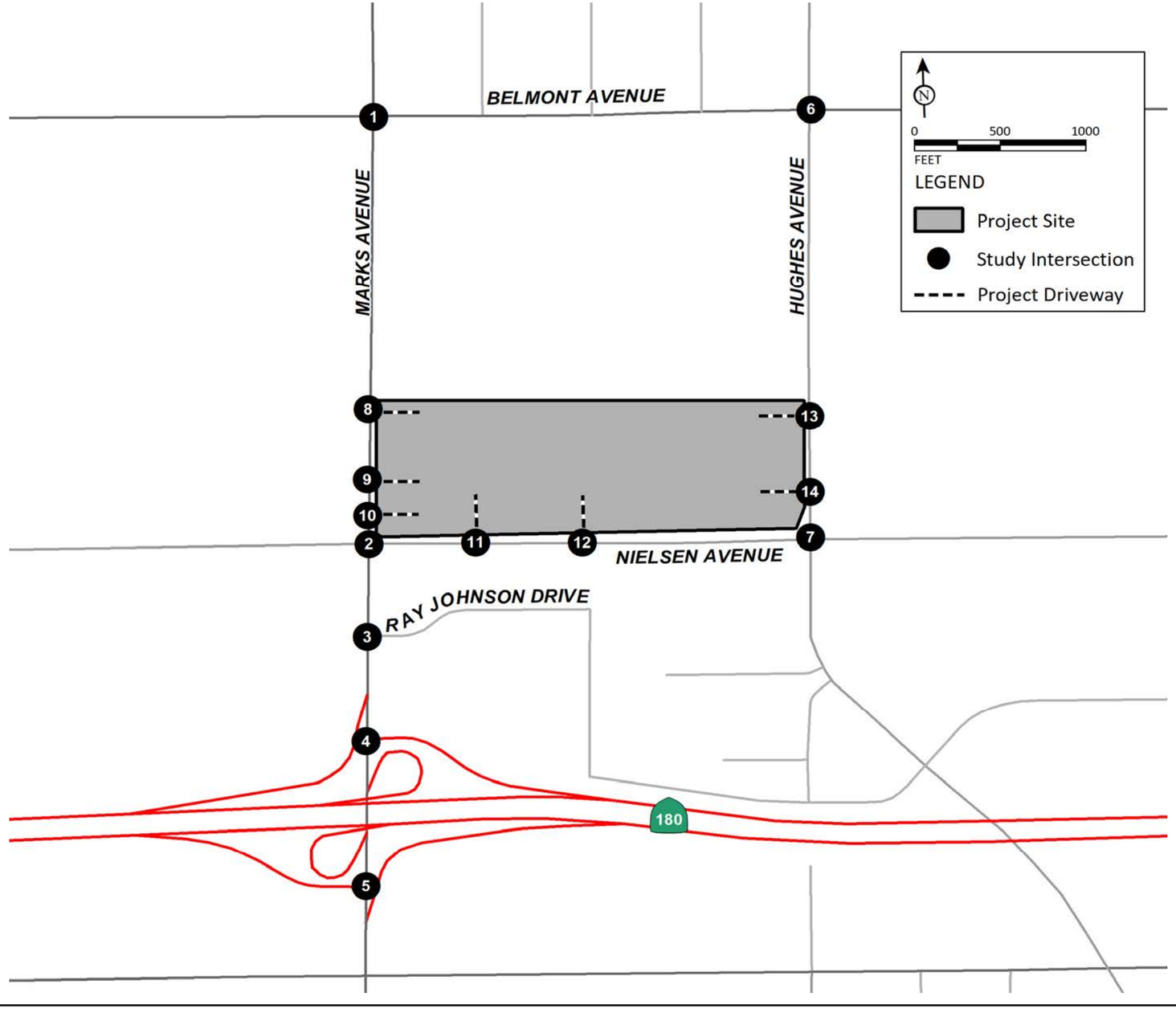
10 Marks Avenue/Project Driveway 3

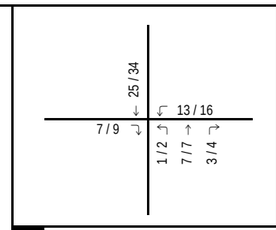
LSA

FIGURE 5-4

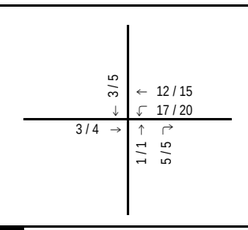
XX / YY
AM / PM Peak Hour Traffic Volumes (In PCE)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*
Project Trip Assignment - Trucks

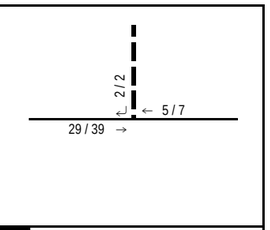


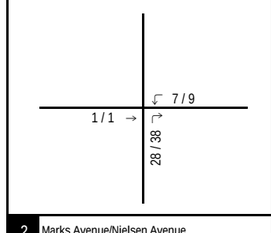

1 Marks Avenue/Belmont Avenue



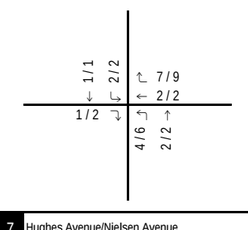

6 Hughes Avenue/Belmont Avenue



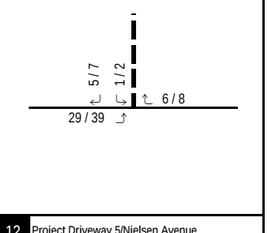

11 Project Driveway 4/Nielsen Avenue



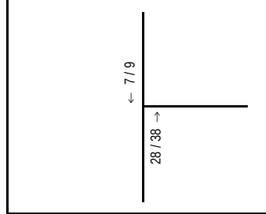

2 Marks Avenue/Nielsen Avenue



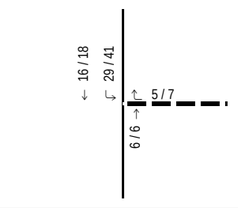

7 Hughes Avenue/Nielsen Avenue



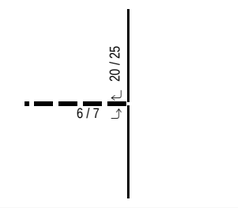

12 Project Driveway 5/Nielsen Avenue



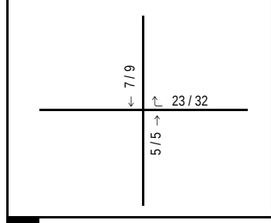

3 Marks Avenue/Ray Johnson Drive



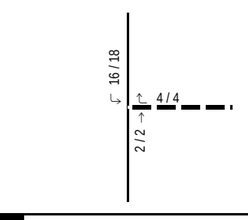

8 Marks Avenue/Project Driveway 1



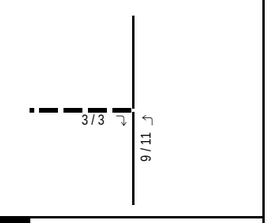

13 Hughes Avenue/Project Driveway 6



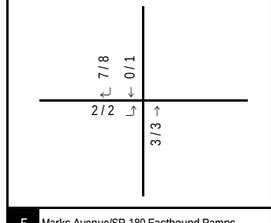

4 Marks Avenue/SR-180 Westbound Ramps



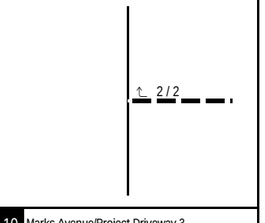

9 Marks Avenue/Project Driveway 2




14 Hughes Avenue/Project Driveway 7




5 Marks Avenue/SR-180 Eastbound Ramps




10 Marks Avenue/Project Driveway 3

LSA

FIGURE 5-5

XX / YY
AM / PM Peak Hour Traffic Volumes (In PCE)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*
Total Project PCE Trip Assignment

R:\SNN2101\TIS\z45_Asgn_Total.xlsx (11/22/2021)

LSA

## Table 5-A - Project Trip Generation

| Land Use | | Units | A.M. Peak Hour In | A.M. Peak Hour Out | A.M. Peak Hour Total | P.M. Peak Hour In | P.M. Peak Hour Out | P.M. Peak Hour Total | Daily |
|---|---|---|---|---|---|---|---|---|---|
| **High-Cube Fulfillment Center**[1,2] | 901.438 | TSF | | | | | | | |
| Trips/Unit (Cars) | | | 0.083 | 0.020 | 0.103 | 0.117 | 0.027 | 0.144 | 1.750 |
| Trips/Unit (2-4 Axle Trucks) | | | 0.006 | 0.002 | 0.008 | 0.009 | 0.002 | 0.011 | 0.162 |
| Trips/Unit (5+ Axle Trucks) | | | 0.009 | 0.002 | 0.011 | 0.008 | 0.002 | 0.010 | 0.217 |
| Trips/Unit (Total) | | | 0.098 | 0.024 | 0.122 | 0.134 | 0.031 | 0.165 | 2.129 |
| Trip Generation (Cars) | | | 75 | 18 | 93 | 105 | 24 | 129 | 1,578 |
| Trip Generation (2-4 Axle Trucks) | | | 5 | 2 | 7 | 8 | 2 | 10 | 146 |
| Trip Generation (5+ Axle Trucks) | | | 8 | 2 | 10 | 7 | 2 | 9 | 196 |
| Trip Generation (Total Trucks) | | | 13 | 4 | 17 | 15 | 4 | 19 | 342 |
| Trip Generation (Total) | | | 88 | 22 | 110 | 120 | 28 | 148 | 1,920 |
| Trip Generation (Cars) | | | 75 | 18 | 93 | 105 | 24 | 129 | 1,578 |
| PCE Trip Generation (2-4 Axle Trucks)[3] | | | 10 | 4 | 14 | 16 | 4 | 20 | 292 |
| PCE Trip Generation (5+ Axle Trucks)[3] | | | 24 | 6 | 30 | 21 | 6 | 27 | 588 |
| PCE Trip Generation (Total Trucks) | | | 34 | 10 | 44 | 37 | 10 | 47 | 880 |
| **PCE Trip Generation (Total)** | | | 109 | 28 | 137 | 142 | 34 | 176 | 2,458 |

Note:

TSF = Thousand Square Feet

[1] Rates from the Western Riverside Council of Governments (WRCOG) *TUMF High-Cube Warehouse Trip Generation Study*, January 2019, prepared by WSP.

[2] The WRCOG study does not provide in/out splits for the peak hour trip generation. Therefore, in/out splits from Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition) supplement Land Use 155 - "High-Cube Fulfilment Center Warehouse" have been used for obtaining in/out traffic.

[3] A Passenger Car Equivalent (PCE) factor 2.0 has been taken for 2-4 axle trucks based on Highway Capacity Manual (HCM) recommendations. Further, as a conservative approach, a PCE factor of 3.0 is taken, for 5+ axle trucks, consistent with latest practices in numerous California jurisdictions.

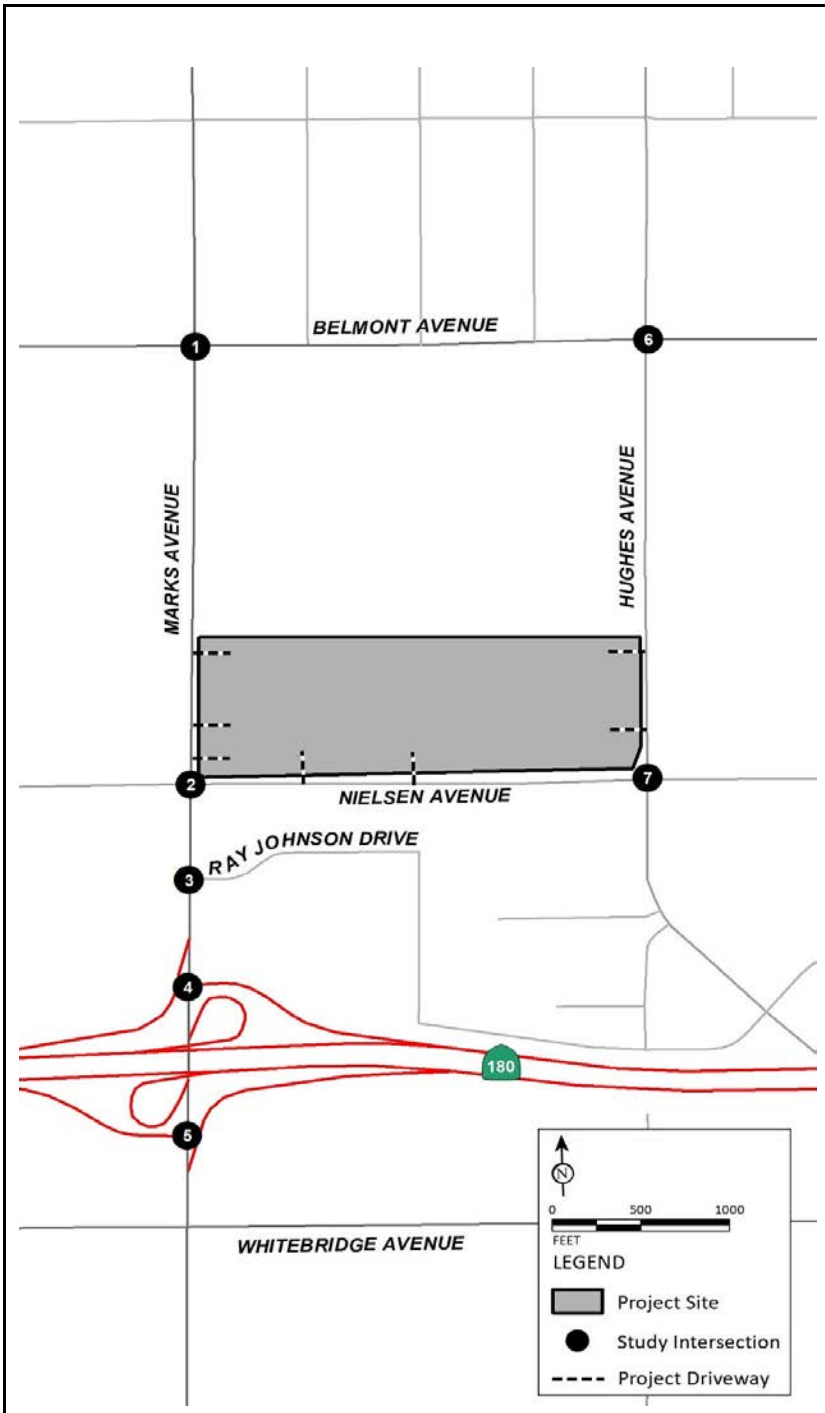
# 6.0 TRAFFIC VOLUMES FOR WITH PROJECT SCENARIOS

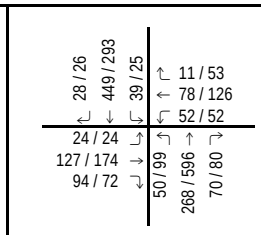
Existing, Near-term approved and pending (2023), and Cumulative year (2035) with project traffic volumes were developed by adding project traffic to the corresponding without project scenarios. Figures 6-1, 6-2, and 6-3 illustrate "with project" peak hour traffic volumes at study intersections under existing, Near-term approved and pending (2023), and Cumulative year (2035) conditions respectively. Previously referenced Tables 4-A, 4-C, and 4-D summarize the "with project" roadway segment daily traffic volumes under existing, Near-term approved and pending (2023), and Cumulative year (2035) conditions.

Detailed volume development worksheets are included in Appendix C.

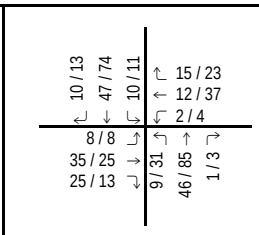
## 6.1 LIST OF CHAPTER 6.0 FIGURES

- Figure 6-1: Existing with Project Peak Hour Traffic Volumes
- Figure 6-2: Near-term approved and pending (2023) with Project Peak Hour Traffic Volumes
- Figure 6-3: Cumulative Year (2035) with Project Peak Hour Traffic Volumes

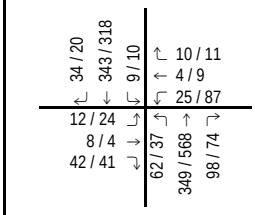


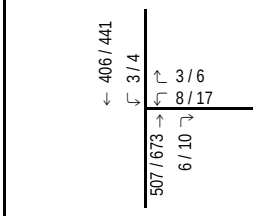

**1** Marks Avenue/Belmont Avenue



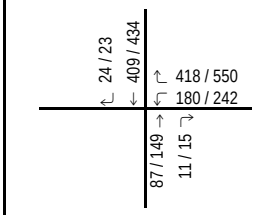

**7** Hughes Avenue/Nielsen Avenue



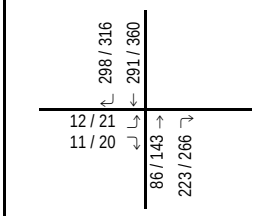

**2** Marks Avenue/Nielsen Avenue



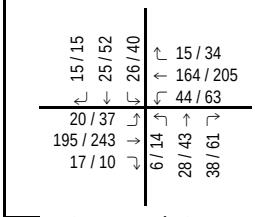

**3** Marks Avenue/Ray Johnson Drive




**4** Marks Avenue/SR-180 Westbound Ramps




**5** Marks Avenue/SR-180 Eastbound Ramps




**6** Hughes Avenue/Belmont Avenue

LSA

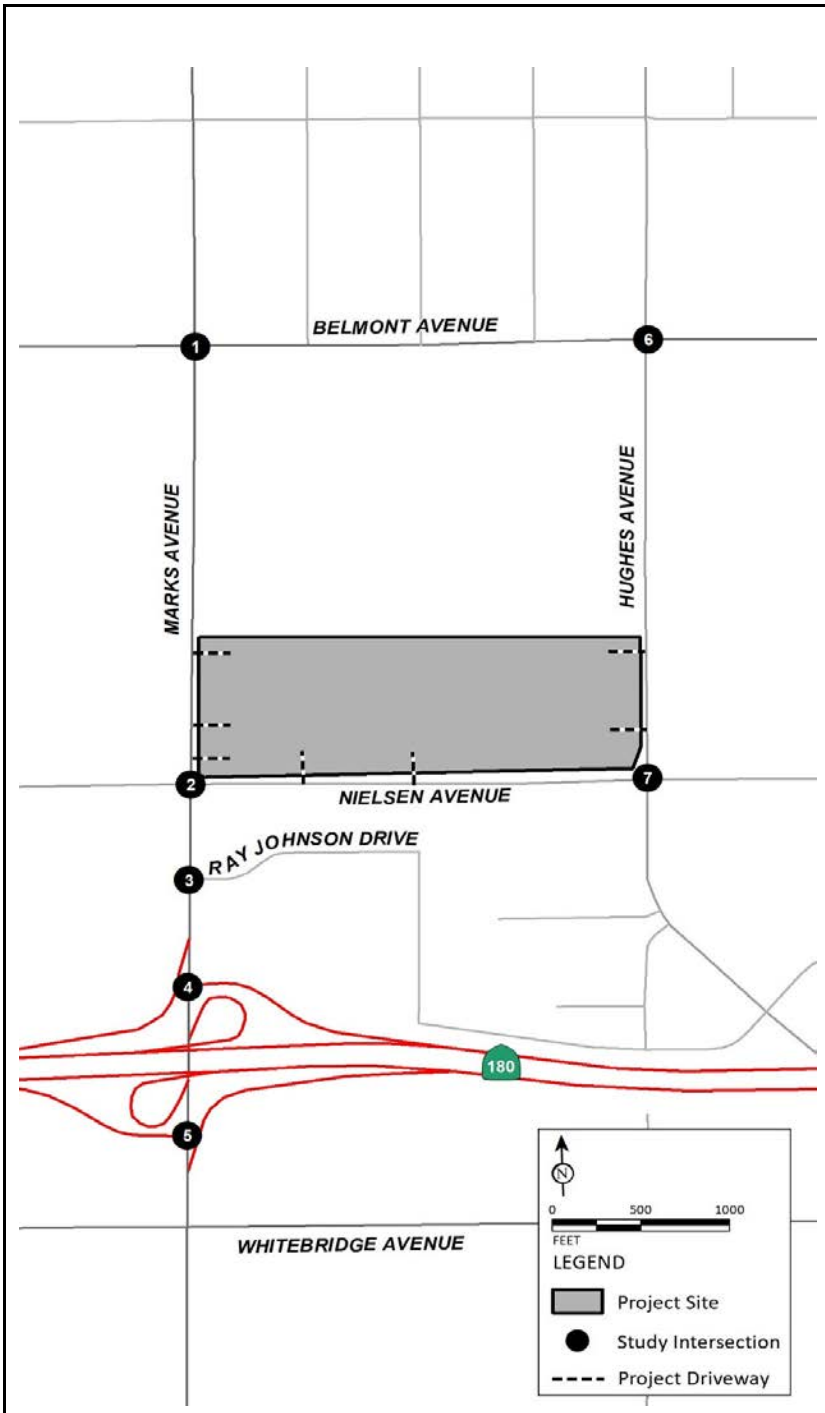
FIGURE 6-1

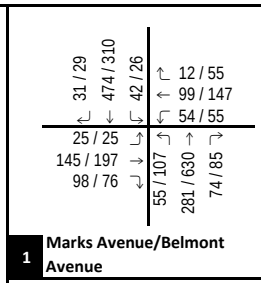
XXX / YYY
AM / PM Peak Hour Traffic Volumes (In PCE)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

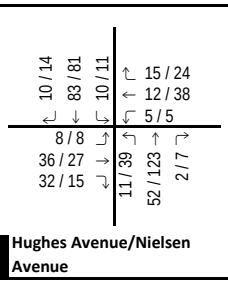
Existing with Project Peak Hour Traffic Volumes

R:\SNN2101\TIS\z30_Vol_Exist_P.xlsx\Figure (11/22/2021)

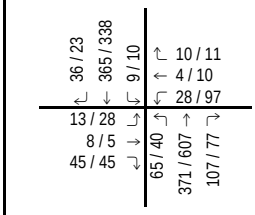


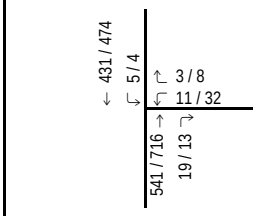

**1** Marks Avenue/Belmont Avenue



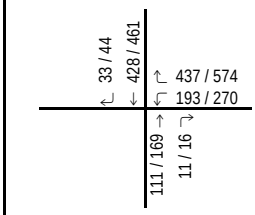

**7** Hughes Avenue/Nielsen Avenue



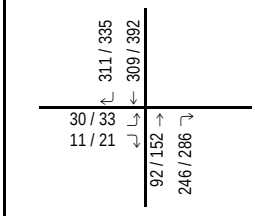

**2** Marks Avenue/Nielsen Avenue



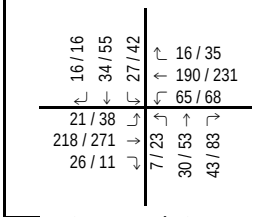

**3** Marks Avenue/Ray Johnson Drive




**4** Marks Avenue/SR-180 Westbound Ramps




**5** Marks Avenue/SR-180 Eastbound Ramps




**6** Hughes Avenue/Belmont Avenue

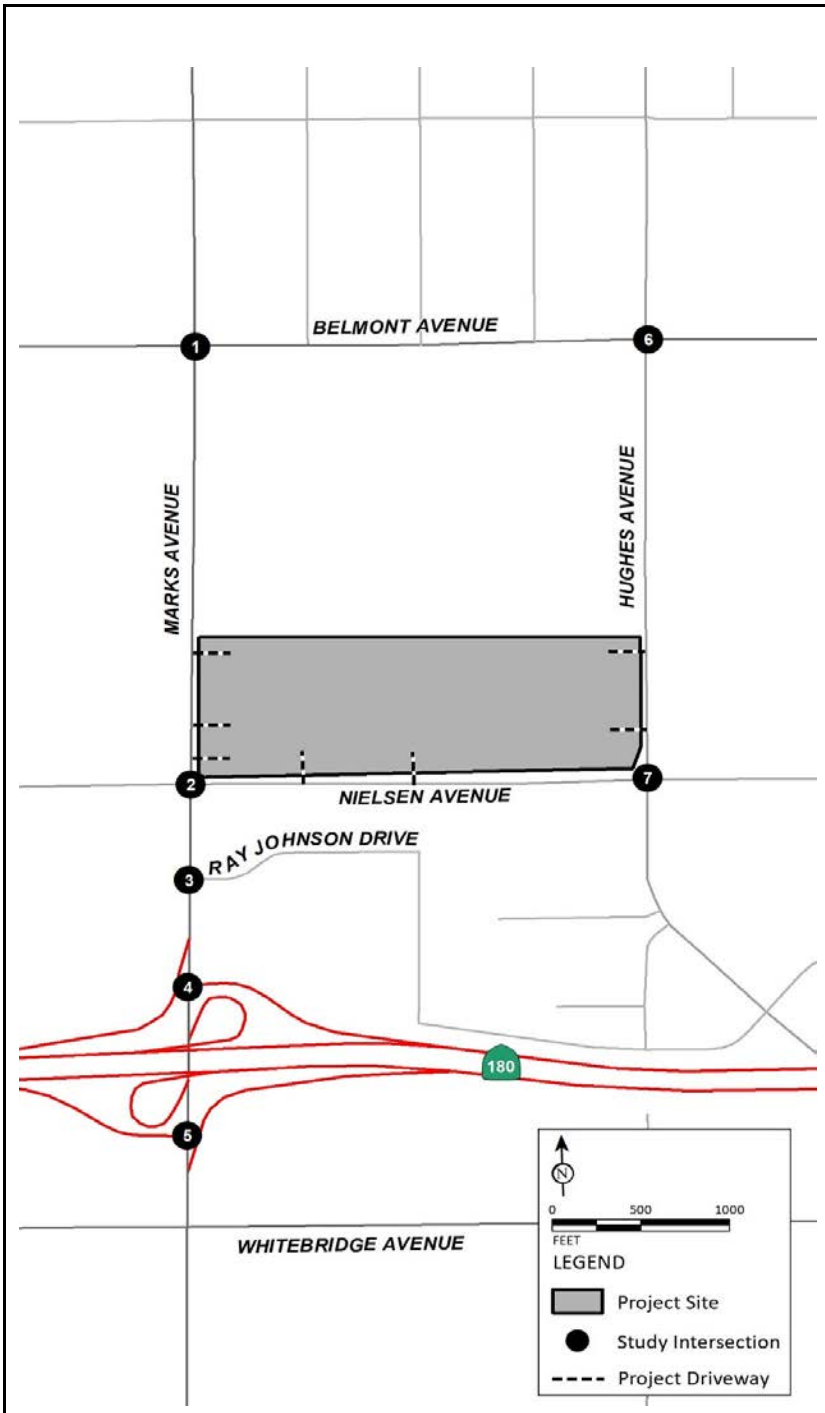
LSA

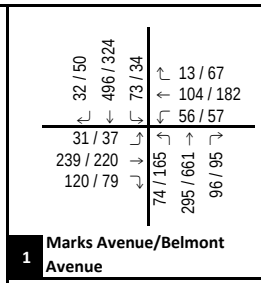
FIGURE 6-2

XXX / YYY
AM / PM Peak Hour Traffic Volumes (In PCE)

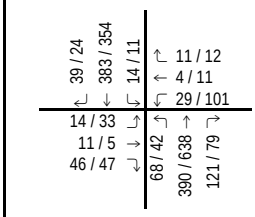
*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Near-term approved and pending (2023) with Project Peak Hour Traffic Volumes

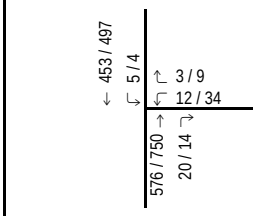


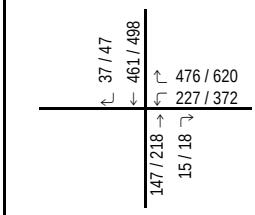

**1** Marks Avenue/Belmont Avenue



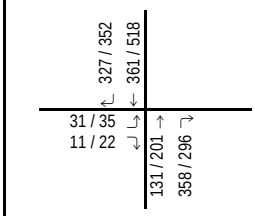

**2** Marks Avenue/Nielsen Avenue



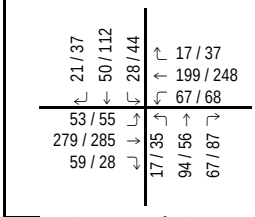

**3** Marks Avenue/Ray Johnson Drive



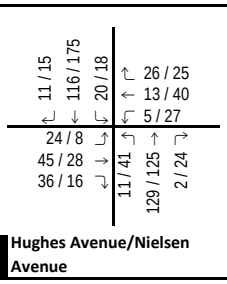

**4** Marks Avenue/SR-180 Westbound Ramps




**5** Marks Avenue/SR-180 Eastbound Ramps




**6** Hughes Avenue/Belmont Avenue




**7** Hughes Avenue/Nielsen Avenue

LSA

FIGURE 6-3

XXX / YYY
AM / PM Peak Hour Traffic Volumes (In PCE)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Cumulative Year (2035) with Project Peak Hour Traffic Volumes

R:\SNN2101\TIS\z30_Vol_BO_P.xlsx\Figure (11/22/2021)

# 7.0 INTERSECTION AND ROADWAY SEGMENT LEVELS OF SERVICE

## 7.1 EXISTING LEVELS OF SERVICE

### 7.1.1 Study Intersections

Previously referenced Figure 3-1 illustrates existing study intersection geometrics and traffic control. An intersection LOS analysis was conducted for existing conditions using the methodologies previously discussed. Table 7-A summarizes the results of this analysis and shows that all intersections are currently operating at a satisfactory LOS except the following:

- Marks Avenue/Belmont Avenue (p.m. peak hour).

Detailed intersection levels of service worksheets are included in Appendix D.

### 7.1.2 Roadway Segments

A roadway segment LOS analysis was conducted for existing conditions using the methodologies previously discussed. Table 7-B summarizes the results of this analysis and shows that all roadway segments are currently operating at a satisfactory LOS.

## 7.2 EXISTING WITH PROJECT LEVELS OF SERVICE

Analysis of the existing with project scenario is provided to identify direct project related operational deficiency if the project were to be built and in operation today. This scenario eliminates the effects of ambient growth and other cumulative projects and deals specifically with operational deficiencies only due to the project traffic.

### 7.2.1 Study Intersections

An intersection LOS analysis was conducted for existing with project conditions using the methodologies previously discussed. Previously referenced Table 7-A summarizes the results of this analysis and shows that the all intersections are forecast to operate at a satisfactory LOS under existing with project conditions except the following:

- Marks Avenue/Belmont Avenue (p.m. peak hour).

It should be noted that this intersection is already operating at a deficient LOS under existing conditions. As such, the project adds to the existing deficiency.

Detailed intersection levels of service worksheets are included in Appendix D.

### 7.2.2 Roadway Segments

A roadway segment LOS analysis was conducted for existing with project conditions using the methodologies previously discussed. Previously referenced Table 7-B summarizes the results of this analysis and shows that all roadway segments are forecast to operate at a satisfactory LOS under existing with project conditions.

## 7.3 NEAR-TERM APPROVED AND PENDING (2023) WITH PROJECT LEVELS OF SERVICE

### 7.3.1 Study Intersections

An intersection LOS analysis was conducted for Near-term approved and pending (2023) with project conditions using the methodologies previously discussed. Table 7-C summarizes the results of this analysis and shows that all intersections are forecast to operate at a satisfactory LOS under Near-term approved and pending (2023) with project conditions with the exception of the following:

- Marks Avenue/Belmont Avenue (p.m. peak hour).

Detailed intersection levels of service worksheets are included in Appendix D.

### 7.3.2 Roadway Segments

A roadway segment LOS analysis was conducted for Near-term approved and pending (2023) with project conditions using the methodologies previously discussed. Table 7-D summarizes the results of this analysis and shows that all roadway segments are forecast to operate at a satisfactory LOS.

## 7.4 CUMULATIVE YEAR (2035) WITHOUT PROJECT LEVELS OF SERVICE

### 7.4.1 Study Intersections

An intersection LOS analysis was conducted under Cumulative Year (2035) without project conditions using the methodologies previously discussed. Table 7-E summarizes the results of this analysis and shows that all of the study intersections are forecast to operate at a satisfactory LOS under Cumulative Year (2035) without project conditions with the exception of the following:

- Marks Avenue/Belmont Avenue (p.m. peak hour).

Detailed intersection levels of service worksheets are included in Appendix D.

### 7.4.2 Roadway Segments

A roadway segment LOS analysis was conducted for Cumulative Year (2035) without project conditions using the methodologies previously discussed. Table 7-F summarizes the results of this analysis and shows that all roadway segments are forecast to operate at a satisfactory LOS.

## 7.4 CUMULATIVE YEAR (2035) WITH PROJECT LEVELS OF SERVICE

### 7.4.1 Study Intersections

An intersection LOS analysis was conducted under Cumulative Year (2035) with project conditions using the methodologies previously discussed. Table 7-E summarizes the results of this analysis and shows that all of the study intersections are forecast to operate at a satisfactory LOS under Cumulative Year (2035) with project conditions with the exception of the following:

- Marks Avenue/Belmont Avenue (p.m. peak hour).

It should be noted that this intersection is forecast to operate at a deficient LOS under Cumulative Year (2035) without project conditions. As such, the project adds to the forecasted deficiency.

Detailed intersection levels of service worksheets are included in Appendix D.

### 7.4.2 Roadway Segments

A roadway segment LOS analysis was conducted for Cumulative Year (2035) with project conditions using the methodologies previously discussed. Table 7-F summarizes the results of this analysis and shows that all roadway segments are forecast to operate at a satisfactory LOS.

## 7.5 LIST OF CHAPTER 7.0 TABLES

- Table 7-A: Existing Intersection Levels of Service
- Table 7-B: Existing Roadway Segment Levels of Service
- Table 7-C: Near term approved and pending (2023) with project Intersection Levels of Service
- Table 7-D: Near term approved and pending (2023) with project Roadway Segment Levels of Service
- Table 7-E: Cumulative Year (2035) Intersection Levels of Service
- Table 7-F: Cumulative Year (2035)Roadway Segment Levels of Service

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## Table 7-A - Existing Intersection Levels of Service

| Intersection | Jurisdiction | Control | Without Project | | | | | With Project | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | PM Peak Hour | | | AM Peak Hour | | PM Peak Hour | | |
| | | | Delay (sec.) | LOS | Delay (sec.) | LOS | | Delay (sec.) | LOS | Delay (sec.) | LOS | |
| 1 . Marks Avenue/Belmont Avenue | City of Fresno | AWSC | 18.7 | C | 95.3 | F | * | 20.9 | C | >100 | F | * |
| 2 . Marks Avenue/Nielsen Avenue | City of Fresno | Signal | 12.2 | B | 12.7 | B | | 12.2 | B | 12.9 | B | |
| 3 . Marks Avenue/Ray Johnson Drive | City of Fresno | Signal | 2.3 | A | 3.0 | A | | 2.4 | A | 3.0 | A | |
| 4 . Marks Avenue/SR-180 Westbound Ramps | CALTRANS | Signal | 19.1 | B | 19.2 | B | | 19.1 | B | 19.3 | B | |
| 5 . Marks Avenue/SR-180 Eastbound Ramps | CALTRANS | Signal | 4.1 | A | 5.1 | A | | 4.2 | A | 5.2 | A | |
| 6 . Hughes Avenue/Belmont Avenue | City of Fresno | AWSC | 8.8 | A | 10.4 | B | | 8.9 | A | 10.8 | B | |
| 7 . Hughes Avenue/Nielsen Avenue | City of Fresno | AWSC | 7.9 | A | 8.5 | A | | 7.9 | A | 8.7 | A | |

**Notes:**

AWSC = All-Way Stop Control

Delay = Average control delay in seconds.

LOS = Level of Service

* Exceeds LOS Standard

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## Table 7-B - Existing Roadway Segment Levels of Service

| Roadway Segment | Functional Classification[1] | Roadway Capacity[2] | Without Project | | With Project | |
|---|---|---|---|---|---|---|
| | | | Daily Volume | LOS | Daily Volume | LOS |
| | | | | | | |
| **Segments on Marks Avenue** | | | | | | |
| 1 . Marks Avenue, between Belmont Avenue and Nielsen Avenue | 4 Lane Arterial (Divided) | 35,820 | 10,190 | C | 11,228 | C |
| 2 . Marks Avenue, between Nielsen Avenue and Ray Johnson Drive | 4 Lane Arterial (Divided) | 35,820 | 11,554 | C | 12,146 | C |
| 3 . Marks Avenue, between Ray Johnson Drive and SR-180 Westbound Ramps | 4 Lane Arterial (Divided) | 35,820 | 12,019 | C | 12,611 | C |
| 4 . Marks Avenue, between SR-180 Westbound Ramps and SR-180 Eastbound Ramps | 4 Lane Arterial (Divided) | 35,820 | 10,651 | C | 10,977 | C |
| **Segments on Belmont Avenue** | | | | | | |
| 5 Belmont Avenue, between Marks Avenue and Hughes Avenue | 4 Lane Collector (Undivided) | 31,860 | 7,240 | C | 7,550 | C |
| **Segments on Nielsen Avenue** | | | | | | |
| 6 . Nielsen Avenue, between Marks Avenue and Hughes Avenue | 2 Lane Collector | 15,930 | 1,614 | C | 2,230 | C |
| **Segments on Hughes Avenue** | | | | | | |
| 7 . Hughes Avenue, between Belmont Avenue and Nielsen Avenue | 2 Lane Collector | 15,930 | 2,604 | C | 3,060 | C |
| | | | | | | |

**Notes:**

LOS = Level of Service.

[1] Functional Classification obtained from the Figure MT-1 Major Street Circulayion Diagram, City of Fresno 2014 General Plan.

[2] Roadway Capacity obtained from Table 1, Generalized Annual averge Daily Volues for Florida's Urbanized Areas. Since the facilities ate Non-State, a 10% reduction factor was applied for the roadway capacities.

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## Table 7-C - Near-Term approved and pending with Project Intersection Levels of Service

| Intersection | Jurisdiction | Control | With Project | | | | |
|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | PM Peak Hour | | |
| | | | Delay (sec.) | LOS | Delay (sec.) | LOS | |
| 1 . Marks Avenue/Belmont Avenue | City of Fresno | AWSC | 26.2 | D | >100 | F | * |
| 2 . Marks Avenue/Nielsen Avenue | City of Fresno | Signal | 12.3 | B | 13.3 | B | |
| 3 . Marks Avenue/Ray Johnson Drive | City of Fresno | Signal | 2.7 | A | 3.9 | A | |
| 4 . Marks Avenue/SR-180 Westbound Ramps | CALTRANS | Signal | 19.0 | B | 19.2 | B | |
| 5 . Marks Avenue/SR-180 Eastbound Ramps | CALTRANS | Signal | 5.7 | A | 5.8 | A | |
| 6 . Hughes Avenue/Belmont Avenue | City of Fresno | AWSC | 9.3 | A | 11.9 | B | |
| 7 . Hughes Avenue/Nielsen Avenue | City of Fresno | AWSC | 8.3 | A | 9.2 | A | |

**Notes:**

AWSC = All-Way Stop Control

Delay = Average control delay in seconds.

LOS = Level of Service

* Exceeds LOS Standard

No delay was reported for Intersection 9 (Project Truck Driveway 1/24th Street) because there are no conflicting movements.

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## Table 7-D - Near-term Approved and Pending (2023) Roadway Segment Levels of Service

| Roadway Segment | Functional Classification[1] | Roadway Capacity[2] | With Project | |
|---|---|---|---|---|
| | | | Daily Volume | LOS |
| | | | | |
| **Segments on Marks Avenue** | | | | |
| 1 . Marks Avenue, between Belmont Avenue and Nielsen Avenue | 4 Lane Arterial (Divided) | 35,820 | 11,976 | C |
| 2 . Marks Avenue, between Nielsen Avenue and Ray Johnson Drive | 4 Lane Arterial (Divided) | 35,820 | 13,000 | C |
| 3 . Marks Avenue, between Ray Johnson Drive and SR-180 Westbound Ramps | 4 Lane Arterial (Divided) | 35,820 | 13,525 | C |
| 4 . Marks Avenue, between SR-180 Westbound Ramps and SR-180 Eastbound Ramps | 4 Lane Arterial (Divided) | 35,820 | 11,789 | C |
| **Segments on Belmont Avenue** | | | | |
| 5 Belmont Avenue, between Marks Avenue and Hughes Avenue | 4 Lane Collector (Undivided) | 31,860 | 8,215 | C |
| **Segments on Nielsen Avenue** | | | | |
| 6 . Nielsen Avenue, between Marks Avenue and Hughes Avenue | 2 Lane Collector | 15,930 | 2,383 | C |
| **Segments on Hughes Avenue** | | | | |
| 7 . Hughes Avenue, between Belmont Avenue and Nielsen Avenue | 2 Lane Collector | 15,930 | 3,252 | C |
| | | | | |

**Notes:**

LOS = Level of Service.

[1] Functional Classification obtained from the Figure MT-1 Major Street Circulayion Diagram, City of Fresno 2014 General Plan.

[2] Roadway Capacity obtained from Table 1, Generalized Annual averge Daily Volues for Florida's Urbanized Areas. Since the facilities ate Non-State, a 10% reduction factor was applied for the roadway capacities.

LSA

## Table 7-E - Cumulative Year (2035) Intersection Levels of Service

| Intersection | Jurisdiction | Control | Without Project | | | | | With Project | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | PM Peak Hour | | | AM Peak Hour | | PM Peak Hour | | |
| | | | Delay (sec.) | LOS | Delay (sec.) | LOS | | Delay (sec.) | LOS | Delay (sec.) | LOS | |
| 1 . Marks Avenue/Belmont Avenue | City of Fresno | AWSC | 21.1 | C | >100 | F | * | 23.6 | C | >100 | F | * |
| 2 . Marks Avenue/Nielsen Avenue | City of Fresno | Signal | 12.2 | B | 13.4 | B | | 12.3 | B | 13.5 | B | |
| 3 . Marks Avenue/Ray Johnson Drive | City of Fresno | Signal | 2.6 | A | 4.0 | A | | 2.6 | A | 4.0 | A | |
| 4 . Marks Avenue/SR-180 Westbound Ramps | CALTRANS | Signal | 18.9 | B | 19.0 | B | | 18.9 | B | 19.0 | B | |
| 5 . Marks Avenue/SR-180 Eastbound Ramps | CALTRANS | Signal | 5.2 | A | 5.4 | A | | 5.3 | A | 5.5 | A | |
| 6 . Hughes Avenue/Belmont Avenue | City of Fresno | TWSC | 10.6 | B | 12.0 | B | | 10.8 | B | 12.3 | B | |
| 7 . Hughes Avenue/Nielsen Avenue | City of Fresno | AWSC | 8.9 | A | 9.5 | A | | 9.0 | A | 9.7 | A | |

**Notes:**

AWSC = All-Way Stop Control

Delay = Average control delay in seconds.

LOS = Level of Service

* Exceeds LOS Standard

No delay was reported for Intersection 9 (Project Truck Driveway 1/24th Street) because there are no conflicting movements.

LSA

## Table 7-F - Cumulative Year (2035) Segment Levels of Service

| Roadway Segment | Functional Classification[1] | Roadway Capacity[2] | Without Project | | With Project | |
|---|---|---|---|---|---|---|
| | | | Daily Volume | LOS | Daily Volume | LOS |
| | | | | | | |
| **Segments on Marks Avenue** | | | | | | |
| 1 . Marks Avenue, between Belmont Avenue and Nielsen Avenue | 4 Lane Arterial (Divided) | 35,820 | 11,651 | C | 12,689 | C |
| 2 . Marks Avenue, between Nielsen Avenue and Ray Johnson Drive | 4 Lane Arterial (Divided) | 35,820 | 13,244 | C | 13,836 | C |
| 3 . Marks Avenue, between Ray Johnson Drive and SR-180 Westbound Ramps | 4 Lane Arterial (Divided) | 35,820 | 13,706 | C | 14,298 | C |
| 4 . Marks Avenue, between SR-180 Westbound Ramps and SR-180 Eastbound Ramps | 4 Lane Arterial (Divided) | 35,820 | 13,065 | C | 13,391 | C |
| **Segments on Belmont Avenue** | | | | | | |
| 5 Belmont Avenue, between Marks Avenue and Hughes Avenue | 4 Lane Collector (Undivided) | 31,860 | 8,846 | C | 9,156 | C |
| **Segments on Nielsen Avenue** | | | | | | |
| 6 . Nielsen Avenue, between Marks Avenue and Hughes Avenue | 2 Lane Collector | 15,930 | 1,772 | C | 2,388 | C |
| **Segments on Hughes Avenue** | | | | | | |
| 7 . Hughes Avenue, between Belmont Avenue and Nielsen Avenue | 2 Lane Collector | 15,930 | 3,531 | C | 3,987 | C |
| | | | | | | |

**Notes:**

LOS = Level of Service.

[1] Functional Classification obtained from the Figure MT-1 Major Street Circulayion Diagram, City of Fresno 2014 General Plan.

[2] Roadway Capacity obtained from Table 1, Generalized Annual averge Daily Volues for Florida's Urbanized Areas. Since the facilities ate Non-State, a 10% reduction factor was applied for the roadway capacities.

# 8.0 QUEUING ANALYSIS

As recommended by the City staff during the scoping agreement process, a queuing analysis was performed at the study intersections for all analysis scenarios.

Table 8-A lists the available turn-pocket storage lengths and summarize the 95$^{th}$ percentile back-of-queue lengths at the study intersections under existing, Near-term approved and pending with project, and Cumulative Year (2035) conditions. The queues for signalized intersections have been reported from Synchro, whereas queues at unsignalized intersections were reported from Simtraffic. As shown in Table 8-A, queues for some of the movements are projected to exceed the existing available turn-pocket storage lengths under existing, Near-term approved and pending with project, and Cumulative Year (2035) for the intersection of Marks Avenue/Belmont Avenue.

Based on the project location, majority of the project traffic will be using the intersections of Marks Avenue/Nielsen Avenue, Hughes Avenue/Belmont Avenue, and Hughes Avenue/Nielsen Avenue. However, as summarized before, the project will not result in creating any inadequacy of turn pocket storage lengths at these intersections.

Detailed queuing analysis worksheets are included in Appendix E.

## 8.1 LIST OF CHAPTER 8.0 TABLES

- Table 8-A: Intersection Queuing Analysis

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## Table 8-A - Intersection Queuing Analysis

| Intersection | Movement | Storage Length[1] (ft/ln) | Queue Lengths[2] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Existing | | | | Near Term | | Cumulative (2035) | | | |
| | | | No Project | | With Project | | With Project | | No Project | | With Project | |
| | | | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM |
| 1. Marks Avenue/Belmont Avenue | **NBL** | 230 | 55 | 160 | 50 | **335** | 60 | **470** | 65 | **480** | 65 | **475** |
| | **NBR** | 375 | 60 | 90 | 50 | 60 | 50 | **450** | 60 | **590** | 55 | **1290** |
| | **SBL** | 135 | 40 | 50 | 40 | 40 | 40 | 40 | 50 | 40 | 55 | 70 |
| | **SBR** | 50 | **55** | **140** | 50 | **110** | **60** | **75** | **80** | 50 | **140** | 20 |
| | **EBL** | 105 | 40 | 45 | 45 | 50 | 40 | 40 | 45 | 35 | 45 | 60 |
| | **WBL** | 250 | 40 | 80 | 40 | 55 | 55 | 50 | 45 | 60 | 50 | 55 |
| | **WBR** | 125 | 30 | 45 | 20 | 35 | 30 | 45 | 20 | 50 | 25 | 50 |
| 2. Marks Avenue/Nielsen Avenue | **NBL** | 240 | 85 | 60 | 85 | 60 | 90 | 65 | 95 | 65 | 95 | 65 |
| | **NBR** | 215 | 15 | 5 | 15 | 20 | 15 | 20 | 20 | 5 | 20 | 20 |
| | **SBL** | 245 | 25 | 10 | 25 | 25 | 25 | 25 | 35 | 25 | 35 | 25 |
| | **SBR** | 215 | 5 | 0 | 5 | 0 | 5 | 0 | 5 | 0 | 5 | 0 |
| | **EBL** | 55 | 30 | 40 | 30 | 40 | 30 | 45 | 30 | 50 | 30 | 50 |
| | **EBR** | 55 | 15 | 15 | 15 | 15 | 20 | 15 | 20 | 20 | 20 | 20 |
| | **WBL** | 215 | 35 | 95 | 45 | 105 | 50 | 115 | 40 | 110 | 50 | 115 |
| | **WBR** | 210 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3. Marks Avenue/Ray Johnson Drive | **SBL** | 110 | 10 | 15 | 10 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | **WBL** | 75 | 20 | 30 | 20 | 30 | 20 | 45 | 25 | 45 | 25 | 45 |
| | **WBR** | 75 | 10 | 15 | 10 | 15 | 10 | 15 | 10 | 15 | 10 | 15 |
| 4. Marks Avenue/SR-180 Westbound Ramps | **NBR** | 475 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **WBL** | 340 | 85 | 105 | 85 | 105 | 85 | 115 | 105 | 145 | 105 | 145 |
| | **WBR** | 205 | 10 | 25 | 5 | 25 | 5 | 25 | 40 | 40 | 40 | 40 |
| 5. Marks Avenue/SR-180 Eastbound Ramps | **NBR** | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **SBR** | 460 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **EBL** | 520 | 20 | 25 | 20 | 25 | 35 | 35 | 35 | 35 | 35 | 35 |
| | **EBR** | 520 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6. Hughes Avenue/Belmont Avenue | **EBL** | 145 | 45 | 45 | 40 | 50 | 45 | 50 | 50 | 50 | 50 | 50 |
| | **WBL** | 165 | 45 | 55 | 50 | 40 | 50 | 60 | 50 | 45 | 50 | 45 |
| 7. Hughes Avenue/Nielsen Avenue | **SBR** | 100 | 30 | 30 | 30 | 40 | 25 | 35 | 40 | 35 | 25 | 35 |
| | **EBL** | 205 | 30 | 15 | 25 | 20 | 25 | 30 | 45 | 20 | 35 | 15 |
| | **WBL** | 205 | 0 | 25 | 15 | 15 | 25 | 15 | 20 | 45 | 35 | 45 |

Notes:

ft/ln = feet per lane

EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound

L = Left; R = Right

**Bold** = Queue exceeds available storage.

[1] Storage length for all movements obtained from Google Earth measurements.

[2] All queues reported are 95th percentile queues. All queues for signalized intersections have been reported from Synchro. Queues for unsignalized intersections have been reported from Simtraffic.

# 9.0 CALTRANS SCENARIO ANALYSIS

Based on the comments received from Caltrans during the scoping agreement process, the Marks Avenue/SR-180 interchange using a different project trip distribution compared to what was approved by the City during the scoping agreement process. This revised project trip distribution would result in potentially greater impacts at the interchange and therefore would present a worst case scenario analysis of the interchange. To conduct this analysis, Caltrans staff recommended to distribute 60% of the project traffic through the ramps for this evaluation. Based on Caltrans staff recommendation, this analysis was conducted for the following two scenarios:

- Near-term approved and pending with project Scenario; and
- Cumulative Year (2035) with project Scenario.

## 9.1 STUDY AREA

### 9.1.1 Study Intersections

The following intersections were evaluated for both scenarios included above:

3. Marks Avenue/Ray Johnson Drive (City of Fresno);
4. Marks Avenue/SR-180 Westbound Ramps (Caltrans);
5. Marks Avenue/SR-180 Eastbound Ramps (Caltrans);

### 9.1.2 Freeway Basic and Merge/Diverge Study Area

The following freeway facilities were included for the worst case scenario analysis:

**SR-180 Eastbound**

1. West of Marks Avenue Off-Ramp (Basic);
2. Marks Avenue Off-Ramp (Diverge);
3. Between Marks Avenue Off-Ramp and Marks Avenue Loop-On Ramp (Basic);
4. Marks Avenue Loop-On Ramp (Merge);
5. Between Marks Avenue Loop-On Ramp and Marks Avenue Slip-On Ramp (Basic);
6. Marks Avenue Slip-On Ramp (Merge); and
7. East of Marks Avenue (Basic).

**SR-180 Westbound**

8. East of Marks Avenue (Basic);
9. Marks Avenue Off-Ramp(Diverge);
10. Between Marks Avenue Off-Ramp and Marks Avenue Loop-On Ramp (Basic);

11. Marks Avenue Loop-On Ramp (Merge);
12. Between Marks Avenue Loop-On Ramp and Marks Avenue Slip-On Ramp (Basic);
13. Marks Avenue Slip-On Ramp (Merge); and
14. West of Marks Avenue (Basic).

## 9.2 VOLUME DEVELOPMENT AND ANALYSIS METHODOLOGY

### 9.2.1 Intersections

Figures 9-1 and Figures 9-2 illustrates the alternate project passenger vehicle and truck trip distribution at the study intersections included in this scenario. Figures 9-3 and 9-4 illustrates the corresponding project trip assignment. Figure 9-5 illustrates the total project trip assignment at the study intersections.

For the study intersections, project trips for this alternative distribution were added to the corresponding no project traffic volumes developed as discussed in Chapter 4 to develop this worst case scenario with project traffic volumes at the study intersections. Figures 9-6 illustrates the traffic volumes for Near-term approved and pending with project conditions. Figure 9-7 illustrates the corresponding traffic volume for Cumulative Year (2035) with project conditions.

### 9.2.2 Freeway Mainline and Merge/Diverge Segments

For freeway segments, existing freeway segment bidirectional volumes was developed using the Annual Average Daily Traffic (AADT) volume data published by Caltrans in 2019. A 2.6 percent per annum growth rate was applied to the volumes to develop volumes for Near-term approved and pending (2023) conditions. This growth rate was obtained from the Fresno COG ABM. Freeway traffic volumes for Cumulative Year (2035) was developed using forecast volumes obtained from the latest version of the Fresno COG ABM and by applying the Fresno COG recommended post-processing methodologies. For ramp influence areas, vehicles entering and exiting a ramp are based on peak hour turning movement counts developed for the study intersections.

Table 9-A summarizes the freeway traffic volumes for the Near-term approved and pending (2023) with project conditions. Table 9-B summarizes the corresponding volumes for Cumulative Year (2035) with project conditions.

## 9.3 NEAR-TERM APPROVED AND PENDING (2023) WITH PROJECT CONDITIONS LOS ANALYSIS

### 9.3.1 Study Intersections

An intersection LOS analysis was conducted for Near-term approved and pending (2023) with project conditions using the methodologies previously discussed. Table 9-C summarizes the results of this analysis and shows that all intersections are forecast to operate at a satisfactory LOS under near term approved and pending (2023) with project conditions.

Detailed intersection levels of service worksheets are included in Appendix D.

### 9.3.2 Freeway Segments

A freeway segment LOS analysis was conducted for Near-term approved and pending (2023) with project conditions using the methodologies previously discussed. Table 9-D summarizes the results of this analysis and shows that all freeway segments are forecast to operate at a satisfactory LOS.

Detailed freeway levels of service worksheets are included in Appendix F.

## 9.4 CUMULATIVE YEAR (2035) WITH PROJECT CONDITIONS LOS ANALYSIS

### 9.4.1 Study Intersections

An intersection LOS analysis was conducted for Cumulative Year (2035) with project conditions using the methodologies previously discussed. Table 9-E summarizes the results of this analysis and shows that all intersections are forecast to operate at a satisfactory LOS under Cumulative Year (2035) with project conditions.

Detailed intersection levels of service worksheets are included in Appendix D.

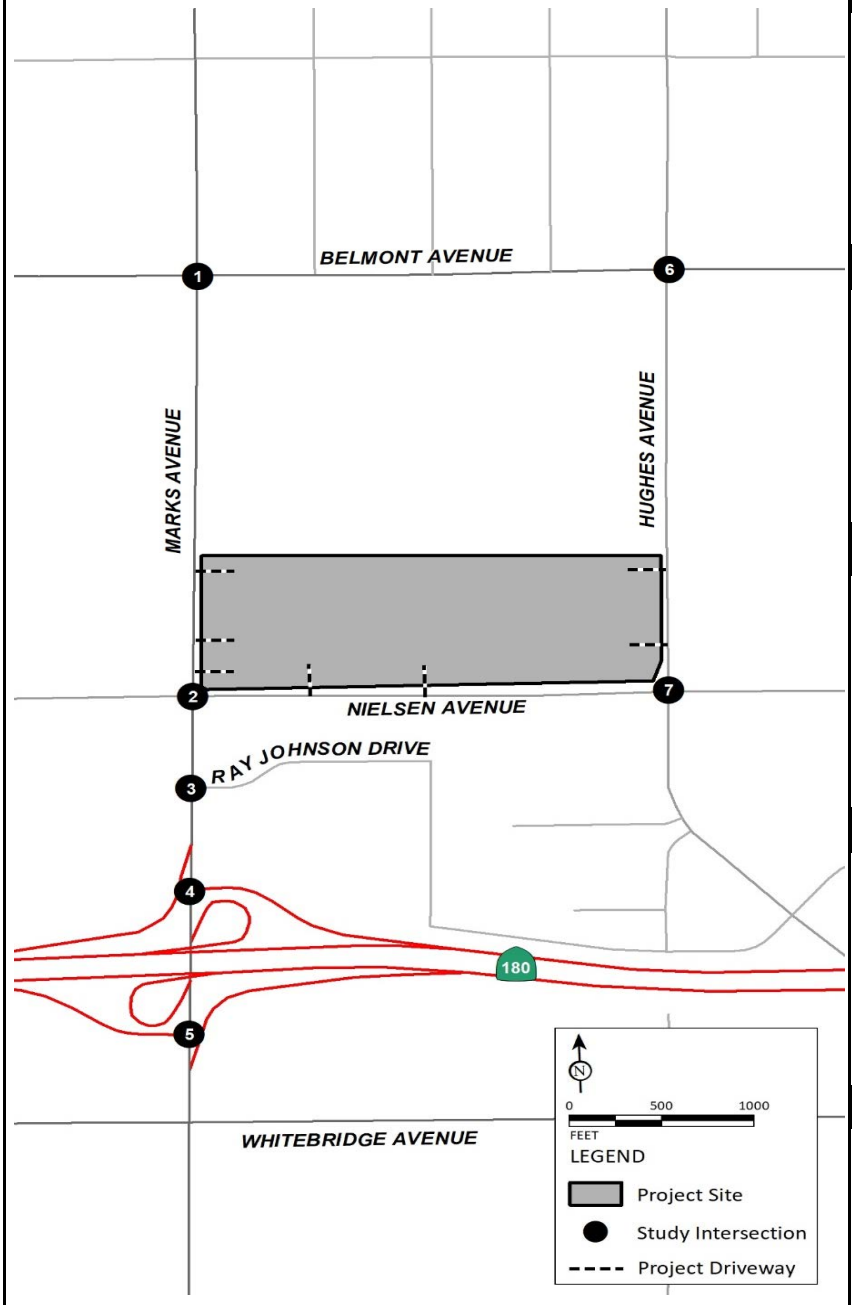
### 9.4.2 Freeway Segments

A freeway segment LOS analysis was conducted for Cumulative Year (2035) with project conditions using the methodologies previously discussed. Table 9-F summarizes the results of this analysis and shows that all freeway segments are forecast to operate at a satisfactory LOS.

Detailed freeway levels of service worksheets are included in Appendix F.

## 9.5 LIST OF CHAPTER 9.0 FIGURES AND TABLES

- Figure 9-1: Project Trip Distribution – Passenger Car
- Figure 9-2: Project Trip Distribution – Truck
- Figure 9-3: Project Trip Assignment – Passenger Car
- Figure 9-4: Project Trip Assignment – Truck
- Figure 9-5: Total Project PCE Trip Assignment
- Figure 9-6: Near-term approved and pending (2023) with Project Peak Hour Traffic Volumes
- Figure 9-7: Cumulative year (2035) with Project Peak Hour Traffic Volumes
- Table 9-A: Near-term approved and pending (2023) with Project Freeway Peak Hour Traffic Volumes
- Table 9-B: Cumulative year (2035) with Project Freeway Peak Hour Traffic Volumes
- Table 9-C: Near-term approved and pending (2023) with project Intersection Levels of Service
- Table 9-D: Near-term approved and pending (2023) with project Freeway Segment Levels of Service
- Table 9-E: Cumulative Year (2035) Intersection Levels of Service
- Table 9-F: Cumulative Year (2035) Freeway Segment Levels of Service




*Intersection Not Analyzed*

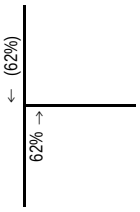
**1** Marks Avenue/Belmont Avenue

*Intersection Not Analyzed*

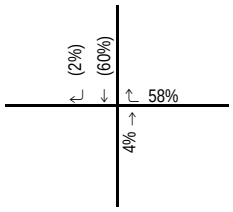
**7** Hughes Avenue/Nielsen Avenue

*Intersection Not Analyzed*

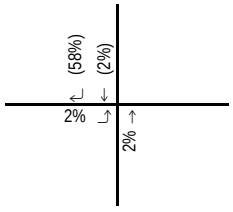
**2** Marks Avenue/Nielsen Avenue




**3** Marks Avenue/Ray Johnson Drive




**4** Marks Avenue/SR-180 Westbound Ramps




**5** Marks Avenue/SR-180 Eastbound Ramps

*Intersection Not Analyzed*

**6** Hughes Avenue/Belmont Avenue

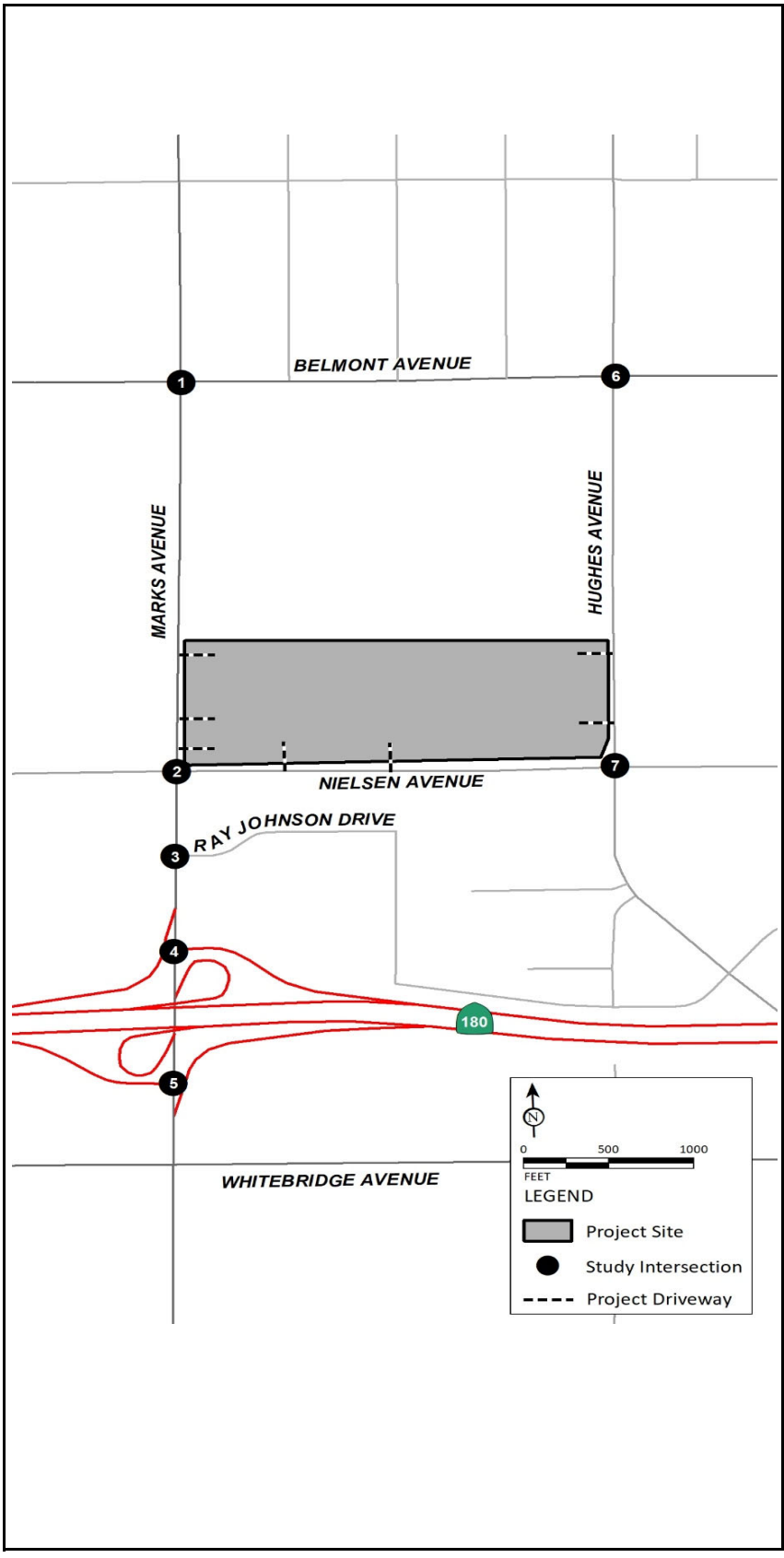
FIGURE 9-1

LSA

XX% (YY%)
Inbound (Outbound) Trip Distribution

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Project Trip Distribution – Passenger Car




*Intersection Not Analyzed*

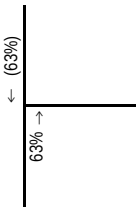
**1** Marks Avenue/Belmont Avenue

*Intersection Not Analyzed*

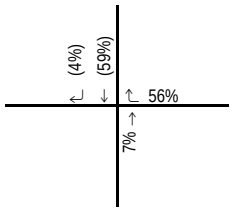
**7** Hughes Avenue/Nielsen Avenue

*Intersection Not Analyzed*

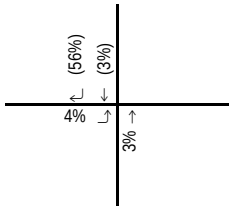
**2** Marks Avenue/Nielsen Avenue




**3** Marks Avenue/Ray Johnson Drive




**4** Marks Avenue/SR-180 Westbound Ramps




**5** Marks Avenue/SR-180 Eastbound Ramps

*Intersection Not Analyzed*

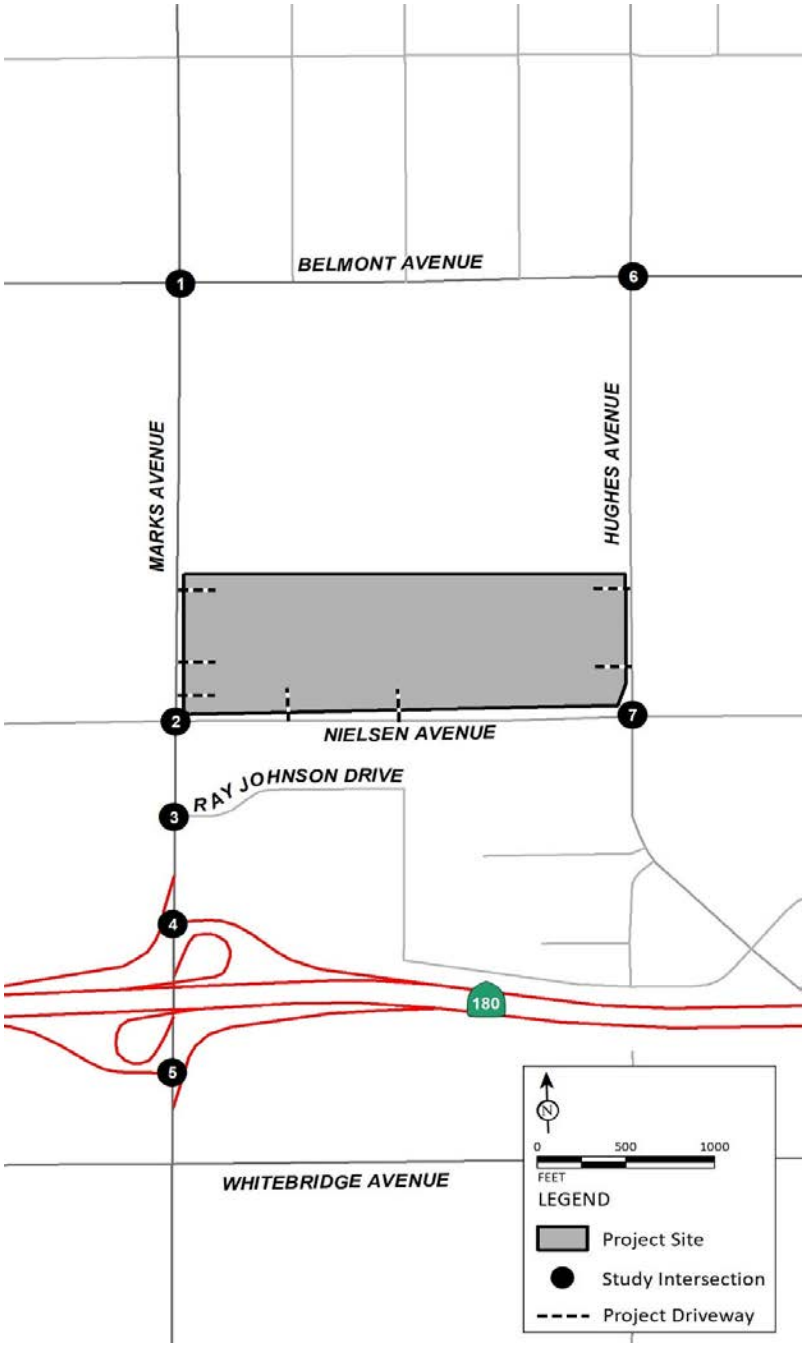
**6** Hughes Avenue/Belmont Avenue

FIGURE 9-2

XX% (YY%)
Inbound (Outbound) Trip Distribution

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Project Trip Distribution – Truck

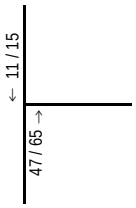



*Intersection Not Analyzed*

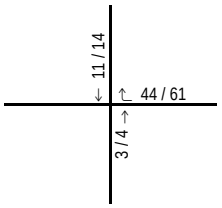
**1** Marks Avenue/Belmont Avenue

*Intersection Not Analyzed*

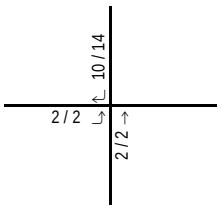
**2** Marks Avenue/Nielsen Avenue




**3** Marks Avenue/Ray Johnson Drive




**4** Marks Avenue/SR-180 Westbound Ramps




**5** Marks Avenue/SR-180 Eastbound Ramps

*Intersection Not Analyzed*

**6** Hughes Avenue/Belmont Avenue

*Intersection Not Analyzed*

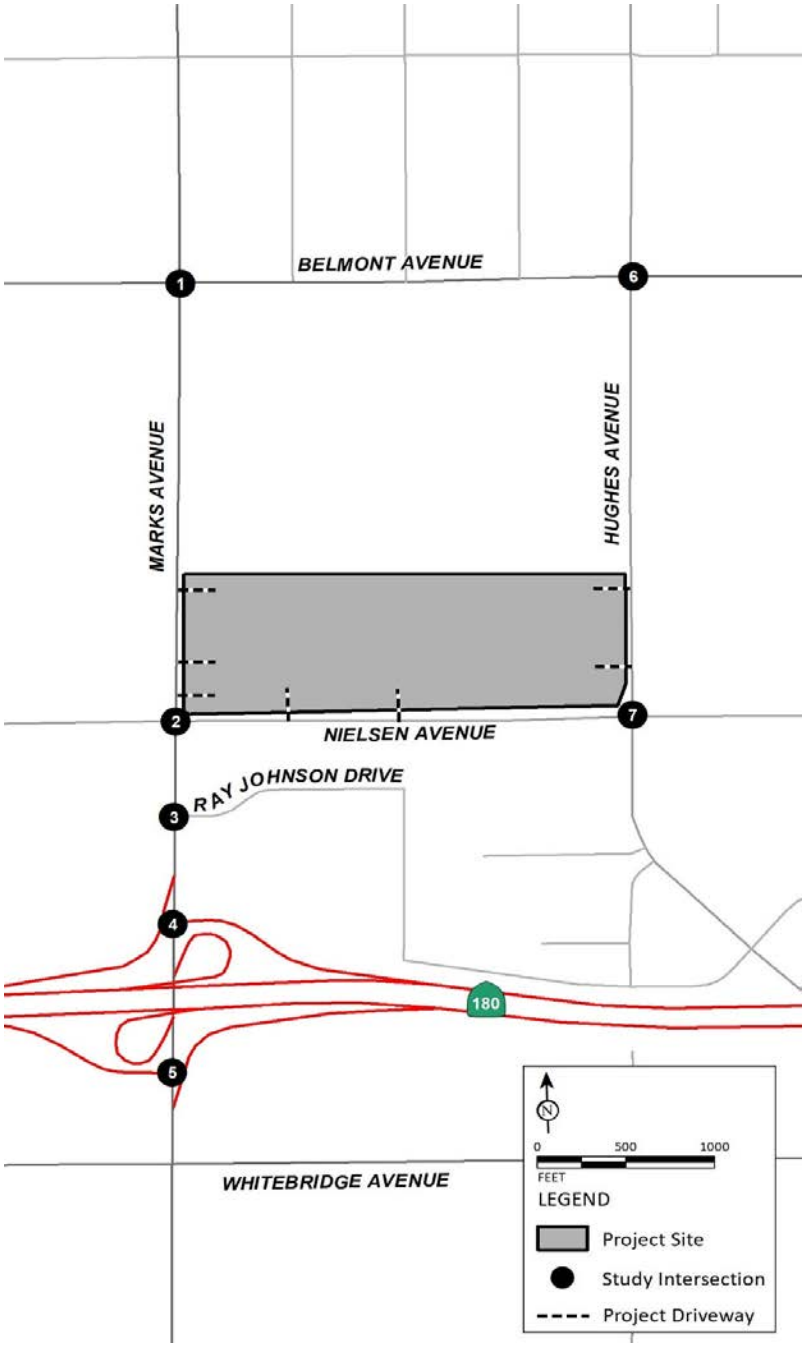
**7** Hughes Avenue/Nielsen Avenue

FIGURE 9-3

XX / YY
AM / PM Peak Hour Traffic Volumes

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Project Trip Assignment – Passenger Car

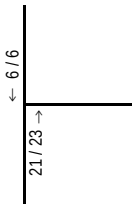



*Intersection Not Analyzed*

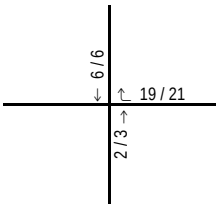
**1** Marks Avenue/Belmont Avenue

*Intersection Not Analyzed*

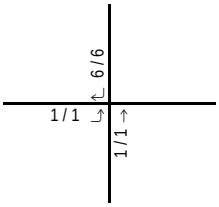
**2** Marks Avenue/Nielsen Avenue




**3** Marks Avenue/Ray Johnson Drive




**4** Marks Avenue/SR-180 Westbound Ramps




**5** Marks Avenue/SR-180 Eastbound Ramps

*Intersection Not Analyzed*

**6** Hughes Avenue/Belmont Avenue

*Intersection Not Analyzed*

**7** Hughes Avenue/Nielsen Avenue

FIGURE 9-4

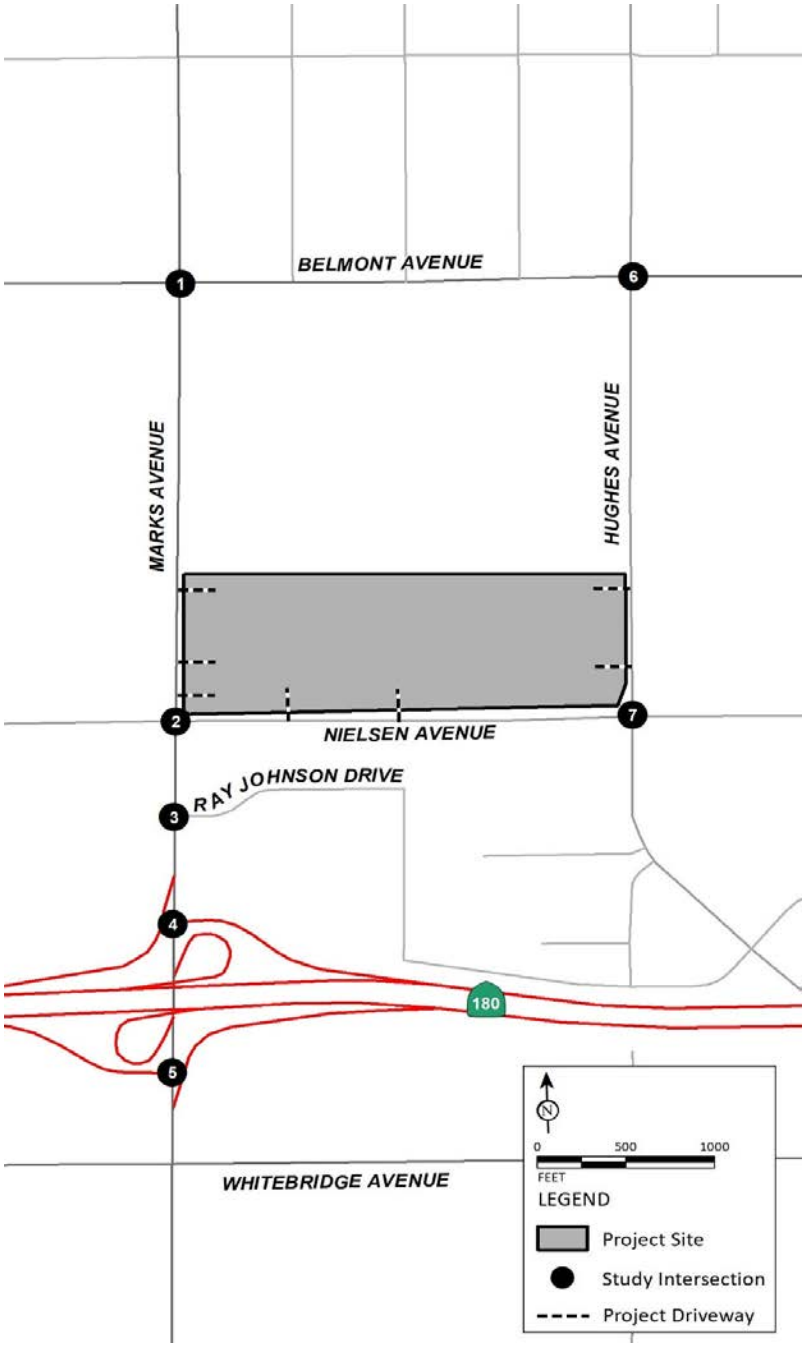
LSA

XX / YY
AM / PM Peak Hour Traffic Volumes (In PCE)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Project Trip Assignment – Truck

R:\SNN2101\TIS\z30_Asgn_Truck_CT.xlsx\Figure (11/22/2021)




*Intersection Not Analyzed*

**1** Marks Avenue/Belmont Avenue

*Intersection Not Analyzed*

**2** Marks Avenue/Nielsen Avenue

← 17 / 21
68 / 88 →

**3** Marks Avenue/Ray Johnson Drive

← 17 / 20
↱ 63 / 82
5 / 7 →

**4** Marks Avenue/SR-180 Westbound Ramps

↰ 16 / 20
3 / 3 ↳
3 / 3 →

**5** Marks Avenue/SR-180 Eastbound Ramps

*Intersection Not Analyzed*

**6** Hughes Avenue/Belmont Avenue

*Intersection Not Analyzed*

**7** Hughes Avenue/Nielsen Avenue

LSA

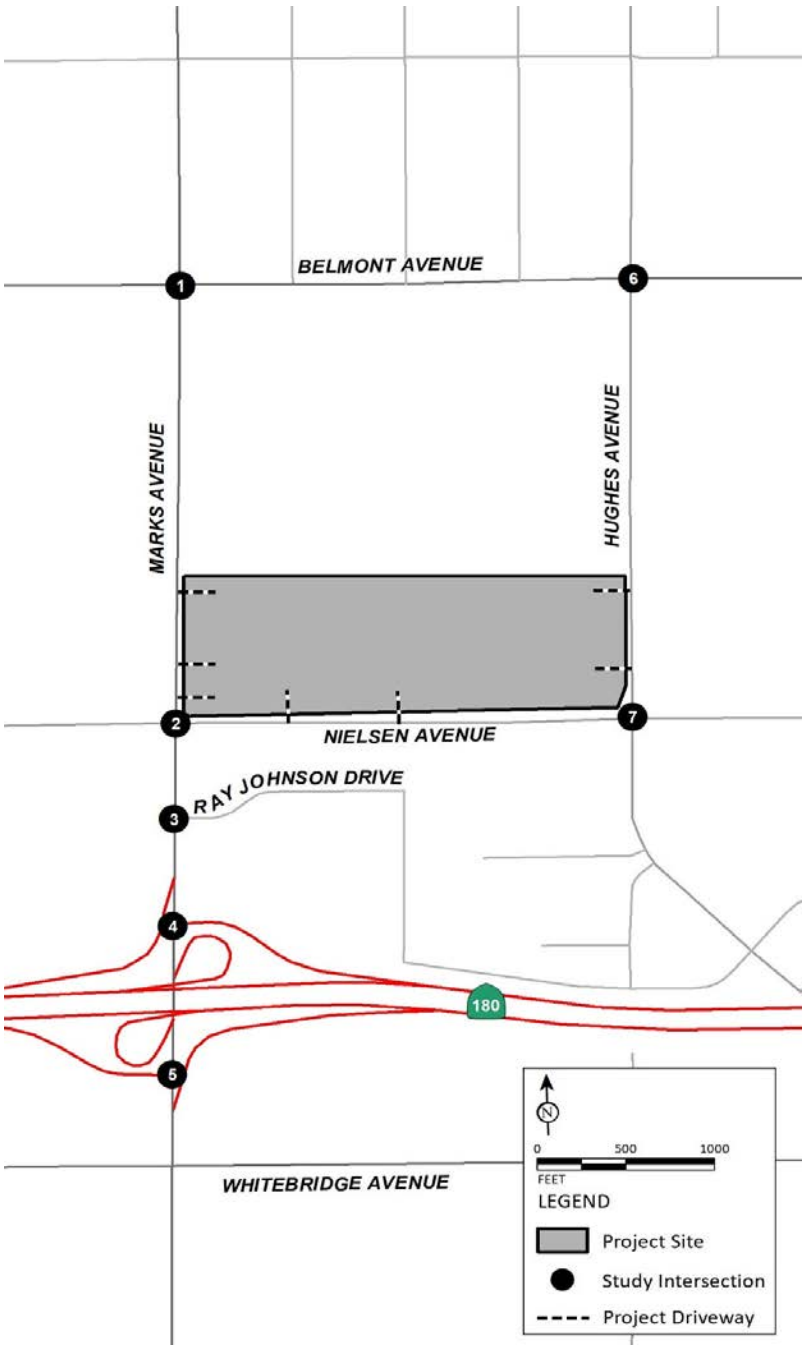
FIGURE 9-5

XXX / YYY
AM / PM Peak Hour Traffic Volumes (In PCE)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Total Project PCE Trip Assignment

R:\SNN2101\TIS\z30_Asgn_Total_CT.xlsx\Figure (11/22/2021)

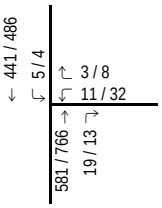



*Intersection Not Analyzed*

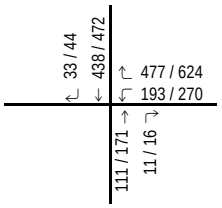
**1** Marks Avenue/Belmont Avenue

*Intersection Not Analyzed*

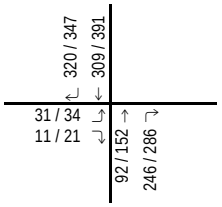
**2** Marks Avenue/Nielsen Avenue




**3** Marks Avenue/Ray Johnson Drive




**4** Marks Avenue/SR-180 Westbound Ramps




**5** Marks Avenue/SR-180 Eastbound Ramps

*Intersection Not Analyzed*

**6** Hughes Avenue/Belmont Avenue

*Intersection Not Analyzed*

**7** Hughes Avenue/Nielsen Avenue

LSA

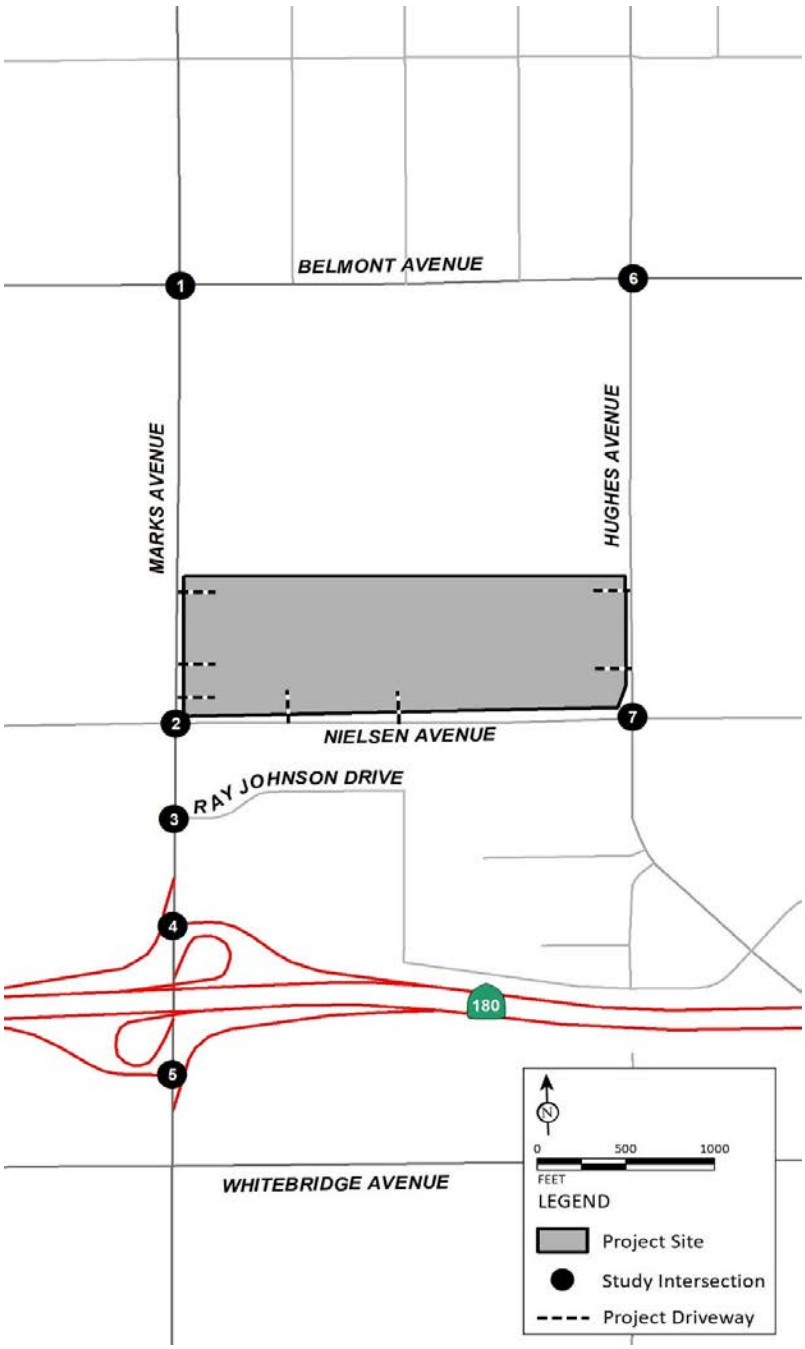
FIGURE 9-6

XXX / YYY
AM / PM Peak Hour Traffic Volumes (In PCE)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Near-term approved and pending (2023) with Project Peak Hour Traffic Volumes

R:\SNN2101\TIS\z30_Vol_OY_P_CT.xlsx\Figure (11/22/2021)

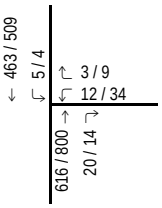



*Intersection Not Analyzed*

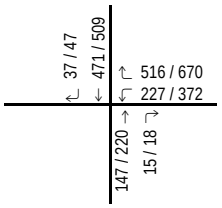
**1** Marks Avenue/Belmont Avenue

*Intersection Not Analyzed*

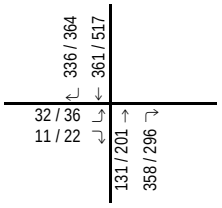
**2** Marks Avenue/Nielsen Avenue




**3** Marks Avenue/Ray Johnson Drive




**4** Marks Avenue/SR-180 Westbound Ramps




**5** Marks Avenue/SR-180 Eastbound Ramps

*Intersection Not Analyzed*

**6** Hughes Avenue/Belmont Avenue

*Intersection Not Analyzed*

**7** Hughes Avenue/Nielsen Avenue

FIGURE 9-7

LSA

XXX / YYY
AM / PM Peak Hour Traffic Volumes (In PCE)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

Cumulative Year (2035) with Project Peak Hour Traffic Volumes

R:\SNN2101\TIS\z30_Vol_BO_P_CT.xlsx\Figure (11/22/2021)

LSA

**Table 9-A - Near-Term Approved and Pending (2023) with Projects Conditions Freeway Segment and Ramp Traffic Volumes**

| Eastbound | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | AM Peak Hour | | | | | | | | PM Peak Hour | | | | | | | |
| SR-180 Eastbound | Type | Mainline Auto | Mainline Trucks | Mainline Total | Mainline Truck% | Ramp PCE Volumes | Ramp Truck% | Ramp Total Volumes | Ramp Truck Volumes | Mainline Cars | Mainline Trucks | Mainline Total | Mainline Truck% | Ramp PCE Volumes | Ramp Truck% | Ramp Total Volumes | Ramp Truck Volumes |
| 1 . West of Marks Avenue Off-Ramp | Basic | 1,830 | 252 | 2,082 | 12.1% | | | | | 1,314 | 185 | 1,499 | 12.3% | | | | |
| 2 . Marks Avenue Off-Ramp | Ramp (Diverge) | | | | | 42 | 0.0% | 42 | 0 | | | | | 55 | 11.4% | 49 | 6 |
| 3 . Between Marks Avenue Off-Ramp and Marks Avenue Loop-On Ramp | Basic | 1,788 | 252 | 2,040 | 12.4% | | | | | 1,271 | 179 | 1,450 | 12.3% | | | | |
| 4 . Marks Avenue Loop-On Ramp | Ramp (Merge) | | | | | 320 | 23.0% | 260 | 60 | | | | | 347 | 5.8% | 328 | 19 |
| 5 . Between Marks Avenue Loop-On Ramp and Maks Avenue Slip-On Ramp | Basic | 1,988 | 312 | 2,300 | 13.6% | | | | | 1,580 | 198 | 1,778 | 11.1% | | | | |
| 6 . Marks Avenue Slip-On Ramp | Ramp (Merge) | | | | | 246 | 3.7% | 237 | 9 | | | | | 286 | 0.8% | 284 | 2 |
| 7 . East of Marks Avenue | Basic | 2,216 | 321 | 2,537 | 12.7% | | | | | 1,862 | 200 | 2,062 | 9.7% | | | | |

| Westbound | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | AM Peak Hour | | | | | | | | PM Peak Hour | | | | | | | |
| SR-180 Westbound | Type | Mainline Cars | Mainline Trucks | Mainline Total | Mainline Truck% | Ramp PCE Volumes | Ramp Truck% | Ramp Total Volumes | Ramp Truck Volumes | Mainline Cars | Mainline Trucks | Mainline Total | Mainline Truck% | Ramp PCE Volumes | Ramp Truck% | Ramp Total Volumes | Ramp Truck Volumes |
| 8 . East of Marks Avenue | Basic | 2,001 | 257 | 2,258 | 11.4% | | | | | 2,416 | 345 | 2,761 | 12.5% | | | | |
| 9 . Marks Avenue Off-Ramp | Ramp (Diverge) | | | | | 670 | 8.8% | 616 | 54 | | 0 | | 0 | 894 | 12.8% | 793 | 102 |
| 10 . Between Marks Avenue Off-Ramp and Marks Avenue Loop-On Ramp | Basic | 1,439 | 203 | 1,642 | 12.3% | | | | | 1,725 | 243 | 1,968 | 12.3% | | | | |
| 11 . Marks Avenue Loop-On Ramp | Ramp (Merge) | | | | | 11 | 0.0% | 11 | 0 | | 0 | | 0 | 16 | 0.0% | 16 | 0 |
| 12 . Between Marks Avenue Loop-On Ramp and Maks Avenue Slip-On Ramp | Basic | 1,450 | 203 | 1,653 | 12.3% | | | | | 1,741 | 243 | 1,984 | 12.2% | | | | |
| 13 . Marks Avenue Slip-On Ramp | Ramp (Merge) | | | | | 33 | 26.3% | 26 | 7 | | 0 | | 0 | 44 | 15.0% | 38 | 6 |
| 14 . West of Marks Avenue | Basic | 1,469 | 210 | 1,679 | 12.5% | | | | | 1,773 | 249 | 2,022 | 12.3% | | | | |

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## Table 9-B - Cumulative Year (2035) With Project Conditions Freeway Segment and Ramp Traffic Volumes

| Eastbound | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | AM Peak Hour | | | | | | | | PM Peak Hour | | | | | | | |
| SR-180 Eastbound | Type | Mainline Auto | Mainline Trucks | Mainline Total | Mainline Truck% | Ramp PCE Volumes | Ramp Truck% | Ramp Non-PCE Volume | Ramp Truck Volumes | Mainline Auto | Mainline Trucks | Mainline Total | Mainline Truck% | Ramp PCE Volumes | Ramp Truck% | Ramp Non-PCE Volume | Ramp Truck Volumes |
| 1 . West of Marks Avenue Off-Ramp | Basic | 2,332 | 323 | 2,655 | 12.2% | | | | | 1,619 | 227 | 1,846 | 12.3% | | | | |
| 2 . Marks Avenue Off-Ramp | Ramp (Diverge) | | | | | 43 | 0.0% | 43 | 0 | | | | | 58 | 11.4% | 52 | 6 |
| 3 . Between Marks Avenue Off-Ramp and Marks Avenue Loop-On Ramp | Basic | 2,289 | 323 | 2,612 | 12.4% | | | | | 1,573 | 221 | 1,794 | 12.3% | | | | |
| 4 . Marks Avenue Loop-On Ramp | Ramp (Merge) | | | | | 336 | 23.0% | 273 | 63 | | | | | 364 | 5.8% | 344 | 20 |
| 5 . Between Marks Avenue Loop-On Ramp and Maks Avenue Slip-On Ramp | Basic | 2,499 | 386 | 2,885 | 13.4% | | | | | 1,897 | 241 | 2,138 | 11.3% | | | | |
| 6 . Marks Avenue Slip-On Ramp | Ramp (Merge) | | | | | 358 | 3.7% | 345 | 13 | | | | | 296 | 0.8% | 294 | 2 |
| 7 . East of Marks Avenue | Basic | 2,831 | 399 | 3,230 | 12.3% | | | | | 2,189 | 243 | 2,432 | 10.0% | | | | |

| Westbound | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | AM Peak Hour | | | | | | | | PM Peak Hour | | | | | | | |
| SR-180 Westbound | Type | Mainline Auto | Mainline Trucks | Mainline Total | Mainline Truck% | Ramp PCE Volumes | Ramp Truck% | Ramp Non-PCE Volume | Ramp Truck Volumes | Mainline Auto | Mainline Trucks | Mainline Total | Mainline Truck% | Ramp PCE Volumes | Ramp Truck% | Ramp Non-PCE Volume | Ramp Truck Volumes |
| 8 . East of Marks Avenue | Basic | 2,272 | 292 | 2,564 | 11.4% | | | | | 3,105 | 442 | 3,547 | 12.5% | | | | |
| 9 . Marks Avenue Off-Ramp | Ramp (Diverge) | | | | | 743 | 8.8% | 683 | 60 | | | | | 1,042 | 12.8% | 924 | 118 |
| 10 . Between Marks Avenue Off-Ramp and Marks Avenue Loop-On Ramp | Basic | 1,649 | 232 | 1,881 | 12.3% | | | | | 2,299 | 324 | 2,623 | 12.3% | | | | |
| 11 . Marks Avenue Loop-On Ramp | Ramp (Merge) | | | | | 15 | 0.0% | 15 | 0 | | | | | 18 | 0.0% | 18 | 0 |
| 12 . Between Marks Avenue Loop-On Ramp and Maks Avenue Slip-On Ramp | Basic | 1,664 | 232 | 1,896 | 12.2% | | | | | 2,317 | 324 | 2,641 | 12.3% | | | | |
| 13 . Marks Avenue Slip-On Ramp | Ramp (Merge) | | | | | 37 | 26.3% | 29 | 8 | | | | | 47 | 15.0% | 41 | 6 |
| 14 . West of Marks Avenue | Basic | 1,685 | 240 | 1,925 | 12.5% | | | | | 2,352 | 330 | 2,682 | 12.3% | | | | |

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## Table 9-C - Near-Term approved and pending with Project Intersection Levels of Service

| Intersection | Jurisdiction | Control | With Project | | | |
|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | PM Peak Hour | |
| | | | Delay (sec.) | LOS | Delay (sec.) | LOS |
| 3 . Marks Avenue/Ray Johnson Drive | City of Fresno | Signal | 2.7 | A | 3.9 | A |
| 4 . Marks Avenue/SR-180 Westbound Ramps | CALTRANS | Signal | 19.2 | B | 19.5 | B |
| 5 . Marks Avenue/SR-180 Eastbound Ramps | CALTRANS | Signal | 5.8 | A | 5.9 | A |

**Notes:**

Delay = Average control delay in seconds.

LOS = Level of Service

* Exceeds LOS Standard

LSA

**Table 9-D -Near Term Approved and Pending (2023) With Project Freeway Segment and Ramp Levels of Service**

| | SR-180 Freeway | Type | Mainline Lanes | With Project | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | AM Peak Hour | | | PM Peak Hour | | |
| | | | | Speed (mi/hr) | Density (pc/mi/ln) | LOS | Speed (mi/hr) | Density (pc/mi/ln) | LOS |
| | **Eastbound** | | | | | | | | |
| 1 . | West of Marks Avenue Off-Ramp | Basic | 2 | 73.2 | 17.0 | B | 73.6 | 12.2 | B |
| 2 . | Marks Avenue Off-Ramp | Ramp (Diverge) | 2 | 65.3 | 24.1 | C | 65.3 | 18.2 | B |
| 3 . | Between Marks Avenue Off-Ramp and Marks Avenue Loop-On Ramp | Basic | 2 | 72.9 | 16.6 | B | 72.9 | 11.8 | B |
| 4 . | Marks Avenue Loop-On Ramp | Ramp (Merge) | 2 | 64.1 | 21.2 | C | 65.2 | 15.9 | B |
| 6 . | Marks Avenue Slip-On Ramp | Ramp (Merge) | 3 | 74.3 | 13.4 | B | 74.4 | 10.6 | A |
| 7 . | East of Marks Avenue | Basic | 3 | 73.6 | 13.7 | B | 73.6 | 10.9 | A |
| | | | | | | | | | |
| | **Westbound** | | | | | | | | |
| 8a . | East of Marks Avenue | Basic | 3 | 73.6 | 12.1 | B | 73.6 | 15.0 | B |
| 8b . | East of Marks Avenue | Basic | 4 | 73.6 | 9.1 | A | 73.6 | 11.2 | B |
| 9 . | Marks Avenue Off-Ramp | Ramp (Diverge) | 4 | 72.5 | 9.2 | A | 71.8 | 11.5 | A |
| 10a . | Between Marks Avenue Off-Ramp and Marks Avenue Loop-On Ramp | Basic | 3 | 73.3 | 8.9 | A | 73.1 | 10.7 | A |
| 10b . | Between Marks Avenue Off-Ramp and Marks Avenue Loop-On Ramp | Basic | 2 | 73.5 | 13.3 | B | 73.4 | 16.0 | B |
| 11 . | Marks Avenue Loop-On Ramp | Ramp (Merge) | 2 | 65.1 | 15.2 | B | 64.6 | 19.0 | B |
| 13 . | Marks Avenue Slip-On Ramp | Ramp (Merge) | 2 | 66.4 | 15.1 | B | 65.9 | 18.7 | B |
| 14 . | East of Marks Avenue | Basic | 2 | 73.2 | 13.6 | B | 73.2 | 16.5 | B |
| | | | | | | | | | |

Notes:

SR-180 = State Route 180

mi/hr : miles per hour

pc/mi/ln: passanger cars per mile per lane

**Bold** Indicates deficient LOS

LSA

## Table 9-E - Cumulative Year (2035) Intersection Levels of Service

| Intersection | Jurisdiction | Control | With Project | | | |
|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | PM Peak Hour | |
| | | | Delay (sec.) | LOS | Delay (sec.) | LOS |
| 3 . Marks Avenue/Ray Johnson Drive | City of Fresno | Signal | 2.6 | A | 4.0 | A |
| 4 . Marks Avenue/SR-180 Westbound Ramps | CALTRANS | Signal | 19.0 | B | 19.2 | B |
| 5 . Marks Avenue/SR-180 Eastbound Ramps | CALTRANS | Signal | 5.4 | A | 5.5 | A |

**Notes:**

Delay = Average control delay in seconds.

LOS = Level of Service

* Exceeds LOS Standard

LSA

**Table 9-F -Cumulative Year (2035) With Project Freeway Segment and Ramp Levels of Service**

| SR-180 Freeway | Type | Mainline Lanes | With Project | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | | PM Peak Hour | | |
| | | | Speed (mi/hr) | Density (pc/mi/ln) | LOS | Speed (mi/hr) | Density (pc/mi/ln) | LOS |
| **Eastbound** | | | | | | | | |
| 1 . West of Marks Avenue Off-Ramp | Basic | 2 | 73.2 | 17.0 | B | 70.5 | 22.5 | C |
| 2 . Marks Avenue Off-Ramp | Ramp (Diverge) | 2 | 65.3 | 24.1 | C | 65.3 | 30.0 | D |
| 3 . Between Marks Avenue Off-Ramp and Marks Avenue Loop-On Ramp | Basic | 2 | 72.9 | 16.6 | B | 70.7 | 22.1 | C |
| 4 . Marks Avenue Loop-On Ramp | Ramp (Merge) | 2 | 64.1 | 21.2 | C | 62.0 | 26.1 | C |
| 6 . Marks Avenue Slip-On Ramp | Ramp (Merge) | 3 | 57.3 | 35.0 | D | 74.1 | 17.3 | B |
| 7 . East of Marks Avenue | Basic | 3 | 54.1 | 37.6 | B | 73.0 | 17.6 | B |
| | | | | | | | | |
| | | | | | | | | |
| **Westbound** | | | | | | | | |
| 8a . East of Marks Avenue | Basic | 3 | 73.6 | 13.8 | B | 72.2 | 19.6 | C |
| 8b . East of Marks Avenue | Basic | 4 | 73.6 | 10.3 | A | 73.4 | 14.4 | B |
| 9 . Marks Avenue Off-Ramp | Ramp (Diverge) | 4 | 72.5 | 10.5 | A | 71.6 | 7.3 | A |
| 10a . Between Marks Avenue Off-Ramp and Marks Avenue Loop-On Ramp | Basic | 3 | 73.3 | 10.2 | A | 73.0 | 14.2 | B |
| 10b . Between Marks Avenue Off-Ramp and Marks Avenue Loop-On Ramp | Basic | 2 | 73.5 | 15.3 | B | 70.7 | 22.2 | C |
| 11 . Marks Avenue Loop-On Ramp | Ramp (Merge) | 2 | 64.7 | 18.2 | B | 63.0 | 25.1 | C |
| 13 . Marks Avenue Slip-On Ramp | Ramp (Merge) | 2 | 66.1 | 17.8 | B | 64.2 | 24.9 | C |
| 14 . West of Marks Avenue | Basic | 2 | 73.2 | 15.7 | B | 70.2 | 22.8 | C |
| | | | | | | | | |

Notes:

SR-180 = State Route 180

mi/hr : miles per hour

pc/mi/ln: passanger cars per mile per lane

**Bold** Indicates deficient LOS

# 10.0 SITE ACCESS ANALYSIS

## 10.1 EVALUATION OF PROJECT DRIVEWAYS

Previously referenced Figure 1-2 illustrates the project site plan. As shown in Figure 1-2, and as described in Chapter 1, access to the project site will be provided via seven driveways located on Marks Avenue, Nielsen Avenue, and Hughes Avenue.

All project driveways will be stop controlled at the driveway approach. Therefore, vehicles exiting the project site from project driveways must stop before they continue to merge on the neighboring circulation network.

The majority of the observed traffic flow within the study area utilize Marks Avenue. Out of the three driveways on Marks Avenue, two of them are right-in-right-out only. For the other driveway, left-turn egress movement will be restricted. Additionally, a two-way left turn lane (TWLTL) is present at this location on Marks Avenue. Therefore, project trips using a left-turn ingress movement can also wait in the TWLTL for the clearance of northbound traffic on Marks Avenue. Since there is a traffic signal at the intersection of Marks Avenue/Nielsen Avenue, these project trips will have the opportunity to utilize gaps in northbound traffic created by the signal to complete the turn into the project driveway. Additionally, there are no major obstructions to vision present along Marks Avenue. Therefore, sight distance will not be an issue for these driveways.

For project driveways located along Nielsen Avenue and Hughes Avenue, there needs to be adequate corner sight distance for vehicles to make an egress movement. There is no provision for on-street parking along the project frontage on Nielsen Avenue or Hughes Avenue. Additionally, there are no trees or large stationary objects that might obstruct the sight triangle for drivers. As such, there should be adequate sight distance at the project driveways along Nielsen Avenue or Hughes Avenue. Therefore, it can be concluded that a clear sight triangle will be available for drivers exiting the driveway to safely make turns onto Nielsen Avenue or Hughes Avenue.

# 11.0 SIGNAL WARRANT ANALYSIS

As recommended during the scoping agreement process, signal warrant analysis was conducted at all unsignalized study intersections. Intersection approach volumes for the study intersections was examined to determine whether signalization is warranted per the criteria defined in the California supplement of the *Manual on Uniform Traffic Control Devices* (CA-MUTCD). As recommended by City staff, three separate signal warrant analysis was conducted for the unsignalized study intersections as follows:

1. Warrant 1: 8 hour Vehicular Volume
2. Warrant 2: 4 hour Vehicular Volume
3. Warrant 3: Peak Hour

Specifically, warrant 1 and 2 was conducted for all the unsignalized intersections under existing scenario, and an analysis with signal warrant 3 was conducted for the unsignalized intersections under all scenarios. Following is a brief summary of signal warrant analysis for each intersection:

## 11.1 MARKS AVENUE/BELMONT AVENUE

Table 11-A shows the Warrant 1 – Eight Hour Vehicular Volume Condition A for the intersection under existing scenario. Additionally, since the posted speed limit on Marks Avenue (Major Street) is 45 mph, the 70% traffic volume condition was used for this analysis. As shown in Table 11-A, the intersection meets the signal warrant. Since Condition A is already met, Condition B was not analyzed for this intersection.

Figure 11-1 illustrates the Warrant 2- 4 hour for the study intersection under existing scenario. As shown in Figure 11-1, the intersection meets the signal warrant.

Figures 11-2, 11-3, and 11-4 illustrate the Warrant 3 (peak hour signal warrant) for this intersection under existing, Near-term approved and pending with project and Cumulative Year (2035) scenario. As shown in these figures, the intersection meets the signal warrant under all scenarios.

## 11.2 HUGHES AVENUE/BELMONT AVENUE

Based on the traffic volumes for this intersection, a combination of Condition A and Condition B was evaluated for this intersection. Tables 11-B and 11-C shows the Warrant 1 – Eight Hour Vehicular Volume Condition A, and Condition B, respectively for the intersection under existing scenario. As shown in these tables, the intersection does not meet the signal warrant. As such, this intersection does not meet either Condition A or Condition B.

Figure 11-5 illustrates the Warrant 2- 4 hour for the study intersection. As shown in Figure 11-5, the intersection does not meet the signal warrant.

Figures 11-6, 11-7, and 11-8 illustrates the Warrant 3- peak hour signal warrant for this intersection under existing, Near term Approved and pending with project and Cumulative Year (2035) scenario. As shown in these figures, the intersection does not meet the signal warrant under any scenarios.

## 11.3 HUGHES AVENUE/NIELSEN AVENUE

Based on the traffic volumes for this intersection, a combination of Condition A and Condition B was evaluated for this intersection. Tables 11-D and 11-E shows the Warrant 1 – Eight Hour Vehicular Volume Condition A, and Condition B, respectively for the intersection under existing scenario. As shown in these tables, the intersection does not meet the signal warrant. As such, this intersection does not meet either Condition A or Condition B.

Figure 11-9 illustrates the Warrant 2- 4 hour for the study intersection. As shown in Figure 11-9, the intersection does not meet the signal warrant.

Figures 11-10, 11-11, and 11-12 illustrates the Warrant 3- peak hour signal warrant for this intersection under existing, Near-term Approved and pending with project and Cumulative Year (2035) scenario. As shown in these figures, the intersection does not meet the signal warrant under any scenarios.

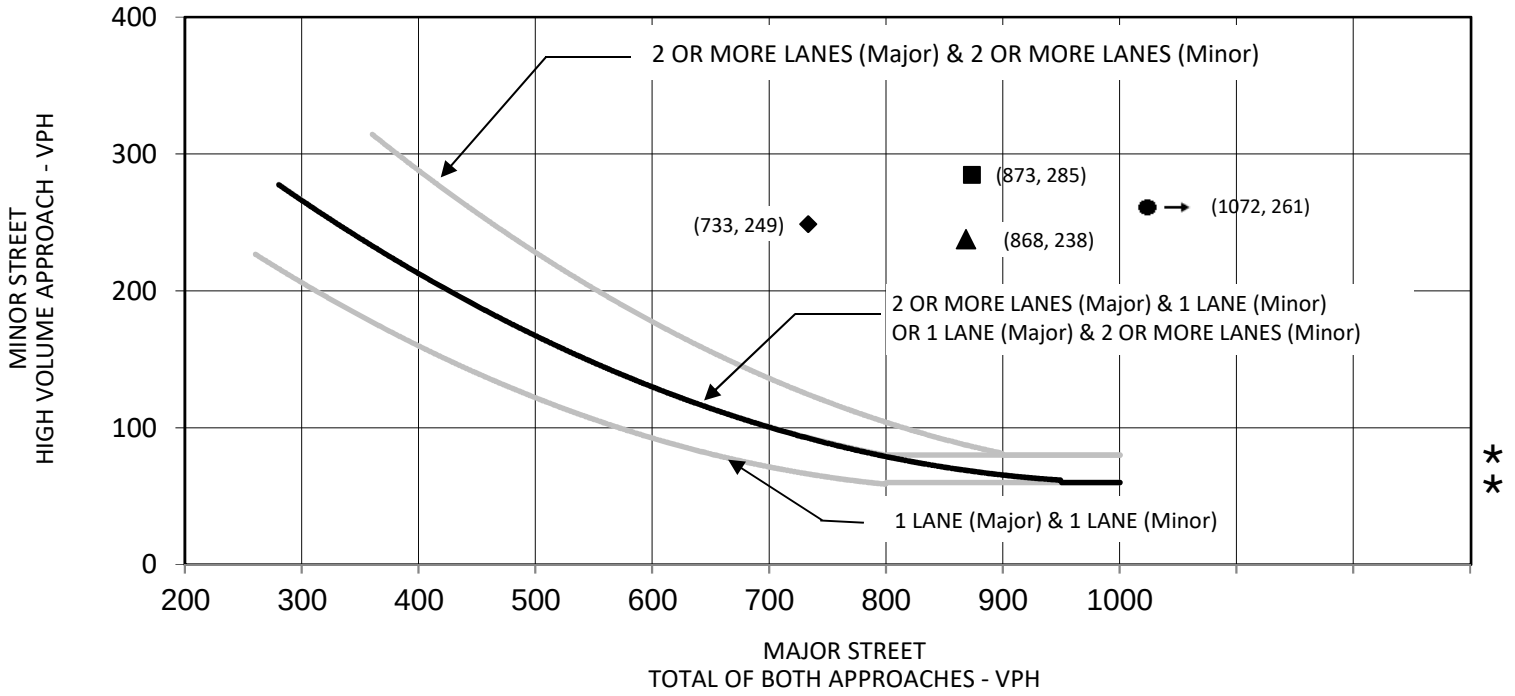
## 11.5 LIST OF CHAPTER 11.0 FIGURES AND TABLES

- Figure 11-1: Warrant 2: 4 Hour - Marks Avenue/Belmont Avenue– Existing Conditions
- Figure 11-2: Warrant 3: Peak Hour - Marks Avenue/Belmont Avenue – Existing Conditions
- Figure 11-3: Warrant 3: Peak Hour - Marks Avenue/Belmont Avenue - Near-term Approved and pending with project Conditions
- Figure 11-4: Warrant 3: Peak Hour - Marks Avenue/Belmont Avenue - Cumulative Year (2035) Conditions
- Figure 11-5: Warrant 2: 4 Hour - Hughes Avenue/Belmont Avenue
- Figure 11-6: Warrant 3: Peak Hour - Hughes Avenue/Belmont Avenue – Existing Conditions
- Figure 11-7: Warrant 3: Peak Hour - Hughes Avenue/Belmont Avenue –Near-term Approved and pending with project Conditions
- Figure 11-8: Warrant 3: Peak Hour - Hughes Avenue/Belmont Avenue Cumulative Year (2035) Conditions
- Figure 11-9: Warrant 2: 4 Hour - Hughes Avenue/Nielsen Avenue
- Figure 11-10: Warrant 3: Peak Hour - Hughes Avenue/Nielsen Avenue – Existing Conditions
- Figure 11-11: Warrant 3: Peak Hour - Hughes Avenue/Nielsen Avenue –Near-term Approved and pending with project Conditions
- Figure 11-12: Warrant 3: Peak Hour - Hughes Avenue/Nielsen Avenue - Cumulative Year (2035) Conditions
- Table 11-A : Eight-Hour Warrant Analysis - Condition A (70%)- Marks Avenue/Belmont Avenue
- Table 11-B : Eight-Hour Warrant Analysis - Condition A (80%)- Hughes Avenue/Belmont Avenue
- Table 11-C : Eight-Hour Warrant Analysis - Condition B (80%)- Hughes Avenue/Belmont Avenue
- Table 11-D : Eight-Hour Warrant Analysis - Condition A(80%)- Hughes Avenue/Nielsen Avenue

- Table 11-E : Eight-Hour Warrant Analysis - Condition B (80%) - Hughes Avenue/Nielsen Avenue

# WARRANT 2, FOUR-HOUR VEHICULAR VOLUME (70% fACTOR)

**(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 mph ON MAJOR STREET)**




* 80 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 60 VPH applies as the lower threshold volume for a minor street approaching with one lane.

FIGURE 11-1

LSA

● Highest Hour Volumes (P.M. Peak Hour)

■ Second Highest Hourly Volumes (15:00-16:00)

▲ Third Highest Hourly Volumes (A.M. Peak Hour)

◆ Fourth Highest Hourly Volumes (14:00-15:00)

*2740 West Nielsen Warehouse Project*

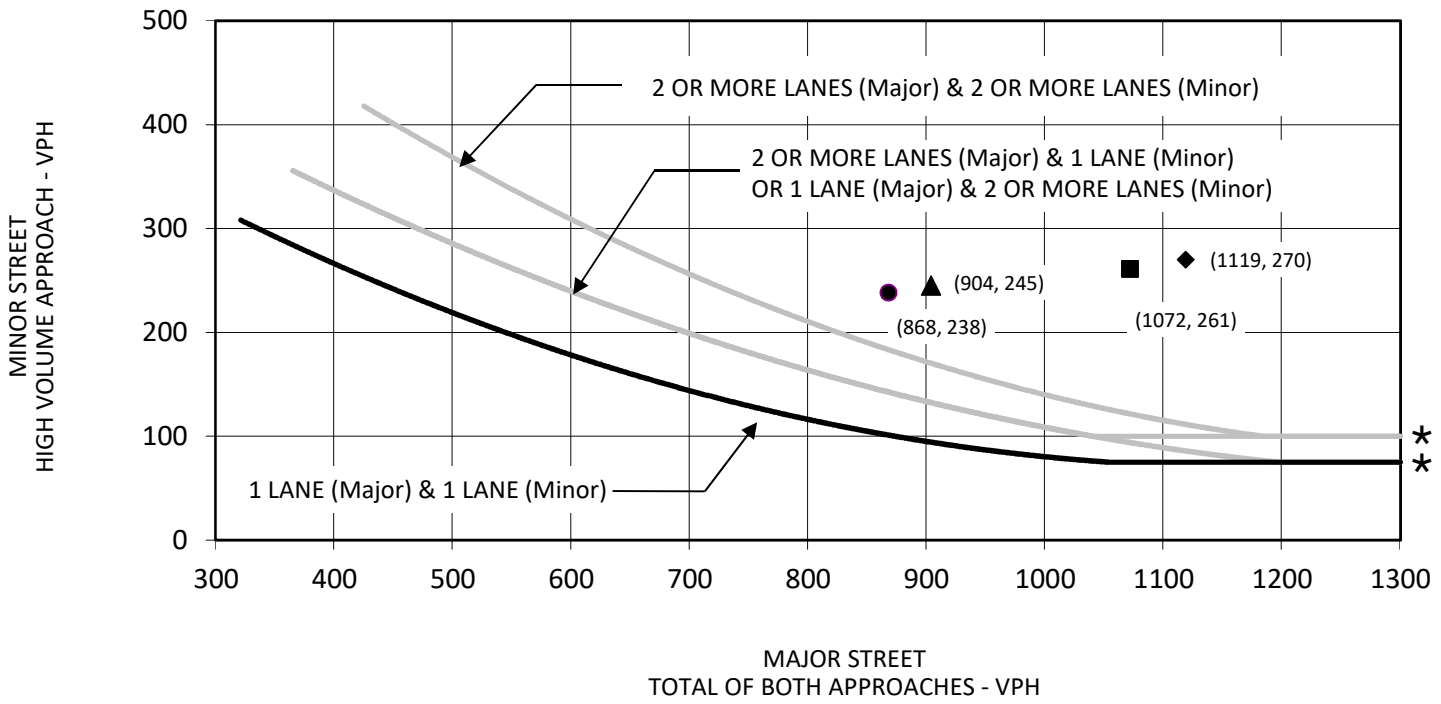
*Traffic Impact Study*

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-2

Warrant 2: 4 Hour - Marks Avenue/Belmont Avenue– Existing Conditions

# WARRANT 3, PEAK HOUR (70% FACTOR)

**(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 mph ON MAJOR STREET)**




* 100 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 75 VPH applies as the lower threshold volume for a minor street approaching with one lane.

LSA

FIGURE 11-2

● No Project AM Peak Hour
▲ With Project AM Peak Hour
■ No Project PM Peak Hour
◆ With Project PM Peak Hour

*2740 West Nielsen Warehouse Project*

*Warrant 3: Peak Hour - Marks Avenue/Belmont Avenue – Existing Conditions*

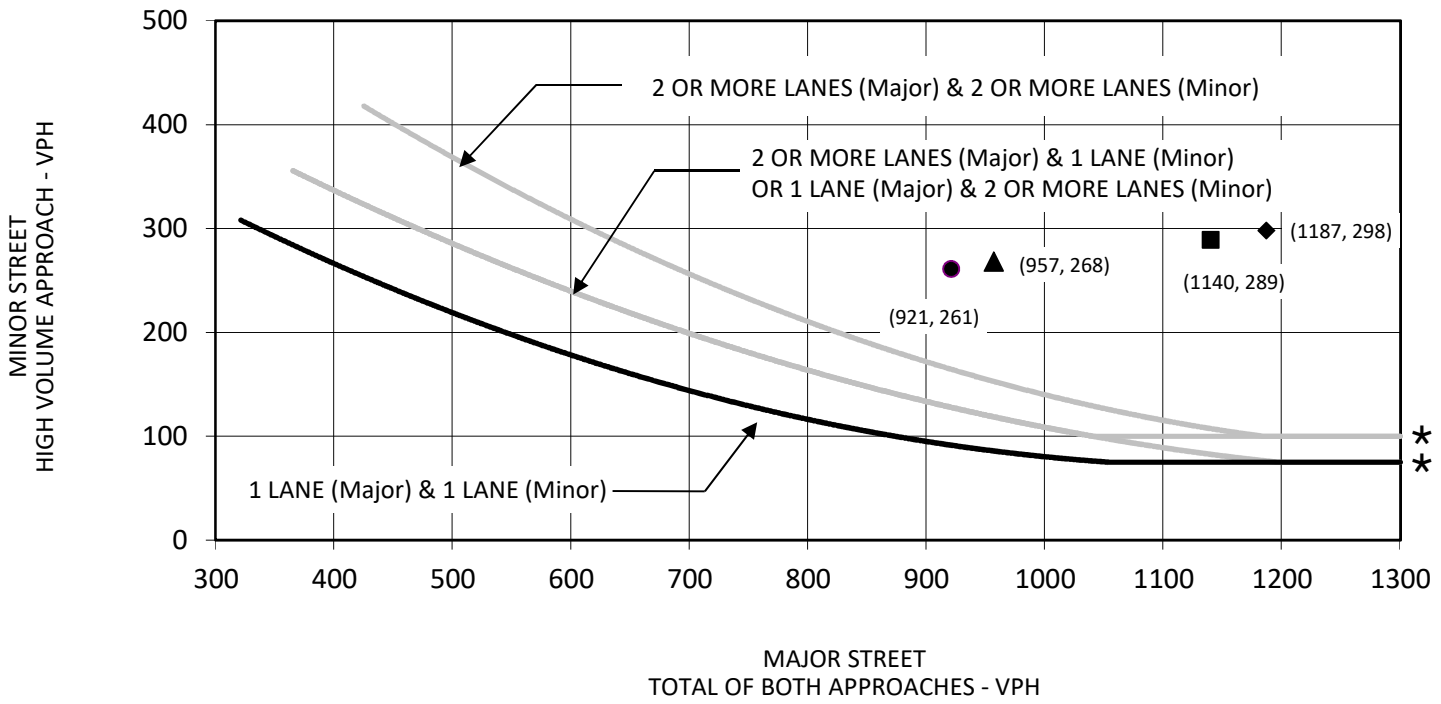
SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-4

Traffic Impact Study

R:\SNN2101\TIS\Warrants\SW_2021 Exist_Int 1.xlsx (11/22/2021)

# WARRANT 3, PEAK HOUR (70% FACTOR)

**(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 mph ON MAJOR STREET)**




* 100 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 75 VPH applies as the lower threshold volume for a minor street approaching with one lane.

LSA

FIGURE 11-3

● No Project AM Peak Hour
▲ With Project AM Peak Hour
■ No Project PM Peak Hour
◆ With Project PM Peak Hour

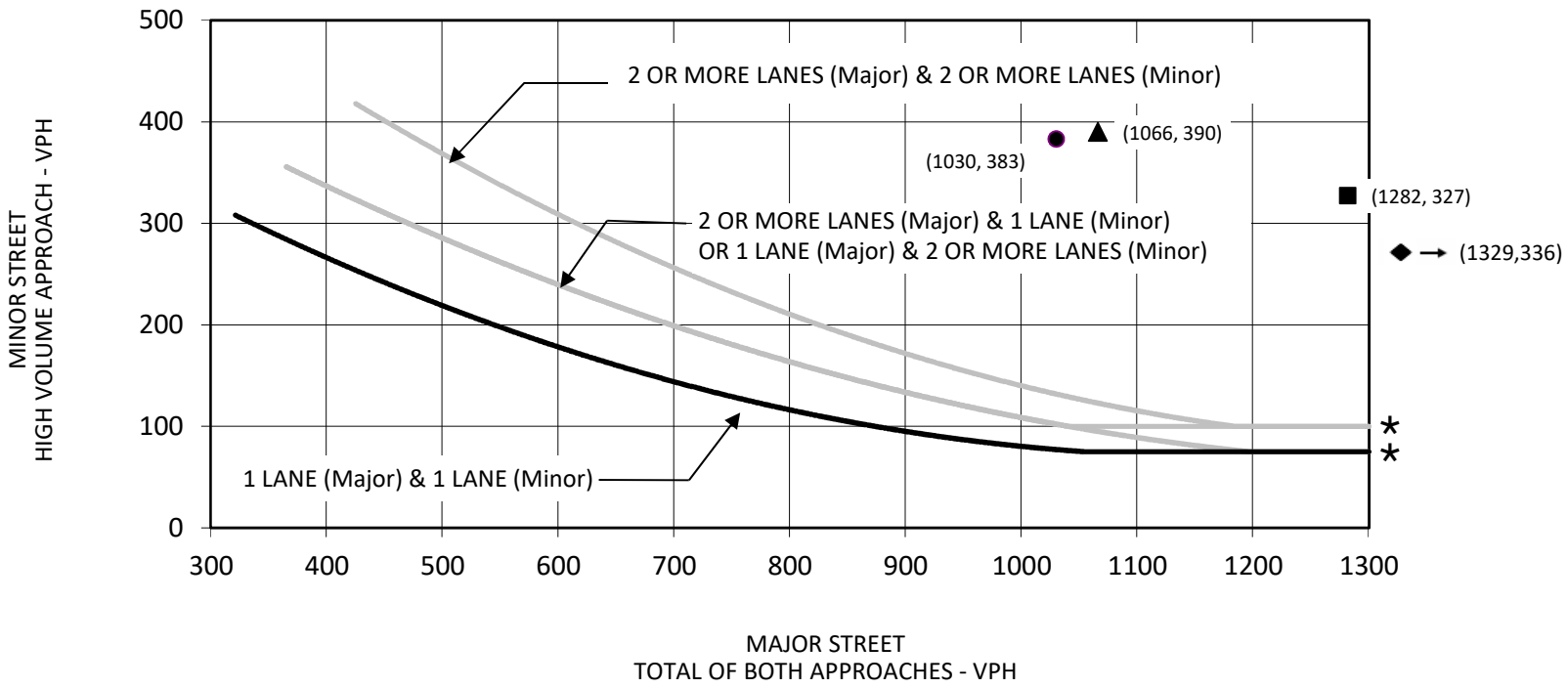
*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-4 Warrant 3: Peak Hour - Marks Avenue/Belmont Avenue - Near-term Approved and pending with project Conditions

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# WARRANT 3, PEAK HOUR (70% FACTOR)

**(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 mph ON MAJOR STREET)**




* 100 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 75 VPH applies as the lower threshold volume for a minor street approaching with one lane.

LSA

FIGURE 11-4

● No Project AM Peak Hour
▲ With Project AM Peak Hour
■ No Project PM Peak Hour
◆ With Project PM Peak Hour

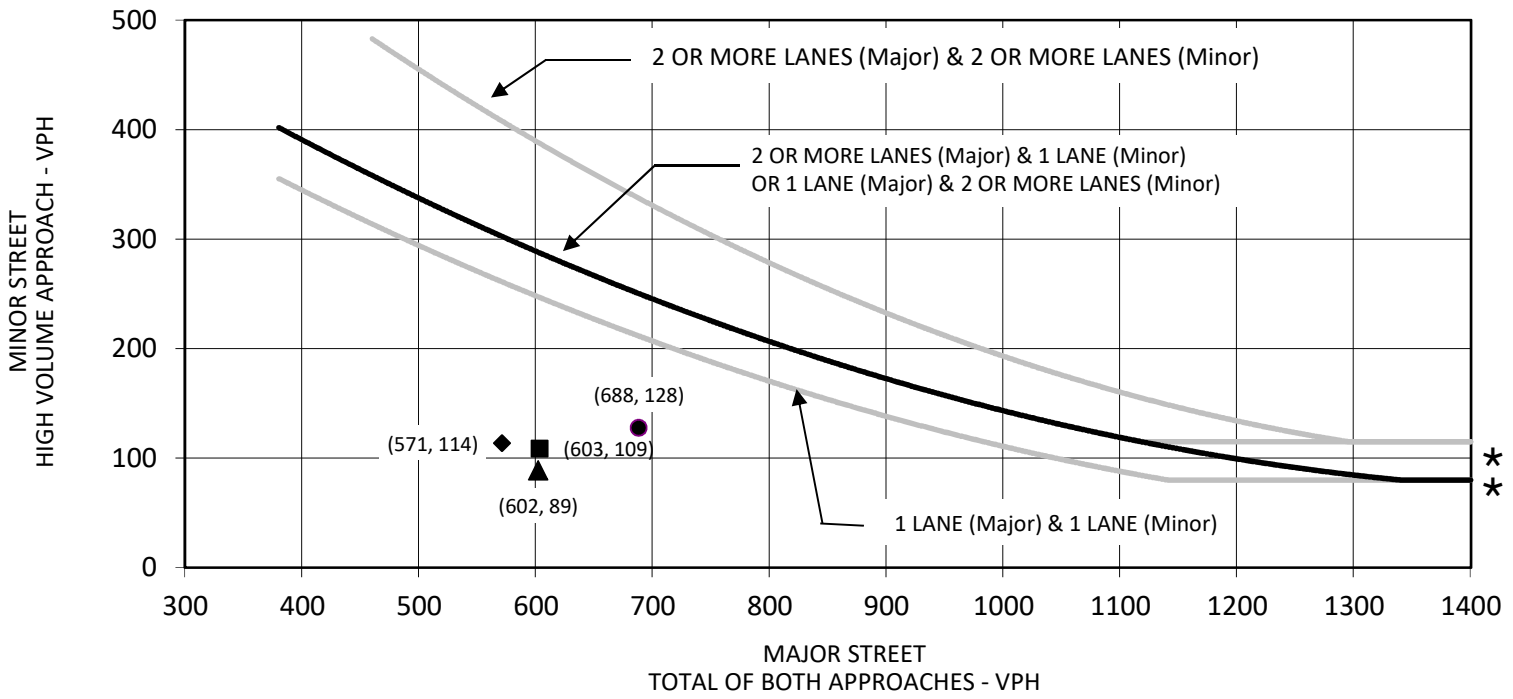
*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-4

Warrant 3: Peak Hour - Marks Avenue/Belmont Avenue Cumulative Year (2035) Conditions

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# WARRANT 2, FOUR-HOUR VEHICULAR VOLUME




* 115 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 80 VPH applies as the lower threshold volume for a minor street approaching with one lane.

FIGURE 11-5

LSA

● Highest Hour Volumes (15:00-16:00)

■ Second Highest Hourly Volumes (14:00-15:00)

▲ Third Highest Hourly Volumes (13:00-14:00)

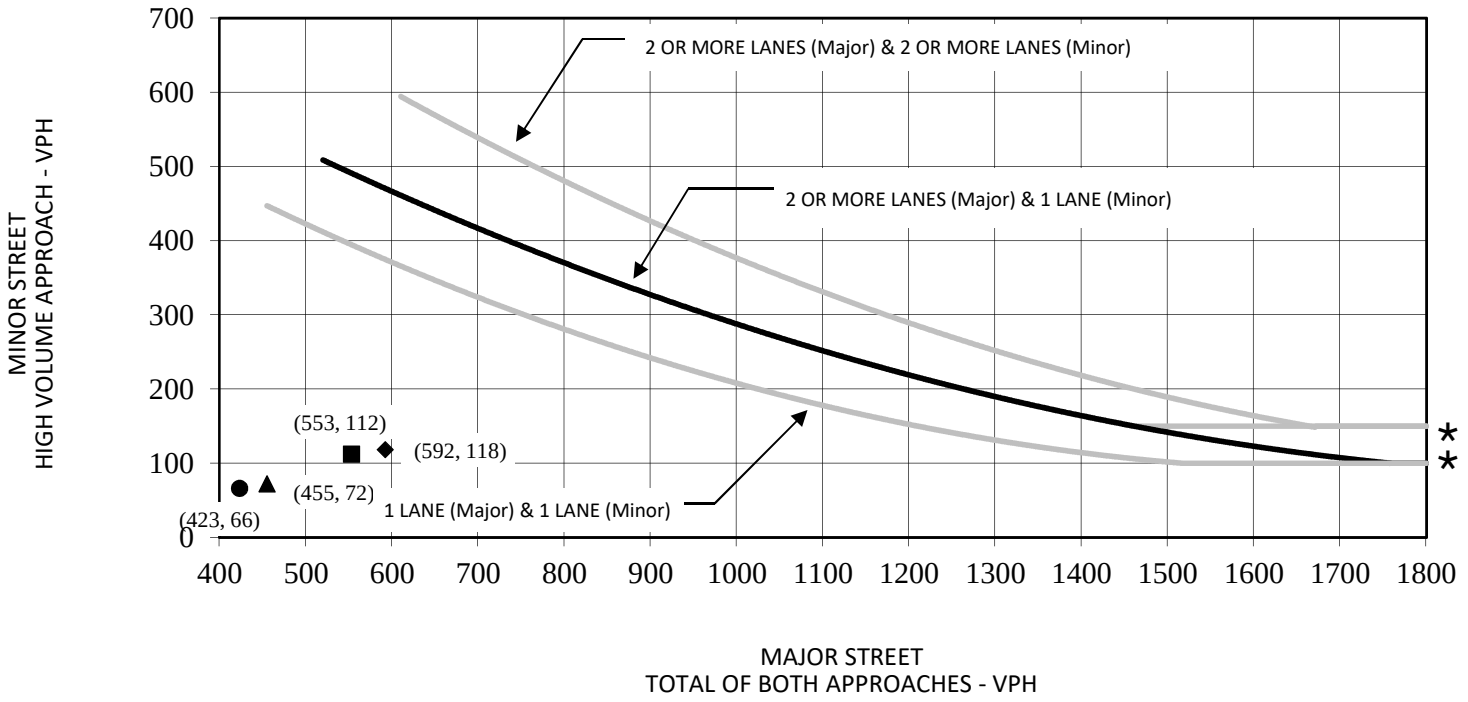
◆ Fourth Highest Hourly Volumes (12:00-13:00)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-1

Warrant 2: 4 Hour - Hughes Avenue/Belmont Avenue-Existing Conditions

# WARRANT 3, PEAK HOUR




* 150 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 100 VPH applies as the lower threshold volume for a minor street approaching with one lane.

LSA

FIGURE 11-6

● No Project AM Peak Hour
▲ With Project AM Peak Hour
■ No Project PM Peak Hour
◆ With Project PM Peak Hour

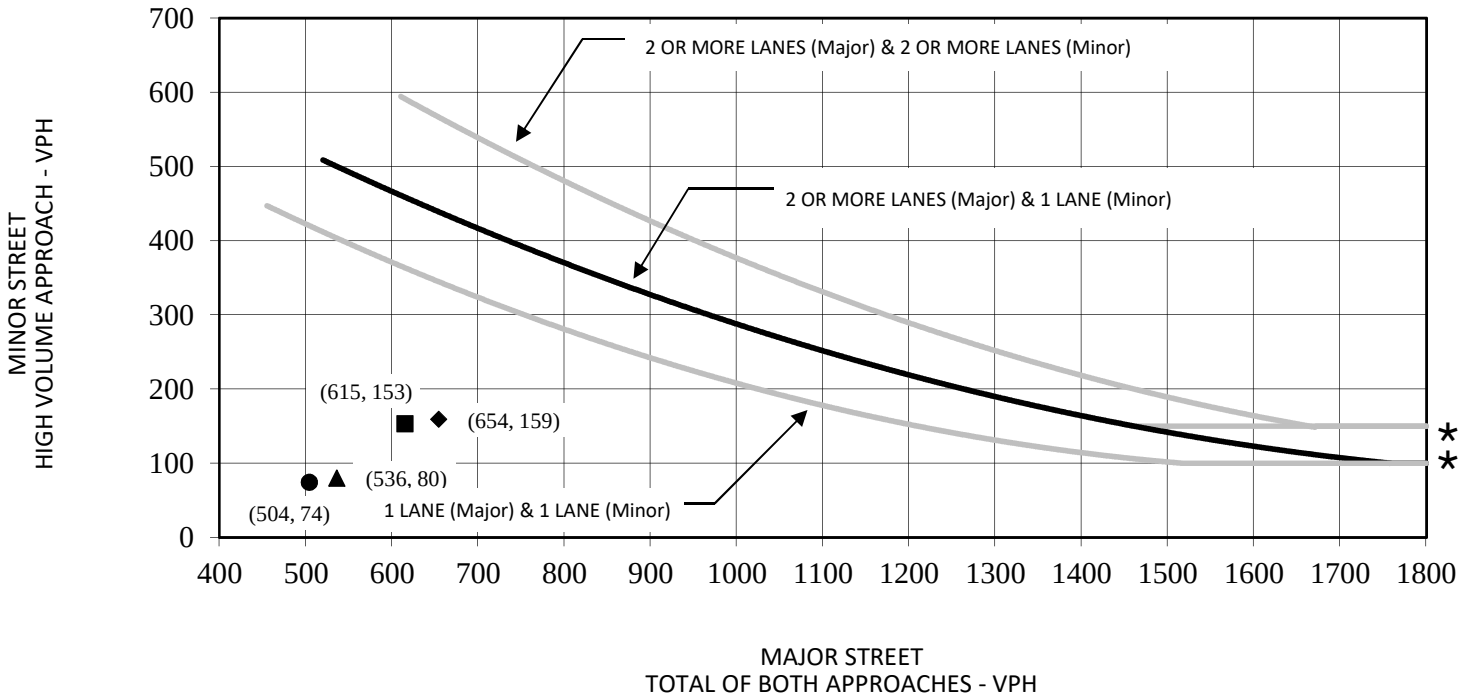
*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-3

Warrant 3: Peak Hour - Hughes Avenue/Belmont Avenue – Existing Conditions

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# WARRANT 3, PEAK HOUR




* 150 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 100 VPH applies as the lower threshold volume for a minor street approaching with one lane.

LSA

FIGURE 11-7

● No Project AM Peak Hour
▲ With Project AM Peak Hour
■ No Project PM Peak Hour
◆ With Project PM Peak Hour

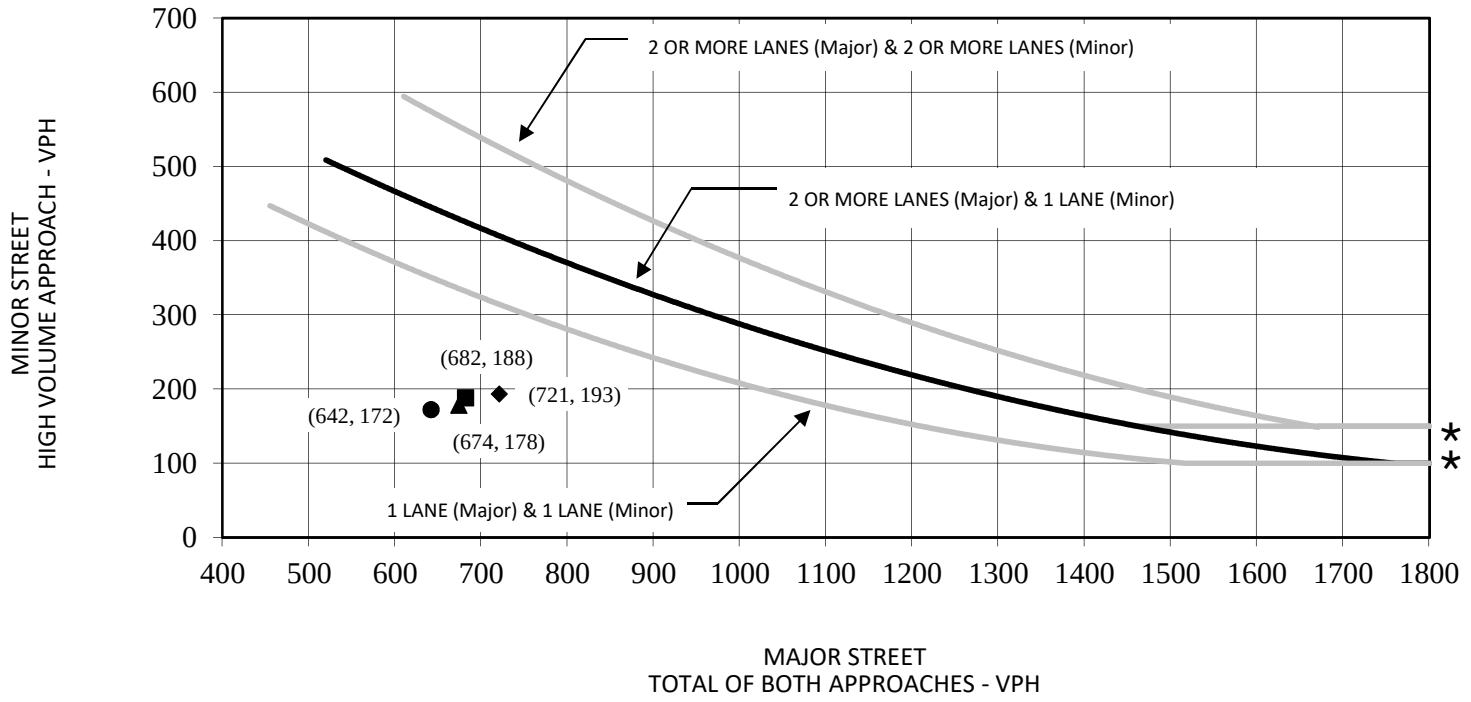
*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-3

Warrant 3, Peak Hour - Hughes Avenue/Belmont Avenue –Near-term approved and pending with project Conditions

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# WARRANT 3, PEAK HOUR




* 150 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 100 VPH applies as the lower threshold volume for a minor street approaching with one lane.

LSA

FIGURE 11-8

● No Project AM Peak Hour
▲ With Project AM Peak Hour
■ No Project PM Peak Hour
◆ With Project PM Peak Hour

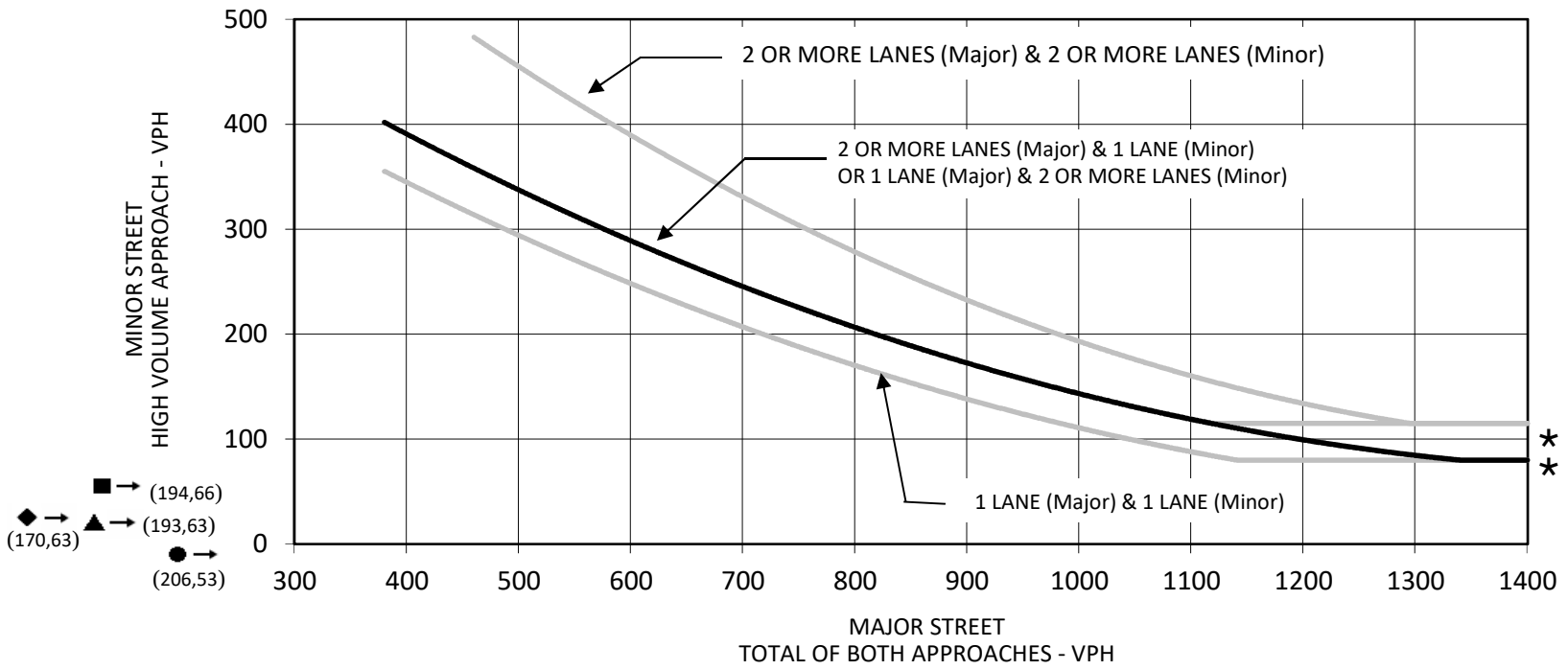
*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-3

Warrant 3: Peak Hour - Hughes Avenue/Belmont Avenue Cumulative Year (2035) Conditions

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# WARRANT 2, FOUR-HOUR VEHICULAR VOLUME




* 115 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 80 VPH applies as the lower threshold volume for a minor street approaching with one lane.

FIGURE 11-9

LSA

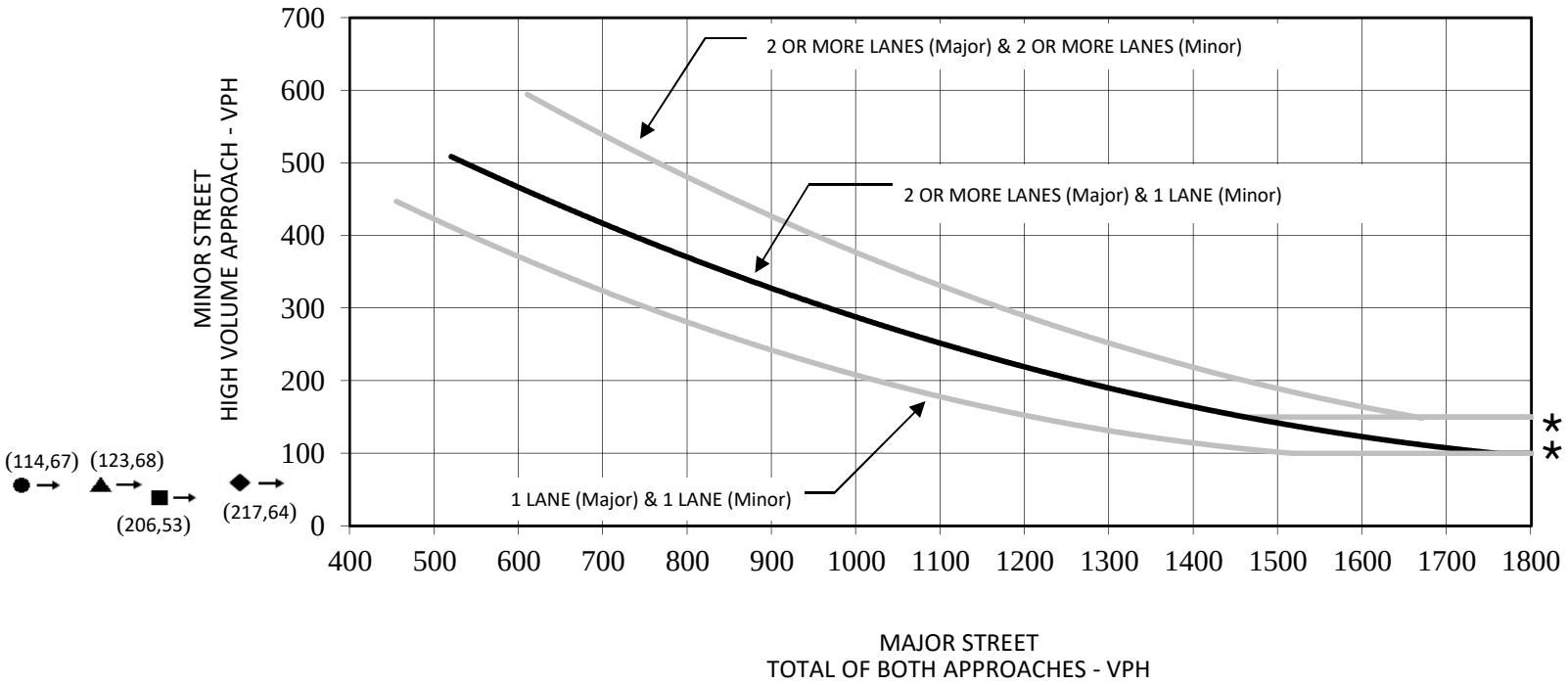
- ● Highest Hour Volumes (P.M. Peak Hour)
- ■ Second Highest Hourly Volumes (14:00-15:00)
- ▲ Third Highest Hourly Volumes (12:00-13:00)
- ◆ Fourth Highest Hourly Volumes (15:00-16:00)

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-1

Warrant 2: 4 Hour - Hughes Avenue/Nielsen Avenue-Existing Conditions

# WARRANT 3, PEAK HOUR




* 150 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 100 VPH applies as the lower threshold volume for a minor street approaching with one lane.

LSA

FIGURE 11-10

● No Project AM Peak Hour
▲ With Project AM Peak Hour
■ No Project PM Peak Hour
◆ With Project PM Peak Hour

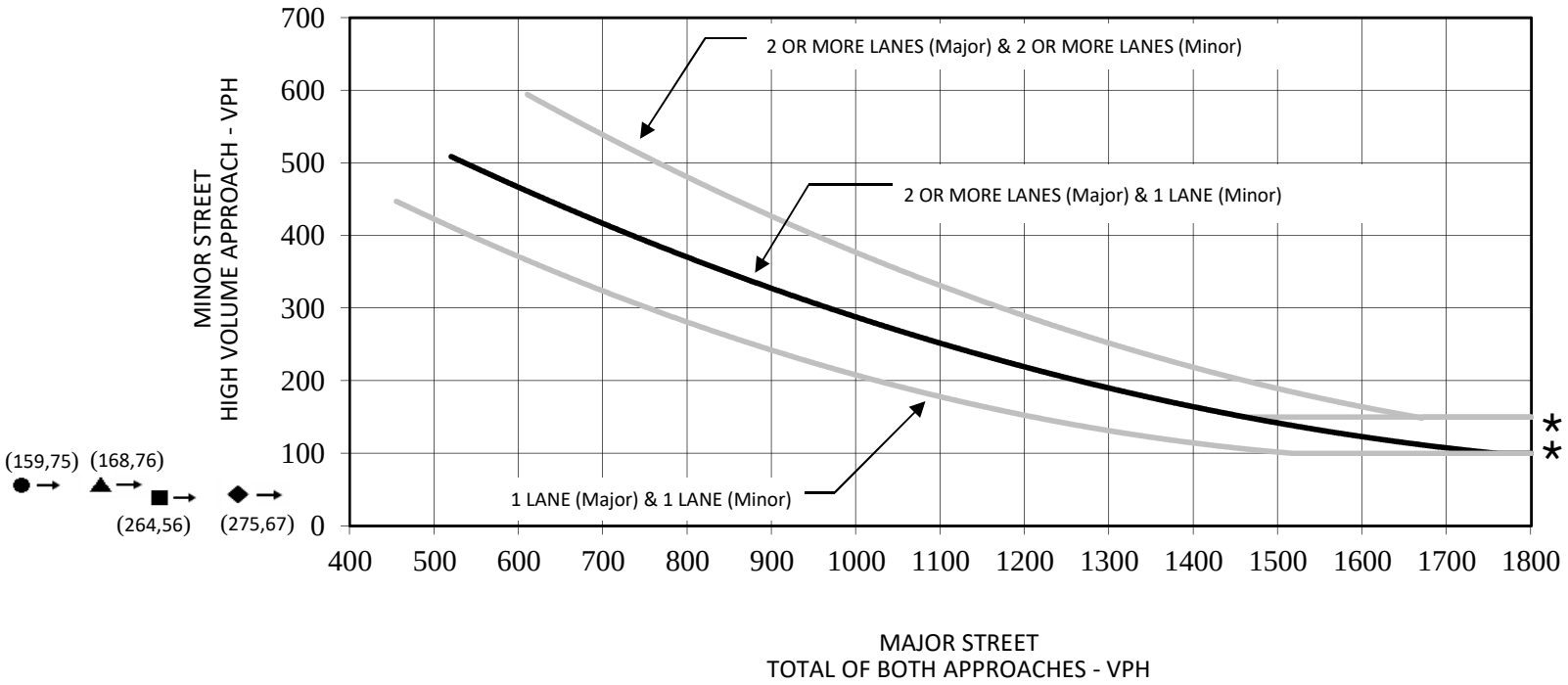
*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-3

Warrant 3: Peak Hour - Hughes Avenue/Nielsen Avenue – Existing Conditions

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# WARRANT 3, PEAK HOUR




* 150 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 100 VPH applies as the lower threshold volume for a minor street approaching with one lane.

LSA

FIGURE 11-11

● No Project AM Peak Hour
▲ With Project AM Peak Hour
■ No Project PM Peak Hour
◆ With Project PM Peak Hour

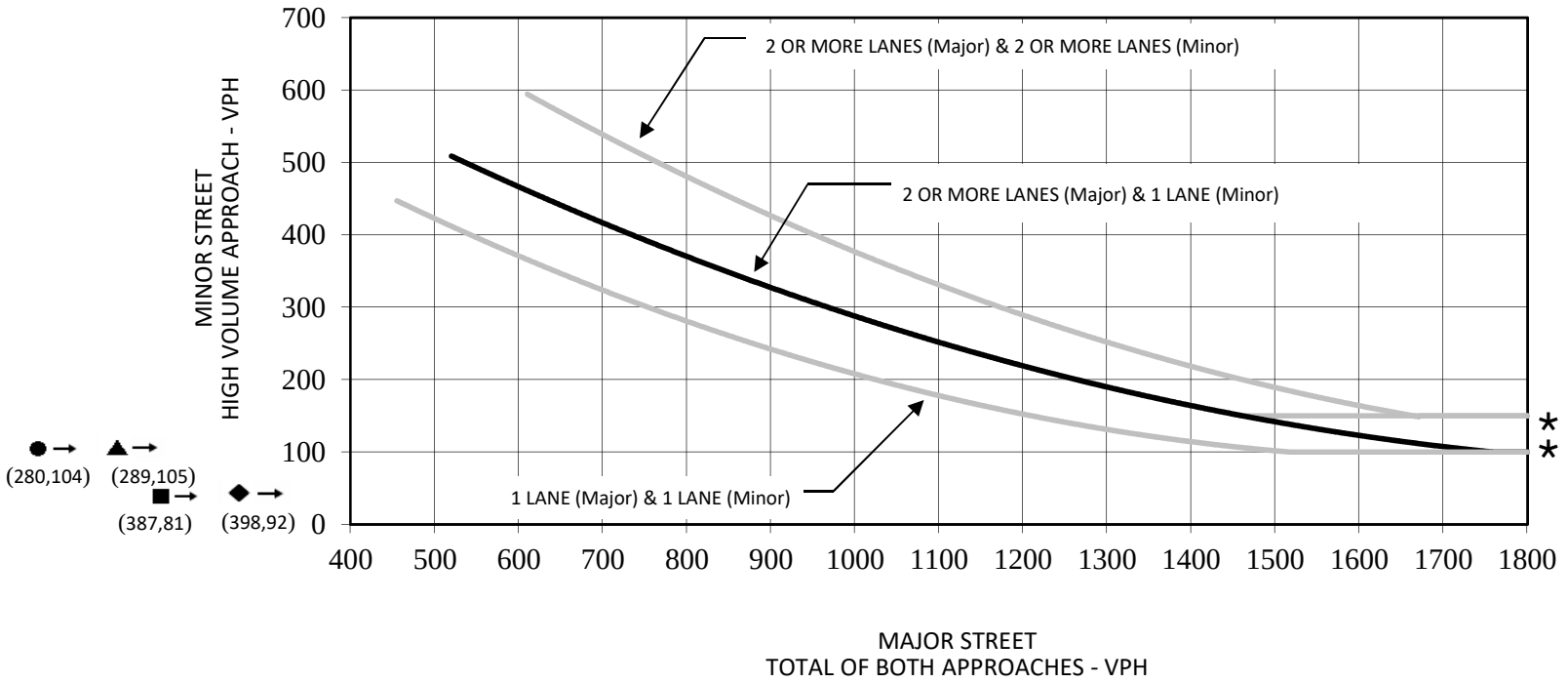
*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, Figure 4C-3

Warrant 3: Peak Hour - Hughes Avenue/Nielsen Avenue –Near-term approved and pending with project Conditions

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# WARRANT 3, PEAK HOUR




* 150 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 100 VPH applies as the lower threshold volume for a minor street approaching with one lane.

LSA

FIGURE 11-12

● No Project AM Peak Hour
▲ With Project AM Peak Hour
■ No Project PM Peak Hour
◆ With Project PM Peak Hour

*2740 West Nielsen Warehouse Project*
*Traffic Impact Study*

SOURCE: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, FIGURE 4C-3

Warrant 3: Peak Hour - Hughes Avenue/Nielsen Avenue - Cumulative Year (2035) Conditions

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LSA

# Table 11-A - Eight-Hour Warrant Analysis - Condition A (70%)

**Marks Avenue/Belmont Avenue**

| Time | 24-Hour Counts (Veh/hr) EB | WB | NB | SB | Total Major Approaches (≥ 420 Veh/hr) | Higher Minor Approaches (≥ 140 Veh/hr) | Warrant Met |
|---|---|---|---|---|---|---|---|
| **1 Marks Avenue/Belmont Avenue** | **Minor Approach** | | **Major Approach** | | | | |
| **0:00 - 1:00** | 15 | 39 | 26 | 27 | 53 | 39 | No |
| **1:00 - 2:00** | 10 | 0 | 19 | 12 | 31 | 10 | No |
| **2:00 - 3:00** | 13 | 6 | 22 | 18 | 40 | 13 | No |
| **3:00 - 4:00** | 14 | 18 | 22 | 18 | 40 | 18 | No |
| **4:00 - 5:00** | 42 | 62 | 52 | 60 | 112 | 62 | No |
| **5:00 - 6:00** | 106 | 85 | 115 | 141 | 256 | 106 | No |
| **6:00 - 7:00** | 131 | 105 | 164 | 193 | 357 | 131 | No |
| **7:00 - 8:00** | 248 | 130 | 230 | 357 | 587 | 248 | Yes |
| **8:00 - 9:00** | 182 | 162 | 259 | 289 | 548 | 182 | Yes |
| **9:00 - 10:00** | 145 | 173 | 240 | 196 | 436 | 173 | Yes |
| **10:00 - 11:00** | 142 | 221 | 262 | 178 | 440 | 221 | Yes |
| **11:00 - 12:00** | 173 | 239 | 281 | 206 | 487 | 239 | Yes |
| **12:00 - 13:00** | 168 | 234 | 383 | 196 | 578 | 234 | Yes |
| **13:00 - 14:00** | 166 | 242 | 400 | 211 | 612 | 242 | Yes |
| **14:00 - 15:00** | 192 | 249 | 522 | 211 | 733 | 249 | Yes |
| **15:00 - 16:00** | 241 | 285 | 662 | 211 | 873 | 285 | Yes |
| **16:00 - 17:00** | 264 | 236 | 530 | 201 | 732 | 264 | Yes |
| **17:00 - 18:00** | 171 | 191 | 449 | 206 | 655 | 191 | Yes |
| **18:00 - 19:00** | 122 | 136 | 296 | 134 | 429 | 136 | No |
| **19:00 - 20:00** | 96 | 146 | 121 | 104 | 225 | 146 | No |
| **20:00 - 21:00** | 53 | 91 | 183 | 94 | 277 | 91 | No |
| **21:00 - 22:00** | 33 | 86 | 99 | 53 | 152 | 86 | No |
| **22:00 -23:00** | 24 | 67 | 55 | 29 | 84 | 67 | No |
| **23:00 - 24:00** | 22 | 46 | 39 | 26 | 65 | 46 | No |
| **Total** | 2,773 | 3,249 | 5,430 | 3,371 | | | |

Notes:

Meets Approach Volume Criteria

LSA

# Table 11-B - Eight-Hour Warrant Analysis - Condition A (80%)

**Hughes Avenue/Belmont Avenue**

| Time | 24-Hour Counts (Veh/hr) EB | WB | NB | SB | Total Major Approaches (≥ 480 Veh/hr) | Higher Minor Approaches (≥ 120 Veh/hr) | Warrant Met |
|---|---|---|---|---|---|---|---|
| **6 Hughes Avenue/Belmont Avenue** | **Major Approach** | | **Minor Approach** | | | | |
| **0:00 - 1:00** | 27 | 27 | 17 | 15 | 54 | 17 | No |
| **1:00 - 2:00** | 1 | 4 | 17 | 6 | 5 | 17 | No |
| **2:00 - 3:00** | 13 | 30 | 7 | 4 | 43 | 7 | No |
| **3:00 - 4:00** | 32 | 25 | 8 | 11 | 57 | 11 | No |
| **4:00 - 5:00** | 55 | 83 | 13 | 15 | 138 | 15 | No |
| **5:00 - 6:00** | 155 | 128 | 52 | 49 | 283 | 52 | No |
| **6:00 - 7:00** | 165 | 138 | 43 | 47 | 303 | 47 | No |
| **7:00 - 8:00** | 200 | 163 | 66 | 57 | 363 | 66 | No |
| **8:00 - 9:00** | 214 | 185 | 77 | 74 | 399 | 77 | No |
| **9:00 - 10:00** | 213 | 215 | 73 | 107 | 428 | 107 | No |
| **10:00 - 11:00** | 257 | 257 | 104 | 89 | 514 | 104 | No |
| **11:00 - 12:00** | 266 | 291 | 94 | 87 | 557 | 94 | No |
| **12:00 - 13:00** | 296 | 275 | 114 | 81 | 571 | 114 | No |
| **13:00 - 14:00** | 291 | 311 | 80 | 89 | 602 | 89 | No |
| **14:00 - 15:00** | 293 | 310 | 109 | 96 | 603 | 109 | No |
| **15:00 - 16:00** | 353 | 335 | 128 | 97 | 688 | 128 | Yes |
| **16:00 - 17:00** | 299 | 269 | 109 | 102 | 568 | 109 | No |
| **17:00 - 18:00** | 216 | 239 | 113 | 77 | 455 | 113 | No |
| **18:00 - 19:00** | 181 | 170 | 40 | 62 | 351 | 62 | No |
| **19:00 - 20:00** | 157 | 173 | 18 | 52 | 330 | 52 | No |
| **20:00 - 21:00** | 110 | 129 | 49 | 49 | 239 | 49 | No |
| **21:00 - 22:00** | 79 | 125 | 46 | 40 | 204 | 46 | No |
| **22:00 -23:00** | 63 | 90 | 30 | 26 | 153 | 30 | No |
| **23:00 - 24:00** | 55 | 69 | 14 | 15 | 124 | 15 | No |
| **Total** | 3,991 | 4,041 | 1,421 | 1,347 | | | |

Notes:

Meets Approach Volume Criteria

LSA

# Table 11- C - Eight-Hour Warrant Analysis - Condition B (80%)

**Hughes Avenue/Belmont Avenue**

| Time | 24-Hour Counts (Veh/hr) EB | WB | NB | SB | Total Major Approaches (≥ 720 Veh/hr) | Higher Minor Approaches (≥ 60 Veh/hr) | Warrant Met |
|---|---|---|---|---|---|---|---|
| **6 Hughes Avenue/Belmont Avenue** | **Major Approach** | | **Minor Approach** | | | | |
| **0:00 - 1:00** | 27 | 27 | 17 | 15 | 54 | 17 | No |
| **1:00 - 2:00** | 1 | 4 | 17 | 6 | 5 | 17 | No |
| **2:00 - 3:00** | 13 | 30 | 7 | 4 | 43 | 7 | No |
| **3:00 - 4:00** | 32 | 25 | 8 | 11 | 57 | 11 | No |
| **4:00 - 5:00** | 55 | 83 | 13 | 15 | 138 | 15 | No |
| **5:00 - 6:00** | 155 | 128 | 52 | 49 | 283 | 52 | No |
| **6:00 - 7:00** | 165 | 138 | 43 | 47 | 303 | 47 | No |
| **7:00 - 8:00** | 200 | 163 | 66 | 57 | 363 | 66 | No |
| **8:00 - 9:00** | 214 | 185 | 77 | 74 | 399 | 77 | No |
| **9:00 - 10:00** | 213 | 215 | 73 | 107 | 428 | 107 | No |
| **10:00 - 11:00** | 257 | 257 | 104 | 89 | 514 | 104 | No |
| **11:00 - 12:00** | 266 | 291 | 94 | 87 | 557 | 94 | No |
| **12:00 - 13:00** | 296 | 275 | 114 | 81 | 571 | 114 | No |
| **13:00 - 14:00** | 291 | 311 | 80 | 89 | 602 | 89 | No |
| **14:00 - 15:00** | 293 | 310 | 109 | 96 | 603 | 109 | No |
| **15:00 - 16:00** | 353 | 335 | 128 | 97 | 688 | 128 | No |
| **16:00 - 17:00** | 299 | 269 | 109 | 102 | 568 | 109 | No |
| **17:00 - 18:00** | 216 | 239 | 113 | 77 | 455 | 113 | No |
| **18:00 - 19:00** | 181 | 170 | 40 | 62 | 351 | 62 | No |
| **19:00 - 20:00** | 157 | 173 | 18 | 52 | 330 | 52 | No |
| **20:00 - 21:00** | 110 | 129 | 49 | 49 | 239 | 49 | No |
| **21:00 - 22:00** | 79 | 125 | 46 | 40 | 204 | 46 | No |
| **22:00 -23:00** | 63 | 90 | 30 | 26 | 153 | 30 | No |
| **23:00 - 24:00** | 55 | 69 | 14 | 15 | 124 | 15 | No |
| **Total** | 3,991 | 4,041 | 1,421 | 1,347 | | | |

Notes:

Meets Approach Volume Criteria

LSA

# Table 11-D - Eight-Hour Warrant Analysis - Condition A (80%)

**Hughes Avenue/Nielsen Avenue**

| Time | 24-Hour Counts (Veh/hr) EB | WB | NB | SB | Total Major Approaches (≥ 400 Veh/hr) | Higher Minor Approaches (≥ 120 Veh/hr) | Warrant Met |
|---|---|---|---|---|---|---|---|
| **7 Hughes Avenue/Nielsen Avenue** | **Minor Approach** | | **Major Approach** | | | | |
| **0:00 - 1:00** | 7 | 9 | 21 | 12 | 33 | 9 | No |
| **1:00 - 2:00** | 5 | 2 | 18 | 12 | 30 | 5 | No |
| **2:00 - 3:00** | 4 | 3 | 6 | 11 | 17 | 4 | No |
| **3:00 - 4:00** | 2 | 3 | 6 | 10 | 16 | 3 | No |
| **4:00 - 5:00** | 23 | 2 | 11 | 11 | 22 | 23 | No |
| **5:00 - 6:00** | 44 | 14 | 19 | 49 | 68 | 44 | No |
| **6:00 - 7:00** | 55 | 12 | 30 | 38 | 68 | 55 | No |
| **7:00 - 8:00** | 61 | 21 | 38 | 56 | 94 | 61 | No |
| **8:00 - 9:00** | 56 | 21 | 61 | 64 | 125 | 56 | No |
| **9:00 - 10:00** | 44 | 30 | 52 | 80 | 132 | 44 | No |
| **10:00 - 11:00** | 46 | 37 | 67 | 75 | 142 | 46 | No |
| **11:00 - 12:00** | 44 | 41 | 73 | 91 | 164 | 44 | No |
| **12:00 - 13:00** | 63 | 31 | 105 | 88 | 193 | 63 | No |
| **13:00 - 14:00** | 62 | 43 | 66 | 71 | 137 | 62 | No |
| **14:00 - 15:00** | 66 | 46 | 96 | 98 | 194 | 66 | No |
| **15:00 - 16:00** | 63 | 52 | 92 | 78 | 170 | 63 | No |
| **16:00 - 17:00** | 44 | 50 | 102 | 96 | 198 | 50 | No |
| **17:00 - 18:00** | 33 | 31 | 77 | 66 | 143 | 33 | No |
| **18:00 - 19:00** | 33 | 30 | 56 | 40 | 96 | 33 | No |
| **19:00 - 20:00** | 64 | 18 | 51 | 7 | 58 | 64 | No |
| **20:00 - 21:00** | 22 | 8 | 48 | 44 | 92 | 22 | No |
| **21:00 - 22:00** | 12 | 12 | 38 | 39 | 77 | 12 | No |
| **22:00 -23:00** | 10 | 5 | 25 | 22 | 47 | 10 | No |
| **23:00 - 24:00** | 6 | 5 | 11 | 25 | 36 | 6 | No |
| **Total** | 869 | 526 | 1,169 | 1,183 | | | |

Notes:

Meets Approach Volume Criteria

LSA

# Table 11-E - Eight-Hour Warrant Analysis - Condition B (80%)

**Hughes Avenue/Nielsen Avenue**

| Time | 24-Hour Counts (Veh/hr) EB | WB | NB | SB | Total Major Approaches (≥ 600 Veh/hr) | Higher Minor Approaches (≥ 60 Veh/hr) | Warrant Met |
|---|---|---|---|---|---|---|---|
| **7 Hughes Avenue/Nielsen Avenue** | **Minor Approach** | | **Major Approach** | | | | |
| **0:00 - 1:00** | 7 | 9 | 21 | 12 | 33 | 9 | No |
| **1:00 - 2:00** | 5 | 2 | 18 | 12 | 30 | 5 | No |
| **2:00 - 3:00** | 4 | 3 | 6 | 11 | 17 | 4 | No |
| **3:00 - 4:00** | 2 | 3 | 6 | 10 | 16 | 3 | No |
| **4:00 - 5:00** | 23 | 2 | 11 | 11 | 22 | 23 | No |
| **5:00 - 6:00** | 44 | 14 | 19 | 49 | 68 | 44 | No |
| **6:00 - 7:00** | 55 | 12 | 30 | 38 | 68 | 55 | No |
| **7:00 - 8:00** | 61 | 21 | 38 | 56 | 94 | 61 | No |
| **8:00 - 9:00** | 56 | 21 | 61 | 64 | 125 | 56 | No |
| **9:00 - 10:00** | 44 | 30 | 52 | 80 | 132 | 44 | No |
| **10:00 - 11:00** | 46 | 37 | 67 | 75 | 142 | 46 | No |
| **11:00 - 12:00** | 44 | 41 | 73 | 91 | 164 | 44 | No |
| **12:00 - 13:00** | 63 | 31 | 105 | 88 | 193 | 63 | No |
| **13:00 - 14:00** | 62 | 43 | 66 | 71 | 137 | 62 | No |
| **14:00 - 15:00** | 66 | 46 | 96 | 98 | 194 | 66 | No |
| **15:00 - 16:00** | 63 | 52 | 92 | 78 | 170 | 63 | No |
| **16:00 - 17:00** | 44 | 50 | 102 | 96 | 198 | 50 | No |
| **17:00 - 18:00** | 33 | 31 | 77 | 66 | 143 | 33 | No |
| **18:00 - 19:00** | 33 | 30 | 56 | 40 | 96 | 33 | No |
| **19:00 - 20:00** | 64 | 18 | 51 | 7 | 58 | 64 | No |
| **20:00 - 21:00** | 22 | 8 | 48 | 44 | 92 | 22 | No |
| **21:00 - 22:00** | 12 | 12 | 38 | 39 | 77 | 12 | No |
| **22:00 -23:00** | 10 | 5 | 25 | 22 | 47 | 10 | No |
| **23:00 - 24:00** | 6 | 5 | 11 | 25 | 36 | 6 | No |
| **Total** | 869 | 526 | 1,169 | 1,183 | | | |

Notes:

Meets Approach Volume Criteria

# 12.0 CIRCULATION IMPROVEMENTS AND FUNDING SOURCES

## 12.1 RECOMMENDED IMPROVEMENTS

Based on the results of the LOS analysis, an operational deficiency currently exists at the intersection of Marks Avenue/Belmont Avenue. As discussed in Chapter 11, this intersection meets several signal warrants under existing, Near-term approved and pending, and Cumulative Year (2035) scenarios. Therefore, the following improvement is being recommended for this intersection:

- Marks Avenue/Belmont Avenue: Install a signal.

Tables 12-A, 12-B, and 12-C illustrate the post-improvement intersection levels of service under existing, Near-term approved and pending conditions, and Cumulative Year (2035) conditions, respectively. As shown in these tables, the intersection is forecast to operate at a satisfactory LOS with the implementation of the proposed improvement.

## 12.2 FUNDING SOURCES AND MECHANISMS

Where there is a funding mechanism (fee program) for the recommended improvements, payment into the fee program would be considered sufficient project obligation to alleviate project impacts. At study intersections where the project adds to or creates a forecast deficiency and there is no funding mechanism in place, the project is responsible for its fair-share payment toward the implementation of the improvements.

### 12.2.1 Citywide Traffic Signal Mitigation Impact (TSMI) Program

The City of Fresno traffic Signal Mitigation Impact (TSMI) fees are charged to all new developments throughout the City to mitigate the traffic operational deficiencies through the funding of traffic signal improvements to serve new developments. Based on the City of Fresno *City-Wide Traffic Signal Mitigation Impact Fee nexus Analysis for Proposed Fee Update*, dated September 2016, signalization of intersection of Marks Avenue/Belmont Avenue is included in the Traffic Signal Capital Improvements, where the entire funding is expected to be generated from the TSMI fees. Therefore, since the improvement is covered under the TSMI Fee program, the project will be paying into the fee program for this improvement.

## 12.3 LIST OF CHAPTER 12.0 TABLES

- Table 12-A: Existing with Project with Improvements Intersection Levels of Service
- Table 12-B: Near-Term Approved and Pending with Project with Improvements Intersection Levels of Service
- Table 12-C: Cumulative (2035) with Project with Improvements Intersection Levels of Service

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## Table 12-A - Existing with Project with Recommended Improvements Intersection Levels of Service

| Intersection | With Project Without Improvements | | | | | With Project With Improvements | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | A.M. Peak Hour | | P.M. Peak Hour | | | A.M. Peak Hour | | P.M. Peak Hour | |
| | Control | Delay (sec.) | LOS | Delay (sec.) | LOS | Control | Delay (sec.) | LOS | Delay (sec.) | LOS |
| 1 . Marks Avenue/Belmont Avenue | AWSC | 20.9 | C | >100 | F * | Signal | 20.6 | C | 22.3 | C |

## Table 12-B - Near-Term approved and pending with Project with Recommended Improvements Intersection Levels of Service

| Intersection | With Project Without Improvements | | | | | With Project With Improvements | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | A.M. Peak Hour | | P.M. Peak Hour | | | A.M. Peak Hour | | P.M. Peak Hour | |
| | Control | Delay (sec.) | LOS | Delay (sec.) | LOS | Control | Delay (sec.) | LOS | Delay (sec.) | LOS |
| 1 . Marks Avenue/Belmont Avenue | AWSC | 26.2 | D | >100 | F * | Signal | 21.3 | C | 23.3 | C |

## Table 12-C - Cumulative Year (2035) with Project with Recommended Improvements Intersection Levels of Service

| Intersection | With Project Without Improvements | | | | | With Project With Improvements | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | A.M. Peak Hour | | P.M. Peak Hour | | | A.M. Peak Hour | | P.M. Peak Hour | |
| | Control | Delay (sec.) | LOS | Delay (sec.) | LOS | Control | Delay (sec.) | LOS | Delay (sec.) | LOS |
| 1 . Marks Avenue/Belmont Avenue | AWSC | 23.6 | C | >100 | F * | Signal | 23.4 | C | 24.4 | C |

**Notes:**

AWSC = All-Way Stop Control

Delay = Average control delay in seconds (For OWSC intersections, reported delay is for worst-case movement).

LOS = Level of Service

* Exceeds LOS Standard

# 13.0 VEHICLE MILES TRAVELED ANALYSIS

On December 28, 2018, the California Office of Administrative Law cleared the revised California Environmental Quality Act (CEQA) guidelines for use. Among the changes to the guidelines was removal of vehicle delay and level of service from consideration under CEQA. With the adopted guidelines, transportation impacts are to be evaluated based on a project's effect on vehicle miles traveled (VMT).

The City adopted the City of Fresno CEQA Guidelines for Vehicle Miles Traveled Thresholds (VMT Guidelines) on June 25, 2020, which includes the screening criteria, VMT analysis methodology, VMT impact thresholds, and VMT mitigation measures. Therefore, the City's VMT Guidelines was used in the evaluation of the project's VMT analysis.

## 13.1 METHODOLOGY

The VMT Guidelines provides multiple screening criteria for land use projects. The project was compared with the screening criteria established in the "Project Screening" section of the VMT Guidelines to check if the project can be screened out. Following is a brief description about the project in relation with the project screening criteria:

- **Transit Priority Area (TPA) Screening:** The project is not located within a TPA. Therefore, this screening criteria does not apply to the project.
- **Low Trip Generator:** The VMT Guidelines identifies that projects generating less than 500 daily trips could also be screened out. As discussed in the project trip generation section, the project is estimated to generate 2,458 daily trips. Therefore, the project does not satisfy this screening criteria.
- **Other Screening Criteria:** The project is not a residential or office projects, and therefore it could not be screened out using low VMT area maps. Additionally, it is neither an affordable housing project nor it could be classified as retail, institutional/government uses or public service uses. Therefore, these criteria do not apply for the project.

As shown above, the project could not be screened out from detailed VMT analysis. As such, pursuant to the VMT Guidelines, a detailed VMT analysis was conducted to assess the project's VMT impact.

### 13.1.1 Thresholds of Significance

Though the project is non-residential it could not be classified as a retail or office project. Additionally, the project does not require a General Plan Amendment (GPA). Therefore, pursuant to the VMT Guidelines, the project VMT per employee needs to be compared with the existing VMT per employee for the region. The City's VMT Guidelines establishes a numerical value of 25.6 for the regional VMT per employee.

As recommended in the VMT Guidelines, Fresno COG ABM was used for the project VMT analysis. The model database was updated with the project land uses to calculate project VMT. The project VMT was calculated from Fresno COG ABM model run as described below:

### 13.1.2 Project Traffic Analysis Zone Update

The first step in preparation of this analysis was to update the traffic analysis zone (TAZ) in the model that include the project area. The project land use was converted to employments. SF to employee conversion factor were estimated from Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. Daily Trip rates per employee were divided by daily trip rates per 1,000 SF to estimate the ratio between land use square footage and number of employees. The socioeconomic data for the project TAZ in the existing year model scenario was updated accordingly.

### 13.1.3 Model Runs and Project VMT Estimation

Model run was conducted for this updated model upon completion of the socioeconomic data update. The outputs from this updated model run was used to calculate the project VMT per employee.

## 13.2 PROJECT VMT ANALYSIS

Table 13-A summarizes the regional threshold and project VMT per employee. As shown in Table 13-A, the project VMT per employee is 22.66% lower than the existing regional VMT per employee. Therefore, based on the VMT Guidelines, the project will not have any significant VMT impact.

Detailed VMT calculation for the project is included in Appendix G.

## 13.3 LIST OF CHAPTER 13.0 TABLES

- Table 13-A: Existing (2019) Regional and Project VMT per Employee

**Table 13-A: Existing (2019) Regional and Project VMT per Employee**

| Regional* | Project | Difference | Percentage Difference | Significant Impact |
|---|---|---|---|---|
| 25.6 | 19.8 | 5.8 | 22.66% | No |

* *Obtained from City's VMT Guidelines.*

# 14.0 COLLISION ANALYSIS

As recommended by the City staff during the scoping agreement process, a collision analysis was performed in the vicinity of the project area. As such, intersections and roadway segments within the study area where accidents occurred in recent times were evaluated to estimate the accident rates at those locations. For the arterial roadway network system in the vicinity of the project, Statewide Integrated Traffic Records System (SWITRS) collision data between January 2018 and December 2020 were obtained from the Transportation Injury Mapping System (TIMS) database. For the freeway facilities in the vicinity of SR-180 Marks Avenue Interchange, Traffic Accident Surveillance and Analysis System (TASAS) crash data summary was obtained from Caltrans for the same time period. The SWIRTS data summary and Caltrans TASAS data summary is included in Appendix H.

Based on the SWIRTS data summary, within the study area during the same time period, one collision occurred at the intersection of Marks Avenue/SR-180 Westbound Ramps and one fatal collision occurred along the roadway segment of Hughes Avenue, between Belmont Avenue and Nielsen Avenue.

## 14.1 METHODOLOGY

For the intersections analyzed, rates per million entering vehicle (RMEV) was calculated to develop the accident rate at the intersection of Marks Avenue/SR-180 Westbound Ramps. Similarly, for the roadway segment of Hughes Avenue, between Belmont Avenue and Nielsen Avenue, rates per million vehicle miles (MVM) was calculated to determine the accident rate. For the roadway segment, length of the segment was determined from Google Earth aerial imagery. Additionally, since the accidents occurred at one intersection and within one segment only, only those locations were evaluated. These rates were compared against corresponding countywide and statewide rates to identify their performance. The statewide and countywide rates were obtained or derived from the data published in Caltrans *2018 Crash Data on California State Highways (Caltrans Crash Data).*

## 14.2 ANALYSIS SUMMARY

### 14.2.1 Intersections

Table 14-A summarizes the accident ratio for the intersection of Marks Avenue/SR-180 Westbound Ramps. As shown in Table 14-A, the accident rate at this intersection is 0.06 per million entering vehicle, which is substantially lower than the statewide average for such intersections. The accident rate for such intersections (signalized T-intersections under suburban setting) is 0.29 as per the Caltrans Crash Data. Relevant pages from the Caltrans Crash Data summary is included in Appendix H. As such, the intersection currently operates within the safety limits and no safety related improvements would be required at this intersection. Since no accidents occurred at the other intersections within recent years, no improvement is necessary for those intersections as well.

### 14.2.2 Roadway Segment

Table 14-B summarizes the accident rate for the roadway segment of Hughes Avenue, between Belmont Avenue and Nielsen Avenue. As shown in Table 14-B, the accident rate at this roadway segment is 0.71 per million vehicle miles traveled, which is lower than both countywide and

statewide average for non-freeway facilities. The average accident rate for roadway segments (non-freeway facilities) is 0.96 for the County and 1.02 for the state based on the Caltrans Crash Data. Additionally, as per Caltrans Crash Data, the statewide accident rate for two-lane undivided roadways with a speed limit of less than 45 mph and in a suburban setting is 1.6 which is substantially higher than the accident rate at the analyzed segment. Relevant pages from the Caltrans Crash Data summary is included in Appendix H. Therefore, this segment currently operates within acceptable safety limits.

However, currently, this roadway segment does not have any sidewalks to provide safe access to pedestrians. As previously mentioned, the City recommends installing sidewalks along this roadway segment under its Active Transportation Plan. As such, the project would be constructing a sidewalk along this segment along the project frontage, as well as project frontages along Marks Avenue and Nielsen Avenue as a project design feature. The addition of these sidewalks by the project would enhance pedestrian access and address safety concerns.

Since no accidents happened along other roadway segments within the study area, no improvement have been recommended at those segments.

### 14.2.3 Freeway Segment

Based on the TASAS data for freeway facilities, 36 collisions occurred in the freeway facilities within one mile on either side of the SR-180 and Marks Avenue interchange. None of these collisions resulted in any fatalities. The Caltrans TASAS data summary is included in Appendix H. As included in the summary, the rate of total fatal and injury related collisions along this facility is lower than the corresponding average rate for similar facilities.

## 14.3 CONCLUSION

Based on the results of this analysis, no improvement is necessary within the study area with the exception of installation of sidewalk along the project frontage on Hughes Avenue. Though the project will be adding new trips within the study area, it is not estimated that the project traffic will be significantly changing the traffic flow pattern within the neighborhood. As such, it is not expected that the project traffic will result in unsafe environment within the study area from traffic safety perspective. As described in the previous chapter, project traffic are estimated to have adequate time for turn movements and corner sight clearance along the project driveway and the intersections. Therefore, both car and truck trips generated by the project could safely maneuver throughout the study area. As such, the project would not potentially increase traffic collision rate within the study area.

## 14.4 LIST OF CHAPTER 14.0 TABLES

- Table 14-A: Intersection Accident Rate per RMEV
- Table 14-B: Roadway Segment Accident Rate per MVM

LSA

## Table 14-A - Intersection Accident Rate per RMEV

| | Intersection | # of Crashes C | Existing Daily Approach V | Years of Data N | Accident Ratio R |
|---|---|---|---|---|---|
| 4 . | Marks Avenue/SR-180 Westbound Ramps | 1 | 16,474 | 3 | 0.06 |

**Notes:**

RMEV= Rate per Million Entering Vehicle

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## Table 14-B - Roadway Segment Accident Rate per MVM

| Roadway | # | Segment | # of Crashes C | Existing ADT V | Years of Data N | Length of Segment (ft)[1] L | Accident Ratio R |
|---|---|---|---|---|---|---|---|
| **Hughes Avenue** | **7** | Hughes Avenue, between Belmont Avenue and Nielsen Avenue | 1 | 2,604 | 3 | 2,587 | 0.72 |

**Notes:**

MVM = Million Vehicle Miles Traveled.

# 15.0 SUMMARY AND CONCLUSION

The proposed project consists of four buildings with a total area of 901,438 sf, all of which will be High Cube Fulfilment Center warehouses. Access to the project site would be provided via seven driveways located on Marks Avenue, Nielsen Avenue and Hughes Avenue. The project is estimated to generate 2,458 daily PCE trips, with 137 PCE trips occurring during the a.m. peak hour and 176 PCE trips occurring during the p.m. peak hour.

## 15.1 EXISTING CONDITIONS SUMMARY

All but one study intersections and all roadway segments operate at a satisfactory LOS under existing without and with project conditions.

## 15.2 NEAR-TERM APPROVED AND PENDING (2023) CONDITIONS SUMMARY

All but one study intersections and all roadway segments are forecast to operate at a satisfactory LOS under Near-term approved and pending (2023) with project conditions.

## 15.3 CUMULATIVE YEAR (2035) CONDITIONS SUMMARY

All but one study intersections and all roadway segments are forecast to operate at a satisfactory LOS under Cumulative Year (2035) without and with project conditions.

## 15.4 QUEUING ANALYSIS SUMMARY

Except for some movements for the intersection of Marks Avenue/Belmont Avenue, all other study intersections are forecast to have adequate storage lane lengths to accommodate queues under all scenarios.

## 15.5 WORST CASE SCENARIO ANALYSIS SUMMARY

All study intersections and freeway segments evaluated under this scenario are forecast to operate at a satisfactory LOS under Near-term approved and pending (2023) with project conditions and Cumulative Year (2035) with project conditions.

## 15.6 SITE ACCESS ANALYSIS SUMMARY

The project driveways have adequate corner sight distance and will be stop controlled. Based on the locations of the project driveways, the project is not anticipated to create deficiency in the neighborhood traffic flow pattern.

## 15.7 SIGNAL WARRANT ANALYSIS SUMMARY

The intersection of Marks Avenue/Belmont Avenue meets signal warrant 1 and signal warrant 2 under existing conditions. This intersection also meets peak hour signal warrant for existing and all other analysis scenarios. The intersections of Hughes Avenue/Belmont Avenue and Hughes Avenue/Nielsen Avenue do not meet any signal warrant under any scenario.

## 15.7 CIRCULATION IMPROVEMENTS SUMMARY

Based on the improvements discussed in Section 12.1 “Recommended Improvements” of this report, the recommended improvements includes installing a signal at the intersection of Marks Avenue/Belmont Avenue. This improvement is included in the City’s TSMI fee program.

## 15.8 CEQA VMT ANALYSIS SUMMARY

The project could not be screened out and a detailed VMT analysis was performed for the project. Based on the results of this analysis, the project will not have any CEQA VMT impact.

## 15.9 COLLISION ANALYSIS SUMMARY

Accident ratio within the study area is lower than the corresponding countywide and statewide average and no improvement is necessary to enhance safety within the study area. Within one mile of the SR-180 and Marks Avenue interchange, the accident rates are lower than the average for similar facilities. It is not estimated that the project traffic will significantly change the traffic flow pattern within the study area or increase the current collision frequency.

# APPENDIX A:

# SCOPING AGREEMENT

CARLSBAD
FRESNO
IRVINE
LOS ANGELES
PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROSEVILLE
SAN LUIS OBISPO

July 19, 2021

Ms. Jill Gormley
City Traffic Engineer, City of Fresno
2600 Fresno Street
Room 4016
Fresno, CA 93721

Subject: Scope of Work for the 2740 West Nielsen Warehouse Traffic Impact Study (LSA Project No. SNN2101)

Dear Jill:

LSA will be preparing a traffic impact study (TIS) for the proposed 2740 West Nielsen Warehouse Project (project) to be located at the northeast corner of the intersection of Marks Avenue and Nielsen Avenue in the City of Fresno (City). Figure 1 (all figures and tables attached) illustrates the regional and project location.

The proposed project includes four High Cube Fulfillment Center warehouses totaling an area of 907,780 square feet (sf). Access to the project will be provided via the following seven driveways:

## Driveways on Marks Avenue

- Driveway 1: This full access driveway located on Marks Avenue near the Northwest corner of the site will be used by passenger vehicles only.
- Driveway 2: This driveway located on Marks Avenue will be used by trucks only. This driveway will allow all movements except for left-turn egress from the project site.
- Driveway 3: This right-in-right-out driveway located on Marks Avenue near the Southwest corner of the site will be used by passenger vehicles only.

## Driveways on Nielsen Avenue

- Driveway 4: This right-in-right-out driveway located on Nielsen Avenue will be used by passenger vehicles only.
- Driveway 5: This full access driveway located on Nielsen Avenue will be used by both passenger vehicles and trucks.

## Driveways on Hughes Avenue

- Driveway 6: This full access driveway located on Hughes Avenue near the Northeast corner of the site will be used by both passenger vehicles and trucks.
- Driveway 7: This full access driveway located on Hughes Avenue will be used by both passenger vehicles and trucks.

Figure 2 illustrates the conceptual site plan and the driveway locations.



1500 Iowa Avenue, Suite 200, Riverside, California 92507 951.781.9310 www.lsa.net

The project site designation in the City of Fresno Official Zoning Map is IH – Heavy Industrial. The project is consistent with the designated zoning. LSA anticipates that the following scope of work will be required to prepare the TIS for the proposed project.

## SCOPE OF WORK: CEQA TRANSPORTATION ASSESSMENT

Senate Bill 743 (SB 743) required changes be made to California Environmental Quality Act (CEQA) regulations introducing vehicle miles traveled (VMT) as the metric for determining project traffic impacts. Thus, a VMT analysis will be conducted for the project to satisfy the CEQA requirements. The City adopted the *City of Fresno CEQA Guidelines for Vehicle Miles Traveled Thresholds* (VMT Guidelines) on June 25, 2020, which includes the screening criteria, VMT analysis methodology, VMT impact thresholds, and VMT mitigation measures. Based on the screening criteria provided in the VMT Guidelines, it is anticipated that the project will not be screened out from a detailed VMT analysis.

LSA will utilize the Fresno Council of Governments (Fresno COG) Activity Based Model (ABM) for the VMT calculations for the project. Recently LSA has been selected as one of the consultants to run the model in-house for VMT analysis and other purposes. Therefore, LSA will run the model in-house and extract the project VMT for the VMT analysis purposes. The CEQA VMT Assessment will involve the following steps:

### Project Traffic Analysis Zone Update

The first step in preparation of this analysis will be to update the traffic analysis zones (TAZs) in the model that include the project area. LSA will convert the project land use into model socioeconomic categories using regional conversion factors. The socioeconomic data for the project TAZ in the existing year model scenario will be updated.

### Project VMT Analysis

Upon completion of the socioeconomic data update, LSA will conduct model run for the existing scenario. LSA will utilize the outputs from the model runs to calculate the regional (Entire Fresno County) with project VMT per employee. Further, with project regional VMT per employee will be compared to corresponding no project VMT per employee under existing conditions. As per the City's VMT analysis guidelines, if the with project VMT per employee exceeds the no project VMT per employee, then the project would create a significant VMT impact.

The TIS will include a chapter with the detailed VMT analysis methodology and results, and a discussion on mitigations if a significant VMT impact is found. The VMT methodology and findings will be confirmed with City staff prior to inclusion in the TIS.

### Active Transportation and Public Transit Analysis

The TIS will evaluate potential project impacts on public transit, bicycle, and pedestrian facilities in the vicinity of the project. The analysis will determine whether the project conflicts with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decreases the performance or safety of such facilities.

## SCOPE OF WORK: LEVEL OF SERVICE ANALYSIS

While Levels of Service (LOS) analysis is not a determinant of CEQA impacts, consistency with the City's General Plan goals and policies is still required. The LOS analysis will be prepared to satisfy the requirements established by the City of Fresno *Traffic Impact Study Report Guidelines* (City Guidelines), updated February 2, 2009.

### Study Intersections

LSA proposes to include the following intersections in the study:

1. Marks Avenue/Belmont Avenue (City of Fresno, County of Fresno);
2. Marks Avenue/Nielsen Avenue (City of Fresno);
3. Marks Avenue/Ray Johnson Drive (City of Fresno);
4. Marks Avenue/SR-180 Westbound Ramps (Caltrans);
5. Marks Avenue/SR-180 Eastbound Ramps (Caltrans);
6. Hughes Avenue/Belmont Avenue (City of Fresno, County of Fresno); and
7. Hughes Avenue/Nielsen Avenue (City of Fresno).

Figure 3 illustrates the study area intersections.

It should be noted that based upon the recommendation by the City, a detailed LOS analysis will not be conducted at the project driveway intersections. As such, these intersections will be included for project trip distribution, assignment and volume development purposes only. A detailed LOS analysis will only be conducted for the intersections listed above.

### Roadway Segments

LSA recommends evaluating the following roadway segments in the study:

1. Marks Avenue, between Belmont Avenue and Nielsen Avenue;
2. Marks Avenue, between Nielsen Avenue and Ray Johnson Drive;
3. Marks Avenue, between Ray Johnson Drive and SR-180 Westbound Ramps;
4. Marks Avenue, between SR-180 Westbound Ramps and SR-180 Eastbound Ramps;
5. Belmont Avenue, between Marks Avenue and Hughes Avenue;
6. Nielsen Avenue, between Marks Avenue and Hughes Avenue; and
7. Hughes Avenue, between Belmont Avenue and Nielsen Avenue.

For each roadway segment, the highest volume on any part of the segment will be considered as the analysis volume for the entire segment.

## Analysis Scenarios

The LOS analysis will satisfy the requirements established by the City and Caltrans. The following scenarios will be included in the TIS:

- Existing Conditions;
- Existing plus Project Conditions;
- Existing plus Project and Near-term approved and pending projects Conditions;
- Cumulative Year (2040) no Project Conditions; and
- Cumulative Year (2040) plus Project Conditions.

## Trip Generation

The trip generation rates from Institute of Transportation Engineers (ITE) *Trip Generation Manual* (10th Edition) Land Use 155 – "High-Cube Fulfillment Center Warehouse" have a small sample size. Recently, Western Riverside Council of Governments (WRCOG) facilitated a Trip Generation Study for such facilities. Therefore, the trip generation for the proposed project was developed using rates from this WRCOG *TUMF High-Cube Warehouse Trip Generation Study* (dated January 29, 2019) prepared by WSP. The study is included in Appendix A. The study provides separate trip generation rates for passenger vehicles, 2-4 axle trucks and 5+ axle trucks. The truck trips were converted to Passenger Car Equivalent (PCE) trips using a PCE factor of 2.0 for 2-4 axle trucks, consistent with Highway Capacity Manual (HCM) recommendations. However, as a conservative approach, a PCE factor of 3.0 was used for 5+ axle trucks, consistent with the practices in several regions within the State.

Table A summarizes the daily, a.m., and p.m. peak hour project trip generation. As shown in Table A, the project is estimated to generate 2,474 daily PCE trips, with 137 PCE trips occurring during the a.m. peak hour and 178 PCE trips occurring during the p.m. peak hour. Trip distribution patterns were obtained from select zone model runs of the Fresno COG ABM, which take into account the location of the proposed project in relation to surrounding land uses and the regional roadway network. Separate select zone trip distributions for passenger car and truck trips were obtained from the Fresno COG ABM. The select zone distribution plots are included in Appendix B. However, the model does not account for driveway location, driveway access configuration or the internal site circulation pattern. Therefore, the distribution was manually adjusted to reflect the project driveway locations and access patterns. Figures 4-A and 4-B illustrate the trip distributions at study intersections for passenger car and truck trips respectively.

The project trip assignment is the product of the project trip generation and the trip distribution percentages. Figures 5-A and 5-B illustrate the trip assignments at study intersections for passenger car and truck PCE trips respectively. Figure 6 illustrates the total project PCE trip assignment. It should be noted that these figures also include trip distribution and assignment at all the project driveways. These figures help demonstrate the volume development methodology under plus project conditions with addition of project traffic.

## Volume Development and Analysis Methodology

Traffic volumes for existing year traffic conditions are usually based on current count data collected at study intersections and roadway segments. However, current traffic counts will not reflect the typical traffic conditions due to the statewide COVID-induced closure. LSA proposes to use historical counts available from counters, and apply a growth rate appropriate for the City to develop Existing year (2021) traffic volumes.

Existing plus project volumes will be developed by adding project traffic to the Existing conditions scenario volumes.

Existing plus project and Near-term approved and pending project conditions traffic volumes will be developed by applying a per annum growth factor to the existing traffic volumes and adding traffic from the project, as well as from the approved and pending development projects in the vicinity of the project. LSA contacted the City's Planning and GIS department and obtained a list of approved and pending development projects in the project vicinity. LSA is in the process of obtaining the list of cumulative projects from the County of Fresno because of the project's adjacency to the unincorporated County limits. Table B summarizes the list of Cumulative projects within the City. As noted in Table B, LSA is requesting the City to provide additional details for projects that have missing information.

Cumulative Year (2040) no Project volumes will be developed using forecast volumes obtained from the latest version of the Fresno COG ABM and by applying the FCOG recommended post-processing methodologies. Additionally, the transportation network to be evaluated in this scenario will include all Capital Improvement Projects (CIPs) already identified in an impact fee program such as the Fresno Major Street Impact (FMSI) program or Traffic Signal Mitigation Impact (TSMI) program.

Cumulative Year (2040) plus Project Conditions will be developed by adding project traffic to the Cumulative Year (2040) scenario volumes.

All study intersections will be analyzed during the a.m. and p.m. peak hours. As per the City Guidelines, the a.m. peak hour is defined as the one hour of highest traffic volumes occurring between 7:00 and 9:00 a.m. while the p.m. peak hour is defined as the one hour of highest traffic volumes occurring between 4:00 and 6:00 p.m. Intersection LOS will be calculated using *Highway Capacity Manual 6* (HCM 6) analysis methodologies by using the Synchro 10 software.

Roadway segments will be analyzed for daily traffic using the Florida Tables as recommended in the City Guidelines.

## Queuing Analysis

A queuing analysis will be performed at all the study intersections. Queues for signalized intersections will be reported from Synchro, while queues for unsignalized intersections will be reported from SimTraffic.

## Site Access and Circulation

A description of project driveways and illustration on the Site plan will be provided in the TIS. Traffic operations at the project driveways will be analyzed for Levels of service (LOS) and queues as part of the LOS and queuing analysis. The TIS will also include a discussion on the distance of the driveways

from nearby intersections, along with the anticipated queues and Minimum Required Throat Depth (MRTD) at the driveways. An evaluation of sight distance and other potential unsafe traffic conditions shall be included in the TIS as requested by the City Staff.

### Analysis of Traffic Operations and Recommended Circulation Improvements

LOS and delay will be analyzed under the Existing plus Project, Near-Term, and Cumulative plus project analysis scenarios to determine operational deficiencies at study intersections and roadway segments. Determination of operational deficiencies will be made based on the City's LOS standards and significance threshold criteria set forth in the City Guidelines and as per consultation with City staff.

Improvements will be recommended at locations operating at an unsatisfactory LOS or where the project causes an operational deficiency. Improvements may include addition of intersection turn lanes, roadway widening, traffic signal installation and modification, local street striping and channelization improvements, and signage. The LOS with improvements will be calculated and summarized along with a comparison of the LOS without improvements.

### Signal Warrant Analysis

As per City staff comments, signal warrant analysis would be conducted at unsignalized study intersections. Peak hour approach volumes for the study intersections will be examined to determine whether signalization may be warranted per the criteria defined in the California supplement of the *Manual on Uniform Traffic Control Devices* (CA-MUTCD). Specifically, warrants 1 and 2 will be included for existing unsignalized intersections under the existing scenario. Warrant 3 will be included for unsignalized study intersections under all study scenarios.

### Multimodal Analysis

The existing, pedestrian, bicycle, and transit service will be documented and gaps in the existing sidewalk and bicycle network within the study area as well as current access to transit and current transit service will be identified in the analysis. The analysis will identify connectivity from the project site to the existing bicycle, pedestrian network, and distance to current transit stops. Improvements that will increase connectivity to sidewalks, trails, bicycle facilities and transit facilities will be considered in the TIS.

### Collision Analysis

An analysis of the collision data based on the California Highway Patrol (CHP) Statewide Integrated Traffic Records System (SWITRS) will be included in the TIS.

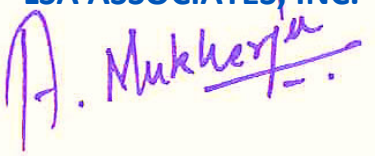
### Fair Share

LSA will evaluate whether the improvements identified in the TIS are included in the City's FMSI or the TMSI programs. If it is determined that the improvement is not covered through either of the fee programs, then the project's fair share contribution will be calculated based on the project traffic as a percentage of total growth from existing to cumulative year conditions.

Should you have any questions, please do not hesitate to contact me at (951) 781-9310 or email me at Ambarish.Mukherjee@lsa.net.

Sincerely,

**LSA ASSOCIATES, INC.**



Ambarish Mukherjee, AICP, PE
Principal

**Attachments:**

Table A: Project Trip Generation
Table B: Cumulative Projects
Figure 1: Regional and Project Location
Figure 2: Conceptual Site Plan
Figure 3: Study Area Intersections
Figure 4-A: Project Trip Distribution – Passenger Vehicles
Figure 4-B: Project Trip Distribution – Trucks
Figure 5-A: Project Trip Assignment – Passenger Vehicles
Figure 5-B: Project Trip Assignment – Truck PCE
Figure 6: Project Total Trip Assignment
Appendix A: WRCOG TUMF High-Cube Warehouse Trip Generation Study
Appendix B: Fresno COG Travel Model Select Zone Distribution Plots

# TABLES

LSA

## Table A - Project Trip Generation

| Land Use | | Units | A.M. Peak Hour In | A.M. Peak Hour Out | A.M. Peak Hour Total | P.M. Peak Hour In | P.M. Peak Hour Out | P.M. Peak Hour Total | Daily |
|---|---|---|---|---|---|---|---|---|---|
| **High-Cube Fulfillment Center**[1,2] | 907.780 | TSF | | | | | | | |
| Trips/Unit (Cars) | | | 0.083 | 0.020 | 0.103 | 0.117 | 0.027 | 0.144 | 1.750 |
| Trips/Unit (2-4 Axle Trucks) | | | 0.006 | 0.002 | 0.008 | 0.009 | 0.002 | 0.011 | 0.162 |
| Trips/Unit (5+ Axle Trucks) | | | 0.009 | 0.002 | 0.011 | 0.008 | 0.002 | 0.010 | 0.217 |
| Trips/Unit (Total) | | | 0.098 | 0.024 | 0.122 | 0.134 | 0.031 | 0.165 | 2.129 |
| Trip Generation (Cars) | | | 75 | 18 | 93 | 106 | 25 | 131 | 1,589 |
| Trip Generation (2-4 Axle Trucks) | | | 5 | 2 | 7 | 8 | 2 | 10 | 147 |
| Trip Generation (5+ Axle Trucks) | | | 8 | 2 | 10 | 7 | 2 | 9 | 197 |
| Trip Generation (Total Trucks) | | | 13 | 4 | 17 | 15 | 4 | 19 | 344 |
| Trip Generation (Total) | | | 88 | 22 | 110 | 121 | 29 | 150 | 1,933 |
| Trip Generation (Cars) | | | 75 | 18 | 93 | 106 | 25 | 131 | 1,589 |
| PCE Trip Generation (2-4 Axle Trucks)[3] | | | 10 | 4 | 14 | 16 | 4 | 20 | 294 |
| PCE Trip Generation (5+ Axle Trucks)[3] | | | 24 | 6 | 30 | 21 | 6 | 27 | 591 |
| PCE Trip Generation (Total Trucks) | | | 34 | 10 | 44 | 37 | 10 | 47 | 885 |
| **PCE Trip Generation (Total)** | | | 109 | 28 | 137 | 143 | 35 | 178 | 2,474 |

Note:

TSF = Thousand Square Feet

[1] Rates from the Western Riverside Council of Governments (WRCOG) *TUMF High-Cube Warehouse Trip Generation Study*, January 2019, prepared by WSP.

[2] The WRCOG study does not provide in/out splits for the peak hour trip generation. Therefore, in/out splits from Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition) supplement have been used for obtaining in/out traffic.

[3] A Passenger Car Equivalent (PCE) factor 2.0 has been taken for 2-4 axle trucks based on Highway Capacity Manual (HCM) recommendations. Further, as a conservative approach, a PCE factor of 3.0 is taken, for 5+ axle trucks, consistent with latest practices in numerous California jurisdictions.

LSA

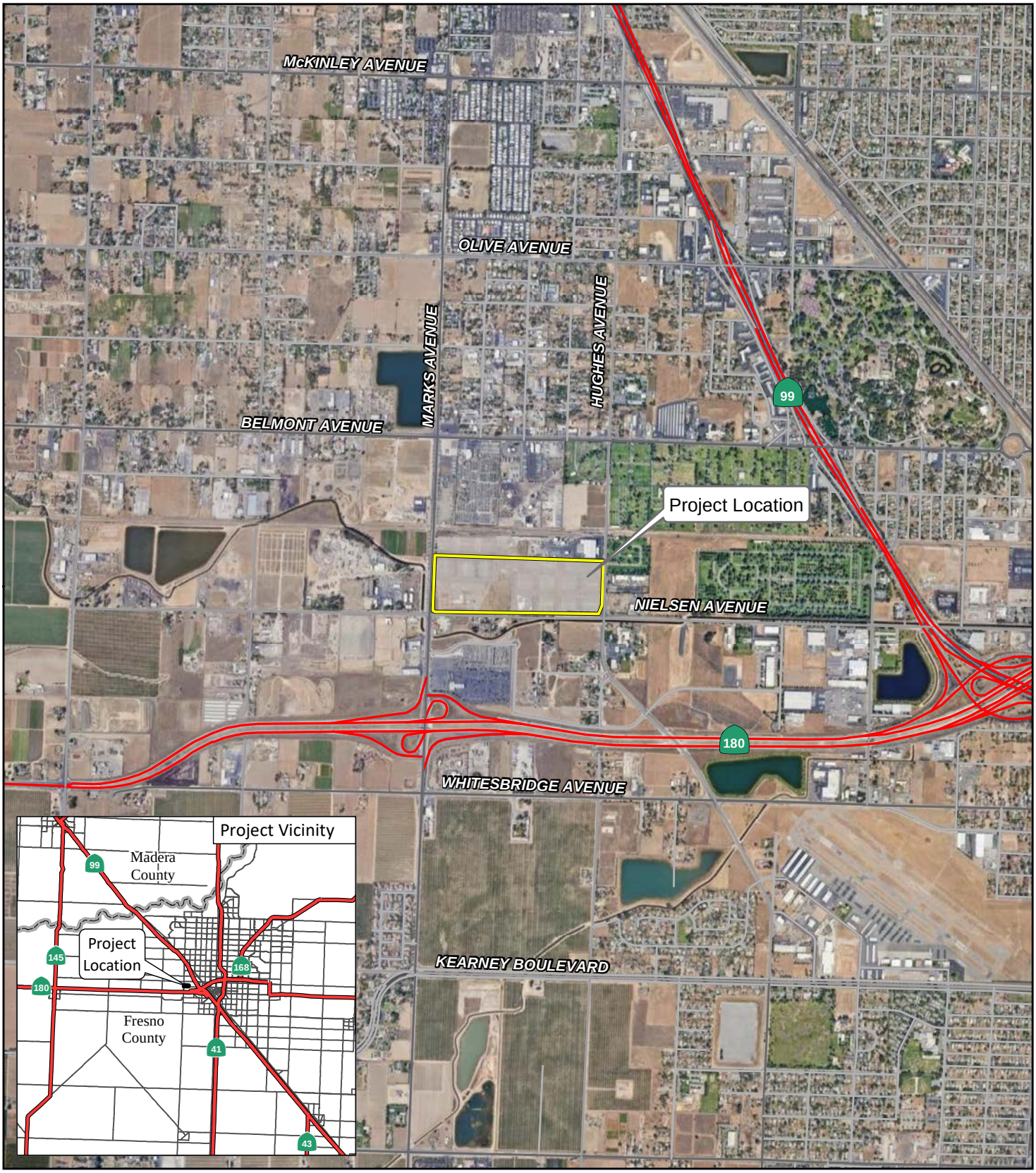
**Table B - Cumulative Projects**

| Project No. | Project Name | Address | Project Description | Required Information |
|---|---|---|---|---|
| 1 | Clinton and Marks Commercial Building | 3031 W Clinton Avenue, 3015 W Clinton Avenue | 8,775 sf restaurant, a 4,669 sf car wash building, a 2,200 sf Starbucks cafe with drive thru | *Please confirm project description.* |
| 2 | Derrel's Mini Storage West Belmont Expansion | 1800 W Belmont Avenue, 1827 W Dudley Avenue | 6.02-acre mini-storage facility | *Please confirm project description.* |
| 3 | Soccer, Retail, and Hotel Project | 310 S West Street, 1725 W Nielsen Avenue, 1730 W Nielsen Avenue | The applicant proposes to develop these parcels into two indoor soccer fields, seven outdoor soccer fields, a 190 room hotel, restaurants, soccer apparel store, and market with gas station. | *Please confirm project description. Another description for 3100 S West Avenue is to site, build and operate a Permanent Regional Household Hazardous Waste Collection Facility. Another description for 1725 W Nielsen Avenue in the table is that the proposed project pertains to the development of a 16,000 SF industrial shop with office, 7 bays and truck yard with 60 stalls for Dave's Trucking (DISABLED AMERICAN VETERAN ENTERPRISES TRUCKING & SWEEPING, INC.).* |
| 4 | Bombay Business Park | 145 N Fruit Avenue, 147 N Fruit Avenue, 183 N Fruit Avenue, 227 N Fruit Avenue, 289 N Fruit Avenue, 662 W Nielsen Avenue | The proposed project site is situated in the old industrial area east of State Route 99 and north of State Route 180 West, lying west of and fronting on North Fruit Avenue, south of the Southern Pacific Rail Road tracks and north of the Houghton Canal. | *Please provide number of units for the project (a detailed project description).* |
| 5 | ABS Auto Auctions | 130 S West Avenue | The applicant is proposing the new use of an auto auction dealership. The proposed use will be through an online bidding system for wholesaling and services made available only to licensed dealers. The site will store between 30 to 60 cars at a time. | *Please provide building square footage.* |
| 6 | OASIS Tract 5463 | 3425 W Whites Bridge Avenue | - | *Please provide detailed project description.* |
| 7 | OASIS Tract 5456 | 3420 W Madison Avenue | - | *Please provide detailed project description.* |
| 8 | Tentative Map Tract 6183 | 3558 W Madison Avenue | The applicant proposes to subdivide the existing property into a 66-lot single-family subdivision. | |
| 9 | Tentative Map Tract 6183 | 3338 W Madison Avenue | The applicant proposes to subdivide the existing property into a 18-lot single-family subdivision. | |
| 10 | Truck Wash and Service | 294 N Fruit Avenue | - | *Please provide detailed project description.* |
| 11 | Replacement of a Commercial Fire Damaged Building | 3075 W Nielsen Avenue | Replacing a 7,000 sf fire damaged metal building with a new 4,920 sf metal building. | |
| 12 | KFC ASAP REFRESH | 1904 W Olive Avenue | - | *Please provide project name and detailed project description.* |
| 13 | RNG/CNG Fueling Station | 227 N Fruit Avenue, 289 N Fruit Avenue | A Renewable Natural Gas (RNG/CNG) fueling station. | *Please provide detailed project description with number of units.* |
| 14 | Fresno Mobile Home Park Expansion | 3147 W Olive Avenue | - | *Please provide detailed project description with number of units.* |
| 15 | Red Onion Drive Thru | 555 W Belmont Avenue | - | *Please provide detailed project description.* |
| 16 | Truck Wash and Lube Building | 125 S Pleasant Avenue | 8,100 sf metal building | *Please provide details about land use.* |
| 17 | Mixed-use Project | 1824 W Olive Avenue | A 95-space 15 yr truck parking yard, a 5,000 sf convenience store with drive thru restaurant, and 6 multi-purpose dispensers and car wash tunnel. | |
| 18 | Renewable Natural Gas (RNG) Fueling Station | 2280 W Whites Bridge Avenue | - | *Please provide detailed project description with number of units.* |
| 19 | Sandoval Trucking | Please provide exact address. | Proposal to build a new 3,750 sf metal building with 1,000 sf attached roof cover, to be used for truck repair (replace tires, brakes, etc.) and to store tools for trucking company. | *Please provide exact address and confirm project description.* |
| 20 | Truck Wash and Repair Facility | - | The proposed development is to construct a 5,000 sf metal building. This metal building will consist of one bay for truck wash and another bay for truck repair, and roughly 60 sf of reception area. | *Please provide exact address.* |
| 21 | Commercial Project | 2809 W McKinley Avenue | - | *Please provide detailed project description with number of units.* |
| 22 | Royalty Freight Trucking Service | 50 S Hughes Avenue | The applicant is proposing to develop a new 26,143 sf truck-service facility for truck repair, lube, wash, a tire repair shop with storage for parts, and offices. This project will also include a vestibule and covered patio, oil tank, guard kiosk and loading cross pit. | *Please confirm project description and number of units.* |
| 23 | New Metal Office Building | 30 E Divisadero Street | 3,800 sf general industrial | |
| 24 | NKRS Trucking | - | Accela record number P18-01260 pertains to the development permit application for a large diesel truck repair facility that specializes in minor maintenance and repair of large diesel trucks. | *Please provide exact address and detailed project description with number of units.* |

Notes:

sf = square feet

# FIGURES




LSA

FIGURE 1

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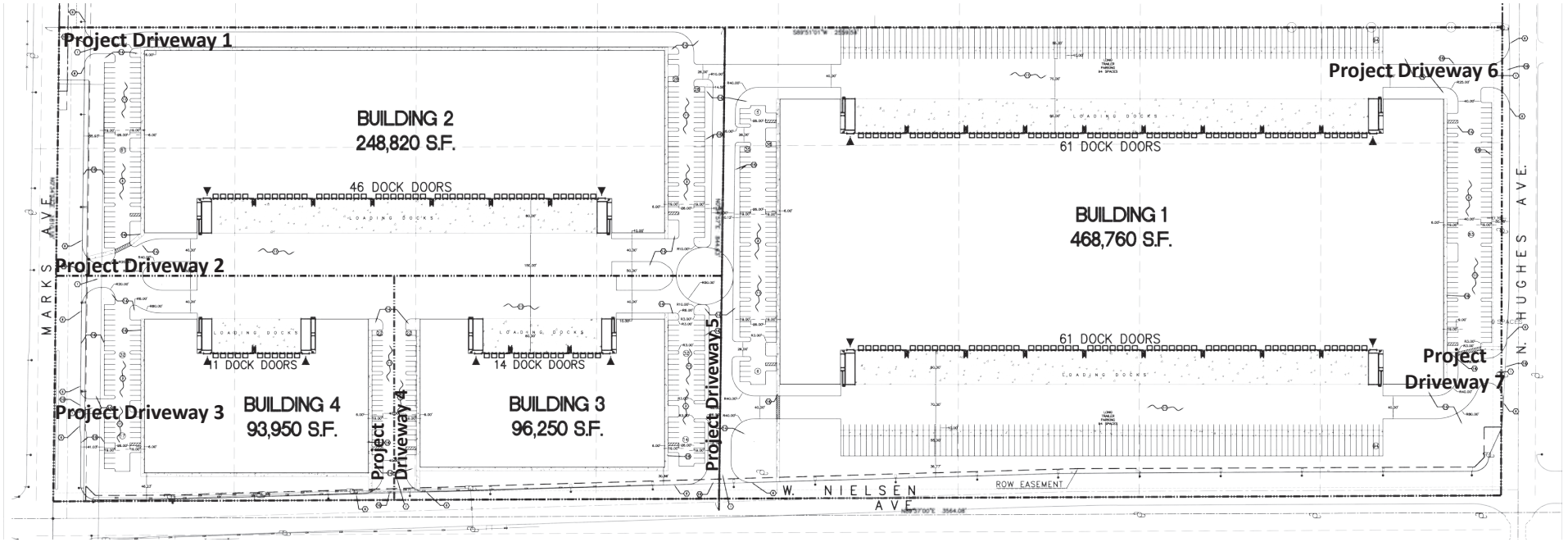
FEET

*2740 West Nielsen Warehouse*
*Traffic Impact Study*

Regional and Project Location

SOURCE: ESRI Streetmap, 2021; Google Earth, 2019.

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FIGURE 2

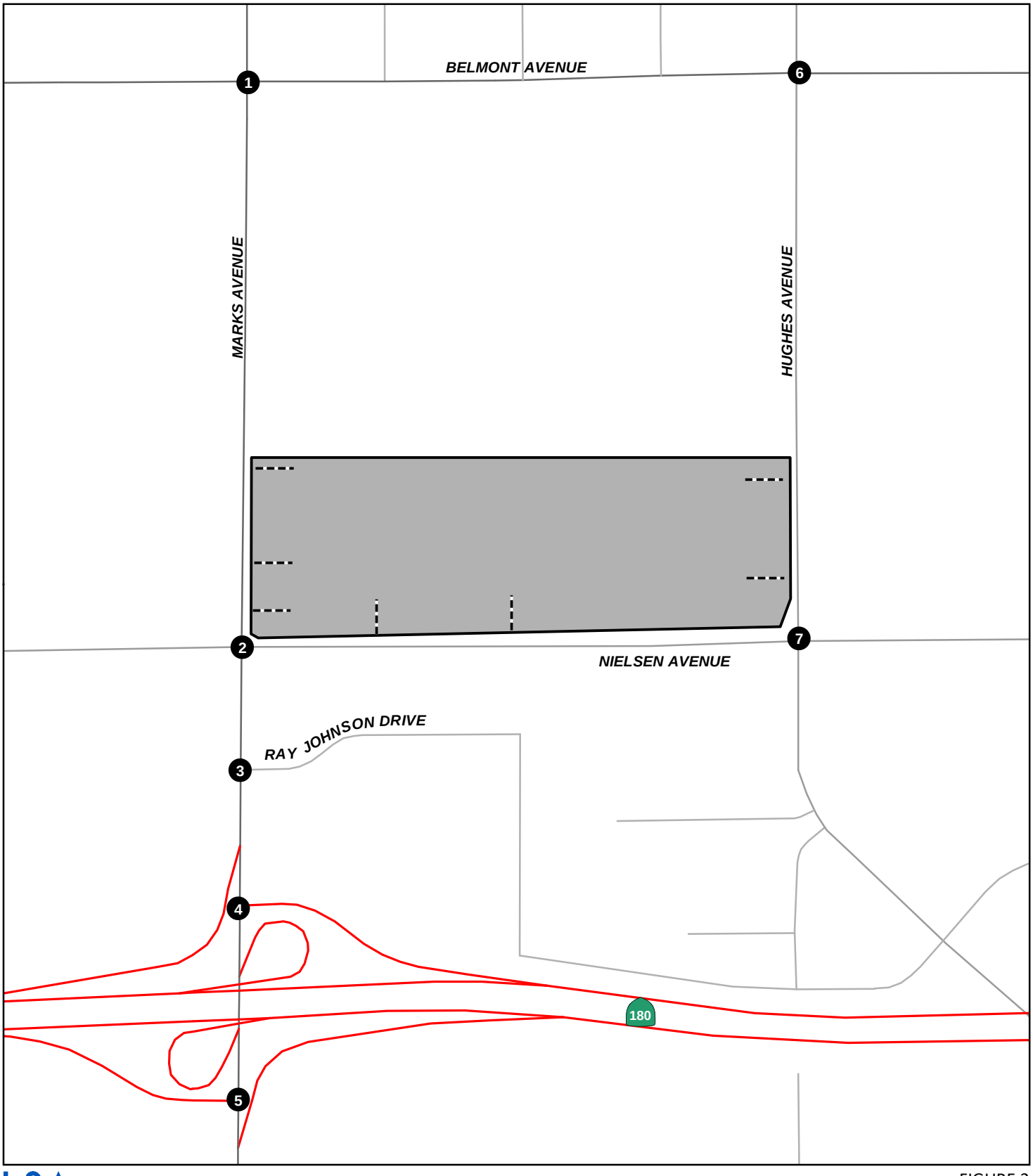
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SOURCE: Lars Anderson and Associates, Inc.; April 2021
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*2740 West Nielsen Warehouse*
*Traffic Impact Study*

Conceptual Site Plan




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LEGEND

Project Site

Study Intersection

Project Driveway

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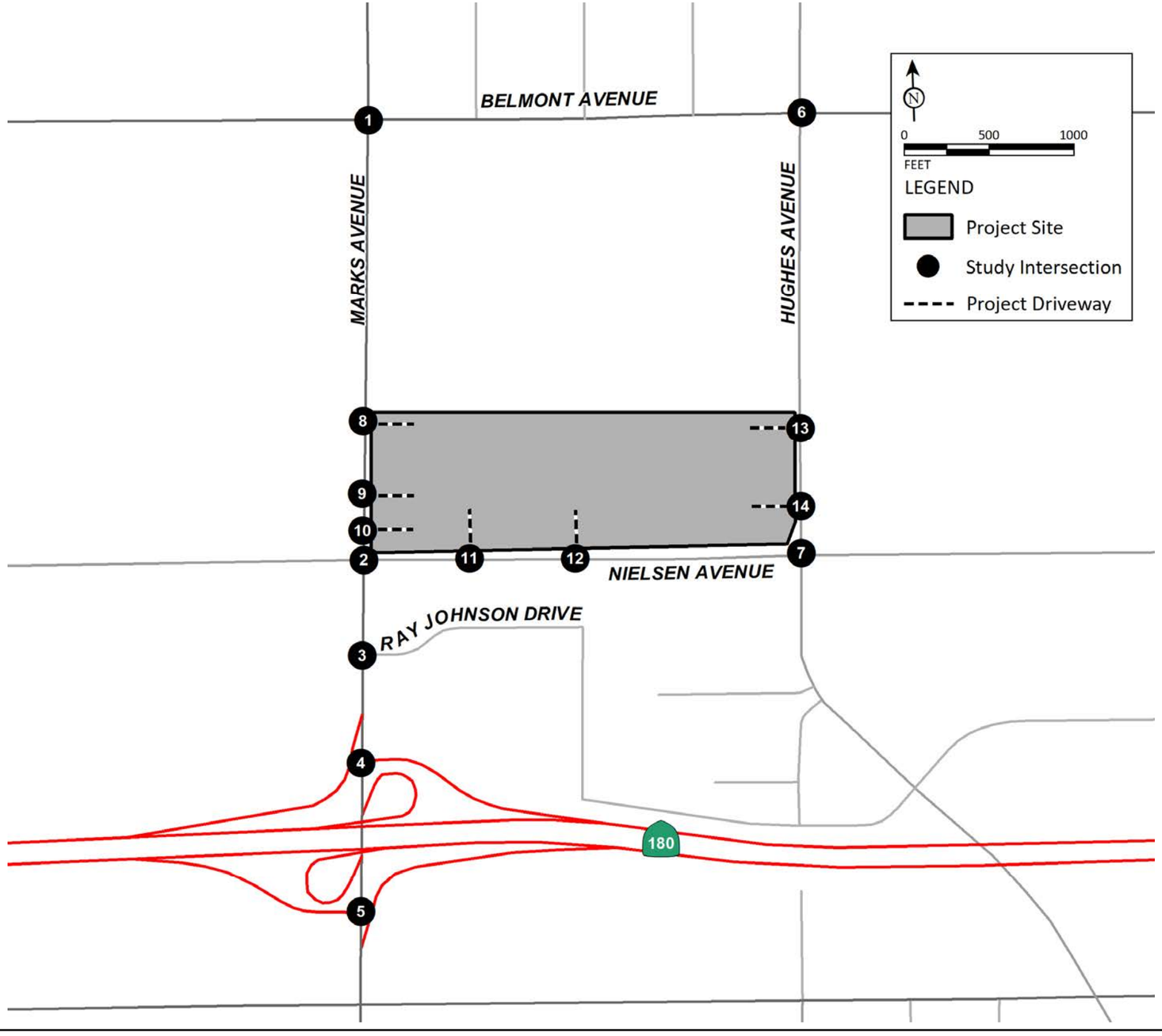
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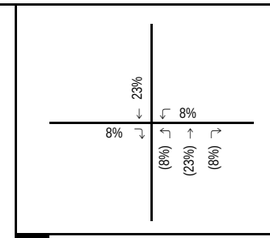
*2740 West Nielsen Warehouse*
*Traffic Impact Study*

Study Area Intersections

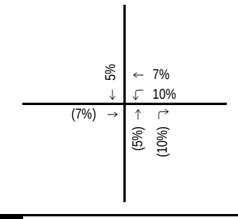
SOURCE: County of Fresno Streets Data, 2021.

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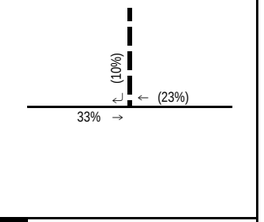


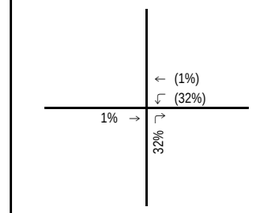

1 Marks Avenue/Belmont Avenue



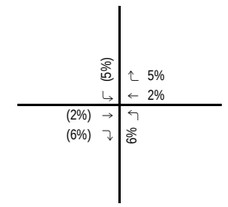

6 Hughes Avenue/Belmont Avenue



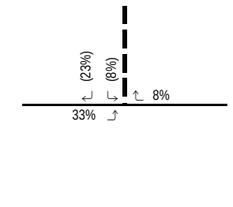

11 Project Driveway 4/Nielsen Avenue



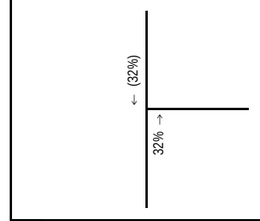

2 Marks Avenue/Nielsen Avenue



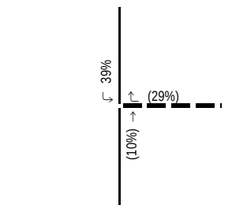

7 Hughes Avenue/Nielsen Avenue



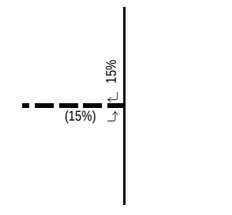

12 Project Driveway 5/Nielsen Avenue



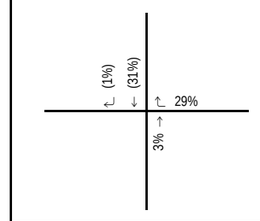

3 Marks Avenue/Ray Johnson Drive



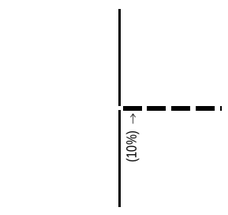

8 Marks Avenue/Project Driveway 1



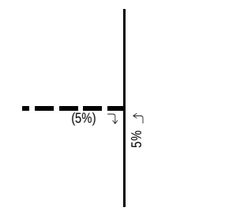

13 Hughes Avenue/Project Driveway 6



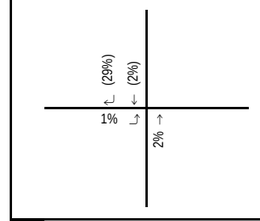

4 Marks Avenue/SR-180 Westbound Ramps



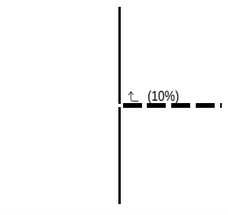

9 Marks Avenue/Project Driveway 2




14 Hughes Avenue/Project Driveway 7




5 Marks Avenue/SR-180 Eastbound Ramps




10 Marks Avenue/Project Driveway 3

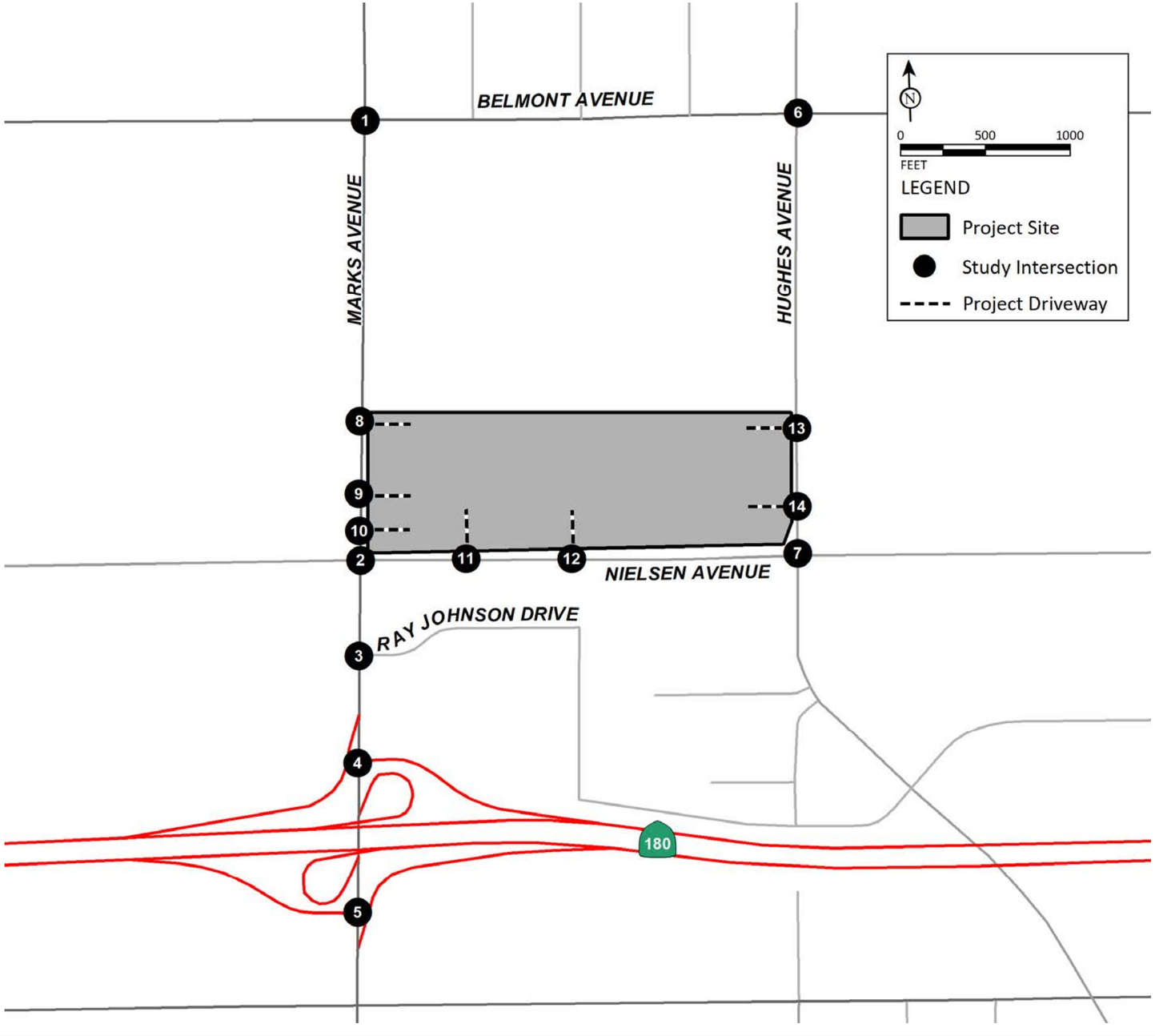
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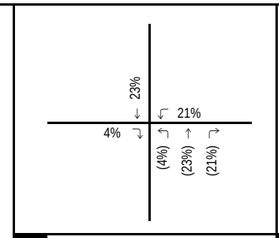
FIGURE 4-A

XX% (YY%)
Inbound (Outbound) Distribution
– – – – Project Driveway

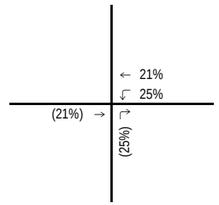
*2740 West Nielsen Warehouse*
*Traffic Impact Study*
Project Trip Distribution - Passenger Vehicles

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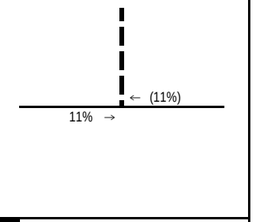


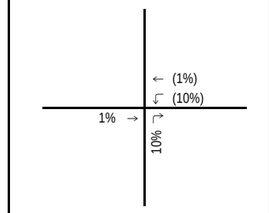

1 Marks Avenue/Belmont Avenue



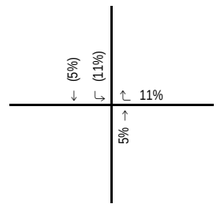

6 Hughes Avenue/Belmont Avenue



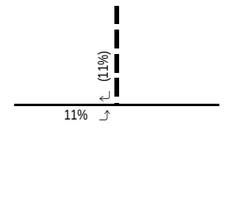

11 Project Driveway 4/Nielsen Avenue



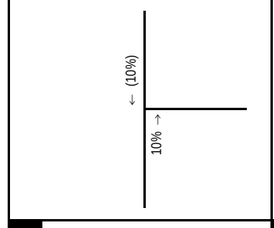

2 Marks Avenue/Nielsen Avenue



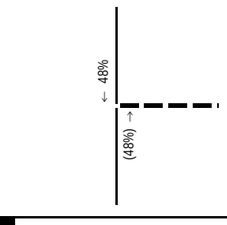

7 Hughes Avenue/Nielsen Avenue



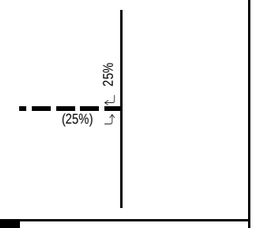

12 Project Driveway 5/Nielsen Avenue



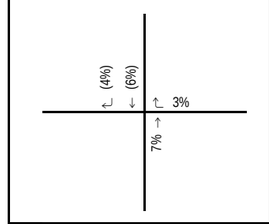

3 Marks Avenue/Ray Johnson Drive



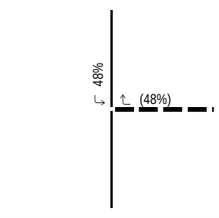

8 Marks Avenue/Project Driveway 1



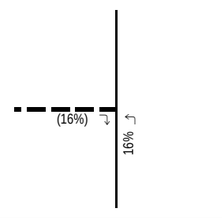

13 Hughes Avenue/Project Driveway 6



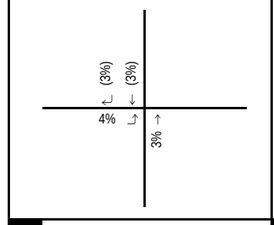

4 Marks Avenue/SR-180 Westbound Ramps



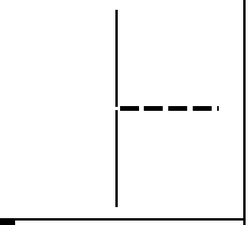

9 Marks Avenue/Project Driveway 2




14 Hughes Avenue/Project Driveway 7




5 Marks Avenue/SR-180 Eastbound Ramps



10 Marks Avenue/Project Driveway 3

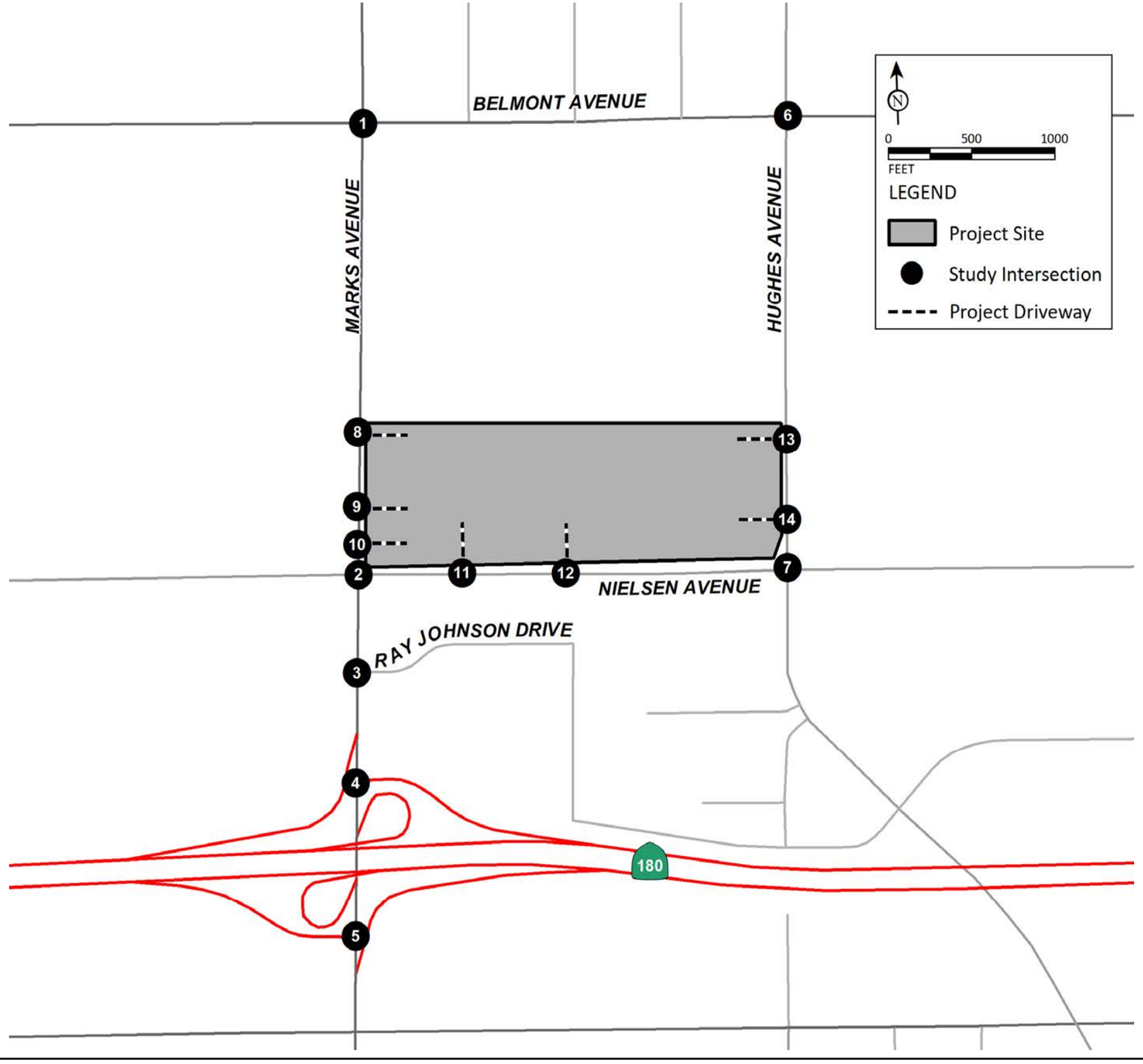
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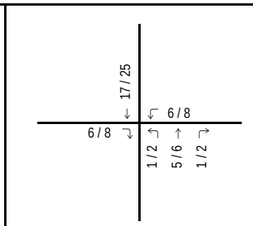
FIGURE 4-B

XX% (YY%)
Inbound (Outbound) Distribution
– – – – Project Driveway

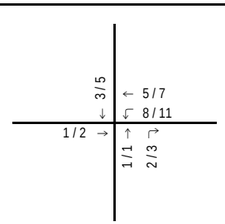
*2740 West Nielsen Warehouse*
*Traffic Impact Study*
Project Trip Distribution - Trucks

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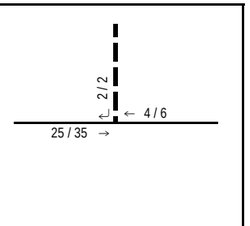


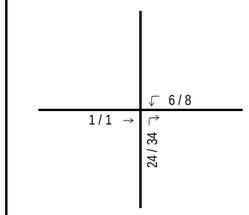

1 Marks Avenue/Belmont Avenue



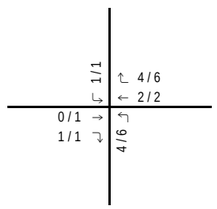

6 Hughes Avenue/Belmont Avenue



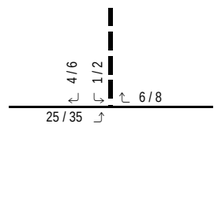

11 Project Driveway 4/Nielsen Avenue




2 Marks Avenue/Nielsen Avenue



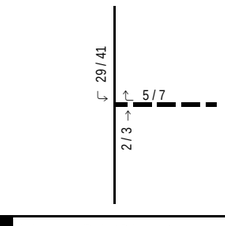

7 Hughes Avenue/Nielsen Avenue



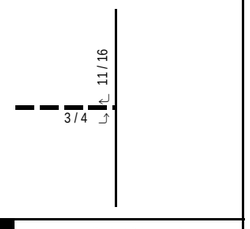

12 Project Driveway 5/Nielsen Avenue



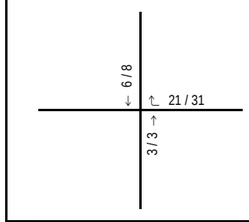

3 Marks Avenue/Ray Johnson Drive



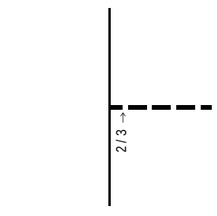

8 Marks Avenue/Project Driveway 1



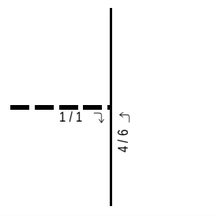

13 Hughes Avenue/Project Driveway 6



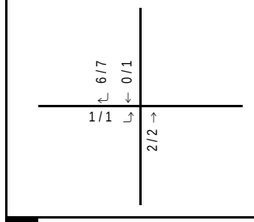

4 Marks Avenue/SR-180 Westbound Ramps



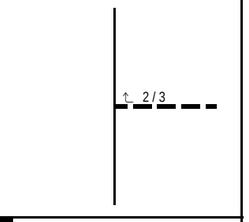

9 Marks Avenue/Project Driveway 2




14 Hughes Avenue/Project Driveway 7




5 Marks Avenue/SR-180 Eastbound Ramps



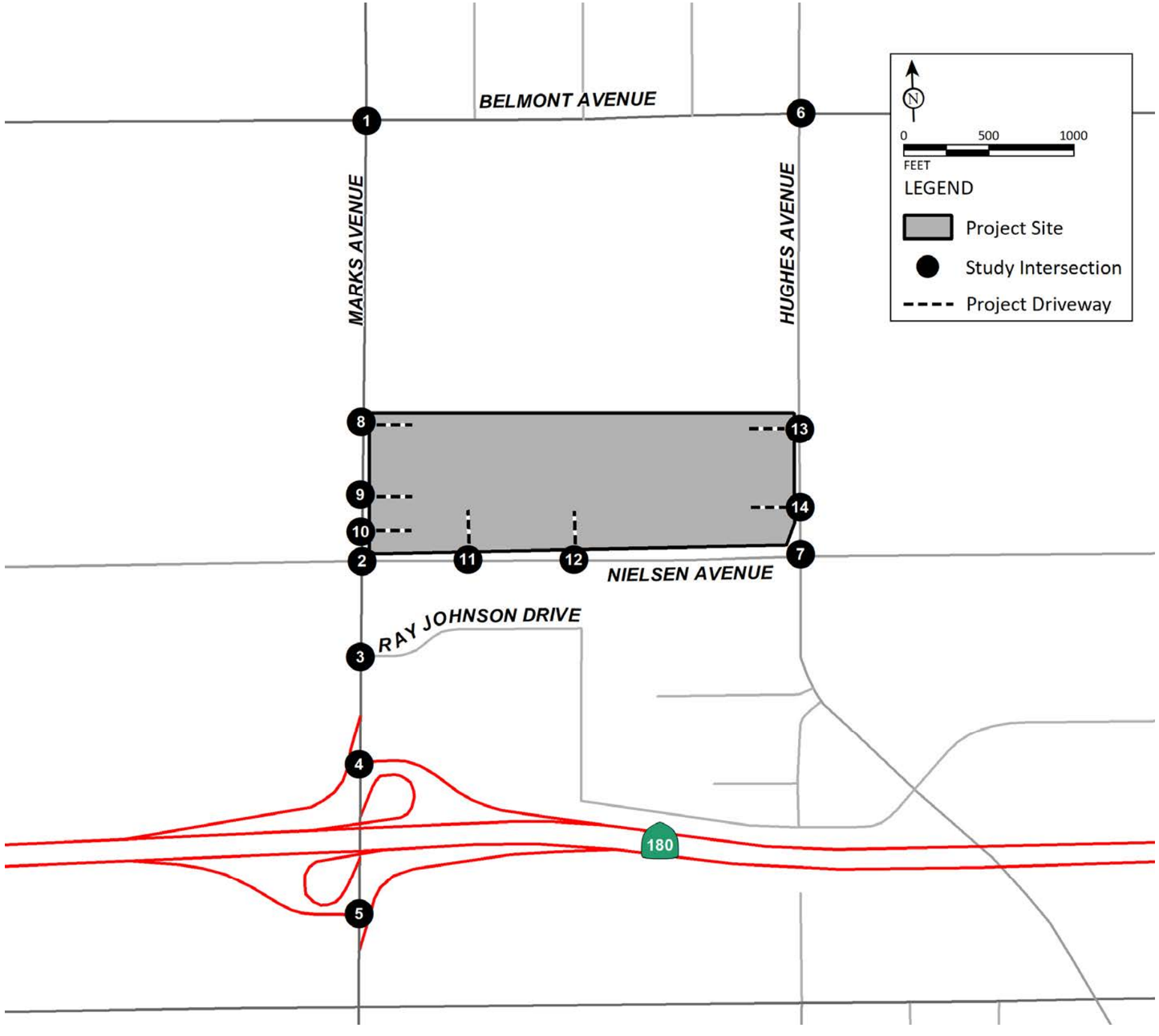

10 Marks Avenue/Project Driveway 3

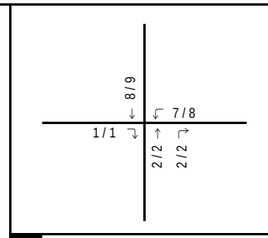
LSA

FIGURE 5-A

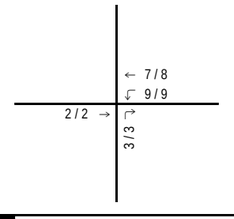
XX / YY
AM / PM Peak Hour Traffic Volumes

*2740 West Nielsen Warehouse*
*Traffic Impact Study*
Project Trip Assignment - Passenger Vehicles

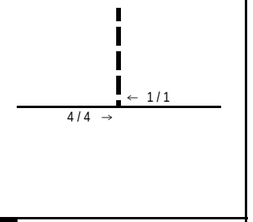


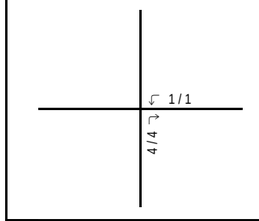

1 Marks Avenue/Belmont Avenue



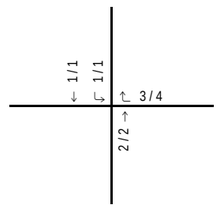

6 Hughes Avenue/Belmont Avenue



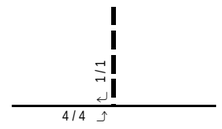

11 Project Driveway 4/Nielsen Avenue



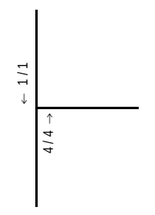

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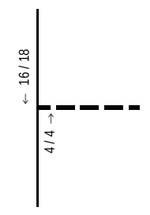

7 Hughes Avenue/Nielsen Avenue



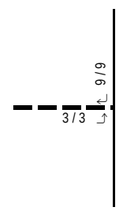

12 Project Driveway 5/Nielsen Avenue



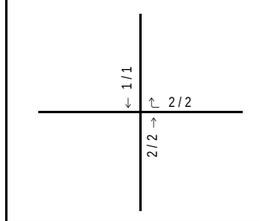

3 Marks Avenue/Ray Johnson Drive



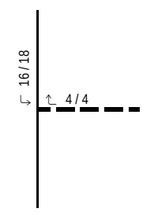

8 Marks Avenue/Project Driveway 1



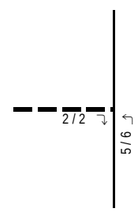

13 Hughes Avenue/Project Driveway 6



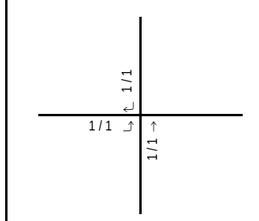

4 Marks Avenue/SR-180 Westbound Ramps



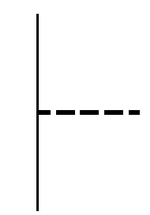

9 Marks Avenue/Project Driveway 2




14 Project Driveway 7




5 Marks Avenue/SR-180 Eastbound Ramps



10 Marks Avenue/Project Driveway 3

LSA

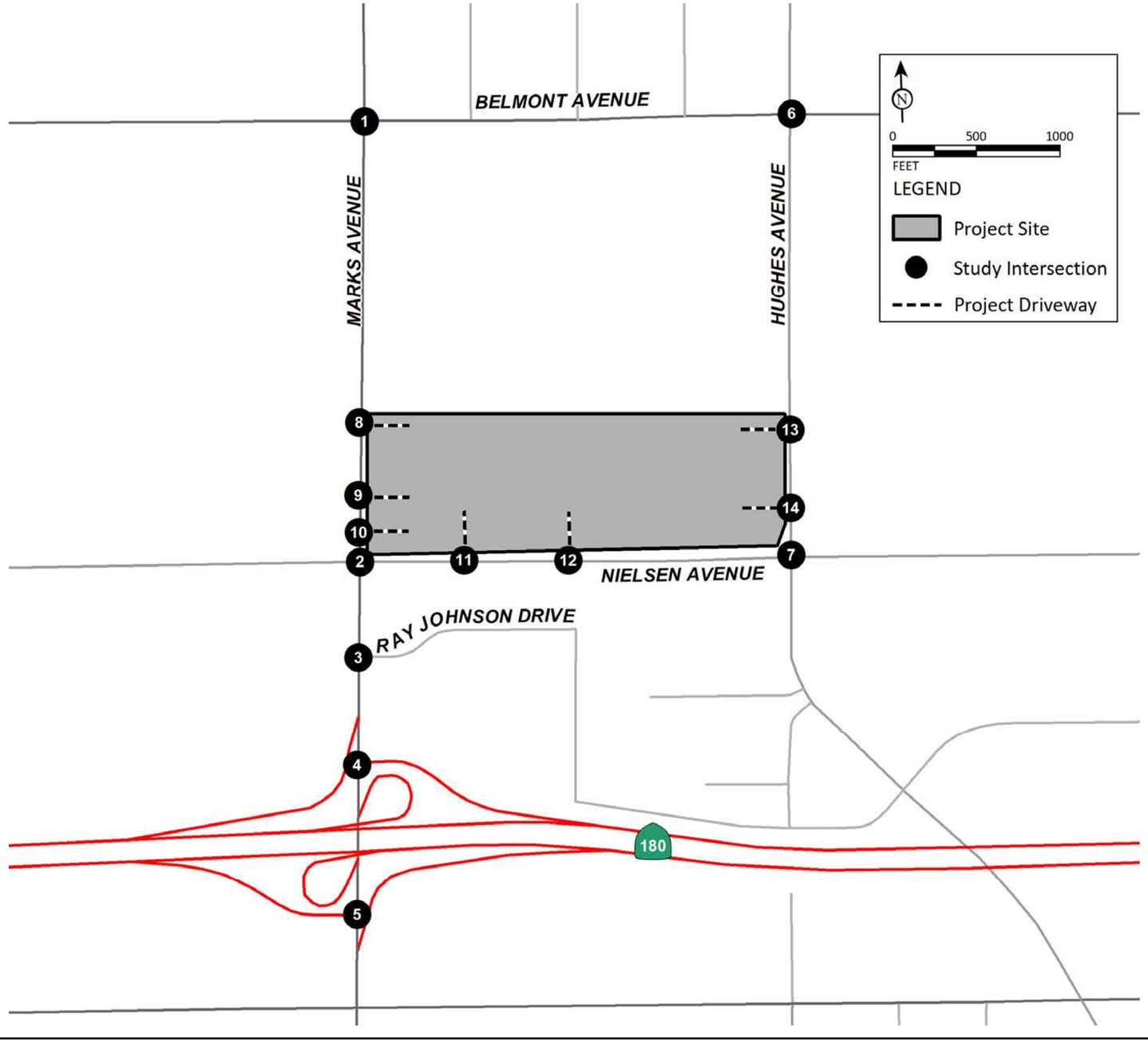
FIGURE 5-B

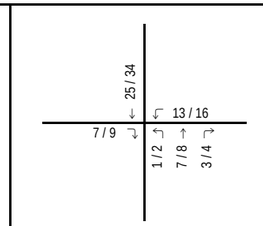
XX / YY

AM / PM Peak Hour Traffic Volumes (In PCE)

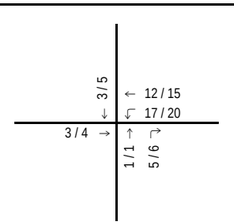
*2740 West Nielsen Warehouse*
*Traffic Impact Study*

Project Trip Assignment - Trucks

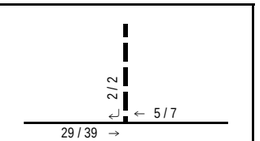


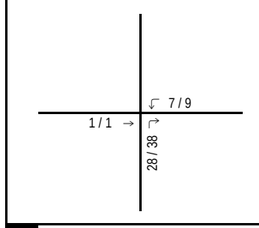

1 Marks Avenue/Belmont Avenue



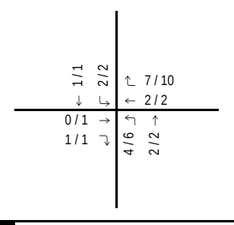

6 Hughes Avenue/Belmont Avenue



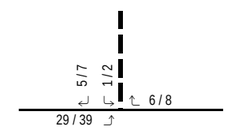

11 Project Driveway 4/Nielsen Avenue



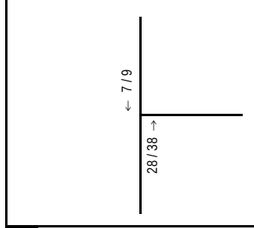

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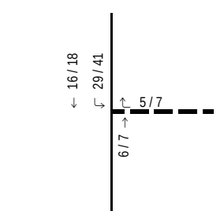

7 Hughes Avenue/Nielsen Avenue



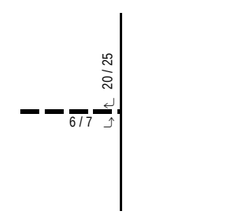

12 Project Driveway 5/Nielsen Avenue



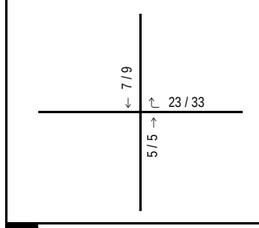

3 Marks Avenue/Ray Johnson Drive



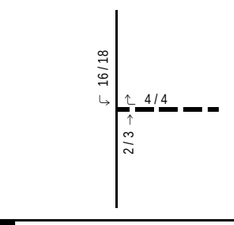

8 Marks Avenue/Project Driveway 1



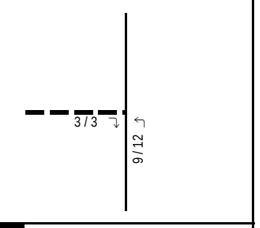

13 Hughes Avenue/Project Driveway 6



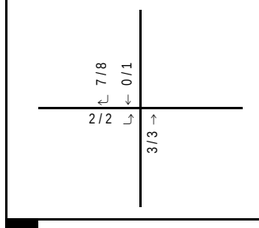

4 Marks Avenue/SR-180 Westbound Ramps



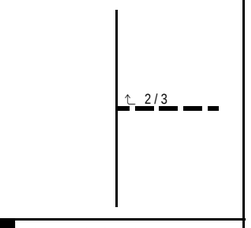

9 Marks Avenue/Project Driveway 2




14 Hughes Avenue/Project Driveway 7




5 Marks Avenue/SR-180 Eastbound Ramps




10 Marks Avenue/Project Driveway 3

LSA

FIGURE 6

XX / YY

AM / PM Peak Hour Traffic Volumes (In PCE)

*2740 West Nielsen Warehouse*
*Traffic Impact Study*

Total Project Trip Assignment

# APPENDICES

# Technical Memorandum

**To:** Daniel Ramirez-Cornejo, Program Manager, WRCOG

**From:** Billy Park, Supervising Transportation Planner, WSP

**Subject:** **TUMF High-Cube Warehouse Trip Generation Study**

**Date:** January 29, 2019

## Background

High-cube warehousing is emerging as an important development type in the Inland Empire. Studies such as Logistics & Distribution: *An Answer to Regional Upward Social Mobility*[1] and *Multi-County Goods Movement Action Plan*[2] suggests that this trend is likely to increase over time due to the Inland Empire's relative abundance of suitable sites compared to coastal counties.

A recurring analytical problem for the analyses of traffic impacts associated with proposed high-cube warehouses is the lack of reliable data regarding the number and vehicle mix of trips generated by this land development type. Specifically:

- The *2003 Fontana Truck Trip Generation Study*, which has been used for years by agencies in the Inland Empire, is based on the older type of high-cube warehouse. Newer warehouses generally are larger (often over 1 million square feet), much more automated, and generate far fewer trips per square foot.
- The use of overly-conservative estimates has produced results that were unreasonable when compared to actual field conditions. For example, the Environmental Impact Report (EIR) for the Skechers high-cube warehouse building in Moreno Valley included traffic forecasts that were substantially higher than the actual post-construction trip generation for both cars and trucks. Overstated forecasts are misleading to decision makers and could result in oversized infrastructure that could itself have environmental consequences, creates an undue burden on development, and could even have adverse legal consequences for the agencies involved.
- In 2011 the Commercial Real Estate Development Association, also known by its former acronym NAIOP, commissioned a trip generation study of high-cube warehouses focused on large highly-automated warehouses in the Inland Empire. NAIOP had hoped that their study, which found trip-gen rates considerably lower than previous studies, would be used in CEQA analyses going forward. However, concerns about potential bias by the sponsoring party have placed into question the validity of the study results. Similarly, a study commissioned by SCAQMD was viewed as possibly having an anti-development bias.
- Finally, in 2015 NAIOP and SCAQMD jointly sponsored a trip-gen study for high-cube warehouses through a respected neutral party, the Institute of Transportation Engineers (ITE). The report for this study, *High-Cube Warehouse Vehicle Trip Generation Analysis*, was completed in 2016.

The joint NAIOP/SCAQMD/ITE study resulted in a consensus on the trip generation rates to be used for the most common type of high-cube warehouse, a category they call "transload and short-term storage". The findings of the joint study generally indicated the trip generation rates for this use as being consistent with the trip generation rates for the broader category of high-cube warehouses as described by ITE in the 9th Edition of the *Trip*

[1] *Logistics & Distribution: An Answer to Regional Upward Social Mobility*, Dr. John Husing for SCAG, June 2004
[2] *Multi-County Goods Movement Action Plan*, Wilbur Smith Associates, August 2008

*Generation Manual*. However, the report did not settle the issue of trip generation rates for two other specific types of high-cube warehouses:

> *"The single data points for fulfillment centers and parcel hubs indicate that they have significantly different vehicle trip generation characteristics compared to other HCWs. However, there are insufficient data from which to derive useable trip generation rates."*

The purpose of this technical memorandum is to gather sufficient data to develop reliable trip generation rates for fulfillment centers and parcel hubs for use in traffic impact studies in the Inland Empire.

## Methodology

Number of Sites: The study team reviewed ITE's *Trip Generation Handbook 2nd* Edition, Chapter 4 of which describes how to perform a trip generation study that meets ITE's standards (which improves the defensibility of the results if they are used for CEQA analyses). ITE recommends that at least three sites, and preferably five, be surveyed for a given land use category. Based on the review of candidate sites identified by Western Riverside Council of Governments (WRCOG) staff, it was recommended that data be collected at a total of 16 sites for the purposes of this study.

Independent Variables: ITE's Trip Generation Manual measures the size of proposed developments using more than a dozen different independent variables, such as students (for schools), acres (for parks), etc. All High-Cube related categories in both 9th and 10th Editions of the Trip Generation Manual are reported in Square Foot Gross Floor Area (GFA) measured in thousands of square feet (TSF), which is also the independent variable used for the TUMF program. Some other ITE employment categories use employment as the independent variable, as does SCAG in its Sustainable Communities Strategy. WRCOG provided GFA for all sites and employment data for eight fulfillment centers and one parcel hub site.

The ITE *Trip Generation Manual* typically reports trip generation rates two ways; namely as the average rate and using the "best fit" mathematical relationship between the number of trips generated and the independent variable. R-squared, also known as the coefficient of determination, is used to measure how well the best fit equations match the surveyed traffic counts. The *Trip Generation Manual* recommends that the best fit equation only be used when the $R^2$ is greater than or equal to 0.50 and certain other conditions being met; otherwise the average rate should be used.

## Data Collection

WRCOG provided a list of recommended trip generation study sites after reviewing potential sites within the Inland Empire with its member agencies. The list included 11 fulfillment centers and 5 parcel hub sites as follows:

Fulfillment Centers

1. Walmart: 6750 Kimball Ave, Chino, CA 91708
2. Amazon: 24208 San Michele Rd, Moreno Valley, CA 92551
3. Lineage Logistics: 1001 Columbia Ave Riverside, CA 92507
4. P&G: 16110 Cosmos Street, Moreno Valley, CA 92551
5. Big 5: 6125 Sycamore Canyon Blvd, Riverside, CA 92507
6. Nestle USA: 3450 Dulles Drive, Jurupa Valley, CA
7. Home Depot: 11650 Venture Drive, Jurupa Valley, CA
8. ACT Fulfillment Center: 3155 Universe Drive, Jurupa Valley, CA
9. Petco: 4345 Parkhurst Street, Jurupa Valley, CA
10. Komer: 11850 Riverside Drive, Jurupa Valley, CA
11. Ross: 3404 Indian Ave Perris, CA 92571

Parcel Hubs

12. UPS: 15801 Meridian Pkwy, Riverside, CA 92518
13. FedEx: 330 Resource Dr, Bloomington, CA 92316
14. FedEx Freight: 12100 Riverside Drive, Jurupa Valley, CA
15. UPS Chain Logistics: 11811/11991 Landon Drive, Jurupa Valley, CA
16. DHL: 12249 Holly St N, Riverside, CA 92509

Traffic counts were collected at all of these sites. These were 72-hour driveway counts collected using video cameras for three-midweek days starting June 26, 2018. Video collection was determined to be preferable to collection data by means of machine counts, which can be problematic for driveways where vehicles are maneuvering at slow speeds. Video counts provide the ability for human viewers to review the captured footage to classify vehicles into 5 types (car, large 2-axle, 3-axle, 4-axle, and 5+ axle truck). The three-day average was calculated and used for the purposes of this study.

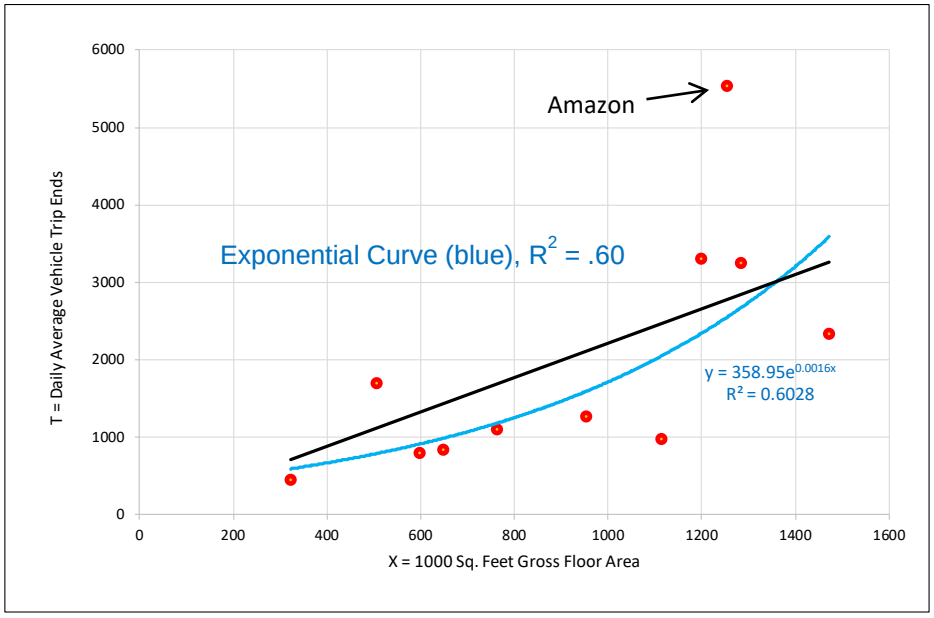
## Fulfillment Centers

**By Building Size**

Exhibit 1 displays a data plot of daily vehicle trips for the 11 fulfillment centers against building size as the independent variable. The average trip generation rate for fulfillments centers (see black line in Exhibit 1) was found to be 2.2 trips/TSF, compared to the 1.4 trips/TSF found for conventional high-cube warehouses in the ITE/SCAQMD/NAIOP study (i.e. about 50% higher).

Exhibit 1 denotes one outlier data point representing the Amazon site in the upper right of the chart. As shown, the average daily trips generated at this facility is over 50% higher than the trips generated at the two sites of similar size (Walmart and Ross), which appears indicative of a greater frequency of same day e-commerce deliveries from Amazon to individual consumers.

**Exhibit 1: Data Plot for Daily Total Vehicle Trip Ends against Building Size (Fulfillment Center)**




The best fit equation was an exponential relationship with $R^2$ of 0.60 (i.e. high enough to meet the criteria of acceptability). This is shown as a blue line in Exhibit 1. An exponential relationship, meaning that the larger the

building the higher the trip generation rate, is quite unusual. Exhibit 2 takes a deeper look at this by showing the daily vehicle trip generation rates for each of the 11 surveyed fulfillment centers sorted by the smallest to the largest building size from left to right. As shown, small sites tend to generate fewer trips per thousand square feet, but higher percentage of trucks. On the other hand, largest sites tend to generate a higher number of car trips, but fewer truck trips. So not only is the overall trip generation rate affected by building size, the vehicle mix is affected as well.

**Exhibit 2: Daily Vehicle Trip Generation Rates by Building Size for Each Fulfillment Center**

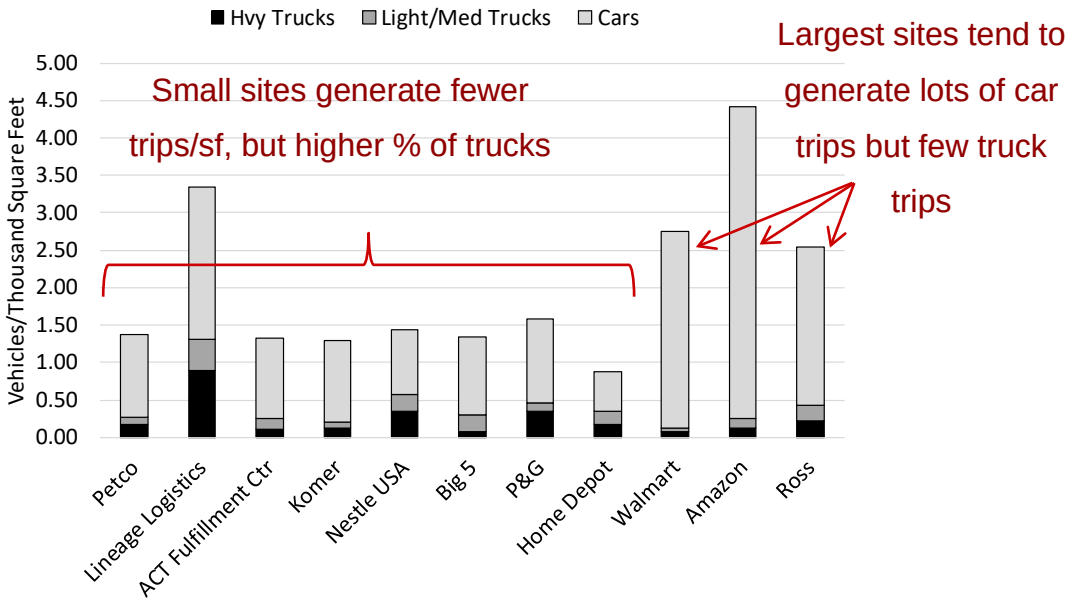



Exhibit 3 and Exhibit 4 show data plots for AM and PM peak hour vehicle trip ends against building size (respectively). The fitted curves had a low $R^2$, and so we recommend using the average rate.

**Exhibit 3: Data Plot for AM Peak Hour Vehicle Trip Ends against Building Size (Fulfillment Center)**

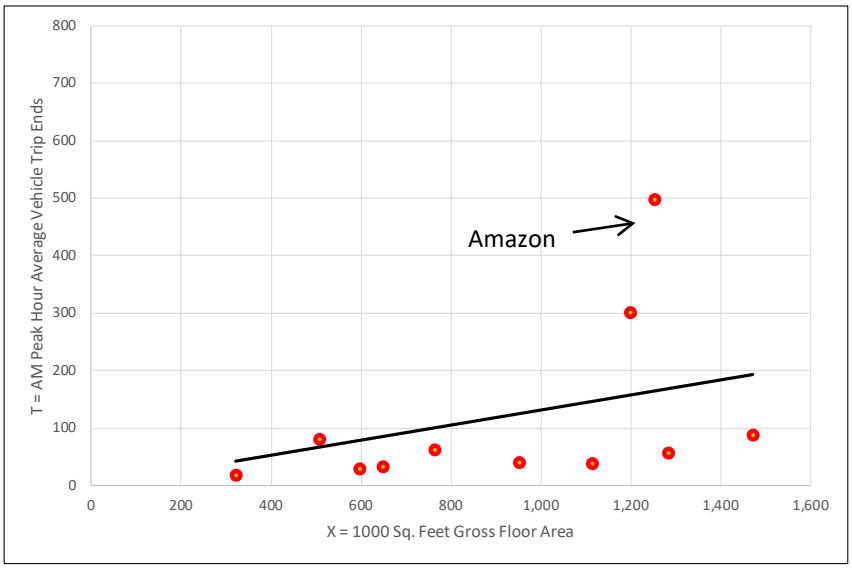


**Exhibit 4: Data Plot for PM Peak Hour Vehicle Trip Ends against Building Size (Fulfillment Center)**

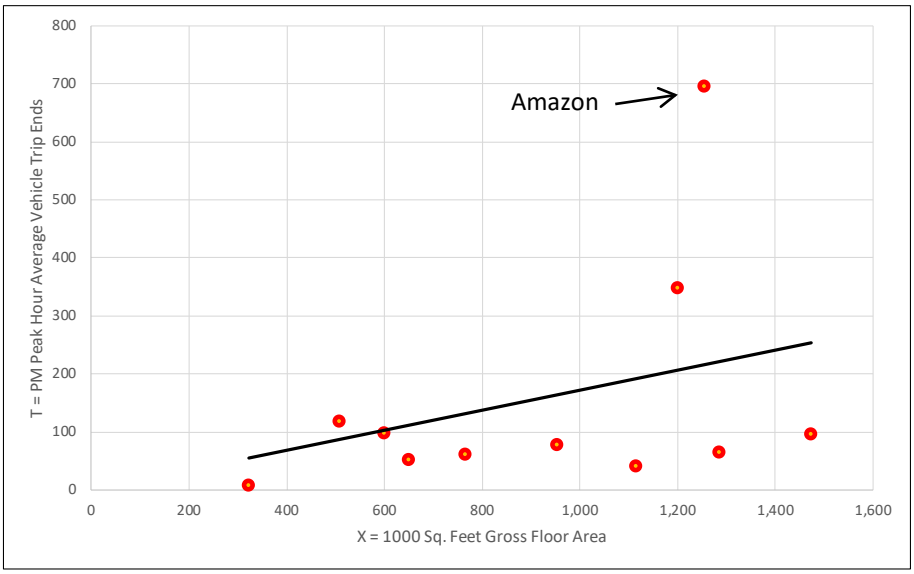
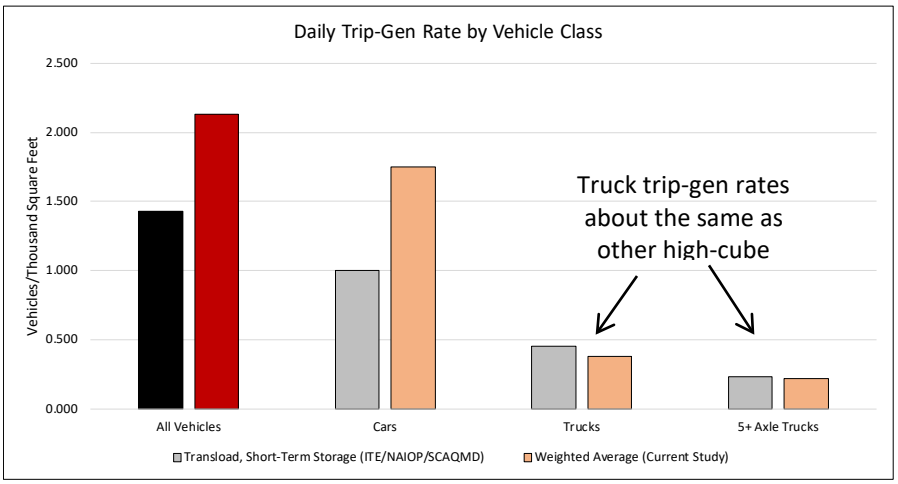



Exhibit 5 compares the average trip generation rates of 11 fulfillment centers with the rates found for conventional transload and short-term storage warehouses in the 2016 high-cube warehouse trip generation study[3] by SCAQMD/NAIOP/ITE. As shown, the fulfillment centers generate more daily vehicle trips than conventional warehouse facilities although trucks are roughly the same. This means that the additional trips by fulfillment centers are entirely due to additional car traffic, which is almost double the rate of car trips generated by conventional warehouses.

**Exhibit 5: Conventional Warehouse vs Fulfillment Centers**




Visual observation of the fulfillment center sites indicates the higher trip generation rates for cars appears to be mostly due to the use vans and passenger cars as delivery vehicles, particularly for the larger facilities operated by retailers such as Amazon and Walmart.

[3] *High-Cube Warehouse Vehicle Trip Generation Analysis*, Institute of Transportation Engineers, 2016

Exhibit 6 summarizes the AM and PM peak hour trip rates and the daily rates for fulfillment centers based on the findings of this study, and compares the results to rates for conventional transload and short-term storage warehouses.

**Exhibit 6: Summary of Trip Generation Rates per Thousand Square Feet of Gross Floor Area for Fulfillment Centers**

| Vehicle Class | AM Peak Hour | | PM Peak Hour | | Daily | |
|---|---|---|---|---|---|---|
| | Conventional Warehouse* | Fulfillment Center | Conventional Warehouse | Fulfillment Center | Conventional Warehouse | Fulfillment Center |
| Cars | 0.057 | 0.103 | 0.086 | 0.144 | 1.000 | 1.750 |
| 2-4 Axle Trucks | 0.009 | 0.008 | 0.013 | 0.011 | 0.221 | 0.162 |
| 5-Axle Trucks | 0.015 | 0.011 | 0.010 | 0.010 | 0.233 | 0.217 |
| Total | 0.082 | 0.122 | 0.108 | 0.165 | 1.432 | 2.129 |
| % Higher than Conventional | | 49% | | 52% | | 49% |

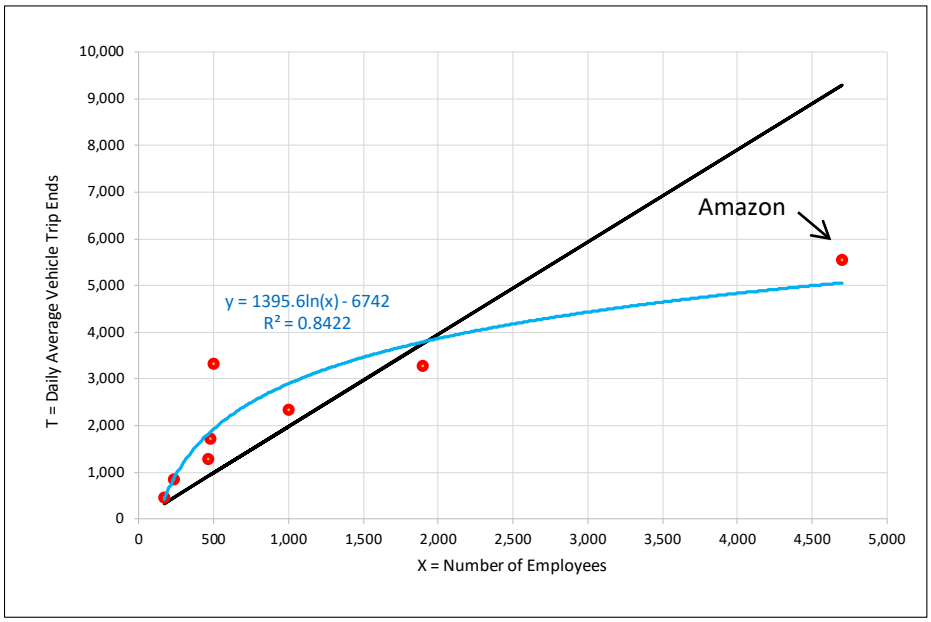
* Transload, Short-Term Storage category in 2016 TIE/ NAIOP/ SCAQMD study

**By Employee**

The WRCOG contacted the surveyed fulfillment centers and obtained employment data for eight of the eleven sites. Exhibit 7 shows a data plot for those eight sites for daily total vehicle trip ends against the number of employees. The best fit equation was logarithmic function which had an $R^2$ of 0.84, indicating a very good fit. Notably, the Amazon site, which was an outlier for trip generation based on floor area (see Exhibit 1), correlates more closely to other sites when employment is used instead. The average trip generation rate for fulfillments centers (represented by the black line in Exhibit 7) was found to be 2.0 trips/TSF

No comparison was made to any previous rates per employees because none of the previous high-cube warehouse related trip generation studies included correlation of trips with employment data.

**Exhibit 7: Data Plot for Daily Total Vehicle Trip Ends against Employee (Fulfillment Center)**



The data plots for the AM and PM peak hour total vehicle trip ends against the number of fulfillment center employees are shown in Exhibit 8 and Exhibit 9. The best fit equations are linear regressions (shown with black lines) which show a good $R^2$ for both the AM and PM peak periods.

**Exhibit 8: Data Plot for AM Peak Hour Total Vehicle Trip Ends against Employee (Fulfillment Center)**

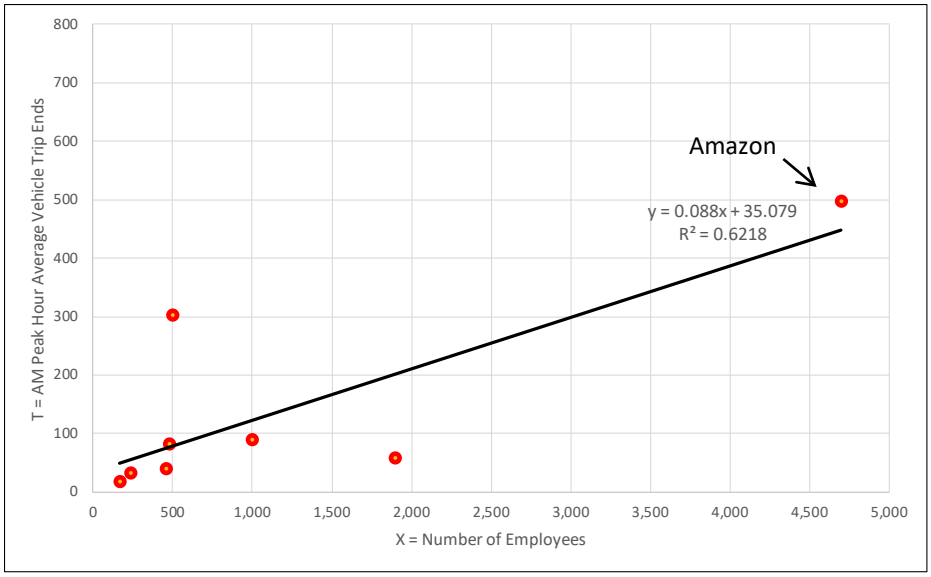



**Exhibit 9: Data Plot for PM Peak Hour Total Vehicle Trip Ends against Employee (Fulfillment Center)**

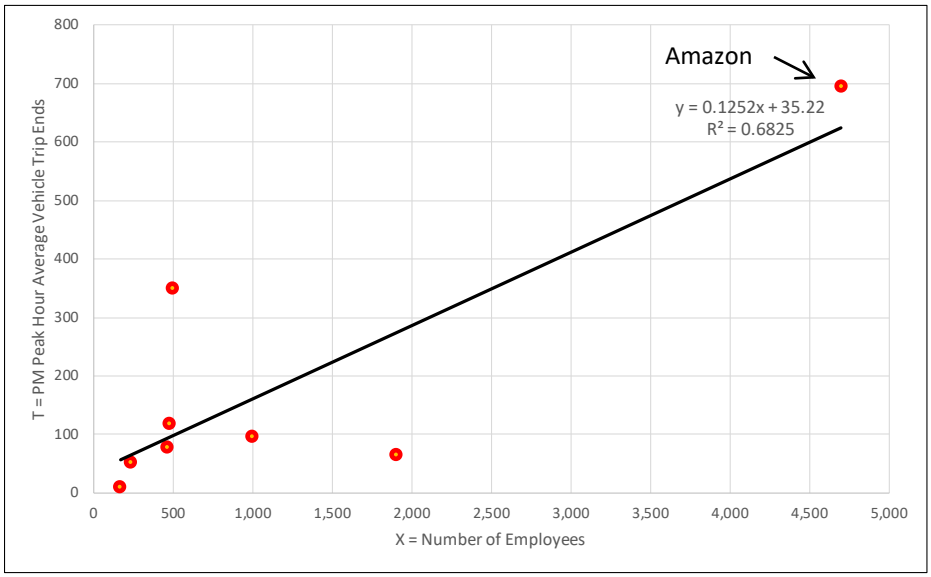



Exhibit 10 summarizes the AM and PM peak hour trip rates and the daily rates for trip generation per employee at fulfillment centers based on the findings of this study.

**Exhibit 10: Summary of Trip Generation Rates per Employee for Fulfillment Centers**

| Vehicle Class | AM Peak Hour | PM Peak Hour | Daily |
|---|---|---|---|
| Cars | 0.102 | 0.139 | 1.673 |
| 2-4 Axle Trucks | 0.006 | 0.008 | 0.125 |
| 5-Axle Trucks | 0.009 | 0.008 | 0.178 |
| Total | 0.118 | 0.155 | 1.977 |

## Parcel Hubs

**By Building Size**

Exhibit 11 displays daily vehicle trip generation rates by building size for each of five parcel hub sites. They are sorted by the smallest to the largest building size from left to right. In this case the small sites generate significantly more trips of every kind than the larger sites, which is the opposite to the pattern observed for fulfillment centers.

**Exhibit 11: Daily Trip Generation Rates at Parcel Hubs**

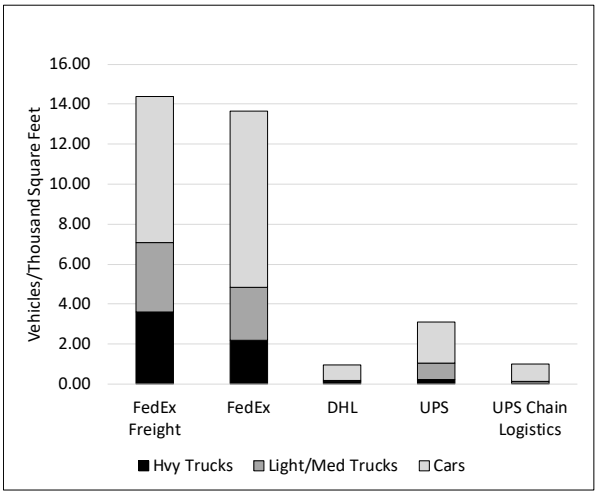



Exhibit 12 shows a data plot of daily vehicle trips of five parcel hubs against building size. As shown, a linear best fit was negative. During the collection of traffic data, construction activity was observed at the FedEx site potentially tainting the validity of these data to represent typical trip generation characteristics. To determine if the trip generation at this site was contributing to the poor data correlation, Exhibit 13 displays the same daily data plot without the FedEx site. The linear best fit shows a positive slope, but remains almost flat effectively indicating no correlation between the daily trips and building size based on the analysis of these sites.

The basic premise of the ITE trip generation approach is that the number of trips generated by a project is proportional to its size. That premise does not hold true for the parcel hubs in this sample and so no meaningful trip generation rates could be determined based on the data collected in support of this study. It should be recognized that a sample size of four or five sites represents the minimum recommended by ITE for valid trip generation studies, and for this reason, it is recommended that additional sites would need to be investigated and included in the data set to develop a more definitive finding on trip generation rates. Furthermore, it may be appropriate to determine the specific function at each site, due to the disparity between the rates observed at the FedEx sites versus the other three sites. It is likely that the function served by the respective sites is significantly different, as reflected in the trip generation rates, thereby necessitating reclassification of these uses for comparative purposes.

**Exhibit 12: Data Plot for Daily Total Vehicle Trip Ends against Building Size (Parcel Hubs)**

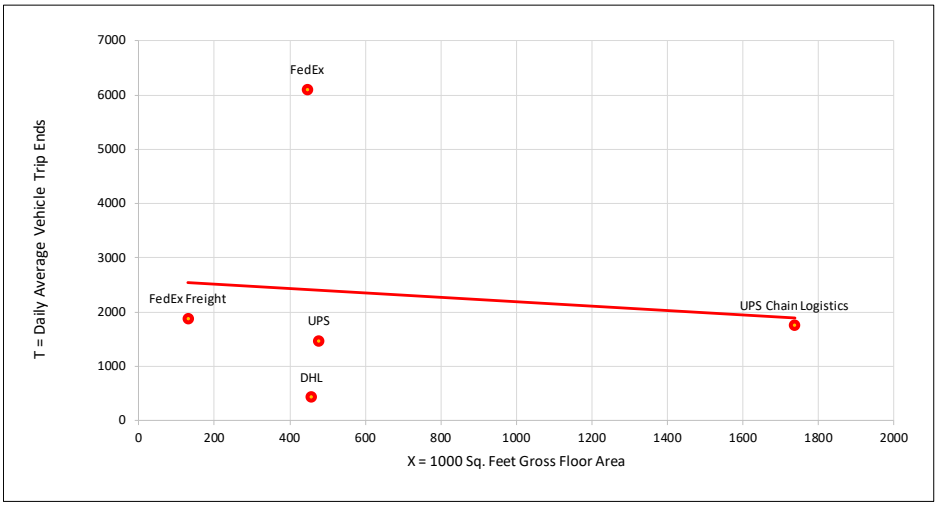
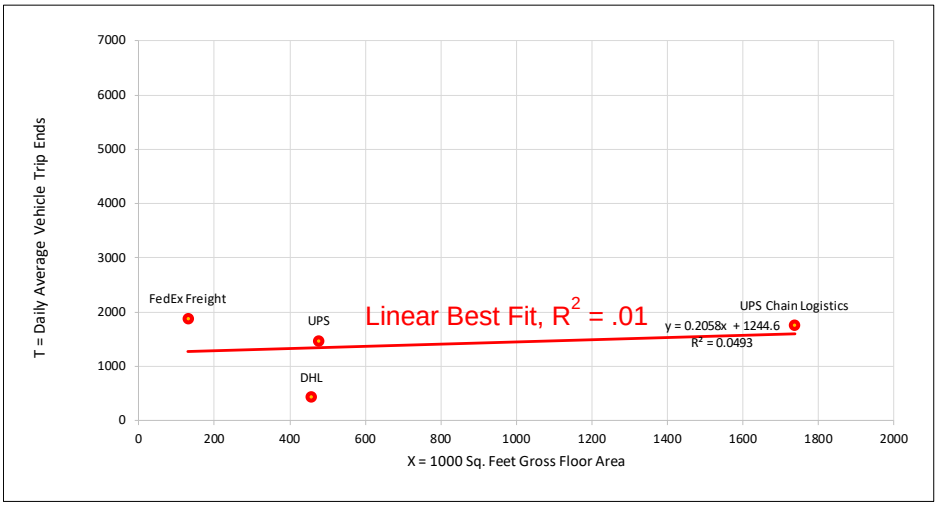



**Exhibit 13: Data Plot for Daily Vehicle Trip Ends against Building Size without Construction Site**




## Conclusions

Our survey of 11 fulfillment centers produced trip generation rates based on the gross floor area of the sites that satisfies ITE's standards for use. The findings of the study indicate that the daily trip generation rates for fulfillment centers is approximately 2.1 trips per thousand square feet of gross floor area, which is roughly 50% higher than the comparable rate for conventional transload and short term storage warehouses previously defined in the ITE *Trip Generation Manual* Version 10. The results of the study further indicate that the higher rates were entirely due to more cars traffic at these sites; the trip generation rates for trucks was found to comparable to those at conventional warehouses.

Employment data were available for eight out of 11 fulfillment center sites. This provided the ability to determine trip generation rates per employee. The study results indicate that that trip generation for fulfillment centers is approximately 2.0 trips per employee. The study also found that the trip generation rate per employee correlated more closely that the trip generation rate per thousand square feet of gross floor area.

The data from the five parcel hubs did not show any statistically meaningful relationship between trips and building size. Therefore, no trip generation rate could be calculated. However, the data collected at these sites may provide a useful basis for further comparison with additional sites to provide more data points for analysis.

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# Item 7.D

## High-Cube Warehouse Calculation

# Attachment 2

## TUMF Calculation Handbook – High Cube Warehouse

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## 1.1. High-Cube Warehouses

### *1.1.1. Summary*

For the purpose of determining the TUMF obligation, all types of high-cube warehouses, including fulfillment centers, transload and short-term storage warehouses and other similar distribution facilities will be considered industrial use types. The methodology outlined in **Worksheet A.2.8** and described as follows will be applied to determine the equivalent floor area for high-cube warehouses/fulfillment centers with a minimum gross floor area of 200,000 square feet, a minimum ceiling height of 24 feet and a minimum dock-high door loading ratio of 1 door per 10,000 square feet *(for the example calculation assume a high-cube warehouse with a gross floor area of 450,000 square feet, a ceiling height exceeding 24 feet and a dock-high door loading ratio exceeding 1:10,000)*:

1. Subtract 200,000 square feet from the total gross floor area
   (*i.e. for the example facility it is 450,000 – 200,000 = 250,000 square feet*)
2. Multiply the resultant value from step 1 which is total gross floor area in excess of 200,000 square feet by 0.36
   (*i.e. for the example facility it is 250,000 x 0.36 = 90,000 square feet*)
3. Add 200,000 square feet to the resultant value of step 2
   (*i.e. for the example facility it is 200,000 + 90,000 = 290,000 square feet*)
4. Use the resultant value of step 3 as the gross floor area to calculate the TUMF obligation using **Worksheet A.2.1** for standard non-residential fee calculations.

The TUMF obligation for a warehouse facility with a gross floor area of less than 200,000 square feet, a ceiling height of less than 24 feet and/or a dock-high door loading ratio of less than 1 door per 10,000 square feet will be calculated based on the actual gross floor area using **Worksheet A.2.1** for standard non-residential fee calculations. Furthermore, where other uses such as wholesale showrooms, retail showrooms or office suites are co-located with qualifying high-cube warehouse facilities, only the qualifying warehouse portion of the premises will be calculated using **Worksheet A.2.8**. The fee obligation for all other co-located facilities will be calculated based on the actual gross floor area and the appropriate land use category using **Worksheet A.2.1** for standard non-residential fee calculations.

### *1.1.2. Detailed Narrative*

High-cube warehouses are primarily for the storage and/or consolidation of manufactured goods (and to a lesser extent, raw materials) prior to their distribution to retail locations or other warehouses. These facilities typically have a high level of on-site automation and logistics management enable highly-efficient processing of goods through the facility. High-cube warehouses include, but may not be limited to, the following types of facilities:

- High-cube transload and short-term storage facilities typically provide for consolidation and distribution of loads for manufacturers, wholesalers or retailers.

Transload and short-term storage facilities typically provide limited storage duration, high throughput and high-efficiency distribution.

- Fulfillment centers include high-cube warehouses typically characterized by significant storage and direct distribution of ecommerce products to the end users. These facilities typically handle smaller packages and quantities than other types of high-cube warehouses.
- High-cube parcel hub warehouses typically serve as regional and local freight-forwarding facilities of time sensitive shipments via air freight and ground carriers. These sites may also include truck maintenance, wash, and/or fueling facilities ancillary to the primary use of the site.
- High-cube cold storage warehouses are facilities that provide temperature-controlled environments for the storage and distribution of frozen foods or other perishable products.

For the purpose of determining the TUMF obligation, all high-cube warehouses are defined as follows:

> *Very large shell buildings commonly constructed using steel framed and/or concrete tilt-up techniques with a minimum gross floor area of 200,000 square feet, a minimum ceiling height of 24 feet and a minimum dock-high door loading ratio of 1 door per 10,000 square feet.*

In accordance with Section 6.2 and Appendix B of the Transportation Uniform Mitigation Fee Nexus Study 2016 Update Final Report (Western Riverside Council of Governments, As Adopted July 10, 2017), high-cube warehouses are considered to be industrial use types with the primary use of the facility generally meeting the description of Motor Freight Transportation and Warehousing (SIC Major Category 42). The TUMF obligation for industrial (and all non-residential) land uses is based on the gross floor area of buildings associated with the specific land use and is calculated using **Worksheet A.2.1** for standard non-residential fee calculations. However, in the case of high-cube warehouses, vehicle trips generated to and from the site are typically lower than traditional industrial uses due to the high-level of on-site automation and logistics management. For this reason, it is necessary to determine the gross floor area equivalency for the purpose of calculating the TUMF obligation.

A review of Trip Generation 9th Edition (Institute of Traffic Engineers, 2012) indicates the average weekday daily trip generation rate for high-cube warehouses is 1.68 trips per thousand square feet, while the weekday PM peak-hour trip generation rate for the same uses is approximately 0.16 trips per thousand square feet of building area. By comparison, traditional warehouse uses have a weekday daily trip generation rate of 3.56 trips per thousand square feet, and PM peak-hour trip generation rates of 0.45 trips per thousand square feet and 0.58 trips per employee. A study of the trip generation characteristics of fulfillment centers in the Inland Empire of Southern California completed in January 2019 by WSP for the Western Riverside Council of Governments (WRCOG) found trip generation rates of these facilities to be generally consistent with the rates prescribed in Trip Generation 9th Edition for all high-cube warehouse uses, with an average weekday daily trip generation rate of 2.13 trips per thousand square feet and an average weekday PM peak rate of 0.16 trips per thousand square feet.

**Table 5.7** summarizes the various characteristics of high-cube warehouses, including trip generation, and establishes the equivalent square feet for the purpose of calculating the TUMF obligation for all high-cube warehouse facilities.

**Table 5.7 – Characteristics of High-Cube Warehouses and Distribution Centers**

| *Land Use Type* | *Average Daily Vehicle Trips per 1,000 sqft* | *Average PM Peak Vehicle Trips per 1,000 sqft* | *Average PM Peak Trips per Employee* | *TUMF Weighted Equivalent sqft ** |
|---|---|---|---|---|
| *Warehousing (i) (150)* | 3.56 | 0.45 | 0.58 | |
| *High-Cube Warehouse (i) (152)* | 1.68 | 0.16 | | *0.36* |
| *Fulfillment Centers (ii)* | 2.13 | 0.16 | 0.16 | |
| *Warehouse/Distribution Center (iii)* | 1.10 | 0.08 | | |
| *All TUMF Industrial Use Types (i)* | 5.33 | | | |

Source: (i) Trip Generation 9th Edition, Institute of Traffic Engineers, 2012

(ii) TUMF High-Cube Warehouse Trip Generation Study, WRCOG, January 2019

(iii) San Bernardino/Riverside County Warehouse/Distribution Center Vehicle Trip Generation Study, Crain and Associates, January 2005

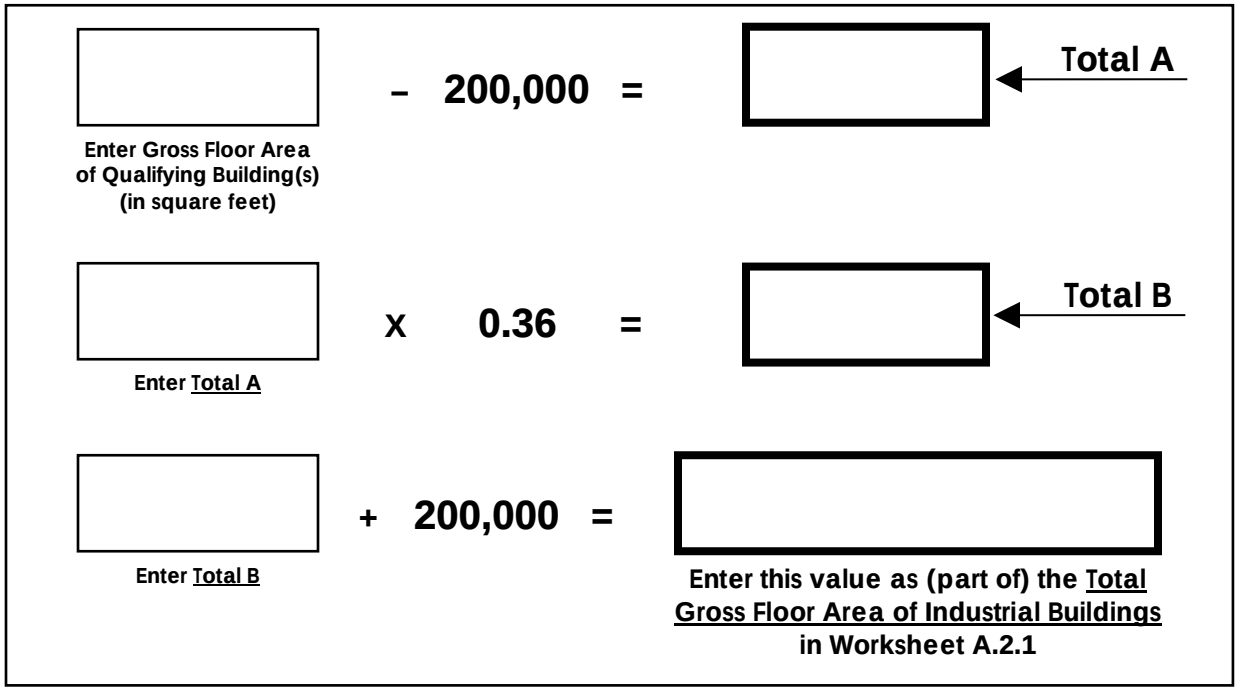
Note: * - TUMF weighted equivalent square feet based on relative trip generation per 1000 sqft between the average of High-Cube Warehouse and Fulfillment Centers and the median of all TUMF Industrial Uses (consistent with TUMF Nexus Study Trip Generation Rate Comparison).

The gross floor area equivalency for High-Cube Warehouses is based on the average of the trip generation characteristics of High-Cube Warehouse, which is quantified in the Trip Generation 9th Edition in terms of both daily and peak trips per thousand square feet gross floor area, and Fulfillment Centers, which is quantified in the TUMF High-Cube Warehouse Trip Generation Study in terms of both daily and peak trips per thousand square feet gross floor area as well as per employees. Based on this information, the simple average daily trip generation rate for a high-cube warehouse, including fulfillment centers, is approximately 1.90 trips per thousand square feet of gross floor area. To account for the variation in trip generation rates between high-cube warehouses, including fulfillment centers, and all TUMF industrial land use types, the gross floor area equivalency was weighted based on the relative trip generation between high-cube warehouses, including fulfillment centers, and the median of all TUMF Industrial Uses as used in the TUMF Nexus Study. The weighted gross floor area equivalency for high-cube warehouses is 0.36.

For the purpose of calculating the TUMF obligation for *High-Cube Warehouses* with a minimum gross floor area of 200,000 square feet, a minimum ceiling height of 24 feet and a minimum dock-high door loading ratio of 1 door per 10,000 square feet, the gross floor area *in excess of 200,000 square feet* will be multiplied by *0.36* and the resultant value *increased by 200,000 square feet* to determine the equivalent number of square feet of floor area. The *equivalent floor area will be used for the purpose of calculating the TUMF* at the rate prescribed by the respective local jurisdictions TUMF Ordinance and supported by the TUMF Nexus Study. For example, a high-cube warehouse with a gross floor area of 450,000 square feet, a ceiling height exceeding 24 feet and a dock-high door loading ratio exceeding 1:10,000 (for the example facility it is at least 45 dock-high door loading bays i.e. 450,000/10,000 = 45) the equivalent floor area would be 290,000 square feet ({[450,000 - 200,000] x 0.36} + 200,000 = 290,000)

The TUMF obligation for a warehouse facility with a gross floor area of less than 200,000 square feet, a ceiling height of less than 24 feet and/or a dock-high door loading ratio of less than 1 door per 10,000 square feet will be calculated based on the actual gross floor area using **Worksheet A.2.1** for standard non-residential fee calculations. Furthermore, where other uses such as wholesale showrooms, retail showrooms or office suites are co-located with qualifying high-cube warehouse facilities, only the qualifying warehouse portion of the premises will be calculated using **Worksheet A.2.8**. The fee obligation for all other co-located facilities will be calculated based on the actual gross floor area and the appropriate land use category using **Worksheet A.2.1** for standard non-residential fee calculations.

*Worksheet A.2.8 High-Cube Warehouse TUMF Calculation Worksheet*



# Item 7.D

## High-Cube Warehouse Calculation

# Attachment 3

## Trip Generation Study – Stakeholder comments

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## Daniel Ramirez-Cornejo

**From:** Frank Sherkow <fsherkow@earthlink.net>
**Sent:** Thursday, January 17, 2019 1:00 PM
**To:** Daniel Ramirez-Cornejo
**Cc:** 'Jonathan Shardlow'; Chris Gray; 'Sandipan Bhattacharjee, P.E., AICP'; Matt Englhard
**Subject:** RE: E-Commerce Trip Generation Rates
**Attachments:** Survey Trip Gen Average-01.16.19_v2.xlsx

Daniel:

Here are some preliminary results from our analysis. As you open the excel file, you will see a summary of facilities sorted by groups that we believe are relevant and as consistent as possible with ITE and sound traffic engineering practices. I will refer to items on this file/tab in this email.

1. We believe that the square footage used in the report for the P&G facility is wrong, and reflects the Floor & Décor company (next door). The real square footage for the P&G facility should be 1,560,046 SF.
2. We conducted a hand-count of the parking spaces using aerial photos from Google Maps.
3. The consultant's reports refers to the size of facilities' sites as the driving factor as to whether they are e-commerce (fulfillment) facilities and how much traffic they might generate. The bigger the site the more trips, they say. "Largest sites tend to generate lots of car trips but few truck trips." The size of the site is NOT the cause for more trips. The auto parking spaces per building SF is the real relationship. It is one of the key factors as to whether the building is/will be e-commerce vs. High Cube Distribution Center. When reviewing a site plan, does it have a large number of auto parking spaces or not? Directly related is also the Total Trips (employees) per 1,000 SF. More goods handling will necessitate more employees, until/unless additional automation comes on the scene.

From our analysis, the group of facilities that were studied actually consists of 5 separate land use types or combinations of land uses:

a. Fulfillment centers (e-commerce) – Walmart (Chino) and Amazon (MV)
b. Distribution with Cold Storage (maybe mixed land uses on one site) – Walmart (Columbia Ave.)
c. Distribution without Cold Storage – P&G, Big 5, Home Depot, Nestles, Petco, Komar, ACT
d. Aggregation Distribution & Handling (probably mixed land uses on one site) – Ross
e. Parcel Hubs – FedEx, UPS, DHL

Referring to the spreadsheet column "S", note the significant differences between sub groups in Total Trips per 1,000 SF (building). True High Cube facilities (Distribution Centers without Cold Storage) will have a small trip rate, because there aren't as many employees per SF. Due to their efficiency of goods movements (with less handling), the truck traffic compared to all trips is a relatively high percentage for High Cube – see column "N". These trip rates are similar to those for Transloading or High Cube facilities in the ITE Trip Generation Handbook. They are also similar to previous data points collected by ITE and AQMD. They are NOT e-commerce of fulfillment facilities.

We know (from work with AQMD and ITE) that cold storage will have slightly higher trip rates, dependent on the type of goods (frozen vs. perishable). Clearly, the Walmart facility on Columbia Ave. is partially or totally cold storage. There is evidence online about its cold storage function.

The Ross facility (Perris) is a mixture of High Cube and goods handling (but not e-commerce). The trip rates and truck % is evidence of this. Ross's business model depends on selling goods that have been for sale in other stores. So, the facilities like the one in Perris are used to resort and regroup goods for sale in Ross stores. Thus, there are many more

employees than at High Cube facilities per SF, but less than an e-commerce building. This mixture is NOT a recognized ITE land use, so we have set it aside.

The only facilities that are acting like true Fulfillment Centers or E-commerce facilities are Amazon (MV) and Walmart (Chino). Note that both of these companies have other facilities that are more like High Cube or Cold Storage, and even Parcel Hub facilities. So, each site should be viewed separately. See column "N" for the small proportion of truck trips vs. total trips. Also see column "S" to compare the higher total trip rates compared to High Cube Distribution Centers (similar for column "Q").

For purposes of establishing traffic impacts or development fees, the group of facilities that the consultant studied does NOT represent Fulfillment Centers. This is also reinforced by the data plot diagrams from the consultant's report.

The other item of note is that true e-commerce facilities are a relatively small portion of the warehouses built or being developed. Even when a facility uses the label of "fulfillment center," it does not mean that it functions as, or has the necessary characteristics of, a true e-commerce facility.

In reference to Parcel Hubs, these facilities are different from other warehouse facilities in size, shape, height, and design. Thus, they can easily be identified as a separate group for your purposes.

We welcome your questions or comments. We hope you will share this information with members of the Public Works Committee.

**Franklin E. Sherkow, P.E., T.E., P.S.E., Env SP, F.ASCE**
***Executive Vice President***
***Southstar Engineering & Consulting, Inc.***
*949-500-7878*

## Daniel Ramirez-Cornejo

**From:** Frank Sherkow <fsherkow@earthlink.net>
**Sent:** Friday, January 11, 2019 3:46 PM
**To:** Daniel Ramirez-Cornejo
**Cc:** 'Jonathan Shardlow'; Chris Gray; 'Sandipan Bhattacharjee, P.E., AICP'
**Subject:** RE: E-Commerce Trip Generation Rates

Daniel:

Thanks for the quick response.

On the P&G building, here is what we had in our data:

| Tenant | Address Line 1 | City | Building Total SF | Building Dock High Doors | Orignial Database - Parking Stalls |
|---|---|---|---|---|---|
| Floor & Décor | 24101 Iris Avenue | Moreno Valley | 1,103,003 | 166 | 400 |
| P&G | 24015 Iris Avenue | Moreno Valley | 1,560,046 | 268 | 862 |

I believe that someone has used the Floor & Decor square footage for the P&G building in your excel spreadsheet. Can you clarify?

Are you aware of any transit usage to these site? Any signs of significant ridesharing at any of these sites? The reason I ask, is that when you take each site's daily traffic flow and divide by the number of employees, the results are very puzzling in some cases. Don't know if you really care about the employment levels, but they should be within reason ranges.

**Franklin E. Sherkow, P.E., T.E., P.S.E., Env SP, F.ASCE**
***Executive Vice President***
***Southstar Engineering & Consulting, Inc.***
*949-500-7878*

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**From:** Daniel Ramirez-Cornejo [mailto:dramirez-cornejo@wrcog.us]
**Sent:** Friday, January 11, 2019 9:34 AM
**To:** Frank Sherkow
**Cc:** 'Jonathan Shardlow'; Chris Gray; 'Sandipan Bhattacharjee, P.E., AICP'
**Subject:** RE: E-Commerce Trip Generation Rates

Good morning Frank,

The employment numbers were provided by the agencies in which the sites are located.

We have also provided responses to your previous questions on two sites as shown below:

1. For the P&G site, the physical address is shown as 24015 Iris Ave, Moreno Valley, CA 92551. The driveways were selected based on the building called out in the aerial photo below. Cosmos Street is an internal road of the same property as shown in the aerial photo.




2. The below is a street view from Riverside Drive to the shared driveway of Komar (building on the left) and Damco (on the right). As shown, the access from Damco (on the right) to the shared driveway is prohibited. Komar does the same for the northern aisle (on the left).




For reference, all traffic counts were collected with video cameras.

-Daniel

Daniel Ramirez-Cornejo
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Western Riverside Council of Governments
3390 University Ave., Suite 450
Riverside, CA 92501-3315

Phone: (951) 405-6712
www.wrcog.us

"Respect Local Control...Provide Regional Perspective"



**From:** Frank Sherkow <fsherkow@earthlink.net>
**Sent:** Wednesday, January 9, 2019 11:52 AM
**To:** Daniel Ramirez-Cornejo <dramirez-cornejo@wrcog.us>
**Cc:** 'Jonathan Shardlow' <Jonathan.Shardlow@GreshamSavage.com>; Chris Gray <cgray@wrcog.us>; 'Sandipan Bhattacharjee, P.E., AICP' <sandipan@translutions.com>
**Subject:** RE: E-Commerce Trip Generation Rates

Daniel:

Thanks for the update.

A few items. We know from our work on development activities and working with tenants, plus our work on traffic impact studies, that the employment levels at these (and most other sites) fluctuates based on a regular seasonal pattern. Since the traffic counts appear have been gathered in Aug. 2018, we understand that this would represent an off-peak season period. This period last about 10 months during the year, but can vary based on local circumstances.

**Can you tell us how you determined the employment numbers from your spreadsheet?**

Based on our very preliminary work on the information from the consultant's report and other data that we possess (omitting the parcel hubs for the time being), it appears that there is a mixture of High Cube, E-commerce, and Cold Storage facilities in the list provided (11 sites). Some individual sites may have a mixture of several of these land uses, and therefore, in our opinion, would not be good candidates for this type of analysis. They don't have a pure representation of any of the recognized ITE land uses, thus, it would be difficult to apply the trips rates (and other factors) to a broader analysis or draw generalized conclusions about this sites.

When AQMD and NAIOP conducted similar studies, we always made sure of two things: 1. The sites were as pure a representative land uses as possible (not a mixture, like cold storage and high cube), and 2. The site possess driveways that could be isolated for traffic counts.

Unfortunately, some of these facilities, from your list, violate one or both of these criteria.

We are continuing to dig, so stay tuned. Thanks.

**Franklin E. Sherkow, P.E., T.E., P.S.E., Env SP, F.ASCE**
***Executive Vice President***
***Southstar Engineering & Consulting, Inc.***
*949-500-7878*

**From:** Daniel Ramirez-Cornejo [mailto:dramirez-cornejo@wrcog.us]
**Sent:** Wednesday, January 9, 2019 11:26 AM
**To:** Frank Sherkow
**Cc:** 'Jonathan Shardlow'; Chris Gray; 'Sandipan Bhattacharjee, P.E., AICP'
**Subject:** RE: E-Commerce Trip Generation Rates

Hi Frank,

Thank you for your comments on WRCOG's High-Cube Warehouse Trip Generation Study with regard to use of the facilities in the study to represent e-commerce trip rates.

We wanted to give you some further background on the study, why we did it, and how the study was performed.

Back in 2017 the Nexus Study was approved, we received some broad direction from our Executive Committee to look into the issue of whether the Nexus Study and the TUMF Program accurately reflects impacts associated with industrial uses. There was some limited direction provided to Staff to look at different industrial uses such parcel hubs, distribution centers, etc. given the perception that these uses generate more trips than typical industrial or high-cube uses.

We convened a working group of local agency staff who recommended a series of locations they were familiar with and also worked with a consultant (WSP) to identify facilities that could be classified as either a distribution center or a parcel hub.

After that, we collected data for each of the sites and summarized the data. We then presented the information to first our working group and then our Public Works Committee to get their feedback. They also recommended that we not have a separate category for these types of uses.

We will be reaching out to WSP to provide a detailed response with respect to the questions below. As requested we are including the worksheet with the data from each facility.

We would be happy to answer any additional questions that you have regarding the work that we've done and will be doing in the future.

Thank you,

-Daniel

Daniel Ramirez-Cornejo
Program Manager
Western Riverside Council of Governments
3390 University Ave., Suite 450
Riverside, CA 92501-3315
Phone: (951) 405-6712
www.wrcog.us

"Respect Local Control...Provide Regional Perspective"



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**From:** Frank Sherkow <fsherkow@earthlink.net>
**Sent:** Monday, January 7, 2019 3:36 PM
**To:** Daniel Ramirez-Cornejo <dramirez-cornejo@wrcog.us>
**Cc:** 'Jonathan Shardlow' <Jonathan.Shardlow@GreshamSavage.com>; Chris Gray <cgray@wrcog.us>; 'Sandipan Bhattacharjee, P.E., AICP' <sandipan@translutions.com>
**Subject:** RE: E-Commerce Trip Generation Rates

Daniel:

Two preliminary questions:

1. Floor & Décor with an address of 24101 Iris and P&G with an address of 16110 Cosmos Street in MV. The traffic sheets and report says that the P&G facility was studied at 24015 Iris Ave. Can you clarify?
2. The Komar facility shares a driveway with a neighboring distribution center (Damco) onto Riverside Dr. What steps were taken to isolate the Komar traffic from other?

**Franklin E. Sherkow, P.E., T.E., P.S.E., Env SP, F.ASCE**
***Executive Vice President***
***Southstar Engineering & Consulting, Inc.***
*949-500-7878*

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**From:** Frank Sherkow [mailto:fsherkow@earthlink.net]
**Sent:** Thursday, January 3, 2019 10:07 AM
**To:** 'Daniel Ramirez-Cornejo'
**Cc:** 'Jonathan Shardlow'; 'Chris Gray'; 'Sandipan Bhattacharjee, P.E., AICP'
**Subject:** RE: E-Commerce Trip Generation Rates

Daniel:

Thanks so much for your quick response. We stand ready to work with you on this important matter.

In the meantime, we will start to examine the traffic counts provided. Perhaps, we will have some comments in the near future.

**Franklin E. Sherkow, P.E., T.E., P.S.E., Env SP, F.ASCE**
***Executive Vice President***
***Southstar Engineering & Consulting, Inc.***
*949-500-7878*

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**From:** Daniel Ramirez-Cornejo [mailto:dramirez-cornejo@wrcog.us]
**Sent:** Thursday, January 3, 2019 9:40 AM
**To:** Frank Sherkow
**Cc:** Jonathan Shardlow; Chris Gray; Sandipan Bhattacharjee, P.E., AICP
**Subject:** RE: E-Commerce Trip Generation Rates

Good morning Frank,

We will begin reviewing your comments and will respond accordingly. However, we wanted to ensure you receive the data requested. Per your request, we are attaching the spreadsheets with the counts taken in summer 2018.

Please let us know if you have any questions. Thank you,

-Daniel

Daniel Ramirez-Cornejo
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Phone: (951) 405-6712
www.wrcog.us

"Respect Local Control...Provide Regional Perspective"



**From:** Frank Sherkow <fsherkow@earthlink.net>
**Sent:** Wednesday, January 2, 2019 3:05 PM
**To:** Daniel Ramirez-Cornejo <dramirez-cornejo@wrcog.us>
**Cc:** Jonathan Shardlow <Jonathan.Shardlow@GreshamSavage.com>; Sandipan Bhattacharjee, P.E., AICP <sandipan@translutions.com>
**Subject:** E-Commerce Trip Generation Rates

Daniel:

I am writing to you concerning the Dec. 13, 2018 staff report about the High-Cube Warehouse Trip Generation Study and possible adjustments related to E-commerce facilities. To give you a bit of history, I represented NAIOP when the original High Cube fee levels were set. We continue to do consulting work for NAIOP and some of their members.

I have read your consultant's report about E-commerce facilities. The staff report states that, "The Trip Generation Study was conducted in a manner that meets the ITE standards for performing studies of this nature." Although the traffic counts may have done in accordance with the ITE Trip Generation Manual, the facilities selected and definitions for the E-commerce facilities do not seem to done in accordance with the ITE recent work on this issue.

I have attached a recent working prepare (referred to on page 2 of your staff report). Note that the ITE working paper refers to definitions for many of the large warehouse facilities, which I authored for ITE, with support of NAIOP members. There are physical site and buildings differences between the warehouse categories.

Having said that, not all E-commerce facilities are the same. For example, Amazon facilities may be "sort", "non-sort", "cross-dock", or some hybrids. My firm has done extensive traffic work on High Cube and E-commerce facilities in the Inland Empire. Some of these E-commerce facilities operate like High Cube facilities, while others have higher trip generation rates due to higher employee activities.

**One major note of concern: Using the label, by the consultant, as "Fulfillment Centers" is most probably NOT ACCURATE.**

The trip rates and parking capacity at some of these sites are significant indicators that some of these facilities are true High Cube buildings that feed local retail outlets, and not the end-customer. Even if the establishment uses the name "fulfillment center" in the title, it does not make them true E-commerce facilities for trip rates purposes.

**Grouping these particular facilities together as a representation of E-commerce trip rates is not correct.**

We would be glad to work with you, on behalf of NAIOP, to ensure that WRCOG has the most recent and correct information. We are glad to hear that, the WRCOG "staff is not recommending the inclusion of a separate component of the TUMF Calculation Handbook for fulfillment centers." However, as you explore possible adjustments to the TUMF fee program, NAIOP would like the opportunity to correct the record about this data and give WRCOG better information about this issue.

In the meantime, we would **formally request the electronic spreadsheets with the actual traffic counts for the 16 facilities** mentioned in the study. Please advise. Thanks.

**Franklin E. Sherkow, P.E., T.E., P.S.E., Env SP, F.ASCE**
***Executive Vice President***
***Southstar Engineering & Consulting, Inc.***
*949-500-7878*

# Western Riverside Council of Governments
## Public Works Committee

## Staff Report

**Subject:** **TUMF Calculation Handbook Revisions**

**Contact:** **Daniel Ramirez-Cornejo, Program Manager, dramirez-cornejo@wrcog.us, (951) 405-6712**

**Date:** **February 14, 2019**

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***The purpose of this item is to*** *present several proposed minor revisions to the Transportation Uniform Mitigation Fee (TUMF) Calculation Handbook and request input on additional revisions from the Committee.*

**Requested Actions:**

1. Recommend that the Executive Committee approve the proposed revisions to the TUMF Fee Calculation Handbook to include clarification language on the 3,000 square foot deduction policy for retail and service uses.
2. Discuss and provide input on proposed clarification to the issuance of credit for existing uses for the exemption outlined in the TUMF Administrative Plan.

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*WRCOG's Transportation Uniform Mitigation Fee (TUMF) Program is a regional fee program designed to provide transportation and transit infrastructure that mitigates the impact of new growth in Western Riverside County. Each of WRCOG's member jurisdictions and the March JPA participates in the Program through an adopted ordinance, collects fees from new development, and remits the fees to WRCOG. WRCOG, as administrator of the TUMF Program, allocates TUMF to the Riverside County Transportation Commission (RCTC), groupings of jurisdictions – referred to as TUMF Zones – based on the amounts of fees collected in these groups, the Western Riverside County Regional Conservation Authority (RCA) and the Riverside Transit Agency (RTA). The TUMF Fee Calculation Handbook details the methodology for calculating the TUMF obligation for different categories of new development and, where necessary, clarifies the definition and calculation methodology for uses not clearly defined in the respective TUMF Ordinances.*

As part of the annual review of TUMF Program documents, staff has identified several items to be added or modified in the TUMF Fee Calculation Handbook.

### 3,000 Square Foot Deduction Policy

On August 7, 2017, the Executive Committee approved a 3,000 square foot (SF) deduction for all service and retail land use types. Since approval of the policy on August 7, 2017, most project applicants are not required to pay TUMF fees on the first 3,000 SF of retail and service projects. This policy benefits both new uses and existing uses that are expanding their operation to provide more economic development in the region. Staff have also interpreted this policy to include Class A and Class B office buildings, to each independent tenant space of a multi-tenant building, and to all defined land uses in the TUMF Fee Calculation Handbook.

On October 1, 2018, the Executive Committee approved an update to the 3,000 SF deduction to retail and service TUMF land uses that limits the reduction to development projects that are less than 20,000 SF, effective immediately. This means that a retail / service project that is 19,999 SF would receive the 3,000 SF deduction but a 20,000 SF retail / service project would not receive the 3,000 SF deduction.

There is currently no specific language in the TUMF Fee Calculation Handbook or any of the TUMF governing documents detailing how the 3,000 SF deduction policy is to be implemented. Staff have proposed clarifying language for addition to the TUMF Fee Calculation Handbook and has added a line in Worksheet A.2.1 for standard, non-residential TUMF calculations to provide guidance on administration of the 3,000 SF deduction. These proposed updates to the TUMF Fee Calculation Handbook are included as an attachment to this Staff Report.

**Credit for Existing Uses**

The TUMF Program contains an exemption for the reuse / reconstruction of existing buildings and the language in the TUMF Administrative Plan is as follows:

> "The rehabilitation and/or reconstruction of any habitable structure in use on or after January 1, 2000, provided that the same or fewer traffic trips are generated as a result thereof"

There is currently no official calculation methodology to guide staff in implementation of this exemption. Staff currently calculate credits for existing uses utilizing the fees and policies currently in effect. Staff is requesting input from the Public Works Committee (PWC) on the following two proposed implementation strategies for potential inclusion in the TUMF Fee Calculation Handbook:

- Option 1: Calculate credit based on the fees in effect at the time that the building was last in use, no earlier than January 1, 2000. This would mean that a credit would be awarded on the full building square footage for existing uses that were in place prior to introduction of the 3,000 SF deduction policy in August 2017; or

- Option 2: Continue calculating credits for existing uses based on the current fee schedules and calculation policies, including the 3,000 SF deduction.

The developer and/or member agency would continue to be responsible for providing documentation showing that the building was in use and occupied after January 1, 2000, to receive credit. If the PWC elects to move forward with Option 1, the developer and/or member agency would also be required to provide documentation of termination of use after January 1, 2000, in order to have credit calculated based on a previous fee schedule and calculation policy. If insufficient documentation is provided, credit would be awarded using the fees and policies currently in place.

**Next Steps**

Staff is requesting input from member agencies on the potential addition to the TUMF Fee Calculation Handbook to clarify application of the 3,000 SF deduction policy. Once staff has direction on allocating credit for existing uses, draft language will be brought to the PWC for possible recommendation to the Executive Committee for action.

**Prior Action:**

None.

**Fiscal Impact:**

Transportation Department activities are included in the Agency's adopted FY 2018/2019 Budget under the Transportation Department.

**Attachment:**

1. 3,000 SF Deduction Revisions for Fee Calculation Handbook.

# Item 7.E

## TUMF Calculation Handbook Revisions

# Attachment 1

## 3,000 SF Deduction Revisions for Fee Calculation Handbook

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## 1.1. 3,000 Square Foot Reduction for Retail and Service TUMF Land Uses

### *1.1.1. Summary*

On August 7, 2017, the WRCOG Executive Committee implemented a policy of waiving the TUMF obligation for the first 3,000 square feet (SF) of gross floor area for all service and retail land uses due to concerns raised during the 2016 Nexus Study update over the impact of TUMF on retail uses. On October 1, 2018, the WRCOG Executive Committee updated the provisions of this policy to limit the fee reduction to only those retail and service land uses that have a total gross floor area of less than 20,000 SF.

### *1.1.2. Implementation*

The policy enacted in August 2017 and updated in October 2018 provides a waiver from the TUMF obligation for the first 3,000 SF of gross floor area for new retail and service development projects as well as expansions to existing retail and service land uses where the net increase in the total gross floor area of the building(s) will be less than 20,000 SF. As such, no TUMF is paid on retail or service projects that increase the total gross floor area of the building(s) by less than 3,000 SF, and the gross floor area used as the basis to determine the fee obligation is reduced by 3,000 SF for retail or service projects that increase the total gross floor area of the building(s) by more than 3,000 SF but less than 20,000 SF. For the purposes of this policy, Class A/B offices are considered Service uses.

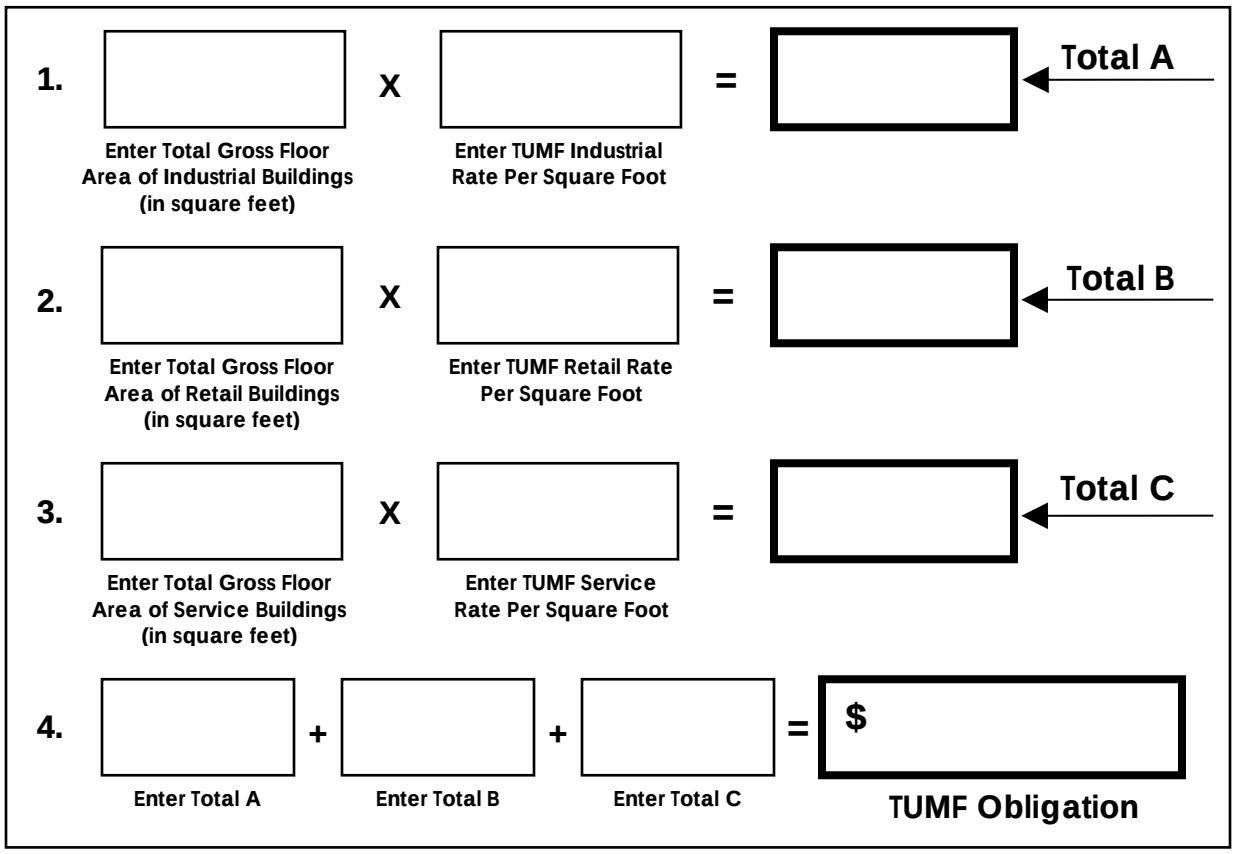
For mixed-use projects or projects with multiple tenants, the 3,000 SF reduction would apply to each individual use or each individual tenant to the extent that each tenant is operating independently of one another, and each is viewed as separate uses. This deduction is applied at the time of TUMF fee assessment and is based on the building as shown on plans at that time. Therefore, if a building is subdivided after TUMF fees are paid, TUMF would not be refunded.

### *1.1.3. Background*

In response to concerns raised during the 2016 Nexus Study update, WRCOG staff undertook a study of several mid-size shopping centers in the subregion. Results from this study show that these shopping centers are generally anchored by a large tenant, typically occupying a space over 20,000 SF, and that these large spaces are surrounded by a number of smaller tenant spaces. The larger spaces are commonly occupied by large retailers such as grocery stores, clothing stores, and supermarkets; however, smaller tenant spaces are more commonly occupied by restaurants, beauty salons, dental offices, or electronics shops. Whereas the larger spaces may create a regional traffic draw, these smaller uses are generally more local-serving. For example, a new 200,000 SF retail super center may draw traffic from adjacent jurisdictions, as there may be a limited number of these retailers in the region. However, the smaller uses, such as a beauty salon or dental office, are generally located in every jurisdiction and will not likely create a large regional draw. Thus, even if a smaller use does generate additional traffic, this traffic will generally be local (i.e., new drive-through coffee shop locations, as there are numerous locations throughout the region).

## A.2 Fee Calculation Worksheets for Non-Residential Use Types

*Worksheet A.2.1 Standard Non-Residential TUMF Calculation Worksheet*

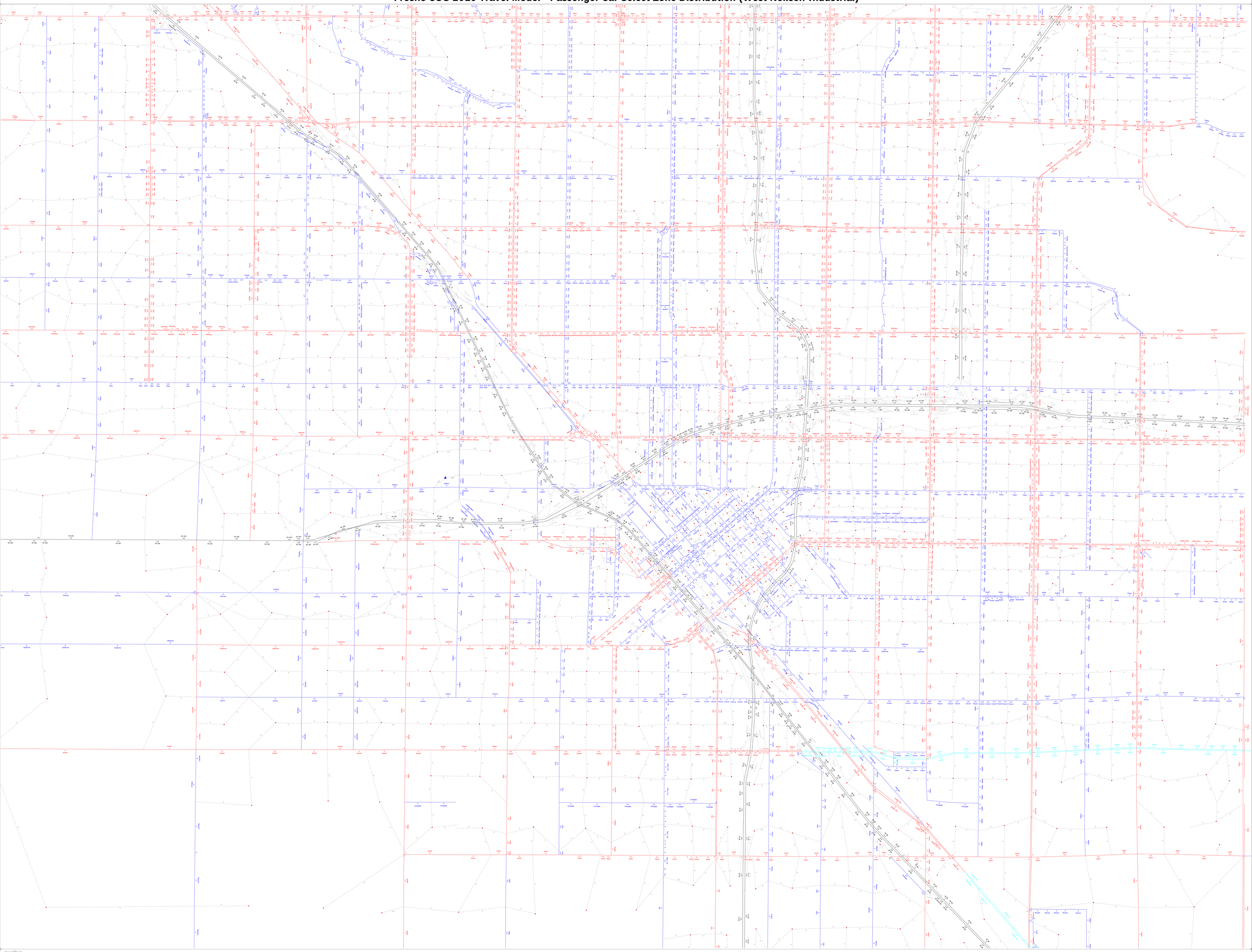



☐ 3,000 SF Deduction Awarded (Total SF: _____; Adjusted SF: _____)

**August 7, 2017** the WRCOG Executive Committee approved a 3,000 SF deduction for all service and retail TUMF land use types.

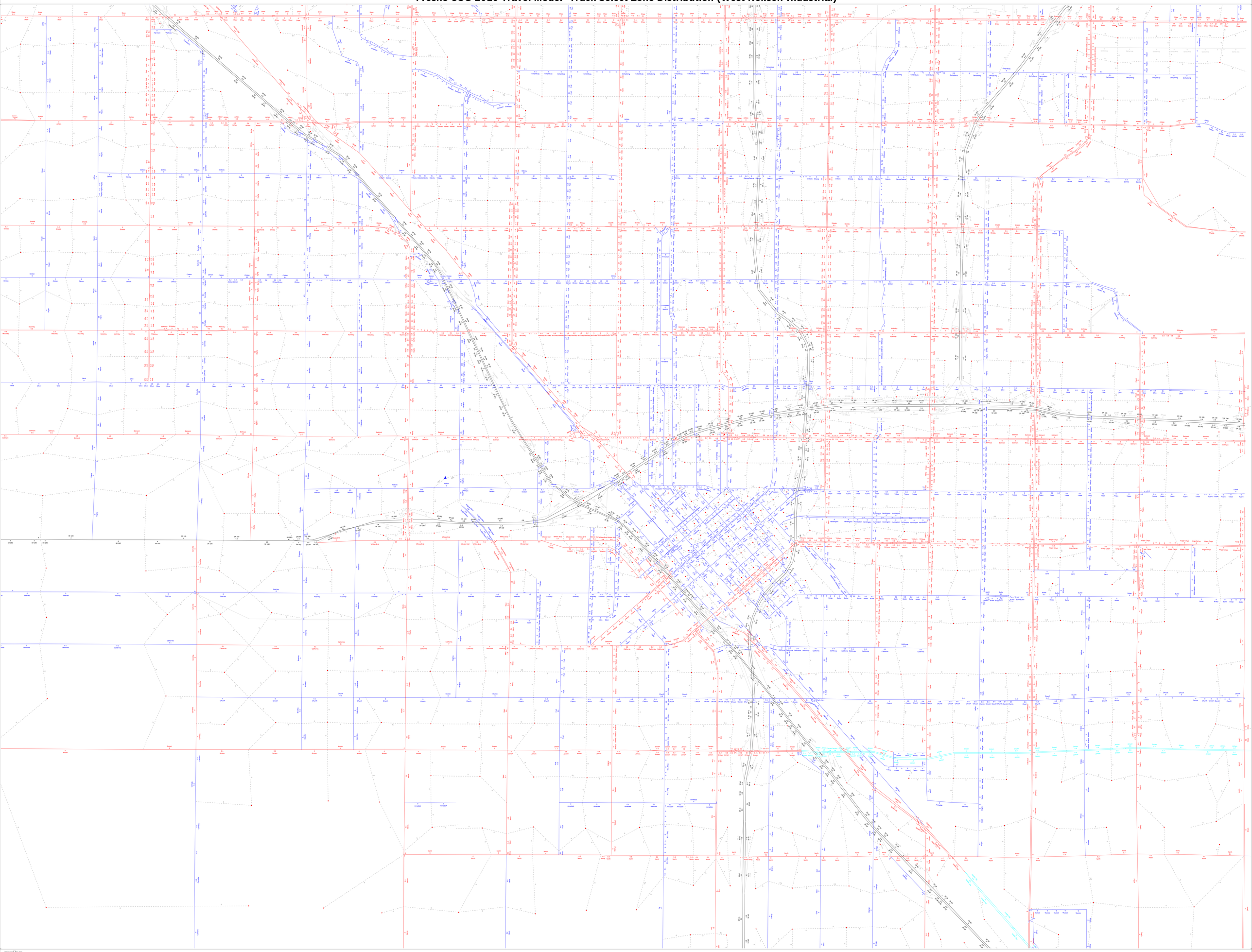
**October 1, 2018** the WRCOG Executive Committee approved a revision to the 3,000 SF reduction policy for retail and service uses to limit this reduction to projects that are less than 20,000 SF.

# Fresno COG 2019 Travel Model - Passenger Car Select Zone Distribution (West Neilsen Industrial)



(Licensed to LSA Associates Inc)

# Fresno COG 2019 Travel Model -Truck Select Zone Distribution (West Neilsen Industrial)



(Licensed to LSA Associates Inc)

# APPENDIX B:

# TRAFFIC COUNT SHEETS AND SIGNAL TIMING SHEETS

Prepared by National Data & Surveying Services

# N Marks Ave & W Belmont Ave

## Peak Hour Turning Movement Count

**ID:** 21-030058-001
**City:** Fresno

**Day:** Tuesday
**Date:** 8/3/2021

**PEAK HOURS**

| | |
|---|---|
| AM | 07:30 AM - 08:30 AM |
| NOON | NONE |
| PM | 04:00 PM - 05:00 PM |

**COUNT PERIODS**

| | |
|---|---|
| AM | 7:00 AM - 09:00 AM |
| NOON | NONE |
| PM | 4:00 PM - 06:00 PM |

### SOUTHBOUND (N Marks Ave)

| | | | | | | |
|---|---|---|---|---|---|---|
| AM | 14 | 112 | 38 | 0 | 134 | AM |
| NOON | 0 | 0 | 0 | 0 | 0 | NOON |
| PM | 22 | 110 | 24 | 0 | 289 | PM |
| | 0 | 3 | 1 | 0 | | |

### EASTBOUND (W Belmont Ave)

| AM | NOON | PM | |
|---|---|---|---|
| 122 | 0 | 222 | |
| 0 | 0 | 0 | 0 |
| 18 | 0 | 19 | 1 |
| 115 | 0 | 163 | 2 |
| 68 | 0 | 44 | 0 |
| AM | NOON | PM | |

### WESTBOUND (W Belmont Ave)

| PM | NOON | AM | |
|---|---|---|---|
| 53 | 0 | 11 | 1 |
| 115 | 0 | 66 | 1 |
| 35 | 0 | 32 | 1 |
| 0 | 0 | 1 | 0 |
| 258 | 0 | 211 | |
| PM | NOON | AM | |

### NORTHBOUND (N Marks Ave)

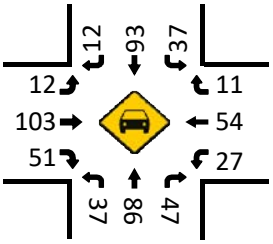
| | | | | | | |
|---|---|---|---|---|---|---|
| PM | 191 | 2 | 85 | 217 | 71 | PM |
| NOON | 0 | 0 | 0 | 0 | 0 | NOON |
| AM | 213 | 1 | 42 | 105 | 57 | AM |
| | | 0 | 1 | 1 | 1 | |

### CONTROL

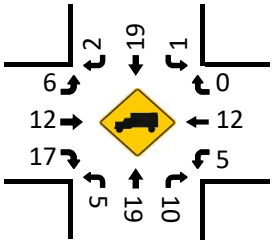
4-Way Stop

| | | | |
|---|---|---|---|
| TEV | 680 | 0 | 960 |
| | AM | NOON | PM |
| PHF | 0.83 | | 0.88 |

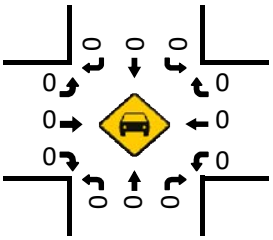
### Cars (AM)



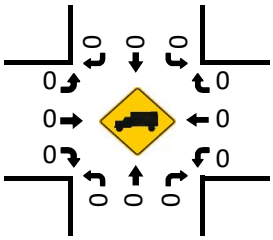

### HT (AM)



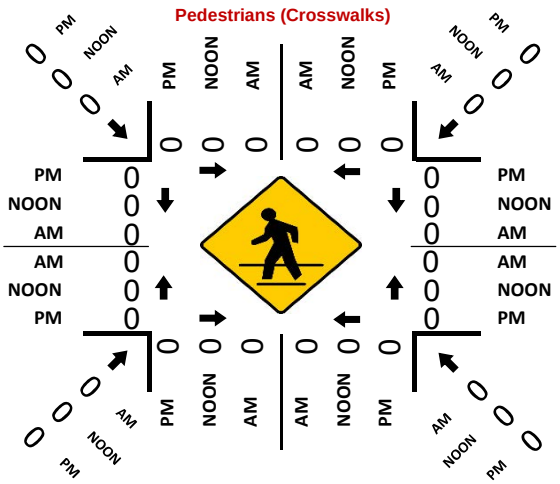

### Cars (NOON)



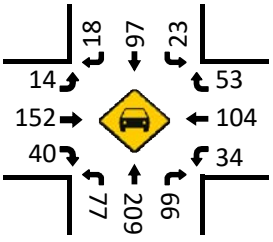

### HT (NOON)



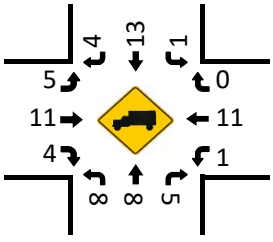

### Pedestrians (Crosswalks)




### Cars (PM)




### HT (PM)



Prepared by National Data & Surveying Services

# N Marks Ave & W Nielsen Ave

## Peak Hour Turning Movement Count

**ID:** 21-030058-002
**City:** Fresno

**Day:** Tuesday
**Date:** 8/3/2021

**PEAK HOURS**

| | |
|---|---|
| AM | 07:30 AM - 08:30 AM |
| NOON | NONE |
| PM | 04:30 PM - 05:30 PM |

**COUNT PERIODS**

| | |
|---|---|
| AM | 7:00 AM - 09:00 AM |
| NOON | NONE |
| PM | 4:00 PM - 06:00 PM |

### SOUTHBOUND (N Marks Ave)

| | | | | | | |
|---|---|---|---|---|---|---|
| AM | 27 | 176 | 8 | 0 | 213 | AM |
| NOON | 0 | 0 | 0 | 0 | 0 | NOON |
| PM | 13 | 182 | 2 | 3 | 388 | PM |
| | 1 | 2 | 1 | 0 | | |

### EASTBOUND (W Nielsen Ave)

| AM | NOON | PM | |
|---|---|---|---|
| 82 | 0 | 47 | |
| 0 | 0 | 0 | 0 |
| 10 | 0 | 22 | 1 |
| 6 | 0 | 2 | 1 |
| 30 | 0 | 33 | 1 |
| AM | NOON | PM | |

### WESTBOUND (W Nielsen Ave)

| PM | NOON | AM | |
|---|---|---|---|
| 10 | 0 | 8 | 1 |
| 7 | 0 | 4 | 1 |
| 64 | 0 | 14 | 1 |
| 0 | 0 | 0 | 0 |
| 29 | 0 | 74 | |
| PM | NOON | AM | |

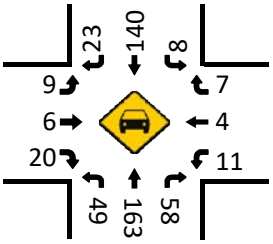
### NORTHBOUND (N Marks Ave)

| | | | | | | |
|---|---|---|---|---|---|---|
| PM | 280 | 1 | 27 | 353 | 25 | PM |
| NOON | 0 | 0 | 0 | 0 | 0 | NOON |
| AM | 221 | 1 | 51 | 195 | 60 | AM |
| | | 0 | 1 | 2 | 1 | |

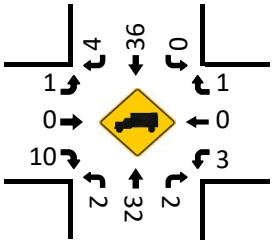
**CONTROL:** Signalized

| | | | |
|---|---|---|---|
| TEV | 590 AM | 0 NOON | 744 PM |
| PHF | 0.81 | | 0.96 |

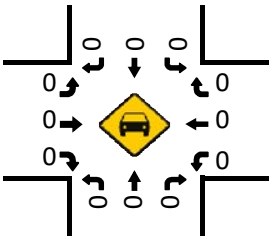
### Cars (AM)



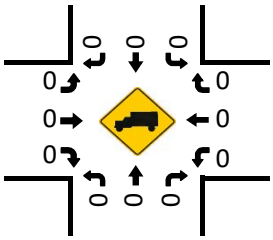

### HT (AM)



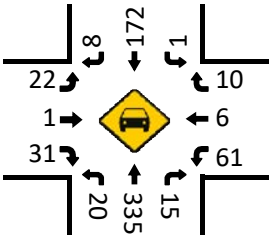

### Cars (NOON)



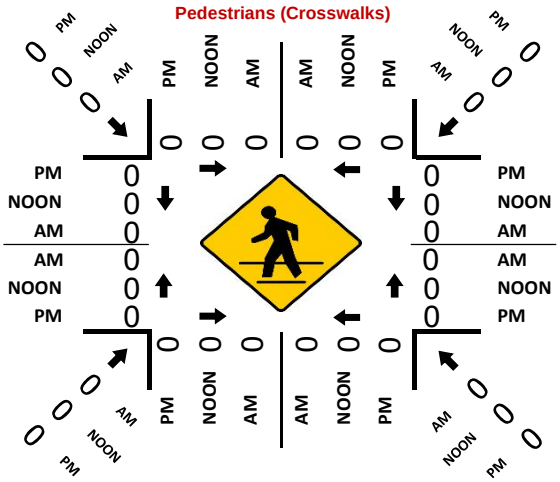

### HT (NOON)



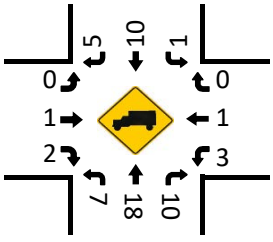

### Cars (PM)




### Pedestrians (Crosswalks)




### HT (PM)



Prepared by National Data & Surveying Services

# N Marks Ave & W Ray Johnson Dr

## Peak Hour Turning Movement Count

**ID:** 21-030058-003
**City:** Fresno

**Day:** Tuesday
**Date:** 8/3/2021

**PEAK HOURS**

AM: 07:15 AM - 08:15 AM
NOON: NONE
PM: 04:30 PM - 05:30 PM

**COUNT PERIODS**

AM: 7:00 AM - 09:00 AM
NOON: NONE
PM: 4:00 PM - 06:00 PM

### SOUTHBOUND (N Marks Ave)

| | | | | | | |
|---|---|---|---|---|---|---|
| AM | 0 | 223 | 1 | 1 | 305 | AM |
| NOON | 0 | 0 | 0 | 0 | 0 | NOON |
| PM | 0 | 281 | 4 | 0 | 404 | PM |

### EASTBOUND (W Ray Johnson Dr)

| AM | NOON | PM | |
|---|---|---|---|
| 0 | 0 | 0 | ⇦ |
| 0 | 0 | 0 | ↶ 0 |
| 0 | 0 | 0 | → 0 |
| 0 | 0 | 0 | ↷ 0 |
| 0 | 0 | 0 | ⇩ |

### WESTBOUND (W Ray Johnson Dr)

| PM | NOON | AM | |
|---|---|---|---|
| 6 | 0 | 3 | 1 ↷ |
| 0 | 0 | 0 | 0 ← |
| 17 | 0 | 8 | 1 ↶ |
| 0 | 0 | 0 | 0 ↶ |
| 14 | 0 | 7 | ⇨ |

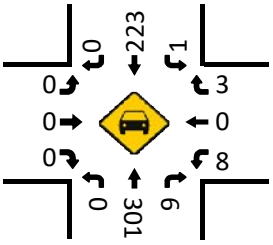
### NORTHBOUND (N Marks Ave)

| | | | | | | |
|---|---|---|---|---|---|---|
| PM | 298 | 0 | 0 | 398 | 10 | PM |
| NOON | 0 | 0 | 0 | 0 | 0 | NOON |
| AM | 231 | 0 | 0 | 301 | 6 | AM |

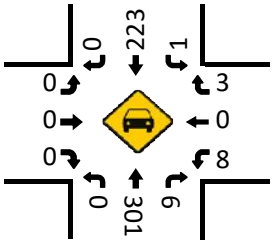
**CONTROL:** Signalized

| | | | |
|---|---|---|---|
| TEV | 543 AM | 0 NOON | 716 PM |
| PHF | 0.80 | | 0.92 |

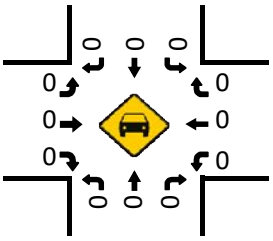
Totals (AM)



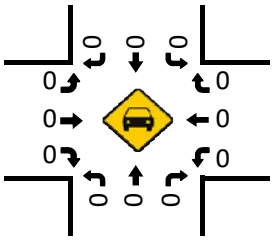

Totals (AM)



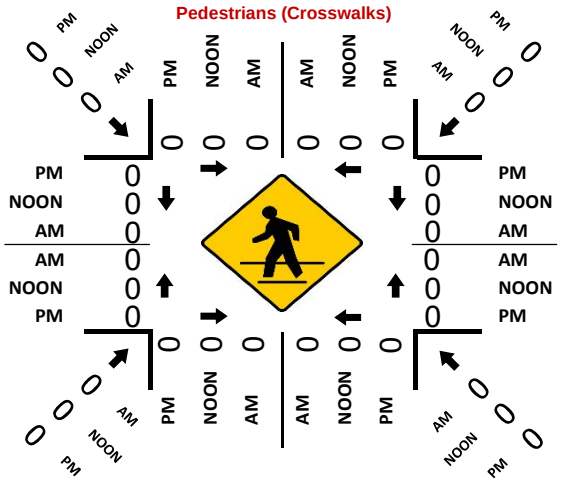

Totals (NOON)



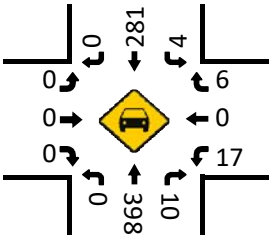

Totals (NOON)



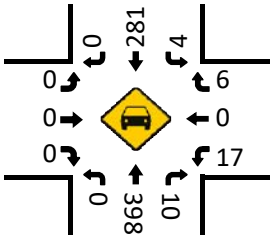

Pedestrians (Crosswalks)




Totals (PM)




Totals (PM)



Prepared by National Data & Surveying Services

# N Marks Ave & SR-180 WB Ramps

## Peak Hour Turning Movement Count

**ID:** 21-030058-004
**City:** Fresno

**Day:** Tuesday
**Date:** 8/3/2021

| PEAK HOURS | COUNT PERIODS |
|---|---|
| 07:15 AM - 08:15 AM | 7:00 AM - 09:00 AM |
| NONE | NONE |
| 04:30 PM - 05:30 PM | 4:00 PM - 06:00 PM |

### SOUTHBOUND (N Marks Ave)

| | | | | | | |
|---|---|---|---|---|---|---|
| AM | 19 | 212 | 0 | 0 | 314 | AM |
| NOON | 0 | 0 | 0 | 0 | 0 | NOON |
| PM | 20 | 286 | 0 | 0 | 413 | PM |

### EASTBOUND (SR-180 WB Ramps)

| AM | NOON | PM | |
|---|---|---|---|
| 19 | 0 | 20 | |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| AM | NOON | PM | |

### WESTBOUND (SR-180 WB Ramps)

| PM | NOON | AM | |
|---|---|---|---|
| 273 | 0 | 238 | 2 |
| 0 | 0 | 0 | 0 |
| 219 | 0 | 173 | 2 |
| 0 | 0 | 0 | 0 |
| 15 | 0 | 11 | |
| PM | NOON | AM | |

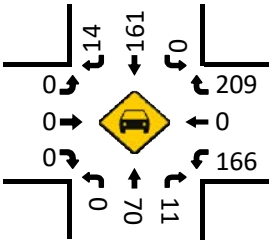
### NORTHBOUND (N Marks Ave)

| | | | | | | |
|---|---|---|---|---|---|---|
| PM | 505 | 0 | 0 | 140 | 15 | PM |
| NOON | 0 | 0 | 0 | 0 | 0 | NOON |
| AM | 385 | 0 | 0 | 76 | 11 | AM |

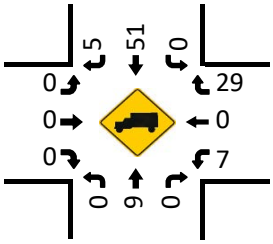
| | | | | |
|---|---|---|---|---|
| 1 | 2 | 0 | 0 | |
| | | | 0 | 0 |
| | | | 2 | 1 |

| CONTROL | | | |
|---|---|---|---|
| Signalized | | | |
| TEV | 729 AM | 0 NOON | 953 PM |
| PHF | 0.84 | | 0.98 |

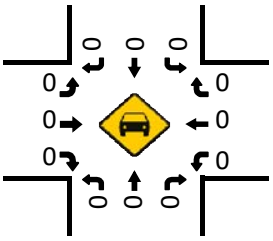
### Cars (AM)



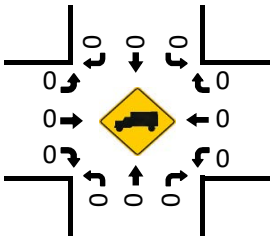

### HT (AM)



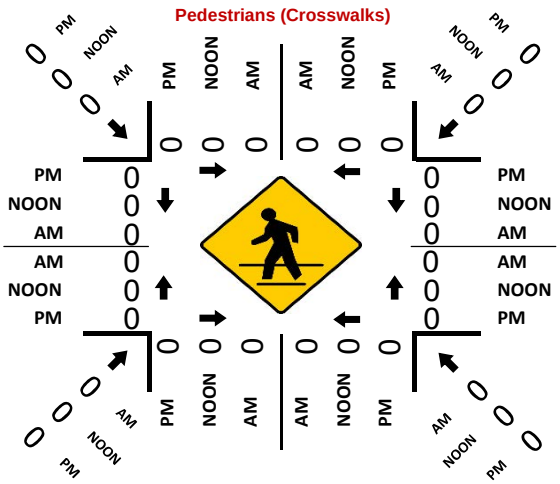

### Cars (NOON)



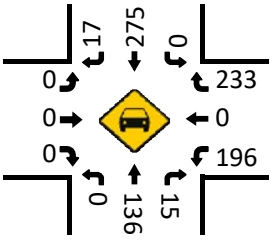

### HT (NOON)



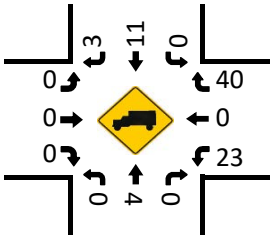

### Pedestrians (Crosswalks)




### Cars (PM)




### HT (PM)



Prepared by National Data & Surveying Services

# N Marks Ave & SR-180 EB Ramps

## Peak Hour Turning Movement Count

**ID:** 21-030058-005
**City:** Fresno

**Day:** Tuesday
**Date:** 8/3/2021

| PEAK HOURS | COUNT PERIODS |
|---|---|
| 07:15 AM - 08:15 AM | 7:00 AM - 09:00 AM |
| NONE | NONE |
| 04:30 PM - 05:30 PM | 4:00 PM - 06:00 PM |

### SOUTHBOUND (N Marks Ave)

| | | | | | | |
|---|---|---|---|---|---|---|
| AM | 122 | 261 | 0 | 0 | 87 | AM |
| NOON | 0 | 0 | 0 | 0 | 0 | NOON |
| PM | 171 | 336 | 0 | 0 | 155 | PM |

### EASTBOUND (SR-180 EB Ramps)

| AM | NOON | PM | |
|---|---|---|---|
| 122 | 0 | 171 | |
| 0 | 0 | 0 | 0 |
| 10 | 0 | 17 | 1 |
| 0 | 0 | 0 | 0 |
| 11 | 0 | 18 | 1 |

### WESTBOUND (SR-180 EB Ramps)

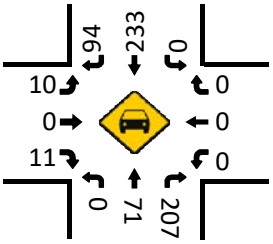
| | PM | NOON | AM |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| | 264 | 0 | 215 |

### NORTHBOUND (N Marks Ave)

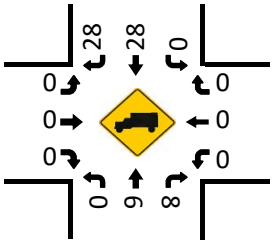
| | | | | | | |
|---|---|---|---|---|---|---|
| PM | 354 | 0 | 0 | 138 | 264 | PM |
| NOON | 0 | 0 | 0 | 0 | 0 | NOON |
| AM | 272 | 0 | 0 | 77 | 215 | AM |

| CONTROL | | | |
|---|---|---|---|
| Signalized | | | |
| TEV | 696 AM | 0 NOON | 944 PM |
| PHF | 0.92 | | 0.92 |

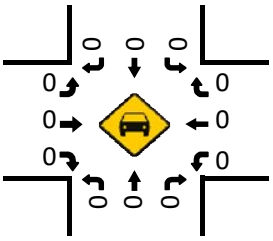
Cars (AM)



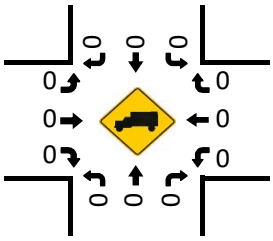

HT (AM)



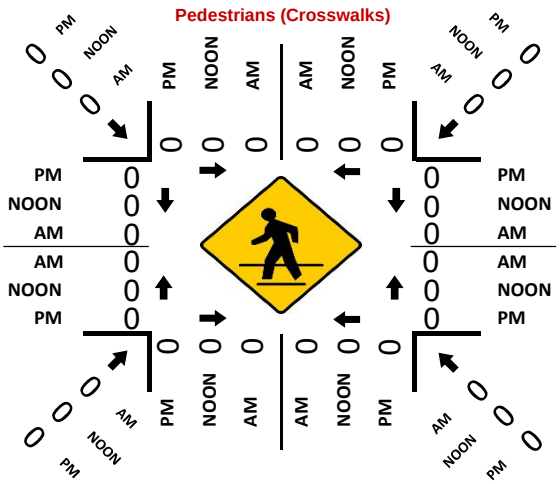

Cars (NOON)



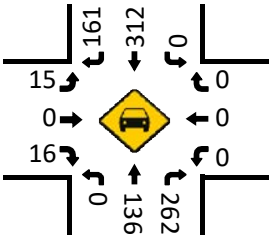

HT (NOON)



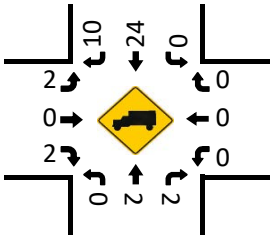

Pedestrians (Crosswalks)




Cars (PM)




HT (PM)



Prepared by National Data & Surveying Services

# N Hughes Ave & W Belmont Ave

## Peak Hour Turning Movement Count

**ID:** 21-030058-006
**City:** Fresno

**Day:** Tuesday
**Date:** 8/3/2021

**PEAK HOURS**

AM: 07:30 AM - 08:30 AM
NOON: NONE
PM: 04:00 PM - 05:00 PM

**COUNT PERIODS**

AM: 7:00 AM - 09:00 AM
NOON: NONE
PM: 4:00 PM - 06:00 PM

### SOUTHBOUND (N Hughes Ave)

| | | | | | | |
|---|---|---|---|---|---|---|
| AM | 15 | 22 | 26 | 0 | 62 | AM |
| NOON | 0 | 0 | 0 | 0 | 0 | NOON |
| PM | 15 | 47 | 40 | 0 | 113 | PM |

### EASTBOUND (W Belmont Ave)

| AM | NOON | PM | | |
|---|---|---|---|---|
| 156 | 0 | 208 | | |
| 0 | 0 | 0 | 0 | |
| 20 | 0 | 37 | 1 | |
| 171 | 0 | 225 | 2 | |
| 17 | 0 | 10 | 0 | |
| AM | NOON | PM | | |

### WESTBOUND (W Belmont Ave)

| PM | NOON | AM | | |
|---|---|---|---|---|
| | | | 0 | 34 | 0 | 15 |
| | | | 2 | 179 | 0 | 135 |
| | | | 1 | 39 | 0 | 27 |
| | | | 0 | 2 | 0 | 0 |
| 323 | 0 | 230 | | |
| PM | NOON | AM | | |

### NORTHBOUND (N Hughes Ave)

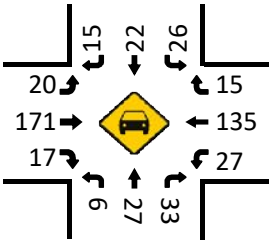
| | | | | | | |
|---|---|---|---|---|---|---|
| PM | 96 | 0 | 14 | 42 | 56 | PM |
| NOON | 0 | 0 | 0 | 0 | 0 | NOON |
| AM | 66 | 0 | 6 | 27 | 33 | AM |

| | | | | |
|---|---|---|---|---|
| | 0 | 1 | 0 | 0 |
| | 0 | 0 | 1 | 0 |

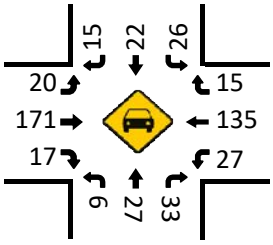
**CONTROL:** 4-Way Stop

| | | | |
|---|---|---|---|
| TEV | 514 | 0 | 740 |
| | AM | NOON | PM |
| PHF | 0.91 | | 0.82 |

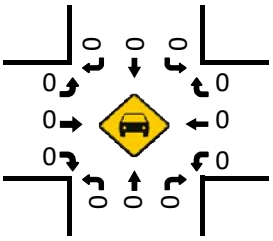
**Totals (AM)**



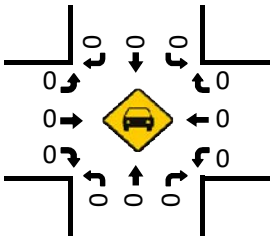

**Totals (AM)**



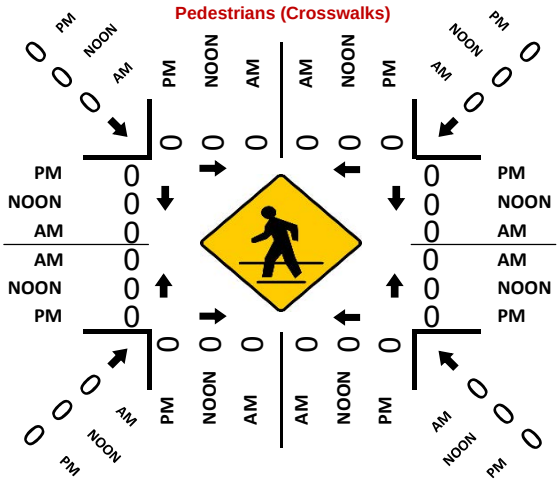

**Totals (NOON)**



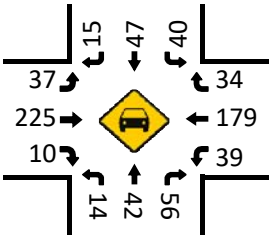

**Totals (NOON)**



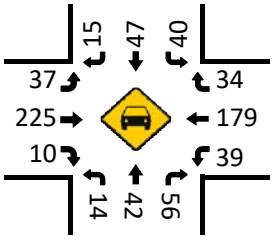

**Pedestrians (Crosswalks)**




**Totals (PM)**




**Totals (PM)**



Prepared by National Data & Surveying Services

# N Hughes Ave & W Nielsen Ave

## Peak Hour Turning Movement Count

**ID:** 21-030058-007
**City:** Fresno

**Day:** Tuesday
**Date:** 8/3/2021

**PEAK HOURS**

AM: 07:45 AM - 08:45 AM
NOON: NONE
PM: 04:00 PM - 05:00 PM

**COUNT PERIODS**

AM: 7:00 AM - 09:00 AM
NOON: NONE
PM: 4:00 PM - 06:00 PM

### SOUTHBOUND (N Hughes Ave)

| | | | | | | |
|---|---|---|---|---|---|---|
| AM | 10 | 46 | 8 | 0 | 60 | AM |
| NOON | 0 | 0 | 0 | 0 | 0 | NOON |
| PM | 13 | 73 | 9 | 0 | 105 | PM |

### EASTBOUND (W Nielsen Ave)

| AM | NOON | PM | |
|---|---|---|---|
| 24 | 0 | 69 | |
| 0 | 0 | 0 | 0 |
| 8 | 0 | 8 | 1 |
| 33 | 0 | 22 | 1 |
| 24 | 0 | 11 | 0 |
| AM | NOON | PM | |

### WESTBOUND (W Nielsen Ave)

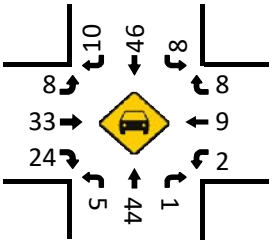
| PM | NOON | AM | |
|---|---|---|---|
| 14 | 0 | 8 | 0 |
| 31 | 0 | 9 | 1 |
| 4 | 0 | 2 | 1 |
| 0 | 0 | 0 | 0 |
| 34 | 0 | 42 | |
| PM | NOON | AM | |

### NORTHBOUND (N Hughes Ave)

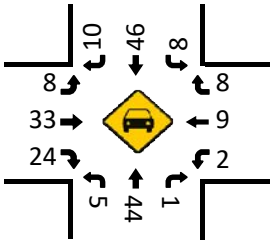
| | | | | | |
|---|---|---|---|---|---|
| PM | 88 | 0 | 25 | 83 | 3 | PM |
| NOON | 0 | 0 | 0 | 0 | 0 | NOON |
| AM | 72 | 0 | 5 | 44 | 1 | AM |

| CONTROL | | | |
|---|---|---|---|
| 4-Way Stop | | | |
| TEV | 198 AM | 0 NOON | 296 PM |
| PHF | 0.84 | | 0.82 |

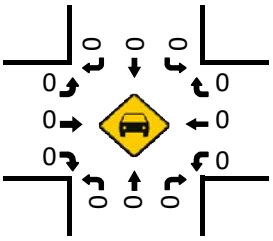
**Totals (AM)**



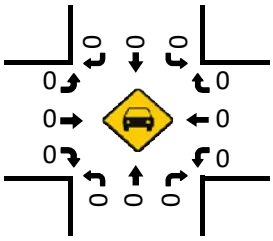

**Totals (AM)**



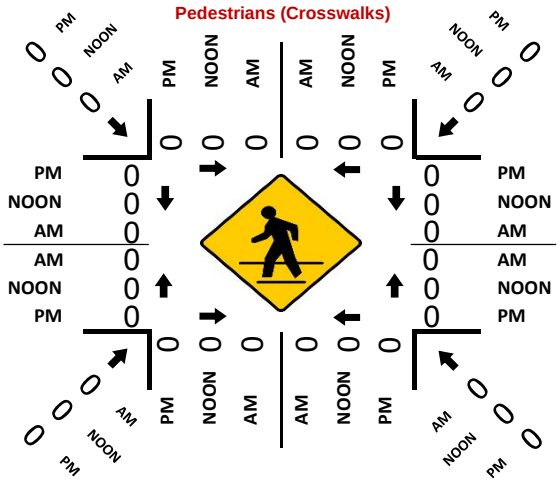

**Totals (NOON)**



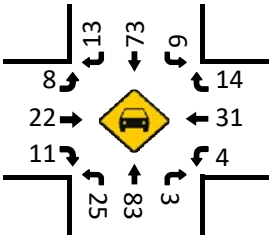

**Totals (NOON)**



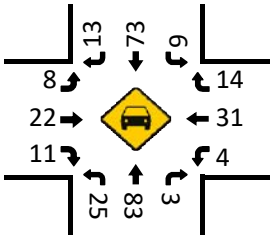

**Pedestrians (Crosswalks)**




**Totals (PM)**




**Totals (PM)**



# ITM Peak Hour Summary

Prepared by:

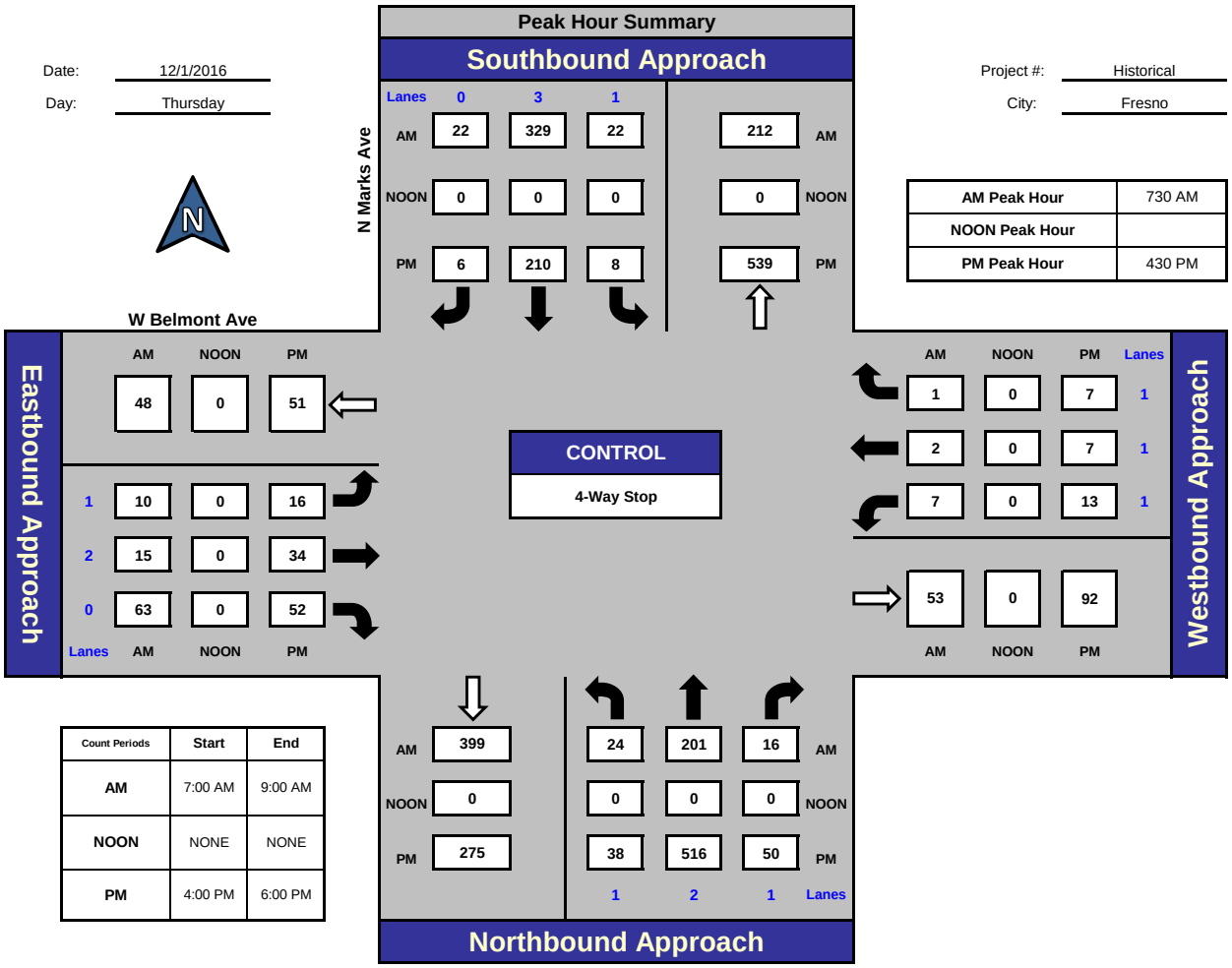
National Data & Surveying Services

## *N Marks Ave and W Belmont Ave , Fresno*

Date: 12/1/2016
Day: Thursday

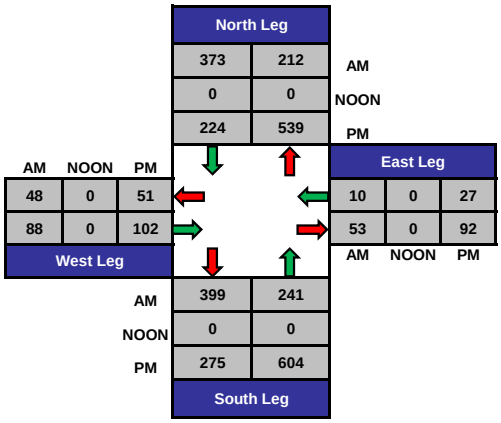
Project #: Historical
City: Fresno

| | |
|---|---|
| AM Peak Hour | 730 AM |
| NOON Peak Hour | |
| PM Peak Hour | 430 PM |

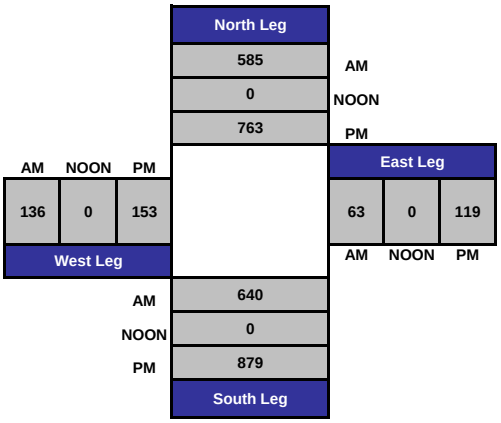



| Count Periods | Start | End |
|---|---|---|
| AM | 7:00 AM | 9:00 AM |
| NOON | NONE | NONE |
| PM | 4:00 PM | 6:00 PM |

## Total Ins & Outs




## Total Volume Per Leg



# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** Historical

**Day:** Thursday

**City:** Fresno

**Cars**

**Date:** 12/1/2016

**AM**

| **NS/EW Streets:** | N Marks Ave | | | N Marks Ave | | | W Belmont Ave | | | W Belmont Ave | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 1 | 1 | 3 | 0 | 1 | 2 | 0 | 1 | 1 | 1 | |
| 7:00 AM | 2 | 33 | 2 | 3 | 37 | 1 | 2 | 4 | 11 | 0 | 1 | 0 | 96 |
| 7:15 AM | 4 | 26 | 4 | 8 | 47 | 4 | 3 | 2 | 13 | 3 | 3 | 0 | 117 |
| 7:30 AM | 9 | 48 | 3 | 8 | 101 | 6 | 3 | 6 | 17 | 1 | 0 | 0 | 202 |
| 7:45 AM | 5 | 58 | 2 | 4 | 97 | 7 | 3 | 1 | 16 | 0 | 1 | 0 | 194 |
| 8:00 AM | 4 | 55 | 4 | 3 | 73 | 2 | 2 | 5 | 19 | 2 | 1 | 1 | 171 |
| 8:15 AM | 4 | 38 | 7 | 4 | 54 | 6 | 2 | 2 | 8 | 2 | 0 | 0 | 127 |
| 8:30 AM | 7 | 48 | 12 | 6 | 61 | 4 | 5 | 5 | 9 | 1 | 0 | 0 | 158 |
| 8:45 AM | 5 | 39 | 6 | 1 | 51 | 3 | 4 | 1 | 8 | 2 | 0 | 0 | 120 |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| **TOTAL VOLUMES :** | 40 | 345 | 40 | 37 | 521 | 33 | 24 | 26 | 101 | 11 | 6 | 1 | 1185 |
| **APPROACH %'s :** | 9.41% | 81.18% | 9.41% | 6.26% | 88.16% | 5.58% | 15.89% | 17.22% | 66.89% | 61.11% | 33.33% | 5.56% | |
| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
| **PEAK HR VOL :** | 22 | 199 | 16 | 19 | 325 | 21 | 10 | 14 | 60 | 5 | 2 | 1 | 694 |
| **PEAK HR FACTOR :** | | 0.912 | | | 0.793 | | | 0.808 | | | 0.500 | | 0.859 |

| UTURNS | NB | SB | EB | WB |
|---|---|---|---|---|
| | | | | |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 2 | 0 | 0 |
| | 0 | 3 | 0 | 0 |
| | 1 | 1 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 2 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | NB | SB | EB | WB |
| | 1 | 8 | 0 | 0 |

**CONTROL :** 4-Way Stop

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** Historical

**Day:** Thursday

**City:** Fresno

**Cars**

**Date:** 12/1/2016

**PM**

| **NS/EW Streets:** | N Marks Ave | | | N Marks Ave | | | W Belmont Ave | | | W Belmont Ave | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 1 | 1 | 3 | 0 | 1 | 2 | 0 | 1 | 1 | 1 | |
| 4:00 PM | 10 | 121 | 11 | 2 | 58 | 5 | 2 | 5 | 14 | 1 | 2 | 1 | 232 |
| 4:15 PM | 5 | 110 | 14 | 0 | 49 | 6 | 4 | 10 | 15 | 5 | 0 | 2 | 220 |
| 4:30 PM | 6 | 104 | 8 | 0 | 63 | 1 | 3 | 8 | 12 | 8 | 3 | 4 | 220 |
| 4:45 PM | 4 | 134 | 10 | 4 | 46 | 1 | 4 | 13 | 17 | 3 | 2 | 0 | 238 |
| 5:00 PM | 9 | 131 | 17 | 4 | 50 | 1 | 6 | 5 | 13 | 2 | 2 | 2 | 242 |
| 5:15 PM | 13 | 147 | 13 | 0 | 50 | 2 | 3 | 8 | 4 | 0 | 0 | 1 | 241 |
| 5:30 PM | 3 | 147 | 11 | 1 | 38 | 3 | 0 | 2 | 12 | 2 | 0 | 0 | 219 |
| 5:45 PM | 2 | 114 | 7 | 2 | 27 | 3 | 1 | 6 | 9 | 1 | 1 | 1 | 174 |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| **TOTAL VOLUMES :** | 52 | 1008 | 91 | 13 | 381 | 22 | 23 | 57 | 96 | 22 | 10 | 11 | 1786 |
| **APPROACH %'s :** | 4.52% | 87.58% | 7.91% | 3.13% | 91.59% | 5.29% | 13.07% | 32.39% | 54.55% | 51.16% | 23.26% | 25.58% | |
| **PEAK HR START TIME :** | 430 PM | | | | | | | | | | | | TOTAL |
| **PEAK HR VOL :** | 32 | 516 | 48 | 8 | 209 | 5 | 16 | 34 | 46 | 13 | 7 | 7 | 941 |
| **PEAK HR FACTOR :** | 0.861 | | | 0.867 | | | 0.706 | | | 0.450 | | | 0.972 |

| UTURNS | NB | SB | EB | WB |
|---|---|---|---|---|
| | 1 | 2 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | NB | SB | EB | WB |
| | 1 | 2 | 0 | 0 |

**CONTROL :** 4-Way Stop

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** Historical

**City:** Fresno

**HT**

**AM**

**Day:** Thursday

**Date:** 12/1/2016

| **NS/EW Streets:** | N Marks Ave | | | N Marks Ave | | | W Belmont Ave | | | W Belmont Ave | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 1 | 1 | 3 | 0 | 1 | 2 | 0 | 1 | 1 | 1 | |
| 7:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:15 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 4 |
| 7:30 AM | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 7:45 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 8:00 AM | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 7 |
| 8:15 AM | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 5 |
| 8:30 AM | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 3 |
| 8:45 AM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 4 |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| **TOTAL VOLUMES :** | 2 | 3 | 2 | 4 | 5 | 1 | 1 | 3 | 4 | 5 | 0 | 0 | 30 |
| **APPROACH %'s :** | 28.57% | 42.86% | 28.57% | 40.00% | 50.00% | 10.00% | 12.50% | 37.50% | 50.00% | 100.00% | 0.00% | 0.00% | |
| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
| **PEAK HR VOL :** | 2 | 2 | 0 | 3 | 4 | 1 | 0 | 1 | 3 | 2 | 0 | 0 | 18 |
| **PEAK HR FACTOR :** | 0.500 | | | 0.500 | | | 0.333 | | | 0.500 | | | 0.859 |

UTURNS

| | NB | SB | EB | WB |
|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 2 | 0 | 0 |
| 7:45 AM | 0 | 3 | 0 | 0 |
| 8:00 AM | 1 | 1 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 2 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 |
| **TOTAL VOLUMES :** | 1 | 8 | 0 | 0 |

**CONTROL :** 4-Way Stop

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** Historical

**City:** Fresno

**HT**

**PM**

**Day:** Thursday

**Date:** 12/1/2016

| **NS/EW Streets:** | N Marks Ave | | | N Marks Ave | | | W Belmont Ave | | | W Belmont Ave | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 1 | 1 | 3 | 0 | 1 | 2 | 0 | 1 | 1 | 1 | |
| 4:00 PM | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 4:15 PM | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 4:30 PM | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 4:45 PM | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 6 |
| 5:00 PM | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 5:15 PM | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 |
| 5:30 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 3 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| **TOTAL VOLUMES :** | 8 | 1 | 2 | 0 | 3 | 1 | 1 | 0 | 8 | 0 | 0 | 0 | 24 |
| **APPROACH %'s :** | 72.73% | 9.09% | 18.18% | 0.00% | 75.00% | 25.00% | 11.11% | 0.00% | 88.89% | #DIV/0! | #DIV/0! | #DIV/0! | |
| **PEAK HR START TIME :** | 430 PM | | | | | | | | | | | | TOTAL |
| **PEAK HR VOL :** | 6 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 6 | 0 | 0 | 0 | 16 |
| **PEAK HR FACTOR :** | 0.667 | | | 0.500 | | | 0.375 | | | 0.000 | | | 0.972 |

UTURNS

| | NB | SB | EB | WB |
|---|---|---|---|---|
| 4:00 PM | 1 | 2 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 |
| **TOTAL VOLUMES :** | NB | SB | EB | WB |
| | 1 | 2 | 0 | 0 |

**CONTROL :** 4-Way Stop

Prepared by National Data & Surveying Services

# VOLUME

Marks Ave Bet. Belmont Ave & Nielsen Ave

**Day:** Tuesday
**Date:** 8/3/2021

**City:** Riverside
**Project #:** CA21_030059_001

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 3,857 | 3,312 | 0 | 0 | 7,169 |

| AM Period | NB | | SB | | EB | WB | TOTAL | | PM Period | NB | | SB | | EB | WB | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | 10 | | 11 | | | | 21 | | 12:00 | 85 | | 35 | | | | 120 | |
| 00:15 | 7 | | 5 | | | | 12 | | 12:15 | 44 | | 64 | | | | 108 | |
| 00:30 | 5 | | 4 | | | | 9 | | 12:30 | 75 | | 50 | | | | 125 | |
| 00:45 | 4 | 26 | 12 | 32 | | | 16 | 58 | 12:45 | 55 | 259 | 52 | 201 | | | 107 | 460 |
| 01:00 | 7 | | 9 | | | | 16 | | 13:00 | 71 | | 36 | | | | 107 | |
| 01:15 | 5 | | 18 | | | | 23 | | 13:15 | 80 | | 51 | | | | 131 | |
| 01:30 | 3 | | 9 | | | | 12 | | 13:30 | 66 | | 44 | | | | 110 | |
| 01:45 | 4 | 19 | 7 | 43 | | | 11 | 62 | 13:45 | 54 | 271 | 59 | 190 | | | 113 | 461 |
| 02:00 | 3 | | 4 | | | | 7 | | 14:00 | 72 | | 70 | | | | 142 | |
| 02:15 | 8 | | 3 | | | | 11 | | 14:15 | 59 | | 66 | | | | 125 | |
| 02:30 | 2 | | 7 | | | | 9 | | 14:30 | 97 | | 62 | | | | 159 | |
| 02:45 | 9 | 22 | 5 | 19 | | | 14 | 41 | 14:45 | 125 | 353 | 73 | 271 | | | 198 | 624 |
| 03:00 | 4 | | 2 | | | | 6 | | 15:00 | 117 | | 65 | | | | 182 | |
| 03:15 | 4 | | 1 | | | | 5 | | 15:15 | 116 | | 41 | | | | 157 | |
| 03:30 | 6 | | 1 | | | | 7 | | 15:30 | 113 | | 36 | | | | 149 | |
| 03:45 | 8 | 22 | 7 | 11 | | | 15 | 33 | 15:45 | 102 | 448 | 42 | 184 | | | 144 | 632 |
| 04:00 | 4 | | 5 | | | | 9 | | 16:00 | 93 | | 46 | | | | 139 | |
| 04:15 | 8 | | 8 | | | | 16 | | 16:15 | 74 | | 54 | | | | 128 | |
| 04:30 | 10 | | 24 | | | | 34 | | 16:30 | 91 | | 51 | | | | 142 | |
| 04:45 | 16 | 38 | 10 | 47 | | | 26 | 85 | 16:45 | 101 | 359 | 56 | 207 | | | 157 | 566 |
| 05:00 | 15 | | 13 | | | | 28 | | 17:00 | 77 | | 50 | | | | 127 | |
| 05:15 | 25 | | 16 | | | | 41 | | 17:15 | 103 | | 53 | | | | 156 | |
| 05:30 | 23 | | 18 | | | | 41 | | 17:30 | 75 | | 45 | | | | 120 | |
| 05:45 | 21 | 84 | 17 | 64 | | | 38 | 148 | 17:45 | 49 | 304 | 53 | 201 | | | 102 | 505 |
| 06:00 | 35 | | 19 | | | | 54 | | 18:00 | 50 | | 42 | | | | 92 | |
| 06:15 | 21 | | 27 | | | | 48 | | 18:15 | 54 | | 45 | | | | 99 | |
| 06:30 | 15 | | 25 | | | | 40 | | 18:30 | 60 | | 48 | | | | 108 | |
| 06:45 | 49 | 120 | 50 | 121 | | | 99 | 241 | 18:45 | 36 | 200 | 40 | 175 | | | 76 | 375 |
| 07:00 | 36 | | 44 | | | | 80 | | 19:00 | 25 | | 38 | | | | 63 | |
| 07:15 | 34 | | 47 | | | | 81 | | 19:15 | 22 | | 16 | | | | 38 | |
| 07:30 | 33 | | 46 | | | | 79 | | 19:30 | 14 | | 26 | | | | 40 | |
| 07:45 | 66 | 169 | 53 | 190 | | | 119 | 359 | 19:45 | 21 | 82 | 47 | 127 | | | 68 | 209 |
| 08:00 | 56 | | 57 | | | | 113 | | 20:00 | 48 | | 26 | | | | 74 | |
| 08:15 | 39 | | 55 | | | | 94 | | 20:15 | 30 | | 13 | | | | 43 | |
| 08:30 | 43 | | 49 | | | | 92 | | 20:30 | 25 | | 4 | | | | 29 | |
| 08:45 | 52 | 190 | 47 | 208 | | | 99 | 398 | 20:45 | 21 | 124 | 16 | 59 | | | 37 | 183 |
| 09:00 | 47 | | 84 | | | | 131 | | 21:00 | 22 | | 22 | | | | 44 | |
| 09:15 | 41 | | 70 | | | | 111 | | 21:15 | 21 | | 21 | | | | 42 | |
| 09:30 | 41 | | 87 | | | | 128 | | 21:30 | 31 | | 10 | | | | 41 | |
| 09:45 | 47 | 176 | 67 | 308 | | | 114 | 484 | 21:45 | 25 | 99 | 17 | 70 | | | 42 | 169 |
| 10:00 | 48 | | 59 | | | | 107 | | 22:00 | 16 | | 15 | | | | 31 | |
| 10:15 | 39 | | 90 | | | | 129 | | 22:15 | 14 | | 20 | | | | 34 | |
| 10:30 | 52 | | 37 | | | | 89 | | 22:30 | 14 | | 20 | | | | 34 | |
| 10:45 | 53 | 192 | 66 | 252 | | | 119 | 444 | 22:45 | 11 | 55 | 10 | 65 | | | 21 | 120 |
| 11:00 | 45 | | 70 | | | | 115 | | 23:00 | 13 | | 11 | | | | 24 | |
| 11:15 | 34 | | 60 | | | | 94 | | 23:15 | 7 | | 6 | | | | 13 | |
| 11:30 | 68 | | 54 | | | | 122 | | 23:30 | 11 | | 7 | | | | 18 | |
| 11:45 | 59 | 206 | 55 | 239 | | | 114 | 445 | 23:45 | 8 | 39 | 4 | 28 | | | 12 | 67 |
| TOTALS | | 1264 | | 1534 | | | | 2798 | TOTALS | | 2593 | | 1778 | | | | 4371 |
| SPLIT % | | 45.2% | | 54.8% | | | | 39.0% | SPLIT % | | 59.3% | | 40.7% | | | | 61.0% |

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 3,857 | 3,312 | 0 | 0 | 7,169 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AM Peak Hour | 11:45 | 09:00 | | | | 09:00 | PM Peak Hour | 14:45 | 14:00 | | | | 14:30 |
| AM Pk Volume | 263 | 308 | | | | 484 | PM Pk Volume | 471 | 271 | | | | 696 |
| Pk Hr Factor | 0.774 | 0.885 | | | | 0.924 | Pk Hr Factor | 0.942 | 0.928 | | | | 0.879 |
| 7 - 9 Volume | 359 | 398 | 0 | 0 | | 757 | 4 - 6 Volume | 663 | 408 | 0 | 0 | | 1071 |
| 7 - 9 Peak Hour | 07:45 | 07:45 | | | | 07:45 | 4 - 6 Peak Hour | 16:30 | 16:15 | | | | 16:30 |
| 7 - 9 Pk Volume | 204 | 214 | 0 | 0 | | 418 | 4 - 6 Pk Volume | 372 | 211 | 0 | 0 | | 582 |
| Pk Hr Factor | 0.773 | 0.939 | 0.000 | 0.000 | | 0.878 | Pk Hr Factor | 0.903 | 0.942 | 0.000 | 0.000 | | 0.927 |

Prepared by National Data & Surveying Services

# VOLUME

Marks Ave Bet. Nielsen Ave & Ray Johnson Dr

**Day:** Tuesday
**Date:** 8/3/2021

**City:** Riverside
**Project #:** CA21_030059_002

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 5,128 | 3,822 | 0 | 0 | 8,950 |

| AM Period | NB | | SB | | EB | WB | TOTAL | | PM Period | NB | | SB | | EB | WB | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | 12 | | 22 | | | | 34 | | 12:00 | 97 | | 63 | | | | 160 | |
| 00:15 | 11 | | 10 | | | | 21 | | 12:15 | 78 | | 51 | | | | 129 | |
| 00:30 | 6 | | 6 | | | | 12 | | 12:30 | 99 | | 68 | | | | 167 | |
| 00:45 | 8 | 37 | 5 | 43 | | | 13 | 80 | 12:45 | 77 | 351 | 87 | 269 | | | 164 | 620 |
| 01:00 | 6 | | 5 | | | | 11 | | 13:00 | 98 | | 62 | | | | 160 | |
| 01:15 | 7 | | 6 | | | | 13 | | 13:15 | 99 | | 69 | | | | 168 | |
| 01:30 | 3 | | 5 | | | | 8 | | 13:30 | 80 | | 82 | | | | 162 | |
| 01:45 | 7 | 23 | 5 | 21 | | | 12 | 44 | 13:45 | 91 | 368 | 63 | 276 | | | 154 | 644 |
| 02:00 | 3 | | 1 | | | | 4 | | 14:00 | 94 | | 64 | | | | 158 | |
| 02:15 | 8 | | 1 | | | | 9 | | 14:15 | 85 | | 59 | | | | 144 | |
| 02:30 | 5 | | 3 | | | | 8 | | 14:30 | 119 | | 76 | | | | 195 | |
| 02:45 | 14 | 30 | 7 | 12 | | | 21 | 42 | 14:45 | 150 | 448 | 49 | 248 | | | 199 | 696 |
| 03:00 | 9 | | 4 | | | | 13 | | 15:00 | 141 | | 72 | | | | 213 | |
| 03:15 | 9 | | 19 | | | | 28 | | 15:15 | 123 | | 81 | | | | 204 | |
| 03:30 | 10 | | 13 | | | | 23 | | 15:30 | 126 | | 79 | | | | 205 | |
| 03:45 | 13 | 41 | 14 | 50 | | | 27 | 91 | 15:45 | 125 | 515 | 75 | 307 | | | 200 | 822 |
| 04:00 | 8 | | 16 | | | | 24 | | 16:00 | 93 | | 84 | | | | 177 | |
| 04:15 | 10 | | 17 | | | | 27 | | 16:15 | 83 | | 68 | | | | 151 | |
| 04:30 | 16 | | 23 | | | | 39 | | 16:30 | 115 | | 80 | | | | 195 | |
| 04:45 | 32 | 66 | 24 | 80 | | | 56 | 146 | 16:45 | 113 | 404 | 56 | 288 | | | 169 | 692 |
| 05:00 | 29 | | 33 | | | | 62 | | 17:00 | 89 | | 91 | | | | 180 | |
| 05:15 | 31 | | 39 | | | | 70 | | 17:15 | 106 | | 65 | | | | 171 | |
| 05:30 | 35 | | 51 | | | | 86 | | 17:30 | 83 | | 58 | | | | 141 | |
| 05:45 | 45 | 140 | 43 | 166 | | | 88 | 306 | 17:45 | 57 | 335 | 56 | 270 | | | 113 | 605 |
| 06:00 | 53 | | 51 | | | | 104 | | 18:00 | 50 | | 30 | | | | 80 | |
| 06:15 | 44 | | 33 | | | | 77 | | 18:15 | 65 | | 38 | | | | 103 | |
| 06:30 | 33 | | 50 | | | | 83 | | 18:30 | 64 | | 47 | | | | 111 | |
| 06:45 | 67 | 197 | 69 | 203 | | | 136 | 400 | 18:45 | 43 | 222 | 34 | 149 | | | 77 | 371 |
| 07:00 | 56 | | 49 | | | | 105 | | 19:00 | 39 | | 18 | | | | 57 | |
| 07:15 | 55 | | 61 | | | | 116 | | 19:15 | 47 | | 13 | | | | 60 | |
| 07:30 | 67 | | 60 | | | | 127 | | 19:30 | 45 | | 21 | | | | 66 | |
| 07:45 | 102 | 280 | 66 | 236 | | | 168 | 516 | 19:45 | 38 | 169 | 24 | 76 | | | 62 | 245 |
| 08:00 | 91 | | 52 | | | | 143 | | 20:00 | 42 | | 20 | | | | 62 | |
| 08:15 | 56 | | 59 | | | | 115 | | 20:15 | 37 | | 15 | | | | 52 | |
| 08:30 | 61 | | 52 | | | | 113 | | 20:30 | 31 | | 19 | | | | 50 | |
| 08:45 | 75 | 283 | 41 | 204 | | | 116 | 487 | 20:45 | 29 | 139 | 22 | 76 | | | 51 | 215 |
| 09:00 | 74 | | 76 | | | | 150 | | 21:00 | 27 | | 25 | | | | 52 | |
| 09:15 | 89 | | 30 | | | | 119 | | 21:15 | 28 | | 24 | | | | 52 | |
| 09:30 | 63 | | 65 | | | | 128 | | 21:30 | 34 | | 16 | | | | 50 | |
| 09:45 | 76 | 302 | 62 | 233 | | | 138 | 535 | 21:45 | 25 | 114 | 15 | 80 | | | 40 | 194 |
| 10:00 | 65 | | 55 | | | | 120 | | 22:00 | 17 | | 8 | | | | 25 | |
| 10:15 | 53 | | 67 | | | | 120 | | 22:15 | 14 | | 8 | | | | 22 | |
| 10:30 | 72 | | 50 | | | | 122 | | 22:30 | 17 | | 11 | | | | 28 | |
| 10:45 | 83 | 273 | 49 | 221 | | | 132 | 494 | 22:45 | 16 | 64 | 13 | 40 | | | 29 | 104 |
| 11:00 | 63 | | 61 | | | | 124 | | 23:00 | 13 | | 4 | | | | 17 | |
| 11:15 | 51 | | 61 | | | | 112 | | 23:15 | 17 | | 5 | | | | 22 | |
| 11:30 | 74 | | 59 | | | | 133 | | 23:30 | 9 | | 11 | | | | 20 | |
| 11:45 | 91 | 279 | 62 | 243 | | | 153 | 522 | 23:45 | 9 | 48 | 11 | 31 | | | 20 | 79 |
| TOTALS | | 1951 | | 1712 | | | | 3663 | TOTALS | | 3177 | | 2110 | | | | 5287 |
| SPLIT % | | 53.3% | | 46.7% | | | | 40.9% | SPLIT % | | 60.1% | | 39.9% | | | | 59.1% |

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 5,128 | 3,822 | 0 | 0 | 8,950 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AM Peak Hour | 11:45 | 09:30 | | | | 11:45 | PM Peak Hour | 14:45 | 15:15 | | | | 15:00 |
| AM Pk Volume | 365 | 249 | | | | 609 | PM Pk Volume | 540 | 319 | | | | 822 |
| Pk Hr Factor | 0.922 | 0.929 | | | | 0.912 | Pk Hr Factor | 0.900 | 0.949 | | | | 0.965 |
| 7 - 9 Volume | 563 | 440 | 0 | 0 | | 1003 | 4 - 6 Volume | 739 | 558 | 0 | 0 | | 1297 |
| 7 - 9 Peak Hour | 07:30 | 07:15 | | | | 07:15 | 4 - 6 Peak Hour | 16:30 | 16:15 | | | | 16:30 |
| 7 - 9 Pk Volume | 316 | 239 | 0 | 0 | | 554 | 4 - 6 Pk Volume | 423 | 295 | 0 | 0 | | 715 |
| Pk Hr Factor | 0.775 | 0.905 | 0.000 | 0.000 | | 0.824 | Pk Hr Factor | 0.920 | 0.810 | 0.000 | 0.000 | | 0.917 |

Prepared by National Data & Surveying Services

# VOLUME

Marks Ave Bet. Ray Johnson Dr & SR-180 WB Ramps

**Day:** Tuesday
**Date:** 8/3/2021

**City:** Riverside
**Project #:** CA21_030059_003

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 5,301 | 4,079 | 0 | 0 | 9,380 |

| AM Period | NB | | SB | | EB | WB | TOTAL | | PM Period | NB | | SB | | EB | WB | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | 14 | | 21 | | | | 35 | | 12:00 | 95 | | 64 | | | | 159 | |
| 00:15 | 11 | | 11 | | | | 22 | | 12:15 | 84 | | 56 | | | | 140 | |
| 00:30 | 7 | | 8 | | | | 15 | | 12:30 | 93 | | 75 | | | | 168 | |
| 00:45 | 6 | 38 | 5 | 45 | | | 11 | 83 | 12:45 | 76 | 348 | 82 | 277 | | | 158 | 625 |
| 01:00 | 8 | | 5 | | | | 13 | | 13:00 | 99 | | 75 | | | | 174 | |
| 01:15 | 8 | | 9 | | | | 17 | | 13:15 | 104 | | 70 | | | | 174 | |
| 01:30 | 3 | | 5 | | | | 8 | | 13:30 | 84 | | 89 | | | | 173 | |
| 01:45 | 9 | 28 | 8 | 27 | | | 17 | 55 | 13:45 | 98 | 385 | 65 | 299 | | | 163 | 684 |
| 02:00 | 3 | | 1 | | | | 4 | | 14:00 | 90 | | 72 | | | | 162 | |
| 02:15 | 9 | | 3 | | | | 12 | | 14:15 | 84 | | 69 | | | | 153 | |
| 02:30 | 5 | | 3 | | | | 8 | | 14:30 | 126 | | 79 | | | | 205 | |
| 02:45 | 16 | 33 | 6 | 13 | | | 22 | 46 | 14:45 | 157 | 457 | 53 | 273 | | | 210 | 730 |
| 03:00 | 9 | | 6 | | | | 15 | | 15:00 | 146 | | 78 | | | | 224 | |
| 03:15 | 10 | | 17 | | | | 27 | | 15:15 | 131 | | 83 | | | | 214 | |
| 03:30 | 10 | | 14 | | | | 24 | | 15:30 | 129 | | 87 | | | | 216 | |
| 03:45 | 12 | 41 | 17 | 54 | | | 29 | 95 | 15:45 | 125 | 531 | 81 | 329 | | | 206 | 860 |
| 04:00 | 8 | | 16 | | | | 24 | | 16:00 | 91 | | 85 | | | | 176 | |
| 04:15 | 10 | | 19 | | | | 29 | | 16:15 | 84 | | 71 | | | | 155 | |
| 04:30 | 17 | | 26 | | | | 43 | | 16:30 | 115 | | 93 | | | | 208 | |
| 04:45 | 34 | 69 | 26 | 87 | | | 60 | 156 | 16:45 | 114 | 404 | 61 | 310 | | | 175 | 714 |
| 05:00 | 33 | | 34 | | | | 67 | | 17:00 | 92 | | 104 | | | | 196 | |
| 05:15 | 32 | | 41 | | | | 73 | | 17:15 | 107 | | 70 | | | | 177 | |
| 05:30 | 38 | | 51 | | | | 89 | | 17:30 | 81 | | 58 | | | | 139 | |
| 05:45 | 48 | 151 | 40 | 166 | | | 88 | 317 | 17:45 | 60 | 340 | 57 | 289 | | | 117 | 629 |
| 06:00 | 52 | | 48 | | | | 100 | | 18:00 | 49 | | 37 | | | | 86 | |
| 06:15 | 43 | | 36 | | | | 79 | | 18:15 | 63 | | 43 | | | | 106 | |
| 06:30 | 34 | | 51 | | | | 85 | | 18:30 | 71 | | 47 | | | | 118 | |
| 06:45 | 68 | 197 | 72 | 207 | | | 140 | 404 | 18:45 | 49 | 232 | 36 | 163 | | | 85 | 395 |
| 07:00 | 57 | | 50 | | | | 107 | | 19:00 | 41 | | 26 | | | | 67 | |
| 07:15 | 54 | | 65 | | | | 119 | | 19:15 | 51 | | 15 | | | | 66 | |
| 07:30 | 72 | | 60 | | | | 132 | | 19:30 | 46 | | 25 | | | | 71 | |
| 07:45 | 100 | 283 | 73 | 248 | | | 173 | 531 | 19:45 | 37 | 175 | 29 | 95 | | | 66 | 270 |
| 08:00 | 103 | | 55 | | | | 158 | | 20:00 | 50 | | 21 | | | | 71 | |
| 08:15 | 61 | | 59 | | | | 120 | | 20:15 | 34 | | 18 | | | | 52 | |
| 08:30 | 73 | | 52 | | | | 125 | | 20:30 | 36 | | 24 | | | | 60 | |
| 08:45 | 82 | 319 | 40 | 206 | | | 122 | 525 | 20:45 | 30 | 150 | 22 | 85 | | | 52 | 235 |
| 09:00 | 77 | | 75 | | | | 152 | | 21:00 | 27 | | 26 | | | | 53 | |
| 09:15 | 92 | | 40 | | | | 132 | | 21:15 | 27 | | 21 | | | | 48 | |
| 09:30 | 66 | | 73 | | | | 139 | | 21:30 | 33 | | 17 | | | | 50 | |
| 09:45 | 78 | 313 | 66 | 254 | | | 144 | 567 | 21:45 | 27 | 114 | 17 | 81 | | | 44 | 195 |
| 10:00 | 68 | | 58 | | | | 126 | | 22:00 | 19 | | 10 | | | | 29 | |
| 10:15 | 55 | | 73 | | | | 128 | | 22:15 | 16 | | 7 | | | | 23 | |
| 10:30 | 71 | | 52 | | | | 123 | | 22:30 | 18 | | 10 | | | | 28 | |
| 10:45 | 89 | 283 | 57 | 240 | | | 146 | 523 | 22:45 | 17 | 70 | 13 | 40 | | | 30 | 110 |
| 11:00 | 63 | | 63 | | | | 126 | | 23:00 | 15 | | 4 | | | | 19 | |
| 11:15 | 54 | | 69 | | | | 123 | | 23:15 | 11 | | 7 | | | | 18 | |
| 11:30 | 78 | | 59 | | | | 137 | | 23:30 | 12 | | 12 | | | | 24 | |
| 11:45 | 100 | 295 | 65 | 256 | | | 165 | 551 | 23:45 | 7 | 45 | 12 | 35 | | | 19 | 80 |
| TOTALS | | 2050 | | 1803 | | | | 3853 | TOTALS | | 3251 | | 2276 | | | | 5527 |
| SPLIT % | | 53.2% | | 46.8% | | | | 41.1% | SPLIT % | | 58.8% | | 41.2% | | | | 58.9% |

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 5,301 | 4,079 | 0 | 0 | 9,380 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AM Peak Hour | 11:45 | 09:30 | | | | 11:45 | PM Peak Hour | 14:45 | 15:15 | | | | 14:45 |
| AM Pk Volume | 372 | 270 | | | | 632 | PM Pk Volume | 563 | 336 | | | | 864 |
| Pk Hr Factor | 0.930 | 0.925 | | | | 0.940 | Pk Hr Factor | 0.896 | 0.966 | | | | 0.964 |
| 7 - 9 Volume | 602 | 454 | 0 | 0 | | 1056 | 4 - 6 Volume | 744 | 599 | 0 | 0 | | 1343 |
| 7 - 9 Peak Hour | 07:45 | 07:15 | | | | 07:30 | 4 - 6 Peak Hour | 16:30 | 16:15 | | | | 16:30 |
| 7 - 9 Pk Volume | 337 | 253 | 0 | 0 | | 583 | 4 - 6 Pk Volume | 428 | 329 | 0 | 0 | | 756 |
| Pk Hr Factor | 0.818 | 0.866 | 0.000 | 0.000 | | 0.842 | Pk Hr Factor | 0.930 | 0.791 | 0.000 | 0.000 | | 0.909 |

Prepared by National Data & Surveying Services

# VOLUME

Marks Ave Bet. SR-180 WB Ramps & SR-180 EB Ramps

**Day:** Tuesday
**Date:** 8/3/2021

**City:** Riverside
**Project #:** CA21_030059_004

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 5,209 | 4,576 | 0 | 0 | 9,785 |

| AM Period | NB | | SB | | EB | WB | TOTAL | | PM Period | NB | | SB | | EB | WB | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | 9 | | 23 | | | | 32 | | 12:00 | 88 | | 65 | | | | 153 | |
| 00:15 | 17 | | 20 | | | | 37 | | 12:15 | 66 | | 57 | | | | 123 | |
| 00:30 | 12 | | 14 | | | | 26 | | 12:30 | 73 | | 59 | | | | 132 | |
| 00:45 | 7 | 45 | 14 | 71 | | | 21 | 116 | 12:45 | 81 | 308 | 68 | 249 | | | 149 | 557 |
| 01:00 | 13 | | 12 | | | | 25 | | 13:00 | 63 | | 66 | | | | 129 | |
| 01:15 | 13 | | 17 | | | | 30 | | 13:15 | 88 | | 54 | | | | 142 | |
| 01:30 | 11 | | 10 | | | | 21 | | 13:30 | 83 | | 75 | | | | 158 | |
| 01:45 | 10 | 47 | 7 | 46 | | | 17 | 93 | 13:45 | 71 | 305 | 69 | 264 | | | 140 | 569 |
| 02:00 | 6 | | 5 | | | | 11 | | 14:00 | 98 | | 88 | | | | 186 | |
| 02:15 | 7 | | 2 | | | | 9 | | 14:15 | 79 | | 74 | | | | 153 | |
| 02:30 | 7 | | 6 | | | | 13 | | 14:30 | 92 | | 57 | | | | 149 | |
| 02:45 | 12 | 32 | 10 | 23 | | | 22 | 55 | 14:45 | 94 | 363 | 64 | 283 | | | 158 | 646 |
| 03:00 | 7 | | 8 | | | | 15 | | 15:00 | 89 | | 79 | | | | 168 | |
| 03:15 | 10 | | 8 | | | | 18 | | 15:15 | 96 | | 81 | | | | 177 | |
| 03:30 | 14 | | 8 | | | | 22 | | 15:30 | 104 | | 74 | | | | 178 | |
| 03:45 | 8 | 39 | 19 | 43 | | | 27 | 82 | 15:45 | 83 | 372 | 77 | 311 | | | 160 | 683 |
| 04:00 | 6 | | 18 | | | | 24 | | 16:00 | 99 | | 77 | | | | 176 | |
| 04:15 | 10 | | 24 | | | | 34 | | 16:15 | 104 | | 71 | | | | 175 | |
| 04:30 | 28 | | 21 | | | | 49 | | 16:30 | 114 | | 77 | | | | 191 | |
| 04:45 | 34 | 78 | 39 | 102 | | | 73 | 180 | 16:45 | 92 | 409 | 98 | 323 | | | 190 | 732 |
| 05:00 | 34 | | 44 | | | | 78 | | 17:00 | 94 | | 93 | | | | 187 | |
| 05:15 | 50 | | 39 | | | | 89 | | 17:15 | 89 | | 93 | | | | 182 | |
| 05:30 | 59 | | 40 | | | | 99 | | 17:30 | 77 | | 71 | | | | 148 | |
| 05:45 | 47 | 190 | 66 | 189 | | | 113 | 379 | 17:45 | 57 | 317 | 81 | 338 | | | 138 | 655 |
| 06:00 | 42 | | 49 | | | | 91 | | 18:00 | 74 | | 62 | | | | 136 | |
| 06:15 | 52 | | 43 | | | | 95 | | 18:15 | 73 | | 67 | | | | 140 | |
| 06:30 | 51 | | 46 | | | | 97 | | 18:30 | 75 | | 64 | | | | 139 | |
| 06:45 | 58 | 203 | 68 | 206 | | | 126 | 409 | 18:45 | 74 | 296 | 70 | 263 | | | 144 | 559 |
| 07:00 | 72 | | 70 | | | | 142 | | 19:00 | 63 | | 54 | | | | 117 | |
| 07:15 | 70 | | 72 | | | | 142 | | 19:15 | 54 | | 55 | | | | 109 | |
| 07:30 | 93 | | 68 | | | | 161 | | 19:30 | 73 | | 42 | | | | 115 | |
| 07:45 | 106 | 341 | 71 | 281 | | | 177 | 622 | 19:45 | 44 | 234 | 50 | 201 | | | 94 | 435 |
| 08:00 | 73 | | 62 | | | | 135 | | 20:00 | 70 | | 40 | | | | 110 | |
| 08:15 | 66 | | 78 | | | | 144 | | 20:15 | 50 | | 43 | | | | 93 | |
| 08:30 | 79 | | 58 | | | | 137 | | 20:30 | 56 | | 48 | | | | 104 | |
| 08:45 | 68 | 286 | 55 | 253 | | | 123 | 539 | 20:45 | 35 | 211 | 45 | 176 | | | 80 | 387 |
| 09:00 | 68 | | 56 | | | | 124 | | 21:00 | 33 | | 37 | | | | 70 | |
| 09:15 | 67 | | 40 | | | | 107 | | 21:15 | 46 | | 46 | | | | 92 | |
| 09:30 | 60 | | 49 | | | | 109 | | 21:30 | 35 | | 20 | | | | 55 | |
| 09:45 | 87 | 282 | 51 | 196 | | | 138 | 478 | 21:45 | 38 | 152 | 50 | 153 | | | 88 | 305 |
| 10:00 | 61 | | 54 | | | | 115 | | 22:00 | 35 | | 23 | | | | 58 | |
| 10:15 | 63 | | 48 | | | | 111 | | 22:15 | 30 | | 16 | | | | 46 | |
| 10:30 | 62 | | 56 | | | | 118 | | 22:30 | 35 | | 23 | | | | 58 | |
| 10:45 | 48 | 234 | 50 | 208 | | | 98 | 442 | 22:45 | 26 | 126 | 20 | 82 | | | 46 | 208 |
| 11:00 | 71 | | 44 | | | | 115 | | 23:00 | 12 | | 16 | | | | 28 | |
| 11:15 | 60 | | 64 | | | | 124 | | 23:15 | 12 | | 15 | | | | 27 | |
| 11:30 | 80 | | 59 | | | | 139 | | 23:30 | 17 | | 15 | | | | 32 | |
| 11:45 | 78 | 289 | 82 | 249 | | | 160 | 538 | 23:45 | 9 | 50 | 20 | 66 | | | 29 | 116 |
| TOTALS | | 2066 | | 1867 | | | | 3933 | TOTALS | | 3143 | | 2709 | | | | 5852 |
| SPLIT % | | 52.5% | | 47.5% | | | | 40.2% | SPLIT % | | 53.7% | | 46.3% | | | | 59.8% |

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 5,209 | 4,576 | 0 | 0 | 9,785 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AM Peak Hour | 07:15 | 07:00 | | | | 07:00 | PM Peak Hour | 16:00 | 16:30 | | | | 16:30 |
| AM Pk Volume | 342 | 281 | | | | 622 | PM Pk Volume | 409 | 361 | | | | 750 |
| Pk Hr Factor | 0.807 | 0.976 | | | | 0.879 | Pk Hr Factor | 0.897 | 0.921 | | | | 0.982 |
| 7 - 9 Volume | 627 | 534 | 0 | 0 | | 1161 | 4 - 6 Volume | 726 | 661 | 0 | 0 | | 1387 |
| 7 - 9 Peak Hour | 07:15 | 07:00 | | | | 07:00 | 4 - 6 Peak Hour | 16:00 | 16:30 | | | | 16:30 |
| 7 - 9 Pk Volume | 342 | 281 | 0 | 0 | | 622 | 4 - 6 Pk Volume | 409 | 361 | 0 | 0 | | 750 |
| Pk Hr Factor | 0.807 | 0.976 | 0.000 | 0.000 | | 0.879 | Pk Hr Factor | 0.897 | 0.921 | 0.000 | 0.000 | | 0.982 |

Prepared by National Data & Surveying Services

# VOLUME

Belmont Ave Bet. Marks Ave & Hughes Ave

**Day:** Tuesday
**Date:** 8/3/2021

**City:** Riverside
**Project #:** CA21_030059_005

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 0 | 0 | 3,991 | 3,249 | 7,240 |

| AM Period | NB | SB | EB | | WB | | TOTAL | | PM Period | NB | SB | EB | | WB | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | | | 9 | | 12 | | 21 | | 12:00 | | | 73 | | 59 | | 132 | |
| 00:15 | | | 6 | | 4 | | 10 | | 12:15 | | | 58 | | 63 | | 121 | |
| 00:30 | | | 5 | | 11 | | 16 | | 12:30 | | | 90 | | 51 | | 141 | |
| 00:45 | | | 7 | 27 | 12 | 39 | 19 | 66 | 12:45 | | | 75 | 296 | 61 | 234 | 136 | 530 |
| 01:00 | | | 1 | | 0 | | 1 | | 13:00 | | | 76 | | 56 | | 132 | |
| 01:15 | | | 0 | | 0 | | 0 | | 13:15 | | | 70 | | 62 | | 132 | |
| 01:30 | | | 0 | | 0 | | 0 | | 13:30 | | | 82 | | 64 | | 146 | |
| 01:45 | | | 0 | 1 | 0 | | 0 | 1 | 13:45 | | | 63 | 291 | 60 | 242 | 123 | 533 |
| 02:00 | | | 0 | | 0 | | 0 | | 14:00 | | | 77 | | 59 | | 136 | |
| 02:15 | | | 0 | | 0 | | 0 | | 14:15 | | | 72 | | 49 | | 121 | |
| 02:30 | | | 1 | | 1 | | 2 | | 14:30 | | | 67 | | 81 | | 148 | |
| 02:45 | | | 12 | 13 | 5 | 6 | 17 | 19 | 14:45 | | | 77 | 293 | 60 | 249 | 137 | 542 |
| 03:00 | | | 10 | | 2 | | 12 | | 15:00 | | | 76 | | 65 | | 141 | |
| 03:15 | | | 10 | | 4 | | 14 | | 15:15 | | | 92 | | 79 | | 171 | |
| 03:30 | | | 5 | | 3 | | 8 | | 15:30 | | | 106 | | 71 | | 177 | |
| 03:45 | | | 7 | 32 | 9 | 18 | 16 | 50 | 15:45 | | | 79 | 353 | 70 | 285 | 149 | 638 |
| 04:00 | | | 6 | | 6 | | 12 | | 16:00 | | | 91 | | 72 | | 163 | |
| 04:15 | | | 14 | | 16 | | 30 | | 16:15 | | | 68 | | 62 | | 130 | |
| 04:30 | | | 14 | | 12 | | 26 | | 16:30 | | | 71 | | 56 | | 127 | |
| 04:45 | | | 21 | 55 | 28 | 62 | 49 | 117 | 16:45 | | | 69 | 299 | 46 | 236 | 115 | 535 |
| 05:00 | | | 41 | | 17 | | 58 | | 17:00 | | | 56 | | 40 | | 96 | |
| 05:15 | | | 53 | | 16 | | 69 | | 17:15 | | | 46 | | 57 | | 103 | |
| 05:30 | | | 26 | | 23 | | 49 | | 17:30 | | | 53 | | 50 | | 103 | |
| 05:45 | | | 35 | 155 | 29 | 85 | 64 | 240 | 17:45 | | | 61 | 216 | 44 | 191 | 105 | 407 |
| 06:00 | | | 27 | | 23 | | 50 | | 18:00 | | | 55 | | 38 | | 93 | |
| 06:15 | | | 46 | | 26 | | 72 | | 18:15 | | | 44 | | 26 | | 70 | |
| 06:30 | | | 42 | | 26 | | 68 | | 18:30 | | | 40 | | 34 | | 74 | |
| 06:45 | | | 50 | 165 | 30 | 105 | 80 | 270 | 18:45 | | | 42 | 181 | 38 | 136 | 80 | 317 |
| 07:00 | | | 27 | | 26 | | 53 | | 19:00 | | | 37 | | 42 | | 79 | |
| 07:15 | | | 47 | | 22 | | 69 | | 19:15 | | | 52 | | 39 | | 91 | |
| 07:30 | | | 56 | | 37 | | 93 | | 19:30 | | | 39 | | 27 | | 66 | |
| 07:45 | | | 70 | 200 | 45 | 130 | 115 | 330 | 19:45 | | | 29 | 157 | 38 | 146 | 67 | 303 |
| 08:00 | | | 55 | | 34 | | 89 | | 20:00 | | | 29 | | 31 | | 60 | |
| 08:15 | | | 47 | | 47 | | 94 | | 20:15 | | | 31 | | 30 | | 61 | |
| 08:30 | | | 49 | | 40 | | 89 | | 20:30 | | | 29 | | 15 | | 44 | |
| 08:45 | | | 63 | 214 | 41 | 162 | 104 | 376 | 20:45 | | | 21 | 110 | 15 | 91 | 36 | 201 |
| 09:00 | | | 36 | | 44 | | 80 | | 21:00 | | | 21 | | 21 | | 42 | |
| 09:15 | | | 53 | | 39 | | 92 | | 21:15 | | | 13 | | 26 | | 39 | |
| 09:30 | | | 65 | | 39 | | 104 | | 21:30 | | | 33 | | 26 | | 59 | |
| 09:45 | | | 59 | 213 | 51 | 173 | 110 | 386 | 21:45 | | | 12 | 79 | 13 | 86 | 25 | 165 |
| 10:00 | | | 48 | | 59 | | 107 | | 22:00 | | | 15 | | 26 | | 41 | |
| 10:15 | | | 64 | | 53 | | 117 | | 22:15 | | | 19 | | 9 | | 28 | |
| 10:30 | | | 72 | | 51 | | 123 | | 22:30 | | | 11 | | 16 | | 27 | |
| 10:45 | | | 73 | 257 | 58 | 221 | 131 | 478 | 22:45 | | | 18 | 63 | 16 | 67 | 34 | 130 |
| 11:00 | | | 56 | | 59 | | 115 | | 23:00 | | | 18 | | 15 | | 33 | |
| 11:15 | | | 66 | | 63 | | 129 | | 23:15 | | | 12 | | 11 | | 23 | |
| 11:30 | | | 75 | | 54 | | 129 | | 23:30 | | | 18 | | 9 | | 27 | |
| 11:45 | | | 69 | 266 | 63 | 239 | 132 | 505 | 23:45 | | | 7 | 55 | 11 | 46 | 18 | 101 |
| TOTALS | | | | 1598 | | 1240 | | 2838 | TOTALS | | | | 2393 | | 2009 | | 4402 |
| SPLIT % | | | | 56.3% | | 43.7% | | 39.2% | SPLIT % | | | | 54.4% | | 45.6% | | 60.8% |

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 0 | 0 | 3,991 | 3,249 | 7,240 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AM Peak Hour | | | 11:45 | 11:00 | 11:45 | PM Peak Hour | | | 15:15 | 15:15 | 15:15 |
| AM Pk Volume | | | 290 | 239 | 526 | PM Pk Volume | | | 368 | 292 | 660 |
| Pk Hr Factor | | | 0.806 | 0.948 | 0.933 | Pk Hr Factor | | | 0.868 | 0.924 | 0.932 |
| 7 - 9 Volume | 0 | 0 | 414 | 292 | 706 | 4 - 6 Volume | 0 | 0 | 515 | 427 | 942 |
| 7 - 9 Peak Hour | | | 07:15 | 07:45 | 07:30 | 4 - 6 Peak Hour | | | 16:00 | 16:00 | 16:00 |
| 7 - 9 Pk Volume | 0 | 0 | 228 | 166 | 391 | 4 - 6 Pk Volume | 0 | 0 | 299 | 236 | 535 |
| Pk Hr Factor | 0.000 | 0.000 | 0.814 | 0.883 | 0.850 | Pk Hr Factor | 0.000 | 0.000 | 0.821 | 0.819 | 0.821 |

Prepared by National Data & Surveying Services

# VOLUME

Nielsen Ave Bet. Marks Ave & Hughes Ave

**Day:** Tuesday
**Date:** 8/3/2021

**City:** Riverside
**Project #:** CA21_030059_006

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 0 | 0 | 869 | 746 | 1,615 |

| AM Period | NB | SB | EB | | WB | | TOTAL | | PM Period | NB | SB | EB | | WB | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | | | 3 | | 3 | | 6 | | 12:00 | | | 20 | | 6 | | 26 | |
| 00:15 | | | 0 | | 3 | | 3 | | 12:15 | | | 10 | | 3 | | 13 | |
| 00:30 | | | 1 | | 0 | | 1 | | 12:30 | | | 16 | | 18 | | 34 | |
| 00:45 | | | 3 | 7 | 2 | 8 | 5 | 15 | 12:45 | | | 17 | 63 | 13 | 40 | 30 | 103 |
| 01:00 | | | 1 | | 1 | | 2 | | 13:00 | | | 16 | | 21 | | 37 | |
| 01:15 | | | 0 | | 0 | | 0 | | 13:15 | | | 16 | | 20 | | 36 | |
| 01:30 | | | 3 | | 0 | | 3 | | 13:30 | | | 17 | | 18 | | 35 | |
| 01:45 | | | 1 | 5 | 1 | 2 | 2 | 7 | 13:45 | | | 13 | 62 | 13 | 72 | 26 | 134 |
| 02:00 | | | 1 | | 3 | | 4 | | 14:00 | | | 20 | | 16 | | 36 | |
| 02:15 | | | 1 | | 0 | | 1 | | 14:15 | | | 14 | | 16 | | 30 | |
| 02:30 | | | 1 | | 1 | | 2 | | 14:30 | | | 17 | | 25 | | 42 | |
| 02:45 | | | 1 | 4 | 2 | 6 | 3 | 10 | 14:45 | | | 15 | 66 | 13 | 70 | 28 | 136 |
| 03:00 | | | 0 | | 0 | | 0 | | 15:00 | | | 19 | | 23 | | 42 | |
| 03:15 | | | 0 | | 2 | | 2 | | 15:15 | | | 12 | | 14 | | 26 | |
| 03:30 | | | 1 | | 2 | | 3 | | 15:30 | | | 11 | | 27 | | 38 | |
| 03:45 | | | 1 | 2 | 1 | 5 | 2 | 7 | 15:45 | | | 21 | 63 | 7 | 71 | 28 | 134 |
| 04:00 | | | 1 | | 0 | | 1 | | 16:00 | | | 10 | | 18 | | 28 | |
| 04:15 | | | 1 | | 0 | | 1 | | 16:15 | | | 12 | | 7 | | 19 | |
| 04:30 | | | 7 | | 4 | | 11 | | 16:30 | | | 12 | | 28 | | 40 | |
| 04:45 | | | 14 | 23 | 3 | 7 | 17 | 30 | 16:45 | | | 10 | 44 | 18 | 71 | 28 | 115 |
| 05:00 | | | 4 | | 3 | | 7 | | 17:00 | | | 7 | | 22 | | 29 | |
| 05:15 | | | 7 | | 5 | | 12 | | 17:15 | | | 8 | | 12 | | 20 | |
| 05:30 | | | 12 | | 13 | | 25 | | 17:30 | | | 10 | | 8 | | 18 | |
| 05:45 | | | 21 | 44 | 1 | 22 | 22 | 66 | 17:45 | | | 8 | 33 | 8 | 50 | 16 | 83 |
| 06:00 | | | 10 | | 5 | | 15 | | 18:00 | | | 3 | | 12 | | 15 | |
| 06:15 | | | 8 | | 3 | | 11 | | 18:15 | | | 12 | | 13 | | 25 | |
| 06:30 | | | 15 | | 5 | | 20 | | 18:30 | | | 6 | | 8 | | 14 | |
| 06:45 | | | 22 | 55 | 4 | 17 | 26 | 72 | 18:45 | | | 12 | 33 | 15 | 48 | 27 | 81 |
| 07:00 | | | 10 | | 5 | | 15 | | 19:00 | | | 17 | | 11 | | 28 | |
| 07:15 | | | 12 | | 19 | | 31 | | 19:15 | | | 16 | | 9 | | 25 | |
| 07:30 | | | 17 | | 4 | | 21 | | 19:30 | | | 20 | | 14 | | 34 | |
| 07:45 | | | 22 | 61 | 6 | 34 | 28 | 95 | 19:45 | | | 11 | 64 | 7 | 41 | 18 | 105 |
| 08:00 | | | 25 | | 14 | | 39 | | 20:00 | | | 6 | | 3 | | 9 | |
| 08:15 | | | 7 | | 5 | | 12 | | 20:15 | | | 3 | | 5 | | 8 | |
| 08:30 | | | 12 | | 4 | | 16 | | 20:30 | | | 6 | | 4 | | 10 | |
| 08:45 | | | 12 | 56 | 9 | 32 | 21 | 88 | 20:45 | | | 7 | 22 | 4 | 16 | 11 | 38 |
| 09:00 | | | 8 | | 5 | | 13 | | 21:00 | | | 4 | | 3 | | 7 | |
| 09:15 | | | 13 | | 3 | | 16 | | 21:15 | | | 1 | | 0 | | 1 | |
| 09:30 | | | 12 | | 9 | | 21 | | 21:30 | | | 5 | | 2 | | 7 | |
| 09:45 | | | 11 | 44 | 13 | 30 | 24 | 74 | 21:45 | | | 2 | 12 | 3 | 8 | 5 | 20 |
| 10:00 | | | 17 | | 10 | | 27 | | 22:00 | | | 1 | | 0 | | 1 | |
| 10:15 | | | 12 | | 9 | | 21 | | 22:15 | | | 4 | | 1 | | 5 | |
| 10:30 | | | 9 | | 11 | | 20 | | 22:30 | | | 4 | | 3 | | 7 | |
| 10:45 | | | 8 | 46 | 6 | 36 | 14 | 82 | 22:45 | | | 1 | 10 | 1 | 5 | 2 | 15 |
| 11:00 | | | 16 | | 11 | | 27 | | 23:00 | | | 1 | | 0 | | 1 | |
| 11:15 | | | 8 | | 14 | | 22 | | 23:15 | | | 3 | | 2 | | 5 | |
| 11:30 | | | 9 | | 9 | | 18 | | 23:30 | | | 0 | | 0 | | 0 | |
| 11:45 | | | 11 | 44 | 18 | 52 | 29 | 96 | 23:45 | | | 2 | 6 | 1 | 3 | 3 | 9 |
| **TOTALS** | | | | 391 | | 251 | | **642** | **TOTALS** | | | | 478 | | 495 | | **973** |
| **SPLIT %** | | | | 60.9% | | 39.1% | | **39.8%** | **SPLIT %** | | | | 49.1% | | 50.9% | | **60.2%** |

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 0 | 0 | 869 | 746 | 1,615 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM Peak Hour** | | | 07:15 | 11:00 | **07:15** | **PM Peak Hour** | | | 12:45 | 16:30 | **14:15** |
| **AM Pk Volume** | | | 76 | 52 | **119** | **PM Pk Volume** | | | 66 | 80 | **142** |
| **Pk Hr Factor** | | | 0.760 | 0.722 | **0.763** | **Pk Hr Factor** | | | 0.971 | 0.714 | **0.845** |
| **7 - 9 Volume** | 0 | 0 | 117 | 66 | **183** | **4 - 6 Volume** | 0 | 0 | 77 | 121 | **198** |
| **7 - 9 Peak Hour** | | | 07:15 | 07:15 | **07:15** | **4 - 6 Peak Hour** | | | 16:00 | 16:30 | **16:30** |
| **7 - 9 Pk Volume** | 0 | 0 | 76 | 43 | **119** | **4 - 6 Pk Volume** | 0 | 0 | 44 | 80 | **117** |
| **Pk Hr Factor** | 0.000 | 0.000 | 0.760 | 0.566 | **0.763** | **Pk Hr Factor** | 0.000 | 0.000 | 0.917 | 0.714 | **0.731** |

Prepared by National Data & Surveying Services

# VOLUME

Hughes Ave Bet. Belmont Ave & Nielsen Ave

**Day:** Tuesday
**Date:** 8/3/2021

**City:** Riverside
**Project #:** CA21_030059_007

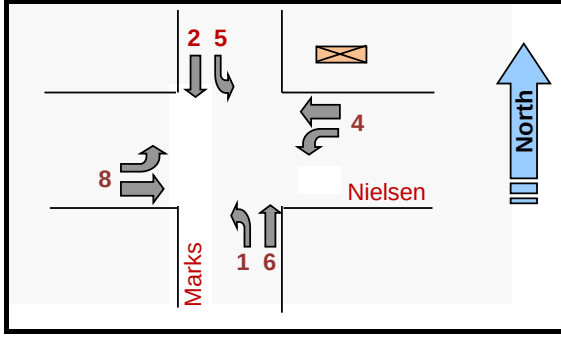
| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 1,421 | 1,183 | 0 | 0 | 2,604 |

| AM Period | NB | | SB | | EB | WB | TOTAL | | PM Period | NB | | SB | | EB | WB | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | 6 | | 2 | | | | 8 | | 12:00 | 34 | | 21 | | | | 55 | |
| 00:15 | 5 | | 3 | | | | 8 | | 12:15 | 31 | | 14 | | | | 45 | |
| 00:30 | 5 | | 3 | | | | 8 | | 12:30 | 26 | | 25 | | | | 51 | |
| 00:45 | 1 | 17 | 4 | 12 | | | 5 | 29 | 12:45 | 23 | 114 | 28 | 88 | | | 51 | 202 |
| 01:00 | 2 | | 3 | | | | 5 | | 13:00 | 11 | | 12 | | | | 23 | |
| 01:15 | 5 | | 4 | | | | 9 | | 13:15 | 19 | | 26 | | | | 45 | |
| 01:30 | 7 | | 3 | | | | 10 | | 13:30 | 22 | | 17 | | | | 39 | |
| 01:45 | 3 | 17 | 2 | 12 | | | 5 | 29 | 13:45 | 28 | 80 | 16 | 71 | | | 44 | 151 |
| 02:00 | 1 | | 1 | | | | 2 | | 14:00 | 12 | | 24 | | | | 36 | |
| 02:15 | 3 | | 6 | | | | 9 | | 14:15 | 27 | | 29 | | | | 56 | |
| 02:30 | 1 | | 2 | | | | 3 | | 14:30 | 33 | | 21 | | | | 54 | |
| 02:45 | 2 | 7 | 2 | 11 | | | 4 | 18 | 14:45 | 37 | 109 | 24 | 98 | | | 61 | 207 |
| 03:00 | 1 | | 4 | | | | 5 | | 15:00 | 33 | | 20 | | | | 53 | |
| 03:15 | 3 | | 2 | | | | 5 | | 15:15 | 40 | | 12 | | | | 52 | |
| 03:30 | 3 | | 4 | | | | 7 | | 15:30 | 29 | | 26 | | | | 55 | |
| 03:45 | 1 | 8 | 0 | 10 | | | 1 | 18 | 15:45 | 26 | 128 | 20 | 78 | | | 46 | 206 |
| 04:00 | 1 | | 0 | | | | 1 | | 16:00 | 33 | | 32 | | | | 65 | |
| 04:15 | 3 | | 0 | | | | 3 | | 16:15 | 27 | | 21 | | | | 48 | |
| 04:30 | 2 | | 3 | | | | 5 | | 16:30 | 30 | | 25 | | | | 55 | |
| 04:45 | 7 | 13 | 8 | 11 | | | 15 | 24 | 16:45 | 19 | 109 | 18 | 96 | | | 37 | 205 |
| 05:00 | 12 | | 8 | | | | 20 | | 17:00 | 48 | | 11 | | | | 59 | |
| 05:15 | 7 | | 12 | | | | 19 | | 17:15 | 27 | | 16 | | | | 43 | |
| 05:30 | 16 | | 14 | | | | 30 | | 17:30 | 17 | | 21 | | | | 38 | |
| 05:45 | 17 | 52 | 15 | 49 | | | 32 | 101 | 17:45 | 21 | 113 | 18 | 66 | | | 39 | 179 |
| 06:00 | 4 | | 7 | | | | 11 | | 18:00 | 17 | | 16 | | | | 33 | |
| 06:15 | 14 | | 7 | | | | 21 | | 18:15 | 17 | | 18 | | | | 35 | |
| 06:30 | 9 | | 9 | | | | 18 | | 18:30 | 6 | | 4 | | | | 10 | |
| 06:45 | 16 | 43 | 15 | 38 | | | 31 | 81 | 18:45 | 0 | 40 | 2 | 40 | | | 2 | 80 |
| 07:00 | 12 | | 12 | | | | 24 | | 19:00 | 8 | | 2 | | | | 10 | |
| 07:15 | 17 | | 16 | | | | 33 | | 19:15 | 5 | | 3 | | | | 8 | |
| 07:30 | 14 | | 11 | | | | 25 | | 19:30 | 2 | | 0 | | | | 2 | |
| 07:45 | 23 | 66 | 17 | 56 | | | 40 | 122 | 19:45 | 3 | 18 | 2 | 7 | | | 5 | 25 |
| 08:00 | 25 | | 18 | | | | 43 | | 20:00 | 6 | | 11 | | | | 17 | |
| 08:15 | 19 | | 15 | | | | 34 | | 20:15 | 10 | | 14 | | | | 24 | |
| 08:30 | 17 | | 15 | | | | 32 | | 20:30 | 18 | | 10 | | | | 28 | |
| 08:45 | 16 | 77 | 16 | 64 | | | 32 | 141 | 20:45 | 15 | 49 | 9 | 44 | | | 24 | 93 |
| 09:00 | 28 | | 17 | | | | 45 | | 21:00 | 12 | | 13 | | | | 25 | |
| 09:15 | 10 | | 23 | | | | 33 | | 21:15 | 11 | | 7 | | | | 18 | |
| 09:30 | 21 | | 16 | | | | 37 | | 21:30 | 15 | | 5 | | | | 20 | |
| 09:45 | 14 | 73 | 24 | 80 | | | 38 | 153 | 21:45 | 8 | 46 | 14 | 39 | | | 22 | 85 |
| 10:00 | 28 | | 19 | | | | 47 | | 22:00 | 10 | | 9 | | | | 19 | |
| 10:15 | 27 | | 15 | | | | 42 | | 22:15 | 11 | | 8 | | | | 19 | |
| 10:30 | 29 | | 9 | | | | 38 | | 22:30 | 4 | | 2 | | | | 6 | |
| 10:45 | 20 | 104 | 32 | 75 | | | 52 | 179 | 22:45 | 5 | 30 | 3 | 22 | | | 8 | 52 |
| 11:00 | 27 | | 22 | | | | 49 | | 23:00 | 4 | | 8 | | | | 12 | |
| 11:15 | 24 | | 23 | | | | 47 | | 23:15 | 2 | | 5 | | | | 7 | |
| 11:30 | 20 | | 22 | | | | 42 | | 23:30 | 4 | | 6 | | | | 10 | |
| 11:45 | 23 | 94 | 24 | 91 | | | 47 | 185 | 23:45 | 4 | 14 | 6 | 25 | | | 10 | 39 |
| TOTALS | | 571 | | 509 | | | | 1080 | TOTALS | | 850 | | 674 | | | | 1524 |
| SPLIT % | | 52.9% | | 47.1% | | | | 41.5% | SPLIT % | | 55.8% | | 44.2% | | | | 58.5% |

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 1,421 | 1,183 | 0 | 0 | 2,604 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AM Peak Hour | 11:45 | 10:45 | | | 11:45 | PM Peak Hour | 14:30 | 15:30 | | | 14:15 |
| AM Pk Volume | 114 | 99 | | | 198 | PM Pk Volume | 143 | 99 | | | 224 |
| Pk Hr Factor | 0.838 | 0.773 | | | 0.900 | Pk Hr Factor | 0.894 | 0.773 | | | 0.918 |
| 7 - 9 Volume | 143 | 120 | 0 | 0 | 263 | 4 - 6 Volume | 222 | 162 | 0 | 0 | 384 |
| 7 - 9 Peak Hour | 07:45 | 07:45 | | | 07:45 | 4 - 6 Peak Hour | 16:15 | 16:00 | | | 16:00 |
| 7 - 9 Pk Volume | 84 | 65 | 0 | 0 | 149 | 4 - 6 Pk Volume | 124 | 96 | 0 | 0 | 205 |
| Pk Hr Factor | 0.840 | 0.903 | 0.000 | 0.000 | 0.866 | Pk Hr Factor | 0.646 | 0.750 | 0.000 | 0.000 | 0.788 |

| Movement | NL | ST | | WT | SL | NT | | ET | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Times [1.1.1]** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Min Green | 8 | 8 | 0 | 8 | 8 | 8 | | 8 | | 0 |
| Gap, Ext | 2 | 5.5 | 0 | 5.2 | 2 | 5.4 | | 5.2 | | 0 |
| Max 1 | 20 | 35 | 0 | 48 | 20 | 35 | | 48 | | 0 |
| Max 2 | 12 | 25 | 0 | 38 | 12 | 25 | | 38 | | 0 |
| Yel Clearance | 3.9 | 4.3 | 0 | 3.9 | 3.9 | 4.3 | | 3.9 | | 0 |
| Red Clearance | 1 | 1 | 0 | 2 | 1 | 1 | | 2 | | 0 |
| Walk | 0 | 5 | 0 | 5 | | 5 | | 5 | | 0 |
| Ped Clearance | 0 | 22 | 0 | 28 | | 21 | | 28 | | 0 |
| Red Revert | 2 | 2 | 0 | 2 | 2 | 2 | | 2 | | 0 |
| Add Initial | 0 | | 0 | | | 0 | | 0 | | 0 |
| Max Initial | 0 | | 0 | | | 0 | | 0 | | 0 |
| Time B4 Reduct | 0 | 8 | 0 | 8 | | 8 | | 8 | | 0 |
| Cars B4 Reduct | 0 | | 0 | | | 0 | | 0 | | 0 |
| Time To Reduce | 0 | 18 | 0 | 27 | | 18 | | 27 | | 0 |
| Reduce By | 0 | | 0 | | | 0 | | 0 | | 0 |
| Min Gap | 2 | 2 | 0 | 2 | 2 | 2 | | 2 | | 0 |
| DyMaxLim | 0 | | 0 | | | 0 | | 0 | | 0 |
| Max Step | 0 | | 0 | | | 0 | | 0 | | 0 |
| **Options [1.1.2]** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Enable | X | X | | X | X | X | | X | | |
| Min Recall | | | | | | | | | | |
| Max Recall | | | | | | | | | | |
| Ped Recall | | | | | | | | | | |
| Soft Recall | | X | | | | X | | | | |
| Lock Calls | | | | | | | | | | |
| Auto Flash Entry | | | | | | | | | | |
| Auto Flash Exit | | | | | | | | | | |
| Dual Entry | | X | | X | | X | | X | | |
| Enable Simul Gap | | | | | | | | | | |
| Gaurantee Passage | | | | | | | | | | |
| Rest In Walk | | | | | | | | | | |
| Conditonal Service | | | | | | | | | | |
| Non-Actuated 1 | | | | | | | | | | |
| Non-Actuated 2 | | | | | | | | | | |
| Add Init Calc | | | | | | | | | | |




**Phase Options+ [1.1.3]**

| Options+ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Reservice | | | | | | | | | | |
| PedClr Thru Yel | | | | | | | | | | |
| SkipRed-NoCall | | | | | | | | | | |
| Red Rest | | | | | | | | | | |
| Max II | | | | | | | | | | |
| *Max III | | | | | | | | | | |
| Max Inhibit | | | | | | | | | | |
| Ped Delay | | | | | | | | | | |
| Red Rest on Gap | | | | | | | | | | |
| Conflicting Phase | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grn/Ped Delay | | | | | | | | | | |
| Omit Yel, Yel P | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped Out/Olp Ped | | | | | | | | | | |
| StartYel, Next P | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *StartupVehCall | 1 | 2 | | 4 | 5 | 6 | | 8 | | |
| *StartupPedCall | | | | | | | | | | |

**Phase Concurrency [1.1.4]**

| Phase | Ring | StartUp | Concurrent Phases | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | RED | 5 | 6 | 0 | 0 | | | | |
| 2 | 1 | GREEN | 5 | 6 | 0 | 0 | | | | |
| 3 | 1 | RED | 7 | 8 | 0 | 0 | | | | |
| 4 | 1 | RED | 7 | 8 | 0 | 0 | | | | |
| 5 | 2 | RED | 1 | 2 | 0 | 0 | | | | |
| 6 | 2 | GREEN | 1 | 2 | 0 | 0 | | | | |
| 7 | 2 | RED | 3 | 4 | 0 | 0 | | | | |
| 8 | 2 | RED | 3 | 4 | 0 | 0 | | | | |
| 9 | 0 | RED | 0 | 0 | 0 | 0 | | | | |
| 10 | 0 | RED | 0 | 0 | 0 | 0 | | | | |
| 11 | 0 | RED | 0 | 0 | 0 | 0 | | | | |
| 12 | 0 | RED | 0 | 0 | 0 | 0 | | | | |

**Comm Ports [6.6]**

| Channel | Port | Echo | Mode |
|---|---|---|---|
| Async 1 | SP1 | NONE | 0 |
| Async 2 | SP2 | NONE | 0 |
| Async 3 | SP8 | NONE | 0 |
| Async 4 | OFF | NONE | 0 |
| Sync 1 | SP5S | | |
| Sync 2 | OFF | | |
| TS2CVM | NONE | | |
| Opticom | NONE | | |
| GPS | NONE | | |

**Unit Params [1.2.1]**

| | | | |
|---|---|---|---|
| Screen Size | 8 | Metric | OFF |
| Startup Flash | 0 | Red Revert | 2 |
| MCE Timeout | 0 | Auto Ped Clear | OFF |
| Loc Flsh Start | RSt | Display Time | 60 |
| Yellow < 3" | OFF | Tone Disable | ON |
| Allow Skip Yel | OFF | AudioPedTime | 0 |
| Start Red Tm | 6 | Phase Mode | STD8 |
| Startup Calls | UseProg | CNA FreeTime | 0 |
| TOD Dimming | OFF | Diamond Mode | 4Ph |
| ST over Prmpt | OFF | Free Ring Seq | 1 |
| Feature Profile | 1 | IO Mode | USER |
| Mx Seek TrkTm | 0 | Max Cyc Timer | 0 |
| Mx Seek Dwell | 0 | CycFlt Actn | ALARM |
| Prmpt/Ext Coor | EXT | Clrnc Decide | OFF |
| Aux Switch | STOPTM | LPAlt Srs | 3-6 |
| *InhFYA Red St | OFF | Security Delay | 0 |
| RingA1go | 0 | | |

* - 76.12B or newer

**Times+ [1.1.7]**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Walk2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BikeClr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GrnFlash | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SfClrMn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SfClrNoFlsh | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| NoPed Reserv | | | | | | | | |

**Comm [6.2]**

| Port | Baud Rate | FCM |
|---|---|---|
| 1 | 38400 | 6 |
| 2 | 9600 | 6 |
| 3 | 9600 | 6 |
| 4 | 9600 | 6 |

**Comm [6.5]**

| | | | | | Host IPs | | | |
|---|---|---|---|---|---|---|---|---|
| IP Address: | 0 | 0 | 0 | 77 | ATMS | | | |
| Mask: | 255 | 255 | 255 | 0 | 10 | 50 | 10 | 22 |
| Gateway: | 0 | 0 | 0 | 1 | SG | | | |
| Port #: | 5001 | | | | 0 | 0 | 0 | 0 |

City of FRESNO

**Phase Seq. (2 ring) Chart [1.2.4]**

| Seq # | Ring | Phases | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 2 | 3 | 4 | 0 | 0 |
| | 2 | 5 | 6 | 7 | 8 | 0 | 0 |
| 2 | 1 | 1 | 2 | 3 | 4 | 0 | 0 |
| | 2 | 6 | 5 | 7 | 8 | 0 | 0 |
| 3 | 1 | 2 | 1 | 3 | 4 | 0 | 0 |
| | 2 | 5 | 6 | 7 | 8 | 0 | 0 |
| 4 | 1 | 2 | 1 | 3 | 4 | 0 | 0 |
| | 2 | 6 | 5 | 7 | 8 | 0 | 0 |
| 5 | 1 | 1 | 2 | 3 | 4 | 0 | 0 |
| | 2 | 5 | 6 | 8 | 7 | 0 | 0 |
| 6 | 1 | 1 | 2 | 3 | 4 | 0 | 0 |
| | 2 | 6 | 5 | 8 | 7 | 0 | 0 |
| 7 | 1 | 2 | 1 | 3 | 4 | 0 | 0 |
| | 2 | 5 | 6 | 8 | 7 | 0 | 0 |
| 8 | 1 | 2 | 1 | 3 | 4 | 0 | 0 |
| | 2 | 6 | 5 | 8 | 7 | 0 | 0 |
| 9 | 1 | 1 | 2 | 4 | 3 | 0 | 0 |
| | 2 | 5 | 6 | 7 | 8 | 0 | 0 |
| 10 | 1 | 1 | 2 | 4 | 3 | 0 | 0 |
| | 2 | 6 | 5 | 7 | 8 | 0 | 0 |
| 11 | 1 | 2 | 1 | 4 | 3 | 0 | 0 |
| | 2 | 5 | 6 | 7 | 8 | 0 | 0 |
| 12 | 1 | 2 | 1 | 4 | 3 | 0 | 0 |
| | 2 | 6 | 5 | 7 | 8 | 0 | 0 |
| 13 | 1 | 1 | 2 | 4 | 3 | 0 | 0 |
| | 2 | 5 | 6 | 8 | 7 | 0 | 0 |
| 14 | 1 | 1 | 2 | 4 | 3 | 0 | 0 |
| | 2 | 6 | 5 | 8 | 7 | 0 | 0 |
| 15 | 1 | 2 | 1 | 4 | 3 | 0 | 0 |
| | 2 | 5 | 6 | 8 | 7 | 0 | 0 |
| 16 | 1 | 2 | 1 | 4 | 3 | 0 | 0 |
| | 2 | 6 | 5 | 8 | 7 | 0 | 0 |

**Advance Warning [1.1.9]**

| | Ph | Tm |
|---|---|---|
| Aux Out #1 | 0 | 0 |
| Aux Out #2 | 0 | 0 |

**NAME:** Marks & Nielsen **ID:** 1342 **Configuration:** Standard File

| | | | |
|---|---|---|---|
| **Prepared by:** | JT | **Date Installed / By:** | |
| **Checked by:** | PG | **Date Superseded:** | |

**V76.12/13**
**Updated 12/6/17**

**Date Printed:** 12/4/20

## [2.1] Coord Modes+

| | |
|---|---|
| Test OpMode | 0 |
| Correction | SHRT/LNG |
| Maximum | MAX INH |
| Force Mode | FIXED |
| Flash Mode | CHANNEL |

## Coord Modes+ (Page 2)

| | |
|---|---|
| FreeonSeqCh | ON |
| Closed Loop | OFF |
| External | OFF |
| Latch Sec Frc | OFF |
| Stop-in-Walk | OFF |
| Ped Recycle | P1256_INH |
| Expand Split | OFF |
| Easy Float | OFF |
| Auto Reset | ON |
| NTCIP Yield | + 0 |

**Leave Walk**

| | |
|---|---|
| Before | TIMED |
| After | TIMED |

**Intersection Name:** Marks & Nielsen

**ID:** 1342

**Date Printed:** 12/4/2020

## [2.4] Patterns

| Pat# | Cyc | Off | Split | Seq |
|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 1 |
| 2 | 0 | 0 | 2 | 1 |
| 3 | 0 | 0 | 3 | 1 |
| 4 | 0 | 0 | 4 | 1 |
| 5 | 0 | 0 | 5 | 1 |
| 6 | 0 | 0 | 6 | 1 |
| 7 | 0 | 0 | 7 | 1 |
| 8 | 0 | 0 | 8 | 1 |
| 9 | 0 | 0 | 9 | 1 |
| 10 | 0 | 0 | 10 | 1 |
| 11 | 0 | 0 | 0 | 1 |
| 12 | 0 | 0 | 0 | 1 |
| 13 | 0 | 0 | 0 | 1 |

## [2.7.1-24] Splits

| Split | [2.7] | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 2 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 3 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 4 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 5 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 6 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 7 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 8 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 9 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 10 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 11 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 12 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 13 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |

## [2.5] Transition

| Pat# | Short | Long | Dwell | No Shortway Ø | | | | E-Yld | Offset | Ret Hold | Flt | Min Veh | Min Ped | MI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 2 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 3 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 4 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 5 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 6 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 7 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 8 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 9 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | - | OFF |
| 10 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | - | OFF |
| 11 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 12 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 13 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |

## [2.1] Coord Modes+

| | |
|---|---|
| Test OpMode | 0 |
| Correction | SHRT/LNG |
| Maximum | MAX INH |
| Force Mode | FIXED |
| Flash Mode | CHANNEL |

## Coord Modes+ (Page 2)

| | |
|---|---|
| FreeonSeqCh | ON |
| Closed Loop | OFF |
| External | OFF |
| Latch Sec Frc | OFF |
| Stop-in-Walk | OFF |
| Ped Recycle | P1256_INH |
| Expand Splt | OFF |
| Easy Float | OFF |
| Auto Reset | ON |
| NTCIP Yield | + 0 |

**Leave Walk**

| | |
|---|---|
| Before | TIMED |
| After | TIMED |

Intersection Name: Marks & Nielsen

ID: 1342

City of FRESNO

Date Printed: 12/4/2020

## [2.4] Patterns

| Pat# | Cyc | Off | Split | Seq |
|---|---|---|---|---|
| 20 | 0 | 0 | 0 | 1 |
| 21 | 0 | 0 | 0 | 1 |
| 22 | 0 | 0 | 0 | 1 |
| 23 | 0 | 0 | 0 | 1 |
| 24 | 0 | 0 | 0 | 1 |
| 25 | 0 | 0 | 0 | 1 |
| 26 | 0 | 0 | 0 | 1 |
| 27 | 0 | 0 | 0 | 1 |
| 28 | 0 | 0 | 0 | 1 |
| 29 | 0 | 0 | 0 | 1 |
| 30 | 0 | 0 | 0 | 1 |
| 31 | 0 | 0 | 0 | 1 |
| 32 | 0 | 0 | 0 | 1 |

## [2.7.1-24] Splits

| Split | [2.7] | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 21 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 22 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 23 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 24 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 25 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 26 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 27 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 28 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 29 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 30 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 31 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 32 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |

## [2.5] Transition

| Pat# | Short | Long | Dwell | No Shortway Ø | | | | E-Yld | Offset | Ret Hold | Flt | Min Veh | Min Ped | MI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 21 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 22 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 23 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 24 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 25 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 26 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 27 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 28 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 29 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 30 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 31 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 32 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |

## [2.7.X.3] TSP Split Table

| Pat# | Cyc | Off | Split | Seq | SPLITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Extend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | Request | 1 | 2 | 3 | 4 | | | | | | |
| | | | | | Strategy | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimSvcDes | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimEstDep | 0 | 0 | 0 | 0 | | | | | | |
| 2 | Cyc | Off | Split | Seq | SPLITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 0 | 0 | 2 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Extend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | Request | 1 | 2 | 3 | 4 | | | | | | |
| | | | | | Strategy | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimSvcDes | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimEstDep | 0 | 0 | 0 | 0 | | | | | | |
| 3 | Cyc | Off | Split | Seq | SPLITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 0 | 0 | 3 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Extend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | Request | 1 | 2 | 3 | 4 | | | | | | |
| | | | | | Strategy | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimSvcDes | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimEstDep | 0 | 0 | 0 | 0 | | | | | | |
| 4 | Cyc | Off | Split | Seq | SPLITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 0 | 0 | 4 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Extend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | Request | 1 | 2 | 3 | 4 | | | | | | |
| | | | | | Strategy | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimSvcDes | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimEstDep | 0 | 0 | 0 | 0 | | | | | | |
| 5 | Cyc | Off | Split | Seq | SPLITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 0 | 0 | 5 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Extend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | Request | 1 | 2 | 3 | 4 | | | | | | |
| | | | | | Strategy | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimSvcDes | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimEstDep | 0 | 0 | 0 | 0 | | | | | | |
| 6 | Cyc | Off | Split | Seq | SPLITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 0 | 0 | 6 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Extend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | Request | 1 | 2 | 3 | 4 | | | | | | |
| | | | | | Strategy | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimSvcDes | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimEstDep | 0 | 0 | 0 | 0 | | | | | | |
| 9 - FREE | Cyc | Off | Split | Seq | SPLITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 0 | 0 | 9 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Extend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | Request | 1 | 2 | 3 | 4 | | | | | | |
| | | | | | Strategy | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimSvcDes | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimEstDep | 0 | 0 | 0 | 0 | | | | | | |

## [2.9.2.(1-8)] Strategy Tables

**STRATEGY_1**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

**STRATEGY_2**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

**STRATEGY_3**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

**STRATEGY_4**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

**STRATEGY_5**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

**STRATEGY_6**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

**STRATEGY_7**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

**STRATEGY_8**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

## Overlap 1-8 Program Parms & Parm+ [1.5.2.1] [1.5.2.8]

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| A | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |
| 2 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| B | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |
| 3 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| C | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |
| 4 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| D | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |
| 5 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| E | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |
| 6 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| F | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |
| 7 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| G | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |
| 8 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| H | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |

## OLP GENERAL PARAMETERS [1.5.1]

| | |
|---|---|
| Lock Inhibit | OFF |
| Conflict Lock Enable | OFF |
| Parent P Clearance | ON |
| Xtra Incl Phases | OFF |
| InhibitLockInterval | Always |

## Channel Parameters [1.8.3]

| | |
|---|---|
| Pre Invert Rail Input | OFF |

## Preemption Options+ [3.Pre #.6]

| Pre # | Enable | Type | Output | Pattern | Skip | Co+Pre | Flash | Max/Min |
|---|---|---|---|---|---|---|---|---|
| 1 | OFF | RAIL | TS2 | | OFF | OFF | OFF | MAX |
| 2 | OFF | RAIL | TS2 | 0 | OFF | OFF | OFF | MAX |
| 3 | ON | EMERG | TS2 | | OFF | OFF | OFF | MAX |
| 4 | ON | EMERG | TS2 | 0 | OFF | OFF | OFF | MAX |
| 5 | ON | EMERG | TS2 | | OFF | OFF | OFF | MAX |
| 6 | ON | EMERG | TS2 | 0 | OFF | OFF | OFF | MAX |

## Preemption Times [3.#.1]

| Pre # | Delay | MinDura | MaxPres | MinGrn | MinWlk | PedClr | Track Grn | Min Dwell |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | | 10 | 60 | 6 | | 25 | | 10 |
| 4 | 0 | 10 | 60 | 6 | 0 | 25 | 0 | 10 |
| 5 | | 10 | 60 | 6 | | 25 | | 10 |
| 6 | 0 | 10 | 60 | 6 | 0 | 25 | 0 | 10 |

## Preemption, Options [3.#.3]

| Pre # | Lock Input | Over-ride Auto Flash | Over-ride Higher Preempt | Flash Dwell | Link |
|---|---|---|---|---|---|
| 1 | OFF | OFF | OFF | ON | |
| 2 | OFF | OFF | OFF | OFF | 0 |
| 3 | OFF | OFF | OFF | OFF | |
| 4 | OFF | OFF | OFF | OFF | 0 |
| 5 | OFF | OFF | OFF | OFF | |
| 6 | OFF | OFF | OFF | OFF | 0 |

## Preemption, Times+ [3.#.4]

| Pre No. | Extend Dwell | Return Max | Ped Clr | Yel | Red |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | 0 | 0 | 0 | 0 | 0 |
| 3 | | 20 | 10 | 3.9 | 2 |
| 4 | 0 | 20 | 10 | 3.9 | 2 |
| 5 | | 20 | 10 | 3.9 | 2 |
| 6 | 0 | 20 | 10 | 3.9 | 2 |

Pre 1 = RR1
Pre 2 = RR2
Pre 3 = EVA
Pre 4 = EVB
Pre 5 = EVC
Pre 6 = EVD

## Prog Parms+ (MM>1>5>2>X>3)

| | | | |
|---|---|---|---|
| Leading Green | OFF | FYA MCE Disable | OFF |
| Transit Input | 0 | FYA Skip Red | OFF |
| FYA Delay Time | 0 | FYA AfterPreempt | OFF |
| Ped Call Clear | OFF | | |
| Ped ClearTime | 0 | FYA ImmedReturn | OFF |
| Green Ext Inh | 0 | 0 0 0 0 0 | |

## OverlapB+: 1-A

| | | | |
|---|---|---|---|
| Leading Green | OFF | FYA MCE Disable | OFF |
| Transit Input | 0 | FYA Skip Red | OFF |
| FYA Delay Time | 0 | FYA AfterPreempt | OFF |
| Ped Call Clear | OFF | | |
| Ped ClearTime | 0 | FYA ImmedReturn | OFF |
| Green Ext Inh | 0 | 0 0 0 0 0 | |

## OverlapB+: 2-B

| | | | |
|---|---|---|---|
| Leading Green | OFF | FYA MCE Disable | OFF |
| Transit Input | 0 | FYA Skip Red | OFF |
| FYA Delay Time | 0 | FYA AfterPreempt | OFF |
| Ped Call Clear | OFF | | |
| Ped ClearTime | 0 | FYA ImmedReturn | OFF |
| Green Ext Inh | 0 | 0 0 0 0 0 | |

## OverlapB+: 3-C

| | | | |
|---|---|---|---|
| Leading Green | OFF | FYA MCE Disable | OFF |
| Transit Input | 0 | FYA Skip Red | OFF |
| FYA Delay Time | 0 | FYA AfterPreempt | OFF |
| Ped Call Clear | OFF | | |
| Ped ClearTime | 0 | FYA ImmedReturn | OFF |
| Green Ext Inh | 0 | 0 0 0 0 0 | |

## OverlapB+: 4-D

| | | | |
|---|---|---|---|
| Leading Green | OFF | FYA MCE Disable | OFF |
| Transit Input | 0 | FYA Skip Red | OFF |
| FYA Delay Time | 0 | FYA AfterPreempt | OFF |
| Ped Call Clear | OFF | | |
| Ped ClearTime | 0 | FYA ImmedReturn | OFF |
| Green Ext Inh | 0 | 0 0 0 0 0 | |

## Phases [3.#.2] - set the Dwell Phases

| Pre # | Column | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Dwell Veh | | | | | | | | | | |
| | Peds | | | | | | | | | | |
| 2 | Dwell Veh | | | | | | | | | | |
| | Peds | | | | | | | | | | |
| 3 | Dwell Veh | 2 | 5 | | | | | | | | |
| | Peds | | | | | | | | | | |
| 4 | Dwell Veh | 4 | | | | | | | | | |
| | Peds | | | | | | | | | | |
| 5 | Dwell Veh | 6 | 1 | | | | | | | | |
| | Peds | | | | | | | | | | |
| 6 | Dwell Veh | 8 | | | | | | | | | |
| | Peds | | | | | | | | | | |

## Phases [3.#.2] - Trk Veh

| Pre # | Phases | | | |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |

## Exit Phases [3.#.2]

| No. | Exit Phase | | | |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | 2 | 5 | | |
| 4 | 2 | 6 | | |
| 5 | 1 | 6 | | |
| 6 | 2 | 6 | | |

## Overlaps+ [3.#.5]

| Pre # | | Preempt Overlaps + | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Track | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dwell | | | | | | | | | | |
| 2 | Track | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dwell | | | | | | | | | | |
| 3 | Track | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dwell | | | | | | | | | | |
| 4 | Track | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dwell | | | | | | | | | | |
| 5 | Track | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dwell | | | | | | | | | | |
| 6 | Track | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dwell | | | | | | | | | | |

City of FRESNO

**ID:** 1342 **Name:** Marks & Nielsen **Date Printed:** 12/4/2020

# CHANNEL SETTINGS [1.8] plus UNIT PARAMETERS [1.2.1]

## CHANNEL SETTINGS [1.8.1]

| Channel | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phase / Olap # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 | 2 | 4 | 6 | 8 |
| Channel Type | VEH | VEH | VEH | VEH | VEH | VEH | VEH | VEH | OLP | OLP | OLP | OLP | PED | PED | PED | PED |
| Channel Flash | RED | RED | RED | RED | RED | RED | RED | RED | RED | RED | RED | RED | DRK | DRK | DRK | DRK |
| Flash 1-2 Hertz | | X | | X | | X | | X | | | | | | | | |
| | Page 1 | | | | | | | | Page 2 | | | | | | | |

## Chan Settings [1.8.2]

| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| VEH | VEH | VEH | VEH | VEH | VEH | VEH | VEH |
| DRK | DRK | DRK | DRK | DRK | DRK | DRK | DRK |
| | | | | | | | |

## CHANNEL PARMETERS [1.8.3]

| | |
|---|---|
| CH 17-24 Mapping: | DEFAULT |
| D-Conn Mapping: | NONE |
| Invert Rail Inputs: | OFF |
| C1-C11-ABC IO Mode: | USER |

## IO PARAMETERS [1.8.6]

| | |
|---|---|
| C1-C11-ABC IO Mode: | USER |
| D-Conn Mapping: | NONE |
| T & F BIU Mapping | DEFAULT |
| Invert Rail Inputs: | OFF |
| EVP Ped Confirm | OFF |

## CHANNELS+ [1.8.4]

| *Channel* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* | *16* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Flash Green* | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off |
| *Flash Red* | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off |
| *Flash Yellow* | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off |
| *Inh Red Fl in Preempt* | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off |
| *Olap Ovrd* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Override Type* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**ID:** 1342 **NAME:** Marks & Nielsen

## I/O LOGIC [1.8.7]

**Prt Date:** 12/4/2020

| Row# | Result | | | Operand_1 | | | | | Operand_2 | | | | | Operand_3 | | | | | Timer | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I/O | Fcn | = | Inv | Src | I/0 | Fun | Logic Func | Inv | Src | I/0 | Fun | Logic Func | Inv | Src | I/0 | Fun | Logic Func | Dly | Sec |
| 1 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 2 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 3 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 4 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 5 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 6 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 7 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 8 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 9 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 10 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |

## Ped Parms (MM>5>4)

| Det# | Call | No Act | Max Pres | Err Cnt |
|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 |
| 2 | 2 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 |
| 4 | 4 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 |
| 6 | 6 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 |
| 8 | 8 | 0 | 0 | 0 |

| Veh Par 1-32 [5.1] | | | | | | | | | | | Vehicle Options 1-32 [5.2] | | | | | | | | | Parameters+ 1-32 [5.3] | | | | | | | | Info Only | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Det # | Input Slot | Call Ø | Swi Ø | Dlay | Ext | Que | No Act | Max Pres | Err Cnt | Fail Time | Det # | Call | Ext | Que | Add Init | Red Lock | Yell Lock | occ | vol | Det # | Occupancy G | Y | R | Delay 1 | 2 | Type | Src | Dir | Det # |
| 1 | 1I1U | 1 | | | | | 0 | 0 | 0 | 255 | 1 | X | X | - | - | - | - | X | X | 1 | X | X | - | | | NORM | | NBL1 | 1 |
| 2 | 2I2U | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 2 | - | X | - | - | - | - | X | X | 2 | X | X | - | 0 | 0 | NORM | 0 | | 2 |
| 3 | 2I2L | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 255 | 3 | X | - | - | - | - | - | X | X | 3 | X | X | - | 0 | 0 | STOPB | 0 | | 3 |
| 4 | 2I3U | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 255 | 4 | X | - | - | - | - | - | X | X | 4 | X | X | - | 0 | 0 | STOPB | 0 | | 4 |
| 5 | 2I3L | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 255 | 5 | X | - | - | - | - | - | X | X | 5 | X | X | - | 0 | 0 | STOPB | 0 | SBR1 | 5 |
| 6 | 2I4U | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 255 | 6 | X | - | - | - | - | - | X | X | 6 | X | X | - | 0 | 0 | STOPB | 0 | SBT1 | 6 |
| 7 | 3I5U | 8 | | | | | 0 | 0 | 0 | 255 | 7 | X | X | - | - | - | - | X | X | 7 | X | X | - | | | NORM | | EBL1 | 7 |
| 8 | 4I6U | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 8 | - | X | - | - | - | - | X | X | 8 | X | X | - | 0 | 0 | NORM | 0 | | 8 |
| 9 | 4I6L | 4 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 255 | 9 | X | - | - | - | - | - | X | X | 9 | X | X | - | 0 | 0 | STOPB | 0 | | 9 |
| 10 | 4I7U | 4 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 255 | 10 | X | - | - | - | - | - | X | X | 10 | X | X | - | 0 | 0 | STOPB | 0 | | 10 |
| 11 | 4I7L | 4 | | 15 | 2 | | 0 | 0 | 0 | 255 | 11 | X | - | - | - | - | - | X | X | 11 | X | X | - | | | STOPB | | WBR1 | 11 |
| 12 | 4I8U | 4 | | | 2 | | 0 | 0 | 0 | 255 | 12 | X | - | - | - | - | - | X | X | 12 | X | X | - | | | STOPB | | WBT1 | 12 |
| 13 | 1I9U | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 13 | X | X | - | - | - | - | X | X | 13 | X | X | - | 0 | 0 | NORM | 0 | | 13 |
| 14 | 3I9L | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 14 | X | X | - | - | - | - | X | X | 14 | X | X | - | 0 | 0 | NORM | 0 | | 14 |
| 15 | 5J1U | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 15 | X | X | - | - | - | - | X | X | 15 | X | X | - | 0 | 0 | NORM | 0 | SBL1 | 15 |
| 16 | 6J2U | 6 | | | | | 0 | 0 | 0 | 255 | 16 | - | X | - | - | - | - | X | X | 16 | X | X | - | | | NORM | | | 16 |
| 17 | 6J2L | 6 | | | 2 | | 0 | 0 | 0 | 255 | 17 | X | - | - | - | - | - | X | X | 17 | X | X | - | | | STOPB | | | 17 |
| 18 | 6J3U | 6 | | | 2 | | 0 | 0 | 0 | 255 | 18 | X | - | - | - | - | - | X | X | 18 | X | X | - | | | STOPB | | | 18 |
| 19 | 6J3L | 6 | | | 2 | | 0 | 0 | 0 | 255 | 19 | X | - | - | - | - | - | X | X | 19 | X | X | - | | | STOPB | | NBR1 | 19 |
| 20 | 6J4U | 6 | | | 2 | | 0 | 0 | 0 | 255 | 20 | X | - | - | - | - | - | X | X | 20 | X | X | - | | | STOPB | | NBT1 | 20 |
| 21 | 7J5U | 4 | | | | | 0 | 0 | 0 | 255 | 21 | X | X | - | - | - | - | X | X | 21 | X | X | - | | | NORM | | WBL1 | 21 |
| 22 | 8J6U | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 22 | - | X | - | - | - | - | X | X | 22 | X | X | - | 0 | 0 | NORM | 0 | | 22 |
| 23 | 8J6L | 8 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 255 | 23 | X | - | - | - | - | - | X | X | 23 | X | X | - | 0 | 0 | STOPB | 0 | | 23 |
| 24 | 8J7U | 8 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 255 | 24 | X | - | - | - | - | - | X | X | 24 | X | X | - | 0 | 0 | STOPB | 0 | | 24 |
| 25 | 8J7L | 8 | 0 | 15 | 2 | 0 | 0 | 0 | 0 | 255 | 25 | X | - | - | - | - | - | X | X | 25 | X | X | - | 0 | 0 | STOPB | 0 | EBR1 | 25 |
| 26 | 8J8U | 8 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 255 | 26 | X | - | - | - | - | - | X | X | 26 | X | X | - | 0 | 0 | STOPB | 0 | EBT1 | 26 |
| 27 | 5J9U | 5 | | | | | 0 | 0 | 0 | 255 | 27 | X | X | - | - | - | - | X | X | 27 | X | X | - | | | NORM | | | 27 |
| 28 | 7J9L | 4 | | | | | 0 | 0 | 0 | 255 | 28 | X | X | - | - | - | - | X | X | 28 | X | X | - | | | NORM | | | 28 |
| 29 | 2I11U | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 255 | 29 | X | - | - | - | - | - | X | X | 29 | X | X | - | 0 | 0 | STOPB | 0 | | 29 |
| 30 | 4I11L | 4 | 0 | 15 | 2 | 0 | 0 | 0 | 0 | 255 | 30 | X | - | - | - | - | - | X | X | 30 | X | X | - | 0 | 0 | STOPB | 0 | | 30 |
| 31 | 6J11U | 6 | | | 2 | | 0 | 0 | 0 | 255 | 31 | X | - | - | - | - | - | X | X | 31 | X | X | - | | | STOPB | | | 31 |
| 32 | 8J11L | 8 | | 15 | 2 | | 0 | 0 | 0 | 255 | 32 | X | - | - | - | - | - | X | X | 32 | X | X | - | | | STOPB | | | 32 |
| 33 | 1I1L | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 33 | X | X | - | - | - | - | X | X | 33 | X | X | - | 0 | 0 | NORM | 0 | | 33 |
| 34 | 2I4L | 2 | | | 2 | | 0 | 0 | 0 | 255 | 34 | X | - | - | - | - | - | X | X | 34 | X | X | - | | | STOPB | | SBT2 | 34 |
| 35 | 3I5L | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 35 | X | X | - | - | - | - | X | X | 35 | X | X | - | 0 | 0 | NORM | 0 | | 35 |
| 36 | 4I8L | 4 | | | 2 | | 0 | 0 | 0 | 255 | 36 | X | - | - | - | - | - | X | X | 36 | X | X | - | | | STOPB | | | 36 |
| 37 | 5J1L | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 37 | X | X | - | - | - | - | X | X | 37 | X | X | - | 0 | 0 | NORM | 0 | | 37 |
| 38 | 6J4L | 6 | | | 2 | | 0 | 0 | 0 | 255 | 38 | X | - | - | - | - | - | X | X | 38 | X | X | - | | | STOPB | | NBT2 | 38 |
| 39 | 7J5L | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 39 | X | X | - | - | - | - | X | X | 39 | X | X | - | 0 | 0 | NORM | 0 | | 39 |
| 40 | 8J8L | 8 | | | 2 | | 0 | 0 | 0 | 255 | 40 | X | - | - | - | - | - | X | X | 40 | X | X | - | | | STOPB | | | 40 |
| 41 | 4I10U | 2 | | | | | 0 | 0 | 0 | 255 | 41 | - | X | - | - | - | - | X | X | 41 | X | X | - | | | NORM | | | 41 |
| 42 | 4I10L | 2 | | | | | 0 | 0 | 0 | 255 | 42 | - | X | - | - | - | - | X | X | 42 | X | X | - | | | NORM | | | 42 |
| 43 | 8J10U | 6 | | | | | 0 | 0 | 0 | 255 | 43 | - | X | - | - | - | - | X | X | 43 | X | X | - | | | NORM | | | 43 |
| 44 | 8J10L | 6 | | | | | 0 | 0 | 0 | 255 | 44 | - | X | - | - | - | - | X | X | 44 | X | X | - | | | NORM | | | 44 |

**ID:** 1342 **Name:** Marks & Nielsen

**Vol/Occ Period** 0 Seconds 5 Minutes

12/4/2020

### Alt# 1 Times Table [1.1.6.1]

| Column#... -> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Assign Ø | | | | | | | | |
| Min Grn | | | | | | | | |
| Gap, Ext | | | | | | | | |
| Max 1 | | | | | | | | |
| Max 2 | | | | | | | | |
| Yel Clr | | | | | | | | |
| Red Clr | | | | | | | | |
| Walk | | | | | | | | |
| Ped Clr | | | | | | | | |

### Alt# 2 Times Table [1.1.6.1]

| Column#... -> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Assign Ø | | | | | | | | |
| Min Grn | | | | | | | | |
| Gap, Ext | | | | | | | | |
| Max 1 | | | | | | | | |
| Max 2 | | | | | | | | |
| Yel Clr | | | | | | | | |
| Red Clr | | | | | | | | |
| Walk | | | | | | | | |
| Ped Clr | | | | | | | | |

### Alt# 3 Times Table [1.1.6.1]

| Column#... -> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Assign Ø | | | | | | | | |
| Min Grn | | | | | | | | |
| Gap, Ext | | | | | | | | |
| Max 1 | | | | | | | | |
| Max 2 | | | | | | | | |
| Yel Clr | | | | | | | | |
| Red Clr | | | | | | | | |
| Walk | | | | | | | | |
| Ped Clr | | | | | | | | |

### Alt# 1 Options Table [1.1.6.2]

| Column # -> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Assign Ø | | 0 | | 0 | | 0 | | 0 |
| Lock Calls | - | - | - | - | - | - | - | - |
| Soft Recall | - | - | - | - | - | - | - | - |
| Dual Entry | - | - | - | - | - | - | - | - |
| Enabl SimGap | - | - | - | - | - | - | - | - |
| Guar Passage | - | - | - | - | - | - | - | - |
| Rest In Walk | - | - | - | - | - | - | - | - |
| Cond Service | - | - | - | - | - | - | - | - |
| Reservice | - | - | - | - | - | - | - | - |
| Non-Act 1 | - | - | - | - | - | - | - | - |
| Red Rest | - | - | - | - | - | - | - | - |
| Max2 | - | - | - | - | - | - | - | - |
| Ped Delay | - | - | - | - | - | - | - | - |
| Conflicting Ø1 | | 0 | | 0 | | 0 | | 0 |
| | | | | | | | | |

### Alt# 2 Options Table [1.1.6.2]

| Column # -> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Assign Ø | | 0 | | 0 | | 0 | | 0 |
| Lock Calls | - | - | - | - | - | - | - | - |
| Soft Recall | - | - | - | - | - | - | - | - |
| Dual Enrty | - | - | - | - | - | - | - | - |
| Enabl SimGap | - | - | - | - | - | - | - | - |
| Gaur Passage | - | - | - | - | - | - | - | - |
| Rest In Walk | - | - | - | - | - | - | - | - |
| Cond Service | - | - | - | - | - | - | - | - |
| Reservice | - | - | - | - | - | - | - | - |
| Non-Act 1 | - | - | - | - | - | - | - | - |
| Red Rest | - | - | - | - | - | - | - | - |
| Max2 | - | - | - | - | - | - | - | - |
| Ped Delay | - | - | - | - | - | - | - | - |
| Conflicting Ø1 | | 0 | | 0 | | 0 | | 0 |
| | | | | | | | | |

### Alt# 3 Options Table [1.1.6.2]

| Column # -> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Assign Ø | | 0 | | 0 | | 0 | | 0 |
| Lock Calls | - | - | - | - | - | - | - | - |
| Soft Recall | - | - | - | - | - | - | - | - |
| Dual Enrty | - | - | - | - | - | - | - | - |
| Enabl SimGap | - | - | - | - | - | - | - | - |
| Gaur Passage | - | - | - | - | - | - | - | - |
| Rest In Walk | - | - | - | - | - | - | - | - |
| Cond Service | - | - | - | - | - | - | - | - |
| Reservice | - | - | - | - | - | - | - | - |
| Non-Act 1 | - | - | - | - | - | - | - | - |
| Red Rest | - | - | - | - | - | - | - | - |
| Max2 | - | - | - | - | - | - | - | - |
| Ped Delay | - | - | - | - | - | - | - | - |
| Conflicting Ø1 | | 0 | | 0 | | 0 | | 0 |
| | | | | | | | | |

### Alt# 4 Options Table [1.1.6.2]

| Column # -> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Assign Ø | | 0 | | 0 | | 0 | | 0 |
| Lock Calls | - | - | - | - | - | - | - | - |
| Soft Recall | - | - | - | - | - | - | - | - |
| Dual Entry | - | - | - | - | - | - | - | - |
| Enabl SimGap | - | - | - | - | - | - | - | - |
| Gaur Passage | - | - | - | - | - | - | - | - |
| Rest In Walk | - | - | - | - | - | - | - | - |
| Cond Service | - | - | - | - | - | - | - | - |
| Reservice | - | - | - | - | - | - | - | - |
| Non-Act 1 | - | - | - | - | - | - | - | - |
| Red Rest | - | - | - | - | - | - | - | - |
| Max2 | - | - | - | - | - | - | - | - |
| Ped Delay | - | - | - | - | - | - | - | - |
| Conflicting Ø1 | | 0 | | 0 | | 0 | | 0 |
| | | | | | | | | |

### Alternate Tables [2.6]

| Pat# | POpt | PTime | DetGrp | Call/Inh | Olp Off 1 2 3 4 5 6 7 8 | ASC | CNA1 | Max2 | Dia |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | | 0 | Off | | DFT |
| 2 | | | | | | 0 | Off | | DFT |
| 3 | 0 | 0 | 0 | 0 | | 0 | Off | | DFT |
| 4 | | | | | | 0 | Off | | DFT |
| 5 | 0 | 0 | 0 | 0 | | 0 | Off | | DFT |
| 6 | | | | | | 0 | Off | | DFT |
| 7 | 0 | 0 | 0 | 0 | | 0 | Off | | DFT |
| 8 | | | | | | 0 | Off | | DFT |
| 9 | 0 | 0 | 0 | 0 | | 0 | Off | | DFT |
| 10 | | | | | | 0 | Off | | DFT |
| 11 | 0 | 0 | 0 | 0 | | 0 | Off | | DFT |
| 12 | | | | | | 0 | Off | | DFT |
| 13 | 0 | 0 | 0 | 0 | | 0 | Off | | DFT |
| 14 | | | | | | 0 | Off | | DFT |
| 15 | 0 | 0 | 0 | 0 | | 0 | Off | | DFT |
| 16 | | | | | | 0 | Off | | DFT |
| 17 | 0 | 0 | 0 | 0 | | 0 | Off | | DFT |
| 18 | | | | | | 0 | Off | | DFT |
| 19 | 0 | 0 | 0 | 0 | | 0 | Off | | DFT |
| 20 | | | | | | 0 | Off | | DFT |
| 21 | 0 | 0 | 0 | 0 | | 0 | Off | | DFT |
| 22 | | | | | | 0 | Off | | DFT |
| 23 | 0 | 0 | 0 | 0 | | 0 | Off | | DFT |
| 24 | | | | | | 0 | Off | | DFT |

### Time Base Parameters [4.6]

| | | |
|---|---|---|
| Daylight Savings Time | ENABLE | |
| Time Base Sync Ref | 0 | |
| GMT Offset | - | 8 |
| Daylight Savings | **Mon** | **Week** |
| Spring | 3 | 2 |
| Fall | 11 | 1 |

**NOTE:** % and MI parameters are not used and are not shown above.

City of FRESNO

**NAME:** Marks & Nielsen

12/4/2020 **ID:** 1342

| Annual Schedule [4.3] | Month | | | | | | | | | | | | Day of Week | | | | | | | Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Day Plan |
|---|---|---

| # | Alarm | Ev | Alr |
|---|---|---|---|
| 1 | Power Up Alarm. | X | X |
| 2 | Stop Timing | X | X |
| 3 | Cabinet Door Activation | - | - |
| 4 | Coordination Failure | X | X |
| 5 | External Alarm # 1 | - | - |
| 6 | External Alarm # 2 | - | - |
| 7 | External Alarm # 3 | - | - |
| 8 | External Alarm # 4 | - | - |
| 9 | Closed Loop Disabled | - | - |
| 10 | External Alarm # 5 | - | - |
| 11 | External Alarm # 6 | - | - |
| 12 | Manual Control Enable | X | X |
| 13 | Coord Free Input | - | - |
| 14 | Local Flash Input | X | X |
| 15 | CMU/MMU Flash Input | - | - |
| 16 | MMU Fault | X | X |
| 17 | Cycle Fault | X | - |
| 18 | Cycle Failure | X | - |
| 19 | Coordination Fault | X | X |
| 20 | Controller Fault | X | X |
| 25 | EEPROM CRC Fault | X | X |
| 30 | Coord Diagnostic Fault | X | X |
| 37 | Download Request | X | X |
| 38 | Pattern Change | - | - |
| 49 | Preempt 1 Input | X | X |
| 50 | Preempt 2 Input | X | X |
| 51 | Preempt 3 Input | X | X |
| 52 | Preempt 4 Input | X | X |
| 53 | Preempt 5 Input | X | X |
| 54 | Preempt 6 Input | X | X |
| 55 | Preempt 7 Input | - | - |
| 56 | Preempt 8 Input | - | - |
| 57 | Preempt 9 Input | - | - |
| 58 | Preempt 10 Input | - | - |
| 59 | EEPROM Compare Fault | X | X |
| 60 | Coordination Failure | X | X |
| 63 | TSP Active Trigger | - | - |
| 73 | Controller Access | X | X |
| 81 | FIO Changed Status | X | X |

**#1 Bus Preempt**

| | | Times | | Prior. Phases | | | |
|---|---|---|---|---|---|---|---|
| Enable | OFF | Min | 0 | 0 | 0 | 0 | 0 |
| Coor+Pre | OFF | Max | 0 | ---TSP--- | | | |
| Lock Mode | MAX | Lock | 0 | Headway | 0 | | |
| No Skip | OFF | Alt Table | 0 | GrpLock | OFF | | |
| Qjump | OFF | HoldDwell | #N/A | FreeMod | OFF | | |

**#2 Bus Preempt**

| | | Times | | Prior. Phases | | | |
|---|---|---|---|---|---|---|---|
| Enable | OFF | Min | 0 | 0 | 0 | 0 | 0 |
| Coor+Pre | OFF | Max | 0 | ---TSP--- | | | |
| Lock Mode | MAX | Lock | 0 | Headway | 0 | | |
| No Skip | OFF | Alt Table | 0 | GrpLock | OFF | | |
| Qjump | OFF | HoldDwell | #N/A | FreeMod | OFF | | |

**#3 Bus Preempt**

| | | Times | | Prior. Phases | | | |
|---|---|---|---|---|---|---|---|
| Enable | OFF | Min | 0 | 0 | 0 | 0 | 0 |
| Coor+Pre | OFF | Max | 0 | ---TSP--- | | | |
| Lock Mode | MAX | Lock | 0 | Headway | 0 | | |
| No Skip | OFF | Alt Table | 0 | GrpLock | OFF | | |
| Qjump | OFF | HoldDwell | #N/A | FreeMod | OFF | | |

**#4 Bus Preempt**

| | | Times | | Prior. Phases | | | |
|---|---|---|---|---|---|---|---|
| Enable | OFF | Min | 0 | 0 | 0 | 0 | 0 |
| Coor+Pre | OFF | Max | 0 | ---TSP--- | | | |
| Lock Mode | MAX | Lock | 0 | Headway | 0 | | |
| No Skip | OFF | Alt Table | 0 | GrpLock | OFF | | |
| Qjump | OFF | HoldDwell | #N/A | FreeMod | OFF | | |

**I/O INPUT TABLE**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 16 | 8 | 22 | 3 | 17 | 9 | 23 |
| 2 | 6 | 20 | 12 | 26 | 198 | 199 | 30 | 31 |
| 3 | 15 | 1 | 21 | 7 | 27 | 13 | 28 | 14 |
| 4 | 189 | 189 | 189 | 189 | 4 | 18 | 10 | 24 |
| 5 | 130 | 134 | 132 | 136 | 200 | 201 | 202 | 203 |
| 6 | 32 | 5 | 19 | 11 | 25 | 29 | 208 | 207 |
| 7 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 8 | 41 | 42 | 43 | 44 | 189 | 189 | 189 | 189 |

**ACTION Table [4.5]**

| Act | Pat# | A1 | A2 | A3 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | P1 | P2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 2 | 2 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 4 | 4 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 5 | 5 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 6 | 6 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 7 | 7 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 8 | 8 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 9 | 9 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 10 | 10 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 11 | 11 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 12 | 12 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 13 | 13 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 14 | 14 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 15 | 15 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 16 | 0 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 54 | 254 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 55 | 0 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |

**Alarm Parameters [1.6.7.1]**

| | |
|---|---|
| Pattern Events: | ON |
| Local Txmt Alarms: | OFF |
| Reassign User Alarm #1 In (5): | 0 |
| Reassign User Alarm #2 In (6): | 0 |
| Preempt Events: | ON |

City of FRESNO

**Date Printed**
12/4/2020

**ID:** 1342 **Name:** Marks & Nielsen

## I/O Inputs - 1.8.9.1.5

| C-1 PIN | I/O Source | Function | Input Name |
|---|---|---|---|
| 39 | I1-1 | 2 | Veh Det 2 |
| 40 | I1-2 | 16 | Veh Det 16 |
| 41 | I1-3 | 8 | Veh Det 8 |
| 42 | I1-4 | 22 | Veh Det 22 |
| 43 | I1-5 | 3 | Veh Det 3 |
| 44 | I1-6 | 17 | Veh Det 17 |
| 45 | I1-7 | 9 | Veh Det 9 |
| 46 | I1-8 | 23 | Veh Det 23 |
| 47 | I2-1 | 6 | Veh Det 6 |
| 48 | I2-2 | 20 | Veh Det 20 |
| 49 | I2-3 | 12 | Veh Det 12 |
| 50 | I2-4 | 26 | Veh Det 26 |
| 51 | I2-5 | 198 | Pre 1 In |
| 52 | I2-6 | 199 | Pre 2 In |
| 53 | I2-7 | 30 | Veh Det 30 |
| 54 | I2-8 | 31 | Veh Det 31 |
| 55 | I3-1 | 15 | Veh Det 15 |
| 56 | I3-2 | 1 | Veh Det 1 |
| 57 | I3-3 | 21 | Veh Det 21 |
| 58 | I3-4 | 7 | Veh Det 7 |
| 59 | I3-5 | 27 | Veh Det 27 |
| 60 | I3-6 | 13 | Veh Det 13 |
| 61 | I3-7 | 28 | Veh Det 28 |
| 62 | I3-8 | 14 | Veh Det 14 |
| 63 | I4-5 | 4 | Veh Det 4 |
| 64 | I4-6 | 18 | Veh Det 18 |
| 65 | I4-7 | 10 | Veh Det 10 |
| 66 | I4-8 | 24 | Veh Det 24 |
| 67 | I5-1 | 130 | Ped Call 2 |
| 68 | I5-2 | 134 | Ped Call 6 |
| 69 | I5-3 | 132 | Ped Call 4 |
| 70 | I5-4 | 136 | Ped Call 8 |
| 71 | I5-5 | 200 | Pre 3 In |
| 72 | I5-6 | 201 | Pre 4 In |
| 73 | I5-7 | 202 | Pre 5 In |
| 74 | I5-8 | 203 | Pre 6 In |
| 75 | I6-1 | 32 | Veh Det 32 |
| 76 | I6-2 | 5 | Veh Det 5 |
| 77 | I6-3 | 19 | Veh Det 19 |
| 78 | I6-4 | 11 | Veh Det 11 |
| 79 | I6-5 | 25 | Veh Det 25 |
| 80 | I6-6 | 29 | Veh Det 29 |
| 81 | I6-7 | 208 | Local Flash |
| 82 | I6-8 | 207 | Comp StopTm |

## I/O OUTPUTS - 1.8.9.2.5

| C-1 PIN | I/O Source | Function | Output Name |
|---|---|---|---|
| 1 | Logic Grd | | |
| 2 | O1-1 | 14 | Red Ch 14 |
| 3 | O1-2 | 62 | Grn Chan 14 |
| 4 | O1-3 | 4 | Red Ch 4 |
| 5 | O1-4 | 28 | Yel Chan 4 |
| 6 | O1-5 | 52 | Grn Chan 4 |
| 7 | O1-6 | 3 | Red Ch 3 |
| 8 | O1-7 | 27 | Yel Chan 3 |
| 9 | O1-8 | 51 | Grn Chan 3 |
| 10 | O2-1 | 13 | Red Ch 13 |
| 11 | O2-2 | 61 | Grn Chan 13 |
| 12 | O2-3 | 2 | Red Ch 2 |
| 13 | O2-4 | 26 | Yel Chan 2 |
| 14 | Logic Grd | | |
| 15 | O2-5 | 50 | Grn Chan 2 |
| 16 | O2-6 | 1 | Red Ch 1 |
| 17 | O2-7 | 25 | Yel Chan 1 |
| 18 | O2-8 | 49 | Grn Chan 1 |
| 19 | O3-1 | 16 | Red Ch 16 |
| 20 | O3-2 | 64 | Grn Chan 16 |
| 21 | O3-3 | 8 | Red Ch 8 |
| 22 | O3-4 | 32 | Yel Chan 8 |
| 23 | O3-5 | 56 | Grn Chan 8 |
| 24 | O3-6 | 7 | Red Ch 7 |
| 25 | O3-7 | 31 | Yel Chan 7 |
| 26 | O3-8 | 55 | Grn Chan 7 |
| 27 | O4-1 | 15 | Red Ch 15 |
| 28 | O4-2 | 63 | Grn Chan 15 |
| 29 | O4-3 | 6 | Red Ch 6 |
| 30 | O4-4 | 30 | Yel Chan 6 |
| 31 | O4-5 | 54 | Grn Chan 6 |
| 32 | O4-6 | 5 | Red Ch 5 |
| 33 | O4-7 | 29 | Yel Chan 5 |
| 34 | O4-8 | 53 | Grn Chan 5 |
| 35 | O5-1 | 37 | Yel Chan 13 |
| 36 | O5-2 | 39 | Yel Chan 15 |
| 37 | O5-3 | 38 | Yel Chan 14 |
| 38 | O5-4 | 40 | Yel Chan 16 |
| 100 | O5-5 | 42 | Yel Chan 18 |
| 101 | O5-6 | 41 | Yel Chan 17 |
| 102 | O5-7 | 115 | Not Used |
| 103 | O5-8 | 114 | Watchdog |

| C-1 PIN | I/O Source | Function | Output Name |
|---|---|---|---|
| 83 | O6-1 | 18 | Red Ch 18 |
| 84 | O6-2 | 66 | Grn Chan 18 |
| 85 | O6-3 | 12 | Red Ch 12 |
| 86 | O6-4 | 36 | Yel Chan 12 |
| 87 | O6-5 | 60 | Grn Chan 12 |
| 88 | O6-6 | 11 | Red Ch 11 |
| 89 | O6-7 | 35 | Yel Chan 11 |
| 90 | O6-8 | 59 | Grn Chan 11 |
| 91 | O7-1 | 17 | Red Ch 17 |
| 92 | Logic Grd | | |
| 93 | O7-2 | 65 | Grn Chan 17 |
| 94 | O7-3 | 10 | Red Ch 10 |
| 95 | O7-4 | 34 | Yel Chan 10 |
| 96 | O7-5 | 58 | Grn Chan 10 |
| 97 | O7-6 | 9 | Red Ch 9 |
| 98 | O7-7 | 33 | Yel Chan 9 |
| 99 | O7-8 | 57 | Grn Chan 9 |

## I/O Outputs - 1.8.9.2.5
## C-11 OUTPUTS

| | | | |
|---|---|---|---|
| 1 | O8-1 | 115 | Not Used |
| 2 | O8-2 | 115 | Not Used |
| 3 | O8-3 | 115 | Not Used |
| 4 | O8-4 | 115 | Not Used |

## I/O Inputs - 1.8.9.1.5
## C-11 INPUTS

| | | | |
|---|---|---|---|
| 15 | I7-1 | 33 | Veh Det 33 |
| 16 | I7-2 | 34 | Veh Det 34 |
| 17 | I7-3 | 35 | Veh Det 35 |
| 18 | I7-4 | 36 | Veh Det 36 |
| 19 | I7-5 | 37 | Veh Det 37 |
| 20 | I7-6 | 38 | Veh Det 38 |
| 21 | I7-7 | 39 | Veh Det 39 |
| 22 | I7-8 | 40 | Veh Det 40 |
| 23 | I8-1 | 41 | Veh Det 41 |
| 24 | I8-2 | 42 | Veh Det 42 |
| 25 | I8-3 | 43 | Veh Det 43 |
| 26 | I8-4 | 44 | Veh Det 44 |
| 27 | I8-5 | 189 | Unused |
| 28 | I8-6 | 189 | Unused |
| 29 | I8-7 | 189 | Unused |
| 30 | I8-8 | 189 | Unused |

City of FRESNO

**ID:** 1342

**NAME:** Marks & Nielsen

**Date Printed:** 12/4/2020

ID Number: 1342

LOCATION: Marks & Nielsen

# City of Fresno
# 332 Cabinet
# 44 Detector Plus Setup

## DETECTOR ASSIGNMENTS

## ISOLATORS

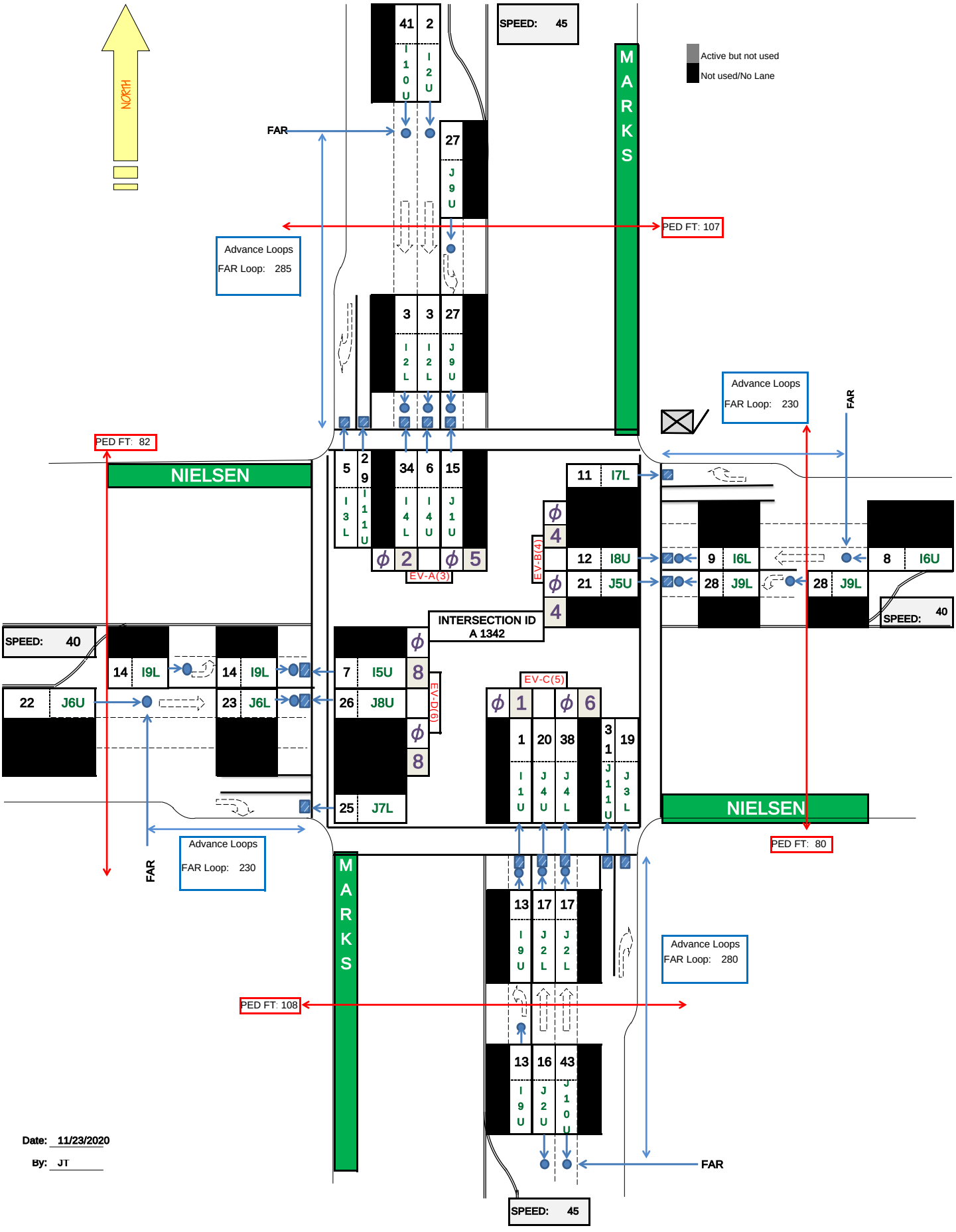
| "I" | I1 | I2 | I3 | I4 | I5 | I6 | I7 | I8 | I9 | I10 | I11 | I12 | I13 | I14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UPPER | Ph 1<br>Call&Ext<br>T2-1&2<br>C1-56<br>Det 1<br>NBL1 | Ph 2<br>Ext<br>T2-5&6<br>C1-39<br>Det 2<br>SB Far | Ph 2<br>Call&TP3<br>T2-9&10<br>C1-63<br>Det 4<br>SB Mid | Ph 2<br>Call&TP3<br>T4-1&2<br>C1-47<br>Det 6<br>SBT1 | Ph 3<br>Call&Ext<br>T4-5&6<br>C1-58<br>Det 7<br>EBL1 | Ph 4<br>Ext<br>T4-9&10<br>C1-41<br>Det 8<br>WB Far | Ph 4<br>Call&TP3<br>T6-1&2<br>C1-65<br>Det 10<br>WB Mid | Ph 4<br>Call&TP3<br>T6-5&6<br>C1-49<br>Det 12<br>WBT1 | Ph 1<br>Call&Ext<br>T6-9&10<br>C1-60<br>Det 13<br>NBLt Bk | Ph 2/4<br>Ext<br>T10-5&6<br>C11-23<br>Det 41 | Ph 2<br>Call&Ext<br>T8-1<br>C1-80<br>Det 29<br>BIKE | Ph 2<br>PPB<br>T8-4<br>C1-67 | Ph 6<br>PPB<br>T8-7<br>C1-68 | FLASH<br>SENSE<br>T8-10<br>C1-81 |
| LOWER | Ph 1<br>Call&Ext<br>T2-3&4<br>C11-15<br>Det 33<br>NBL2 | Ph 2<br>Call&TP3<br>T2-7&8<br>C1-43<br>Det 3<br>SB Bk | Ph 2<br>Call&Ext<br>T2-11&12<br>C1-76<br>Det 5<br>SBRt | Ph 2<br>Call&TP3<br>T4-3&4<br>C11-16<br>Det 34<br>SBT2 | Ph 3<br>Call&Ext<br>T4-7&8<br>C11-17<br>Det 35<br>EBL2 | Ph 4<br>Call&TP3<br>T4-11&12<br>C1-45<br>Det 9<br>WB Bk | Ph 4<br>Call&Ext<br>T6-3&4<br>C1-78<br>Det 11<br>WBRt | Ph 4<br>Call&TP3<br>T6-7&8<br>C11-18<br>Det 36<br>WBT2 | Ph 3<br>Call&Ext<br>T6-11&12<br>C1-62<br>Det 14<br>EBLt Bk | Ph 2/4<br>Ext<br>T10-7&8<br>C11-24<br>Det 42 | Ph 4<br>Call&Ext<br>T8-2<br>C1-53<br>Det 30<br>BIKE | Ph 4<br>PPB<br>T8-5<br>C1-69 | Ph 8<br>PPB<br>T8-8<br>C1-70 | STOP<br>TIMING<br>T8-11<br>C1-82 |
| "J" | J1 | J2 | J3 | J4 | J5 | J6 | J7 | J8 | J9 | J10 | J11 | J12 | J13 | J14 |
| UPPER | Ph 5<br>Call&Ext<br>T3-1&2<br>C1-55<br>Det 15<br>SBL1 | Ph 6<br>Ext<br>T3-5&6<br>C1-40<br>Det 16<br>NB Far | Ph 6<br>Call&TP3<br>T3-9&10<br>C1-64<br>Det 18<br>NB Mid | Ph 6<br>Call&TP3<br>T5-1&2<br>C1-48<br>Det 20<br>NBT1 | Ph 7<br>Call&Ext<br>T5-5&6<br>C1-57<br>Det 21<br>WBL1 | Ph 8<br>Ext<br>T5-9&10<br>C1-42<br>Det 22<br>EB Far | Ph 8<br>Call&TP3<br>T7-1&2<br>C1-66<br>Det 24<br>EB Mid | Ph 8<br>Call&TP3<br>T7-5&6<br>C1-50<br>Det 26<br>EBT1 | Ph 5<br>Call&Ext<br>T7-9&10<br>C1-59<br>Det 27<br>SBLt Bk | Ph 6/8<br>Ext<br>T10-9&10<br>C11-25<br>Det 43 | Ph 6<br>Call&Ext<br>T9-1<br>C1-54<br>Det 31<br>BIKE | EMER A<br>Ph 2 + 5<br>T9-4<br>C1-71 | EMER B<br>Ph 4 + 7<br>T9-5<br>C1-72 | RR1<br>FLASH<br>T9-10<br>C1-51 |
| LOWER | Ph 5<br>Call&Ext<br>T3-3&4<br>C11-19<br>Det 37<br>SBL2 | Ph 6<br>Call&TP3<br>T3-7&8<br>C1-44<br>Det 17<br>NB Bk | Ph 6<br>Call&Ext<br>T3-11&12<br>C1-77<br>Det 19<br>NBRt | Ph 6<br>Call&TP3<br>T5-3&4<br>C11-20<br>Det 38<br>NBT2 | Ph 7<br>Call&Ext<br>T5-7&8<br>C11-21<br>Det 39<br>WBL2 | Ph 8<br>Call&TP3<br>T5-11&12<br>C1-46<br>Det 23<br>EB Bk | Ph 8<br>Call&Ext<br>T7-3&4<br>C1-79<br>Det 25<br>EBRt | Ph 8<br>Call&TP3<br>T7-7&8<br>C11-22<br>Det 40<br>EBT2 | Ph 7<br>Call&Ext<br>T7-11&12<br>C1-61<br>Det 28<br>WBLt Bk | Ph 6/8<br>EXT<br>T10-11&12<br>C11-26<br>Det 44 | Ph 8<br>Call&Ext<br>T9-2<br>C1-75<br>Det 32<br>BIKE | EMER C<br>Ph 1 + 6<br>T9-7<br>C1-73 | EMER D<br>Ph 3 + 8<br>T9-8<br>C1-74 | RR2<br>LTD OP<br>T9-11<br>C1-52 |

COMMENTS:

## TIMING UPDATES AND MODIFICATIONS

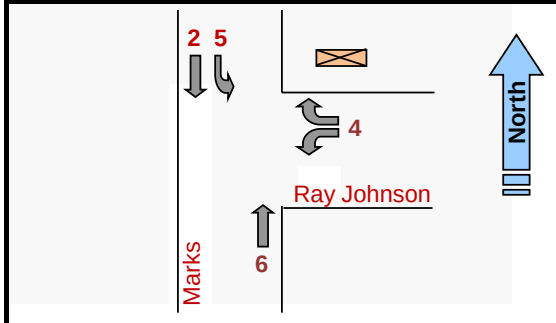
**ID:** 1342 **NAME:** Marks & Nielsen

| DATE | CHANGES MADE | ATMS or CABINET | BY |
|---|---|---|---|
| 12/4/2020 | New Intersection - Created timing calculations, FDW, & detector attributes per plan specifications. | ATMS | JT |
| | | | |
| | | | |
| | | |




Detector Layout for the intersection of: MARKS & NIELSEN

| Movement | | ST | | WT | SL | NT | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Times [1.1.1]** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Min Green | 0 | 8 | 0 | 6 | 6 | 8 | | 0 | | 0 |
| Gap, Ext | 0 | 4.3 | 0 | 5 | 2 | 4.3 | | 0 | | 0 |
| Max 1 | 0 | 30 | 0 | 30 | 20 | 30 | | 0 | | 0 |
| Max 2 | 0 | 20 | 0 | 20 | 15 | 20 | | 0 | | 0 |
| Yel Clearance | 0 | 4.3 | 0 | 3 | 3 | 4.3 | | 0 | | 0 |
| Red Clearance | 0 | 1 | 0 | 1 | 1 | 1 | | 0 | | 0 |
| Walk | 0 | | 0 | 7 | | 7 | | 0 | | 0 |
| Ped Clearance | 0 | | 0 | 12 | | 12 | | 0 | | 0 |
| Red Revert | 0 | 2 | 0 | 2 | 2 | 2 | | 0 | | 0 |
| Add Initial | 0 | | 0 | | | 0 | | 0 | | 0 |
| Max Initial | 0 | | 0 | | | 0 | | 0 | | 0 |
| Time B4 Reduct | 0 | 8 | 0 | 8 | | 8 | | 0 | | 0 |
| Cars B4 Reduct | 0 | | 0 | | | 0 | | 0 | | 0 |
| Time To Reduce | 0 | 15 | 0 | 15 | | 15 | | 0 | | 0 |
| Reduce By | 0 | 0.6 | 0 | | | 0.6 | | 0 | | 0 |
| Min Gap | 0 | 2 | 0 | 2 | 2 | 2 | | 0 | | 0 |
| DyMaxLim | 0 | | 0 | | | 0 | | 0 | | 0 |
| Max Step | 0 | | 0 | | | 0 | | 0 | | 0 |
| **Options [1.1.2]** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Enable | | X | | X | X | X | | | | |
| Min Recall | | | | | | | | | | |
| Max Recall | | | | | | | | | | |
| Ped Recall | | | | | | | | | | |
| Soft Recall | | X | | | | X | | | | |
| Lock Calls | | | | | | | | | | |
| Auto Flash Entry | | | | | | | | | | |
| Auto Flash Exit | | | | | | | | | | |
| Dual Entry | | X | | | | X | | | | |
| Enable Simul Gap | | | | | | | | | | |
| Gaurantee Passage | | | | | | | | | | |
| Rest In Walk | | | | | | | | | | |
| Conditonal Service | | | | | | | | | | |
| Non-Actuated 1 | | | | | | | | | | |
| Non-Actuated 2 | | | | | | | | | | |
| Add Init Calc | | | | | | | | | | |




**Phase Options+ [1.1.3]**

| Options+ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Reservice | | | | | | | | | | |
| PedClr Thru Yel | | | | | | | | | | |
| SkipRed-NoCall | | | | | | | | | | |
| Red Rest | | | | | | | | | | |
| Max II | | | | | | | | | | |
| *Max III | | | | | | | | | | |
| Max Inhibit | | | | | | | | | | |
| Ped Delay | | | | | | | | | | |
| Red Rest on Gap | | | | | | | | | | |
| Conflicting Phase | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grn/Ped Delay | | | | | | | | | | |
| Omit Yel, Yel P | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped Out/Olp Ped | | | | | | | | | | |
| **StartYel, Next P** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *StartupVehCall | | 2 | | 4 | 5 | 6 | | | | |
| *StartupPedCall | | | | | | | | | | |

**Phase Concurrency [1.1.4]**

| Phase | Ring | StartUp | Concurrent Phases | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | RED | 5 | 6 | 0 | 0 | | | | |
| 2 | 1 | GREEN | 5 | 6 | 0 | 0 | | | | |
| 3 | 1 | RED | 7 | 8 | 0 | 0 | | | | |
| 4 | 1 | RED | 7 | 8 | 0 | 0 | | | | |
| 5 | 2 | RED | 1 | 2 | 0 | 0 | | | | |
| 6 | 2 | GREEN | 1 | 2 | 0 | 0 | | | | |
| 7 | 2 | RED | 3 | 4 | 0 | 0 | | | | |
| 8 | 2 | RED | 3 | 4 | 0 | 0 | | | | |
| 9 | 0 | RED | 0 | 0 | 0 | 0 | | | | |
| 10 | 0 | RED | 0 | 0 | 0 | 0 | | | | |
| 11 | 0 | RED | 0 | 0 | 0 | 0 | | | | |
| 12 | 0 | RED | 0 | 0 | 0 | 0 | | | | |

**Comm Ports [6.6]**

| Channel | Port | Echo | Mode |
|---|---|---|---|
| Async 1 | SP1 | NONE | 0 |
| Async 2 | SP2 | NONE | 0 |
| Async 3 | SP8 | NONE | 0 |
| Async 4 | OFF | NONE | 0 |
| Sync 1 | SP5S | | |
| Sync 2 | OFF | | |
| TS2CVM | NONE | | |
| Opticom | NONE | | |
| GPS | NONE | | |

**Unit Params [1.2.1]**

| | | | |
|---|---|---|---|
| Screen Size | 8 | Metric | OFF |
| Startup Flash | 0 | Red Revert | 2 |
| MCE Timeout | 0 | Auto Ped Clear | OFF |
| Loc Flsh Start | RSt | Display Time | 60 |
| Yellow < 3" | OFF | Tone Disable | ON |
| Allow Skip Yel | OFF | AudioPedTime | 0 |
| Start Red Tm | 6 | Phase Mode | STD8 |
| Startup Calls | UseProg | CNA FreeTime | 0 |
| TOD Dimming | OFF | Diamond Mode | 4Ph |
| ST over Prmpt | OFF | Free Ring Seq | 1 |
| Feature Profile | 1 | IO Mode | USER |
| Mx Seek TrkTm | 0 | Max Cyc Timer | 0 |
| Mx Seek Dwell | 0 | CycFlt Actn | ALARM |
| Prmpt/Ext Coor | EXT | Clrnc Decide | OFF |
| Aux Switch | STOPTM | LPAlt Srs | 3-6 |
| *InhFYA Red St | OFF | Security Delay | 0 |
| RingA1go | 0 | | |

* - 76.12B or newer

**Times+ [1.1.7]**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Walk2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BikeClr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GrnFlash | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SfClrMn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SfClrNoFlsh | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| NoPed Reserv | | | | | | | | |

**Comm [6.2]**

| Port | Baud Rate | FCM |
|---|---|---|
| 1 | 38400 | 6 |
| 2 | 9600 | 6 |
| 3 | 9600 | 6 |
| 4 | 9600 | 6 |

**Comm [6.5]** — Host IPs

| | | | | | ATMS | | | |
|---|---|---|---|---|---|---|---|---|
| IP Address: | 10 | 50 | 20 | 32 | | | | |
| Mask: | 255 | 255 | 255 | 0 | 10 | 50 | 10 | 22 |
| Gateway: | 10 | 50 | 20 | 1 | SG | | | |
| Port #: | 5003 | | | | 0 | 0 | 0 | 0 |

City of FRESNO

**Phase Seq. (2 ring) Chart [1.2.4]**

| Seq # | Ring | Phases | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 2 | 3 | 4 | 0 | 0 |
| | 2 | 5 | 6 | 7 | 8 | 0 | 0 |
| 2 | 1 | 1 | 2 | 3 | 4 | 0 | 0 |
| | 2 | 6 | 5 | 7 | 8 | 0 | 0 |
| 3 | 1 | 2 | 1 | 3 | 4 | 0 | 0 |
| | 2 | 5 | 6 | 7 | 8 | 0 | 0 |
| 4 | 1 | 2 | 1 | 3 | 4 | 0 | 0 |
| | 2 | 6 | 5 | 7 | 8 | 0 | 0 |
| 5 | 1 | 1 | 2 | 3 | 4 | 0 | 0 |
| | 2 | 5 | 6 | 8 | 7 | 0 | 0 |
| 6 | 1 | 1 | 2 | 3 | 4 | 0 | 0 |
| | 2 | 6 | 5 | 8 | 7 | 0 | 0 |
| 7 | 1 | 2 | 1 | 3 | 4 | 0 | 0 |
| | 2 | 5 | 6 | 8 | 7 | 0 | 0 |
| 8 | 1 | 2 | 1 | 3 | 4 | 0 | 0 |
| | 2 | 6 | 5 | 8 | 7 | 0 | 0 |
| 9 | 1 | 1 | 2 | 4 | 3 | 0 | 0 |
| | 2 | 5 | 6 | 7 | 8 | 0 | 0 |
| 10 | 1 | 1 | 2 | 4 | 3 | 0 | 0 |
| | 2 | 6 | 5 | 7 | 8 | 0 | 0 |
| 11 | 1 | 2 | 1 | 4 | 3 | 0 | 0 |
| | 2 | 5 | 6 | 7 | 8 | 0 | 0 |
| 12 | 1 | 2 | 1 | 4 | 3 | 0 | 0 |
| | 2 | 6 | 5 | 7 | 8 | 0 | 0 |
| 13 | 1 | 1 | 2 | 4 | 3 | 0 | 0 |
| | 2 | 5 | 6 | 8 | 7 | 0 | 0 |
| 14 | 1 | 1 | 2 | 4 | 3 | 0 | 0 |
| | 2 | 6 | 5 | 8 | 7 | 0 | 0 |
| 15 | 1 | 2 | 1 | 4 | 3 | 0 | 0 |
| | 2 | 5 | 6 | 8 | 7 | 0 | 0 |
| 16 | 1 | 2 | 1 | 4 | 3 | 0 | 0 |
| | 2 | 6 | 5 | 8 | 7 | 0 | 0 |

**Advance Warning [1.1.9]**

| | Ph | Tm |
|---|---|---|
| Aux Out #1 | 0 | 0 |
| Aux Out #2 | 0 | 0 |

**NAME:** Marks @ Ray Johnson **ID:** 1337 **Configuration:** Standard File

V76.12/13
Updated 12/6/17

| | | | |
|---|---|---|---|
| Prepared by: | JT | Date Installed / By: | 3/1/2021 (JT) |
| Checked by: | JT | Date Superseded: | |

Date Printed: 2/23/21

## [2.1] Coord Modes+

| | |
|---|---|
| Test OpMode | 0 |
| Correction | SHRT/LNG |
| Maximum | MAX INH |
| Force Mode | FIXED |
| Flash Mode | CHANNEL |

## Coord Modes+ (Page 2)

| | |
|---|---|
| FreeonSeqCh | ON |
| Closed Loop | OFF |
| External | OFF |
| Latch Sec Frc | OFF |
| Stop-in-Walk | OFF |
| Ped Recycle | P1256_INH |
| Expand Split | OFF |
| Easy Float | OFF |
| Auto Reset | ON |
| NTCIP Yield | + 0 |

**Leave Walk**

| | |
|---|---|
| Before | TIMED |
| After | TIMED |

**Intersection Name:** Marks @ Ray Johnson

**ID:** 1337

City of FRESNO

**Date Printed:** 2/23/2021

## [2.4] Patterns

| Pat# | Cyc | Off | Split | Seq |
|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 1 |
| 2 | 0 | 0 | 2 | 1 |
| 3 | 0 | 0 | 3 | 1 |
| 4 | 0 | 0 | 4 | 1 |
| 5 | 0 | 0 | 5 | 1 |
| 6 | 0 | 0 | 6 | 1 |
| 7 | 0 | 0 | 7 | 1 |
| 8 | 0 | 0 | 8 | 1 |
| 9 | 0 | 0 | 9 | 1 |
| 10 | 0 | 0 | 10 | 1 |
| 11 | 0 | 0 | 0 | 1 |
| 12 | 0 | 0 | 0 | 1 |
| 13 | 0 | 0 | 0 | 1 |

## [2.7.1-24] Splits

| Split | [2.7] | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 2 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 3 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 4 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 5 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 6 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 7 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 8 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 9 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 10 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 11 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 12 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 13 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |

## [2.5] Transition

| Pat# | Short | Long | Dwell | No Shortway Ø | | | | E-Yld | Offset | Ret Hold | Flt | Min Veh | Min Ped | MI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 2 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 3 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 4 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 5 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 6 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 7 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 8 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | X | OFF |
| 9 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | - | OFF |
| 10 | 10 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | EndGRN | - | - | - | - | OFF |
| 11 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 12 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 13 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |

## [2.1] Coord Modes+

| | |
|---|---|
| Test OpMode | 0 |
| Correction | SHRT/LNG |
| Maximum | MAX INH |
| Force Mode | FIXED |
| Flash Mode | CHANNEL |

### Coord Modes+ (Page 2)

| | |
|---|---|
| FreeonSeqCh | ON |
| Closed Loop | OFF |
| External | OFF |
| Latch Sec Frc | OFF |
| Stop-in-Walk | OFF |
| Ped Recycle | P1256_INH |
| Expand Splt | OFF |
| Easy Float | OFF |
| Auto Reset | ON |
| NTCIP Yield | + 0 |

**Leave Walk**

| | |
|---|---|
| Before | TIMED |
| After | TIMED |

Intersection Name: Marks @ Ray Johnson

ID: 1337

City of FRESNO

Date Printed: 2/23/2021

## [2.4] Patterns

| Pat# | Cyc | Off | Split | Seq |
|---|---|---|---|---|
| 20 | 0 | 0 | 0 | 1 |
| 21 | 0 | 0 | 0 | 1 |
| 22 | 0 | 0 | 0 | 1 |
| 23 | 0 | 0 | 0 | 1 |
| 24 | 0 | 0 | 0 | 1 |
| 25 | 0 | 0 | 0 | 1 |
| 26 | 0 | 0 | 0 | 1 |
| 27 | 0 | 0 | 0 | 1 |
| 28 | 0 | 0 | 0 | 1 |
| 29 | 0 | 0 | 0 | 1 |
| 30 | 0 | 0 | 0 | 1 |
| 31 | 0 | 0 | 0 | 1 |
| 32 | 0 | 0 | 0 | 1 |

## [2.7.1-24] Splits

| Split | [2.7] | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 21 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 22 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 23 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 24 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 25 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 26 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 27 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 28 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 29 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 30 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 31 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |
| 32 | Split | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Crd-P | | | | | | | | | | |
| | Mode | NON | NON | NON | NON | NON | NON | NON | NON | NON | NON |

## [2.5] Transition

| Pat# | Short | Long | Dwell | No Shortway Ø | | | | E-Yld | Offset | Ret Hold | Flt | Min Veh | Min Ped | MI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 21 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 22 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 23 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 24 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 25 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 26 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 27 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 28 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 29 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 30 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 31 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |
| 32 | | 17 | 0 | 0 | 0 | 0 | 0 | 0 | BegGRN | - | - | - | - | OFF |

## [2.7.X.3] TSP Split Table

| Pat# | Cyc | Off | Split | Seq | SPLITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Extend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | Request | 1 | 2 | 3 | 4 | | | | | | |
| | | | | | Strategy | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimSvcDes | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimEstDep | 0 | 0 | 0 | 0 | | | | | | |
| 2 | Cyc | Off | Split | Seq | SPLITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 0 | 0 | 2 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Extend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | Request | 1 | 2 | 3 | 4 | | | | | | |
| | | | | | Strategy | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimSvcDes | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimEstDep | 0 | 0 | 0 | 0 | | | | | | |
| 3 | Cyc | Off | Split | Seq | SPLITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 0 | 0 | 3 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Extend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | Request | 1 | 2 | 3 | 4 | | | | | | |
| | | | | | Strategy | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimSvcDes | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimEstDep | 0 | 0 | 0 | 0 | | | | | | |
| 4 | Cyc | Off | Split | Seq | SPLITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 0 | 0 | 4 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Extend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | Request | 1 | 2 | 3 | 4 | | | | | | |
| | | | | | Strategy | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimSvcDes | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimEstDep | 0 | 0 | 0 | 0 | | | | | | |
| 5 | Cyc | Off | Split | Seq | SPLITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 0 | 0 | 5 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Extend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | Request | 1 | 2 | 3 | 4 | | | | | | |
| | | | | | Strategy | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimSvcDes | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimEstDep | 0 | 0 | 0 | 0 | | | | | | |
| 6 | Cyc | Off | Split | Seq | SPLITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 0 | 0 | 6 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Extend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | Request | 1 | 2 | 3 | 4 | | | | | | |
| | | | | | Strategy | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimSvcDes | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimEstDep | 0 | 0 | 0 | 0 | | | | | | |
| 9 - FREE | Cyc | Off | Split | Seq | SPLITS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 0 | 0 | 9 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | TSP - Max Extend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | Request | 1 | 2 | 3 | 4 | | | | | | |
| | | | | | Strategy | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimSvcDes | 0 | 0 | 0 | 0 | | | | | | |
| | | | | | TimEstDep | 0 | 0 | 0 | 0 | | | | | | |

## [2.9.2.(1-8)] Strategy Tables

**STRATEGY_1**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

**STRATEGY_2**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

**STRATEGY_3**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

**STRATEGY_4**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

**STRATEGY_5**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

**STRATEGY_6**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

**STRATEGY_7**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

**STRATEGY_8**

| | | | | |
|---|---|---|---|---|
| SvcPhases | 0 | 0 | 0 | 0 |
| Phs Omits | 0 | 0 | 0 | 0 |
| Ped Omits | 0 | 0 | 0 | 0 |

## Overlap 1-8 Program Parms & Parm+ [1.5.2.1] [1.5.2.8]

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| A | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |
| 2 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| B | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |
| 3 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| C | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |
| 4 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| D | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |
| 5 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| E | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |
| 6 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| F | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |
| 7 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| G | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |
| 8 | Included Ø | | | | | | | | | NORMAL | |
| | Modifier Ø | | | | | | | | | Grn | |
| | Conflict Ø | | | | | | | | | Yel | 3 |
| H | Conflict Olap | | | | | | | | | Red | 1 |
| | Conflict Ped | | | | | | | | | | |

## OLP GENERAL PARAMETERS [1.5.1]

| | |
|---|---|
| Lock Inhibit | OFF |
| Conflict Lock Enable | OFF |
| Parent P Clearance | ON |
| Xtra Incl Phases | OFF |
| InhibitLockInterval | Always |

## Channel Parameters [1.8.3]

| | |
|---|---|
| Pre Invert Rail Input | OFF |

## Preemption Options+ [3.Pre #.6]

| Pre # | Enable | Type | Output | Pattern | Skip | Co+Pre | Flash | Max/Min |
|---|---|---|---|---|---|---|---|---|
| 1 | OFF | RAIL | TS2 | | OFF | OFF | OFF | MAX |
| 2 | OFF | RAIL | TS2 | 0 | OFF | OFF | OFF | MAX |
| 3 | ON | EMERG | TS2 | | OFF | OFF | OFF | MAX |
| 4 | ON | EMERG | TS2 | 0 | OFF | OFF | OFF | MAX |
| 5 | ON | EMERG | TS2 | | OFF | OFF | OFF | MAX |
| 6 | OFF | EMERG | TS2 | 0 | OFF | OFF | OFF | MAX |

## Preemption Times [3.#.1]

| Pre # | Delay | MinDura | MaxPres | MinGrn | MinWlk | PedClr | Track Grn | Min Dwell |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | | 10 | 60 | 6 | | 10 | | 10 |
| 4 | 0 | 10 | 60 | 6 | 0 | 10 | 0 | 10 |
| 5 | | 10 | 60 | 6 | | 10 | | 10 |
| 6 | 0 | 10 | 60 | 6 | 0 | 10 | 0 | 10 |

## Preemption, Options [3.#.3]

| Pre # | Lock Input | Over-ride Auto Flash | Over-ride Higher Preempt | Flash Dwell | Link |
|---|---|---|---|---|---|
| 1 | OFF | OFF | OFF | ON | |
| 2 | OFF | OFF | OFF | OFF | 0 |
| 3 | OFF | OFF | OFF | OFF | |
| 4 | OFF | OFF | OFF | OFF | 0 |
| 5 | OFF | OFF | OFF | OFF | |
| 6 | OFF | OFF | OFF | OFF | 0 |

## Preemption, Times+ [3.#.4]

| Pre No. | Extend Dwell | Return Max | Ped Clr | Yel | Red |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | 0 | 0 | 0 | 0 | 0 |
| 3 | | 20 | 10 | 3.6 | 1 |
| 4 | 0 | 20 | 10 | 3.6 | 1 |
| 5 | | 20 | 10 | 3.6 | 1 |
| 6 | 0 | 20 | 10 | 3.6 | 1 |

Pre 1 = RR1
Pre 2 = RR2
Pre 3 = EVA
Pre 4 = EVB
Pre 5 = EVC
Pre 6 = EVD

## Prog Parms+ (MM>1>5>2>X>3)

| | | | |
|---|---|---|---|
| Leading Green | OFF | FYA MCE Disable | OFF |
| Transit Input | 0 | FYA Skip Red | OFF |
| FYA Delay Time | 0 | FYA AfterPreempt | OFF |
| Ped Call Clear | OFF | | |
| Ped ClearTime | 0 | FYA ImmedReturn | OFF |
| Green Ext Inh | 0 | 0 0 0 0 0 | |

## OverlapB+: 1-A

| | | | |
|---|---|---|---|
| Leading Green | OFF | FYA MCE Disable | OFF |
| Transit Input | 0 | FYA Skip Red | OFF |
| FYA Delay Time | 0 | FYA AfterPreempt | OFF |
| Ped Call Clear | OFF | | |
| Ped ClearTime | 0 | FYA ImmedReturn | OFF |
| Green Ext Inh | 0 | 0 0 0 0 0 | |

## OverlapB+: 2-B

| | | | |
|---|---|---|---|
| Leading Green | OFF | FYA MCE Disable | OFF |
| Transit Input | 0 | FYA Skip Red | OFF |
| FYA Delay Time | 0 | FYA AfterPreempt | OFF |
| Ped Call Clear | OFF | | |
| Ped ClearTime | 0 | FYA ImmedReturn | OFF |
| Green Ext Inh | 0 | 0 0 0 0 0 | |

## OverlapB+: 3-C

| | | | |
|---|---|---|---|
| Leading Green | OFF | FYA MCE Disable | OFF |
| Transit Input | 0 | FYA Skip Red | OFF |
| FYA Delay Time | 0 | FYA AfterPreempt | OFF |
| Ped Call Clear | OFF | | |
| Ped ClearTime | 0 | FYA ImmedReturn | OFF |
| Green Ext Inh | 0 | 0 0 0 0 0 | |

## OverlapB+: 4-D

| | | | |
|---|---|---|---|
| Leading Green | OFF | FYA MCE Disable | OFF |
| Transit Input | 0 | FYA Skip Red | OFF |
| FYA Delay Time | 0 | FYA AfterPreempt | OFF |
| Ped Call Clear | OFF | | |
| Ped ClearTime | 0 | FYA ImmedReturn | OFF |
| Green Ext Inh | 0 | 0 0 0 0 0 | |

## Phases [3.#.2] - set the Dwell Phases

| Pre # | Column | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Dwell Veh | | | | | | | | | | |
| | Peds | | | | | | | | | | |
| 2 | Dwell Veh | | | | | | | | | | |
| | Peds | | | | | | | | | | |
| 3 | Dwell Veh | 2 | 5 | | | | | | | | |
| | Peds | | | | | | | | | | |
| 4 | Dwell Veh | 4 | | | | | | | | | |
| | Peds | | | | | | | | | | |
| 5 | Dwell Veh | 6 | | | | | | | | | |
| | Peds | | | | | | | | | | |
| 6 | Dwell Veh | | | | | | | | | | |
| | Peds | | | | | | | | | | |

## Phases [3.#.2] - Trk Veh

| Pre # | Phases | | | |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |

## Exit Phases [3.#.2]

| No. | Exit Phase | | | |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | 2 | 5 | | |
| 4 | 4 | | | |
| 5 | 6 | | | |
| 6 | | | | |

## Overlaps+ [3.#.5]

| Pre # | | Preempt Overlaps + | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Track | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dwell | | | | | | | | | | |
| 2 | Track | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dwell | | | | | | | | | | |
| 3 | Track | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dwell | | | | | | | | | | |
| 4 | Track | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dwell | | | | | | | | | | |
| 5 | Track | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dwell | | | | | | | | | | |
| 6 | Track | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dwell | | | | | | | | | | |

City of FRESNO

**ID:** 1337 **Name:** Marks @ Ray Johnson **Date Printed:** 2/23/2021

# CHANNEL SETTINGS [1.8] plus UNIT PARAMETERS [1.2.1]

## CHANNEL SETTINGS [1.8.1]

| Channel | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phase / Olap # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 | 2 | 4 | 6 | 8 |
| Channel Type | VEH | VEH | VEH | VEH | VEH | VEH | VEH | VEH | OLP | OLP | OLP | OLP | PED | PED | PED | PED |
| Channel Flash | RED | RED | RED | RED | RED | RED | RED | RED | RED | RED | RED | RED | DRK | DRK | DRK | DRK |
| Flash 1-2 Hertz | | X | | X | | X | | X | | | | | | | | |
| | Page 1 | | | | | | | | Page 2 | | | | | | | |

## Chan Settings [1.8.2]

| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| VEH | VEH | VEH | VEH | VEH | VEH | VEH | VEH |
| DRK | DRK | DRK | DRK | DRK | DRK | DRK | DRK |
| | | | | | | | |

## CHANNEL PARMETERS [1.8.3]

| | |
|---|---|
| CH 17-24 Mapping: | DEFAULT |
| D-Conn Mapping: | NONE |
| Invert Rail Inputs: | OFF |
| C1-C11-ABC IO Mode: | USER |

## IO PARAMETERS [1.8.6]

| | |
|---|---|
| C1-C11-ABC IO Mode: | USER |
| D-Conn Mapping: | NONE |
| T & F BIU Mapping | DEFAULT |
| Invert Rail Inputs: | OFF |
| EVP Ped Confirm | OFF |

## CHANNELS+ [1.8.4]

| *Channel* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* | *16* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Flash Green* | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off |
| *Flash Red* | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off |
| *Flash Yellow* | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off |
| *Inh Red Fl in Preempt* | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off |
| *Olap Ovrd* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Override Type* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**ID:** 1337 **NAME:** Marks @ Ray Johnson

## I/O LOGIC [1.8.7]

**Prt Date:** 2/23/2021

| Row# | Result | | | Operand_1 | | | | | Operand_2 | | | | | Operand_3 | | | | | Timer | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I/O | Fcn | = | Inv | Src | I/0 | Fun | Logic Func | Inv | Src | I/0 | Fun | Logic Func | Inv | Src | I/0 | Fun | Logic Func | Dly | Sec |
| 1 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 2 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 3 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 4 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 5 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 6 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 7 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 8 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 9 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |
| 10 | I | 0 | = | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | - | 0 | I | OFF | ---- | DLY | 0 |

## Ped Parms (MM>5>4)

| Det# | Call | No Act | Max Pres | Err Cnt |
|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 |
| 2 | 2 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 |
| 4 | 4 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 |
| 6 | 6 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 |
| 8 | 8 | 0 | 0 | 0 |

| Veh Par 1-32 [5.1] | | | | | | | | | | | Vehicle Options 1-32 [5.2] | | | | | | | | | Parameters+ 1-32 [5.3] | | | | | | | | Info Only | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Det # | Input Slot | Call Ø | Swi Ø | Dlay | Ext | Que | No Act | Max Pres | Err Cnt | Fail Time | Det # | Call | Ext | Que | Add Init | Red Lock | Yell Lock | occ | vol | Det # | Occupancy G | Y | R | Delay 1 | 2 | Type | Src | Dir | Det # |
| 1 | 1I1U | 1 | | | | | 0 | 0 | 0 | 255 | 1 | X | X | - | - | - | - | X | X | 1 | X | X | - | | | NORM | | | 1 |
| 2 | 2I2U | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 2 | - | X | - | - | - | - | X | X | 2 | X | X | - | 0 | 0 | NORM | 0 | | 2 |
| 3 | 2I2L | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 3 | X | X | - | - | - | - | X | X | 3 | X | X | - | 0 | 0 | NORM | 0 | | 3 |
| 4 | 2I3U | 2 | 0 | 0 | 2 | 20 | 0 | 0 | 0 | 255 | 4 | X | - | X | - | - | - | X | X | 4 | X | X | - | 0 | 0 | NORM | 0 | | 4 |
| 5 | 2I3L | 2 | 0 | 0 | 2 | 10 | 0 | 0 | 0 | 255 | 5 | X | - | X | - | - | - | X | X | 5 | X | X | - | 0 | 0 | NORM | 0 | | 5 |
| 6 | 2I4U | 2 | 0 | 0 | 2 | 20 | 0 | 0 | 0 | 255 | 6 | X | - | X | - | - | - | X | X | 6 | X | X | - | 0 | 0 | NORM | 0 | SBT1 | 6 |
| 7 | 3I5U | 3 | | | | | 0 | 0 | 0 | 255 | 7 | X | X | - | - | - | - | X | X | 7 | X | X | - | | | NORM | | | 7 |
| 8 | 4I6U | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 8 | - | X | - | - | - | - | X | X | 8 | X | X | - | 0 | 0 | NORM | 0 | | 8 |
| 9 | 4I6L | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 9 | X | X | - | - | - | - | X | X | 9 | X | X | - | 0 | 0 | NORM | 0 | | 9 |
| 10 | 4I7U | 4 | 0 | 0 | 2 | 20 | 0 | 0 | 0 | 255 | 10 | X | - | X | - | - | - | X | X | 10 | X | X | - | 0 | 0 | NORM | 0 | | 10 |
| 11 | 4I7L | 4 | | 15 | 2 | 10 | 0 | 0 | 0 | 255 | 11 | X | - | X | - | - | - | X | X | 11 | X | X | - | | | NORM | | WBT2 | 11 |
| 12 | 4I8U | 4 | | | 2 | 20 | 0 | 0 | 0 | 255 | 12 | X | - | X | - | - | - | X | X | 12 | X | X | - | | | NORM | | WBT1 | 12 |
| 13 | 1I9U | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 13 | X | X | - | - | - | - | X | X | 13 | X | X | - | 0 | 0 | NORM | 0 | | 13 |
| 14 | 3I9L | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 14 | X | X | - | - | - | - | X | X | 14 | X | X | - | 0 | 0 | NORM | 0 | | 14 |
| 15 | 5J1U | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 15 | X | X | - | - | - | - | X | X | 15 | X | X | - | 0 | 0 | NORM | 0 | SBL1 | 15 |
| 16 | 6J2U | 6 | | | | | 0 | 0 | 0 | 255 | 16 | - | X | - | - | - | - | X | X | 16 | X | X | - | | | NORM | | | 16 |
| 17 | 6J2L | 6 | | | | | 0 | 0 | 0 | 255 | 17 | X | X | - | - | - | - | X | X | 17 | X | X | - | | | NORM | | | 17 |
| 18 | 6J3U | 6 | | | 2 | 20 | 0 | 0 | 0 | 255 | 18 | X | - | X | - | - | - | X | X | 18 | X | X | - | | | NORM | | | 18 |
| 19 | 6J3L | 6 | | | 2 | 10 | 0 | 0 | 0 | 255 | 19 | X | - | X | - | - | - | X | X | 19 | X | X | - | | | NORM | | | 19 |
| 20 | 6J4U | 6 | | | 2 | 20 | 0 | 0 | 0 | 255 | 20 | X | - | X | - | - | - | X | X | 20 | X | X | - | | | NORM | | NBT1 | 20 |
| 21 | 7J5U | 7 | | | | | 0 | 0 | 0 | 255 | 21 | X | X | - | - | - | - | X | X | 21 | X | X | - | | | NORM | | | 21 |
| 22 | 8J6U | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 22 | - | X | - | - | - | - | X | X | 22 | X | X | - | 0 | 0 | NORM | 0 | | 22 |
| 23 | 8J6L | 8 | 0 | 0 | 2 | 20 | 0 | 0 | 0 | 255 | 23 | X | - | X | - | - | - | X | X | 23 | X | X | - | 0 | 0 | NORM | 0 | | 23 |
| 24 | 8J7U | 8 | 0 | 0 | 2 | 20 | 0 | 0 | 0 | 255 | 24 | X | - | X | - | - | - | X | X | 24 | X | X | - | 0 | 0 | NORM | 0 | | 24 |
| 25 | 8J7L | 8 | 0 | 0 | 2 | 10 | 0 | 0 | 0 | 255 | 25 | X | - | X | - | - | - | X | X | 25 | X | X | - | 0 | 0 | NORM | 0 | | 25 |
| 26 | 8J8U | 8 | 0 | 0 | 2 | 20 | 0 | 0 | 0 | 255 | 26 | X | - | X | - | - | - | X | X | 26 | X | X | - | 0 | 0 | NORM | 0 | | 26 |
| 27 | 5J9U | 5 | | | | | 0 | 0 | 0 | 255 | 27 | X | X | - | - | - | - | X | X | 27 | X | X | - | | | NORM | | | 27 |
| 28 | 7J9L | 7 | | | | | 0 | 0 | 0 | 255 | 28 | X | X | - | - | - | - | X | X | 28 | X | X | - | | | NORM | | | 28 |
| 29 | 2I11U | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 29 | X | - | - | X | - | - | X | X | 29 | X | X | - | 0 | 0 | BIKE | 0 | | 29 |
| 30 | 4I11L | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 30 | X | - | - | X | - | - | X | X | 30 | X | X | - | 0 | 0 | BIKE | 0 | SBT3 | 30 |
| 31 | 6J11U | 6 | | | | | 0 | 0 | 0 | 255 | 31 | X | - | - | X | - | - | X | X | 31 | X | X | - | | | BIKE | | NBR1 | 31 |
| 32 | 8J11L | 8 | | | | | 0 | 0 | 0 | 255 | 32 | X | - | - | X | - | - | X | X | 32 | X | X | - | | | BIKE | | | 32 |
| 33 | 1I1L | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 33 | X | X | - | - | - | - | X | X | 33 | X | X | - | 0 | 0 | NORM | 0 | | 33 |
| 34 | 2I4L | 2 | | | 2 | 20 | 0 | 0 | 0 | 255 | 34 | X | - | X | - | - | - | X | X | 34 | X | X | - | | | NORM | | SBT2 | 34 |
| 35 | 3I5L | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 35 | X | X | - | - | - | - | X | X | 35 | X | X | - | 0 | 0 | NORM | 0 | | 35 |
| 36 | 4I8L | 4 | | | 2 | 20 | 0 | 0 | 0 | 255 | 36 | X | - | X | - | - | - | X | X | 36 | X | X | - | | | NORM | | | 36 |
| 37 | 5J1L | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 37 | X | X | - | - | - | - | X | X | 37 | X | X | - | 0 | 0 | NORM | 0 | | 37 |
| 38 | 6J4L | 6 | | | 2 | 20 | 0 | 0 | 0 | 255 | 38 | X | - | X | - | - | - | X | X | 38 | X | X | - | | | NORM | | NBT2 | 38 |
| 39 | 7J5L | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 39 | X | X | - | - | - | - | X | X | 39 | X | X | - | 0 | 0 | NORM | 0 | | 39 |
| 40 | 8J8L | 8 | | | 2 | 20 | 0 | 0 | 0 | 255 | 40 | X | - | X | - | - | - | X | X | 40 | X | X | - | | | NORM | | | 40 |
| 41 | 4I10U | 4 | | | | | 0 | 0 | 0 | 255 | 41 | - | X | - | - | - | - | X | X | 41 | X | X | - | | | NORM | | | 41 |
| 42 | 4I10L | 4 | | | | | 0 | 0 | 0 | 255 | 42 | - | X | - | - | - | - | X | X | 42 | X | X | - | | | NORM | | | 42 |
| 43 | 8J10U | 8 | | | | | 0 | 0 | 0 | 255 | 43 | - | X | - | - | - | - | X | X | 43 | X | X | - | | | NORM | | | 43 |
| 44 | 8J10L | 8 | | | | | 0 | 0 | 0 | 255 | 44 | - | X | - | - | - | - | X | X | 44 | X | X | - | | | NORM | | | 44 |

**ID:** 1337 **Name:** Marks @ Ray Johnson

**Vol/Occ Period** 0 Seconds 5 Minutes

2/23/2021

### Alt# 1 Times Table [1.1.6.1]

| Column#... -> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Assign Ø | | | | | | | | |
| Min Grn | | | | | | | | |
| Gap, Ext | | | | | | | | |
| Max 1 | | | | | | | | |
| Max 2 | | | | | | | | |
| Yel Clr | | | | | | | | |
| Red Clr | | | | | | | | |
| Walk | | | | | | | | |
| Ped Clr | | | | | | | | |

### Alt# 2 Times Table [1.1.6.1]

| Column#... -> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Assign Ø | | | | | | | | |
| Min Grn | | | | | | | | |
| Gap, Ext | | | | | | | | |
| Max 1 | | | | | | | | |
| Max 2 | | | | | | | | |
| Yel Clr | | | | | | | | |
| Red Clr | | | | | | | | |
| Walk | | | | | | | | |
| Ped Clr | | | | | | | | |

### Alt# 3 Times Table [1.1.6.1]

| Column#... -> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Assign Ø | | | | | | | | |
| Min Grn | | | | | | | | |
| Gap, Ext | | | | | | | | |
| Max 1 | | | | | | | | |
| Max 2 | | | | | | | | |
| Yel Clr | | | | | | | | |
| Red Clr | | | | | | | | |
| Walk | | | | | | | | |
| Ped Clr | | | | | | | | |

### Alt# 1 Options Table [1.1.6.2]

| Column # -> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Assign Ø | | 0 | | 0 | | 0 | | 0 |
| Lock Calls | - | - | - | - | - | - | - | - |
| Soft Recall | - | - | - | - | - | - | - | - |
| Dual Entry | - | - | - | - | - | - | - | - |
| Enabl SimGap | - | - | - | - | - | - | - | - |
| Guar Passage | - | - | - | - | - | - | - | - |
| Rest In Walk | - | - | - | - | - | - | - | - |
| Cond Service | - | - | - | - | - | - | - | - |
| Reservice | - | - | - | - | - | - | - | - |
| Non-Act 1 | - | - | - | - | - | - | - | - |
| Red Rest | - | - | - | - | - | - | - | - |
| Max2 | - | - | - | - | - | - | - | - |
| Ped Delay | - | - | - | - | - | - | - | - |
| Conflicting Ø1 | | 0 | | 0 | | 0 | | 0 |
| | | | | | | | | |

### Alt# 2 Options Table [1.1.6.2]

| Column # -> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Assign Ø | | 0 | | 0 | | 0 | | 0 |
| Lock Calls | - | - | - | - | - | - | - | - |
| Soft Recall | - | - | - | - | - | - | - | - |
| Dual Enrty | - | - | - | - | - | - | - | - |
| Enabl SimGap | - | - | - | - | - | - | - | - |
| Gaur Passage | - | - | - | - | - | - | - | - |
| Rest In Walk | - | - | - | - | - | - | - | - |
| Cond Service | - | - | - | - | - | - | - | - |
| Reservice | - | - | - | - | - | - | - | - |
| Non-Act 1 | - | - | - | - | - | - | - | - |
| Red Rest | - | - | - | - | - | - | - | - |
| Max2 | - | - | - | - | - | - | - | - |
| Ped Delay | - | - | - | - | - | - | - | - |
| Conflicting Ø1 | | 0 | | 0 | | 0 | | 0 |
| | | | | | | | | |

### Alt# 3 Options Table [1.1.6.2]

| Column # -> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Assign Ø | | 0 | | 0 | | 0 | | 0 |
| Lock Calls | - | - | - | - | - | - | - | - |
| Soft Recall | - | - | - | - | - | - | - | - |
| Dual Enrty | - | - | - | - | - | - | - | - |
| Enabl SimGap | - | - | - | - | - | - | - | - |
| Gaur Passage | - | - | - | - | - | - | - | - |
| Rest In Walk | - | - | - | - | - | - | - | - |
| Cond Service | - | - | - | - | - | - | - | - |
| Reservice | - | - | - | - | - | - | - | - |
| Non-Act 1 | - | - | - | - | - | - | - | - |
| Red Rest | - | - | - | - | - | - | - | - |
| Max2 | - | - | - | - | - | - | - | - |
| Ped Delay | - | - | - | - | - | - | - | - |
| Conflicting Ø1 | | 0 | | 0 | | 0 | | 0 |
| | | | | | | | | |

### Alt# 4 Options Table [1.1.6.2]

| Column # -> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Assign Ø | | 0 | | 0 | | 0 | | 0 |
| Lock Calls | - | - | - | - | - | - | - | - |
| Soft Recall | - | - | - | - | - | - | - | - |
| Dual Entry | - | - | - | - | - | - | - | - |
| Enabl SimGap | - | - | - | - | - | - | - | - |
| Gaur Passage | - | - | - | - | - | - | - | - |
| Rest In Walk | - | - | - | - | - | - | - | - |
| Cond Service | - | - | - | - | - | - | - | - |
| Reservice | - | - | - | - | - | - | - | - |
| Non-Act 1 | - | - | - | - | - | - | - | - |
| Red Rest | - | - | - | - | - | - | - | - |
| Max2 | - | - | - | - | - | - | - | - |
| Ped Delay | - | - | - | - | - | - | - | - |
| Conflicting Ø1 | | 0 | | 0 | | 0 | | 0 |
| | | | | | | | | |

### Alternate Tables [2.6]

| Pat# | POpt | PTime | DetGrp | Call/Inh | Olp Off 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | ASC | CNA1 | Max2 | Dia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | | | | | | | | | 0 | Off | | DFT |
| 2 | | | | | | | | | | | | | 0 | Off | | DFT |
| 3 | 0 | 0 | 0 | 0 | | | | | | | | | 0 | Off | | DFT |
| 4 | | | | | | | | | | | | | 0 | Off | | DFT |
| 5 | 0 | 0 | 0 | 0 | | | | | | | | | 0 | Off | | DFT |
| 6 | | | | | | | | | | | | | 0 | Off | | DFT |
| 7 | 0 | 0 | 0 | 0 | | | | | | | | | 0 | Off | | DFT |
| 8 | | | | | | | | | | | | | 0 | Off | | DFT |
| 9 | 0 | 0 | 0 | 0 | | | | | | | | | 0 | Off | | DFT |
| 10 | | | | | | | | | | | | | 0 | Off | | DFT |
| 11 | 0 | 0 | 0 | 0 | | | | | | | | | 0 | Off | | DFT |
| 12 | | | | | | | | | | | | | 0 | Off | | DFT |
| 13 | 0 | 0 | 0 | 0 | | | | | | | | | 0 | Off | | DFT |
| 14 | | | | | | | | | | | | | 0 | Off | | DFT |
| 15 | 0 | 0 | 0 | 0 | | | | | | | | | 0 | Off | | DFT |
| 16 | | | | | | | | | | | | | 0 | Off | | DFT |
| 17 | 0 | 0 | 0 | 0 | | | | | | | | | 0 | Off | | DFT |
| 18 | | | | | | | | | | | | | 0 | Off | | DFT |
| 19 | 0 | 0 | 0 | 0 | | | | | | | | | 0 | Off | | DFT |
| 20 | | | | | | | | | | | | | 0 | Off | | DFT |
| 21 | 0 | 0 | 0 | 0 | | | | | | | | | 0 | Off | | DFT |
| 22 | | | | | | | | | | | | | 0 | Off | | DFT |
| 23 | 0 | 0 | 0 | 0 | | | | | | | | | 0 | Off | | DFT |
| 24 | | | | | | | | | | | | | 0 | Off | | DFT |

### Time Base Parameters [4.6]

| | | |
|---|---|---|
| Daylight Savings Time | ENABLE | |
| Time Base Sync Ref | 0 | |
| GMT Offset | - | 8 |
| Daylight Savings | **Mon** | **Week** |
| Spring | 3 | 2 |
| Fall | 11 | 1 |

**NOTE:** % and MI parameters are not used and are not shown above.

City of FRESNO

**NAME:** Marks @ Ray Johnson

2/23/2021 **ID:** 1337

| Annual Schedule [4.3] | Month | | | | | | | | | | | | Day of Week | | | | | | | Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Day Plan |
|---|---|---

| # | Alarm | Ev | Alr |
|---|---|---|---|
| 1 | Power Up Alarm. | X | X |
| 2 | Stop Timing | X | X |
| 3 | Cabinet Door Activation | - | - |
| 4 | Coordination Failure | X | X |
| 5 | External Alarm # 1 | - | - |
| 6 | External Alarm # 2 | - | - |
| 7 | External Alarm # 3 | - | - |
| 8 | External Alarm # 4 | - | - |
| 9 | Closed Loop Disabled | - | - |
| 10 | External Alarm # 5 | - | - |
| 11 | External Alarm # 6 | - | - |
| 12 | Manual Control Enable | X | X |
| 13 | Coord Free Input | - | - |
| 14 | Local Flash Input | X | X |
| 15 | CMU/MMU Flash Input | - | - |
| 16 | MMU Fault | X | X |
| 17 | Cycle Fault | X | - |
| 18 | Cycle Failure | X | - |
| 19 | Coordination Fault | X | X |
| 20 | Controller Fault | X | X |
| 25 | EEPROM CRC Fault | X | X |
| 30 | Coord Diagnostic Fault | X | X |
| 37 | Download Request | X | X |
| 38 | Pattern Change | - | - |
| 49 | Preempt 1 Input | X | X |
| 50 | Preempt 2 Input | X | X |
| 51 | Preempt 3 Input | X | X |
| 52 | Preempt 4 Input | X | X |
| 53 | Preempt 5 Input | X | X |
| 54 | Preempt 6 Input | X | X |
| 55 | Preempt 7 Input | - | - |
| 56 | Preempt 8 Input | - | - |
| 57 | Preempt 9 Input | - | - |
| 58 | Preempt 10 Input | - | - |
| 59 | EEPROM Compare Fault | X | X |
| 60 | Coordination Failure | X | X |
| 63 | TSP Active Trigger | - | - |
| 73 | Controller Access | X | X |
| 81 | FIO Changed Status | X | X |

**#1 Bus Preempt**

| | | Times | | Prior. Phases | | | |
|---|---|---|---|---|---|---|---|
| Enable | OFF | Min | 0 | 0 | 0 | 0 | 0 |
| Coor+Pre | OFF | Max | 0 | ---TSP--- | | | |
| Lock Mode | MAX | Lock | 0 | Headway | 0 | | |
| No Skip | OFF | Alt Table | 0 | GrpLock | OFF | | |
| Qjump | OFF | HoldDwell | #N/A | FreeMod | OFF | | |

**#2 Bus Preempt**

| | | Times | | Prior. Phases | | | |
|---|---|---|---|---|---|---|---|
| Enable | OFF | Min | 0 | 0 | 0 | 0 | 0 |
| Coor+Pre | OFF | Max | 0 | ---TSP--- | | | |
| Lock Mode | MAX | Lock | 0 | Headway | 0 | | |
| No Skip | OFF | Alt Table | 0 | GrpLock | OFF | | |
| Qjump | OFF | HoldDwell | #N/A | FreeMod | OFF | | |

**#3 Bus Preempt**

| | | Times | | Prior. Phases | | | |
|---|---|---|---|---|---|---|---|
| Enable | OFF | Min | 0 | 0 | 0 | 0 | 0 |
| Coor+Pre | OFF | Max | 0 | ---TSP--- | | | |
| Lock Mode | MAX | Lock | 0 | Headway | 0 | | |
| No Skip | OFF | Alt Table | 0 | GrpLock | OFF | | |
| Qjump | OFF | HoldDwell | #N/A | FreeMod | OFF | | |

**#4 Bus Preempt**

| | | Times | | Prior. Phases | | | |
|---|---|---|---|---|---|---|---|
| Enable | OFF | Min | 0 | 0 | 0 | 0 | 0 |
| Coor+Pre | OFF | Max | 0 | ---TSP--- | | | |
| Lock Mode | MAX | Lock | 0 | Headway | 0 | | |
| No Skip | OFF | Alt Table | 0 | GrpLock | OFF | | |
| Qjump | OFF | HoldDwell | #N/A | FreeMod | OFF | | |

**I/O INPUT TABLE**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 16 | 8 | 22 | 3 | 17 | 9 | 23 |
| 2 | 6 | 20 | 12 | 26 | 198 | 199 | 30 | 31 |
| 3 | 15 | 1 | 21 | 7 | 27 | 13 | 28 | 14 |
| 4 | 189 | 189 | 189 | 189 | 4 | 18 | 10 | 24 |
| 5 | 130 | 134 | 132 | 136 | 200 | 201 | 202 | 203 |
| 6 | 32 | 5 | 19 | 11 | 25 | 29 | 208 | 207 |
| 7 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 8 | 41 | 42 | 43 | 44 | 189 | 189 | 189 | 189 |

**ACTION Table [4.5]**

| Act | Pat# | A1 | A2 | A3 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | P1 | P2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 2 | 2 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 4 | 4 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 5 | 5 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 6 | 6 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 7 | 7 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 8 | 8 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 9 | 9 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 10 | 10 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 11 | 11 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 12 | 12 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 13 | 13 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 14 | 14 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 15 | 15 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 16 | 0 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 54 | 254 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |
| 55 | 0 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 |

**Alarm Parameters [1.6.7.1]**

| | |
|---|---|
| Pattern Events: | ON |
| Local Txmt Alarms: | OFF |
| Reassign User Alarm #1 In (5): | 0 |
| Reassign User Alarm #2 In (6): | 0 |
| Preempt Events: | ON |

City of FRESNO

**Date Printed**
2/23/2021

**ID:** 1337 **Name:** Marks @ Ray Johnson

## I/O Inputs - 1.8.9.1.5

| C-1 PIN | I/O Source | Function | Input Name |
|---|---|---|---|
| 39 | I1-1 | 2 | Veh Det 2 |
| 40 | I1-2 | 16 | Veh Det 16 |
| 41 | I1-3 | 8 | Veh Det 8 |
| 42 | I1-4 | 22 | Veh Det 22 |
| 43 | I1-5 | 3 | Veh Det 3 |
| 44 | I1-6 | 17 | Veh Det 17 |
| 45 | I1-7 | 9 | Veh Det 9 |
| 46 | I1-8 | 23 | Veh Det 23 |
| 47 | I2-1 | 6 | Veh Det 6 |
| 48 | I2-2 | 20 | Veh Det 20 |
| 49 | I2-3 | 12 | Veh Det 12 |
| 50 | I2-4 | 26 | Veh Det 26 |
| 51 | I2-5 | 198 | Pre 1 In |
| 52 | I2-6 | 199 | Pre 2 In |
| 53 | I2-7 | 30 | Veh Det 30 |
| 54 | I2-8 | 31 | Veh Det 31 |
| 55 | I3-1 | 15 | Veh Det 15 |
| 56 | I3-2 | 1 | Veh Det 1 |
| 57 | I3-3 | 21 | Veh Det 21 |
| 58 | I3-4 | 7 | Veh Det 7 |
| 59 | I3-5 | 27 | Veh Det 27 |
| 60 | I3-6 | 13 | Veh Det 13 |
| 61 | I3-7 | 28 | Veh Det 28 |
| 62 | I3-8 | 14 | Veh Det 14 |
| 63 | I4-5 | 4 | Veh Det 4 |
| 64 | I4-6 | 18 | Veh Det 18 |
| 65 | I4-7 | 10 | Veh Det 10 |
| 66 | I4-8 | 24 | Veh Det 24 |
| 67 | I5-1 | 130 | Ped Call 2 |
| 68 | I5-2 | 134 | Ped Call 6 |
| 69 | I5-3 | 132 | Ped Call 4 |
| 70 | I5-4 | 136 | Ped Call 8 |
| 71 | I5-5 | 200 | Pre 3 In |
| 72 | I5-6 | 201 | Pre 4 In |
| 73 | I5-7 | 202 | Pre 5 In |
| 74 | I5-8 | 203 | Pre 6 In |
| 75 | I6-1 | 32 | Veh Det 32 |
| 76 | I6-2 | 5 | Veh Det 5 |
| 77 | I6-3 | 19 | Veh Det 19 |
| 78 | I6-4 | 11 | Veh Det 11 |
| 79 | I6-5 | 25 | Veh Det 25 |
| 80 | I6-6 | 29 | Veh Det 29 |
| 81 | I6-7 | 208 | Local Flash |
| 82 | I6-8 | 207 | Comp StopTm |

## I/O OUTPUTS - 1.8.9.2.5

| C-1 PIN | I/O Source | Function | Output Name |
|---|---|---|---|
| 1 | Logic Grd | | |
| 2 | O1-1 | 14 | Red Ch 14 |
| 3 | O1-2 | 62 | Grn Chan 14 |
| 4 | O1-3 | 4 | Red Ch 4 |
| 5 | O1-4 | 28 | Yel Chan 4 |
| 6 | O1-5 | 52 | Grn Chan 4 |
| 7 | O1-6 | 3 | Red Ch 3 |
| 8 | O1-7 | 27 | Yel Chan 3 |
| 9 | O1-8 | 51 | Grn Chan 3 |
| 10 | O2-1 | 13 | Red Ch 13 |
| 11 | O2-2 | 61 | Grn Chan 13 |
| 12 | O2-3 | 2 | Red Ch 2 |
| 13 | O2-4 | 26 | Yel Chan 2 |
| 14 | Logic Grd | | |
| 15 | O2-5 | 50 | Grn Chan 2 |
| 16 | O2-6 | 1 | Red Ch 1 |
| 17 | O2-7 | 25 | Yel Chan 1 |
| 18 | O2-8 | 49 | Grn Chan 1 |
| 19 | O3-1 | 16 | Red Ch 16 |
| 20 | O3-2 | 64 | Grn Chan 16 |
| 21 | O3-3 | 8 | Red Ch 8 |
| 22 | O3-4 | 32 | Yel Chan 8 |
| 23 | O3-5 | 56 | Grn Chan 8 |
| 24 | O3-6 | 7 | Red Ch 7 |
| 25 | O3-7 | 31 | Yel Chan 7 |
| 26 | O3-8 | 55 | Grn Chan 7 |
| 27 | O4-1 | 15 | Red Ch 15 |
| 28 | O4-2 | 63 | Grn Chan 15 |
| 29 | O4-3 | 6 | Red Ch 6 |
| 30 | O4-4 | 30 | Yel Chan 6 |
| 31 | O4-5 | 54 | Grn Chan 6 |
| 32 | O4-6 | 5 | Red Ch 5 |
| 33 | O4-7 | 29 | Yel Chan 5 |
| 34 | O4-8 | 53 | Grn Chan 5 |
| 35 | O5-1 | 37 | Yel Chan 13 |
| 36 | O5-2 | 39 | Yel Chan 15 |
| 37 | O5-3 | 38 | Yel Chan 14 |
| 38 | O5-4 | 40 | Yel Chan 16 |
| 100 | O5-5 | 42 | Yel Chan 18 |
| 101 | O5-6 | 41 | Yel Chan 17 |
| 102 | O5-7 | 115 | Not Used |
| 103 | O5-8 | 114 | Watchdog |

| C-1 PIN | I/O Source | Function | Output Name |
|---|---|---|---|
| 83 | O6-1 | 18 | Red Ch 18 |
| 84 | O6-2 | 66 | Grn Chan 18 |
| 85 | O6-3 | 12 | Red Ch 12 |
| 86 | O6-4 | 36 | Yel Chan 12 |
| 87 | O6-5 | 60 | Grn Chan 12 |
| 88 | O6-6 | 11 | Red Ch 11 |
| 89 | O6-7 | 35 | Yel Chan 11 |
| 90 | O6-8 | 59 | Grn Chan 11 |
| 91 | O7-1 | 17 | Red Ch 17 |
| 92 | Logic Grd | | |
| 93 | O7-2 | 65 | Grn Chan 17 |
| 94 | O7-3 | 10 | Red Ch 10 |
| 95 | O7-4 | 34 | Yel Chan 10 |
| 96 | O7-5 | 58 | Grn Chan 10 |
| 97 | O7-6 | 9 | Red Ch 9 |
| 98 | O7-7 | 33 | Yel Chan 9 |
| 99 | O7-8 | 57 | Grn Chan 9 |

## I/O Outputs - 1.8.9.2.5
## C-11 OUTPUTS

| | | | |
|---|---|---|---|
| 1 | O8-1 | 115 | Not Used |
| 2 | O8-2 | 115 | Not Used |
| 3 | O8-3 | 115 | Not Used |
| 4 | O8-4 | 115 | Not Used |

## I/O Inputs - 1.8.9.1.5
## C-11 INPUTS

| | | | |
|---|---|---|---|
| 15 | I7-1 | 33 | Veh Det 33 |
| 16 | I7-2 | 34 | Veh Det 34 |
| 17 | I7-3 | 35 | Veh Det 35 |
| 18 | I7-4 | 36 | Veh Det 36 |
| 19 | I7-5 | 37 | Veh Det 37 |
| 20 | I7-6 | 38 | Veh Det 38 |
| 21 | I7-7 | 39 | Veh Det 39 |
| 22 | I7-8 | 40 | Veh Det 40 |
| 23 | I8-1 | 41 | Veh Det 41 |
| 24 | I8-2 | 42 | Veh Det 42 |
| 25 | I8-3 | 43 | Veh Det 43 |
| 26 | I8-4 | 44 | Veh Det 44 |
| 27 | I8-5 | 189 | Unused |
| 28 | I8-6 | 189 | Unused |
| 29 | I8-7 | 189 | Unused |
| 30 | I8-8 | 189 | Unused |

City of FRESNO

**ID:** 1337

**NAME:** Marks @ Ray Johnson

**Date Printed:** 2/23/2021

ID Number: 1337

LOCATION: Marks @ Ray Johnson

# City of Fresno
# 332 Cabinet
# 44 Detector Plus Setup

## DETECTOR ASSIGNMENTS

## ISOLATORS

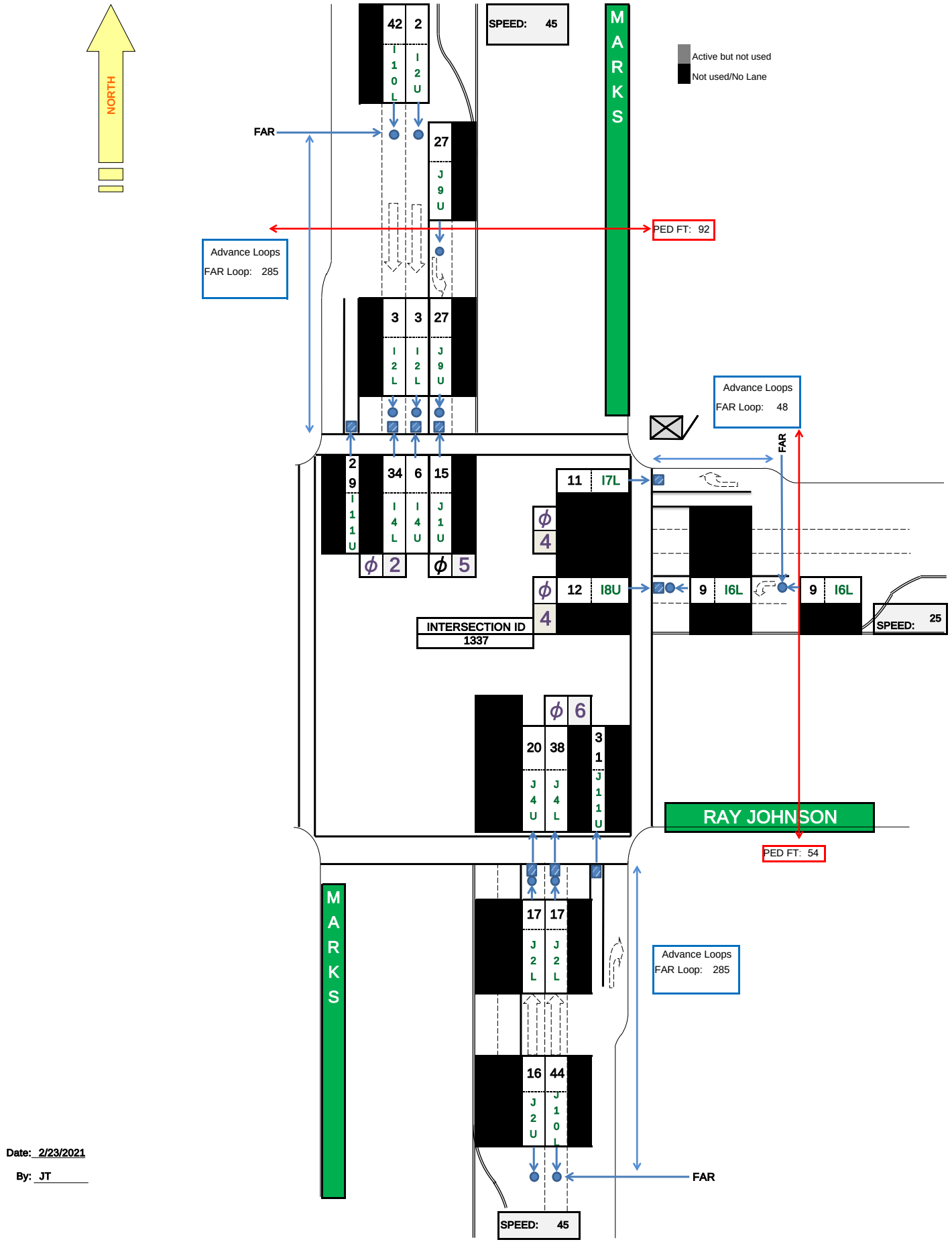
| "I" | I1 | I2 | I3 | I4 | I5 | I6 | I7 | I8 | I9 | I10 | I11 | I12 | I13 | I14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UPPER | Ph 1<br>Call&Ext<br>T2-1&2<br>C1-56<br>Det 1<br>NBL1 | Ph 2<br>Ext<br>T2-5&6<br>C1-39<br>Det 2<br>SB Far | Ph 2<br>Call&TP3<br>T2-9&10<br>C1-63<br>Det 4<br>SB Mid | Ph 2<br>Call&TP3<br>T4-1&2<br>C1-47<br>Det 6<br>SBT1 | Ph 3<br>Call&Ext<br>T4-5&6<br>C1-58<br>Det 7<br>EBL1 | Ph 4<br>Ext<br>T4-9&10<br>C1-41<br>Det 8<br>WB Far | Ph 4<br>Call&TP3<br>T6-1&2<br>C1-65<br>Det 10<br>WB Mid | Ph 4<br>Call&TP3<br>T6-5&6<br>C1-49<br>Det 12<br>WBT1 | Ph 1<br>Call&Ext<br>T6-9&10<br>C1-60<br>Det 13<br>NBLt Bk | Ph 2/4<br>Ext<br>T10-5&6<br>C11-23<br>Det 41 | Ph 2<br>Call&Ext<br>T8-1<br>C1-80<br>Det 29<br>BIKE | Ph 2<br>PPB<br>T8-4<br>C1-67 | Ph 6<br>PPB<br>T8-7<br>C1-68 | FLASH<br>SENSE<br>T8-10<br>C1-81 |
| LOWER | Ph 1<br>Call&Ext<br>T2-3&4<br>C11-15<br>Det 33<br>NBL2 | Ph 2<br>Call&TP3<br>T2-7&8<br>C1-43<br>Det 3<br>SB Bk | Ph 2<br>Call&Ext<br>T2-11&12<br>C1-76<br>Det 5<br>SBRt | Ph 2<br>Call&TP3<br>T4-3&4<br>C11-16<br>Det 34<br>SBT2 | Ph 3<br>Call&Ext<br>T4-7&8<br>C11-17<br>Det 35<br>EBL2 | Ph 4<br>Call&TP3<br>T4-11&12<br>C1-45<br>Det 9<br>WB Bk | Ph 4<br>Call&Ext<br>T6-3&4<br>C1-78<br>Det 11<br>WBRt | Ph 4<br>Call&TP3<br>T6-7&8<br>C11-18<br>Det 36<br>WBT2 | Ph 3<br>Call&Ext<br>T6-11&12<br>C1-62<br>Det 14<br>EBLt Bk | Ph 2/4<br>Ext<br>T10-7&8<br>C11-24<br>Det 42 | Ph 4<br>Call&Ext<br>T8-2<br>C1-53<br>Det 30<br>BIKE | Ph 4<br>PPB<br>T8-5<br>C1-69 | Ph 8<br>PPB<br>T8-8<br>C1-70 | STOP<br>TIMING<br>T8-11<br>C1-82 |
| "J" | J1 | J2 | J3 | J4 | J5 | J6 | J7 | J8 | J9 | J10 | J11 | J12 | J13 | J14 |
| UPPER | Ph 5<br>Call&Ext<br>T3-1&2<br>C1-55<br>Det 15<br>SBL1 | Ph 6<br>Ext<br>T3-5&6<br>C1-40<br>Det 16<br>NB Far | Ph 6<br>Call&TP3<br>T3-9&10<br>C1-64<br>Det 18<br>NB Mid | Ph 6<br>Call&TP3<br>T5-1&2<br>C1-48<br>Det 20<br>NBT1 | Ph 7<br>Call&Ext<br>T5-5&6<br>C1-57<br>Det 21<br>WBL1 | Ph 8<br>Ext<br>T5-9&10<br>C1-42<br>Det 22<br>EB Far | Ph 8<br>Call&TP3<br>T7-1&2<br>C1-66<br>Det 24<br>EB Mid | Ph 8<br>Call&TP3<br>T7-5&6<br>C1-50<br>Det 26<br>EBT1 | Ph 5<br>Call&Ext<br>T7-9&10<br>C1-59<br>Det 27<br>SBLt Bk | Ph 6/8<br>Ext<br>T10-9&10<br>C11-25<br>Det 43 | Ph 6<br>Call&Ext<br>T9-1<br>C1-54<br>Det 31<br>BIKE | EMER A<br>Ph 2 + 5<br>T9-4<br>C1-71 | EMER B<br>Ph 4 + 7<br>T9-5<br>C1-72 | RR1<br>FLASH<br>T9-10<br>C1-51 |
| LOWER | Ph 5<br>Call&Ext<br>T3-3&4<br>C11-19<br>Det 37<br>SBL2 | Ph 6<br>Call&TP3<br>T3-7&8<br>C1-44<br>Det 17<br>NB Bk | Ph 6<br>Call&Ext<br>T3-11&12<br>C1-77<br>Det 19<br>NBRt | Ph 6<br>Call&TP3<br>T5-3&4<br>C11-20<br>Det 38<br>NBT2 | Ph 7<br>Call&Ext<br>T5-7&8<br>C11-21<br>Det 39<br>WBL2 | Ph 8<br>Call&TP3<br>T5-11&12<br>C1-46<br>Det 23<br>EB Bk | Ph 8<br>Call&Ext<br>T7-3&4<br>C1-79<br>Det 25<br>EBRt | Ph 8<br>Call&TP3<br>T7-7&8<br>C11-22<br>Det 40<br>EBT2 | Ph 7<br>Call&Ext<br>T7-11&12<br>C1-61<br>Det 28<br>WBLt Bk | Ph 6/8<br>EXT<br>T10-11&12<br>C11-26<br>Det 44 | Ph 8<br>Call&Ext<br>T9-2<br>C1-75<br>Det 32<br>BIKE | EMER C<br>Ph 1 + 6<br>T9-7<br>C1-73 | EMER D<br>Ph 3 + 8<br>T9-8<br>C1-74 | RR2<br>LTD OP<br>T9-11<br>C1-52 |

**COMMENTS:**

## TIMING UPDATES AND MODIFICATIONS

**ID:** 1337 **NAME:** Marks @ Ray Johnson

| DATE | CHANGES MADE | ATMS or CABINET | BY |
|---|---|---|---|
| 2/23/2021 | Updated First Phases Ø2 & Ø6 to start green with a 6 second All Red-Start and removed Yellow Start from phases Ø4 & Ø8. | | |
| | Also updated the Advanced Schedule, Console Parameters, and turned ON the Occupancy & Volume attributes for all 44 detectors. | ATMS | JT |
| | | | |
| | | | |
| | | |




Date: 2/23/2021

By: JT

Detector Layout for the intersection of: MARKS & RAY JOHNSON

State of California
DEPARTMENT OF TRANSPORTATION

# 2070 Controller Timing Chart

Caltrans TSCP Ver 2.21

| | | | |
|---|---|---|---|
| Location: | | Designed By: | |
| System: | District: | Intalled By: | |
| Master At: | I/C: | Service Info: | |

| Timing Change: | By: | Date Start: | Date End: | Designed: | Installed: |
|---|---|---|---|---|---|
| | | | | | |

| | | FLASH |
|---|---|---|
| PHASE | 1) | [ ] |
| | 2) | [ ] |
| | 3) | [ ] |
| | 4) | [ ] |
| | 5) | [ ] |
| | 6) | [ ] |
| | 7) | [ ] |
| | 8) | [ ] |
| OVERLAP | A) | [ ] |
| | B) | [ ] |
| | C) | [ ] |
| | D) | [ ] |
| | E) | [ ] |
| | F) | [ ] |

## Intersection Layout

Comments and Notes:

RAM Checksum

| | | | |
|---|---|---|---|
| Page 2: | D7FF | Page 8: | 85AF |
| Page 3: | B2AB | Page 9: | FEC4 |
| Page 4: | F29E | Page 10: | 68FD |
| Page 5: | 191A | Page 11: | C3CB |
| Page 6: | 191A | Page 12: | D68F |
| Page 7: | 0D5D | Page 13: | 86F7 |

# CONFIGURATION PHASE FLAGS

| Phases ( 2-1-1-1 ) | |
|---|---|
| Permitted | - 2 - - - 6 - 8 |
| Restricted | - - - - - - - - |

| Phase Recalls ( 2-1-1-2 ) | |
|---|---|
| Vehicle Min | - 2 - - - 6 - - |
| vehicle Max | - - - - - - - - |
| Pedestrian | - - - - - - - - |
| Bicyle | - - - - - - - - |

| Phase Locks ( 2-1-1-3 ) | |
|---|---|
| Red | - - - - - - - - |
| Yellow | - - - - - - - - |
| Force/Max | - - - - - - - - |

| Phase Features ( 2-1-1-4 ) | |
|---|---|
| Double Entry | - - - - - - - - |
| Rest In Walk | - - - - - - - - |
| Rest In Red | - - - - - - - - |
| Walk2 | - - - - - - - - |
| Max Green 2 | - - - - - - - - |
| Max Green 3 | - - - - - - - - |

| Startup ( 2-1-1-5 ) | |
|---|---|
| First Green Phases | - 2 - - - 6 - - |
| Yellow Start Phases | - - - - - - - - |
| Vehicle Calls | - 2 - - - 6 - 8 |
| Pedestrian Calls | - 2 - - - 6 - 8 |
| Yellow Start Overlaps | - - - - - - - - |
| Startup All-Red | 6.0 |

| Call To Phase ( 2-1-2-1 ) | | Omit On Green | |
|---|---|---|---|
| 1 | - - - - - - - - | 1 | - - - - - - - - |
| 2 | - - - - - - - - | 2 | - - - - - - - - |
| 3 | - - - - - - - - | 3 | - - - - - - - - |
| 4 | - - - - - - - - | 4 | - - - - - - - - |
| 5 | - - - - - - - - | 5 | - - - - - - - - |
| 6 | - - - - - - - - | 6 | - - - - - - - - |
| 7 | - - - - - - - - | 7 | - - - - - - - - |
| 8 | - - - - - - - - | 8 | - - - - - - - - |

| Flashing Colors ( 2-1-2-2 ) | |
|---|---|
| Yellow Flash Phases | - - - - - - - - |
| Yellow Flash Overlap | - - - - - - - - |
| Flash In Red Phases | - - - - - - - - |
| Flash In Red Overlap | - - - - - - - - |

| Special Operation ( 2-1-2-3 ) | |
|---|---|
| Single Exit Phase | - - - - - - - - |
| Driveway Signal Phases | - - - - - - - - |
| Driveway Signal Overlaps | - - - - - - - - |
| Leading Ped Phases | - - - - - - - - |

| Protected Permissive ( 2-1-2-4 ) | |
|---|---|
| Protected Permissive | - - - - - - - - |

| Pedestrian ( 2-1-3 ) | |
|---|---|
| P1 | - - - - - - - - |
| P2 | - 2 - - - - - - |
| P3 | - - - - - - - - |
| P4 | - - - 4 - - - - |
| P5 | - - - - - - - - |
| P6 | - - - - - 6 - - |
| P7 | - - - - - - - - |
| P8 | - - - - - - - 8 |

| Overlap ( 2-1-4 ) | | | | |
|---|---|---|---|---|
| Overlap | Parent | Omit | No Start | Not |
| A [Arrow A] | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - |
| B [Arrow B] | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - |
| C [OL A] | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - |
| D [OL B] | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - |
| E [OL C] | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - |
| F [OL D] | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - |

[-] 332 Cabinet Overlap Assignment - For Reference Only

PAGE 2 CHECKSUM: D7FF

## PHASE TIMING

| PHASE ( 2-2 ) | -1- | -2- | -3- | -4- | -5- | -6- | -7- | -8- |
|---|---|---|---|---|---|---|---|---|
| --- Walk 1 --- | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| Flash Don't Walk | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| Minimum Green | 0 | 10 | 0 | 0 | 0 | 10 | 0 | 8 |
| Det Limit | 0 | 20 | 0 | 0 | 0 | 20 | 0 | 20 |
| Max Initial | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max Green 1 | 0 | 25 | 0 | 0 | 0 | 25 | 0 | 25 |
| Max Green 2 | 0 | 35 | 0 | 0 | 0 | 35 | 0 | 35 |
| Max Green 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Extension | 0.0 | 4.9 | 0.0 | 0.0 | 0.0 | 4.9 | 0.0 | 5.2 |
| Maximum Gap | 0.0 | 6.8 | 0.0 | 0.0 | 0.0 | 6.8 | 0.0 | 7.2 |
| Minimum Gap | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 |
| Add Per Vehicle | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Reduce Gap By | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 |
| Reduce Every | 1.0 | 0.5 | 1.0 | 1.0 | 1.0 | 0.5 | 1.0 | 0.4 |
| Yellow | 3.0 | 4.8 | 3.0 | 3.0 | 3.0 | 4.8 | 3.0 | 4.4 |
| All-Red | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 |
| Ped/Bike (2-3) | -1- | -2- | -3- | -4- | -5- | -6- | -7- | -8- |
| --- Walk 2 --- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Delay/Early Walk | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Solid Don't Walk | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bike Green | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bike All-Red | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

### OVERLAP TIMING

| Overlap ( 2-4 ) | A [Arrow A] | B [Arrow B] | C [OL A] | D [OL B] | E [OL C] | F [OL D] |
|---|---|---|---|---|---|---|
| Green | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Yellow | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Red | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| Red Revert ( 2-5 ) | |
|---|---|
| Time | 5.0 |

| Red To Se ( 2-6 ) | |
|---|---|
| Red To Sec | OFF |

| Max/Gap Out ( 2-7 ) | |
|---|---|
| Max Cnt | 0 |
| Gap Cnt | 0 |

PAGE 3 CHECKSUM: B2AB

# DETECTORS

| Detector Attributes (5-1) | | | | Slot |
|---|---|---|---|---|
| Det | Type | Phases | Lock | |
| 1 | Count+Call+Extend | 1 - - - - - - - | NO | 1I1U |
| 2 | Count+Call+Extend | 1 - - - - - - - | NO | 1I1L |
| 3 | Extend | - 2 - - - - - - | NO | 2I2U |
| 4 | Extend | - 2 - - - - - - | NO | 2I2L |
| 5 | Call+Extend | - 2 - - - - - - | NO | 2I3U |
| 6 | Limited | - 2 - - - - - - | NO | 2I3L |
| 7 | Limited | - 2 - - - - - - | NO | 2I4U |
| 8 | Limited | - 2 - - - - - - | NO | 2I4L |
| 9 | Count+Call+Extend | - - 3 - - - - - | NO | 3I5U |
| 10 | Count+Call+Extend | - - 3 - - - - - | NO | 3I5L |
| 11 | Extend | - - - 4 - - - - | NO | 4I6U |
| 12 | Extend | - - - 4 - - - - | NO | 4I6L |
| 13 | Call+Extend | - - - 4 - - - - | NO | 4I7U |
| 14 | Limited | - - - 4 - - - - | NO | 4I7L |
| 15 | Limited | - - - 4 - - - - | NO | 4I8U |
| 16 | Limited | - - - 4 - - - - | NO | 4I8L |
| 17 | Call+Extend | 1 - - - - - - - | NO | 1I9U |
| 18 | Call+Extend | - - 3 - - - - - | NO | 3I9L |
| 19 | Count+Call | - 2 - - - - - - | NO | 2I10U |
| 20 | Count+Call | - - - 4 - - - - | NO | 4I10L |
| 21 | Count+Call+Extend | - - - - 5 - - - | NO | 5J1U |
| 22 | Count+Call+Extend | - - - - 5 - - - | NO | 5J1L |
| 23 | Extend | - - - - - 6 - - | NO | 6J2U |
| 24 | Extend | - - - - - 6 - - | NO | 6J2L |
| 25 | Call+Extend | - - - - - 6 - - | NO | 6J3U |
| 26 | Limited | - - - - - 6 - - | NO | 6J3L |
| 27 | Limited | - - - - - 6 - - | NO | 6J4U |
| 28 | Limited | - - - - - 6 - - | NO | 6J4L |
| 29 | Count+Call+Extend | - - - - - - 7 - | NO | 7J5U |
| 30 | Count+Call+Extend | - - - - - - 7 - | NO | 7J5L |
| 31 | Extend | - - - - - - - 8 | NO | 8J6U |
| 32 | Extend | - - - - - - - 8 | NO | 8J6L |
| 33 | Call+Extend | - - - - - - - 8 | NO | 8J7U |
| 34 | Limited | - - - - - - - 8 | NO | 8J7L |
| 35 | Limited | - - - - - - - 8 | NO | 8J8U |
| 36 | Limited | - - - - - - - 8 | NO | 8J8L |
| 37 | Call+Extend | - - - - 5 - - - | NO | 5J9U |
| 38 | Call+Extend | - - - - - - 7 - | NO | 7J9L |
| 39 | Count+Call | - - - - - 6 - - | NO | 6J10U |
| 40 | Count+Call | - - - - - - - 8 | NO | 8J10L |
| 41 | Pedestrian | - 2 - - - - - - | NO | 2I12U |
| 42 | Pedestrian | - - - 4 - - - - | NO | 4I12L |
| 43 | Pedestrian | - - - - - 6 - - | NO | 6I13U |
| 44 | Pedestrian | - - - - - - - 8 | NO | 8I13L |

| Detector Configuration (5-2) | | | | |
|---|---|---|---|---|
| Det | Delay | Extend | Recall | Port |
| 1 | 0 | 0.0 | 10 | 3.2 |
| 2 | 0 | 0.0 | 10 | 7.2 |
| 3 | 0 | 0.0 | 10 | 1.1 |
| 4 | 0 | 0.0 | 10 | 1.5 |
| 5 | 0 | 0.0 | 10 | 4.5 |
| 6 | 0 | 0.0 | 10 | 6.2 |
| 7 | 0 | 2.0 | 10 | 2.1 |
| 8 | 0 | 2.0 | 10 | 7.4 |
| 9 | 0 | 0.0 | 10 | 3.4 |
| 10 | 0 | 0.0 | 10 | 7.6 |
| 11 | 0 | 0.0 | 10 | 1.3 |
| 12 | 0 | 0.0 | 10 | 1.7 |
| 13 | 0 | 0.0 | 10 | 4.7 |
| 14 | 15 | 0.0 | 10 | 6.4 |
| 15 | 0 | 0.0 | 10 | 2.3 |
| 16 | 0 | 0.0 | 10 | 7.8 |
| 17 | 0 | 0.0 | 10 | 3.6 |
| 18 | 0 | 0.0 | 10 | 3.8 |
| 19 | 0 | 0.0 | 10 | 4.1 |
| 20 | 0 | 0.0 | 10 | 4.2 |
| 21 | 0 | 0.0 | 10 | 3.1 |
| 22 | 0 | 0.0 | 10 | 7.1 |
| 23 | 0 | 0.0 | 10 | 1.2 |
| 24 | 0 | 0.0 | 10 | 1.6 |
| 25 | 0 | 0.0 | 10 | 4.6 |
| 26 | 0 | 0.0 | 10 | 6.3 |
| 27 | 0 | 2.0 | 10 | 2.2 |
| 28 | 0 | 2.0 | 10 | 7.3 |
| 29 | 0 | 0.0 | 10 | 3.3 |
| 30 | 0 | 0.0 | 10 | 7.5 |
| 31 | 0 | 0.0 | 10 | 1.4 |
| 32 | 2 | 0.0 | 10 | 1.8 |
| 33 | 15 | 0.0 | 10 | 4.8 |
| 34 | 15 | 0.0 | 10 | 6.5 |
| 35 | 0 | 0.0 | 10 | 2.4 |
| 36 | 0 | 0.0 | 10 | 7.7 |
| 37 | 0 | 0.0 | 10 | 3.5 |
| 38 | 0 | 0.0 | 10 | 3.7 |
| 39 | 0 | 0.0 | 10 | 4.3 |
| 40 | 0 | 0.0 | 10 | 4.4 |
| 41 | 0 | 0.0 | 10 | 5.1 |
| 42 | 0 | 0.0 | 10 | 5.3 |
| 43 | 0 | 0.0 | 10 | 5.2 |
| 44 | 0 | 0.0 | 10 | 5.4 |

| Failure Times (5-3) | Minutes |
|---|---|
| Maximum On Time | 0 |
| Fail Reset Time | 0 |

| Failure Override (5-4) | |
|---|---|
| Detectors 1-8 | - - - - - - - - |
| Detectors 9-16 | - - - - - - - - |
| Detectors 17-24 | - - - - - - - - |
| Detectors 25-32 | - - - - - - - - |
| Detectors 33-40 | - - - - - - - - |
| Detectors 41-44 | - - - - - - - - |

| System Detector Assignment (5-5) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Sys Det | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Det Num | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sys Det | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Det Num | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| CIC Operation (5-6-1) | |
|---|---|
| Enable in Plans | - - - - - - - - |

| CIC Values (5-6-2) | Volume | Occupancy | Demand |
|---|---|---|---|
| Smoothing | 0.66 | 0.66 | 0.66 |
| Multiplier | 4.0 | 0.33 | |
| Exponent | 0.50 | 1.0 | |

| Detector-to-Phase Assignment (5-6-3) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Sys Det | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Phase | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sys Det | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Phase | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Input File Port-Bit Assignments

332 Cabinet - For Reference Only

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I- | 3.2 | 1.1 | 4.5 | 2.1 | 3.4 | 1.3 | 4.7 | 2.3 | 3.6 | 4.1 | 6.6 | 5.1 | 5.2 | 6.7 |
| | 7.2 | 1.5 | 6.2 | 7.4 | 7.6 | 1.7 | 6.4 | 7.8 | 3.8 | 4.2 | 2.7 | 5.3 | 5.4 | 6.8 |
| J- | 3.1 | 1.2 | 4.6 | 2.2 | 3.3 | 1.4 | 4.8 | 2.4 | 3.5 | 4.3 | 2.8 | 5.5 | 5.6 | 2.5 |
| | 7.1 | 1.6 | 6.3 | 7.3 | 7.5 | 1.8 | 6.5 | 7.7 | 3.7 | 4.4 | 6.1 | 5.7 | 5.8 | 2.6 |


CHECKSUM: 0D5D

## TOD SCHEDULE

| Table 1 (8-2-1) | | |
|---|---|---|
| Time | Plan | OS |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |

| Table 2 (8-2-2) | | |
|---|---|---|
| Hour | Plan | OS |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |

| Table 3 (8-2-3) | | |
|---|---|---|
| Hour | Plan | OS |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |

| Table 4 (8-2-4) | | |
|---|---|---|
| Hour | Plan | OS |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |

| Table 5 (8-2-5) | | |
|---|---|---|
| Hour | Plan | OS |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |

| Table 6 (8-2-6) | | |
|---|---|---|
| Hour | Plan | OS |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |

## WEEKDAY ASSIGNMENT

| Weekday Table Assignments (8-2-7) | | | | | | |
|---|---|---|---|---|---|---|
| Mon | Tue | Wed | Thu | Fri | Sat | Sun |
| 1 | 1 | 1 | 1 | 1 | 2 | 2 |

**PAGE 8** **CHECKSUM:** 85AF

# HOLIDAY TABLES

**Floating Holiday Table (8-2-8)**

| # | Mnth | Week | DOW | Table |
|---|---|---|---|---|
| 1 | 0 | 0 | - - - - - - - - | 0 |
| 2 | 0 | 0 | - - - - - - - - | 0 |
| 3 | 0 | 0 | - - - - - - - - | 0 |
| 4 | 0 | 0 | - - - - - - - - | 0 |
| 5 | 0 | 0 | - - - - - - - - | 0 |
| 6 | 0 | 0 | - - - - - - - - | 0 |
| 7 | 0 | 0 | - - - - - - - - | 0 |
| 8 | 0 | 0 | - - - - - - - - | 0 |
| 9 | 0 | 0 | - - - - - - - - | 0 |
| 10 | 0 | 0 | - - - - - - - - | 0 |
| 11 | 0 | 0 | - - - - - - - - | 0 |
| 12 | 0 | 0 | - - - - - - - - | 0 |
| 13 | 0 | 0 | - - - - - - - - | 0 |
| 14 | 0 | 0 | - - - - - - - - | 0 |
| 15 | 0 | 0 | - - - - - - - - | 0 |
| 16 | 0 | 0 | - - - - - - - - | 0 |

**Fixed Holiday Table (8-2-9)**

| # | Mnth | Day | DOW | Table |
|---|---|---|---|---|
| 1 | 0 | 0 | - - - - - - - - | 0 |
| 2 | 0 | 0 | - - - - - - - - | 0 |
| 3 | 0 | 0 | - - - - - - - - | 0 |
| 4 | 0 | 0 | - - - - - - - - | 0 |
| 5 | 0 | 0 | - - - - - - - - | 0 |
| 6 | 0 | 0 | - - - - - - - - | 0 |
| 7 | 0 | 0 | - - - - - - - - | 0 |
| 8 | 0 | 0 | - - - - - - - - | 0 |
| 9 | 0 | 0 | - - - - - - - - | 0 |
| 10 | 0 | 0 | - - - - - - - - | 0 |
| 11 | 0 | 0 | - - - - - - - - | 0 |
| 12 | 0 | 0 | - - - - - - - - | 0 |
| 13 | 0 | 0 | - - - - - - - - | 0 |
| 14 | 0 | 0 | - - - - - - - - | 0 |
| 15 | 0 | 0 | - - - - - - - - | 0 |
| 16 | 0 | 0 | - - - - - - - - | 0 |

**Solar Clock Data (8-4)**

| | |
|---|---|
| North Latidude | 34 |
| West Longitude | 118 |
| Local Time Zone | 8 |

**Sabbatical Clock (8-5)**

| Hebrew | Ped Recall |
|---|---|
| Sabbath | - - - - - - - - |
| Holiday | - - - - - - - - |

**Daylight Saving (8-6)**

| | |
|---|---|
| Daylight Saving | YES |

**TOD Functions (8-3)**

| # | Start | End | DOW | Action | Phases |
|---|---|---|---|---|---|
| 1 | 0530 | 2100 | 1 2 3 4 5 6 7 | 27 | - 2 - - - 6 - 8 |
| 2 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 3 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 4 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 5 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 6 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 7 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 8 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 9 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 10 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 11 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 12 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 13 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 14 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 15 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 16 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |

Action Codes:
0. None
1. Permitted
2. Restricted
4. Veh Min Recall
5. Veh Max Recall
6. Ped Recall
7. Bike Recall
8. Red Lock
9. Yellow Lock
10. Force/Max Lock
11.Double Entry
12. Y-Coord C
13. Y-Coord D
14. Free
15. Flashing
16. Walk 2
17. Max Green 2
18. Max Green 3
19. Rest in Walk
20. Rest in Red
21. Free Lag Phases
22. Special Functions
23. Truck Preempt
24. Conditional Service
25. Conditional Service
26. Leading Ped
41. Protected Permissive
42. Protected Permissive

Action Code = Phases added to normal setting
---
100+Action Code = Phases removed
200+Action Code = Phases replaced

## COMMUNICATIONS

| C2 (6-1-1) | |
|---|---|
| Address | 0 |
| Protocol | AB3418 |
| Limit Access | None |
| Baud | 1200 |
| Parity | None |
| Data Bits | 8 data bits |
| Stop Bits | 1 stop bit |
| RTS On Time | 20 |
| RTS Off Time | 20 |
| Handshaking | Normal |

| C20 (6-1-2) | |
|---|---|
| Address | 0 |
| Protocol | AB3418 |
| Limit Access | None |
| Baud | 1200 |
| Parity | None |
| Data Bits | 8 data bits |
| Stop Bits | 1 stop bit |
| RTS On Time | 20 |
| RTS Off Time | 20 |
| Handshaking | Normal |

| C21 (6-1-3) | |
|---|---|
| Address | 0 |
| Protocol | AB3418 |
| Limit Access | None |
| Baud | 1200 |
| Parity | None |
| Data Bits | 8 data bits |
| Stop Bits | 1 stop bit |
| RTS On Time | 20 |
| RTS Off Time | 20 |
| Handshaking | Normal |

## SOFT LOGIC

| Soft Logic ( 6-2 ) | | | | | | | |
|---|---|---|---|---|---|---|---|
| # | Data | OP | Data | OP | Data | OP | Data |
| 1 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 2 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 3 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 4 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 5 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 6 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 7 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 8 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 9 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 10 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 11 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 12 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 13 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 14 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 15 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 16 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |

## CALLBACK NUMBERS

| Callback Numbers (6-3...3) | |
|---|---|
| Line Out | 0 |
| Local Toll | 0 |
| Long Distance | 0 |
| Delay | 10 |
| Area Code | 0 |
| Phone Number | 0 - 0 |

| | |
|---|---|
| Line Out | 0 |
| Local Toll | 0 |
| Long Distance | 0 |
| Delay | 10 |
| Area Code | 0 |
| Phone Number | 0 - 0 |

| | |
|---|---|
| Line Out | 0 |
| Local Toll | 0 |
| Long Distance | 0 |
| Delay | 10 |
| Area Code | 0 |
| Phone Number | 0 - 0 |

## NETWORK

| Network (6-4) | | | | |
|---|---|---|---|---|
| Address | 1 | | | |
| Protocol | AB3418 | | | |
| Port | 27000 | | | |
| IP Mode | Static IP | | | |
| IP Address | 10 | 53 | 52 | 17 |
| Netmask | 255 | 255 | 255 | 0 |
| Broadcast | 10 | 53 | 52 | 255 |
| Gateway | 10 | 53 | 52 | 254 |

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## RAILROAD PREEMPTION

| RR 1 | (3-1-1) | Timing | Phase Flags (3-1-2) | | | Pedestrian Flags (3-1-3) | | | Overlap Flags (3-1-4) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Delay | 0 | Grn Hold | Yel Flash | Red Flash | Walk | Flash DW | Solid DW | Grn Hold | Yel Flash | Red Flash |
| | Clear 1 | 10 | - 2 - - 5 - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - 2 - 4 - 6 - 8 | - - - - - - - | - - - - - - - | - - - - - - |
| | Clear 2 | 0 | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - | - - - - - - - | - - - - - - |
| | Clear 3 | 0 | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - | - - - - - - - | - - - - - - |
| | Hold | 0 | - - - - - - - - | - - - - - - - - | 1 2 3 4 5 6 7 8 | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - | - - - - - - - | A B C D E F |
| | Exit | 5 | | | | | | | | | |
| | Min Grn | 0 | | | | | | | | | |
| | Ped Clr | 0 | | | | | | | | | |

| Exit Parameters (3-1-5) | | | |
|---|---|---|---|
| Phase Green | Overlap Green | Vehicle Recall | Ped Call |
| - - - - - - - - | - - - - - - - | 1 2 3 4 5 6 7 8 | - 2 - 4 - 6 - 8 |

| Configuration (3-1-6) | | | |
|---|---|---|---|
| Port | Gate Port | Latching | Power-Up |
| 2.5 | 0.0 | Yes | Flashing |

| RR 2 | (3-2-1) | Timing | Phase Flags (3-2-2) | | | Pedestrian Flags (3-2-3) | | | Overlap Flags (3-2-4) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Delay | 0 | Grn Hold | Yel Flash | Red Flash | Walk | Flash DW | Solid DW | Grn Hold | Yel Flash | Red Flash |
| | Clear 1 | 10 | - - - 4 - - 7 - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - 2 - 4 - 6 - 8 | - - - - - - - | - - - - - - - | - - - - - - |
| | Clear 2 | 0 | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - | - - - - - - - | - - - - - - |
| | Clear 3 | 0 | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - | - - - - - - - | - - - - - - |
| | Hold | 0 | 1 2 3 - - 6 - - | - - - - - - - - | - - - - - - - - | - 2 - - - 6 - - | - - - - - - - - | - - - 4 - - - 8 | - - - - - - - | - - - - - - - | - - - - - - |
| | Exit | 0 | | | | | | | | | |
| | Min Grn | 0 | | | | | | | | | |
| | Ped Clr | 0 | | | | | | | | | |

| Exit Parameters (3-2-5) | | | |
|---|---|---|---|
| Exit Ph Grn | Exit Ovl Grn | Exit Veh Recall | Exit Ped Call |
| - - - - - - - - | - - - - - - - | - - - 4 - - 7 - | - - - - - - - - |

| Configuration (3-2-6) | | | |
|---|---|---|---|
| Port | Gate Port | Latching | Power-Up |
| 2.6 | 0.0 | Yes | Dark |

## EMERGENCY VEHICLE PREEMPTION

| EVA (3-A) | Preempt Timers | | | Phase Green | Overlap Grn |
|---|---|---|---|---|---|
| | Delay | Clear | Max | | |
| | 0 | 30 | 30 | - 2 - - 5 - - - | - - - - - - - |

| Port | Latching | Phase Termination |
|---|---|---|
| 5.5 | No | Advance |

| EVB (3-B) | Preempt Timers | | | Phase Green | Overlap Grn |
|---|---|---|---|---|---|
| | Delay | Clear | Max | | |
| | 0 | 30 | 30 | - - - 4 - - 7 - | - - - - - - - |

| Port | Latching | Phase | Phase Termination |
|---|---|---|---|
| 5.6 | No | | Advance |

| EVC (3-C) | Preempt Timers | | | Phase Green | Overlap Grn |
|---|---|---|---|---|---|
| | Delay | Clear | Max | | |
| | 0 | 30 | 30 | 1 - - - - 6 - - | - - - - - - - |

| Port | Latching | Phase Termination |
|---|---|---|
| 5.7 | No | Advance |

| EVD (3-D) | Preempt Timers | | | Phase Green | Overlap Grn |
|---|---|---|---|---|---|
| | Delay | Clear | Max | | |
| | 0 | 30 | 30 | - - 3 - - - - 8 | - - - - - - - |

| Port | Latching | Phase | Phase Termination |
|---|---|---|---|
| 5.8 | No | | Advance |

## INPUTS

| | | 7 Wire I/C(2-1-5-1) | | | |
|---|---|---|---|---|---|
| | | Input | Port | Input | Port |
| Enable | No | R1 | 3.8 | Free | 3.6 |
| Max ON | 0 | R2 | 3.5 | D2 | 2.8 |
| Max OFF | 0 | R3 | 3.7 | D3 | 6.1 |

| Manual Control(2-1-5-2) | |
|---|---|
| Input | Port |
| Manual Adv | 0.0 |
| Adv Enable | 0.0 |

| Battery Backup (2-1-5-5) | |
|---|---|
| Port | Operation |
| 2.7 | Flashing |

| Cabinet Staus (2-1-5-3) | |
|---|---|
| Input | Port |
| Flash Bus | 0.0 |
| Door Ajar | 0.0 |
| Flash Sense | 6.7 |
| Stop Time | 6.8 |

| Special Function (2-1-5-4) | |
|---|---|
| Input | Port |
| 1 | 0.0 |
| 2 | 0.0 |
| 3 | 0.0 |
| 4 | 0.0 |

| Y-Coordination (2-1-5-6) | |
|---|---|
| Port C | Port D |
| 6.1 | 2.8 |

## OUTPUTS

| Loadswitch Assignments ( 2-1-6 ) | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | 1 | 2 | 22 | 3 | 4 | 24 | 9 |
| B | 5 | 6 | 26 | 7 | 8 | 28 | 10 |
| X | 13 | 14 | 0 | 11 | 12 | 0 | 0 |

Loadswitch Codes:
0 Unused (no output)
1-8 Vehicle 1-8
9-14 Overlap A-F
21-28 Ped 1-8
41-47 Special Functions
41 Protected Permissive Flashing Phase 1
43 Protected Permissive Flashing Phase 3
45 Protected Permissive Flashing Phase 5
47 Protected Permissive Flashing Phase 7
51-57 Special Functions
71-72 Seven Wire I/C
+ middle output of loadswitches 3 and 6

## YELLOW YIELD COORDINATION

| | | | | | Force-Offs | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y-Coord Plans (7-C,D) | Long Grn | No Grn | Offset | Perm | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Coord | Lag | Min Recall | Restricted |
| Plan C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - 2 - - - 6 - - | - 2 - 4 - 6 - 8 | - - - - - - - - | - - - - - - - - |
| Plan D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - 2 - - - 6 - - | - 2 - 4 - 6 - 8 | - - - - - - - - | - - - - - - - - |

## TRANSIT PRIORITY

| Local Plans (3-E) 1...9 1...19 | | Early Green | Green Extend | Inhibit Cycles | Phase 1 Minimum | Phase 2 Minimum | Phase 3 Minimum | Phase 4 Minimum | Phase 5 Minimum | Phase 6 Minimum | Phase 7 Minimum | Phase 8 Minimum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plan 1 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 2 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 3 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 4 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 5 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 6 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 7 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 8 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 9 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 11 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 12 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 13 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 14 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 15 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 16 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 17 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 18 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 19 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Enable Priority in Plan (3-E-A) | | | | | |
|---|---|---|---|---|---|
| Enable in Plans | | Input | Type | Stop | Go |
| Plan 1-9 | - - - - - - - - | 0.0 | OPT | 0 | 0 |
| Plan 11-19 | - - - - - - - - | 0.0 | OPT | 0 | 0 |

| Queue Jump (3-E-B) | |
|---|---|
| Grn Hold | Hold Phase |
| 0 | - - - - - - - - |
| 0 | - - - - - - - - |

| Free Plans (3-E-E) | |
|---|---|
| Max Green | Hold Phase |
| 0 | - - - - - - - - |

| Access Utilities (9-5) | |
|---|---|
| Password | *** |
| Timeout | 30 |

## TRUCK PRIORITY

| Truck Priority (3-F) | Passage | CarryOver | Clearance | Next Priority | Phase Green | Det 2 Port | Det 3 Port | Det 4 Port | Sign Output | Slave Input | Slave Output |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.0 | 0.0 | 0.0 | 0 | - - - - - - - - | 0.0 | 0.0 | 0.0 | 0 | 0.0 | 0 |

# CONTROLLER ID

| | |
|---|---|
| Manufacturer ID | Caltrans TSCP Ver 2.21 |
| Model ID | Model 2070 |
| Protocol Revision ID | AB3418 |

State of California
DEPARTMENT OF TRANSPORTATION

# 2070 Controller Timing Chart

Caltrans TSCP Ver 2.21

| | | | |
|---|---|---|---|
| Location: | | Designed By: | |
| System: | District: | Intalled By: | |
| Master At: | I/C: | Service Info: | |

| Timing Change: | By: | Date Start: | Date End: | Designed: | Installed: |
|---|---|---|---|---|---|
| | | | | | |

| | | FLASH |
|---|---|---|
| PHASE | 1) | [ ] |
| | 2) | [ ] |
| | 3) | [ ] |
| | 4) | [ ] |
| | 5) | [ ] |
| | 6) | [ ] |
| | 7) | [ ] |
| | 8) | [ ] |
| OVERLAP | A) | [ ] |
| | B) | [ ] |
| | C) | [ ] |
| | D) | [ ] |
| | E) | [ ] |
| | F) | [ ] |

## Intersection Layout

Comments and Notes:

RAM Checksum

| | | | |
|---|---|---|---|
| Page 2: | 7579 | Page 8: | 85AF |
| Page 3: | A4C9 | Page 9: | 46BF |
| Page 4: | F29E | Page 10: | BAC2 |
| Page 5: | 191A | Page 11: | C3CB |
| Page 6: | 191A | Page 12: | EF20 |
| Page 7: | D8B5 | Page 13: | 86F7 |

# CONFIGURATION PHASE FLAGS

| Phases ( 2-1-1-1 ) | |
|---|---|
| Permitted | - 2 - 4 - 6 - - |
| Restricted | - - - - - - - - |

| Phase Recalls ( 2-1-1-2 ) | |
|---|---|
| Vehicle Min | - 2 - - - 6 - - |
| vehicle Max | - - - - - - - - |
| Pedestrian | - - - - - - - - |
| Bicyle | - - - - - - - - |

| Phase Locks ( 2-1-1-3 ) | |
|---|---|
| Red | - - - - - - - - |
| Yellow | - - - - - - - - |
| Force/Max | - - - - - - - - |

| Phase Features ( 2-1-1-4 ) | |
|---|---|
| Double Entry | - 2 - - - 6 - - |
| Rest In Walk | - - - - - - - - |
| Rest In Red | - - - - - - - - |
| Walk2 | - - - - - - - - |
| Max Green 2 | - 2 - 4 - 6 - - |
| Max Green 3 | - - - - - - - - |

| Startup ( 2-1-1-5 ) | |
|---|---|
| First Green Phases | - 2 - - - 6 - - |
| Yellow Start Phases | - - - - - - - - |
| Vehicle Calls | - 2 - 4 - 6 - - |
| Pedestrian Calls | - 2 - 4 - 6 - - |
| Yellow Start Overlaps | - - - - - - - - |
| Startup All-Red | 6.0 |

| Call To Phase ( 2-1-2-1 ) | | Omit On Green | |
|---|---|---|---|
| 1 | - - - - - - - - | 1 | - - - - - - - - |
| 2 | - - - - - - - - | 2 | - - - - - - - - |
| 3 | - - - - - - - - | 3 | - - - - - - - - |
| 4 | - - - - - - - - | 4 | - - - - - - - - |
| 5 | - - - - - - - - | 5 | - - - - - - - - |
| 6 | - - - - - - - - | 6 | - - - - - - - - |
| 7 | - - - - - - - - | 7 | - - - - - - - - |
| 8 | - - - - - - - - | 8 | - - - - - - - - |

| Flashing Colors ( 2-1-2-2 ) | |
|---|---|
| Yellow Flash Phases | - - - - - - - - |
| Yellow Flash Overlap | - - - - - - - - |
| Flash In Red Phases | - - - - - - - - |
| Flash In Red Overlap | - - - - - - - - |

| Special Operation ( 2-1-2-3 ) | |
|---|---|
| Single Exit Phase | - - - - - - - - |
| Driveway Signal Phases | - - - - - - - - |
| Driveway Signal Overlaps | - - - - - - - - |
| Leading Ped Phases | - - - - - - - - |

| Protected Permissive ( 2-1-2-4 ) | |
|---|---|
| Protected Permissive | - - - - - - - - |

| Pedestrian ( 2-1-3 ) | |
|---|---|
| P1 | - - - - - - - - |
| P2 | - - - - - - - - |
| P3 | - - - - - - - - |
| P4 | - - - - - - - - |
| P5 | - - - - - - - - |
| P6 | - - - - - 6 - - |
| P7 | - - - - - - - - |
| P8 | - - - - - - - - |

| Overlap ( 2-1-4 ) | | | | |
|---|---|---|---|---|
| Overlap | Parent | Omit | No Start | Not |
| A [Arrow A] | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - |
| B [Arrow B] | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - |
| C [OL A] | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - |
| D [OL B] | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - |
| E [OL C] | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - |
| F [OL D] | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - |

[-] 332 Cabinet Overlap Assignment - For Reference Only

**PAGE 2** **CHECKSUM:** 7579

## PHASE TIMING

| PHASE ( 2-2 ) | -1- | -2- | -3- | -4- | -5- | -6- | -7- | -8- |
|---|---|---|---|---|---|---|---|---|
| --- Walk 1 --- | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 |
| Flash Don't Walk | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 |
| Minimum Green | 0 | 10 | 0 | 8 | 0 | 10 | 0 | 0 |
| Det Limit | 0 | 20 | 0 | 20 | 0 | 20 | 0 | 0 |
| Max Initial | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max Green 1 | 0 | 25 | 0 | 20 | 0 | 25 | 0 | 0 |
| Max Green 2 | 0 | 35 | 0 | 30 | 0 | 35 | 0 | 0 |
| Max Green 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Extension | 0.0 | 4.9 | 0.0 | 4.9 | 0.0 | 4.9 | 0.0 | 0.0 |
| Maximum Gap | 0.0 | 6.8 | 0.0 | 6.8 | 0.0 | 6.8 | 0.0 | 0.0 |
| Minimum Gap | 0.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Add Per Vehicle | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Reduce Gap By | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 |
| Reduce Every | 0.0 | 0.5 | 0.0 | 0.4 | 0.0 | 0.5 | 0.0 | 0.0 |
| Yellow | 3.0 | 4.8 | 3.0 | 4.8 | 3.0 | 4.8 | 3.0 | 3.0 |
| All-Red | 0.0 | 2.1 | 0.0 | 2.0 | 0.0 | 2.1 | 0.0 | 0.0 |
| Ped/Bike (2-3) | -1- | -2- | -3- | -4- | -5- | -6- | -7- | -8- |
| --- Walk 2 --- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Delay/Early Walk | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Solid Don't Walk | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bike Green | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bike All-Red | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

### OVERLAP TIMING

| Overlap ( 2-4 ) | A [Arrow A] | B [Arrow B] | C [OL A] | D [OL B] | E [OL C] | F [OL D] |
|---|---|---|---|---|---|---|
| Green | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Yellow | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Red | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| Red Revert ( 2-5 ) | |
|---|---|
| Time | 5.0 |

| Red To Se ( 2-6 ) | |
|---|---|
| Red To Sec | OFF |

| Max/Gap Out ( 2-7 ) | |
|---|---|
| Max Cnt | 3 |
| Gap Cnt | 4 |

# DETECTORS

| Detector Attributes (5-1) | | | | Slot | Detector Configuration (5-2) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Det | Type | Phases | Lock | | Det | Delay | Extend | Recall | Port |
| 1 | Count+Call+Extend | 1 - - - - - - - | NO | 1I1U | 1 | 0 | 0.0 | 10 | 3.2 |
| 2 | Count+Call+Extend | 1 - - - - - - - | NO | 1I1L | 2 | 0 | 0.0 | 10 | 7.2 |
| 3 | Extend | - 2 - - - - - - | NO | 2I2U | 3 | 0 | 0.0 | 10 | 1.1 |
| 4 | Extend | - 2 - - - - - - | NO | 2I2L | 4 | 0 | 0.0 | 10 | 1.5 |
| 5 | Call+Extend | - 2 - - - - - - | NO | 2I3U | 5 | 0 | 0.0 | 10 | 4.5 |
| 6 | Limited | - 2 - - - - - - | NO | 2I3L | 6 | 0 | 0.0 | 10 | 6.2 |
| 7 | Limited | - 2 - - - - - - | NO | 2I4U | 7 | 0 | 2.0 | 10 | 2.1 |
| 8 | Limited | - 2 - - - - - - | NO | 2I4L | 8 | 0 | 2.0 | 10 | 7.4 |
| 9 | Count+Call+Extend | - - 3 - - - - - | NO | 3I5U | 9 | 0 | 0.0 | 10 | 3.4 |
| 10 | Count+Call+Extend | - - 3 - - - - - | NO | 3I5L | 10 | 0 | 0.0 | 10 | 7.6 |
| 11 | Count+Call+Extend | - - - 4 - - - - | NO | 4I6U | 11 | 2 | 0.0 | 10 | 1.3 |
| 12 | Count+Call+Extend | - - - 4 - - - - | NO | 4I6L | 12 | 2 | 0.0 | 10 | 1.7 |
| 13 | Call+Extend | - - - 4 - - - - | NO | 4I7U | 13 | 0 | 0.0 | 10 | 4.7 |
| 14 | Limited | - - - 4 - - - - | NO | 4I7L | 14 | 15 | 2.0 | 10 | 6.4 |
| 15 | Limited | - - - 4 - - - - | NO | 4I8U | 15 | 0 | 2.0 | 10 | 2.3 |
| 16 | Limited | - - - 4 - - - - | NO | 4I8L | 16 | 0 | 0.0 | 10 | 7.8 |
| 17 | Call+Extend | 1 - - - - - - - | NO | 1I9U | 17 | 0 | 0.0 | 10 | 3.6 |
| 18 | Call+Extend | - - 3 - - - - - | NO | 3I9L | 18 | 0 | 0.0 | 10 | 3.8 |
| 19 | Count+Call | - 2 - - - - - - | NO | 2I10U | 19 | 0 | 0.0 | 10 | 4.1 |
| 20 | Count+Call | - - - 4 - - - - | NO | 4I10L | 20 | 0 | 0.0 | 10 | 4.2 |
| 21 | Count+Call+Extend | - - - - 5 - - - | NO | 5J1U | 21 | 0 | 0.0 | 10 | 3.1 |
| 22 | Count+Call+Extend | - - - - 5 - - - | NO | 5J1L | 22 | 0 | 0.0 | 10 | 7.1 |
| 23 | Extend | - - - - - 6 - - | NO | 6J2U | 23 | 0 | 0.0 | 10 | 1.2 |
| 24 | Extend | - - - - - 6 - - | NO | 6J2L | 24 | 0 | 0.0 | 10 | 1.6 |
| 25 | Call+Extend | - - - - - 6 - - | NO | 6J3U | 25 | 0 | 0.0 | 10 | 4.6 |
| 26 | Limited | - - - - - 6 - - | NO | 6J3L | 26 | 0 | 0.0 | 10 | 6.3 |
| 27 | Limited | - - - - - 6 - - | NO | 6J4U | 27 | 0 | 0.0 | 10 | 2.2 |
| 28 | Limited | - - - - - 6 - - | NO | 6J4L | 28 | 0 | 0.0 | 10 | 7.3 |
| 29 | Count+Call+Extend | - - - - - - 7 - | NO | 7J5U | 29 | 0 | 0.0 | 10 | 3.3 |
| 30 | Count+Call+Extend | - - - - - - 7 - | NO | 7J5L | 30 | 0 | 0.0 | 10 | 7.5 |
| 31 | Extend | - - - - - - - 8 | NO | 8J6U | 31 | 0 | 2.0 | 10 | 1.4 |
| 32 | Extend | - - - - - - - 8 | NO | 8J6L | 32 | 0 | 2.0 | 10 | 1.8 |
| 33 | Call+Extend | - - - - - - - 8 | NO | 8J7U | 33 | 0 | 0.0 | 10 | 4.8 |
| 34 | Limited | - - - - - - - 8 | NO | 8J7L | 34 | 0 | 0.0 | 10 | 6.5 |
| 35 | Limited | - - - - - - - 8 | NO | 8J8U | 35 | 0 | 0.0 | 10 | 2.4 |
| 36 | Limited | - - - - - - - 8 | NO | 8J8L | 36 | 0 | 0.0 | 10 | 7.7 |
| 37 | Call+Extend | - - - - 5 - - - | NO | 5J9U | 37 | 0 | 0.0 | 10 | 3.5 |
| 38 | Call+Extend | - - - - - - 7 - | NO | 7J9L | 38 | 0 | 0.0 | 10 | 3.7 |
| 39 | Count+Call | - - - - - 6 - - | NO | 6J10U | 39 | 0 | 0.0 | 10 | 4.3 |
| 40 | Count+Call | - - - - - - - 8 | NO | 8J10L | 40 | 0 | 0.0 | 10 | 4.4 |
| 41 | Pedestrian | - 2 - - - - - - | NO | 2I12U | 41 | 0 | 0.0 | 10 | 5.1 |
| 42 | Pedestrian | - - - 4 - - - - | NO | 4I12L | 42 | 0 | 0.0 | 10 | 5.3 |
| 43 | Pedestrian | - - - - - 6 - - | NO | 6I13U | 43 | 0 | 0.0 | 10 | 5.2 |
| 44 | Pedestrian | - - - - - - - 8 | NO | 8I13L | 44 | 0 | 0.0 | 10 | 5.4 |

| Failure Times (5-3) | Minutes |
|---|---|
| Maximum On Time | 0 |
| Fail Reset Time | 0 |

| Failure Override (5-4) | |
|---|---|
| Detectors 1-8 | - - - - - - - - |
| Detectors 9-16 | - - - - - - - - |
| Detectors 17-24 | - - - - - - - - |
| Detectors 25-32 | - - - - - - - - |
| Detectors 33-40 | - - - - - - - - |
| Detectors 41-44 | - - - - - - - - |

| System Detector Assignment (5-5) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Sys Det | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Det Num | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sys Det | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Det Num | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| CIC Operation (5-6-1) | |
|---|---|
| Enable in Plans | - - - - - - - - |

| CIC Values (5-6-2) | Volume | Occupancy | Demand |
|---|---|---|---|
| Smoothing | 0.66 | 0.66 | 0.66 |
| Multiplier | 4.0 | 0.33 | |
| Exponent | 0.50 | 1.0 | |

| Detector-to-Phase Assignment (5-6-3) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Sys Det | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Phase | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sys Det | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Phase | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Input File Port-Bit Assignments

332 Cabinet - For Reference Only

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I- | 3.2 | 1.1 | 4.5 | 2.1 | 3.4 | 1.3 | 4.7 | 2.3 | 3.6 | 4.1 | 6.6 | 5.1 | 5.2 | 6.7 |
| | 7.2 | 1.5 | 6.2 | 7.4 | 7.6 | 1.7 | 6.4 | 7.8 | 3.8 | 4.2 | 2.7 | 5.3 | 5.4 | 6.8 |
| J- | 3.1 | 1.2 | 4.6 | 2.2 | 3.3 | 1.4 | 4.8 | 2.4 | 3.5 | 4.3 | 2.8 | 5.5 | 5.6 | 2.5 |
| | 7.1 | 1.6 | 6.3 | 7.3 | 7.5 | 1.8 | 6.5 | 7.7 | 3.7 | 4.4 | 6.1 | 5.7 | 5.8 | 2.6 |


CHECKSUM: D8B5

## TOD SCHEDULE

| Table 1 (8-2-1) | | |
|---|---|---|
| Time | Plan | OS |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |

| Table 2 (8-2-2) | | |
|---|---|---|
| Hour | Plan | OS |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |

| Table 3 (8-2-3) | | |
|---|---|---|
| Hour | Plan | OS |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |

| Table 4 (8-2-4) | | |
|---|---|---|
| Hour | Plan | OS |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |

| Table 5 (8-2-5) | | |
|---|---|---|
| Hour | Plan | OS |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |

| Table 6 (8-2-6) | | |
|---|---|---|
| Hour | Plan | OS |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |
| 0000 | 0 | A |

## WEEKDAY ASSIGNMENT

| Weekday Table Assignments (8-2-7) | | | | | | |
|---|---|---|---|---|---|---|
| Mon | Tue | Wed | Thu | Fri | Sat | Sun |
| 1 | 1 | 1 | 1 | 1 | 2 | 2 |

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# HOLIDAY TABLES

**Floating Holiday Table (8-2-8)**

| # | Mnth | Week | DOW | Table |
|---|---|---|---|---|
| 1 | 0 | 0 | - - - - - - - - | 0 |
| 2 | 0 | 0 | - - - - - - - - | 0 |
| 3 | 0 | 0 | - - - - - - - - | 0 |
| 4 | 0 | 0 | - - - - - - - - | 0 |
| 5 | 0 | 0 | - - - - - - - - | 0 |
| 6 | 0 | 0 | - - - - - - - - | 0 |
| 7 | 0 | 0 | - - - - - - - - | 0 |
| 8 | 0 | 0 | - - - - - - - - | 0 |
| 9 | 0 | 0 | - - - - - - - - | 0 |
| 10 | 0 | 0 | - - - - - - - - | 0 |
| 11 | 0 | 0 | - - - - - - - - | 0 |
| 12 | 0 | 0 | - - - - - - - - | 0 |
| 13 | 0 | 0 | - - - - - - - - | 0 |
| 14 | 0 | 0 | - - - - - - - - | 0 |
| 15 | 0 | 0 | - - - - - - - - | 0 |
| 16 | 0 | 0 | - - - - - - - - | 0 |

**Fixed Holiday Table (8-2-9)**

| # | Mnth | Day | DOW | Table |
|---|---|---|---|---|
| 1 | 0 | 0 | - - - - - - - - | 0 |
| 2 | 0 | 0 | - - - - - - - - | 0 |
| 3 | 0 | 0 | - - - - - - - - | 0 |
| 4 | 0 | 0 | - - - - - - - - | 0 |
| 5 | 0 | 0 | - - - - - - - - | 0 |
| 6 | 0 | 0 | - - - - - - - - | 0 |
| 7 | 0 | 0 | - - - - - - - - | 0 |
| 8 | 0 | 0 | - - - - - - - - | 0 |
| 9 | 0 | 0 | - - - - - - - - | 0 |
| 10 | 0 | 0 | - - - - - - - - | 0 |
| 11 | 0 | 0 | - - - - - - - - | 0 |
| 12 | 0 | 0 | - - - - - - - - | 0 |
| 13 | 0 | 0 | - - - - - - - - | 0 |
| 14 | 0 | 0 | - - - - - - - - | 0 |
| 15 | 0 | 0 | - - - - - - - - | 0 |
| 16 | 0 | 0 | - - - - - - - - | 0 |

**Solar Clock Data (8-4)**

| | |
|---|---|
| North Latidude | 34 |
| West Longitude | 118 |
| Local Time Zone | 8 |

**Sabbatical Clock (8-5)**

| Hebrew | Ped Recall |
|---|---|
| Sabbath | - - - - - - - - |
| Holiday | - - - - - - - - |

**Daylight Saving (8-6)**

| | |
|---|---|
| Daylight Saving | YES |

**TOD Functions (8-3)**

| # | Start | End | DOW | Action | Phases |
|---|---|---|---|---|---|
| 1 | 0530 | 2100 | 1 2 3 4 5 6 7 | 27 | - 2 - 4 - 6 - - |
| 2 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 3 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 4 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 5 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 6 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 7 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 8 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 9 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 10 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 11 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 12 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 13 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 14 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 15 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |
| 16 | 0000 | 0000 | - - - - - - - - | 0 | - - - - - - - - |

Action Codes:
0. None
1. Permitted
2. Restricted
4. Veh Min Recall
5. Veh Max Recall
6. Ped Recall
7. Bike Recall
8. Red Lock
9. Yellow Lock
10. Force/Max Lock
11.Double Entry
12. Y-Coord C
13. Y-Coord D
14. Free
15. Flashing
16. Walk 2
17. Max Green 2
18. Max Green 3
19. Rest in Walk
20. Rest in Red
21. Free Lag Phases
22. Special Functions
23. Truck Preempt
24. Conditional Service
25. Conditional Service
26. Leading Ped
41. Protected Permissive
42. Protected Permissive

Action Code = Phases added to normal setting
---
100+Action Code = Phases removed
200+Action Code = Phases replaced

## COMMUNICATIONS

| C2 (6-1-1) | |
|---|---|
| Address | 0 |
| Protocol | AB3418 |
| Limit Access | None |
| Baud | 1200 |
| Parity | None |
| Data Bits | 8 data bits |
| Stop Bits | 1 stop bit |
| RTS On Time | 20 |
| RTS Off Time | 20 |
| Handshaking | Normal |

| C20 (6-1-2) | |
|---|---|
| Address | 0 |
| Protocol | AB3418 |
| Limit Access | None |
| Baud | 1200 |
| Parity | None |
| Data Bits | 8 data bits |
| Stop Bits | 1 stop bit |
| RTS On Time | 20 |
| RTS Off Time | 20 |
| Handshaking | Normal |

| C21 (6-1-3) | |
|---|---|
| Address | 0 |
| Protocol | AB3418 |
| Limit Access | None |
| Baud | 1200 |
| Parity | None |
| Data Bits | 8 data bits |
| Stop Bits | 1 stop bit |
| RTS On Time | 20 |
| RTS Off Time | 20 |
| Handshaking | Normal |

## SOFT LOGIC

| Soft Logic ( 6-2 ) | | | | | | | |
|---|---|---|---|---|---|---|---|
| # | Data | OP | Data | OP | Data | OP | Data |
| 1 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 2 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 3 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 4 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 5 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 6 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 7 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 8 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 9 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 10 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 11 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 12 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 13 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 14 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 15 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |
| 16 | 00.0 | 00 | 00.0 | 00 | 00.0 | 00 | 00.0 |

## CALLBACK NUMBERS

| Callback Numbers (6-3...3) | |
|---|---|
| Line Out | 0 |
| Local Toll | 0 |
| Long Distance | 0 |
| Delay | 10 |
| Area Code | 0 |
| Phone Number | 0 - 0 |

| | |
|---|---|
| Line Out | 0 |
| Local Toll | 0 |
| Long Distance | 0 |
| Delay | 10 |
| Area Code | 0 |
| Phone Number | 0 - 0 |

| | |
|---|---|
| Line Out | 0 |
| Local Toll | 0 |
| Long Distance | 0 |
| Delay | 10 |
| Area Code | 0 |
| Phone Number | 0 - 0 |

## NETWORK

| Network (6-4) | | | | |
|---|---|---|---|---|
| Address | 1 | | | |
| Protocol | AB3418 | | | |
| Port | 27000 | | | |
| IP Mode | Static IP | | | |
| IP Address | 192 | 168 | 13 | 1 |
| Netmask | 255 | 255 | 255 | 0 |
| Broadcast | 192 | 168 | 13 | 255 |
| Gateway | 192 | 168 | 13 | 254 |

## RAILROAD PREEMPTION

**RR 1**

| (3-1-1) | Timing | Phase Flags (3-1-2) | | | Pedestrian Flags (3-1-3) | | | Overlap Flags (3-1-4) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Grn Hold | Yel Flash | Red Flash | Walk | Flash DW | Solid DW | Grn Hold | Yel Flash | Red Flash |
| Delay | 0 | | | | | | | | | |
| Clear 1 | 10 | - 2 - - 5 - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - 2 - 4 - 6 - 8 | - - - - - - - | - - - - - - - | - - - - - - - |
| Clear 2 | 0 | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - | - - - - - - - | - - - - - - - |
| Clear 3 | 0 | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - | - - - - - - - | - - - - - - - |
| Hold | 0 | - - - - - - - - | - - - - - - - - | 1 2 3 4 5 6 7 8 | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - | - - - - - - - | A B C D E F |
| Exit | 5 | | | | | | | | | |
| Min Grn | 0 | | | | | | | | | |
| Ped Clr | 0 | | | | | | | | | |

| Exit Parameters (3-1-5) | | | |
|---|---|---|---|
| Phase Green | Overlap Green | Vehicle Recall | Ped Call |
| - - - - - - - - | - - - - - - - | 1 2 3 4 5 6 7 8 | - 2 - 4 - 6 - 8 |

| Configuration (3-1-6) | | | |
|---|---|---|---|
| Port | Gate Port | Latching | Power-Up |
| 2.5 | 0.0 | Yes | Flashing |

**RR 2**

| (3-2-1) | Timing | Phase Flags (3-2-2) | | | Pedestrian Flags (3-2-3) | | | Overlap Flags (3-2-4) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Grn Hold | Yel Flash | Red Flash | Walk | Flash DW | Solid DW | Grn Hold | Yel Flash | Red Flash |
| Delay | 0 | | | | | | | | | |
| Clear 1 | 10 | - - - 4 - - 7 - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - 2 - 4 - 6 - 8 | - - - - - - - | - - - - - - - | - - - - - - - |
| Clear 2 | 0 | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - | - - - - - - - | - - - - - - - |
| Clear 3 | 0 | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - - | - - - - - - - | - - - - - - - | - - - - - - - |
| Hold | 0 | 1 2 3 - - 6 - - | - - - - - - - - | - - - - - - - - | - 2 - - - 6 - - | - - - - - - - - | - - - 4 - - - 8 | - - - - - - - | - - - - - - - | - - - - - - - |
| Exit | 0 | | | | | | | | | |
| Min Grn | 0 | | | | | | | | | |
| Ped Clr | 0 | | | | | | | | | |

| Exit Parameters (3-2-5) | | | |
|---|---|---|---|
| Exit Ph Grn | Exit Ovl Grn | Exit Veh Recall | Exit Ped Call |
| - - - - - - - - | - - - - - - - | - - - 4 - - 7 - | - - - - - - - - |

| Configuration (3-2-6) | | | |
|---|---|---|---|
| Port | Gate Port | Latching | Power-Up |
| 2.6 | 0.0 | Yes | Dark |

## EMERGENCY VEHICLE PREEMPTION

**EVA (3-A)**

| Preempt Timers | | | Phase Green | Overlap Grn |
|---|---|---|---|---|
| Delay | Clear | Max | | |
| 0 | 30 | 30 | - 2 - - 5 - - - | - - - - - - - |

| Port | Latching | Phase Termination |
|---|---|---|
| 5.5 | No | Advance |

**EVB (3-B)**

| Preempt Timers | | | Phase Green | Overlap Grn |
|---|---|---|---|---|
| Delay | Clear | Max | | |
| 0 | 30 | 30 | - - - 4 - - 7 - | - - - - - - - |

| Port | Latching | Phase | Phase Termination |
|---|---|---|---|
| 5.6 | No | | Advance |

**EVC (3-C)**

| Preempt Timers | | | Phase Green | Overlap Grn |
|---|---|---|---|---|
| Delay | Clear | Max | | |
| 0 | 30 | 30 | 1 - - - - 6 - - | - - - - - - - |

| Port | Latching | Phase Termination |
|---|---|---|
| 5.7 | No | Advance |

**EVD (3-D)**

| Preempt Timers | | | Phase Green | Overlap Grn |
|---|---|---|---|---|
| Delay | Clear | Max | | |
| 0 | 30 | 30 | - - 3 - - - - 8 | - - - - - - - |

| Port | Latching | Phase | Phase Termination |
|---|---|---|---|
| 5.8 | No | | Advance |

## INPUTS

| | | 7 Wire I/C(2-1-5-1) | | | |
|---|---|---|---|---|---|
| | | Input | Port | Input | Port |
| Enable | No | R1 | 3.8 | Free | 3.6 |
| Max ON | 0 | R2 | 3.5 | D2 | 2.8 |
| Max OFF | 0 | R3 | 3.7 | D3 | 6.1 |

| Manual Control(2-1-5-2) | |
|---|---|
| Input | Port |
| Manual Adv | 6.6 |
| Adv Enable | 6.6 |

| Battery Backup (2-1-5-5) | |
|---|---|
| Port | Operation |
| 2.7 | Flashing |

| Cabinet Staus (2-1-5-3) | |
|---|---|
| Input | Port |
| Flash Bus | 0.0 |
| Door Ajar | 0.0 |
| Flash Sense | 6.7 |
| Stop Time | 6.8 |

| Special Function (2-1-5-4) | |
|---|---|
| Input | Port |
| 1 | 0.0 |
| 2 | 0.0 |
| 3 | 0.0 |
| 4 | 0.0 |

| Y-Coordination (2-1-5-6) | |
|---|---|
| Port C | Port D |
| 6.1 | 2.8 |

## OUTPUTS

| Loadswitch Assignments ( 2-1-6 ) | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | 1 | 2 | 22 | 3 | 4 | 24 | 9 |
| B | 5 | 6 | 26 | 7 | 8 | 28 | 10 |
| X | 13 | 14 | 0 | 11 | 12 | 0 | 0 |

Loadswitch Codes:
0 Unused (no output)
1-8 Vehicle 1-8
9-14 Overlap A-F
21-28 Ped 1-8
41-47 Special Functions
41 Protected Permissive Flashing Phase 1
43 Protected Permissive Flashing Phase 3
45 Protected Permissive Flashing Phase 5
47 Protected Permissive Flashing Phase 7
51-57 Special Functions
71-72 Seven Wire I/C
+ middle output of loadswitches 3 and 6

## YELLOW YIELD COORDINATION

| | | | | | Force-Offs | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y-Coord Plans (7-C,D) | Long Grn | No Grn | Offset | Perm | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Coord | Lag | Min Recall | Restricted |
| Plan C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - 2 - - - 6 - - | - 2 - 4 - 6 - 8 | - - - - - - - - | - - - - - - - - |
| Plan D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - 2 - - - 6 - - | - 2 - 4 - 6 - 8 | - - - - - - - - | - - - - - - - - |

## TRANSIT PRIORITY

| Local Plans (3-E) 1...9 1...19 | | Early Green | Green Extend | Inhibit Cycles | Phase 1 Minimum | Phase 2 Minimum | Phase 3 Minimum | Phase 4 Minimum | Phase 5 Minimum | Phase 6 Minimum | Phase 7 Minimum | Phase 8 Minimum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plan 1 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 2 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 3 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 4 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 5 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 6 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 7 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 8 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 9 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 11 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 12 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 13 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 14 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 15 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 16 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 17 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 18 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 19 | Green Factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Enable Priority in Plan (3-E-A) | | | | | |
|---|---|---|---|---|---|
| Enable in Plans | | Input | Type | Stop | Go |
| Plan 1-9 | - - - - - - - - | 0.0 | OPT | 0 | 0 |
| Plan 11-19 | - - - - - - - - | 0.0 | OPT | 0 | 0 |

| Queue Jump (3-E-B) | |
|---|---|
| Grn Hold | Hold Phase |
| 0 | - - - - - - - - |
| 0 | - - - - - - - - |

| Free Plans (3-E-E) | |
|---|---|
| Max Green | Hold Phase |
| 0 | - - - - - - - - |

| Access Utilities (9-5) | |
|---|---|
| Password | *** |
| Timeout | 30 |

## TRUCK PRIORITY

| Truck Priority (3-F) | Passage | CarryOver | Clearance | Next Priority | Phase Green | Det 2 Port | Det 3 Port | Det 4 Port | Sign Output | Slave Input | Slave Output |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.0 | 0.0 | 0.0 | 0 | - - - - - - - - | 0.0 | 0.0 | 0.0 | 0 | 0.0 | 0 |

**PAGE 13** **CHECKSUM:** 86F7

## CONTROLLER ID

| | |
|---|---|
| Manufacturer ID | Caltrans TSCP Ver 2.21 |
| Model ID | Model 2070 |
| Protocol Revision ID | AB3418 |

# APPENDIX C:

# VOLUME DEVELOPMENT WORKSHEETS

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**Table B-1 - Existing (2021) Peak Hour Volume Summary**

| | A.M. Peak Hour | | | | | | P.M. Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year 2,021 Counts | COVID Non-COVID Adjustments | Adjusted 2,021 Volumes | Balanced 2,021 Volumes | Net Project Trips | Existing With Project | Year 2,021 Counts | COVID Non-COVID Adjustments | Adjusted 2,021 Volumes | Balanced 2,021 Volumes | Net Project Trips | Existing With Project |
| **1 Marks Avenue/Belmont Avenue** | | | | | | | | | | | | |
| 2016 count | | | | | | | | | | | | |
| NBL | | | 49 | 49 | 1 | 50 | | | 97 | 97 | 2 | 99 |
| NBT | | | 261 | 261 | 7 | 268 | | | 589 | 589 | 7 | 596 |
| NBR | | | 67 | 67 | 3 | 70 | | | 76 | 76 | 4 | 80 |
| SBL | | | 39 | 39 | 0 | 39 | | | 25 | 25 | 0 | 25 |
| SBT | | | 424 | 424 | 25 | 449 | | | 259 | 259 | 34 | 293 |
| SBR | | | 28 | 28 | 0 | 28 | | | 26 | 26 | 0 | 26 |
| EBL | | | 24 | 24 | 0 | 24 | | | 24 | 24 | 0 | 24 |
| EBT | | | 127 | 127 | 0 | 127 | | | 174 | 174 | 0 | 174 |
| EBR | | | 87 | 87 | 7 | 94 | | | 63 | 63 | 9 | 72 |
| WBL | | | 39 | 39 | 13 | 52 | | | 36 | 36 | 16 | 52 |
| WBT | | | 78 | 78 | 0 | 78 | | | 126 | 126 | 0 | 126 |
| WBR | | | 11 | 11 | 0 | 11 | | | 53 | 53 | 0 | 53 |
| North Leg | | | | | | | | | | | | |
| Approach | 0 | 0 | 491 | 491 | 25 | 516 | 0 | 0 | 310 | 310 | 34 | 344 |
| Departure | 0 | 0 | 296 | 296 | 7 | 303 | 0 | 0 | 666 | 666 | 7 | 673 |
| Total | 0 | 0 | 787 | 787 | 32 | 819 | 0 | 0 | 976 | 976 | 41 | 1,017 |
| South Leg | | | | | | | | | | | | |
| Approach | 0 | 0 | 377 | 377 | 11 | 388 | 0 | 0 | 762 | 762 | 13 | 775 |
| Departure | 0 | 0 | 550 | 550 | 45 | 595 | 0 | 0 | 358 | 358 | 59 | 417 |
| Total | 0 | 0 | 927 | 927 | 56 | 983 | 0 | 0 | 1,120 | 1,120 | 72 | 1,192 |
| East Leg | | | | | | | | | | | | |
| Approach | 0 | 0 | 128 | 128 | 13 | 141 | 0 | 0 | 215 | 215 | 16 | 231 |
| Departure | 0 | 0 | 233 | 233 | 3 | 236 | 0 | 0 | 275 | 275 | 4 | 279 |
| Total | 0 | 0 | 361 | 361 | 16 | 377 | 0 | 0 | 490 | 490 | 20 | 510 |
| West Leg | | | | | | | | | | | | |
| Approach | 0 | 0 | 238 | 238 | 7 | 245 | 0 | 0 | 261 | 261 | 9 | 270 |
| Departure | 0 | 0 | 155 | 155 | 1 | 156 | 0 | 0 | 249 | 249 | 2 | 251 |
| Total | 0 | 0 | 393 | 393 | 8 | 401 | 0 | 0 | 510 | 510 | 11 | 521 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 0 | 0 | 1,234 | 1,234 | 56 | 1,290 | 0 | 0 | 1,548 | 1,548 | 72 | 1,620 |
| Departure | 0 | 0 | 1,234 | 1,234 | 56 | 1,290 | 0 | 0 | 1,548 | 1,548 | 72 | 1,620 |
| Total | 0 | 0 | 2,468 | 2,468 | 112 | 2,580 | 0 | 0 | 3,096 | 3,096 | 144 | 3,240 |

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**Table B-1 - Existing (2021) Peak Hour Volume Summary**

| | A.M. Peak Hour | | | | | | P.M. Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year 2,021 Counts | COVID Non-COVID Adjustments | Adjusted 2,021 Volumes | Balanced 2,021 Volumes | Net Project Trips | Existing With Project | Year 2,021 Counts | COVID Non-COVID Adjustments | Adjusted 2,021 Volumes | Balanced 2,021 Volumes | Net Project Trips | Existing With Project |
| **2 Marks Avenue/Nielsen Avenue** | | | | | | | | | | | | |
| NBL | 55 | | 55 | 62 | 0 | 62 | 36 | | 36 | 37 | 0 | 37 |
| NBT | 227 | 82 | 309 | 349 | 0 | 349 | 371 | 177 | 548 | 568 | 0 | 568 |
| NBR | 62 | | 62 | 70 | 28 | 98 | 35 | | 35 | 36 | 38 | 74 |
| SBL | 8 | | 8 | 9 | 0 | 9 | 9 | | 9 | 10 | 0 | 10 |
| SBT | 212 | 114 | 326 | 343 | 0 | 343 | 192 | 81 | 273 | 318 | 0 | 318 |
| SBR | 31 | | 31 | 34 | 0 | 34 | 18 | | 18 | 20 | 0 | 20 |
| EBL | 11 | | 11 | 12 | 0 | 12 | 22 | | 22 | 24 | 0 | 24 |
| EBT | 6 | | 6 | 7 | 1 | 8 | 3 | | 3 | 3 | 1 | 4 |
| EBR | 40 | | 40 | 42 | 0 | 42 | 35 | | 35 | 41 | 0 | 41 |
| WBL | 17 | | 17 | 18 | 7 | 25 | 67 | | 67 | 78 | 9 | 87 |
| WBT | 4 | | 4 | 4 | 0 | 4 | 8 | | 8 | 9 | 0 | 9 |
| WBR | 9 | | 9 | 10 | 0 | 10 | 10 | | 10 | 11 | 0 | 11 |
| North Leg | | | | | | | | | | | | |
| Approach | 251 | 114 | 365 | 386 | 0 | 386 | 219 | 81 | 300 | 348 | 0 | 348 |
| Departure | 247 | 82 | 329 | 371 | 0 | 371 | 403 | 177 | 580 | 603 | 0 | 603 |
| Total | 498 | 196 | 694 | 757 | 0 | 757 | 622 | 258 | 880 | 951 | 0 | 951 |
| South Leg | | | | | | | | | | | | |
| Approach | 344 | 82 | 426 | 481 | 28 | 509 | 442 | 177 | 619 | 641 | 38 | 679 |
| Departure | 269 | 114 | 383 | 403 | 7 | 410 | 294 | 81 | 375 | 437 | 9 | 446 |
| Total | 613 | 196 | 809 | 884 | 35 | 919 | 736 | 258 | 994 | 1,078 | 47 | 1,125 |
| East Leg | | | | | | | | | | | | |
| Approach | 30 | 0 | 30 | 32 | 7 | 39 | 85 | 0 | 85 | 98 | 9 | 107 |
| Departure | 76 | 0 | 76 | 86 | 29 | 115 | 47 | 0 | 47 | 49 | 39 | 88 |
| Total | 106 | 0 | 106 | 118 | 36 | 154 | 132 | 0 | 132 | 147 | 48 | 195 |
| West Leg | | | | | | | | | | | | |
| Approach | 57 | 0 | 57 | 61 | 1 | 62 | 60 | 0 | 60 | 68 | 1 | 69 |
| Departure | 90 | 0 | 90 | 100 | 0 | 100 | 62 | 0 | 62 | 66 | 0 | 66 |
| Total | 147 | 0 | 147 | 161 | 1 | 162 | 122 | 0 | 122 | 134 | 1 | 135 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 682 | 196 | 878 | 960 | 36 | 996 | 806 | 258 | 1,064 | 1,155 | 48 | 1,203 |
| Departure | 682 | 196 | 878 | 960 | 36 | 996 | 806 | 258 | 1,064 | 1,155 | 48 | 1,203 |
| Total | 1,364 | 392 | 1,756 | 1,920 | 72 | 1,992 | 1,612 | 516 | 2,128 | 2,310 | 96 | 2,406 |

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**Table B-1 - Existing (2021) Peak Hour Volume Summary**

| | A.M. Peak Hour | | | | | | P.M. Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year 2,021 Counts | COVID Non-COVID Adjustments | Adjusted 2,021 Volumes | Balanced 2,021 Volumes | Net Project Trips | Existing With Project | Year 2,021 Counts | COVID Non-COVID Adjustments | Adjusted 2,021 Volumes | Balanced 2,021 Volumes | Net Project Trips | Existing With Project |
| **3 Marks Avenue/Ray Johnson Drive** | | | | | | | | | | | | |
| NBL | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| NBT | 351 | 128 | 479 | 479 | 28 | 507 | 430 | 205 | 635 | 635 | 38 | 673 |
| NBR | 6 | | 6 | 6 | 0 | 6 | 10 | | 10 | 10 | 0 | 10 |
| SBL | 3 | | 3 | 3 | 0 | 3 | 4 | | 4 | 4 | 0 | 4 |
| SBT | 260 | 139 | 399 | 399 | 7 | 406 | 304 | 128 | 432 | 432 | 9 | 441 |
| SBR | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| EBL | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| EBT | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| EBR | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| WBL | 8 | | 8 | 8 | 0 | 8 | 17 | | 17 | 17 | 0 | 17 |
| WBT | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| WBR | 3 | | 3 | 3 | 0 | 3 | 6 | | 6 | 6 | 0 | 6 |
| North Leg | | | | | | | | | | | | |
| Approach | 263 | 139 | 402 | 402 | 7 | 409 | 308 | 128 | 436 | 436 | 9 | 445 |
| Departure | 354 | 128 | 482 | 482 | 28 | 510 | 436 | 205 | 641 | 641 | 38 | 679 |
| Total | 617 | 267 | 884 | 884 | 35 | 919 | 744 | 334 | 1,078 | 1,078 | 47 | 1,125 |
| South Leg | | | | | | | | | | | | |
| Approach | 357 | 128 | 485 | 485 | 28 | 513 | 440 | 205 | 645 | 645 | 38 | 683 |
| Departure | 268 | 139 | 407 | 407 | 7 | 414 | 321 | 128 | 449 | 449 | 9 | 458 |
| Total | 625 | 267 | 892 | 892 | 35 | 927 | 761 | 334 | 1,095 | 1,095 | 47 | 1,142 |
| East Leg | | | | | | | | | | | | |
| Approach | 11 | 0 | 11 | 11 | 0 | 11 | 23 | 0 | 23 | 23 | 0 | 23 |
| Departure | 9 | 0 | 9 | 9 | 0 | 9 | 14 | 0 | 14 | 14 | 0 | 14 |
| Total | 20 | 0 | 20 | 20 | 0 | 20 | 37 | 0 | 37 | 37 | 0 | 37 |
| West Leg | | | | | | | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 631 | 267 | 898 | 898 | 35 | 933 | 771 | 334 | 1,105 | 1,105 | 47 | 1,152 |
| Departure | 631 | 267 | 898 | 898 | 35 | 933 | 771 | 334 | 1,105 | 1,105 | 47 | 1,152 |
| Total | 1,262 | 534 | 1,796 | 1,796 | 70 | 1,866 | 1,542 | 667 | 2,209 | 2,209 | 94 | 2,303 |

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**Table B-1 - Existing (2021) Peak Hour Volume Summary**

| | A.M. Peak Hour | | | | | | P.M. Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year 2,021 Counts | COVID Non-COVID Adjustments | Adjusted 2,021 Volumes | Balanced 2,021 Volumes | Net Project Trips | Existing With Project | Year 2,021 Counts | COVID Non-COVID Adjustments | Adjusted 2,021 Volumes | Balanced 2,021 Volumes | Net Project Trips | Existing With Project |
| **4 Marks Avenue/SR-180 Westbound Ramps** | | | | | | | | | | | | |
| NBL | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| NBT | 82 | | 82 | 82 | 5 | 87 | 144 | | 144 | 144 | 5 | 149 |
| NBR | 11 | | 11 | 11 | 0 | 11 | 15 | | 15 | 15 | 0 | 15 |
| SBL | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| SBT | 263 | 139 | 402 | 402 | 7 | 409 | 297 | 128 | 425 | 425 | 9 | 434 |
| SBR | 24 | | 24 | 24 | 0 | 24 | 23 | | 23 | 23 | 0 | 23 |
| EBL | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| EBT | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| EBR | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| WBL | 180 | | 180 | 180 | 0 | 180 | 242 | | 242 | 242 | 0 | 242 |
| WBT | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| WBR | 267 | 128 | 395 | 395 | 23 | 418 | 313 | 205 | 518 | 518 | 32 | 550 |
| North Leg | | | | | | | | | | | | |
| Approach | 287 | 139 | 426 | 426 | 7 | 433 | 320 | 128 | 448 | 448 | 9 | 457 |
| Departure | 349 | 128 | 477 | 477 | 28 | 505 | 457 | 205 | 662 | 662 | 37 | 699 |
| Total | 636 | 267 | 903 | 903 | 35 | 938 | 777 | 334 | 1,111 | 1,111 | 46 | 1,157 |
| South Leg | | | | | | | | | | | | |
| Approach | 93 | 0 | 93 | 93 | 5 | 98 | 159 | 0 | 159 | 159 | 5 | 164 |
| Departure | 443 | 139 | 582 | 582 | 7 | 589 | 539 | 128 | 667 | 667 | 9 | 676 |
| Total | 536 | 139 | 675 | 675 | 12 | 687 | 698 | 128 | 826 | 826 | 14 | 840 |
| East Leg | | | | | | | | | | | | |
| Approach | 447 | 128 | 575 | 575 | 23 | 598 | 555 | 205 | 760 | 760 | 32 | 792 |
| Departure | 11 | 0 | 11 | 11 | 0 | 11 | 15 | 0 | 15 | 15 | 0 | 15 |
| Total | 458 | 128 | 586 | 586 | 23 | 609 | 570 | 205 | 775 | 775 | 32 | 807 |
| West Leg | | | | | | | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 24 | 0 | 24 | 24 | 0 | 24 | 23 | 0 | 23 | 23 | 0 | 23 |
| Total | 24 | 0 | 24 | 24 | 0 | 24 | 23 | 0 | 23 | 23 | 0 | 23 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 827 | 267 | 1,094 | 1,094 | 35 | 1,129 | 1,034 | 334 | 1,368 | 1,368 | 46 | 1,414 |
| Departure | 827 | 267 | 1,094 | 1,094 | 35 | 1,129 | 1,034 | 334 | 1,368 | 1,368 | 46 | 1,414 |
| Total | 1,654 | 534 | 2,188 | 2,188 | 70 | 2,258 | 2,068 | 667 | 2,735 | 2,735 | 92 | 2,827 |

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**Table B-1 - Existing (2021) Peak Hour Volume Summary**

| | A.M. Peak Hour | | | | | | P.M. Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year 2,021 Counts | COVID Non-COVID Adjustments | Adjusted 2,021 Volumes | Balanced 2,021 Volumes | Net Project Trips | Existing With Project | Year 2,021 Counts | COVID Non-COVID Adjustments | Adjusted 2,021 Volumes | Balanced 2,021 Volumes | Net Project Trips | Existing With Project |
| **5 Marks Avenue/SR-180 Eastbound Ramps** | | | | | | | | | | | | |
| NBL | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| NBT | 83 | | 83 | 83 | 3 | 86 | 140 | | 140 | 140 | 3 | 143 |
| NBR | 223 | | 223 | 223 | 0 | 223 | 266 | | 266 | 266 | 0 | 266 |
| SBL | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| SBT | 289 | | 289 | 291 | 0 | 291 | 360 | | 360 | 359 | 1 | 360 |
| SBR | 150 | 139 | 289 | 291 | 7 | 298 | 181 | 128 | 309 | 308 | 8 | 316 |
| EBL | 10 | | 10 | 10 | 2 | 12 | 19 | | 19 | 19 | 2 | 21 |
| EBT | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| EBR | 11 | | 11 | 11 | 0 | 11 | 20 | | 20 | 20 | 0 | 20 |
| WBL | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| WBT | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| WBR | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| North Leg | | | | | | | | | | | | |
| Approach | 439 | 139 | 578 | 582 | 7 | 589 | 541 | 128 | 669 | 667 | 9 | 676 |
| Departure | 93 | 0 | 93 | 93 | 5 | 98 | 159 | 0 | 159 | 159 | 5 | 164 |
| Total | 532 | 139 | 671 | 675 | 12 | 687 | 700 | 128 | 828 | 826 | 14 | 840 |
| South Leg | | | | | | | | | | | | |
| Approach | 306 | 0 | 306 | 306 | 3 | 309 | 406 | 0 | 406 | 406 | 3 | 409 |
| Departure | 300 | 0 | 300 | 302 | 0 | 302 | 380 | 0 | 380 | 379 | 1 | 380 |
| Total | 606 | 0 | 606 | 608 | 3 | 611 | 786 | 0 | 786 | 785 | 4 | 789 |
| East Leg | | | | | | | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 223 | 0 | 223 | 223 | 0 | 223 | 266 | 0 | 266 | 266 | 0 | 266 |
| Total | 223 | 0 | 223 | 223 | 0 | 223 | 266 | 0 | 266 | 266 | 0 | 266 |
| West Leg | | | | | | | | | | | | |
| Approach | 21 | 0 | 21 | 21 | 2 | 23 | 39 | 0 | 39 | 39 | 2 | 41 |
| Departure | 150 | 139 | 289 | 291 | 7 | 298 | 181 | 128 | 309 | 308 | 8 | 316 |
| Total | 171 | 139 | 310 | 312 | 9 | 321 | 220 | 128 | 348 | 347 | 10 | 357 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 766 | 139 | 905 | 909 | 12 | 921 | 986 | 128 | 1,114 | 1,112 | 14 | 1,126 |
| Departure | 766 | 139 | 905 | 909 | 12 | 921 | 986 | 128 | 1,114 | 1,112 | 14 | 1,126 |
| Total | 1,532 | 279 | 1,811 | 1,819 | 24 | 1,843 | 1,972 | 256 | 2,228 | 2,224 | 28 | 2,252 |

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**Table B-1 - Existing (2021) Peak Hour Volume Summary**

| | A.M. Peak Hour | | | | | | P.M. Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year 2,021 Counts | COVID Non-COVID Adjustments | Adjusted 2,021 Volumes | Balanced 2,021 Volumes | Net Project Trips | Existing With Project | Year 2,021 Counts | COVID Non-COVID Adjustments | Adjusted 2,021 Volumes | Balanced 2,021 Volumes | Net Project Trips | Existing With Project |
| **6 Hughes Avenue/Belmont Avenue** | | | | | | | | | | | | |
| NBL | 6 | | 6 | 6 | 0 | 6 | 14 | | 14 | 14 | 0 | 14 |
| NBT | 27 | | 27 | 27 | 1 | 28 | 42 | | 42 | 42 | 1 | 43 |
| NBR | 33 | | 33 | 33 | 5 | 38 | 56 | | 56 | 56 | 5 | 61 |
| SBL | 26 | | 26 | 26 | 0 | 26 | 40 | | 40 | 40 | 0 | 40 |
| SBT | 22 | | 22 | 22 | 3 | 25 | 47 | | 47 | 47 | 5 | 52 |
| SBR | 15 | | 15 | 15 | 0 | 15 | 15 | | 15 | 15 | 0 | 15 |
| EBL | 20 | | 20 | 20 | 0 | 20 | 37 | | 37 | 37 | 0 | 37 |
| EBT | 192 | | 192 | 192 | 3 | 195 | 239 | | 239 | 239 | 4 | 243 |
| EBR | 17 | | 17 | 17 | 0 | 17 | 10 | | 10 | 10 | 0 | 10 |
| WBL | 27 | | 27 | 27 | 17 | 44 | 43 | | 43 | 43 | 20 | 63 |
| WBT | 152 | | 152 | 152 | 12 | 164 | 190 | | 190 | 190 | 15 | 205 |
| WBR | 15 | | 15 | 15 | 0 | 15 | 34 | | 34 | 34 | 0 | 34 |
| North Leg | | | | | | | | | | | | |
| Approach | 63 | 0 | 63 | 63 | 3 | 66 | 102 | 0 | 102 | 102 | 5 | 107 |
| Departure | 62 | 0 | 62 | 62 | 1 | 63 | 113 | 0 | 113 | 113 | 1 | 114 |
| Total | 125 | 0 | 125 | 125 | 4 | 129 | 215 | 0 | 215 | 215 | 6 | 221 |
| South Leg | | | | | | | | | | | | |
| Approach | 66 | 0 | 66 | 66 | 6 | 72 | 112 | 0 | 112 | 112 | 6 | 118 |
| Departure | 66 | 0 | 66 | 66 | 20 | 86 | 100 | 0 | 100 | 100 | 25 | 125 |
| Total | 132 | 0 | 132 | 132 | 26 | 158 | 212 | 0 | 212 | 212 | 31 | 243 |
| East Leg | | | | | | | | | | | | |
| Approach | 194 | 0 | 194 | 194 | 29 | 223 | 267 | 0 | 267 | 267 | 35 | 302 |
| Departure | 251 | 0 | 251 | 251 | 8 | 259 | 335 | 0 | 335 | 335 | 9 | 344 |
| Total | 445 | 0 | 445 | 445 | 37 | 482 | 602 | 0 | 602 | 602 | 44 | 646 |
| West Leg | | | | | | | | | | | | |
| Approach | 229 | 0 | 229 | 229 | 3 | 232 | 286 | 0 | 286 | 286 | 4 | 290 |
| Departure | 173 | 0 | 173 | 173 | 12 | 185 | 219 | 0 | 219 | 219 | 15 | 234 |
| Total | 402 | 0 | 402 | 402 | 15 | 417 | 505 | 0 | 505 | 505 | 19 | 524 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 552 | 0 | 552 | 552 | 41 | 593 | 767 | 0 | 767 | 767 | 50 | 817 |
| Departure | 552 | 0 | 552 | 552 | 41 | 593 | 767 | 0 | 767 | 767 | 50 | 817 |
| Total | 1,104 | 0 | 1,104 | 1,104 | 82 | 1,186 | 1,534 | 0 | 1,534 | 1,534 | 100 | 1,634 |

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**Table B-1 - Existing (2021) Peak Hour Volume Summary**

| | A.M. Peak Hour | | | | | | P.M. Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year 2,021 Counts | COVID Non-COVID Adjustments | Adjusted 2,021 Volumes | Balanced 2,021 Volumes | Net Project Trips | Existing With Project | Year 2,021 Counts | COVID Non-COVID Adjustments | Adjusted 2,021 Volumes | Balanced 2,021 Volumes | Net Project Trips | Existing With Project |
| **7 Hughes Avenue/Nielsen Avenue** | | | | | | | | | | | | |
| NBL | 5 | | 5 | 5 | 4 | 9 | 25 | | 25 | 25 | 6 | 31 |
| NBT | 44 | | 44 | 44 | 2 | 46 | 83 | | 83 | 83 | 2 | 85 |
| NBR | 1 | | 1 | 1 | 0 | 1 | 3 | | 3 | 3 | 0 | 3 |
| SBL | 8 | | 8 | 8 | 2 | 10 | 9 | | 9 | 9 | 2 | 11 |
| SBT | 46 | | 46 | 46 | 1 | 47 | 73 | | 73 | 73 | 1 | 74 |
| SBR | 10 | | 10 | 10 | 0 | 10 | 13 | | 13 | 13 | 0 | 13 |
| EBL | 8 | | 8 | 8 | 0 | 8 | 8 | | 8 | 8 | 0 | 8 |
| EBT | 35 | | 35 | 35 | 0 | 35 | 25 | | 25 | 25 | 0 | 25 |
| EBR | 24 | | 24 | 24 | 1 | 25 | 11 | | 11 | 11 | 2 | 13 |
| WBL | 2 | | 2 | 2 | 0 | 2 | 4 | | 4 | 4 | 0 | 4 |
| WBT | 10 | | 10 | 10 | 2 | 12 | 35 | | 35 | 35 | 2 | 37 |
| WBR | 8 | | 8 | 8 | 7 | 15 | 14 | | 14 | 14 | 9 | 23 |
| North Leg | | | | | | | | | | | | |
| Approach | 64 | 0 | 64 | 64 | 3 | 67 | 95 | 0 | 95 | 95 | 3 | 98 |
| Departure | 60 | 0 | 60 | 60 | 9 | 69 | 105 | 0 | 105 | 105 | 11 | 116 |
| Total | 124 | 0 | 124 | 124 | 12 | 136 | 200 | 0 | 200 | 200 | 14 | 214 |
| South Leg | | | | | | | | | | | | |
| Approach | 50 | 0 | 50 | 50 | 6 | 56 | 111 | 0 | 111 | 111 | 8 | 119 |
| Departure | 72 | 0 | 72 | 72 | 2 | 74 | 88 | 0 | 88 | 88 | 3 | 91 |
| Total | 122 | 0 | 122 | 122 | 8 | 130 | 199 | 0 | 199 | 199 | 11 | 210 |
| East Leg | | | | | | | | | | | | |
| Approach | 20 | 0 | 20 | 20 | 9 | 29 | 53 | 0 | 53 | 53 | 11 | 64 |
| Departure | 44 | 0 | 44 | 44 | 2 | 46 | 37 | 0 | 37 | 37 | 2 | 39 |
| Total | 64 | 0 | 64 | 64 | 11 | 75 | 90 | 0 | 90 | 90 | 13 | 103 |
| West Leg | | | | | | | | | | | | |
| Approach | 67 | 0 | 67 | 67 | 1 | 68 | 44 | 0 | 44 | 44 | 2 | 46 |
| Departure | 25 | 0 | 25 | 25 | 6 | 31 | 73 | 0 | 73 | 73 | 8 | 81 |
| Total | 92 | 0 | 92 | 92 | 7 | 99 | 117 | 0 | 117 | 117 | 10 | 127 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 201 | 0 | 201 | 201 | 19 | 220 | 303 | 0 | 303 | 303 | 24 | 327 |
| Departure | 201 | 0 | 201 | 201 | 19 | 220 | 303 | 0 | 303 | 303 | 24 | 327 |
| Total | 402 | 0 | 402 | 402 | 38 | 440 | 606 | 0 | 606 | 606 | 48 | 654 |

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## Table B-2 - Opening Year Cumulative (2023) Peak Hour Volume Summary

| | AM Peak Hour | | | | | | PM Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project |
| **1 Marks Avenue/Belmont Avenue** | | | | | | | | | | | | |
| NBL | 49 | 2 | 3 | 54 | 1 | 55 | 97 | 4 | 4 | 105 | 2 | 107 |
| NBT | 261 | 10 | 3 | 274 | 7 | 281 | 589 | 24 | 10 | 623 | 7 | 630 |
| NBR | 67 | 3 | 1 | 71 | 3 | 74 | 76 | 3 | 2 | 81 | 4 | 85 |
| SBL | 39 | 2 | 1 | 42 | 0 | 42 | 25 | 1 | 0 | 26 | 0 | 26 |
| SBT | 424 | 17 | 8 | 449 | 25 | 474 | 259 | 10 | 7 | 276 | 34 | 310 |
| SBR | 28 | 1 | 2 | 31 | 0 | 31 | 26 | 1 | 2 | 29 | 0 | 29 |
| EBL | 24 | 1 | 0 | 25 | 0 | 25 | 24 | 1 | 0 | 25 | 0 | 25 |
| EBT | 127 | 5 | 13 | 145 | 0 | 145 | 174 | 7 | 16 | 197 | 0 | 197 |
| EBR | 87 | 3 | 1 | 91 | 7 | 98 | 63 | 3 | 1 | 67 | 9 | 76 |
| WBL | 39 | 2 | 0 | 41 | 13 | 54 | 36 | 1 | 2 | 39 | 16 | 55 |
| WBT | 78 | 3 | 18 | 99 | 0 | 99 | 126 | 5 | 16 | 147 | 0 | 147 |
| WBR | 11 | 0 | 1 | 12 | 0 | 12 | 53 | 2 | 0 | 55 | 0 | 55 |
| North Leg | | | | | | | | | | | | |
| Approach | 491 | 20 | 11 | 522 | 25 | 547 | 310 | 12 | 9 | 331 | 34 | 365 |
| Departure | 296 | 11 | 4 | 311 | 7 | 318 | 666 | 27 | 10 | 703 | 7 | 710 |
| Total | 787 | 31 | 15 | 833 | 32 | 865 | 976 | 39 | 19 | 1,034 | 41 | 1,075 |
| South Leg | | | | | | | | | | | | |
| Approach | 377 | 15 | 7 | 399 | 11 | 410 | 762 | 31 | 16 | 809 | 13 | 822 |
| Departure | 550 | 22 | 9 | 581 | 45 | 626 | 358 | 14 | 10 | 382 | 59 | 441 |
| Total | 927 | 37 | 16 | 980 | 56 | 1,036 | 1,120 | 45 | 26 | 1,191 | 72 | 1,263 |
| East Leg | | | | | | | | | | | | |
| Approach | 128 | 5 | 19 | 152 | 13 | 165 | 215 | 8 | 18 | 241 | 16 | 257 |
| Departure | 233 | 10 | 15 | 258 | 3 | 261 | 275 | 11 | 18 | 304 | 4 | 308 |
| Total | 361 | 15 | 34 | 410 | 16 | 426 | 490 | 19 | 36 | 545 | 20 | 565 |
| West Leg | | | | | | | | | | | | |
| Approach | 238 | 9 | 14 | 261 | 7 | 268 | 261 | 11 | 17 | 289 | 9 | 298 |
| Departure | 155 | 6 | 23 | 184 | 1 | 185 | 249 | 10 | 22 | 281 | 2 | 283 |
| Total | 393 | 15 | 37 | 445 | 8 | 453 | 510 | 21 | 39 | 570 | 11 | 581 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 1,234 | 49 | 51 | 1,334 | 56 | 1,390 | 1,548 | 62 | 60 | 1,670 | 72 | 1,742 |
| Departure | 1,234 | 49 | 51 | 1,334 | 56 | 1,390 | 1,548 | 62 | 60 | 1,670 | 72 | 1,742 |
| Total | 2,468 | 98 | 102 | 2,668 | 112 | 2,780 | 3,096 | 124 | 120 | 3,340 | 144 | 3,484 |

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## Table B-2 - Opening Year Cumulative (2023) Peak Hour Volume Summary

| | AM Peak Hour | | | | | | PM Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project |
| **2 Marks Avenue/Nielsen Avenue** | | | | | | | | | | | | |
| NBL | 62 | 2 | 1 | 65 | 0 | 65 | 37 | 1 | 2 | 40 | 0 | 40 |
| NBT | 349 | 14 | 8 | 371 | 0 | 371 | 568 | 23 | 16 | 607 | 0 | 607 |
| NBR | 70 | 3 | 6 | 79 | 28 | 107 | 36 | 1 | 2 | 39 | 38 | 77 |
| SBL | 9 | 0 | 0 | 9 | 0 | 9 | 10 | 0 | 0 | 10 | 0 | 10 |
| SBT | 343 | 14 | 8 | 365 | 0 | 365 | 318 | 13 | 7 | 338 | 0 | 338 |
| SBR | 34 | 1 | 1 | 36 | 0 | 36 | 20 | 1 | 2 | 23 | 0 | 23 |
| EBL | 12 | 0 | 1 | 13 | 0 | 13 | 24 | 1 | 3 | 28 | 0 | 28 |
| EBT | 7 | 0 | 0 | 7 | 1 | 8 | 3 | 0 | 1 | 4 | 1 | 5 |
| EBR | 42 | 2 | 1 | 45 | 0 | 45 | 41 | 2 | 2 | 45 | 0 | 45 |
| WBL | 18 | 1 | 2 | 21 | 7 | 28 | 78 | 3 | 7 | 88 | 9 | 97 |
| WBT | 4 | 0 | 0 | 4 | 0 | 4 | 9 | 0 | 1 | 10 | 0 | 10 |
| WBR | 10 | 0 | 0 | 10 | 0 | 10 | 11 | 0 | 0 | 11 | 0 | 11 |
| North Leg | | | | | | | | | | | | |
| Approach | 386 | 15 | 9 | 410 | 0 | 410 | 348 | 14 | 9 | 371 | 0 | 371 |
| Departure | 371 | 14 | 9 | 394 | 0 | 394 | 603 | 24 | 19 | 646 | 0 | 646 |
| Total | 757 | 29 | 18 | 804 | 0 | 804 | 951 | 38 | 28 | 1,017 | 0 | 1,017 |
| South Leg | | | | | | | | | | | | |
| Approach | 481 | 19 | 15 | 515 | 28 | 543 | 641 | 25 | 20 | 686 | 38 | 724 |
| Departure | 403 | 17 | 11 | 431 | 7 | 438 | 437 | 18 | 16 | 471 | 9 | 480 |
| Total | 884 | 36 | 26 | 946 | 35 | 981 | 1,078 | 43 | 36 | 1,157 | 47 | 1,204 |
| East Leg | | | | | | | | | | | | |
| Approach | 32 | 1 | 2 | 35 | 7 | 42 | 98 | 3 | 8 | 109 | 9 | 118 |
| Departure | 86 | 3 | 6 | 95 | 29 | 124 | 49 | 1 | 3 | 53 | 39 | 92 |
| Total | 118 | 4 | 8 | 130 | 36 | 166 | 147 | 4 | 11 | 162 | 48 | 210 |
| West Leg | | | | | | | | | | | | |
| Approach | 61 | 2 | 2 | 65 | 1 | 66 | 68 | 3 | 6 | 77 | 1 | 78 |
| Departure | 100 | 3 | 2 | 105 | 0 | 105 | 66 | 2 | 5 | 73 | 0 | 73 |
| Total | 161 | 5 | 4 | 170 | 1 | 171 | 134 | 5 | 11 | 150 | 1 | 151 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 960 | 37 | 28 | 1,025 | 36 | 1,061 | 1,155 | 45 | 43 | 1,243 | 48 | 1,291 |
| Departure | 960 | 37 | 28 | 1,025 | 36 | 1,061 | 1,155 | 45 | 43 | 1,243 | 48 | 1,291 |
| Total | 1,920 | 74 | 56 | 2,050 | 72 | 2,122 | 2,310 | 90 | 86 | 2,486 | 96 | 2,582 |

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## Table B-2 - Opening Year Cumulative (2023) Peak Hour Volume Summary

| | AM Peak Hour | | | | | | PM Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project |
| **3 Marks Avenue/Ray Johnson Drive** | | | | | | | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NBT | 479 | 19 | 15 | 513 | 28 | 541 | 635 | 25 | 18 | 678 | 38 | 716 |
| NBR | 6 | 0 | 13 | 19 | 0 | 19 | 10 | 0 | 3 | 13 | 0 | 13 |
| SBL | 3 | 0 | 2 | 5 | 0 | 5 | 4 | 0 | 0 | 4 | 0 | 4 |
| SBT | 399 | 16 | 9 | 424 | 7 | 431 | 432 | 17 | 16 | 465 | 9 | 474 |
| SBR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EBR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBL | 8 | 0 | 3 | 11 | 0 | 11 | 17 | 1 | 14 | 32 | 0 | 32 |
| WBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBR | 3 | 0 | 0 | 3 | 0 | 3 | 6 | 0 | 2 | 8 | 0 | 8 |
| North Leg | | | | | | | | | | | | |
| Approach | 402 | 16 | 11 | 429 | 7 | 436 | 436 | 17 | 16 | 469 | 9 | 478 |
| Departure | 482 | 19 | 15 | 516 | 28 | 544 | 641 | 25 | 20 | 686 | 38 | 724 |
| Total | 884 | 35 | 26 | 945 | 35 | 980 | 1,078 | 42 | 36 | 1,156 | 47 | 1,202 |
| South Leg | | | | | | | | | | | | |
| Approach | 485 | 19 | 28 | 532 | 28 | 560 | 645 | 25 | 21 | 691 | 38 | 729 |
| Departure | 407 | 16 | 12 | 435 | 7 | 442 | 449 | 18 | 30 | 497 | 9 | 506 |
| Total | 892 | 35 | 40 | 967 | 35 | 1,002 | 1,095 | 43 | 51 | 1,189 | 47 | 1,235 |
| East Leg | | | | | | | | | | | | |
| Approach | 11 | 0 | 3 | 14 | 0 | 14 | 23 | 1 | 16 | 40 | 0 | 40 |
| Departure | 9 | 0 | 15 | 24 | 0 | 24 | 14 | 0 | 3 | 17 | 0 | 17 |
| Total | 20 | 0 | 18 | 38 | 0 | 38 | 37 | 1 | 19 | 57 | 0 | 57 |
| West Leg | | | | | | | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 898 | 35 | 42 | 975 | 35 | 1,010 | 1,105 | 43 | 53 | 1,201 | 47 | 1,247 |
| Departure | 898 | 35 | 42 | 975 | 35 | 1,010 | 1,105 | 43 | 53 | 1,201 | 47 | 1,247 |
| Total | 1,796 | 70 | 84 | 1,950 | 70 | 2,020 | 2,209 | 86 | 106 | 2,401 | 94 | 2,494 |

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## Table B-2 - Opening Year Cumulative (2023) Peak Hour Volume Summary

| | AM Peak Hour | | | | | | PM Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project |
| **4 Marks Avenue/SR-180 Westbound Ramps** | | | | | | | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NBT | 82 | 3 | 21 | 106 | 5 | 111 | 144 | 6 | 14 | 164 | 5 | 169 |
| NBR | 11 | 0 | 0 | 11 | 0 | 11 | 15 | 1 | 0 | 16 | 0 | 16 |
| SBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SBT | 402 | 16 | 3 | 421 | 7 | 428 | 425 | 17 | 10 | 452 | 9 | 461 |
| SBR | 24 | 1 | 8 | 33 | 0 | 33 | 23 | 1 | 20 | 44 | 0 | 44 |
| EBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EBR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBL | 180 | 7 | 6 | 193 | 0 | 193 | 242 | 10 | 18 | 270 | 0 | 270 |
| WBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBR | 395 | 16 | 3 | 414 | 23 | 437 | 518 | 21 | 3 | 542 | 32 | 574 |
| North Leg | | | | | | | | | | | | |
| Approach | 426 | 17 | 11 | 454 | 7 | 461 | 448 | 18 | 30 | 496 | 9 | 505 |
| Departure | 477 | 19 | 24 | 520 | 28 | 548 | 662 | 27 | 17 | 706 | 37 | 743 |
| Total | 903 | 36 | 35 | 974 | 35 | 1,009 | 1,111 | 45 | 47 | 1,203 | 46 | 1,248 |
| South Leg | | | | | | | | | | | | |
| Approach | 93 | 3 | 21 | 117 | 5 | 122 | 159 | 7 | 14 | 180 | 5 | 185 |
| Departure | 582 | 23 | 9 | 614 | 7 | 621 | 667 | 27 | 28 | 722 | 9 | 731 |
| Total | 675 | 26 | 30 | 731 | 12 | 743 | 826 | 34 | 42 | 902 | 14 | 916 |
| East Leg | | | | | | | | | | | | |
| Approach | 575 | 23 | 9 | 607 | 23 | 630 | 760 | 31 | 21 | 812 | 32 | 844 |
| Departure | 11 | 0 | 0 | 11 | 0 | 11 | 15 | 1 | 0 | 16 | 0 | 16 |
| Total | 586 | 23 | 9 | 618 | 23 | 641 | 775 | 32 | 21 | 828 | 32 | 860 |
| West Leg | | | | | | | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 24 | 1 | 8 | 33 | 0 | 33 | 23 | 1 | 20 | 44 | 0 | 44 |
| Total | 24 | 1 | 8 | 33 | 0 | 33 | 23 | 1 | 20 | 44 | 0 | 44 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 1,094 | 43 | 41 | 1,178 | 35 | 1,213 | 1,368 | 56 | 65 | 1,489 | 46 | 1,534 |
| Departure | 1,094 | 43 | 41 | 1,178 | 35 | 1,213 | 1,368 | 56 | 65 | 1,489 | 46 | 1,534 |
| Total | 2,188 | 86 | 82 | 2,356 | 70 | 2,426 | 2,735 | 112 | 130 | 2,977 | 92 | 3,068 |

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## Table B-2 - Opening Year Cumulative (2023) Peak Hour Volume Summary

| | AM Peak Hour | | | | | | PM Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project |
| **5 Marks Avenue/SR-180 Eastbound Ramps** | | | | | | | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NBT | 83 | 3 | 3 | 89 | 3 | 92 | 140 | 6 | 3 | 149 | 3 | 152 |
| NBR | 223 | 9 | 14 | 246 | 0 | 246 | 266 | 11 | 9 | 286 | 0 | 286 |
| SBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SBT | 291 | 12 | 6 | 309 | 0 | 309 | 359 | 14 | 18 | 391 | 1 | 392 |
| SBR | 291 | 12 | 1 | 304 | 7 | 311 | 308 | 12 | 7 | 327 | 8 | 335 |
| EBL | 10 | 0 | 18 | 28 | 2 | 30 | 19 | 1 | 11 | 31 | 2 | 33 |
| EBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EBR | 11 | 0 | 0 | 11 | 0 | 11 | 20 | 1 | 0 | 21 | 0 | 21 |
| WBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| North Leg | | | | | | | | | | | | |
| Approach | 582 | 24 | 7 | 613 | 7 | 620 | 667 | 26 | 25 | 718 | 9 | 727 |
| Departure | 93 | 3 | 21 | 117 | 5 | 122 | 159 | 7 | 14 | 180 | 5 | 185 |
| Total | 675 | 27 | 28 | 730 | 12 | 742 | 826 | 33 | 39 | 898 | 14 | 912 |
| South Leg | | | | | | | | | | | | |
| Approach | 306 | 12 | 17 | 335 | 3 | 338 | 406 | 17 | 12 | 435 | 3 | 438 |
| Departure | 302 | 12 | 6 | 320 | 0 | 320 | 379 | 15 | 18 | 412 | 1 | 413 |
| Total | 608 | 24 | 23 | 655 | 3 | 658 | 785 | 32 | 30 | 847 | 4 | 851 |
| East Leg | | | | | | | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 223 | 9 | 14 | 246 | 0 | 246 | 266 | 11 | 9 | 286 | 0 | 286 |
| Total | 223 | 9 | 14 | 246 | 0 | 246 | 266 | 11 | 9 | 286 | 0 | 286 |
| West Leg | | | | | | | | | | | | |
| Approach | 21 | 0 | 18 | 39 | 2 | 41 | 39 | 2 | 11 | 52 | 2 | 54 |
| Departure | 291 | 12 | 1 | 304 | 7 | 311 | 308 | 12 | 7 | 327 | 8 | 335 |
| Total | 312 | 12 | 19 | 343 | 9 | 352 | 347 | 14 | 18 | 379 | 10 | 389 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 909 | 36 | 42 | 987 | 12 | 999 | 1,112 | 45 | 48 | 1,205 | 14 | 1,219 |
| Departure | 909 | 36 | 42 | 987 | 12 | 999 | 1,112 | 45 | 48 | 1,205 | 14 | 1,219 |
| Total | 1,819 | 72 | 84 | 1,975 | 24 | 1,998 | 2,224 | 90 | 96 | 2,410 | 28 | 2,438 |

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## Table B-2 - Opening Year Cumulative (2023) Peak Hour Volume Summary

| | AM Peak Hour | | | | | | PM Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project |
| **6 Hughes Avenue/Belmont Avenue** | | | | | | | | | | | | |
| NBL | 6 | 0 | 1 | 7 | 0 | 7 | 14 | 1 | 8 | 23 | 0 | 23 |
| NBT | 27 | 1 | 1 | 29 | 1 | 30 | 42 | 2 | 8 | 52 | 1 | 53 |
| NBR | 33 | 1 | 4 | 38 | 5 | 43 | 56 | 2 | 20 | 78 | 5 | 83 |
| SBL | 26 | 1 | 0 | 27 | 0 | 27 | 40 | 2 | 0 | 42 | 0 | 42 |
| SBT | 22 | 1 | 8 | 31 | 3 | 34 | 47 | 2 | 1 | 50 | 5 | 55 |
| SBR | 15 | 1 | 0 | 16 | 0 | 16 | 15 | 1 | 0 | 16 | 0 | 16 |
| EBL | 20 | 1 | 0 | 21 | 0 | 21 | 37 | 1 | 0 | 38 | 0 | 38 |
| EBT | 192 | 8 | 15 | 215 | 3 | 218 | 239 | 10 | 18 | 267 | 4 | 271 |
| EBR | 17 | 1 | 8 | 26 | 0 | 26 | 10 | 0 | 1 | 11 | 0 | 11 |
| WBL | 27 | 1 | 20 | 48 | 17 | 65 | 43 | 2 | 3 | 48 | 20 | 68 |
| WBT | 152 | 6 | 20 | 178 | 12 | 190 | 190 | 8 | 18 | 216 | 15 | 231 |
| WBR | 15 | 1 | 0 | 16 | 0 | 16 | 34 | 1 | 0 | 35 | 0 | 35 |
| North Leg | | | | | | | | | | | | |
| Approach | 63 | 3 | 8 | 74 | 3 | 77 | 102 | 5 | 1 | 108 | 5 | 113 |
| Departure | 62 | 3 | 1 | 66 | 1 | 67 | 113 | 4 | 8 | 125 | 1 | 126 |
| Total | 125 | 6 | 9 | 140 | 4 | 144 | 215 | 9 | 9 | 233 | 6 | 239 |
| South Leg | | | | | | | | | | | | |
| Approach | 66 | 2 | 6 | 74 | 6 | 80 | 112 | 5 | 36 | 153 | 6 | 159 |
| Departure | 66 | 3 | 36 | 105 | 20 | 125 | 100 | 4 | 5 | 109 | 25 | 134 |
| Total | 132 | 5 | 42 | 179 | 26 | 205 | 212 | 9 | 41 | 262 | 31 | 293 |
| East Leg | | | | | | | | | | | | |
| Approach | 194 | 8 | 40 | 242 | 29 | 271 | 267 | 11 | 21 | 299 | 35 | 334 |
| Departure | 251 | 10 | 19 | 280 | 8 | 288 | 335 | 14 | 38 | 387 | 9 | 396 |
| Total | 445 | 18 | 59 | 522 | 37 | 559 | 602 | 25 | 59 | 686 | 44 | 730 |
| West Leg | | | | | | | | | | | | |
| Approach | 229 | 10 | 23 | 262 | 3 | 265 | 286 | 11 | 19 | 316 | 4 | 320 |
| Departure | 173 | 7 | 21 | 201 | 12 | 213 | 219 | 10 | 26 | 255 | 15 | 270 |
| Total | 402 | 17 | 44 | 463 | 15 | 478 | 505 | 21 | 45 | 571 | 19 | 590 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 552 | 23 | 77 | 652 | 41 | 693 | 767 | 32 | 77 | 876 | 50 | 926 |
| Departure | 552 | 23 | 77 | 652 | 41 | 693 | 767 | 32 | 77 | 876 | 50 | 926 |
| Total | 1,104 | 46 | 154 | 1,304 | 82 | 1,386 | 1,534 | 64 | 154 | 1,752 | 100 | 1,852 |

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**Table B-2 - Opening Year Cumulative (2023) Peak Hour Volume Summary**

| | AM Peak Hour | | | | | | PM Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project |
| **7 Hughes Avenue/Nielsen Avenue** | | | | | | | | | | | | |
| NBL | 5 | 0 | 2 | 7 | 4 | 11 | 25 | 1 | 7 | 33 | 6 | 39 |
| NBT | 44 | 2 | 4 | 50 | 2 | 52 | 83 | 3 | 35 | 121 | 2 | 123 |
| NBR | 1 | 0 | 1 | 2 | 0 | 2 | 3 | 0 | 4 | 7 | 0 | 7 |
| SBL | 8 | 0 | 0 | 8 | 2 | 10 | 9 | 0 | 0 | 9 | 2 | 11 |
| SBT | 46 | 2 | 34 | 82 | 1 | 83 | 73 | 3 | 4 | 80 | 1 | 81 |
| SBR | 10 | 0 | 0 | 10 | 0 | 10 | 13 | 1 | 0 | 14 | 0 | 14 |
| EBL | 8 | 0 | 0 | 8 | 0 | 8 | 8 | 0 | 0 | 8 | 0 | 8 |
| EBT | 35 | 1 | 0 | 36 | 0 | 36 | 25 | 1 | 1 | 27 | 0 | 27 |
| EBR | 24 | 1 | 6 | 31 | 1 | 32 | 11 | 0 | 2 | 13 | 2 | 15 |
| WBL | 2 | 0 | 3 | 5 | 0 | 5 | 4 | 0 | 1 | 5 | 0 | 5 |
| WBT | 10 | 0 | 0 | 10 | 2 | 12 | 35 | 1 | 0 | 36 | 2 | 38 |
| WBR | 8 | 0 | 0 | 8 | 7 | 15 | 14 | 1 | 0 | 15 | 9 | 24 |
| North Leg | | | | | | | | | | | | |
| Approach | 64 | 2 | 34 | 100 | 3 | 103 | 95 | 4 | 4 | 103 | 3 | 106 |
| Departure | 60 | 2 | 4 | 66 | 9 | 75 | 105 | 4 | 35 | 144 | 11 | 155 |
| Total | 124 | 4 | 38 | 166 | 12 | 178 | 200 | 8 | 39 | 247 | 14 | 261 |
| South Leg | | | | | | | | | | | | |
| Approach | 50 | 2 | 7 | 59 | 6 | 65 | 111 | 4 | 46 | 161 | 8 | 169 |
| Departure | 72 | 3 | 43 | 118 | 2 | 120 | 88 | 3 | 7 | 98 | 3 | 101 |
| Total | 122 | 5 | 50 | 177 | 8 | 185 | 199 | 7 | 53 | 259 | 11 | 270 |
| East Leg | | | | | | | | | | | | |
| Approach | 20 | 0 | 3 | 23 | 9 | 32 | 53 | 2 | 1 | 56 | 11 | 67 |
| Departure | 44 | 1 | 1 | 46 | 2 | 48 | 37 | 1 | 5 | 43 | 2 | 45 |
| Total | 64 | 1 | 4 | 69 | 11 | 80 | 90 | 3 | 6 | 99 | 13 | 112 |
| West Leg | | | | | | | | | | | | |
| Approach | 67 | 2 | 6 | 75 | 1 | 76 | 44 | 1 | 3 | 48 | 2 | 50 |
| Departure | 25 | 0 | 2 | 27 | 6 | 33 | 73 | 3 | 7 | 83 | 8 | 91 |
| Total | 92 | 2 | 8 | 102 | 7 | 109 | 117 | 4 | 10 | 131 | 10 | 141 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 201 | 6 | 50 | 257 | 19 | 276 | 303 | 11 | 54 | 368 | 24 | 392 |
| Departure | 201 | 6 | 50 | 257 | 19 | 276 | 303 | 11 | 54 | 368 | 24 | 392 |
| Total | 402 | 12 | 100 | 514 | 38 | 552 | 606 | 22 | 108 | 736 | 48 | 784 |

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## Table C-4-Build-Out (2035) Peak Hour Volume Summary

| | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Build-Out Without Project | Net Project Trips | Build-Out With Project | Build-Out Without Project | Net Project Trips | Build-Out With Project |
| **1 Marks Avenue/Belmont Avenue** | | | | | | |
| NBL | 73 | 1 | 74 | 163 | 2 | 165 |
| NBT | 288 | 7 | 295 | 654 | 7 | 661 |
| NBR | 93 | 3 | 96 | 91 | 4 | 95 |
| SBL | 73 | 0 | 73 | 34 | 0 | 34 |
| SBT | 471 | 25 | 496 | 290 | 34 | 324 |
| SBR | 32 | 0 | 32 | 50 | 0 | 50 |
| EBL | 31 | 0 | 31 | 37 | 0 | 37 |
| EBT | 239 | 0 | 239 | 220 | 0 | 220 |
| EBR | 113 | 7 | 120 | 70 | 9 | 79 |
| WBL | 43 | 13 | 56 | 41 | 16 | 57 |
| WBT | 104 | 0 | 104 | 182 | 0 | 182 |
| WBR | 13 | 0 | 13 | 67 | 0 | 67 |
| North Leg | | | | | | |
| Approach | 576 | 25 | 601 | 374 | 34 | 408 |
| Departure | 332 | 7 | 339 | 758 | 7 | 765 |
| Total | 908 | 32 | 940 | 1,132 | 41 | 1,173 |
| South Leg | | | | | | |
| Approach | 454 | 11 | 465 | 908 | 13 | 921 |
| Departure | 627 | 45 | 672 | 401 | 59 | 460 |
| Total | 1,081 | 56 | 1,137 | 1,309 | 72 | 1,381 |
| East Leg | | | | | | |
| Approach | 160 | 13 | 173 | 290 | 16 | 306 |
| Departure | 405 | 3 | 408 | 345 | 4 | 349 |
| Total | 565 | 16 | 581 | 635 | 20 | 655 |
| West Leg | | | | | | |
| Approach | 383 | 7 | 390 | 327 | 9 | 336 |
| Departure | 209 | 1 | 210 | 395 | 2 | 397 |
| Total | 592 | 8 | 600 | 722 | 11 | 733 |
| Total Approaches | | | | | | |
| Approach | 1,573 | 56 | 1,629 | 1,899 | 72 | 1,971 |
| Departure | 1,573 | 56 | 1,629 | 1,899 | 72 | 1,971 |
| Total | 3,146 | 112 | 3,258 | 3,798 | 144 | 3,942 |

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## Table C-4-Build-Out (2035) Peak Hour Volume Summary

| | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Build-Out Without Project | Net Project Trips | Build-Out With Project | Build-Out Without Project | Net Project Trips | Build-Out With Project |
| **2 Marks Avenue/Nielsen Avenue** | | | | | | |
| NBL | 68 | 0 | 68 | 42 | 0 | 42 |
| NBT | 390 | 0 | 390 | 638 | 0 | 638 |
| NBR | 93 | 28 | 121 | 41 | 38 | 79 |
| SBL | 14 | 0 | 14 | 11 | 0 | 11 |
| SBT | 383 | 0 | 383 | 354 | 0 | 354 |
| SBR | 39 | 0 | 39 | 24 | 0 | 24 |
| EBL | 14 | 0 | 14 | 33 | 0 | 33 |
| EBT | 10 | 1 | 11 | 4 | 1 | 5 |
| EBR | 46 | 0 | 46 | 47 | 0 | 47 |
| WBL | 22 | 7 | 29 | 92 | 9 | 101 |
| WBT | 4 | 0 | 4 | 11 | 0 | 11 |
| WBR | 11 | 0 | 11 | 12 | 0 | 12 |
| North Leg | | | | | | |
| Approach | 436 | 0 | 436 | 389 | 0 | 389 |
| Departure | 415 | 0 | 415 | 683 | 0 | 683 |
| Total | 851 | 0 | 851 | 1,072 | 0 | 1,072 |
| South Leg | | | | | | |
| Approach | 551 | 28 | 579 | 721 | 38 | 759 |
| Departure | 451 | 7 | 458 | 493 | 9 | 502 |
| Total | 1,002 | 35 | 1,037 | 1,214 | 47 | 1,261 |
| East Leg | | | | | | |
| Approach | 37 | 7 | 44 | 115 | 9 | 124 |
| Departure | 117 | 29 | 146 | 56 | 39 | 95 |
| Total | 154 | 36 | 190 | 171 | 48 | 219 |
| West Leg | | | | | | |
| Approach | 70 | 1 | 71 | 84 | 1 | 85 |
| Departure | 111 | 0 | 111 | 77 | 0 | 77 |
| Total | 181 | 1 | 182 | 161 | 1 | 162 |
| Total Approaches | | | | | | |
| Approach | 1,094 | 36 | 1,130 | 1,309 | 48 | 1,357 |
| Departure | 1,094 | 36 | 1,130 | 1,309 | 48 | 1,357 |
| Total | 2,188 | 72 | 2,260 | 2,618 | 96 | 2,714 |

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## Table C-4-Build-Out (2035) Peak Hour Volume Summary

| | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Build-Out Without Project | Net Project Trips | Build-Out With Project | Build-Out Without Project | Net Project Trips | Build-Out With Project |
| **3 Marks Avenue/Ray Johnson Drive** | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 |
| NBT | 548 | 28 | 576 | 712 | 38 | 750 |
| NBR | 20 | 0 | 20 | 14 | 0 | 14 |
| SBL | 5 | 0 | 5 | 4 | 0 | 4 |
| SBT | 446 | 7 | 453 | 488 | 9 | 497 |
| SBR | 0 | 0 | 0 | 0 | 0 | 0 |
| EBL | 0 | 0 | 0 | 0 | 0 | 0 |
| EBT | 0 | 0 | 0 | 0 | 0 | 0 |
| EBR | 0 | 0 | 0 | 0 | 0 | 0 |
| WBL | 12 | 0 | 12 | 34 | 0 | 34 |
| WBT | 0 | 0 | 0 | 0 | 0 | 0 |
| WBR | 3 | 0 | 3 | 9 | 0 | 9 |
| North Leg | | | | | | |
| Approach | 451 | 7 | 458 | 492 | 9 | 501 |
| Departure | 551 | 28 | 579 | 721 | 38 | 759 |
| Total | 1,002 | 35 | 1,037 | 1,213 | 47 | 1,260 |
| South Leg | | | | | | |
| Approach | 568 | 28 | 596 | 726 | 38 | 764 |
| Departure | 458 | 7 | 465 | 522 | 9 | 531 |
| Total | 1,026 | 35 | 1,061 | 1,248 | 47 | 1,295 |
| East Leg | | | | | | |
| Approach | 15 | 0 | 15 | 43 | 0 | 43 |
| Departure | 25 | 0 | 25 | 18 | 0 | 18 |
| Total | 40 | 0 | 40 | 61 | 0 | 61 |
| West Leg | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Approaches | | | | | | |
| Approach | 1,034 | 35 | 1,069 | 1,261 | 47 | 1,308 |
| Departure | 1,034 | 35 | 1,069 | 1,261 | 47 | 1,308 |
| Total | 2,068 | 70 | 2,138 | 2,522 | 94 | 2,616 |

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## Table C-4-Build-Out (2035) Peak Hour Volume Summary

| | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Build-Out Without Project | Net Project Trips | Build-Out With Project | Build-Out Without Project | Net Project Trips | Build-Out With Project |
| **4 Marks Avenue/SR-180 Westbound Ramps** | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 |
| NBT | 142 | 5 | 147 | 213 | 5 | 218 |
| NBR | 15 | 0 | 15 | 18 | 0 | 18 |
| SBL | 0 | 0 | 0 | 0 | 0 | 0 |
| SBT | 454 | 7 | 461 | 489 | 9 | 498 |
| SBR | 37 | 0 | 37 | 47 | 0 | 47 |
| EBL | 0 | 0 | 0 | 0 | 0 | 0 |
| EBT | 0 | 0 | 0 | 0 | 0 | 0 |
| EBR | 0 | 0 | 0 | 0 | 0 | 0 |
| WBL | 227 | 0 | 227 | 372 | 0 | 372 |
| WBT | 0 | 0 | 0 | 0 | 0 | 0 |
| WBR | 453 | 23 | 476 | 588 | 32 | 620 |
| North Leg | | | | | | |
| Approach | 491 | 7 | 498 | 536 | 9 | 545 |
| Departure | 595 | 28 | 623 | 801 | 37 | 838 |
| Total | 1,086 | 35 | 1,121 | 1,337 | 46 | 1,383 |
| South Leg | | | | | | |
| Approach | 157 | 5 | 162 | 231 | 5 | 236 |
| Departure | 681 | 7 | 688 | 861 | 9 | 870 |
| Total | 838 | 12 | 850 | 1,092 | 14 | 1,106 |
| East Leg | | | | | | |
| Approach | 680 | 23 | 703 | 960 | 32 | 992 |
| Departure | 15 | 0 | 15 | 18 | 0 | 18 |
| Total | 695 | 23 | 718 | 978 | 32 | 1,010 |
| West Leg | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 37 | 0 | 37 | 47 | 0 | 47 |
| Total | 37 | 0 | 37 | 47 | 0 | 47 |
| Total Approaches | | | | | | |
| Approach | 1,328 | 35 | 1,363 | 1,727 | 46 | 1,773 |
| Departure | 1,328 | 35 | 1,363 | 1,727 | 46 | 1,773 |
| Total | 2,656 | 70 | 2,726 | 3,454 | 92 | 3,546 |

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## Table C-4-Build-Out (2035) Peak Hour Volume Summary

| | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Build-Out Without Project | Net Project Trips | Build-Out With Project | Build-Out Without Project | Net Project Trips | Build-Out With Project |
| **5 Marks Avenue/SR-180 Eastbound Ramps** | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 |
| NBT | 128 | 3 | 131 | 198 | 3 | 201 |
| NBR | 358 | 0 | 358 | 296 | 0 | 296 |
| SBL | 0 | 0 | 0 | 0 | 0 | 0 |
| SBT | 361 | 0 | 361 | 517 | 1 | 518 |
| SBR | 320 | 7 | 327 | 344 | 8 | 352 |
| EBL | 29 | 2 | 31 | 33 | 2 | 35 |
| EBT | 0 | 0 | 0 | 0 | 0 | 0 |
| EBR | 11 | 0 | 11 | 22 | 0 | 22 |
| WBL | 0 | 0 | 0 | 0 | 0 | 0 |
| WBT | 0 | 0 | 0 | 0 | 0 | 0 |
| WBR | 0 | 0 | 0 | 0 | 0 | 0 |
| North Leg | | | | | | |
| Approach | 681 | 7 | 688 | 861 | 9 | 870 |
| Departure | 157 | 5 | 162 | 231 | 5 | 236 |
| Total | 838 | 12 | 850 | 1,092 | 14 | 1,106 |
| South Leg | | | | | | |
| Approach | 486 | 3 | 489 | 494 | 3 | 497 |
| Departure | 372 | 0 | 372 | 539 | 1 | 540 |
| Total | 858 | 3 | 861 | 1,033 | 4 | 1,037 |
| East Leg | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 358 | 0 | 358 | 296 | 0 | 296 |
| Total | 358 | 0 | 358 | 296 | 0 | 296 |
| West Leg | | | | | | |
| Approach | 40 | 2 | 42 | 55 | 2 | 57 |
| Departure | 320 | 7 | 327 | 344 | 8 | 352 |
| Total | 360 | 9 | 369 | 399 | 10 | 409 |
| Total Approaches | | | | | | |
| Approach | 1,207 | 12 | 1,219 | 1,410 | 14 | 1,424 |
| Departure | 1,207 | 12 | 1,219 | 1,410 | 14 | 1,424 |
| Total | 2,414 | 24 | 2,438 | 2,820 | 28 | 2,848 |

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## Table C-4-Build-Out (2035) Peak Hour Volume Summary

| | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Build-Out Without Project | Net Project Trips | Build-Out With Project | Build-Out Without Project | Net Project Trips | Build-Out With Project |
| **6 Hughes Avenue/Belmont Avenue** | | | | | | |
| NBL | 17 | 0 | 17 | 35 | 0 | 35 |
| NBT | 93 | 1 | 94 | 55 | 1 | 56 |
| NBR | 62 | 5 | 67 | 82 | 5 | 87 |
| SBL | 28 | 0 | 28 | 44 | 0 | 44 |
| SBT | 47 | 3 | 50 | 107 | 5 | 112 |
| SBR | 21 | 0 | 21 | 37 | 0 | 37 |
| EBL | 53 | 0 | 53 | 55 | 0 | 55 |
| EBT | 276 | 3 | 279 | 281 | 4 | 285 |
| EBR | 59 | 0 | 59 | 28 | 0 | 28 |
| WBL | 50 | 17 | 67 | 48 | 20 | 68 |
| WBT | 187 | 12 | 199 | 233 | 15 | 248 |
| WBR | 17 | 0 | 17 | 37 | 0 | 37 |
| North Leg | | | | | | |
| Approach | 96 | 3 | 99 | 188 | 5 | 193 |
| Departure | 163 | 1 | 164 | 147 | 1 | 148 |
| Total | 259 | 4 | 263 | 335 | 6 | 341 |
| South Leg | | | | | | |
| Approach | 172 | 6 | 178 | 172 | 6 | 178 |
| Departure | 156 | 20 | 176 | 183 | 25 | 208 |
| Total | 328 | 26 | 354 | 355 | 31 | 386 |
| East Leg | | | | | | |
| Approach | 254 | 29 | 283 | 318 | 35 | 353 |
| Departure | 366 | 8 | 374 | 407 | 9 | 416 |
| Total | 620 | 37 | 657 | 725 | 44 | 769 |
| West Leg | | | | | | |
| Approach | 388 | 3 | 391 | 364 | 4 | 368 |
| Departure | 225 | 12 | 237 | 305 | 15 | 320 |
| Total | 613 | 15 | 628 | 669 | 19 | 688 |
| Total Approaches | | | | | | |
| Approach | 910 | 41 | 951 | 1,042 | 50 | 1,092 |
| Departure | 910 | 41 | 951 | 1,042 | 50 | 1,092 |
| Total | 1,820 | 82 | 1,902 | 2,084 | 100 | 2,184 |

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## Table C-4-Build-Out (2035) Peak Hour Volume Summary

| | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Build-Out Without Project | Net Project Trips | Build-Out With Project | Build-Out Without Project | Net Project Trips | Build-Out With Project |
| **7 Hughes Avenue/Nielsen Avenue** | | | | | | |
| NBL | 7 | 4 | 11 | 35 | 6 | 41 |
| NBT | 127 | 2 | 129 | 123 | 2 | 125 |
| NBR | 2 | 0 | 2 | 24 | 0 | 24 |
| SBL | 18 | 2 | 20 | 16 | 2 | 18 |
| SBT | 115 | 1 | 116 | 174 | 1 | 175 |
| SBR | 11 | 0 | 11 | 15 | 0 | 15 |
| EBL | 24 | 0 | 24 | 8 | 0 | 8 |
| EBT | 45 | 0 | 45 | 28 | 0 | 28 |
| EBR | 35 | 1 | 36 | 14 | 2 | 16 |
| WBL | 5 | 0 | 5 | 27 | 0 | 27 |
| WBT | 11 | 2 | 13 | 38 | 2 | 40 |
| WBR | 19 | 7 | 26 | 16 | 9 | 25 |
| North Leg | | | | | | |
| Approach | 144 | 3 | 147 | 205 | 3 | 208 |
| Departure | 170 | 9 | 179 | 147 | 11 | 158 |
| Total | 314 | 12 | 326 | 352 | 14 | 366 |
| South Leg | | | | | | |
| Approach | 136 | 6 | 142 | 182 | 8 | 190 |
| Departure | 155 | 2 | 157 | 215 | 3 | 218 |
| Total | 291 | 8 | 299 | 397 | 11 | 408 |
| East Leg | | | | | | |
| Approach | 35 | 9 | 44 | 81 | 11 | 92 |
| Departure | 65 | 2 | 67 | 68 | 2 | 70 |
| Total | 100 | 11 | 111 | 149 | 13 | 162 |
| West Leg | | | | | | |
| Approach | 104 | 1 | 105 | 50 | 2 | 52 |
| Departure | 29 | 6 | 35 | 88 | 8 | 96 |
| Total | 133 | 7 | 140 | 138 | 10 | 148 |
| Total Approaches | | | | | | |
| Approach | 419 | 19 | 438 | 518 | 24 | 542 |
| Departure | 419 | 19 | 438 | 518 | 24 | 542 |
| Total | 838 | 38 | 876 | 1,036 | 48 | 1,084 |

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**Table B-2 - Near-Term Approved and Pending Project (2023) Peak Hour Volume Summary - Worst case**

| | AM Peak Hour | | | | | | PM Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project |
| **3 Marks Avenue/Ray Johnson Drive** | | | | | | | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NBT | 479 | 19 | 15 | 513 | 68 | 581 | 635 | 25 | 18 | 678 | 88 | 766 |
| NBR | 6 | 0 | 13 | 19 | 0 | 19 | 10 | 0 | 3 | 13 | 0 | 13 |
| SBL | 3 | 0 | 2 | 5 | 0 | 5 | 4 | 0 | 0 | 4 | 0 | 4 |
| SBT | 399 | 16 | 9 | 424 | 17 | 441 | 432 | 17 | 16 | 465 | 21 | 486 |
| SBR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EBR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBL | 8 | 0 | 3 | 11 | 0 | 11 | 17 | 1 | 14 | 32 | 0 | 32 |
| WBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBR | 3 | 0 | 0 | 3 | 0 | 3 | 6 | 0 | 2 | 8 | 0 | 8 |
| North Leg | | | | | | | | | | | | |
| Approach | 402 | 16 | 11 | 429 | 17 | 446 | 436 | 17 | 16 | 469 | 21 | 490 |
| Departure | 482 | 19 | 15 | 516 | 68 | 584 | 641 | 25 | 20 | 686 | 88 | 774 |
| Total | 884 | 35 | 26 | 945 | 85 | 1,030 | 1,078 | 42 | 36 | 1,156 | 109 | 1,264 |
| South Leg | | | | | | | | | | | | |
| Approach | 485 | 19 | 28 | 532 | 68 | 600 | 645 | 25 | 21 | 691 | 88 | 779 |
| Departure | 407 | 16 | 12 | 435 | 17 | 452 | 449 | 18 | 30 | 497 | 21 | 518 |
| Total | 892 | 35 | 40 | 967 | 85 | 1,052 | 1,095 | 43 | 51 | 1,189 | 109 | 1,297 |
| East Leg | | | | | | | | | | | | |
| Approach | 11 | 0 | 3 | 14 | 0 | 14 | 23 | 1 | 16 | 40 | 0 | 40 |
| Departure | 9 | 0 | 15 | 24 | 0 | 24 | 14 | 0 | 3 | 17 | 0 | 17 |
| Total | 20 | 0 | 18 | 38 | 0 | 38 | 37 | 1 | 19 | 57 | 0 | 57 |
| West Leg | | | | | | | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 898 | 35 | 42 | 975 | 85 | 1,060 | 1,105 | 43 | 53 | 1,201 | 109 | 1,309 |
| Departure | 898 | 35 | 42 | 975 | 85 | 1,060 | 1,105 | 43 | 53 | 1,201 | 109 | 1,309 |
| Total | 1,796 | 70 | 84 | 1,950 | 170 | 2,120 | 2,209 | 86 | 106 | 2,401 | 218 | 2,618 |

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**Table B-2 - Near-Term Approved and Pending Project (2023) Peak Hour Volume Summary - Worst case**

| | AM Peak Hour | | | | | | PM Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project |
| **4 Marks Avenue/SR-180 Westbound Ramps** | | | | | | | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NBT | 82 | 3 | 21 | 106 | 5 | 111 | 144 | 6 | 14 | 164 | 7 | 171 |
| NBR | 11 | 0 | 0 | 11 | 0 | 11 | 15 | 1 | 0 | 16 | 0 | 16 |
| SBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SBT | 402 | 16 | 3 | 421 | 17 | 438 | 425 | 17 | 10 | 452 | 20 | 472 |
| SBR | 24 | 1 | 8 | 33 | 0 | 33 | 23 | 1 | 20 | 44 | 0 | 44 |
| EBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EBR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBL | 180 | 7 | 6 | 193 | 0 | 193 | 242 | 10 | 18 | 270 | 0 | 270 |
| WBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBR | 395 | 16 | 3 | 414 | 63 | 477 | 518 | 21 | 3 | 542 | 82 | 624 |
| North Leg | | | | | | | | | | | | |
| Approach | 426 | 17 | 11 | 454 | 17 | 471 | 448 | 18 | 30 | 496 | 20 | 516 |
| Departure | 477 | 19 | 24 | 520 | 68 | 588 | 662 | 27 | 17 | 706 | 89 | 795 |
| Total | 903 | 36 | 35 | 974 | 85 | 1,059 | 1,111 | 45 | 47 | 1,203 | 109 | 1,311 |
| South Leg | | | | | | | | | | | | |
| Approach | 93 | 3 | 21 | 117 | 5 | 122 | 159 | 7 | 14 | 180 | 7 | 187 |
| Departure | 582 | 23 | 9 | 614 | 17 | 631 | 667 | 27 | 28 | 722 | 20 | 742 |
| Total | 675 | 26 | 30 | 731 | 22 | 753 | 826 | 34 | 42 | 902 | 27 | 929 |
| East Leg | | | | | | | | | | | | |
| Approach | 575 | 23 | 9 | 607 | 63 | 670 | 760 | 31 | 21 | 812 | 82 | 894 |
| Departure | 11 | 0 | 0 | 11 | 0 | 11 | 15 | 1 | 0 | 16 | 0 | 16 |
| Total | 586 | 23 | 9 | 618 | 63 | 681 | 775 | 32 | 21 | 828 | 82 | 910 |
| West Leg | | | | | | | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 24 | 1 | 8 | 33 | 0 | 33 | 23 | 1 | 20 | 44 | 0 | 44 |
| Total | 24 | 1 | 8 | 33 | 0 | 33 | 23 | 1 | 20 | 44 | 0 | 44 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 1,094 | 43 | 41 | 1,178 | 85 | 1,263 | 1,368 | 56 | 65 | 1,489 | 109 | 1,597 |
| Departure | 1,094 | 43 | 41 | 1,178 | 85 | 1,263 | 1,368 | 56 | 65 | 1,489 | 109 | 1,597 |
| Total | 2,188 | 86 | 82 | 2,356 | 170 | 2,526 | 2,735 | 112 | 130 | 2,977 | 218 | 3,194 |

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**Table B-2 - Near-Term Approved and Pending Project (2023) Peak Hour Volume Summary - Worst case**

| | AM Peak Hour | | | | | | PM Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project | Existing Without Project | 2021-2023 Growth | Cumulative Projects Trips | Cumul Without Project | Net Project Trips | Cumul With Project |
| **5 Marks Avenue/SR-180 Eastbound Ramps** | | | | | | | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NBT | 83 | 3 | 3 | 89 | 3 | 92 | 140 | 6 | 3 | 149 | 3 | 152 |
| NBR | 223 | 9 | 14 | 246 | 0 | 246 | 266 | 11 | 9 | 286 | 0 | 286 |
| SBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SBT | 291 | 12 | 6 | 309 | 0 | 309 | 359 | 14 | 18 | 391 | 0 | 391 |
| SBR | 291 | 12 | 1 | 304 | 16 | 320 | 308 | 12 | 7 | 327 | 20 | 347 |
| EBL | 10 | 0 | 18 | 28 | 3 | 31 | 19 | 1 | 11 | 31 | 3 | 34 |
| EBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EBR | 11 | 0 | 0 | 11 | 0 | 11 | 20 | 1 | 0 | 21 | 0 | 21 |
| WBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| North Leg | | | | | | | | | | | | |
| Approach | 582 | 24 | 7 | 613 | 16 | 629 | 667 | 26 | 25 | 718 | 20 | 738 |
| Departure | 93 | 3 | 21 | 117 | 6 | 123 | 159 | 7 | 14 | 180 | 6 | 186 |
| Total | 675 | 27 | 28 | 730 | 22 | 752 | 826 | 33 | 39 | 898 | 26 | 924 |
| South Leg | | | | | | | | | | | | |
| Approach | 306 | 12 | 17 | 335 | 3 | 338 | 406 | 17 | 12 | 435 | 3 | 438 |
| Departure | 302 | 12 | 6 | 320 | 0 | 320 | 379 | 15 | 18 | 412 | 0 | 412 |
| Total | 608 | 24 | 23 | 655 | 3 | 658 | 785 | 32 | 30 | 847 | 3 | 850 |
| East Leg | | | | | | | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 223 | 9 | 14 | 246 | 0 | 246 | 266 | 11 | 9 | 286 | 0 | 286 |
| Total | 223 | 9 | 14 | 246 | 0 | 246 | 266 | 11 | 9 | 286 | 0 | 286 |
| West Leg | | | | | | | | | | | | |
| Approach | 21 | 0 | 18 | 39 | 3 | 42 | 39 | 2 | 11 | 52 | 3 | 55 |
| Departure | 291 | 12 | 1 | 304 | 16 | 320 | 308 | 12 | 7 | 327 | 20 | 347 |
| Total | 312 | 12 | 19 | 343 | 19 | 362 | 347 | 14 | 18 | 379 | 23 | 402 |
| Total Approaches | | | | | | | | | | | | |
| Approach | 909 | 36 | 42 | 987 | 22 | 1,009 | 1,112 | 45 | 48 | 1,205 | 26 | 1,231 |
| Departure | 909 | 36 | 42 | 987 | 22 | 1,009 | 1,112 | 45 | 48 | 1,205 | 26 | 1,231 |
| Total | 1,819 | 72 | 84 | 1,975 | 44 | 2,018 | 2,224 | 90 | 96 | 2,410 | 52 | 2,462 |

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## Table C-4-Build-Out (2035) Peak Hour Volume Summary

| | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Build-Out Without Project | Net Project Trips | Build-Out With Project | Build-Out Without Project | Net Project Trips | Build-Out With Project |
| **3 Marks Avenue/Ray Johnson Drive** | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 |
| NBT | 548 | 68 | 616 | 712 | 88 | 800 |
| NBR | 20 | 0 | 20 | 14 | 0 | 14 |
| SBL | 5 | 0 | 5 | 4 | 0 | 4 |
| SBT | 446 | 17 | 463 | 488 | 21 | 509 |
| SBR | 0 | 0 | 0 | 0 | 0 | 0 |
| EBL | 0 | 0 | 0 | 0 | 0 | 0 |
| EBT | 0 | 0 | 0 | 0 | 0 | 0 |
| EBR | 0 | 0 | 0 | 0 | 0 | 0 |
| WBL | 12 | 0 | 12 | 34 | 0 | 34 |
| WBT | 0 | 0 | 0 | 0 | 0 | 0 |
| WBR | 3 | 0 | 3 | 9 | 0 | 9 |
| North Leg | | | | | | |
| Approach | 451 | 17 | 468 | 492 | 21 | 513 |
| Departure | 551 | 68 | 619 | 721 | 88 | 809 |
| Total | 1,002 | 85 | 1,087 | 1,213 | 109 | 1,322 |
| South Leg | | | | | | |
| Approach | 568 | 68 | 636 | 726 | 88 | 814 |
| Departure | 458 | 17 | 475 | 522 | 21 | 543 |
| Total | 1,026 | 85 | 1,111 | 1,248 | 109 | 1,357 |
| East Leg | | | | | | |
| Approach | 15 | 0 | 15 | 43 | 0 | 43 |
| Departure | 25 | 0 | 25 | 18 | 0 | 18 |
| Total | 40 | 0 | 40 | 61 | 0 | 61 |
| West Leg | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Approaches | | | | | | |
| Approach | 1,034 | 85 | 1,119 | 1,261 | 109 | 1,370 |
| Departure | 1,034 | 85 | 1,119 | 1,261 | 109 | 1,370 |
| Total | 2,068 | 170 | 2,238 | 2,522 | 218 | 2,740 |

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## Table C-4-Build-Out (2035) Peak Hour Volume Summary

| | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Build-Out Without Project | Net Project Trips | Build-Out With Project | Build-Out Without Project | Net Project Trips | Build-Out With Project |
| **4 Marks Avenue/SR-180 Westbound Ramps** | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 |
| NBT | 142 | 5 | 147 | 213 | 7 | 220 |
| NBR | 15 | 0 | 15 | 18 | 0 | 18 |
| SBL | 0 | 0 | 0 | 0 | 0 | 0 |
| SBT | 454 | 17 | 471 | 489 | 20 | 509 |
| SBR | 37 | 0 | 37 | 47 | 0 | 47 |
| EBL | 0 | 0 | 0 | 0 | 0 | 0 |
| EBT | 0 | 0 | 0 | 0 | 0 | 0 |
| EBR | 0 | 0 | 0 | 0 | 0 | 0 |
| WBL | 227 | 0 | 227 | 372 | 0 | 372 |
| WBT | 0 | 0 | 0 | 0 | 0 | 0 |
| WBR | 453 | 63 | 516 | 588 | 82 | 670 |
| North Leg | | | | | | |
| Approach | 491 | 17 | 508 | 536 | 20 | 556 |
| Departure | 595 | 68 | 663 | 801 | 89 | 890 |
| Total | 1,086 | 85 | 1,171 | 1,337 | 109 | 1,446 |
| South Leg | | | | | | |
| Approach | 157 | 5 | 162 | 231 | 7 | 238 |
| Departure | 681 | 17 | 698 | 861 | 20 | 881 |
| Total | 838 | 22 | 860 | 1,092 | 27 | 1,119 |
| East Leg | | | | | | |
| Approach | 680 | 63 | 743 | 960 | 82 | 1,042 |
| Departure | 15 | 0 | 15 | 18 | 0 | 18 |
| Total | 695 | 63 | 758 | 978 | 82 | 1,060 |
| West Leg | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 37 | 0 | 37 | 47 | 0 | 47 |
| Total | 37 | 0 | 37 | 47 | 0 | 47 |
| Total Approaches | | | | | | |
| Approach | 1,328 | 85 | 1,413 | 1,727 | 109 | 1,836 |
| Departure | 1,328 | 85 | 1,413 | 1,727 | 109 | 1,836 |
| Total | 2,656 | 170 | 2,826 | 3,454 | 218 | 3,672 |

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## Table C-4-Build-Out (2035) Peak Hour Volume Summary

| | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Build-Out Without Project | Net Project Trips | Build-Out With Project | Build-Out Without Project | Net Project Trips | Build-Out With Project |
| **5 Marks Avenue/SR-180 Eastbound Ramps** | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 |
| NBT | 128 | 3 | 131 | 198 | 3 | 201 |
| NBR | 358 | 0 | 358 | 296 | 0 | 296 |
| SBL | 0 | 0 | 0 | 0 | 0 | 0 |
| SBT | 361 | 0 | 361 | 517 | 0 | 517 |
| SBR | 320 | 16 | 336 | 344 | 20 | 364 |
| EBL | 29 | 3 | 32 | 33 | 3 | 36 |
| EBT | 0 | 0 | 0 | 0 | 0 | 0 |
| EBR | 11 | 0 | 11 | 22 | 0 | 22 |
| WBL | 0 | 0 | 0 | 0 | 0 | 0 |
| WBT | 0 | 0 | 0 | 0 | 0 | 0 |
| WBR | 0 | 0 | 0 | 0 | 0 | 0 |
| North Leg | | | | | | |
| Approach | 681 | 16 | 697 | 861 | 20 | 881 |
| Departure | 157 | 6 | 163 | 231 | 6 | 237 |
| Total | 838 | 22 | 860 | 1,092 | 26 | 1,118 |
| South Leg | | | | | | |
| Approach | 486 | 3 | 489 | 494 | 3 | 497 |
| Departure | 372 | 0 | 372 | 539 | 0 | 539 |
| Total | 858 | 3 | 861 | 1,033 | 3 | 1,036 |
| East Leg | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 358 | 0 | 358 | 296 | 0 | 296 |
| Total | 358 | 0 | 358 | 296 | 0 | 296 |
| West Leg | | | | | | |
| Approach | 40 | 3 | 43 | 55 | 3 | 58 |
| Departure | 320 | 16 | 336 | 344 | 20 | 364 |
| Total | 360 | 19 | 379 | 399 | 23 | 422 |
| Total Approaches | | | | | | |
| Approach | 1,207 | 22 | 1,229 | 1,410 | 26 | 1,436 |
| Departure | 1,207 | 22 | 1,229 | 1,410 | 26 | 1,436 |
| Total | 2,414 | 44 | 2,458 | 2,820 | 52 | 2,872 |

# APPENDIX D:

# INTERSECTION LEVEL OF SERVICE WORKSHEETS

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 18.7 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 24 | 127 | 87 | 39 | 78 | 11 | 49 | 261 | 67 | 39 | 424 | 28 |
| Future Vol, veh/h | 24 | 127 | 87 | 39 | 78 | 11 | 49 | 261 | 67 | 39 | 424 | 28 |
| Peak Hour Factor | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 29 | 153 | 105 | 47 | 94 | 13 | 59 | 314 | 81 | 47 | 511 | 34 |
| Number of Lanes | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 3 | 3 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 3 | 3 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 3 | 3 | 3 | 3 |
| HCM Control Delay | 13.8 | 13.3 | 20.6 | 21.1 |
| HCM LOS | B | B | C | C |

| Lane | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 0% | 0% | 100% | 33% | 0% | 100% | 0% | 0% | 100% |
| Vol Right, % | 0% | 0% | 100% | 0% | 0% | 67% | 0% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 49 | 261 | 67 | 24 | 85 | 129 | 39 | 78 | 11 | 39 | 283 |
| LT Vol | 49 | 0 | 0 | 24 | 0 | 0 | 39 | 0 | 0 | 39 | 0 |
| Through Vol | 0 | 261 | 0 | 0 | 85 | 42 | 0 | 78 | 0 | 0 | 283 |
| RT Vol | 0 | 0 | 67 | 0 | 0 | 87 | 0 | 0 | 11 | 0 | 0 |
| Lane Flow Rate | 59 | 314 | 81 | 29 | 102 | 156 | 47 | 94 | 13 | 47 | 341 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.134 | 0.67 | 0.156 | 0.07 | 0.233 | 0.335 | 0.118 | 0.224 | 0.029 | 0.103 | 0.702 |
| Departure Headway (Hd) | 8.168 | 7.668 | 6.968 | 8.716 | 8.216 | 7.745 | 9.074 | 8.574 | 7.874 | 7.917 | 7.417 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 439 | 472 | 513 | 410 | 437 | 463 | 394 | 418 | 453 | 452 | 487 |
| Service Time | 5.927 | 5.427 | 4.727 | 6.482 | 5.982 | 5.511 | 6.847 | 6.347 | 5.647 | 5.672 | 5.172 |
| HCM Lane V/C Ratio | 0.134 | 0.665 | 0.158 | 0.071 | 0.233 | 0.337 | 0.119 | 0.225 | 0.029 | 0.104 | 0.7 |
| HCM Control Delay | 12.2 | 24.7 | 11 | 12.1 | 13.5 | 14.4 | 13.1 | 13.8 | 10.9 | 11.6 | 25.9 |
| HCM Lane LOS | B | C | B | B | B | B | B | B | B | B | D |
| HCM 95th-tile Q | 0.5 | 4.9 | 0.5 | 0.2 | 0.9 | 1.5 | 0.4 | 0.8 | 0.1 | 0.3 | 5.4 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 12 | 7 | 42 | 18 | 4 | 10 | 62 | 349 | 70 | 9 | 343 | 34 |
| Future Volume (veh/h) | 12 | 7 | 42 | 18 | 4 | 10 | 62 | 349 | 70 | 9 | 343 | 34 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 15 | 9 | 52 | 22 | 5 | 12 | 77 | 431 | 86 | 11 | 423 | 42 |
| 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, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 169 | 140 | 118 | 163 | 140 | 118 | 123 | 2716 | 1211 | 38 | 2545 | 1135 |
| Arrive On Green | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.75 | 0.75 | 0.02 | 0.71 | 0.71 |
| Sat Flow, veh/h | 1418 | 1900 | 1610 | 1363 | 1900 | 1610 | 1810 | 3610 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 15 | 9 | 52 | 22 | 5 | 12 | 77 | 431 | 86 | 11 | 423 | 42 |
| Grp Sat Flow(s),veh/h/ln | 1418 | 1900 | 1610 | 1363 | 1900 | 1610 | 1810 | 1805 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 1.0 | 0.5 | 3.2 | 1.6 | 0.3 | 0.7 | 4.3 | 3.5 | 1.5 | 0.6 | 4.1 | 0.8 |
| Cycle Q Clear(g_c), s | 1.3 | 0.5 | 3.2 | 2.1 | 0.3 | 0.7 | 4.3 | 3.5 | 1.5 | 0.6 | 4.1 | 0.8 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 169 | 140 | 118 | 163 | 140 | 118 | 123 | 2716 | 1211 | 38 | 2545 | 1135 |
| V/C Ratio(X) | 0.09 | 0.06 | 0.44 | 0.14 | 0.04 | 0.10 | 0.62 | 0.16 | 0.07 | 0.29 | 0.17 | 0.04 |
| Avail Cap(c_a), veh/h | 661 | 798 | 676 | 635 | 798 | 676 | 260 | 2716 | 1211 | 260 | 2545 | 1135 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 45.8 | 45.3 | 46.6 | 46.2 | 45.2 | 45.4 | 47.6 | 3.7 | 3.4 | 50.6 | 5.2 | 4.7 |
| Incr Delay (d2), s/veh | 0.5 | 0.5 | 5.9 | 0.9 | 0.2 | 0.9 | 1.9 | 0.1 | 0.1 | 1.6 | 0.1 | 0.1 |
| 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 | 0.4 | 0.2 | 1.5 | 0.6 | 0.1 | 0.3 | 2.0 | 1.0 | 0.4 | 0.3 | 1.3 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 46.3 | 45.7 | 52.5 | 47.1 | 45.4 | 46.3 | 49.5 | 3.8 | 3.5 | 52.2 | 5.3 | 4.8 |
| LnGrp LOS | D | D | D | D | D | D | D | A | A | D | A | A |
| Approach Vol, veh/h | | 76 | | | 39 | | | 594 | | | 476 | |
| Approach Delay, s/veh | | 50.5 | | | 46.6 | | | 9.7 | | | 6.3 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 12.1 | 79.3 | | 13.6 | 7.1 | 84.3 | | 13.6 |
| Change Period (Y+Rc), s | 4.9 | 5.3 | | 5.9 | 4.9 | 5.3 | | 5.9 |
| Max Green Setting (Gmax), s | 15.1 | 29.7 | | 44.1 | 15.1 | 29.7 | | 44.1 |
| Max Q Clear Time (g_c+I1), s | 6.3 | 6.1 | | 4.1 | 2.6 | 5.5 | | 5.2 |
| Green Ext Time (p_c), s | 0.0 | 5.7 | | 0.2 | 0.0 | 6.1 | | 0.6 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 12.2 |
| HCM 6th LOS | B |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 8 | 3 | 479 | 6 | 3 | 399 |
| Future Volume (veh/h) | 8 | 3 | 479 | 6 | 3 | 399 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 10 | 4 | 599 | 8 | 4 | 499 |
| Peak Hour Factor | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 48 | 43 | 2913 | 39 | 15 | 3094 |
| Arrive On Green | 0.03 | 0.03 | 0.80 | 0.80 | 0.01 | 0.86 |
| Sat Flow, veh/h | 1810 | 1610 | 3743 | 49 | 1810 | 3705 |
| Grp Volume(v), veh/h | 10 | 4 | 296 | 311 | 4 | 499 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1610 | 1805 | 1891 | 1810 | 1805 |
| Q Serve(g_s), s | 0.4 | 0.2 | 3.2 | 3.2 | 0.2 | 1.8 |
| Cycle Q Clear(g_c), s | 0.4 | 0.2 | 3.2 | 3.2 | 0.2 | 1.8 |
| Prop In Lane | 1.00 | 1.00 | | 0.03 | 1.00 | |
| Lane Grp Cap(c), veh/h | 48 | 43 | 1441 | 1510 | 15 | 3094 |
| V/C Ratio(X) | 0.21 | 0.09 | 0.21 | 0.21 | 0.26 | 0.16 |
| Avail Cap(c_a), veh/h | 588 | 523 | 1441 | 1510 | 362 | 3094 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.88 | 0.88 | 0.99 | 0.99 |
| Uniform Delay (d), s/veh | 38.1 | 38.0 | 1.9 | 1.9 | 39.4 | 0.9 |
| Incr Delay (d2), s/veh | 4.4 | 2.0 | 0.3 | 0.3 | 3.2 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 0.2 | 0.4 | 0.5 | 0.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 42.5 | 40.0 | 2.2 | 2.2 | 42.6 | 1.1 |
| LnGrp LOS | D | D | A | A | D | A |
| Approach Vol, veh/h | 14 | | 607 | | | 503 |
| Approach Delay, s/veh | 41.8 | | 2.2 | | | 1.4 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | 2 | | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 73.9 | | 6.1 | 4.7 | 69.2 |
| Change Period (Y+Rc), s | 5.3 | | 4.0 | 4.0 | 5.3 |
| Max Green Setting (Gmax), s | 44.7 | | 26.0 | 16.0 | 24.7 |
| Max Q Clear Time (g_c+I1), s | 3.8 | | 2.4 | 2.2 | 5.2 |
| Green Ext Time (p_c), s | 5.3 | | 0.0 | 0.0 | 5.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 2.3 |
| HCM 6th LOS | A |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 180 | 0 | 395 | 0 | 82 | 11 | 0 | 402 | 24 |
| Future Volume (veh/h) | 0 | 0 | 0 | 180 | 0 | 395 | 0 | 82 | 11 | 0 | 402 | 24 |
| Initial Q (Qb), veh | | | | 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 |
| Parking Bus, Adj | | | | 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 | |
| Adj Sat Flow, veh/h/ln | | | | 1900 | 1900 | 1900 | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | | | | 250 | 0 | 549 | 0 | 114 | 0 | 0 | 558 | 0 |
| Peak Hour Factor | | | | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 |
| Percent Heavy Veh, % | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | | | | 1071 | 0 | 953 | 0 | 1981 | | 0 | 1981 | |
| Arrive On Green | | | | 0.30 | 0.00 | 0.30 | 0.00 | 0.55 | 0.00 | 0.00 | 0.55 | 0.00 |
| Sat Flow, veh/h | | | | 3619 | 0 | 3220 | 0 | 3705 | 1610 | 0 | 3800 | 0 |
| Grp Volume(v), veh/h | | | | 250 | 0 | 549 | 0 | 114 | 0 | 0 | 558 | 0 |
| Grp Sat Flow(s),veh/h/ln | | | | 1810 | 0 | 1610 | 0 | 1805 | 1610 | 0 | 1805 | 0 |
| Q Serve(g_s), s | | | | 4.4 | 0.0 | 12.3 | 0.0 | 1.3 | 0.0 | 0.0 | 7.0 | 0.0 |
| Cycle Q Clear(g_c), s | | | | 4.4 | 0.0 | 12.3 | 0.0 | 1.3 | 0.0 | 0.0 | 7.0 | 0.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 0.00 | | 1.00 | 0.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | | | | 1071 | 0 | 953 | 0 | 1981 | | 0 | 1981 | |
| V/C Ratio(X) | | | | 0.23 | 0.00 | 0.58 | 0.00 | 0.06 | | 0.00 | 0.28 | |
| Avail Cap(c_a), veh/h | | | | 1516 | 0 | 1349 | 0 | 1981 | | 0 | 1981 | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | | | | 22.6 | 0.0 | 25.4 | 0.0 | 8.9 | 0.0 | 0.0 | 10.2 | 0.0 |
| Incr Delay (d2), s/veh | | | | 0.5 | 0.0 | 2.5 | 0.0 | 0.1 | 0.0 | 0.0 | 0.4 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 1.8 | 0.0 | 4.7 | 0.0 | 0.4 | 0.0 | 0.0 | 2.4 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 23.1 | 0.0 | 27.9 | 0.0 | 9.0 | 0.0 | 0.0 | 10.6 | 0.0 |
| LnGrp LOS | | | | C | A | C | A | A | | A | B | |
| Approach Vol, veh/h | | | | | 799 | | | 114 | A | | 558 | A |
| Approach Delay, s/veh | | | | | 26.4 | | | 9.0 | | | 10.6 | |
| Approach LOS | | | | | C | | | A | | | B | |

| Timer - Assigned Phs | 2 | | 6 | | 8 | | | |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 53.4 | | 53.4 | | 31.6 | | | |
| Change Period (Y+Rc), s | 6.8 | | 6.8 | | 6.4 | | | |
| Max Green Setting (Gmax), s | 36.2 | | 36.2 | | 35.6 | | | |
| Max Q Clear Time (g_c+I1), s | 3.3 | | 9.0 | | 14.3 | | | |
| Green Ext Time (p_c), s | 1.8 | | 9.9 | | 10.8 | | | |

| Intersection Summary | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | 19.1 | | | | | | |
| HCM 6th LOS | | B | | | | | | |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 10 | 0 | 11 | 0 | 0 | 0 | 0 | 83 | 223 | 0 | 291 | 291 |
| Future Volume (veh/h) | 10 | 0 | 11 | 0 | 0 | 0 | 0 | 83 | 223 | 0 | 291 | 291 |
| Initial Q (Qb), veh | 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 |
| Parking Bus, Adj | 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 | |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1900 | | | | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 11 | 0 | 12 | | | | 0 | 90 | 0 | 0 | 316 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 76 | 0 | 67 | | | | 0 | 1420 | | 0 | 2698 | |
| Arrive On Green | 0.04 | 0.00 | 0.04 | | | | 0.00 | 0.75 | 0.00 | 0.00 | 0.75 | 0.00 |
| Sat Flow, veh/h | 1810 | 0 | 1610 | | | | 0 | 1900 | 3220 | 0 | 3705 | 1610 |
| Grp Volume(v), veh/h | 11 | 0 | 12 | | | | 0 | 90 | 0 | 0 | 316 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 0 | 1610 | | | | 0 | 1900 | 1610 | 0 | 1805 | 1610 |
| Q Serve(g_s), s | 0.4 | 0.0 | 0.5 | | | | 0.0 | 0.8 | 0.0 | 0.0 | 1.6 | 0.0 |
| Cycle Q Clear(g_c), s | 0.4 | 0.0 | 0.5 | | | | 0.0 | 0.8 | 0.0 | 0.0 | 1.6 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | | | | 0.00 | | 1.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 76 | 0 | 67 | | | | 0 | 1420 | | 0 | 2698 | |
| V/C Ratio(X) | 0.15 | 0.00 | 0.18 | | | | 0.00 | 0.06 | | 0.00 | 0.12 | |
| Avail Cap(c_a), veh/h | 646 | 0 | 575 | | | | 0 | 1420 | | 0 | 2698 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | | | | 0.00 | 1.00 | 0.00 | 0.00 | 0.97 | 0.00 |
| Uniform Delay (d), s/veh | 30.0 | 0.0 | 30.1 | | | | 0.0 | 2.2 | 0.0 | 0.0 | 2.3 | 0.0 |
| Incr Delay (d2), s/veh | 4.0 | 0.0 | 5.7 | | | | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.2 | 0.0 | 0.3 | | | | 0.0 | 0.1 | 0.0 | 0.0 | 0.2 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 34.0 | 0.0 | 35.8 | | | | 0.0 | 2.3 | 0.0 | 0.0 | 2.4 | 0.0 |
| LnGrp LOS | C | A | D | | | | A | A | | A | A | |
| Approach Vol, veh/h | | 23 | | | | | | 90 | A | | 316 | A |
| Approach Delay, s/veh | | 34.9 | | | | | | 2.3 | | | 2.4 | |
| Approach LOS | | C | | | | | | A | | | A | |

| Timer - Assigned Phs | 2 | 4 | 6 |
|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 55.5 | 9.5 | 55.5 |
| Change Period (Y+Rc), s | 6.9 | 6.8 | 6.9 |
| Max Green Setting (Gmax), s | 28.1 | 23.2 | 28.1 |
| Max Q Clear Time (g_c+I1), s | 2.8 | 2.5 | 3.6 |
| Green Ext Time (p_c), s | 1.1 | 0.1 | 5.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 4.1 |
| HCM 6th LOS | A |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 8.8 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 20 | 192 | 17 | 27 | 152 | 15 | 6 | 27 | 33 | 26 | 22 | 15 |
| Future Vol, veh/h | 20 | 192 | 17 | 27 | 152 | 15 | 6 | 27 | 33 | 26 | 22 | 15 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 22 | 211 | 19 | 30 | 167 | 16 | 7 | 30 | 36 | 29 | 24 | 16 |
| Number of Lanes | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 3 | 3 |
| HCM Control Delay | 8.8 | 8.6 | 8.7 | 9.1 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 9% | 100% | 0% | 0% | 100% | 0% | 0% | 41% |
| Vol Thru, % | 41% | 0% | 100% | 79% | 0% | 100% | 77% | 35% |
| Vol Right, % | 50% | 0% | 0% | 21% | 0% | 0% | 23% | 24% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 66 | 20 | 128 | 81 | 27 | 101 | 66 | 63 |
| LT Vol | 6 | 20 | 0 | 0 | 27 | 0 | 0 | 26 |
| Through Vol | 27 | 0 | 128 | 64 | 0 | 101 | 51 | 22 |
| RT Vol | 33 | 0 | 0 | 17 | 0 | 0 | 15 | 15 |
| Lane Flow Rate | 73 | 22 | 141 | 89 | 30 | 111 | 72 | 69 |
| Geometry Grp | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.107 | 0.034 | 0.199 | 0.122 | 0.046 | 0.159 | 0.1 | 0.109 |
| Departure Headway (Hd) | 5.32 | 5.601 | 5.098 | 4.95 | 5.636 | 5.133 | 4.972 | 5.662 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 671 | 638 | 703 | 723 | 635 | 697 | 719 | 631 |
| Service Time | 3.072 | 3.342 | 2.838 | 2.69 | 3.377 | 2.874 | 2.713 | 3.415 |
| HCM Lane V/C Ratio | 0.109 | 0.034 | 0.201 | 0.123 | 0.047 | 0.159 | 0.1 | 0.109 |
| HCM Control Delay | 8.7 | 8.5 | 9.1 | 8.4 | 8.7 | 8.8 | 8.3 | 9.1 |
| HCM Lane LOS | A | A | A | A | A | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.1 | 0.7 | 0.4 | 0.1 | 0.6 | 0.3 | 0.4 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 7.9 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 8 | 35 | 24 | 2 | 10 | 8 | 5 | 44 | 1 | 8 | 46 | 10 |
| Future Vol, veh/h | 8 | 35 | 24 | 2 | 10 | 8 | 5 | 44 | 1 | 8 | 46 | 10 |
| Peak Hour Factor | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 10 | 42 | 29 | 2 | 12 | 10 | 6 | 52 | 1 | 10 | 55 | 12 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 2 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 2 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 2 | 2 |
| HCM Control Delay | 7.7 | 7.5 | 8.3 | 7.8 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 10% | 100% | 0% | 100% | 0% | 15% | 0% |
| Vol Thru, % | 88% | 0% | 59% | 0% | 56% | 85% | 0% |
| Vol Right, % | 2% | 0% | 41% | 0% | 44% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 50 | 8 | 59 | 2 | 18 | 54 | 10 |
| LT Vol | 5 | 8 | 0 | 2 | 0 | 8 | 0 |
| Through Vol | 44 | 0 | 35 | 0 | 10 | 46 | 0 |
| RT Vol | 1 | 0 | 24 | 0 | 8 | 0 | 10 |
| Lane Flow Rate | 60 | 10 | 70 | 2 | 21 | 64 | 12 |
| Geometry Grp | 6 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.08 | 0.014 | 0.089 | 0.004 | 0.027 | 0.085 | 0.013 |
| Departure Headway (Hd) | 4.842 | 5.359 | 4.572 | 5.407 | 4.593 | 4.779 | 4.004 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 743 | 671 | 787 | 665 | 783 | 739 | 878 |
| Service Time | 2.848 | 3.064 | 2.277 | 3.112 | 2.298 | 2.578 | 1.803 |
| HCM Lane V/C Ratio | 0.081 | 0.015 | 0.089 | 0.003 | 0.027 | 0.087 | 0.014 |
| HCM Control Delay | 8.3 | 8.1 | 7.7 | 8.1 | 7.4 | 8 | 6.9 |
| HCM Lane LOS | A | A | A | A | A | A | A |
| HCM 95th-tile Q | 0.3 | 0 | 0.3 | 0 | 0.1 | 0.3 | 0 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 95.3 |
| Intersection LOS | F |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 24 | 174 | 63 | 36 | 126 | 53 | 97 | 589 | 76 | 25 | 259 | 26 |
| Future Vol, veh/h | 24 | 174 | 63 | 36 | 126 | 53 | 97 | 589 | 76 | 25 | 259 | 26 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 27 | 198 | 72 | 41 | 143 | 60 | 110 | 669 | 86 | 28 | 294 | 30 |
| Number of Lanes | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 3 | 3 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 3 | 3 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 3 | 3 | 3 | 3 |
| HCM Control Delay | 15.7 | 15.5 | 176.8 | 17.1 |
| HCM LOS | C | C | F | C |

| Lane | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 0% | 0% | 100% | 48% | 0% | 100% | 0% | 0% | 100% |
| Vol Right, % | 0% | 0% | 100% | 0% | 0% | 52% | 0% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 97 | 589 | 76 | 24 | 116 | 121 | 36 | 126 | 53 | 25 | 173 |
| LT Vol | 97 | 0 | 0 | 24 | 0 | 0 | 36 | 0 | 0 | 25 | 0 |
| Through Vol | 0 | 589 | 0 | 0 | 116 | 58 | 0 | 126 | 0 | 0 | 173 |
| RT Vol | 0 | 0 | 76 | 0 | 0 | 63 | 0 | 0 | 53 | 0 | 0 |
| Lane Flow Rate | 110 | 669 | 86 | 27 | 132 | 138 | 41 | 143 | 60 | 28 | 196 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.25 | 1.426 | 0.167 | 0.069 | 0.317 | 0.317 | 0.105 | 0.35 | 0.136 | 0.07 | 0.459 |
| Departure Headway (Hd) | 8.171 | 7.671 | 6.971 | 9.747 | 9.247 | 8.882 | 9.896 | 9.396 | 8.696 | 9.426 | 8.926 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 441 | 475 | 516 | 370 | 391 | 407 | 365 | 385 | 415 | 382 | 406 |
| Service Time | 5.904 | 5.404 | 4.704 | 7.447 | 6.947 | 6.582 | 7.596 | 7.096 | 6.396 | 7.126 | 6.626 |
| HCM Lane V/C Ratio | 0.249 | 1.408 | 0.167 | 0.073 | 0.338 | 0.339 | 0.112 | 0.371 | 0.145 | 0.073 | 0.483 |
| HCM Control Delay | 13.6 | 225.1 | 11.1 | 13.2 | 16.2 | 15.7 | 13.8 | 17.1 | 12.8 | 12.8 | 19 |
| HCM Lane LOS | B | F | B | B | C | C | B | C | B | B | C |
| HCM 95th-tile Q | 1 | 32.6 | 0.6 | 0.2 | 1.3 | 1.3 | 0.3 | 1.5 | 0.5 | 0.2 | 2.3 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 24 | 3 | 41 | 78 | 9 | 11 | 37 | 568 | 36 | 10 | 318 | 20 |
| Future Volume (veh/h) | 24 | 3 | 41 | 78 | 9 | 11 | 37 | 568 | 36 | 10 | 318 | 20 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 25 | 3 | 43 | 81 | 9 | 11 | 39 | 592 | 38 | 10 | 331 | 21 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 181 | 160 | 135 | 183 | 160 | 135 | 94 | 2683 | 1197 | 35 | 2566 | 1145 |
| Arrive On Green | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.05 | 0.74 | 0.74 | 0.02 | 0.71 | 0.71 |
| Sat Flow, veh/h | 1414 | 1900 | 1610 | 1381 | 1900 | 1610 | 1810 | 3610 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 25 | 3 | 43 | 81 | 9 | 11 | 39 | 592 | 38 | 10 | 331 | 21 |
| Grp Sat Flow(s),veh/h/ln | 1414 | 1900 | 1610 | 1381 | 1900 | 1610 | 1810 | 1805 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 1.7 | 0.2 | 2.6 | 6.0 | 0.5 | 0.7 | 2.2 | 5.3 | 0.7 | 0.6 | 3.1 | 0.4 |
| Cycle Q Clear(g_c), s | 2.2 | 0.2 | 2.6 | 6.2 | 0.5 | 0.7 | 2.2 | 5.3 | 0.7 | 0.6 | 3.1 | 0.4 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 181 | 160 | 135 | 183 | 160 | 135 | 94 | 2683 | 1197 | 35 | 2566 | 1145 |
| V/C Ratio(X) | 0.14 | 0.02 | 0.32 | 0.44 | 0.06 | 0.08 | 0.42 | 0.22 | 0.03 | 0.29 | 0.13 | 0.02 |
| Avail Cap(c_a), veh/h | 656 | 798 | 676 | 647 | 798 | 676 | 260 | 2683 | 1197 | 260 | 2566 | 1145 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | 0.98 | 0.98 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 45.3 | 44.1 | 45.2 | 46.9 | 44.3 | 44.3 | 48.2 | 4.1 | 3.5 | 50.8 | 4.8 | 4.4 |
| Incr Delay (d2), s/veh | 0.8 | 0.1 | 3.1 | 3.9 | 0.3 | 0.6 | 1.1 | 0.2 | 0.0 | 1.7 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.6 | 0.1 | 1.1 | 2.2 | 0.2 | 0.3 | 1.0 | 1.5 | 0.2 | 0.3 | 0.9 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 46.1 | 44.2 | 48.4 | 50.9 | 44.6 | 44.9 | 49.3 | 4.3 | 3.6 | 52.4 | 4.9 | 4.5 |
| LnGrp LOS | D | D | D | D | D | D | D | A | A | D | A | A |
| Approach Vol, veh/h | | 71 | | | 101 | | | 669 | | | 362 | |
| Approach Delay, s/veh | | 47.4 | | | 49.7 | | | 6.9 | | | 6.2 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.3 | 79.9 | | 14.7 | 6.9 | 83.3 | | 14.7 |
| Change Period (Y+Rc), s | 4.9 | 5.3 | | 5.9 | 4.9 | 5.3 | | 5.9 |
| Max Green Setting (Gmax), s | 15.1 | 29.7 | | 44.1 | 15.1 | 29.7 | | 44.1 |
| Max Q Clear Time (g_c+I1), s | 4.2 | 5.1 | | 8.2 | 2.6 | 7.3 | | 4.6 |
| Green Ext Time (p_c), s | 0.0 | 4.3 | | 0.7 | 0.0 | 7.6 | | 0.5 |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 12.7 | |
| HCM 6th LOS | B | |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 17 | 6 | 635 | 10 | 4 | 432 |
| Future Volume (veh/h) | 17 | 6 | 635 | 10 | 4 | 432 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 18 | 7 | 690 | 11 | 4 | 470 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 77 | 69 | 2846 | 45 | 15 | 3036 |
| Arrive On Green | 0.04 | 0.04 | 0.78 | 0.78 | 0.01 | 0.84 |
| Sat Flow, veh/h | 1810 | 1610 | 3732 | 58 | 1810 | 3705 |
| Grp Volume(v), veh/h | 18 | 7 | 342 | 359 | 4 | 470 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1610 | 1805 | 1890 | 1810 | 1805 |
| Q Serve(g_s), s | 0.8 | 0.3 | 4.1 | 4.1 | 0.2 | 1.9 |
| Cycle Q Clear(g_c), s | 0.8 | 0.3 | 4.1 | 4.1 | 0.2 | 1.9 |
| Prop In Lane | 1.00 | 1.00 | | 0.03 | 1.00 | |
| Lane Grp Cap(c), veh/h | 77 | 69 | 1413 | 1479 | 15 | 3036 |
| V/C Ratio(X) | 0.23 | 0.10 | 0.24 | 0.24 | 0.26 | 0.15 |
| Avail Cap(c_a), veh/h | 588 | 523 | 1413 | 1479 | 362 | 3036 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.88 | 0.88 | 0.99 | 0.99 |
| Uniform Delay (d), s/veh | 37.0 | 36.8 | 2.3 | 2.3 | 39.4 | 1.2 |
| Incr Delay (d2), s/veh | 3.3 | 1.4 | 0.4 | 0.3 | 3.2 | 0.1 |
| 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 | 0.3 | 0.7 | 0.7 | 0.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 40.3 | 38.2 | 2.7 | 2.7 | 42.6 | 1.3 |
| LnGrp LOS | D | D | A | A | D | A |
| Approach Vol, veh/h | 25 | | 701 | | | 474 |
| Approach Delay, s/veh | 39.7 | | 2.7 | | | 1.6 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | 2 | | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 72.6 | | 7.4 | 4.7 | 67.9 |
| Change Period (Y+Rc), s | 5.3 | | 4.0 | 4.0 | 5.3 |
| Max Green Setting (Gmax), s | 44.7 | | 26.0 | 16.0 | 24.7 |
| Max Q Clear Time (g_c+I1), s | 3.9 | | 2.8 | 2.2 | 6.1 |
| Green Ext Time (p_c), s | 5.0 | | 0.1 | 0.0 | 5.7 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 3.0 |
| HCM 6th LOS | A |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 242 | 0 | 518 | 0 | 144 | 15 | 0 | 425 | 23 |
| Future Volume (veh/h) | 0 | 0 | 0 | 242 | 0 | 518 | 0 | 144 | 15 | 0 | 425 | 23 |
| Initial Q (Qb), veh | | | | 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 |
| Parking Bus, Adj | | | | 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 | |
| Adj Sat Flow, veh/h/ln | | | | 1900 | 1900 | 1900 | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | | | | 299 | 0 | 640 | 0 | 178 | 0 | 0 | 525 | 0 |
| Peak Hour Factor | | | | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |
| Percent Heavy Veh, % | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | | | | 1190 | 0 | 1059 | 0 | 1862 | | 0 | 1862 | |
| Arrive On Green | | | | 0.33 | 0.00 | 0.33 | 0.00 | 0.52 | 0.00 | 0.00 | 0.52 | 0.00 |
| Sat Flow, veh/h | | | | 3619 | 0 | 3220 | 0 | 3705 | 1610 | 0 | 3800 | 0 |
| Grp Volume(v), veh/h | | | | 299 | 0 | 640 | 0 | 178 | 0 | 0 | 525 | 0 |
| Grp Sat Flow(s),veh/h/ln | | | | 1810 | 0 | 1610 | 0 | 1805 | 1610 | 0 | 1805 | 0 |
| Q Serve(g_s), s | | | | 5.1 | 0.0 | 14.2 | 0.0 | 2.1 | 0.0 | 0.0 | 7.0 | 0.0 |
| Cycle Q Clear(g_c), s | | | | 5.1 | 0.0 | 14.2 | 0.0 | 2.1 | 0.0 | 0.0 | 7.0 | 0.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 0.00 | | 1.00 | 0.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | | | | 1190 | 0 | 1059 | 0 | 1862 | | 0 | 1862 | |
| V/C Ratio(X) | | | | 0.25 | 0.00 | 0.60 | 0.00 | 0.10 | | 0.00 | 0.28 | |
| Avail Cap(c_a), veh/h | | | | 1516 | 0 | 1349 | 0 | 1862 | | 0 | 1862 | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | | | | 20.9 | 0.0 | 23.9 | 0.0 | 10.5 | 0.0 | 0.0 | 11.7 | 0.0 |
| Incr Delay (d2), s/veh | | | | 0.5 | 0.0 | 2.6 | 0.0 | 0.1 | 0.0 | 0.0 | 0.4 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 2.1 | 0.0 | 5.3 | 0.0 | 0.8 | 0.0 | 0.0 | 2.5 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 21.4 | 0.0 | 26.5 | 0.0 | 10.6 | 0.0 | 0.0 | 12.0 | 0.0 |
| LnGrp LOS | | | | C | A | C | A | B | | A | B | |
| Approach Vol, veh/h | | | | | 939 | | | 178 | A | | 525 | A |
| Approach Delay, s/veh | | | | | 24.8 | | | 10.6 | | | 12.0 | |
| Approach LOS | | | | | C | | | B | | | B | |

| Timer - Assigned Phs | 2 | | 6 | | 8 | | | |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 50.7 | | 50.7 | | 34.3 | | | |
| Change Period (Y+Rc), s | 6.8 | | 6.8 | | 6.4 | | | |
| Max Green Setting (Gmax), s | 36.2 | | 36.2 | | 35.6 | | | |
| Max Q Clear Time (g_c+I1), s | 4.1 | | 9.0 | | 16.2 | | | |
| Green Ext Time (p_c), s | 3.0 | | 9.3 | | 11.8 | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 19.2 | |
| HCM 6th LOS | B | |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 19 | 0 | 20 | 0 | 0 | 0 | 0 | 140 | 266 | 0 | 359 | 308 |
| Future Volume (veh/h) | 19 | 0 | 20 | 0 | 0 | 0 | 0 | 140 | 266 | 0 | 359 | 308 |
| Initial Q (Qb), veh | 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 |
| Parking Bus, Adj | 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 | |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1900 | | | | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 21 | 0 | 22 | | | | 0 | 152 | 0 | 0 | 390 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 120 | 0 | 107 | | | | 0 | 1373 | | 0 | 2609 | |
| Arrive On Green | 0.07 | 0.00 | 0.07 | | | | 0.00 | 0.72 | 0.00 | 0.00 | 0.72 | 0.00 |
| Sat Flow, veh/h | 1810 | 0 | 1610 | | | | 0 | 1900 | 3220 | 0 | 3705 | 1610 |
| Grp Volume(v), veh/h | 21 | 0 | 22 | | | | 0 | 152 | 0 | 0 | 390 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 0 | 1610 | | | | 0 | 1900 | 1610 | 0 | 1805 | 1610 |
| Q Serve(g_s), s | 0.7 | 0.0 | 0.8 | | | | 0.0 | 1.6 | 0.0 | 0.0 | 2.2 | 0.0 |
| Cycle Q Clear(g_c), s | 0.7 | 0.0 | 0.8 | | | | 0.0 | 1.6 | 0.0 | 0.0 | 2.2 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | | | | 0.00 | | 1.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 120 | 0 | 107 | | | | 0 | 1373 | | 0 | 2609 | |
| V/C Ratio(X) | 0.17 | 0.00 | 0.21 | | | | 0.00 | 0.11 | | 0.00 | 0.15 | |
| Avail Cap(c_a), veh/h | 646 | 0 | 575 | | | | 0 | 1373 | | 0 | 2609 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | | | | 0.00 | 1.00 | 0.00 | 0.00 | 0.97 | 0.00 |
| Uniform Delay (d), s/veh | 28.7 | 0.0 | 28.7 | | | | 0.0 | 2.7 | 0.0 | 0.0 | 2.8 | 0.0 |
| Incr Delay (d2), s/veh | 3.1 | 0.0 | 4.3 | | | | 0.0 | 0.2 | 0.0 | 0.0 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.4 | 0.0 | 0.4 | | | | 0.0 | 0.3 | 0.0 | 0.0 | 0.4 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 31.8 | 0.0 | 33.0 | | | | 0.0 | 2.9 | 0.0 | 0.0 | 2.9 | 0.0 |
| LnGrp LOS | C | A | C | | | | A | A | | A | A | |
| Approach Vol, veh/h | | 43 | | | | | | 152 | A | | 390 | A |
| Approach Delay, s/veh | | 32.4 | | | | | | 2.9 | | | 2.9 | |
| Approach LOS | | C | | | | | | A | | | A | |

| Timer - Assigned Phs | 2 | 4 | 6 |
|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 53.9 | 11.1 | 53.9 |
| Change Period (Y+Rc), s | 6.9 | 6.8 | 6.9 |
| Max Green Setting (Gmax), s | 28.1 | 23.2 | 28.1 |
| Max Q Clear Time (g_c+I1), s | 3.6 | 2.8 | 4.2 |
| Green Ext Time (p_c), s | 2.1 | 0.3 | 6.4 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 5.1 |
| HCM 6th LOS | A |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10.4 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 37 | 239 | 10 | 43 | 190 | 34 | 14 | 42 | 56 | 40 | 47 | 15 |
| Future Vol, veh/h | 37 | 239 | 10 | 43 | 190 | 34 | 14 | 42 | 56 | 40 | 47 | 15 |
| Peak Hour Factor | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 45 | 291 | 12 | 52 | 232 | 41 | 17 | 51 | 68 | 49 | 57 | 18 |
| Number of Lanes | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 3 | 3 |
| HCM Control Delay | 10.5 | 10 | 10.7 | 11.1 |
| HCM LOS | B | A | B | B |

| Lane | NBLn1 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 12% | 100% | 0% | 0% | 100% | 0% | 0% | 39% |
| Vol Thru, % | 38% | 0% | 100% | 89% | 0% | 100% | 65% | 46% |
| Vol Right, % | 50% | 0% | 0% | 11% | 0% | 0% | 35% | 15% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 112 | 37 | 159 | 90 | 43 | 127 | 97 | 102 |
| LT Vol | 14 | 37 | 0 | 0 | 43 | 0 | 0 | 40 |
| Through Vol | 42 | 0 | 159 | 80 | 0 | 127 | 63 | 47 |
| RT Vol | 56 | 0 | 0 | 10 | 0 | 0 | 34 | 15 |
| Lane Flow Rate | 137 | 45 | 194 | 109 | 52 | 154 | 119 | 124 |
| Geometry Grp | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.231 | 0.079 | 0.313 | 0.173 | 0.092 | 0.25 | 0.184 | 0.224 |
| Departure Headway (Hd) | 6.088 | 6.297 | 5.79 | 5.711 | 6.329 | 5.822 | 5.574 | 6.479 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 589 | 569 | 622 | 628 | 566 | 616 | 643 | 554 |
| Service Time | 3.832 | 4.034 | 3.526 | 3.447 | 4.067 | 3.56 | 3.311 | 4.223 |
| HCM Lane V/C Ratio | 0.233 | 0.079 | 0.312 | 0.174 | 0.092 | 0.25 | 0.185 | 0.224 |
| HCM Control Delay | 10.7 | 9.6 | 11.2 | 9.6 | 9.7 | 10.5 | 9.6 | 11.1 |
| HCM Lane LOS | B | A | B | A | A | B | A | B |
| HCM 95th-tile Q | 0.9 | 0.3 | 1.3 | 0.6 | 0.3 | 1 | 0.7 | 0.9 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 8.5 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 8 | 25 | 11 | 4 | 35 | 14 | 25 | 83 | 3 | 9 | 73 | 13 |
| Future Vol, veh/h | 8 | 25 | 11 | 4 | 35 | 14 | 25 | 83 | 3 | 9 | 73 | 13 |
| Peak Hour Factor | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 10 | 30 | 13 | 5 | 43 | 17 | 30 | 101 | 4 | 11 | 89 | 16 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 2 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 2 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 2 | 2 |
| HCM Control Delay | 8.1 | 8.2 | 9.1 | 8.3 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 23% | 100% | 0% | 100% | 0% | 11% | 0% |
| Vol Thru, % | 75% | 0% | 69% | 0% | 71% | 89% | 0% |
| Vol Right, % | 3% | 0% | 31% | 0% | 29% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 111 | 8 | 36 | 4 | 49 | 82 | 13 |
| LT Vol | 25 | 8 | 0 | 4 | 0 | 9 | 0 |
| Through Vol | 83 | 0 | 25 | 0 | 35 | 73 | 0 |
| RT Vol | 3 | 0 | 11 | 0 | 14 | 0 | 13 |
| Lane Flow Rate | 135 | 10 | 44 | 5 | 60 | 100 | 16 |
| Geometry Grp | 6 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.187 | 0.015 | 0.061 | 0.008 | 0.083 | 0.138 | 0.019 |
| Departure Headway (Hd) | 4.964 | 5.701 | 4.983 | 5.691 | 4.986 | 4.973 | 4.216 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 724 | 629 | 720 | 630 | 719 | 723 | 850 |
| Service Time | 2.984 | 3.426 | 2.707 | 3.414 | 2.709 | 2.693 | 1.936 |
| HCM Lane V/C Ratio | 0.186 | 0.016 | 0.061 | 0.008 | 0.083 | 0.138 | 0.019 |
| HCM Control Delay | 9.1 | 8.5 | 8 | 8.5 | 8.2 | 8.5 | 7 |
| HCM Lane LOS | A | A | A | A | A | A | A |
| HCM 95th-tile Q | 0.7 | 0 | 0.2 | 0 | 0.3 | 0.5 | 0.1 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 20.9 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 24 | 127 | 94 | 52 | 78 | 11 | 50 | 268 | 70 | 39 | 449 | 28 |
| Future Vol, veh/h | 24 | 127 | 94 | 52 | 78 | 11 | 50 | 268 | 70 | 39 | 449 | 28 |
| Peak Hour Factor | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 29 | 153 | 113 | 63 | 94 | 13 | 60 | 323 | 84 | 47 | 541 | 34 |
| Number of Lanes | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 3 | 3 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 3 | 3 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 3 | 3 | 3 | 3 |
| HCM Control Delay | 14.5 | 13.8 | 22.8 | 24.4 |
| HCM LOS | B | B | C | C |

| Lane | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 0% | 0% | 100% | 31% | 0% | 100% | 0% | 0% | 100% |
| Vol Right, % | 0% | 0% | 100% | 0% | 0% | 69% | 0% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 50 | 268 | 70 | 24 | 85 | 136 | 52 | 78 | 11 | 39 | 299 |
| LT Vol | 50 | 0 | 0 | 24 | 0 | 0 | 52 | 0 | 0 | 39 | 0 |
| Through Vol | 0 | 268 | 0 | 0 | 85 | 42 | 0 | 78 | 0 | 0 | 299 |
| RT Vol | 0 | 0 | 70 | 0 | 0 | 94 | 0 | 0 | 11 | 0 | 0 |
| Lane Flow Rate | 60 | 323 | 84 | 29 | 102 | 164 | 63 | 94 | 13 | 47 | 361 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.14 | 0.707 | 0.168 | 0.072 | 0.239 | 0.363 | 0.162 | 0.229 | 0.03 | 0.106 | 0.761 |
| Departure Headway (Hd) | 8.384 | 7.884 | 7.184 | 8.947 | 8.447 | 7.965 | 9.287 | 8.787 | 8.087 | 8.099 | 7.599 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 427 | 459 | 498 | 399 | 424 | 450 | 385 | 407 | 441 | 442 | 476 |
| Service Time | 6.153 | 5.653 | 4.953 | 6.723 | 6.223 | 5.74 | 7.071 | 6.571 | 5.871 | 5.863 | 5.363 |
| HCM Lane V/C Ratio | 0.141 | 0.704 | 0.169 | 0.073 | 0.241 | 0.364 | 0.164 | 0.231 | 0.029 | 0.106 | 0.758 |
| HCM Control Delay | 12.5 | 27.7 | 11.4 | 12.4 | 13.9 | 15.3 | 13.9 | 14.2 | 11.1 | 11.8 | 30.9 |
| HCM Lane LOS | B | D | B | B | B | C | B | B | B | B | D |
| HCM 95th-tile Q | 0.5 | 5.4 | 0.6 | 0.2 | 0.9 | 1.6 | 0.6 | 0.9 | 0.1 | 0.4 | 6.5 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 12 | 8 | 42 | 25 | 4 | 10 | 62 | 349 | 98 | 9 | 343 | 34 |
| Future Volume (veh/h) | 12 | 8 | 42 | 25 | 4 | 10 | 62 | 349 | 98 | 9 | 343 | 34 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 15 | 10 | 52 | 31 | 5 | 12 | 77 | 431 | 121 | 11 | 423 | 42 |
| 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, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 170 | 141 | 119 | 163 | 141 | 119 | 123 | 2713 | 1210 | 38 | 2543 | 1134 |
| Arrive On Green | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.75 | 0.75 | 0.02 | 0.70 | 0.70 |
| Sat Flow, veh/h | 1418 | 1900 | 1610 | 1362 | 1900 | 1610 | 1810 | 3610 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 15 | 10 | 52 | 31 | 5 | 12 | 77 | 431 | 121 | 11 | 423 | 42 |
| Grp Sat Flow(s),veh/h/ln | 1418 | 1900 | 1610 | 1362 | 1900 | 1610 | 1810 | 1805 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 1.0 | 0.5 | 3.2 | 2.3 | 0.3 | 0.7 | 4.3 | 3.5 | 2.1 | 0.6 | 4.1 | 0.8 |
| Cycle Q Clear(g_c), s | 1.3 | 0.5 | 3.2 | 2.8 | 0.3 | 0.7 | 4.3 | 3.5 | 2.1 | 0.6 | 4.1 | 0.8 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 170 | 141 | 119 | 163 | 141 | 119 | 123 | 2713 | 1210 | 38 | 2543 | 1134 |
| V/C Ratio(X) | 0.09 | 0.07 | 0.44 | 0.19 | 0.04 | 0.10 | 0.62 | 0.16 | 0.10 | 0.29 | 0.17 | 0.04 |
| Avail Cap(c_a), veh/h | 661 | 798 | 676 | 634 | 798 | 676 | 260 | 2713 | 1210 | 260 | 2543 | 1134 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 45.7 | 45.2 | 46.5 | 46.5 | 45.1 | 45.3 | 47.6 | 3.7 | 3.5 | 50.6 | 5.2 | 4.7 |
| Incr Delay (d2), s/veh | 0.5 | 0.5 | 5.8 | 1.3 | 0.2 | 0.9 | 1.9 | 0.1 | 0.2 | 1.6 | 0.1 | 0.1 |
| 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 | 0.4 | 0.3 | 1.5 | 0.8 | 0.1 | 0.3 | 2.0 | 1.0 | 0.5 | 0.3 | 1.3 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 46.2 | 45.7 | 52.3 | 47.9 | 45.4 | 46.2 | 49.5 | 3.8 | 3.7 | 52.2 | 5.3 | 4.8 |
| LnGrp LOS | D | D | D | D | D | D | D | A | A | D | A | A |
| Approach Vol, veh/h | | 77 | | | 48 | | | 629 | | | 476 | |
| Approach Delay, s/veh | | 50.3 | | | 47.2 | | | 9.4 | | | 6.4 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 12.1 | 79.3 | | 13.7 | 7.1 | 84.2 | | 13.7 |
| Change Period (Y+Rc), s | 4.9 | 5.3 | | 5.9 | 4.9 | 5.3 | | 5.9 |
| Max Green Setting (Gmax), s | 15.1 | 29.7 | | 44.1 | 15.1 | 29.7 | | 44.1 |
| Max Q Clear Time (g_c+I1), s | 6.3 | 6.1 | | 4.8 | 2.6 | 5.5 | | 5.2 |
| Green Ext Time (p_c), s | 0.0 | 5.7 | | 0.3 | 0.0 | 6.4 | | 0.6 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 12.2 |
| HCM 6th LOS | B |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 8 | 3 | 507 | 6 | 3 | 406 |
| Future Volume (veh/h) | 8 | 3 | 507 | 6 | 3 | 406 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 10 | 4 | 634 | 8 | 4 | 508 |
| Peak Hour Factor | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 48 | 43 | 2915 | 37 | 15 | 3094 |
| Arrive On Green | 0.03 | 0.03 | 0.80 | 0.80 | 0.01 | 0.86 |
| Sat Flow, veh/h | 1810 | 1610 | 3746 | 46 | 1810 | 3705 |
| Grp Volume(v), veh/h | 10 | 4 | 313 | 329 | 4 | 508 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1610 | 1805 | 1892 | 1810 | 1805 |
| Q Serve(g_s), s | 0.4 | 0.2 | 3.4 | 3.4 | 0.2 | 1.9 |
| Cycle Q Clear(g_c), s | 0.4 | 0.2 | 3.4 | 3.4 | 0.2 | 1.9 |
| Prop In Lane | 1.00 | 1.00 | | 0.02 | 1.00 | |
| Lane Grp Cap(c), veh/h | 48 | 43 | 1441 | 1511 | 15 | 3094 |
| V/C Ratio(X) | 0.21 | 0.09 | 0.22 | 0.22 | 0.26 | 0.16 |
| Avail Cap(c_a), veh/h | 588 | 523 | 1441 | 1511 | 362 | 3094 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.87 | 0.87 | 0.99 | 0.99 |
| Uniform Delay (d), s/veh | 38.1 | 38.0 | 2.0 | 2.0 | 39.4 | 1.0 |
| Incr Delay (d2), s/veh | 4.4 | 2.0 | 0.3 | 0.3 | 3.2 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 0.2 | 0.5 | 0.5 | 0.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 42.5 | 40.0 | 2.3 | 2.3 | 42.6 | 1.1 |
| LnGrp LOS | D | D | A | A | D | A |
| Approach Vol, veh/h | 14 | | 642 | | | 512 |
| Approach Delay, s/veh | 41.8 | | 2.3 | | | 1.4 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | 2 | | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 73.9 | | 6.1 | 4.7 | 69.2 |
| Change Period (Y+Rc), s | 5.3 | | 4.0 | 4.0 | 5.3 |
| Max Green Setting (Gmax), s | 44.7 | | 26.0 | 16.0 | 24.7 |
| Max Q Clear Time (g_c+I1), s | 3.9 | | 2.4 | 2.2 | 5.4 |
| Green Ext Time (p_c), s | 5.5 | | 0.0 | 0.0 | 5.3 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 2.4 |
| HCM 6th LOS | A |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 180 | 0 | 418 | 0 | 87 | 11 | 0 | 409 | 24 |
| Future Volume (veh/h) | 0 | 0 | 0 | 180 | 0 | 418 | 0 | 87 | 11 | 0 | 409 | 24 |
| Initial Q (Qb), veh | | | | 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 |
| Parking Bus, Adj | | | | 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 | |
| Adj Sat Flow, veh/h/ln | | | | 1900 | 1900 | 1900 | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | | | | 250 | 0 | 581 | 0 | 121 | 0 | 0 | 568 | 0 |
| Peak Hour Factor | | | | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 |
| Percent Heavy Veh, % | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | | | | 1108 | 0 | 986 | 0 | 1944 | | 0 | 1944 | |
| Arrive On Green | | | | 0.31 | 0.00 | 0.31 | 0.00 | 0.54 | 0.00 | 0.00 | 0.54 | 0.00 |
| Sat Flow, veh/h | | | | 3619 | 0 | 3220 | 0 | 3705 | 1610 | 0 | 3800 | 0 |
| Grp Volume(v), veh/h | | | | 250 | 0 | 581 | 0 | 121 | 0 | 0 | 568 | 0 |
| Grp Sat Flow(s),veh/h/ln | | | | 1810 | 0 | 1610 | 0 | 1805 | 1610 | 0 | 1805 | 0 |
| Q Serve(g_s), s | | | | 4.4 | 0.0 | 13.0 | 0.0 | 1.4 | 0.0 | 0.0 | 7.3 | 0.0 |
| Cycle Q Clear(g_c), s | | | | 4.4 | 0.0 | 13.0 | 0.0 | 1.4 | 0.0 | 0.0 | 7.3 | 0.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 0.00 | | 1.00 | 0.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | | | | 1108 | 0 | 986 | 0 | 1944 | | 0 | 1944 | |
| V/C Ratio(X) | | | | 0.23 | 0.00 | 0.59 | 0.00 | 0.06 | | 0.00 | 0.29 | |
| Avail Cap(c_a), veh/h | | | | 1516 | 0 | 1349 | 0 | 1944 | | 0 | 1944 | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| Uniform Delay (d), s/veh | | | | 22.0 | 0.0 | 25.0 | 0.0 | 9.4 | 0.0 | 0.0 | 10.7 | 0.0 |
| Incr Delay (d2), s/veh | | | | 0.5 | 0.0 | 2.6 | 0.0 | 0.1 | 0.0 | 0.0 | 0.4 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 1.8 | 0.0 | 4.9 | 0.0 | 0.5 | 0.0 | 0.0 | 2.6 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 22.5 | 0.0 | 27.6 | 0.0 | 9.4 | 0.0 | 0.0 | 11.1 | 0.0 |
| LnGrp LOS | | | | C | A | C | A | A | | A | B | |
| Approach Vol, veh/h | | | | | 831 | | | 121 | A | | 568 | A |
| Approach Delay, s/veh | | | | | 26.0 | | | 9.4 | | | 11.1 | |
| Approach LOS | | | | | C | | | A | | | B | |

| Timer - Assigned Phs | 2 | | 6 | | 8 | |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 52.6 | | 52.6 | | 32.4 | |
| Change Period (Y+Rc), s | 6.8 | | 6.8 | | 6.4 | |
| Max Green Setting (Gmax), s | 36.2 | | 36.2 | | 35.6 | |
| Max Q Clear Time (g_c+I1), s | 3.4 | | 9.3 | | 15.0 | |
| Green Ext Time (p_c), s | 1.9 | | 10.1 | | 11.0 | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 19.1 | |
| HCM 6th LOS | B | |

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 12 | 0 | 11 | 0 | 0 | 0 | 0 | 86 | 223 | 0 | 291 | 298 |
| Future Volume (veh/h) | 12 | 0 | 11 | 0 | 0 | 0 | 0 | 86 | 223 | 0 | 291 | 298 |
| Initial Q (Qb), veh | 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 |
| Parking Bus, Adj | 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 | |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1900 | | | | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 13 | 0 | 12 | | | | 0 | 93 | 0 | 0 | 316 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 81 | 0 | 72 | | | | 0 | 1415 | | 0 | 2688 | |
| Arrive On Green | 0.04 | 0.00 | 0.04 | | | | 0.00 | 0.74 | 0.00 | 0.00 | 0.74 | 0.00 |
| Sat Flow, veh/h | 1810 | 0 | 1610 | | | | 0 | 1900 | 3220 | 0 | 3705 | 1610 |
| Grp Volume(v), veh/h | 13 | 0 | 12 | | | | 0 | 93 | 0 | 0 | 316 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 0 | 1610 | | | | 0 | 1900 | 1610 | 0 | 1805 | 1610 |
| Q Serve(g_s), s | 0.4 | 0.0 | 0.5 | | | | 0.0 | 0.9 | 0.0 | 0.0 | 1.6 | 0.0 |
| Cycle Q Clear(g_c), s | 0.4 | 0.0 | 0.5 | | | | 0.0 | 0.9 | 0.0 | 0.0 | 1.6 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | | | | 0.00 | | 1.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 81 | 0 | 72 | | | | 0 | 1415 | | 0 | 2688 | |
| V/C Ratio(X) | 0.16 | 0.00 | 0.17 | | | | 0.00 | 0.07 | | 0.00 | 0.12 | |
| Avail Cap(c_a), veh/h | 646 | 0 | 575 | | | | 0 | 1415 | | 0 | 2688 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | | | | 0.00 | 1.00 | 0.00 | 0.00 | 0.97 | 0.00 |
| Uniform Delay (d), s/veh | 29.9 | 0.0 | 29.9 | | | | 0.0 | 2.2 | 0.0 | 0.0 | 2.3 | 0.0 |
| Incr Delay (d2), s/veh | 4.2 | 0.0 | 4.9 | | | | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 0.0 | 0.3 | | | | 0.0 | 0.1 | 0.0 | 0.0 | 0.2 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 34.1 | 0.0 | 34.8 | | | | 0.0 | 2.3 | 0.0 | 0.0 | 2.4 | 0.0 |
| LnGrp LOS | C | A | C | | | | A | A | | A | A | |
| Approach Vol, veh/h | | 25 | | | | | | 93 | A | | 316 | A |
| Approach Delay, s/veh | | 34.4 | | | | | | 2.3 | | | 2.4 | |
| Approach LOS | | C | | | | | | A | | | A | |

| Timer - Assigned Phs | 2 | 4 | 6 |
|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 55.3 | 9.7 | 55.3 |
| Change Period (Y+Rc), s | 6.9 | 6.8 | 6.9 |
| Max Green Setting (Gmax), s | 28.1 | 23.2 | 28.1 |
| Max Q Clear Time (g_c+I1), s | 2.9 | 2.5 | 3.6 |
| Green Ext Time (p_c), s | 1.2 | 0.1 | 5.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 4.2 |
| HCM 6th LOS | A |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 8.9 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 20 | 195 | 17 | 44 | 164 | 15 | 6 | 28 | 38 | 26 | 25 | 15 |
| Future Vol, veh/h | 20 | 195 | 17 | 44 | 164 | 15 | 6 | 28 | 38 | 26 | 25 | 15 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 22 | 214 | 19 | 48 | 180 | 16 | 7 | 31 | 42 | 29 | 27 | 16 |
| Number of Lanes | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 3 | 3 |
| HCM Control Delay | 9 | 8.8 | 8.9 | 9.3 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 8% | 100% | 0% | 0% | 100% | 0% | 0% | 39% |
| Vol Thru, % | 39% | 0% | 100% | 79% | 0% | 100% | 78% | 38% |
| Vol Right, % | 53% | 0% | 0% | 21% | 0% | 0% | 22% | 23% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 72 | 20 | 130 | 82 | 44 | 109 | 70 | 66 |
| LT Vol | 6 | 20 | 0 | 0 | 44 | 0 | 0 | 26 |
| Through Vol | 28 | 0 | 130 | 65 | 0 | 109 | 55 | 25 |
| RT Vol | 38 | 0 | 0 | 17 | 0 | 0 | 15 | 15 |
| Lane Flow Rate | 79 | 22 | 143 | 90 | 48 | 120 | 77 | 73 |
| Geometry Grp | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.118 | 0.035 | 0.205 | 0.126 | 0.076 | 0.173 | 0.107 | 0.116 |
| Departure Headway (Hd) | 5.384 | 5.668 | 5.165 | 5.018 | 5.674 | 5.17 | 5.018 | 5.751 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 662 | 630 | 693 | 712 | 630 | 691 | 711 | 620 |
| Service Time | 3.147 | 3.418 | 2.914 | 2.768 | 3.425 | 2.921 | 2.769 | 3.515 |
| HCM Lane V/C Ratio | 0.119 | 0.035 | 0.206 | 0.126 | 0.076 | 0.174 | 0.108 | 0.118 |
| HCM Control Delay | 8.9 | 8.6 | 9.3 | 8.5 | 8.9 | 9 | 8.4 | 9.3 |
| HCM Lane LOS | A | A | A | A | A | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.1 | 0.8 | 0.4 | 0.2 | 0.6 | 0.4 | 0.4 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 7.9 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 8 | 35 | 25 | 2 | 12 | 15 | 9 | 46 | 1 | 10 | 47 | 10 |
| Future Vol, veh/h | 8 | 35 | 25 | 2 | 12 | 15 | 9 | 46 | 1 | 10 | 47 | 10 |
| Peak Hour Factor | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 10 | 42 | 30 | 2 | 14 | 18 | 11 | 55 | 1 | 12 | 56 | 12 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 2 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 2 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 2 | 2 |
| HCM Control Delay | 7.8 | 7.5 | 8.4 | 7.9 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 16% | 100% | 0% | 100% | 0% | 18% | 0% |
| Vol Thru, % | 82% | 0% | 58% | 0% | 44% | 82% | 0% |
| Vol Right, % | 2% | 0% | 42% | 0% | 56% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 56 | 8 | 60 | 2 | 27 | 57 | 10 |
| LT Vol | 9 | 8 | 0 | 2 | 0 | 10 | 0 |
| Through Vol | 46 | 0 | 35 | 0 | 12 | 47 | 0 |
| RT Vol | 1 | 0 | 25 | 0 | 15 | 0 | 10 |
| Lane Flow Rate | 67 | 10 | 71 | 2 | 32 | 68 | 12 |
| Geometry Grp | 6 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.091 | 0.014 | 0.091 | 0.004 | 0.041 | 0.093 | 0.014 |
| Departure Headway (Hd) | 4.89 | 5.399 | 4.604 | 5.44 | 4.547 | 4.92 | 4.131 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 736 | 665 | 781 | 660 | 790 | 732 | 870 |
| Service Time | 2.9 | 3.112 | 2.317 | 3.153 | 2.26 | 2.63 | 1.84 |
| HCM Lane V/C Ratio | 0.091 | 0.015 | 0.091 | 0.003 | 0.041 | 0.093 | 0.014 |
| HCM Control Delay | 8.4 | 8.2 | 7.8 | 8.2 | 7.5 | 8.1 | 6.9 |
| HCM Lane LOS | A | A | A | A | A | A | A |
| HCM 95th-tile Q | 0.3 | 0 | 0.3 | 0 | 0.1 | 0.3 | 0 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 104 |
| Intersection LOS | F |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 24 | 174 | 72 | 52 | 126 | 53 | 99 | 596 | 80 | 25 | 293 | 26 |
| Future Vol, veh/h | 24 | 174 | 72 | 52 | 126 | 53 | 99 | 596 | 80 | 25 | 293 | 26 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 27 | 198 | 82 | 59 | 143 | 60 | 113 | 677 | 91 | 28 | 333 | 30 |
| Number of Lanes | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 3 | 3 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 3 | 3 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 3 | 3 | 3 | 3 |
| HCM Control Delay | 16.5 | 16 | 198.4 | 19.1 |
| HCM LOS | C | C | F | C |

| Lane | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 0% | 0% | 100% | 45% | 0% | 100% | 0% | 0% | 100% |
| Vol Right, % | 0% | 0% | 100% | 0% | 0% | 55% | 0% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 99 | 596 | 80 | 24 | 116 | 130 | 52 | 126 | 53 | 25 | 195 |
| LT Vol | 99 | 0 | 0 | 24 | 0 | 0 | 52 | 0 | 0 | 25 | 0 |
| Through Vol | 0 | 596 | 0 | 0 | 116 | 58 | 0 | 126 | 0 | 0 | 195 |
| RT Vol | 0 | 0 | 80 | 0 | 0 | 72 | 0 | 0 | 53 | 0 | 0 |
| Lane Flow Rate | 112 | 677 | 91 | 27 | 132 | 148 | 59 | 143 | 60 | 28 | 222 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.263 | 1.492 | 0.183 | 0.071 | 0.325 | 0.349 | 0.156 | 0.358 | 0.139 | 0.072 | 0.53 |
| Departure Headway (Hd) | 8.431 | 7.931 | 7.231 | 10.063 | 9.563 | 9.175 | 10.19 | 9.69 | 8.99 | 9.673 | 9.173 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 426 | 461 | 496 | 358 | 378 | 394 | 354 | 374 | 401 | 373 | 395 |
| Service Time | 6.174 | 5.674 | 4.974 | 7.763 | 7.263 | 6.875 | 7.89 | 7.39 | 6.69 | 7.373 | 6.873 |
| HCM Lane V/C Ratio | 0.263 | 1.469 | 0.183 | 0.075 | 0.349 | 0.376 | 0.167 | 0.382 | 0.15 | 0.075 | 0.562 |
| HCM Control Delay | 14.2 | 254.1 | 11.6 | 13.5 | 16.8 | 16.7 | 14.8 | 17.7 | 13.1 | 13.1 | 21.8 |
| HCM Lane LOS | B | F | B | B | C | C | B | C | B | B | C |
| HCM 95th-tile Q | 1 | 35 | 0.7 | 0.2 | 1.4 | 1.5 | 0.5 | 1.6 | 0.5 | 0.2 | 3 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 24 | 4 | 41 | 87 | 9 | 11 | 37 | 568 | 74 | 10 | 318 | 20 |
| Future Volume (veh/h) | 24 | 4 | 41 | 87 | 9 | 11 | 37 | 568 | 74 | 10 | 318 | 20 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 25 | 4 | 43 | 91 | 9 | 11 | 39 | 592 | 77 | 10 | 331 | 21 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 193 | 176 | 149 | 194 | 176 | 149 | 94 | 2653 | 1183 | 35 | 2536 | 1131 |
| Arrive On Green | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.05 | 0.73 | 0.73 | 0.02 | 0.70 | 0.70 |
| Sat Flow, veh/h | 1414 | 1900 | 1610 | 1380 | 1900 | 1610 | 1810 | 3610 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 25 | 4 | 43 | 91 | 9 | 11 | 39 | 592 | 77 | 10 | 331 | 21 |
| Grp Sat Flow(s),veh/h/ln | 1414 | 1900 | 1610 | 1380 | 1900 | 1610 | 1810 | 1805 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 1.7 | 0.2 | 2.6 | 6.7 | 0.5 | 0.7 | 2.2 | 5.5 | 1.4 | 0.6 | 3.2 | 0.4 |
| Cycle Q Clear(g_c), s | 2.2 | 0.2 | 2.6 | 6.9 | 0.5 | 0.7 | 2.2 | 5.5 | 1.4 | 0.6 | 3.2 | 0.4 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 193 | 176 | 149 | 194 | 176 | 149 | 94 | 2653 | 1183 | 35 | 2536 | 1131 |
| V/C Ratio(X) | 0.13 | 0.02 | 0.29 | 0.47 | 0.05 | 0.07 | 0.42 | 0.22 | 0.07 | 0.29 | 0.13 | 0.02 |
| Avail Cap(c_a), veh/h | 656 | 798 | 676 | 646 | 798 | 676 | 260 | 2653 | 1183 | 260 | 2536 | 1131 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | 0.98 | 0.98 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 44.4 | 43.3 | 44.4 | 46.5 | 43.4 | 43.5 | 48.2 | 4.4 | 3.9 | 50.8 | 5.1 | 4.7 |
| Incr Delay (d2), s/veh | 0.7 | 0.1 | 2.5 | 4.1 | 0.3 | 0.5 | 1.1 | 0.2 | 0.1 | 1.7 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.6 | 0.1 | 1.1 | 2.5 | 0.2 | 0.3 | 1.0 | 1.5 | 0.4 | 0.3 | 1.0 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 45.1 | 43.5 | 46.9 | 50.6 | 43.7 | 44.0 | 49.3 | 4.6 | 4.0 | 52.4 | 5.2 | 4.7 |
| LnGrp LOS | D | D | D | D | D | D | D | A | A | D | A | A |
| Approach Vol, veh/h | | 72 | | | 111 | | | 708 | | | 362 | |
| Approach Delay, s/veh | | 46.1 | | | 49.4 | | | 7.0 | | | 6.5 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.3 | 79.1 | | 15.6 | 6.9 | 82.5 | | 15.6 |
| Change Period (Y+Rc), s | 4.9 | 5.3 | | 5.9 | 4.9 | 5.3 | | 5.9 |
| Max Green Setting (Gmax), s | 15.1 | 29.7 | | 44.1 | 15.1 | 29.7 | | 44.1 |
| Max Q Clear Time (g_c+I1), s | 4.2 | 5.2 | | 8.9 | 2.6 | 7.5 | | 4.6 |
| Green Ext Time (p_c), s | 0.0 | 4.3 | | 0.8 | 0.0 | 7.9 | | 0.5 |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 12.9 |
| HCM 6th LOS | | B |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 17 | 6 | 673 | 10 | 4 | 441 |
| Future Volume (veh/h) | 17 | 6 | 673 | 10 | 4 | 441 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 18 | 7 | 732 | 11 | 4 | 479 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 77 | 69 | 2849 | 43 | 15 | 3036 |
| Arrive On Green | 0.04 | 0.04 | 0.78 | 0.78 | 0.01 | 0.84 |
| Sat Flow, veh/h | 1810 | 1610 | 3735 | 55 | 1810 | 3705 |
| Grp Volume(v), veh/h | 18 | 7 | 363 | 380 | 4 | 479 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1610 | 1805 | 1890 | 1810 | 1805 |
| Q Serve(g_s), s | 0.8 | 0.3 | 4.4 | 4.4 | 0.2 | 1.9 |
| Cycle Q Clear(g_c), s | 0.8 | 0.3 | 4.4 | 4.4 | 0.2 | 1.9 |
| Prop In Lane | 1.00 | 1.00 | | 0.03 | 1.00 | |
| Lane Grp Cap(c), veh/h | 77 | 69 | 1413 | 1479 | 15 | 3036 |
| V/C Ratio(X) | 0.23 | 0.10 | 0.26 | 0.26 | 0.26 | 0.16 |
| Avail Cap(c_a), veh/h | 588 | 523 | 1413 | 1479 | 362 | 3036 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.87 | 0.87 | 0.99 | 0.99 |
| Uniform Delay (d), s/veh | 37.0 | 36.8 | 2.4 | 2.4 | 39.4 | 1.2 |
| Incr Delay (d2), s/veh | 3.3 | 1.4 | 0.4 | 0.4 | 3.2 | 0.1 |
| 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 | 0.3 | 0.7 | 0.7 | 0.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 40.3 | 38.2 | 2.7 | 2.7 | 42.6 | 1.3 |
| LnGrp LOS | D | D | A | A | D | A |
| Approach Vol, veh/h | 25 | | 743 | | | 483 |
| Approach Delay, s/veh | 39.7 | | 2.7 | | | 1.6 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | 2 | | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 72.6 | | 7.4 | 4.7 | 67.9 |
| Change Period (Y+Rc), s | 5.3 | | 4.0 | 4.0 | 5.3 |
| Max Green Setting (Gmax), s | 44.7 | | 26.0 | 16.0 | 24.7 |
| Max Q Clear Time (g_c+I1), s | 3.9 | | 2.8 | 2.2 | 6.4 |
| Green Ext Time (p_c), s | 5.1 | | 0.1 | 0.0 | 6.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 3.0 |
| HCM 6th LOS | A |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 242 | 0 | 550 | 0 | 149 | 15 | 0 | 434 | 23 |
| Future Volume (veh/h) | 0 | 0 | 0 | 242 | 0 | 550 | 0 | 149 | 15 | 0 | 434 | 23 |
| Initial Q (Qb), veh | | | | 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 |
| Parking Bus, Adj | | | | 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 | |
| Adj Sat Flow, veh/h/ln | | | | 1900 | 1900 | 1900 | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | | | | 299 | 0 | 679 | 0 | 184 | 0 | 0 | 536 | 0 |
| Peak Hour Factor | | | | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |
| Percent Heavy Veh, % | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | | | | 1228 | 0 | 1092 | 0 | 1825 | | 0 | 1825 | |
| Arrive On Green | | | | 0.34 | 0.00 | 0.34 | 0.00 | 0.51 | 0.00 | 0.00 | 0.51 | 0.00 |
| Sat Flow, veh/h | | | | 3619 | 0 | 3220 | 0 | 3705 | 1610 | 0 | 3800 | 0 |
| Grp Volume(v), veh/h | | | | 299 | 0 | 679 | 0 | 184 | 0 | 0 | 536 | 0 |
| Grp Sat Flow(s),veh/h/ln | | | | 1810 | 0 | 1610 | 0 | 1805 | 1610 | 0 | 1805 | 0 |
| Q Serve(g_s), s | | | | 5.1 | 0.0 | 15.0 | 0.0 | 2.3 | 0.0 | 0.0 | 7.3 | 0.0 |
| Cycle Q Clear(g_c), s | | | | 5.1 | 0.0 | 15.0 | 0.0 | 2.3 | 0.0 | 0.0 | 7.3 | 0.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 0.00 | | 1.00 | 0.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | | | | 1228 | 0 | 1092 | 0 | 1825 | | 0 | 1825 | |
| V/C Ratio(X) | | | | 0.24 | 0.00 | 0.62 | 0.00 | 0.10 | | 0.00 | 0.29 | |
| Avail Cap(c_a), veh/h | | | | 1516 | 0 | 1349 | 0 | 1825 | | 0 | 1825 | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| Uniform Delay (d), s/veh | | | | 20.2 | 0.0 | 23.5 | 0.0 | 11.0 | 0.0 | 0.0 | 12.2 | 0.0 |
| Incr Delay (d2), s/veh | | | | 0.5 | 0.0 | 2.7 | 0.0 | 0.1 | 0.0 | 0.0 | 0.4 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 2.0 | 0.0 | 5.6 | 0.0 | 0.8 | 0.0 | 0.0 | 2.7 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 20.7 | 0.0 | 26.2 | 0.0 | 11.1 | 0.0 | 0.0 | 12.6 | 0.0 |
| LnGrp LOS | | | | C | A | C | A | B | | A | B | |
| Approach Vol, veh/h | | | | | 978 | | | 184 | A | | 536 | A |
| Approach Delay, s/veh | | | | | 24.5 | | | 11.1 | | | 12.6 | |
| Approach LOS | | | | | C | | | B | | | B | |

| Timer - Assigned Phs | 2 | | 6 | | 8 | | | |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 49.8 | | 49.8 | | 35.2 | | | |
| Change Period (Y+Rc), s | 6.8 | | 6.8 | | 6.4 | | | |
| Max Green Setting (Gmax), s | 36.2 | | 36.2 | | 35.6 | | | |
| Max Q Clear Time (g_c+I1), s | 4.3 | | 9.3 | | 17.0 | | | |
| Green Ext Time (p_c), s | 3.1 | | 9.5 | | 11.8 | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 19.3 | |
| HCM 6th LOS | B | |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 21 | 0 | 20 | 0 | 0 | 0 | 0 | 143 | 266 | 0 | 360 | 316 |
| Future Volume (veh/h) | 21 | 0 | 20 | 0 | 0 | 0 | 0 | 143 | 266 | 0 | 360 | 316 |
| Initial Q (Qb), veh | 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 |
| Parking Bus, Adj | 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 | |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1900 | | | | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 23 | 0 | 22 | | | | 0 | 155 | 0 | 0 | 391 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 124 | 0 | 110 | | | | 0 | 1369 | | 0 | 2602 | |
| Arrive On Green | 0.07 | 0.00 | 0.07 | | | | 0.00 | 0.72 | 0.00 | 0.00 | 0.72 | 0.00 |
| Sat Flow, veh/h | 1810 | 0 | 1610 | | | | 0 | 1900 | 3220 | 0 | 3705 | 1610 |
| Grp Volume(v), veh/h | 23 | 0 | 22 | | | | 0 | 155 | 0 | 0 | 391 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 0 | 1610 | | | | 0 | 1900 | 1610 | 0 | 1805 | 1610 |
| Q Serve(g_s), s | 0.8 | 0.0 | 0.8 | | | | 0.0 | 1.6 | 0.0 | 0.0 | 2.2 | 0.0 |
| Cycle Q Clear(g_c), s | 0.8 | 0.0 | 0.8 | | | | 0.0 | 1.6 | 0.0 | 0.0 | 2.2 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | | | | 0.00 | | 1.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 124 | 0 | 110 | | | | 0 | 1369 | | 0 | 2602 | |
| V/C Ratio(X) | 0.19 | 0.00 | 0.20 | | | | 0.00 | 0.11 | | 0.00 | 0.15 | |
| Avail Cap(c_a), veh/h | 646 | 0 | 575 | | | | 0 | 1369 | | 0 | 2602 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | | | | 0.00 | 1.00 | 0.00 | 0.00 | 0.97 | 0.00 |
| Uniform Delay (d), s/veh | 28.6 | 0.0 | 28.6 | | | | 0.0 | 2.8 | 0.0 | 0.0 | 2.8 | 0.0 |
| Incr Delay (d2), s/veh | 3.3 | 0.0 | 4.0 | | | | 0.0 | 0.2 | 0.0 | 0.0 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.4 | 0.0 | 0.4 | | | | 0.0 | 0.3 | 0.0 | 0.0 | 0.4 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 31.8 | 0.0 | 32.6 | | | | 0.0 | 2.9 | 0.0 | 0.0 | 3.0 | 0.0 |
| LnGrp LOS | C | A | C | | | | A | A | | A | A | |
| Approach Vol, veh/h | | 45 | | | | | | 155 | A | | 391 | A |
| Approach Delay, s/veh | | 32.2 | | | | | | 2.9 | | | 3.0 | |
| Approach LOS | | C | | | | | | A | | | A | |

| Timer - Assigned Phs | 2 | 4 | 6 |
|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 53.7 | 11.3 | 53.7 |
| Change Period (Y+Rc), s | 6.9 | 6.8 | 6.9 |
| Max Green Setting (Gmax), s | 28.1 | 23.2 | 28.1 |
| Max Q Clear Time (g_c+I1), s | 3.6 | 2.8 | 4.2 |
| Green Ext Time (p_c), s | 2.2 | 0.3 | 6.4 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 5.2 |
| HCM 6th LOS | A |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10.8 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 37 | 243 | 10 | 63 | 205 | 34 | 14 | 43 | 61 | 40 | 52 | 15 |
| Future Vol, veh/h | 37 | 243 | 10 | 63 | 205 | 34 | 14 | 43 | 61 | 40 | 52 | 15 |
| Peak Hour Factor | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 45 | 296 | 12 | 77 | 250 | 41 | 17 | 52 | 74 | 49 | 63 | 18 |
| Number of Lanes | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 3 | 3 |
| HCM Control Delay | 10.8 | 10.4 | 11 | 11.5 |
| HCM LOS | B | B | B | B |

| Lane | NBLn1 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 12% | 100% | 0% | 0% | 100% | 0% | 0% | 37% |
| Vol Thru, % | 36% | 0% | 100% | 89% | 0% | 100% | 67% | 49% |
| Vol Right, % | 52% | 0% | 0% | 11% | 0% | 0% | 33% | 14% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 118 | 37 | 162 | 91 | 63 | 137 | 102 | 107 |
| LT Vol | 14 | 37 | 0 | 0 | 63 | 0 | 0 | 40 |
| Through Vol | 43 | 0 | 162 | 81 | 0 | 137 | 68 | 52 |
| RT Vol | 61 | 0 | 0 | 10 | 0 | 0 | 34 | 15 |
| Lane Flow Rate | 144 | 45 | 198 | 111 | 77 | 167 | 125 | 130 |
| Geometry Grp | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.249 | 0.081 | 0.325 | 0.18 | 0.137 | 0.273 | 0.197 | 0.24 |
| Departure Headway (Hd) | 6.218 | 6.429 | 5.921 | 5.843 | 6.413 | 5.905 | 5.669 | 6.621 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 577 | 556 | 607 | 613 | 559 | 607 | 631 | 542 |
| Service Time | 3.969 | 4.176 | 3.667 | 3.589 | 4.16 | 3.651 | 3.415 | 4.374 |
| HCM Lane V/C Ratio | 0.25 | 0.081 | 0.326 | 0.181 | 0.138 | 0.275 | 0.198 | 0.24 |
| HCM Control Delay | 11 | 9.7 | 11.5 | 9.9 | 10.2 | 10.9 | 9.8 | 11.5 |
| HCM Lane LOS | B | A | B | A | B | B | A | B |
| HCM 95th-tile Q | 1 | 0.3 | 1.4 | 0.7 | 0.5 | 1.1 | 0.7 | 0.9 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 8.7 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 8 | 25 | 13 | 4 | 37 | 23 | 31 | 85 | 3 | 11 | 74 | 13 |
| Future Vol, veh/h | 8 | 25 | 13 | 4 | 37 | 23 | 31 | 85 | 3 | 11 | 74 | 13 |
| Peak Hour Factor | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 10 | 30 | 16 | 5 | 45 | 28 | 38 | 104 | 4 | 13 | 90 | 16 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 2 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 2 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 2 | 2 |
| HCM Control Delay | 8.2 | 8.2 | 9.3 | 8.4 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 26% | 100% | 0% | 100% | 0% | 13% | 0% |
| Vol Thru, % | 71% | 0% | 66% | 0% | 62% | 87% | 0% |
| Vol Right, % | 3% | 0% | 34% | 0% | 38% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 119 | 8 | 38 | 4 | 60 | 85 | 13 |
| LT Vol | 31 | 8 | 0 | 4 | 0 | 11 | 0 |
| Through Vol | 85 | 0 | 25 | 0 | 37 | 74 | 0 |
| RT Vol | 3 | 0 | 13 | 0 | 23 | 0 | 13 |
| Lane Flow Rate | 145 | 10 | 46 | 5 | 73 | 104 | 16 |
| Geometry Grp | 6 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.202 | 0.016 | 0.064 | 0.008 | 0.101 | 0.145 | 0.019 |
| Departure Headway (Hd) | 5.017 | 5.755 | 5.01 | 5.733 | 4.96 | 5.033 | 4.266 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 717 | 623 | 715 | 625 | 723 | 713 | 840 |
| Service Time | 3.041 | 3.482 | 2.738 | 3.459 | 2.686 | 2.757 | 1.989 |
| HCM Lane V/C Ratio | 0.202 | 0.016 | 0.064 | 0.008 | 0.101 | 0.146 | 0.019 |
| HCM Control Delay | 9.3 | 8.6 | 8.1 | 8.5 | 8.2 | 8.6 | 7.1 |
| HCM Lane LOS | A | A | A | A | A | A | A |
| HCM 95th-tile Q | 0.8 | 0 | 0.2 | 0 | 0.3 | 0.5 | 0.1 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 26.2 |
| Intersection LOS | D |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 25 | 145 | 98 | 54 | 99 | 12 | 55 | 281 | 74 | 42 | 474 | 31 |
| Future Vol, veh/h | 25 | 145 | 98 | 54 | 99 | 12 | 55 | 281 | 74 | 42 | 474 | 31 |
| Peak Hour Factor | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 30 | 175 | 118 | 65 | 119 | 14 | 66 | 339 | 89 | 51 | 571 | 37 |
| Number of Lanes | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 3 | 3 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 3 | 3 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 3 | 3 | 3 | 3 |
| HCM Control Delay | 16.1 | 15.4 | 28.9 | 32.3 |
| HCM LOS | C | C | D | D |

| Lane | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 0% | 0% | 100% | 33% | 0% | 100% | 0% | 0% | 100% |
| Vol Right, % | 0% | 0% | 100% | 0% | 0% | 67% | 0% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 55 | 281 | 74 | 25 | 97 | 146 | 54 | 99 | 12 | 42 | 316 |
| LT Vol | 55 | 0 | 0 | 25 | 0 | 0 | 54 | 0 | 0 | 42 | 0 |
| Through Vol | 0 | 281 | 0 | 0 | 97 | 48 | 0 | 99 | 0 | 0 | 316 |
| RT Vol | 0 | 0 | 74 | 0 | 0 | 98 | 0 | 0 | 12 | 0 | 0 |
| Lane Flow Rate | 66 | 339 | 89 | 30 | 116 | 176 | 65 | 119 | 14 | 51 | 381 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.164 | 0.791 | 0.191 | 0.079 | 0.29 | 0.416 | 0.177 | 0.308 | 0.035 | 0.121 | 0.857 |
| Departure Headway (Hd) | 8.915 | 8.415 | 7.715 | 9.456 | 8.956 | 8.487 | 9.81 | 9.31 | 8.61 | 8.6 | 8.1 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 404 | 433 | 466 | 379 | 402 | 425 | 366 | 386 | 416 | 418 | 449 |
| Service Time | 6.637 | 6.137 | 5.437 | 7.207 | 6.707 | 6.239 | 7.567 | 7.067 | 6.367 | 6.318 | 5.818 |
| HCM Lane V/C Ratio | 0.163 | 0.783 | 0.191 | 0.079 | 0.289 | 0.414 | 0.178 | 0.308 | 0.034 | 0.122 | 0.849 |
| HCM Control Delay | 13.4 | 36.3 | 12.3 | 13 | 15.3 | 17.2 | 14.7 | 16.2 | 11.7 | 12.5 | 43.2 |
| HCM Lane LOS | B | E | B | B | C | C | B | C | B | B | E |
| HCM 95th-tile Q | 0.6 | 7 | 0.7 | 0.3 | 1.2 | 2 | 0.6 | 1.3 | 0.1 | 0.4 | 8.6 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 13 | 8 | 45 | 28 | 4 | 10 | 65 | 371 | 107 | 9 | 365 | 36 |
| Future Volume (veh/h) | 13 | 8 | 45 | 28 | 4 | 10 | 65 | 371 | 107 | 9 | 365 | 36 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 16 | 10 | 56 | 35 | 5 | 12 | 80 | 458 | 132 | 11 | 451 | 44 |
| 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, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 171 | 142 | 120 | 163 | 142 | 120 | 124 | 2711 | 1209 | 38 | 2539 | 1132 |
| Arrive On Green | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.75 | 0.75 | 0.02 | 0.70 | 0.70 |
| Sat Flow, veh/h | 1418 | 1900 | 1610 | 1357 | 1900 | 1610 | 1810 | 3610 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 16 | 10 | 56 | 35 | 5 | 12 | 80 | 458 | 132 | 11 | 451 | 44 |
| Grp Sat Flow(s),veh/h/ln | 1418 | 1900 | 1610 | 1357 | 1900 | 1610 | 1810 | 1805 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 1.1 | 0.5 | 3.5 | 2.6 | 0.3 | 0.7 | 4.5 | 3.8 | 2.3 | 0.6 | 4.4 | 0.9 |
| Cycle Q Clear(g_c), s | 1.4 | 0.5 | 3.5 | 3.1 | 0.3 | 0.7 | 4.5 | 3.8 | 2.3 | 0.6 | 4.4 | 0.9 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 171 | 142 | 120 | 163 | 142 | 120 | 124 | 2711 | 1209 | 38 | 2539 | 1132 |
| V/C Ratio(X) | 0.09 | 0.07 | 0.47 | 0.21 | 0.04 | 0.10 | 0.64 | 0.17 | 0.11 | 0.29 | 0.18 | 0.04 |
| Avail Cap(c_a), veh/h | 661 | 798 | 676 | 632 | 798 | 676 | 260 | 2711 | 1209 | 260 | 2539 | 1132 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | 0.98 | 0.98 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 45.7 | 45.2 | 46.6 | 46.6 | 45.1 | 45.3 | 47.6 | 3.7 | 3.5 | 50.6 | 5.3 | 4.8 |
| Incr Delay (d2), s/veh | 0.6 | 0.5 | 6.5 | 1.5 | 0.2 | 0.8 | 2.0 | 0.1 | 0.2 | 1.6 | 0.2 | 0.1 |
| 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 | 0.4 | 0.3 | 1.6 | 0.9 | 0.1 | 0.3 | 2.0 | 1.0 | 0.6 | 0.3 | 1.4 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 46.3 | 45.7 | 53.1 | 48.2 | 45.3 | 46.1 | 49.6 | 3.9 | 3.7 | 52.2 | 5.4 | 4.8 |
| LnGrp LOS | D | D | D | D | D | D | D | A | A | D | A | A |
| Approach Vol, veh/h | | 82 | | | 52 | | | 670 | | | 506 | |
| Approach Delay, s/veh | | 50.8 | | | 47.4 | | | 9.3 | | | 6.4 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 12.1 | 79.1 | | 13.7 | 7.1 | 84.2 | | 13.7 |
| Change Period (Y+Rc), s | 4.9 | 5.3 | | 5.9 | 4.9 | 5.3 | | 5.9 |
| Max Green Setting (Gmax), s | 15.1 | 29.7 | | 44.1 | 15.1 | 29.7 | | 44.1 |
| Max Q Clear Time (g_c+I1), s | 6.5 | 6.4 | | 5.1 | 2.6 | 5.8 | | 5.5 |
| Green Ext Time (p_c), s | 0.0 | 6.0 | | 0.3 | 0.0 | 6.9 | | 0.6 |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 12.3 | |
| HCM 6th LOS | B | |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 11 | 3 | 541 | 19 | 5 | 431 |
| Future Volume (veh/h) | 11 | 3 | 541 | 19 | 5 | 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 14 | 4 | 676 | 24 | 6 | 539 |
| Peak Hour Factor | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 60 | 53 | 2803 | 99 | 23 | 3071 |
| Arrive On Green | 0.03 | 0.03 | 0.79 | 0.79 | 0.01 | 0.85 |
| Sat Flow, veh/h | 1810 | 1610 | 3651 | 126 | 1810 | 3705 |
| Grp Volume(v), veh/h | 14 | 4 | 343 | 357 | 6 | 539 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1610 | 1805 | 1877 | 1810 | 1805 |
| Q Serve(g_s), s | 0.6 | 0.2 | 4.0 | 4.0 | 0.3 | 2.1 |
| Cycle Q Clear(g_c), s | 0.6 | 0.2 | 4.0 | 4.0 | 0.3 | 2.1 |
| Prop In Lane | 1.00 | 1.00 | | 0.07 | 1.00 | |
| Lane Grp Cap(c), veh/h | 60 | 53 | 1423 | 1480 | 23 | 3071 |
| V/C Ratio(X) | 0.23 | 0.08 | 0.24 | 0.24 | 0.27 | 0.18 |
| Avail Cap(c_a), veh/h | 588 | 523 | 1423 | 1480 | 362 | 3071 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.88 | 0.88 | 0.99 | 0.99 |
| Uniform Delay (d), s/veh | 37.7 | 37.5 | 2.2 | 2.2 | 39.1 | 1.0 |
| Incr Delay (d2), s/veh | 4.2 | 1.3 | 0.4 | 0.3 | 2.3 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 0.2 | 0.6 | 0.6 | 0.1 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 41.9 | 38.8 | 2.6 | 2.6 | 41.4 | 1.2 |
| LnGrp LOS | D | D | A | A | D | A |
| Approach Vol, veh/h | 18 | | 700 | | | 545 |
| Approach Delay, s/veh | 41.2 | | 2.6 | | | 1.6 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | 2 | | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 73.4 | | 6.6 | 5.0 | 68.4 |
| Change Period (Y+Rc), s | 5.3 | | 4.0 | 4.0 | 5.3 |
| Max Green Setting (Gmax), s | 44.7 | | 26.0 | 16.0 | 24.7 |
| Max Q Clear Time (g_c+I1), s | 4.1 | | 2.6 | 2.3 | 6.0 |
| Green Ext Time (p_c), s | 5.9 | | 0.0 | 0.0 | 5.7 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 2.7 |
| HCM 6th LOS | A |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 193 | 0 | 437 | 0 | 111 | 11 | 0 | 428 | 33 |
| Future Volume (veh/h) | 0 | 0 | 0 | 193 | 0 | 437 | 0 | 111 | 11 | 0 | 428 | 33 |
| Initial Q (Qb), veh | | | | 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 |
| Parking Bus, Adj | | | | 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 | |
| Adj Sat Flow, veh/h/ln | | | | 1900 | 1900 | 1900 | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | | | | 268 | 0 | 607 | 0 | 154 | 0 | 0 | 594 | 0 |
| Peak Hour Factor | | | | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 |
| Percent Heavy Veh, % | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | | | | 1144 | 0 | 1018 | 0 | 1908 | | 0 | 1908 | |
| Arrive On Green | | | | 0.32 | 0.00 | 0.32 | 0.00 | 0.53 | 0.00 | 0.00 | 0.53 | 0.00 |
| Sat Flow, veh/h | | | | 3619 | 0 | 3220 | 0 | 3705 | 1610 | 0 | 3800 | 0 |
| Grp Volume(v), veh/h | | | | 268 | 0 | 607 | 0 | 154 | 0 | 0 | 594 | 0 |
| Grp Sat Flow(s),veh/h/ln | | | | 1810 | 0 | 1610 | 0 | 1805 | 1610 | 0 | 1805 | 0 |
| Q Serve(g_s), s | | | | 4.6 | 0.0 | 13.5 | 0.0 | 1.8 | 0.0 | 0.0 | 7.9 | 0.0 |
| Cycle Q Clear(g_c), s | | | | 4.6 | 0.0 | 13.5 | 0.0 | 1.8 | 0.0 | 0.0 | 7.9 | 0.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 0.00 | | 1.00 | 0.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | | | | 1144 | 0 | 1018 | 0 | 1908 | | 0 | 1908 | |
| V/C Ratio(X) | | | | 0.23 | 0.00 | 0.60 | 0.00 | 0.08 | | 0.00 | 0.31 | |
| Avail Cap(c_a), veh/h | | | | 1516 | 0 | 1349 | 0 | 1908 | | 0 | 1908 | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| Uniform Delay (d), s/veh | | | | 21.5 | 0.0 | 24.5 | 0.0 | 9.9 | 0.0 | 0.0 | 11.3 | 0.0 |
| Incr Delay (d2), s/veh | | | | 0.5 | 0.0 | 2.6 | 0.0 | 0.1 | 0.0 | 0.0 | 0.4 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 1.9 | 0.0 | 5.1 | 0.0 | 0.6 | 0.0 | 0.0 | 2.8 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 22.0 | 0.0 | 27.1 | 0.0 | 9.9 | 0.0 | 0.0 | 11.7 | 0.0 |
| LnGrp LOS | | | | C | A | C | A | A | | A | B | |
| Approach Vol, veh/h | | | | | 875 | | | 154 | A | | 594 | A |
| Approach Delay, s/veh | | | | | 25.5 | | | 9.9 | | | 11.7 | |
| Approach LOS | | | | | C | | | A | | | B | |

| Timer - Assigned Phs | 2 | | 6 | | 8 | | | |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 51.7 | | 51.7 | | 33.3 | | | |
| Change Period (Y+Rc), s | 6.8 | | 6.8 | | 6.4 | | | |
| Max Green Setting (Gmax), s | 36.2 | | 36.2 | | 35.6 | | | |
| Max Q Clear Time (g_c+I1), s | 3.8 | | 9.9 | | 15.5 | | | |
| Green Ext Time (p_c), s | 2.5 | | 10.5 | | 11.4 | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 19.0 | |
| HCM 6th LOS | B | |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 30 | 0 | 11 | 0 | 0 | 0 | 0 | 92 | 246 | 0 | 309 | 311 |
| Future Volume (veh/h) | 30 | 0 | 11 | 0 | 0 | 0 | 0 | 92 | 246 | 0 | 309 | 311 |
| Initial Q (Qb), veh | 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 |
| Parking Bus, Adj | 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 | |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1900 | | | | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 33 | 0 | 12 | | | | 0 | 100 | 0 | 0 | 336 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 124 | 0 | 110 | | | | 0 | 1369 | | 0 | 2602 | |
| Arrive On Green | 0.07 | 0.00 | 0.07 | | | | 0.00 | 0.72 | 0.00 | 0.00 | 0.72 | 0.00 |
| Sat Flow, veh/h | 1810 | 0 | 1610 | | | | 0 | 1900 | 3220 | 0 | 3705 | 1610 |
| Grp Volume(v), veh/h | 33 | 0 | 12 | | | | 0 | 100 | 0 | 0 | 336 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 0 | 1610 | | | | 0 | 1900 | 1610 | 0 | 1805 | 1610 |
| Q Serve(g_s), s | 1.1 | 0.0 | 0.5 | | | | 0.0 | 1.0 | 0.0 | 0.0 | 1.9 | 0.0 |
| Cycle Q Clear(g_c), s | 1.1 | 0.0 | 0.5 | | | | 0.0 | 1.0 | 0.0 | 0.0 | 1.9 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | | | | 0.00 | | 1.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 124 | 0 | 110 | | | | 0 | 1369 | | 0 | 2602 | |
| V/C Ratio(X) | 0.27 | 0.00 | 0.11 | | | | 0.00 | 0.07 | | 0.00 | 0.13 | |
| Avail Cap(c_a), veh/h | 646 | 0 | 575 | | | | 0 | 1369 | | 0 | 2602 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | | | | 0.00 | 1.00 | 0.00 | 0.00 | 0.96 | 0.00 |
| Uniform Delay (d), s/veh | 28.7 | 0.0 | 28.4 | | | | 0.0 | 2.7 | 0.0 | 0.0 | 2.8 | 0.0 |
| Incr Delay (d2), s/veh | 5.2 | 0.0 | 2.0 | | | | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.6 | 0.0 | 0.2 | | | | 0.0 | 0.2 | 0.0 | 0.0 | 0.3 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 33.9 | 0.0 | 30.4 | | | | 0.0 | 2.8 | 0.0 | 0.0 | 2.9 | 0.0 |
| LnGrp LOS | C | A | C | | | | A | A | | A | A | |
| Approach Vol, veh/h | | 45 | | | | | | 100 | A | | 336 | A |
| Approach Delay, s/veh | | 33.0 | | | | | | 2.8 | | | 2.9 | |
| Approach LOS | | C | | | | | | A | | | A | |

| Timer - Assigned Phs | 2 | 4 | 6 |
|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 53.7 | 11.3 | 53.7 |
| Change Period (Y+Rc), s | 6.9 | 6.8 | 6.9 |
| Max Green Setting (Gmax), s | 28.1 | 23.2 | 28.1 |
| Max Q Clear Time (g_c+I1), s | 3.0 | 3.1 | 3.9 |
| Green Ext Time (p_c), s | 1.3 | 0.3 | 5.4 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 5.7 |
| HCM 6th LOS | A |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 9.3 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 21 | 218 | 26 | 65 | 190 | 16 | 7 | 30 | 43 | 27 | 34 | 16 |
| Future Vol, veh/h | 21 | 218 | 26 | 65 | 190 | 16 | 7 | 30 | 43 | 27 | 34 | 16 |
| 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, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 23 | 240 | 29 | 71 | 209 | 18 | 8 | 33 | 47 | 30 | 37 | 18 |
| Number of Lanes | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 3 | 3 |
| HCM Control Delay | 9.3 | 9.2 | 9.3 | 9.7 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 9% | 100% | 0% | 0% | 100% | 0% | 0% | 35% |
| Vol Thru, % | 38% | 0% | 100% | 74% | 0% | 100% | 80% | 44% |
| Vol Right, % | 54% | 0% | 0% | 26% | 0% | 0% | 20% | 21% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 80 | 21 | 145 | 99 | 65 | 127 | 79 | 77 |
| LT Vol | 7 | 21 | 0 | 0 | 65 | 0 | 0 | 27 |
| Through Vol | 30 | 0 | 145 | 73 | 0 | 127 | 63 | 34 |
| RT Vol | 43 | 0 | 0 | 26 | 0 | 0 | 16 | 16 |
| Lane Flow Rate | 88 | 23 | 160 | 108 | 71 | 139 | 87 | 85 |
| Geometry Grp | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.137 | 0.037 | 0.235 | 0.154 | 0.115 | 0.204 | 0.125 | 0.14 |
| Departure Headway (Hd) | 5.594 | 5.806 | 5.302 | 5.116 | 5.792 | 5.287 | 5.145 | 5.953 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 635 | 613 | 672 | 695 | 615 | 674 | 691 | 597 |
| Service Time | 3.381 | 3.578 | 3.074 | 2.888 | 3.564 | 3.059 | 2.917 | 3.741 |
| HCM Lane V/C Ratio | 0.139 | 0.038 | 0.238 | 0.155 | 0.115 | 0.206 | 0.126 | 0.142 |
| HCM Control Delay | 9.3 | 8.8 | 9.7 | 8.8 | 9.3 | 9.4 | 8.7 | 9.7 |
| HCM Lane LOS | A | A | A | A | A | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.1 | 0.9 | 0.5 | 0.4 | 0.8 | 0.4 | 0.5 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 8.3 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 8 | 36 | 32 | 5 | 12 | 15 | 11 | 52 | 2 | 10 | 83 | 10 |
| Future Vol, veh/h | 8 | 36 | 32 | 5 | 12 | 15 | 11 | 52 | 2 | 10 | 83 | 10 |
| Peak Hour Factor | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 10 | 43 | 38 | 6 | 14 | 18 | 13 | 62 | 2 | 12 | 99 | 12 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 2 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 2 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 2 | 2 |
| HCM Control Delay | 8 | 7.7 | 8.6 | 8.4 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 17% | 100% | 0% | 100% | 0% | 11% | 0% |
| Vol Thru, % | 80% | 0% | 53% | 0% | 44% | 89% | 0% |
| Vol Right, % | 3% | 0% | 47% | 0% | 56% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 65 | 8 | 68 | 5 | 27 | 93 | 10 |
| LT Vol | 11 | 8 | 0 | 5 | 0 | 10 | 0 |
| Through Vol | 52 | 0 | 36 | 0 | 12 | 83 | 0 |
| RT Vol | 2 | 0 | 32 | 0 | 15 | 0 | 10 |
| Lane Flow Rate | 77 | 10 | 81 | 6 | 32 | 111 | 12 |
| Geometry Grp | 6 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.107 | 0.015 | 0.106 | 0.009 | 0.042 | 0.152 | 0.014 |
| Departure Headway (Hd) | 4.971 | 5.543 | 4.71 | 5.592 | 4.699 | 4.933 | 4.177 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 723 | 648 | 763 | 642 | 763 | 730 | 859 |
| Service Time | 2.989 | 3.26 | 2.426 | 3.312 | 2.418 | 2.649 | 1.893 |
| HCM Lane V/C Ratio | 0.107 | 0.015 | 0.106 | 0.009 | 0.042 | 0.152 | 0.014 |
| HCM Control Delay | 8.6 | 8.3 | 8 | 8.4 | 7.6 | 8.5 | 7 |
| HCM Lane LOS | A | A | A | A | A | A | A |
| HCM 95th-tile Q | 0.4 | 0 | 0.4 | 0 | 0.1 | 0.5 | 0 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 129 |
| Intersection LOS | F |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 25 | 197 | 76 | 55 | 147 | 55 | 107 | 630 | 85 | 26 | 310 | 29 |
| Future Vol, veh/h | 25 | 197 | 76 | 55 | 147 | 55 | 107 | 630 | 85 | 26 | 310 | 29 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 28 | 224 | 86 | 63 | 167 | 63 | 122 | 716 | 97 | 30 | 352 | 33 |
| Number of Lanes | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 3 | 3 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 3 | 3 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 3 | 3 | 3 | 3 |
| HCM Control Delay | 18.3 | 17.9 | 251.5 | 21.5 |
| HCM LOS | C | C | F | C |

| Lane | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 0% | 0% | 100% | 46% | 0% | 100% | 0% | 0% | 100% |
| Vol Right, % | 0% | 0% | 100% | 0% | 0% | 54% | 0% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 107 | 630 | 85 | 25 | 131 | 142 | 55 | 147 | 55 | 26 | 207 |
| LT Vol | 107 | 0 | 0 | 25 | 0 | 0 | 55 | 0 | 0 | 26 | 0 |
| Through Vol | 0 | 630 | 0 | 0 | 131 | 66 | 0 | 147 | 0 | 0 | 207 |
| RT Vol | 0 | 0 | 85 | 0 | 0 | 76 | 0 | 0 | 55 | 0 | 0 |
| Lane Flow Rate | 122 | 716 | 97 | 28 | 149 | 161 | 62 | 167 | 62 | 30 | 235 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.297 | 1.651 | 0.204 | 0.076 | 0.38 | 0.393 | 0.169 | 0.431 | 0.149 | 0.077 | 0.582 |
| Departure Headway (Hd) | 8.8 | 8.3 | 7.6 | 10.544 | 10.044 | 9.668 | 10.679 | 10.179 | 9.479 | 10.191 | 9.691 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 409 | 444 | 471 | 342 | 361 | 375 | 338 | 356 | 381 | 354 | 376 |
| Service Time | 6.556 | 6.056 | 5.356 | 8.244 | 7.744 | 7.368 | 8.379 | 7.879 | 7.179 | 7.891 | 7.391 |
| HCM Lane V/C Ratio | 0.298 | 1.613 | 0.206 | 0.082 | 0.413 | 0.429 | 0.183 | 0.469 | 0.163 | 0.085 | 0.625 |
| HCM Control Delay | 15.3 | 323.9 | 12.3 | 14.1 | 18.8 | 18.5 | 15.5 | 20.4 | 13.8 | 13.7 | 25 |
| HCM Lane LOS | C | F | B | B | C | C | C | C | B | B | C |
| HCM 95th-tile Q | 1.2 | 41.5 | 0.8 | 0.2 | 1.7 | 1.8 | 0.6 | 2.1 | 0.5 | 0.2 | 3.5 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 28 | 5 | 45 | 97 | 10 | 11 | 40 | 607 | 77 | 10 | 338 | 23 |
| Future Volume (veh/h) | 28 | 5 | 45 | 97 | 10 | 11 | 40 | 607 | 77 | 10 | 338 | 23 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 29 | 5 | 47 | 101 | 10 | 11 | 42 | 632 | 80 | 10 | 352 | 24 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 205 | 192 | 163 | 204 | 192 | 163 | 97 | 2621 | 1169 | 35 | 2496 | 1114 |
| Arrive On Green | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.05 | 0.73 | 0.73 | 0.02 | 0.69 | 0.69 |
| Sat Flow, veh/h | 1413 | 1900 | 1610 | 1374 | 1900 | 1610 | 1810 | 3610 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 29 | 5 | 47 | 101 | 10 | 11 | 42 | 632 | 80 | 10 | 352 | 24 |
| Grp Sat Flow(s),veh/h/ln | 1413 | 1900 | 1610 | 1374 | 1900 | 1610 | 1810 | 1805 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 2.0 | 0.2 | 2.8 | 7.5 | 0.5 | 0.6 | 2.4 | 6.1 | 1.5 | 0.6 | 3.5 | 0.5 |
| Cycle Q Clear(g_c), s | 2.5 | 0.2 | 2.8 | 7.8 | 0.5 | 0.6 | 2.4 | 6.1 | 1.5 | 0.6 | 3.5 | 0.5 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 205 | 192 | 163 | 204 | 192 | 163 | 97 | 2621 | 1169 | 35 | 2496 | 1114 |
| V/C Ratio(X) | 0.14 | 0.03 | 0.29 | 0.49 | 0.05 | 0.07 | 0.43 | 0.24 | 0.07 | 0.29 | 0.14 | 0.02 |
| Avail Cap(c_a), veh/h | 655 | 798 | 676 | 642 | 798 | 676 | 260 | 2621 | 1169 | 260 | 2496 | 1114 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.97 | 0.97 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 43.7 | 42.5 | 43.7 | 46.0 | 42.6 | 42.7 | 48.1 | 4.8 | 4.1 | 50.8 | 5.5 | 5.1 |
| Incr Delay (d2), s/veh | 0.7 | 0.1 | 2.3 | 4.3 | 0.3 | 0.4 | 1.1 | 0.2 | 0.1 | 1.7 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.7 | 0.1 | 1.2 | 2.7 | 0.2 | 0.3 | 1.1 | 1.8 | 0.4 | 0.3 | 1.1 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 44.5 | 42.6 | 45.9 | 50.3 | 42.9 | 43.1 | 49.2 | 5.0 | 4.3 | 52.4 | 5.7 | 5.1 |
| LnGrp LOS | D | D | D | D | D | D | D | A | A | D | A | A |
| Approach Vol, veh/h | | 81 | | | 122 | | | 754 | | | 386 | |
| Approach Delay, s/veh | | 45.2 | | | 49.1 | | | 7.4 | | | 6.8 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.5 | 77.9 | | 16.5 | 6.9 | 81.5 | | 16.5 |
| Change Period (Y+Rc), s | 4.9 | 5.3 | | 5.9 | 4.9 | 5.3 | | 5.9 |
| Max Green Setting (Gmax), s | 15.1 | 29.7 | | 44.1 | 15.1 | 29.7 | | 44.1 |
| Max Q Clear Time (g_c+I1), s | 4.4 | 5.5 | | 9.8 | 2.6 | 8.1 | | 4.8 |
| Green Ext Time (p_c), s | 0.0 | 4.6 | | 0.9 | 0.0 | 8.4 | | 0.6 |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 13.3 | |
| HCM 6th LOS | B | |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 32 | 8 | 716 | 13 | 4 | 474 |
| Future Volume (veh/h) | 32 | 8 | 716 | 13 | 4 | 474 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 35 | 9 | 778 | 14 | 4 | 515 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 113 | 100 | 2768 | 50 | 15 | 2965 |
| Arrive On Green | 0.06 | 0.06 | 0.76 | 0.76 | 0.01 | 0.82 |
| Sat Flow, veh/h | 1810 | 1610 | 3723 | 65 | 1810 | 3705 |
| Grp Volume(v), veh/h | 35 | 9 | 387 | 405 | 4 | 515 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1610 | 1805 | 1888 | 1810 | 1805 |
| Q Serve(g_s), s | 1.5 | 0.4 | 5.2 | 5.2 | 0.2 | 2.4 |
| Cycle Q Clear(g_c), s | 1.5 | 0.4 | 5.2 | 5.2 | 0.2 | 2.4 |
| Prop In Lane | 1.00 | 1.00 | | 0.03 | 1.00 | |
| Lane Grp Cap(c), veh/h | 113 | 100 | 1377 | 1440 | 15 | 2965 |
| V/C Ratio(X) | 0.31 | 0.09 | 0.28 | 0.28 | 0.26 | 0.17 |
| Avail Cap(c_a), veh/h | 588 | 523 | 1377 | 1440 | 362 | 2965 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.87 | 0.87 | 0.98 | 0.98 |
| Uniform Delay (d), s/veh | 35.9 | 35.4 | 2.9 | 2.9 | 39.4 | 1.5 |
| Incr Delay (d2), s/veh | 3.3 | 0.8 | 0.4 | 0.4 | 3.2 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.8 | 0.4 | 1.0 | 1.0 | 0.1 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 39.1 | 36.2 | 3.3 | 3.3 | 42.6 | 1.6 |
| LnGrp LOS | D | D | A | A | D | A |
| Approach Vol, veh/h | 44 | | 792 | | | 519 |
| Approach Delay, s/veh | 38.5 | | 3.3 | | | 1.9 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | 2 | | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 71.0 | | 9.0 | 4.7 | 66.3 |
| Change Period (Y+Rc), s | 5.3 | | 4.0 | 4.0 | 5.3 |
| Max Green Setting (Gmax), s | 44.7 | | 26.0 | 16.0 | 24.7 |
| Max Q Clear Time (g_c+I1), s | 4.4 | | 3.5 | 2.2 | 7.2 |
| Green Ext Time (p_c), s | 5.5 | | 0.2 | 0.0 | 6.4 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 3.9 |
| HCM 6th LOS | A |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 270 | 0 | 574 | 0 | 169 | 16 | 0 | 461 | 44 |
| Future Volume (veh/h) | 0 | 0 | 0 | 270 | 0 | 574 | 0 | 169 | 16 | 0 | 461 | 44 |
| Initial Q (Qb), veh | | | | 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 |
| Parking Bus, Adj | | | | 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 | |
| Adj Sat Flow, veh/h/ln | | | | 1900 | 1900 | 1900 | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | | | | 333 | 0 | 709 | 0 | 209 | 0 | 0 | 569 | 0 |
| Peak Hour Factor | | | | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |
| Percent Heavy Veh, % | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | | | | 1265 | 0 | 1126 | 0 | 1787 | | 0 | 1787 | |
| Arrive On Green | | | | 0.35 | 0.00 | 0.35 | 0.00 | 0.50 | 0.00 | 0.00 | 0.50 | 0.00 |
| Sat Flow, veh/h | | | | 3619 | 0 | 3220 | 0 | 3705 | 1610 | 0 | 3800 | 0 |
| Grp Volume(v), veh/h | | | | 333 | 0 | 709 | 0 | 209 | 0 | 0 | 569 | 0 |
| Grp Sat Flow(s),veh/h/ln | | | | 1810 | 0 | 1610 | 0 | 1805 | 1610 | 0 | 1805 | 0 |
| Q Serve(g_s), s | | | | 5.6 | 0.0 | 15.6 | 0.0 | 2.6 | 0.0 | 0.0 | 8.0 | 0.0 |
| Cycle Q Clear(g_c), s | | | | 5.6 | 0.0 | 15.6 | 0.0 | 2.6 | 0.0 | 0.0 | 8.0 | 0.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 0.00 | | 1.00 | 0.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | | | | 1265 | 0 | 1126 | 0 | 1787 | | 0 | 1787 | |
| V/C Ratio(X) | | | | 0.26 | 0.00 | 0.63 | 0.00 | 0.12 | | 0.00 | 0.32 | |
| Avail Cap(c_a), veh/h | | | | 1516 | 0 | 1349 | 0 | 1787 | | 0 | 1787 | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| Uniform Delay (d), s/veh | | | | 19.8 | 0.0 | 23.0 | 0.0 | 11.5 | 0.0 | 0.0 | 12.9 | 0.0 |
| Incr Delay (d2), s/veh | | | | 0.5 | 0.0 | 2.7 | 0.0 | 0.1 | 0.0 | 0.0 | 0.5 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 2.3 | 0.0 | 5.8 | 0.0 | 1.0 | 0.0 | 0.0 | 2.9 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 20.3 | 0.0 | 25.7 | 0.0 | 11.6 | 0.0 | 0.0 | 13.3 | 0.0 |
| LnGrp LOS | | | | C | A | C | A | B | | A | B | |
| Approach Vol, veh/h | | | | | 1042 | | | 209 | A | | 569 | A |
| Approach Delay, s/veh | | | | | 24.0 | | | 11.6 | | | 13.3 | |
| Approach LOS | | | | | C | | | B | | | B | |

| Timer - Assigned Phs | 2 | | 6 | | 8 | | | |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 48.9 | | 48.9 | | 36.1 | | | |
| Change Period (Y+Rc), s | 6.8 | | 6.8 | | 6.4 | | | |
| Max Green Setting (Gmax), s | 36.2 | | 36.2 | | 35.6 | | | |
| Max Q Clear Time (g_c+I1), s | 4.6 | | 10.0 | | 17.6 | | | |
| Green Ext Time (p_c), s | 3.6 | | 10.0 | | 12.1 | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 19.2 | |
| HCM 6th LOS | B | |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 33 | 0 | 21 | 0 | 0 | 0 | 0 | 152 | 286 | 0 | 392 | 335 |
| Future Volume (veh/h) | 33 | 0 | 21 | 0 | 0 | 0 | 0 | 152 | 286 | 0 | 392 | 335 |
| Initial Q (Qb), veh | 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 |
| Parking Bus, Adj | 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 | |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1900 | | | | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 36 | 0 | 23 | | | | 0 | 165 | 0 | 0 | 426 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 146 | 0 | 130 | | | | 0 | 1346 | | 0 | 2558 | |
| Arrive On Green | 0.08 | 0.00 | 0.08 | | | | 0.00 | 0.71 | 0.00 | 0.00 | 0.71 | 0.00 |
| Sat Flow, veh/h | 1810 | 0 | 1610 | | | | 0 | 1900 | 3220 | 0 | 3705 | 1610 |
| Grp Volume(v), veh/h | 36 | 0 | 23 | | | | 0 | 165 | 0 | 0 | 426 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 0 | 1610 | | | | 0 | 1900 | 1610 | 0 | 1805 | 1610 |
| Q Serve(g_s), s | 1.2 | 0.0 | 0.9 | | | | 0.0 | 1.8 | 0.0 | 0.0 | 2.5 | 0.0 |
| Cycle Q Clear(g_c), s | 1.2 | 0.0 | 0.9 | | | | 0.0 | 1.8 | 0.0 | 0.0 | 2.5 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | | | | 0.00 | | 1.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 146 | 0 | 130 | | | | 0 | 1346 | | 0 | 2558 | |
| V/C Ratio(X) | 0.25 | 0.00 | 0.18 | | | | 0.00 | 0.12 | | 0.00 | 0.17 | |
| Avail Cap(c_a), veh/h | 646 | 0 | 575 | | | | 0 | 1346 | | 0 | 2558 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | | | | 0.00 | 1.00 | 0.00 | 0.00 | 0.96 | 0.00 |
| Uniform Delay (d), s/veh | 28.0 | 0.0 | 27.9 | | | | 0.0 | 3.0 | 0.0 | 0.0 | 3.1 | 0.0 |
| Incr Delay (d2), s/veh | 4.0 | 0.0 | 3.0 | | | | 0.0 | 0.2 | 0.0 | 0.0 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.6 | 0.0 | 0.4 | | | | 0.0 | 0.4 | 0.0 | 0.0 | 0.5 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 32.0 | 0.0 | 30.8 | | | | 0.0 | 3.2 | 0.0 | 0.0 | 3.3 | 0.0 |
| LnGrp LOS | C | A | C | | | | A | A | | A | A | |
| Approach Vol, veh/h | | 59 | | | | | | 165 | A | | 426 | A |
| Approach Delay, s/veh | | 31.6 | | | | | | 3.2 | | | 3.3 | |
| Approach LOS | | C | | | | | | A | | | A | |

| Timer - Assigned Phs | 2 | 4 | 6 |
|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 53.0 | 12.0 | 53.0 |
| Change Period (Y+Rc), s | 6.9 | 6.8 | 6.9 |
| Max Green Setting (Gmax), s | 28.1 | 23.2 | 28.1 |
| Max Q Clear Time (g_c+I1), s | 3.8 | 3.2 | 4.5 |
| Green Ext Time (p_c), s | 2.3 | 0.5 | 6.9 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 5.8 |
| HCM 6th LOS | A |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 11.9 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 38 | 271 | 11 | 68 | 231 | 35 | 23 | 53 | 83 | 42 | 55 | 16 |
| Future Vol, veh/h | 38 | 271 | 11 | 68 | 231 | 35 | 23 | 53 | 83 | 42 | 55 | 16 |
| Peak Hour Factor | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 46 | 330 | 13 | 83 | 282 | 43 | 28 | 65 | 101 | 51 | 67 | 20 |
| Number of Lanes | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 3 | 3 |
| HCM Control Delay | 11.9 | 11.3 | 12.8 | 12.3 |
| HCM LOS | B | B | B | B |

| Lane | NBLn1 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 14% | 100% | 0% | 0% | 100% | 0% | 0% | 37% |
| Vol Thru, % | 33% | 0% | 100% | 89% | 0% | 100% | 69% | 49% |
| Vol Right, % | 52% | 0% | 0% | 11% | 0% | 0% | 31% | 14% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 159 | 38 | 181 | 101 | 68 | 154 | 112 | 113 |
| LT Vol | 23 | 38 | 0 | 0 | 68 | 0 | 0 | 42 |
| Through Vol | 53 | 0 | 181 | 90 | 0 | 154 | 77 | 55 |
| RT Vol | 83 | 0 | 0 | 11 | 0 | 0 | 35 | 16 |
| Lane Flow Rate | 194 | 46 | 220 | 124 | 83 | 188 | 137 | 138 |
| Geometry Grp | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.35 | 0.087 | 0.383 | 0.212 | 0.156 | 0.326 | 0.229 | 0.267 |
| Departure Headway (Hd) | 6.496 | 6.774 | 6.264 | 6.186 | 6.757 | 6.246 | 6.023 | 6.986 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 551 | 526 | 571 | 577 | 529 | 573 | 593 | 511 |
| Service Time | 4.271 | 4.546 | 4.035 | 3.957 | 4.525 | 4.015 | 3.791 | 4.768 |
| HCM Lane V/C Ratio | 0.352 | 0.087 | 0.385 | 0.215 | 0.157 | 0.328 | 0.231 | 0.27 |
| HCM Control Delay | 12.8 | 10.2 | 12.9 | 10.6 | 10.8 | 12 | 10.6 | 12.3 |
| HCM Lane LOS | B | B | B | B | B | B | B | B |
| HCM 95th-tile Q | 1.6 | 0.3 | 1.8 | 0.8 | 0.5 | 1.4 | 0.9 | 1.1 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 9.2 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 8 | 27 | 15 | 5 | 38 | 24 | 39 | 123 | 7 | 11 | 81 | 14 |
| Future Vol, veh/h | 8 | 27 | 15 | 5 | 38 | 24 | 39 | 123 | 7 | 11 | 81 | 14 |
| Peak Hour Factor | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 10 | 33 | 18 | 6 | 46 | 29 | 48 | 150 | 9 | 13 | 99 | 17 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 2 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 2 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 2 | 2 |
| HCM Control Delay | 8.5 | 8.5 | 10.1 | 8.6 |
| HCM LOS | A | A | B | A |

| Lane | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 23% | 100% | 0% | 100% | 0% | 12% | 0% |
| Vol Thru, % | 73% | 0% | 64% | 0% | 61% | 88% | 0% |
| Vol Right, % | 4% | 0% | 36% | 0% | 39% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 169 | 8 | 42 | 5 | 62 | 92 | 14 |
| LT Vol | 39 | 8 | 0 | 5 | 0 | 11 | 0 |
| Through Vol | 123 | 0 | 27 | 0 | 38 | 81 | 0 |
| RT Vol | 7 | 0 | 15 | 0 | 24 | 0 | 14 |
| Lane Flow Rate | 206 | 10 | 51 | 6 | 76 | 112 | 17 |
| Geometry Grp | 6 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.289 | 0.016 | 0.074 | 0.01 | 0.108 | 0.16 | 0.021 |
| Departure Headway (Hd) | 5.047 | 5.949 | 5.193 | 5.925 | 5.147 | 5.118 | 4.355 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 713 | 601 | 688 | 604 | 695 | 700 | 821 |
| Service Time | 3.077 | 3.69 | 2.934 | 3.665 | 2.888 | 2.851 | 2.087 |
| HCM Lane V/C Ratio | 0.289 | 0.017 | 0.074 | 0.01 | 0.109 | 0.16 | 0.021 |
| HCM Control Delay | 10.1 | 8.8 | 8.4 | 8.7 | 8.5 | 8.8 | 7.2 |
| HCM Lane LOS | B | A | A | A | A | A | A |
| HCM 95th-tile Q | 1.2 | 0 | 0.2 | 0 | 0.4 | 0.6 | 0.1 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 21.1 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 31 | 239 | 113 | 43 | 104 | 13 | 73 | 288 | 93 | 73 | 471 | 32 |
| Future Vol, veh/h | 31 | 239 | 113 | 43 | 104 | 13 | 73 | 288 | 93 | 73 | 471 | 32 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 33 | 252 | 119 | 45 | 109 | 14 | 77 | 303 | 98 | 77 | 496 | 34 |
| Number of Lanes | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 3 | 3 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 3 | 3 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 3 | 3 | 3 | 3 |
| HCM Control Delay | 17.2 | 14.9 | 23.1 | 23.9 |
| HCM LOS | C | B | C | C |

| Lane | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 0% | 0% | 100% | 41% | 0% | 100% | 0% | 0% | 100% |
| Vol Right, % | 0% | 0% | 100% | 0% | 0% | 59% | 0% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 73 | 288 | 93 | 31 | 159 | 193 | 43 | 104 | 13 | 73 | 314 |
| LT Vol | 73 | 0 | 0 | 31 | 0 | 0 | 43 | 0 | 0 | 73 | 0 |
| Through Vol | 0 | 288 | 0 | 0 | 159 | 80 | 0 | 104 | 0 | 0 | 314 |
| RT Vol | 0 | 0 | 93 | 0 | 0 | 113 | 0 | 0 | 13 | 0 | 0 |
| Lane Flow Rate | 77 | 303 | 98 | 33 | 168 | 203 | 45 | 109 | 14 | 77 | 331 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.19 | 0.707 | 0.209 | 0.083 | 0.404 | 0.465 | 0.124 | 0.284 | 0.033 | 0.182 | 0.738 |
| Departure Headway (Hd) | 8.896 | 8.396 | 7.696 | 9.173 | 8.673 | 8.262 | 9.832 | 9.332 | 8.632 | 8.662 | 8.162 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 405 | 434 | 468 | 392 | 418 | 438 | 366 | 386 | 416 | 416 | 446 |
| Service Time | 6.611 | 6.111 | 5.411 | 6.89 | 6.39 | 5.979 | 7.563 | 7.063 | 6.363 | 6.362 | 5.862 |
| HCM Lane V/C Ratio | 0.19 | 0.698 | 0.209 | 0.084 | 0.402 | 0.463 | 0.123 | 0.282 | 0.034 | 0.185 | 0.742 |
| HCM Control Delay | 13.7 | 29 | 12.4 | 12.7 | 17.2 | 18 | 14 | 15.7 | 11.7 | 13.3 | 30.6 |
| HCM Lane LOS | B | D | B | B | C | C | B | C | B | B | D |
| HCM 95th-tile Q | 0.7 | 5.4 | 0.8 | 0.3 | 1.9 | 2.4 | 0.4 | 1.2 | 0.1 | 0.7 | 6 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 14 | 10 | 46 | 22 | 4 | 11 | 68 | 390 | 93 | 14 | 383 | 39 |
| Future Volume (veh/h) | 14 | 10 | 46 | 22 | 4 | 11 | 68 | 390 | 93 | 14 | 383 | 39 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 15 | 11 | 48 | 23 | 4 | 12 | 72 | 411 | 98 | 15 | 403 | 41 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 170 | 139 | 118 | 161 | 139 | 118 | 121 | 2694 | 1202 | 49 | 2550 | 1137 |
| Arrive On Green | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.75 | 0.75 | 0.03 | 0.71 | 0.71 |
| Sat Flow, veh/h | 1419 | 1900 | 1610 | 1365 | 1900 | 1610 | 1810 | 3610 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 15 | 11 | 48 | 23 | 4 | 12 | 72 | 411 | 98 | 15 | 403 | 41 |
| Grp Sat Flow(s),veh/h/ln | 1419 | 1900 | 1610 | 1365 | 1900 | 1610 | 1810 | 1805 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 1.0 | 0.6 | 3.0 | 1.7 | 0.2 | 0.7 | 4.1 | 3.4 | 1.7 | 0.9 | 3.9 | 0.8 |
| Cycle Q Clear(g_c), s | 1.2 | 0.6 | 3.0 | 2.2 | 0.2 | 0.7 | 4.1 | 3.4 | 1.7 | 0.9 | 3.9 | 0.8 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 170 | 139 | 118 | 161 | 139 | 118 | 121 | 2694 | 1202 | 49 | 2550 | 1137 |
| V/C Ratio(X) | 0.09 | 0.08 | 0.41 | 0.14 | 0.03 | 0.10 | 0.60 | 0.15 | 0.08 | 0.31 | 0.16 | 0.04 |
| Avail Cap(c_a), veh/h | 662 | 798 | 676 | 635 | 798 | 676 | 260 | 2694 | 1202 | 260 | 2550 | 1137 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 45.8 | 45.3 | 46.5 | 46.4 | 45.2 | 45.4 | 47.6 | 3.8 | 3.6 | 50.1 | 5.1 | 4.6 |
| Incr Delay (d2), s/veh | 0.5 | 0.6 | 5.2 | 0.9 | 0.2 | 0.9 | 1.7 | 0.1 | 0.1 | 1.3 | 0.1 | 0.1 |
| 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 | 0.4 | 0.3 | 1.3 | 0.6 | 0.1 | 0.3 | 1.8 | 0.9 | 0.4 | 0.4 | 1.2 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 46.3 | 45.9 | 51.7 | 47.3 | 45.4 | 46.3 | 49.3 | 3.9 | 3.7 | 51.4 | 5.2 | 4.7 |
| LnGrp LOS | D | D | D | D | D | D | D | A | A | D | A | A |
| Approach Vol, veh/h | | 74 | | | 39 | | | 581 | | | 459 | |
| Approach Delay, s/veh | | 49.7 | | | 46.8 | | | 9.5 | | | 6.7 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 11.9 | 79.5 | | 13.6 | 7.7 | 83.7 | | 13.6 |
| Change Period (Y+Rc), s | 4.9 | 5.3 | | 5.9 | 4.9 | 5.3 | | 5.9 |
| Max Green Setting (Gmax), s | 15.1 | 29.7 | | 44.1 | 15.1 | 29.7 | | 44.1 |
| Max Q Clear Time (g_c+I1), s | 6.1 | 5.9 | | 4.2 | 2.9 | 5.4 | | 5.0 |
| Green Ext Time (p_c), s | 0.0 | 5.4 | | 0.2 | 0.0 | 6.0 | | 0.6 |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 12.2 | |
| HCM 6th LOS | B | |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 12 | 3 | 548 | 20 | 5 | 446 |
| Future Volume (veh/h) | 12 | 3 | 548 | 20 | 5 | 446 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 13 | 3 | 577 | 21 | 5 | 469 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 54 | 48 | 2818 | 102 | 19 | 3082 |
| Arrive On Green | 0.03 | 0.03 | 0.79 | 0.79 | 0.01 | 0.85 |
| Sat Flow, veh/h | 1810 | 1610 | 3648 | 129 | 1810 | 3705 |
| Grp Volume(v), veh/h | 13 | 3 | 293 | 305 | 5 | 469 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1610 | 1805 | 1877 | 1810 | 1805 |
| Q Serve(g_s), s | 0.6 | 0.1 | 3.2 | 3.2 | 0.2 | 1.7 |
| Cycle Q Clear(g_c), s | 0.6 | 0.1 | 3.2 | 3.2 | 0.2 | 1.7 |
| Prop In Lane | 1.00 | 1.00 | | 0.07 | 1.00 | |
| Lane Grp Cap(c), veh/h | 54 | 48 | 1432 | 1489 | 19 | 3082 |
| V/C Ratio(X) | 0.24 | 0.06 | 0.20 | 0.20 | 0.26 | 0.15 |
| Avail Cap(c_a), veh/h | 588 | 523 | 1432 | 1489 | 362 | 3082 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.92 | 0.92 | 0.99 | 0.99 |
| Uniform Delay (d), s/veh | 37.9 | 37.7 | 2.0 | 2.0 | 39.3 | 1.0 |
| Incr Delay (d2), s/veh | 4.8 | 1.1 | 0.3 | 0.3 | 2.7 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 0.1 | 0.5 | 0.5 | 0.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 42.7 | 38.9 | 2.3 | 2.3 | 41.9 | 1.1 |
| LnGrp LOS | D | D | A | A | D | A |
| Approach Vol, veh/h | 16 | | 598 | | | 474 |
| Approach Delay, s/veh | 42.0 | | 2.3 | | | 1.5 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | 2 | | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 73.6 | | 6.4 | 4.8 | 68.8 |
| Change Period (Y+Rc), s | 5.3 | | 4.0 | 4.0 | 5.3 |
| Max Green Setting (Gmax), s | 44.7 | | 26.0 | 16.0 | 24.7 |
| Max Q Clear Time (g_c+I1), s | 3.7 | | 2.6 | 2.2 | 5.2 |
| Green Ext Time (p_c), s | 5.0 | | 0.0 | 0.0 | 4.9 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 2.6 |
| HCM 6th LOS | A |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 227 | 0 | 453 | 0 | 142 | 15 | 0 | 454 | 37 |
| Future Volume (veh/h) | 0 | 0 | 0 | 227 | 0 | 453 | 0 | 142 | 15 | 0 | 454 | 37 |
| Initial Q (Qb), veh | | | | 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 |
| Parking Bus, Adj | | | | 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 | |
| Adj Sat Flow, veh/h/ln | | | | 1900 | 1900 | 1900 | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | | | | 239 | 0 | 477 | 0 | 149 | 0 | 0 | 478 | 0 |
| Peak Hour Factor | | | | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | | | | 976 | 0 | 869 | 0 | 2075 | | 0 | 2075 | |
| Arrive On Green | | | | 0.27 | 0.00 | 0.27 | 0.00 | 0.57 | 0.00 | 0.00 | 0.57 | 0.00 |
| Sat Flow, veh/h | | | | 3619 | 0 | 3220 | 0 | 3705 | 1610 | 0 | 3800 | 0 |
| Grp Volume(v), veh/h | | | | 239 | 0 | 477 | 0 | 149 | 0 | 0 | 478 | 0 |
| Grp Sat Flow(s),veh/h/ln | | | | 1810 | 0 | 1610 | 0 | 1805 | 1610 | 0 | 1805 | 0 |
| Q Serve(g_s), s | | | | 4.4 | 0.0 | 10.8 | 0.0 | 1.6 | 0.0 | 0.0 | 5.5 | 0.0 |
| Cycle Q Clear(g_c), s | | | | 4.4 | 0.0 | 10.8 | 0.0 | 1.6 | 0.0 | 0.0 | 5.5 | 0.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 0.00 | | 1.00 | 0.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | | | | 976 | 0 | 869 | 0 | 2075 | | 0 | 2075 | |
| V/C Ratio(X) | | | | 0.24 | 0.00 | 0.55 | 0.00 | 0.07 | | 0.00 | 0.23 | |
| Avail Cap(c_a), veh/h | | | | 1516 | 0 | 1349 | 0 | 2075 | | 0 | 2075 | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | | | | 24.3 | 0.0 | 26.6 | 0.0 | 8.0 | 0.0 | 0.0 | 8.9 | 0.0 |
| Incr Delay (d2), s/veh | | | | 0.6 | 0.0 | 2.5 | 0.0 | 0.1 | 0.0 | 0.0 | 0.3 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 1.8 | 0.0 | 4.1 | 0.0 | 0.5 | 0.0 | 0.0 | 1.9 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 24.9 | 0.0 | 29.1 | 0.0 | 8.1 | 0.0 | 0.0 | 9.1 | 0.0 |
| LnGrp LOS | | | | C | A | C | A | A | | A | A | |
| Approach Vol, veh/h | | | | | 716 | | | 149 | A | | 478 | A |
| Approach Delay, s/veh | | | | | 27.7 | | | 8.1 | | | 9.1 | |
| Approach LOS | | | | | C | | | A | | | A | |

| Timer - Assigned Phs | 2 | | 6 | | 8 | |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 55.7 | | 55.7 | | 29.3 | |
| Change Period (Y+Rc), s | 6.8 | | 6.8 | | 6.4 | |
| Max Green Setting (Gmax), s | 36.2 | | 36.2 | | 35.6 | |
| Max Q Clear Time (g_c+I1), s | 3.6 | | 7.5 | | 12.8 | |
| Green Ext Time (p_c), s | 2.5 | | 8.6 | | 10.1 | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 18.9 | |
| HCM 6th LOS | B | |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 29 | 0 | 11 | 0 | 0 | 0 | 0 | 128 | 358 | 0 | 361 | 320 |
| Future Volume (veh/h) | 29 | 0 | 11 | 0 | 0 | 0 | 0 | 128 | 358 | 0 | 361 | 320 |
| Initial Q (Qb), veh | 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 |
| Parking Bus, Adj | 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 | |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1900 | | | | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 31 | 0 | 12 | | | | 0 | 135 | 0 | 0 | 380 | 0 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | | | | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 120 | 0 | 107 | | | | 0 | 1373 | | 0 | 2609 | |
| Arrive On Green | 0.07 | 0.00 | 0.07 | | | | 0.00 | 0.72 | 0.00 | 0.00 | 0.72 | 0.00 |
| Sat Flow, veh/h | 1810 | 0 | 1610 | | | | 0 | 1900 | 3220 | 0 | 3705 | 1610 |
| Grp Volume(v), veh/h | 31 | 0 | 12 | | | | 0 | 135 | 0 | 0 | 380 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 0 | 1610 | | | | 0 | 1900 | 1610 | 0 | 1805 | 1610 |
| Q Serve(g_s), s | 1.1 | 0.0 | 0.5 | | | | 0.0 | 1.4 | 0.0 | 0.0 | 2.1 | 0.0 |
| Cycle Q Clear(g_c), s | 1.1 | 0.0 | 0.5 | | | | 0.0 | 1.4 | 0.0 | 0.0 | 2.1 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | | | | 0.00 | | 1.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 120 | 0 | 107 | | | | 0 | 1373 | | 0 | 2609 | |
| V/C Ratio(X) | 0.26 | 0.00 | 0.11 | | | | 0.00 | 0.10 | | 0.00 | 0.15 | |
| Avail Cap(c_a), veh/h | 646 | 0 | 575 | | | | 0 | 1373 | | 0 | 2609 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | | | | 0.00 | 1.00 | 0.00 | 0.00 | 0.98 | 0.00 |
| Uniform Delay (d), s/veh | 28.8 | 0.0 | 28.5 | | | | 0.0 | 2.7 | 0.0 | 0.0 | 2.8 | 0.0 |
| Incr Delay (d2), s/veh | 5.1 | 0.0 | 2.1 | | | | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.6 | 0.0 | 0.2 | | | | 0.0 | 0.3 | 0.0 | 0.0 | 0.4 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 33.9 | 0.0 | 30.7 | | | | 0.0 | 2.8 | 0.0 | 0.0 | 2.9 | 0.0 |
| LnGrp LOS | C | A | C | | | | A | A | | A | A | |
| Approach Vol, veh/h | | 43 | | | | | | 135 | A | | 380 | A |
| Approach Delay, s/veh | | 33.0 | | | | | | 2.8 | | | 2.9 | |
| Approach LOS | | C | | | | | | A | | | A | |

| Timer - Assigned Phs | 2 | 4 | 6 |
|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 53.9 | 11.1 | 53.9 |
| Change Period (Y+Rc), s | 6.9 | 6.8 | 6.9 |
| Max Green Setting (Gmax), s | 28.1 | 23.2 | 28.1 |
| Max Q Clear Time (g_c+I1), s | 3.4 | 3.1 | 4.1 |
| Green Ext Time (p_c), s | 1.8 | 0.3 | 6.2 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 5.2 |
| HCM 6th LOS | A |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10.6 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 53 | 276 | 59 | 50 | 187 | 17 | 17 | 93 | 62 | 28 | 47 | 21 |
| Future Vol, veh/h | 53 | 276 | 59 | 50 | 187 | 17 | 17 | 93 | 62 | 28 | 47 | 21 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 56 | 291 | 62 | 53 | 197 | 18 | 18 | 98 | 65 | 29 | 49 | 22 |
| Number of Lanes | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 3 | 3 |
| HCM Control Delay | 10.5 | 10 | 11.6 | 10.7 |
| HCM LOS | B | A | B | B |

| Lane | NBLn1 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 10% | 100% | 0% | 0% | 100% | 0% | 0% | 29% |
| Vol Thru, % | 54% | 0% | 100% | 61% | 0% | 100% | 79% | 49% |
| Vol Right, % | 36% | 0% | 0% | 39% | 0% | 0% | 21% | 22% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 172 | 53 | 184 | 151 | 50 | 125 | 79 | 96 |
| LT Vol | 17 | 53 | 0 | 0 | 50 | 0 | 0 | 28 |
| Through Vol | 93 | 0 | 184 | 92 | 0 | 125 | 62 | 47 |
| RT Vol | 62 | 0 | 0 | 59 | 0 | 0 | 17 | 21 |
| Lane Flow Rate | 181 | 56 | 194 | 159 | 53 | 131 | 84 | 101 |
| Geometry Grp | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.308 | 0.098 | 0.312 | 0.244 | 0.095 | 0.218 | 0.135 | 0.182 |
| Departure Headway (Hd) | 6.128 | 6.307 | 5.8 | 5.522 | 6.479 | 5.971 | 5.818 | 6.474 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 587 | 568 | 620 | 650 | 553 | 601 | 615 | 554 |
| Service Time | 3.872 | 4.046 | 3.538 | 3.261 | 4.22 | 3.712 | 3.559 | 4.222 |
| HCM Lane V/C Ratio | 0.308 | 0.099 | 0.313 | 0.245 | 0.096 | 0.218 | 0.137 | 0.182 |
| HCM Control Delay | 11.6 | 9.7 | 11.2 | 10 | 9.9 | 10.4 | 9.5 | 10.7 |
| HCM Lane LOS | B | A | B | A | A | B | A | B |
| HCM 95th-tile Q | 1.3 | 0.3 | 1.3 | 1 | 0.3 | 0.8 | 0.5 | 0.7 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 8.9 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 24 | 45 | 35 | 5 | 11 | 19 | 7 | 127 | 2 | 18 | 115 | 11 |
| Future Vol, veh/h | 24 | 45 | 35 | 5 | 11 | 19 | 7 | 127 | 2 | 18 | 115 | 11 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 25 | 47 | 37 | 5 | 12 | 20 | 7 | 134 | 2 | 19 | 121 | 12 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 2 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 2 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 2 | 2 |
| HCM Control Delay | 8.5 | 8 | 9.4 | 8.9 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 5% | 100% | 0% | 100% | 0% | 14% | 0% |
| Vol Thru, % | 93% | 0% | 56% | 0% | 37% | 86% | 0% |
| Vol Right, % | 1% | 0% | 44% | 0% | 63% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 136 | 24 | 80 | 5 | 30 | 133 | 11 |
| LT Vol | 7 | 24 | 0 | 5 | 0 | 18 | 0 |
| Through Vol | 127 | 0 | 45 | 0 | 11 | 115 | 0 |
| RT Vol | 2 | 0 | 35 | 0 | 19 | 0 | 11 |
| Lane Flow Rate | 143 | 25 | 84 | 5 | 32 | 140 | 12 |
| Geometry Grp | 6 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.201 | 0.041 | 0.116 | 0.009 | 0.043 | 0.197 | 0.014 |
| Departure Headway (Hd) | 5.055 | 5.79 | 4.978 | 5.874 | 4.923 | 5.07 | 4.299 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 710 | 619 | 720 | 609 | 726 | 708 | 832 |
| Service Time | 3.083 | 3.522 | 2.71 | 3.611 | 2.66 | 2.797 | 2.026 |
| HCM Lane V/C Ratio | 0.201 | 0.04 | 0.117 | 0.008 | 0.044 | 0.198 | 0.014 |
| HCM Control Delay | 9.4 | 8.8 | 8.4 | 8.7 | 7.9 | 9 | 7.1 |
| HCM Lane LOS | A | A | A | A | A | A | A |
| HCM 95th-tile Q | 0.7 | 0.1 | 0.4 | 0 | 0.1 | 0.7 | 0 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 115.4 |
| Intersection LOS | F |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 37 | 220 | 70 | 41 | 182 | 67 | 163 | 654 | 91 | 34 | 290 | 50 |
| Future Vol, veh/h | 37 | 220 | 70 | 41 | 182 | 67 | 163 | 654 | 91 | 34 | 290 | 50 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 39 | 232 | 74 | 43 | 192 | 71 | 172 | 688 | 96 | 36 | 305 | 53 |
| Number of Lanes | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 3 | 3 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 3 | 3 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 3 | 3 | 3 | 3 |
| HCM Control Delay | 18.2 | 19.5 | 220.3 | 19.9 |
| HCM LOS | C | C | F | C |

| Lane | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 0% | 0% | 100% | 51% | 0% | 100% | 0% | 0% | 100% |
| Vol Right, % | 0% | 0% | 100% | 0% | 0% | 49% | 0% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 163 | 654 | 91 | 37 | 147 | 143 | 41 | 182 | 67 | 34 | 193 |
| LT Vol | 163 | 0 | 0 | 37 | 0 | 0 | 41 | 0 | 0 | 34 | 0 |
| Through Vol | 0 | 654 | 0 | 0 | 147 | 73 | 0 | 182 | 0 | 0 | 193 |
| RT Vol | 0 | 0 | 91 | 0 | 0 | 70 | 0 | 0 | 67 | 0 | 0 |
| Lane Flow Rate | 172 | 688 | 96 | 39 | 154 | 151 | 43 | 192 | 71 | 36 | 204 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.421 | 1.595 | 0.203 | 0.105 | 0.397 | 0.374 | 0.118 | 0.498 | 0.17 | 0.095 | 0.515 |
| Departure Headway (Hd) | 8.842 | 8.342 | 7.642 | 10.545 | 10.045 | 9.703 | 10.652 | 10.152 | 9.452 | 10.29 | 9.79 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 407 | 441 | 468 | 342 | 361 | 373 | 339 | 358 | 382 | 350 | 370 |
| Service Time | 6.603 | 6.103 | 5.403 | 8.245 | 7.745 | 7.403 | 8.352 | 7.852 | 7.152 | 7.99 | 7.49 |
| HCM Lane V/C Ratio | 0.423 | 1.56 | 0.205 | 0.114 | 0.427 | 0.405 | 0.127 | 0.536 | 0.186 | 0.103 | 0.551 |
| HCM Control Delay | 17.9 | 299.7 | 12.4 | 14.5 | 19.2 | 18.1 | 14.8 | 22.5 | 14.1 | 14.1 | 22.4 |
| HCM Lane LOS | C | F | B | B | C | C | B | C | B | B | C |
| HCM 95th-tile Q | 2 | 38.5 | 0.8 | 0.3 | 1.8 | 1.7 | 0.4 | 2.7 | 0.6 | 0.3 | 2.8 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 33 | 4 | 47 | 92 | 11 | 12 | 42 | 638 | 41 | 11 | 354 | 24 |
| Future Volume (veh/h) | 33 | 4 | 47 | 92 | 11 | 12 | 42 | 638 | 41 | 11 | 354 | 24 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 34 | 4 | 49 | 96 | 11 | 12 | 44 | 665 | 43 | 11 | 369 | 25 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 198 | 185 | 157 | 199 | 185 | 157 | 100 | 2630 | 1173 | 38 | 2507 | 1118 |
| Arrive On Green | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.06 | 0.73 | 0.73 | 0.02 | 0.69 | 0.69 |
| Sat Flow, veh/h | 1410 | 1900 | 1610 | 1373 | 1900 | 1610 | 1810 | 3610 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 34 | 4 | 49 | 96 | 11 | 12 | 44 | 665 | 43 | 11 | 369 | 25 |
| Grp Sat Flow(s),veh/h/ln | 1410 | 1900 | 1610 | 1373 | 1900 | 1610 | 1810 | 1805 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 2.4 | 0.2 | 3.0 | 7.1 | 0.6 | 0.7 | 2.5 | 6.4 | 0.8 | 0.6 | 3.7 | 0.5 |
| Cycle Q Clear(g_c), s | 2.9 | 0.2 | 3.0 | 7.3 | 0.6 | 0.7 | 2.5 | 6.4 | 0.8 | 0.6 | 3.7 | 0.5 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 198 | 185 | 157 | 199 | 185 | 157 | 100 | 2630 | 1173 | 38 | 2507 | 1118 |
| V/C Ratio(X) | 0.17 | 0.02 | 0.31 | 0.48 | 0.06 | 0.08 | 0.44 | 0.25 | 0.04 | 0.29 | 0.15 | 0.02 |
| Avail Cap(c_a), veh/h | 654 | 798 | 676 | 642 | 798 | 676 | 260 | 2630 | 1173 | 260 | 2507 | 1118 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | 0.98 | 0.98 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 44.4 | 42.9 | 44.1 | 46.2 | 43.0 | 43.1 | 48.0 | 4.7 | 4.0 | 50.6 | 5.5 | 5.0 |
| Incr Delay (d2), s/veh | 1.0 | 0.1 | 2.7 | 4.2 | 0.3 | 0.5 | 1.1 | 0.2 | 0.1 | 1.6 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.9 | 0.1 | 1.3 | 2.6 | 0.3 | 0.3 | 1.1 | 1.9 | 0.2 | 0.3 | 1.1 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 45.3 | 43.0 | 46.8 | 50.4 | 43.4 | 43.6 | 49.2 | 5.0 | 4.0 | 52.2 | 5.6 | 5.0 |
| LnGrp LOS | D | D | D | D | D | D | D | A | A | D | A | A |
| Approach Vol, veh/h | | 87 | | | 119 | | | 752 | | | 405 | |
| Approach Delay, s/veh | | 46.0 | | | 49.1 | | | 7.5 | | | 6.8 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.7 | 78.2 | | 16.1 | 7.1 | 81.8 | | 16.1 |
| Change Period (Y+Rc), s | 4.9 | 5.3 | | 5.9 | 4.9 | 5.3 | | 5.9 |
| Max Green Setting (Gmax), s | 15.1 | 29.7 | | 44.1 | 15.1 | 29.7 | | 44.1 |
| Max Q Clear Time (g_c+I1), s | 4.5 | 5.7 | | 9.3 | 2.6 | 8.4 | | 5.0 |
| Green Ext Time (p_c), s | 0.0 | 4.8 | | 0.9 | 0.0 | 8.4 | | 0.6 |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 13.4 | |
| HCM 6th LOS | B | |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 34 | 9 | 712 | 14 | 4 | 488 |
| Future Volume (veh/h) | 34 | 9 | 712 | 14 | 4 | 488 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 36 | 9 | 749 | 15 | 4 | 514 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 114 | 102 | 2758 | 55 | 15 | 2962 |
| Arrive On Green | 0.06 | 0.06 | 0.76 | 0.76 | 0.01 | 0.82 |
| Sat Flow, veh/h | 1810 | 1610 | 3714 | 72 | 1810 | 3705 |
| Grp Volume(v), veh/h | 36 | 9 | 373 | 391 | 4 | 514 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1610 | 1805 | 1887 | 1810 | 1805 |
| Q Serve(g_s), s | 1.5 | 0.4 | 5.0 | 5.0 | 0.2 | 2.4 |
| Cycle Q Clear(g_c), s | 1.5 | 0.4 | 5.0 | 5.0 | 0.2 | 2.4 |
| Prop In Lane | 1.00 | 1.00 | | 0.04 | 1.00 | |
| Lane Grp Cap(c), veh/h | 114 | 102 | 1375 | 1438 | 15 | 2962 |
| V/C Ratio(X) | 0.31 | 0.09 | 0.27 | 0.27 | 0.26 | 0.17 |
| Avail Cap(c_a), veh/h | 588 | 523 | 1375 | 1438 | 362 | 2962 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.91 | 0.91 | 0.99 | 0.99 |
| Uniform Delay (d), s/veh | 35.8 | 35.3 | 2.9 | 2.9 | 39.4 | 1.5 |
| Incr Delay (d2), s/veh | 3.3 | 0.8 | 0.4 | 0.4 | 3.2 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.8 | 0.4 | 1.0 | 1.0 | 0.1 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 39.1 | 36.1 | 3.3 | 3.3 | 42.6 | 1.6 |
| LnGrp LOS | D | D | A | A | D | A |
| Approach Vol, veh/h | 45 | | 764 | | | 518 |
| Approach Delay, s/veh | 38.5 | | 3.3 | | | 1.9 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | 2 | | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 70.9 | | 9.1 | 4.7 | 66.3 |
| Change Period (Y+Rc), s | 5.3 | | 4.0 | 4.0 | 5.3 |
| Max Green Setting (Gmax), s | 44.7 | | 26.0 | 16.0 | 24.7 |
| Max Q Clear Time (g_c+I1), s | 4.4 | | 3.5 | 2.2 | 7.0 |
| Green Ext Time (p_c), s | 5.5 | | 0.2 | 0.0 | 6.2 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 4.0 |
| HCM 6th LOS | A |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 372 | 0 | 588 | 0 | 213 | 18 | 0 | 489 | 47 |
| Future Volume (veh/h) | 0 | 0 | 0 | 372 | 0 | 588 | 0 | 213 | 18 | 0 | 489 | 47 |
| Initial Q (Qb), veh | | | | 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 |
| Parking Bus, Adj | | | | 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 | |
| Adj Sat Flow, veh/h/ln | | | | 1900 | 1900 | 1900 | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | | | | 392 | 0 | 619 | 0 | 224 | 0 | 0 | 515 | 0 |
| Peak Hour Factor | | | | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | | | | 1204 | 0 | 1071 | 0 | 1849 | | 0 | 1849 | |
| Arrive On Green | | | | 0.33 | 0.00 | 0.33 | 0.00 | 0.51 | 0.00 | 0.00 | 0.51 | 0.00 |
| Sat Flow, veh/h | | | | 3619 | 0 | 3220 | 0 | 3705 | 1610 | 0 | 3800 | 0 |
| Grp Volume(v), veh/h | | | | 392 | 0 | 619 | 0 | 224 | 0 | 0 | 515 | 0 |
| Grp Sat Flow(s),veh/h/ln | | | | 1810 | 0 | 1610 | 0 | 1805 | 1610 | 0 | 1805 | 0 |
| Q Serve(g_s), s | | | | 6.9 | 0.0 | 13.5 | 0.0 | 2.7 | 0.0 | 0.0 | 6.9 | 0.0 |
| Cycle Q Clear(g_c), s | | | | 6.9 | 0.0 | 13.5 | 0.0 | 2.7 | 0.0 | 0.0 | 6.9 | 0.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 0.00 | | 1.00 | 0.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | | | | 1204 | 0 | 1071 | 0 | 1849 | | 0 | 1849 | |
| V/C Ratio(X) | | | | 0.33 | 0.00 | 0.58 | 0.00 | 0.12 | | 0.00 | 0.28 | |
| Avail Cap(c_a), veh/h | | | | 1516 | 0 | 1349 | 0 | 1849 | | 0 | 1849 | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| Uniform Delay (d), s/veh | | | | 21.2 | 0.0 | 23.4 | 0.0 | 10.8 | 0.0 | 0.0 | 11.8 | 0.0 |
| Incr Delay (d2), s/veh | | | | 0.7 | 0.0 | 2.3 | 0.0 | 0.1 | 0.0 | 0.0 | 0.4 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 2.8 | 0.0 | 5.0 | 0.0 | 1.0 | 0.0 | 0.0 | 2.5 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 22.0 | 0.0 | 25.7 | 0.0 | 10.9 | 0.0 | 0.0 | 12.2 | 0.0 |
| LnGrp LOS | | | | C | A | C | A | B | | A | B | |
| Approach Vol, veh/h | | | | | 1011 | | | 224 | A | | 515 | A |
| Approach Delay, s/veh | | | | | 24.3 | | | 10.9 | | | 12.2 | |
| Approach LOS | | | | | C | | | B | | | B | |

| Timer - Assigned Phs | 2 | | 6 | | 8 | | | |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 50.3 | | 50.3 | | 34.7 | | | |
| Change Period (Y+Rc), s | 6.8 | | 6.8 | | 6.4 | | | |
| Max Green Setting (Gmax), s | 36.2 | | 36.2 | | 35.6 | | | |
| Max Q Clear Time (g_c+I1), s | 4.7 | | 8.9 | | 15.5 | | | |
| Green Ext Time (p_c), s | 3.9 | | 9.1 | | 12.8 | | | |

| Intersection Summary | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | 19.0 | | | | | | | |
| HCM 6th LOS | B | | | | | | | |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 33 | 0 | 22 | 0 | 0 | 0 | 0 | 198 | 296 | 0 | 517 | 344 |
| Future Volume (veh/h) | 33 | 0 | 22 | 0 | 0 | 0 | 0 | 198 | 296 | 0 | 517 | 344 |
| Initial Q (Qb), veh | 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 |
| Parking Bus, Adj | 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 | |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1900 | | | | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 35 | 0 | 23 | | | | 0 | 208 | 0 | 0 | 544 | 0 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | | | | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 145 | 0 | 129 | | | | 0 | 1348 | | 0 | 2561 | |
| Arrive On Green | 0.08 | 0.00 | 0.08 | | | | 0.00 | 0.71 | 0.00 | 0.00 | 0.71 | 0.00 |
| Sat Flow, veh/h | 1810 | 0 | 1610 | | | | 0 | 1900 | 3220 | 0 | 3705 | 1610 |
| Grp Volume(v), veh/h | 35 | 0 | 23 | | | | 0 | 208 | 0 | 0 | 544 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 0 | 1610 | | | | 0 | 1900 | 1610 | 0 | 1805 | 1610 |
| Q Serve(g_s), s | 1.2 | 0.0 | 0.9 | | | | 0.0 | 2.3 | 0.0 | 0.0 | 3.4 | 0.0 |
| Cycle Q Clear(g_c), s | 1.2 | 0.0 | 0.9 | | | | 0.0 | 2.3 | 0.0 | 0.0 | 3.4 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | | | | 0.00 | | 1.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 145 | 0 | 129 | | | | 0 | 1348 | | 0 | 2561 | |
| V/C Ratio(X) | 0.24 | 0.00 | 0.18 | | | | 0.00 | 0.15 | | 0.00 | 0.21 | |
| Avail Cap(c_a), veh/h | 646 | 0 | 575 | | | | 0 | 1348 | | 0 | 2561 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | | | | 0.00 | 1.00 | 0.00 | 0.00 | 0.96 | 0.00 |
| Uniform Delay (d), s/veh | 28.1 | 0.0 | 27.9 | | | | 0.0 | 3.1 | 0.0 | 0.0 | 3.2 | 0.0 |
| Incr Delay (d2), s/veh | 3.9 | 0.0 | 3.0 | | | | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.6 | 0.0 | 0.4 | | | | 0.0 | 0.5 | 0.0 | 0.0 | 0.6 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 32.0 | 0.0 | 30.9 | | | | 0.0 | 3.3 | 0.0 | 0.0 | 3.4 | 0.0 |
| LnGrp LOS | C | A | C | | | | A | A | | A | A | |
| Approach Vol, veh/h | | 58 | | | | | | 208 | A | | 544 | A |
| Approach Delay, s/veh | | 31.6 | | | | | | 3.3 | | | 3.4 | |
| Approach LOS | | C | | | | | | A | | | A | |

| Timer - Assigned Phs | 2 | 4 | 6 |
|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 53.0 | 12.0 | 53.0 |
| Change Period (Y+Rc), s | 6.9 | 6.8 | 6.9 |
| Max Green Setting (Gmax), s | 28.1 | 23.2 | 28.1 |
| Max Q Clear Time (g_c+I1), s | 4.3 | 3.2 | 5.4 |
| Green Ext Time (p_c), s | 3.0 | 0.5 | 8.8 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 5.4 |
| HCM 6th LOS | A |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 12 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 55 | 281 | 28 | 48 | 233 | 37 | 35 | 55 | 82 | 44 | 107 | 37 |
| Future Vol, veh/h | 55 | 281 | 28 | 48 | 233 | 37 | 35 | 55 | 82 | 44 | 107 | 37 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 58 | 296 | 29 | 51 | 245 | 39 | 37 | 58 | 86 | 46 | 113 | 39 |
| Number of Lanes | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 3 | 3 |
| HCM Control Delay | 11.6 | 11.2 | 12.5 | 13.4 |
| HCM LOS | B | B | B | B |

| Lane | NBLn1 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 20% | 100% | 0% | 0% | 100% | 0% | 0% | 23% |
| Vol Thru, % | 32% | 0% | 100% | 77% | 0% | 100% | 68% | 57% |
| Vol Right, % | 48% | 0% | 0% | 23% | 0% | 0% | 32% | 20% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 172 | 55 | 187 | 122 | 48 | 155 | 115 | 188 |
| LT Vol | 35 | 55 | 0 | 0 | 48 | 0 | 0 | 44 |
| Through Vol | 55 | 0 | 187 | 94 | 0 | 155 | 78 | 107 |
| RT Vol | 82 | 0 | 0 | 28 | 0 | 0 | 37 | 37 |
| Lane Flow Rate | 181 | 58 | 197 | 128 | 51 | 164 | 121 | 198 |
| Geometry Grp | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.328 | 0.11 | 0.347 | 0.219 | 0.097 | 0.291 | 0.207 | 0.368 |
| Departure Headway (Hd) | 6.528 | 6.839 | 6.328 | 6.164 | 6.91 | 6.399 | 6.168 | 6.691 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 547 | 522 | 566 | 579 | 516 | 558 | 578 | 534 |
| Service Time | 4.309 | 4.615 | 4.103 | 3.939 | 4.689 | 4.177 | 3.946 | 4.47 |
| HCM Lane V/C Ratio | 0.331 | 0.111 | 0.348 | 0.221 | 0.099 | 0.294 | 0.209 | 0.371 |
| HCM Control Delay | 12.5 | 10.5 | 12.5 | 10.7 | 10.4 | 11.8 | 10.6 | 13.4 |
| HCM Lane LOS | B | B | B | B | B | B | B | B |
| HCM 95th-tile Q | 1.4 | 0.4 | 1.5 | 0.8 | 0.3 | 1.2 | 0.8 | 1.7 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 9.5 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 8 | 28 | 14 | 27 | 38 | 16 | 35 | 123 | 24 | 16 | 174 | 15 |
| Future Vol, veh/h | 8 | 28 | 14 | 27 | 38 | 16 | 35 | 123 | 24 | 16 | 174 | 15 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 8 | 29 | 15 | 28 | 40 | 17 | 37 | 129 | 25 | 17 | 183 | 16 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 2 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 2 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 2 | 2 |
| HCM Control Delay | 8.6 | 8.8 | 10 | 9.6 |
| HCM LOS | A | A | A | A |

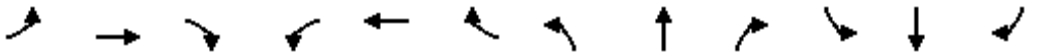
| Lane | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 19% | 100% | 0% | 100% | 0% | 8% | 0% |
| Vol Thru, % | 68% | 0% | 67% | 0% | 70% | 92% | 0% |
| Vol Right, % | 13% | 0% | 33% | 0% | 30% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 182 | 8 | 42 | 27 | 54 | 190 | 15 |
| LT Vol | 35 | 8 | 0 | 27 | 0 | 16 | 0 |
| Through Vol | 123 | 0 | 28 | 0 | 38 | 174 | 0 |
| RT Vol | 24 | 0 | 14 | 0 | 16 | 0 | 15 |
| Lane Flow Rate | 192 | 8 | 44 | 28 | 57 | 200 | 16 |
| Geometry Grp | 6 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.271 | 0.014 | 0.066 | 0.048 | 0.085 | 0.283 | 0.019 |
| Departure Headway (Hd) | 5.091 | 6.138 | 5.397 | 6.091 | 5.377 | 5.09 | 4.344 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 705 | 581 | 661 | 586 | 664 | 706 | 822 |
| Service Time | 3.13 | 3.894 | 3.153 | 3.843 | 3.129 | 2.827 | 2.081 |
| HCM Lane V/C Ratio | 0.272 | 0.014 | 0.067 | 0.048 | 0.086 | 0.283 | 0.019 |
| HCM Control Delay | 10 | 9 | 8.5 | 9.2 | 8.6 | 9.8 | 7.2 |
| HCM Lane LOS | A | A | A | A | A | A | A |
| HCM 95th-tile Q | 1.1 | 0 | 0.2 | 0.2 | 0.3 | 1.2 | 0.1 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 23.6 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 31 | 239 | 120 | 56 | 104 | 13 | 74 | 295 | 96 | 73 | 496 | 32 |
| Future Vol, veh/h | 31 | 239 | 120 | 56 | 104 | 13 | 74 | 295 | 96 | 73 | 496 | 32 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 33 | 252 | 126 | 59 | 109 | 14 | 78 | 311 | 101 | 77 | 522 | 34 |
| Number of Lanes | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 3 | 3 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 3 | 3 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 3 | 3 | 3 | 3 |
| HCM Control Delay | 18.2 | 15.4 | 25.5 | 28.1 |
| HCM LOS | C | C | D | D |

| Lane | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 0% | 0% | 100% | 40% | 0% | 100% | 0% | 0% | 100% |
| Vol Right, % | 0% | 0% | 100% | 0% | 0% | 60% | 0% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 74 | 295 | 96 | 31 | 159 | 200 | 56 | 104 | 13 | 73 | 331 |
| LT Vol | 74 | 0 | 0 | 31 | 0 | 0 | 56 | 0 | 0 | 73 | 0 |
| Through Vol | 0 | 295 | 0 | 0 | 159 | 80 | 0 | 104 | 0 | 0 | 331 |
| RT Vol | 0 | 0 | 96 | 0 | 0 | 120 | 0 | 0 | 13 | 0 | 0 |
| Lane Flow Rate | 78 | 311 | 101 | 33 | 168 | 210 | 59 | 109 | 14 | 77 | 348 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.197 | 0.742 | 0.222 | 0.085 | 0.414 | 0.495 | 0.165 | 0.29 | 0.034 | 0.188 | 0.803 |
| Departure Headway (Hd) | 9.104 | 8.604 | 7.904 | 9.394 | 8.894 | 8.474 | 10.052 | 9.552 | 8.852 | 8.807 | 8.307 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 395 | 422 | 455 | 382 | 406 | 427 | 357 | 377 | 405 | 408 | 435 |
| Service Time | 6.849 | 6.349 | 5.649 | 7.139 | 6.639 | 6.219 | 7.805 | 7.305 | 6.605 | 6.548 | 6.048 |
| HCM Lane V/C Ratio | 0.197 | 0.737 | 0.222 | 0.086 | 0.414 | 0.492 | 0.165 | 0.289 | 0.035 | 0.189 | 0.8 |
| HCM Control Delay | 14.1 | 32.4 | 12.9 | 13 | 17.8 | 19.3 | 14.8 | 16.2 | 11.9 | 13.6 | 37.3 |
| HCM Lane LOS | B | D | B | B | C | C | B | C | B | B | E |
| HCM 95th-tile Q | 0.7 | 6 | 0.8 | 0.3 | 2 | 2.7 | 0.6 | 1.2 | 0.1 | 0.7 | 7.3 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 14 | 11 | 46 | 29 | 4 | 11 | 68 | 390 | 121 | 14 | 383 | 39 |
| Future Volume (veh/h) | 14 | 11 | 46 | 29 | 4 | 11 | 68 | 390 | 121 | 14 | 383 | 39 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 15 | 12 | 48 | 31 | 4 | 12 | 72 | 411 | 127 | 15 | 403 | 41 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 171 | 141 | 119 | 162 | 141 | 119 | 121 | 2692 | 1201 | 49 | 2548 | 1136 |
| Arrive On Green | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.75 | 0.75 | 0.03 | 0.71 | 0.71 |
| Sat Flow, veh/h | 1419 | 1900 | 1610 | 1364 | 1900 | 1610 | 1810 | 3610 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 15 | 12 | 48 | 31 | 4 | 12 | 72 | 411 | 127 | 15 | 403 | 41 |
| Grp Sat Flow(s),veh/h/ln | 1419 | 1900 | 1610 | 1364 | 1900 | 1610 | 1810 | 1805 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 1.0 | 0.6 | 3.0 | 2.3 | 0.2 | 0.7 | 4.1 | 3.4 | 2.3 | 0.9 | 3.9 | 0.8 |
| Cycle Q Clear(g_c), s | 1.2 | 0.6 | 3.0 | 2.9 | 0.2 | 0.7 | 4.1 | 3.4 | 2.3 | 0.9 | 3.9 | 0.8 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 171 | 141 | 119 | 162 | 141 | 119 | 121 | 2692 | 1201 | 49 | 2548 | 1136 |
| V/C Ratio(X) | 0.09 | 0.09 | 0.40 | 0.19 | 0.03 | 0.10 | 0.60 | 0.15 | 0.11 | 0.31 | 0.16 | 0.04 |
| Avail Cap(c_a), veh/h | 662 | 798 | 676 | 633 | 798 | 676 | 260 | 2692 | 1201 | 260 | 2548 | 1136 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 45.7 | 45.3 | 46.4 | 46.6 | 45.1 | 45.4 | 47.6 | 3.8 | 3.7 | 50.1 | 5.1 | 4.7 |
| Incr Delay (d2), s/veh | 0.5 | 0.6 | 5.1 | 1.3 | 0.2 | 0.9 | 1.7 | 0.1 | 0.2 | 1.3 | 0.1 | 0.1 |
| 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 | 0.4 | 0.3 | 1.3 | 0.8 | 0.1 | 0.3 | 1.8 | 0.9 | 0.6 | 0.4 | 1.2 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 46.2 | 45.9 | 51.5 | 48.0 | 45.3 | 46.2 | 49.3 | 4.0 | 3.9 | 51.4 | 5.2 | 4.7 |
| LnGrp LOS | D | D | D | D | D | D | D | A | A | D | A | A |
| Approach Vol, veh/h | | 75 | | | 47 | | | 610 | | | 459 | |
| Approach Delay, s/veh | | 49.5 | | | 47.3 | | | 9.3 | | | 6.7 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 11.9 | 79.4 | | 13.7 | 7.7 | 83.6 | | 13.7 | | | | |
| Change Period (Y+Rc), s | 4.9 | 5.3 | | 5.9 | 4.9 | 5.3 | | 5.9 | | | | |
| Max Green Setting (Gmax), s | 15.1 | 29.7 | | 44.1 | 15.1 | 29.7 | | 44.1 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.1 | 5.9 | | 4.9 | 2.9 | 5.4 | | 5.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 5.4 | | 0.3 | 0.0 | 6.2 | | 0.6 | | | | |

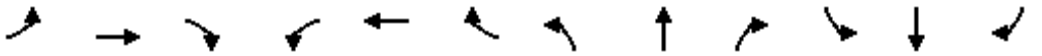
| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 12.3 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 12 | 3 | 576 | 20 | 5 | 453 |
| Future Volume (veh/h) | 12 | 3 | 576 | 20 | 5 | 453 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 13 | 3 | 606 | 21 | 5 | 477 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 54 | 48 | 2824 | 98 | 19 | 3082 |
| Arrive On Green | 0.03 | 0.03 | 0.79 | 0.79 | 0.01 | 0.85 |
| Sat Flow, veh/h | 1810 | 1610 | 3655 | 123 | 1810 | 3705 |
| Grp Volume(v), veh/h | 13 | 3 | 307 | 320 | 5 | 477 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1610 | 1805 | 1878 | 1810 | 1805 |
| Q Serve(g_s), s | 0.6 | 0.1 | 3.4 | 3.4 | 0.2 | 1.8 |
| Cycle Q Clear(g_c), s | 0.6 | 0.1 | 3.4 | 3.4 | 0.2 | 1.8 |
| Prop In Lane | 1.00 | 1.00 | | 0.07 | 1.00 | |
| Lane Grp Cap(c), veh/h | 54 | 48 | 1432 | 1490 | 19 | 3082 |
| V/C Ratio(X) | 0.24 | 0.06 | 0.21 | 0.21 | 0.26 | 0.15 |
| Avail Cap(c_a), veh/h | 588 | 523 | 1432 | 1490 | 362 | 3082 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.91 | 0.91 | 0.99 | 0.99 |
| Uniform Delay (d), s/veh | 37.9 | 37.7 | 2.1 | 2.1 | 39.3 | 1.0 |
| Incr Delay (d2), s/veh | 4.8 | 1.1 | 0.3 | 0.3 | 2.7 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 0.1 | 0.5 | 0.5 | 0.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 42.7 | 38.9 | 2.4 | 2.4 | 41.9 | 1.1 |
| LnGrp LOS | D | D | A | A | D | A |
| Approach Vol, veh/h | 16 | | 627 | | | 482 |
| Approach Delay, s/veh | 42.0 | | 2.4 | | | 1.5 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | | 2 | | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 73.6 | | 6.4 | 4.8 | 68.8 |
| Change Period (Y+Rc), s | | 5.3 | | 4.0 | 4.0 | 5.3 |
| Max Green Setting (Gmax), s | | 44.7 | | 26.0 | 16.0 | 24.7 |
| Max Q Clear Time (g_c+I1), s | | 3.8 | | 2.6 | 2.2 | 5.4 |
| Green Ext Time (p_c), s | | 5.1 | | 0.0 | 0.0 | 5.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 2.6 |
| HCM 6th LOS | A |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 227 | 0 | 476 | 0 | 147 | 15 | 0 | 461 | 37 |
| Future Volume (veh/h) | 0 | 0 | 0 | 227 | 0 | 476 | 0 | 147 | 15 | 0 | 461 | 37 |
| Initial Q (Qb), veh | | | | 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 |
| Parking Bus, Adj | | | | 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 | |
| Adj Sat Flow, veh/h/ln | | | | 1900 | 1900 | 1900 | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | | | | 239 | 0 | 501 | 0 | 155 | 0 | 0 | 485 | 0 |
| Peak Hour Factor | | | | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | | | | 1007 | 0 | 896 | 0 | 2045 | | 0 | 2045 | |
| Arrive On Green | | | | 0.28 | 0.00 | 0.28 | 0.00 | 0.57 | 0.00 | 0.00 | 0.57 | 0.00 |
| Sat Flow, veh/h | | | | 3619 | 0 | 3220 | 0 | 3705 | 1610 | 0 | 3800 | 0 |
| Grp Volume(v), veh/h | | | | 239 | 0 | 501 | 0 | 155 | 0 | 0 | 485 | 0 |
| Grp Sat Flow(s),veh/h/ln | | | | 1810 | 0 | 1610 | 0 | 1805 | 1610 | 0 | 1805 | 0 |
| Q Serve(g_s), s | | | | 4.3 | 0.0 | 11.3 | 0.0 | 1.7 | 0.0 | 0.0 | 5.7 | 0.0 |
| Cycle Q Clear(g_c), s | | | | 4.3 | 0.0 | 11.3 | 0.0 | 1.7 | 0.0 | 0.0 | 5.7 | 0.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 0.00 | | 1.00 | 0.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | | | | 1007 | 0 | 896 | 0 | 2045 | | 0 | 2045 | |
| V/C Ratio(X) | | | | 0.24 | 0.00 | 0.56 | 0.00 | 0.08 | | 0.00 | 0.24 | |
| Avail Cap(c_a), veh/h | | | | 1516 | 0 | 1349 | 0 | 2045 | | 0 | 2045 | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | | | | 23.7 | 0.0 | 26.2 | 0.0 | 8.3 | 0.0 | 0.0 | 9.2 | 0.0 |
| Incr Delay (d2), s/veh | | | | 0.6 | 0.0 | 2.5 | 0.0 | 0.1 | 0.0 | 0.0 | 0.3 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 1.8 | 0.0 | 4.3 | 0.0 | 0.6 | 0.0 | 0.0 | 2.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 24.3 | 0.0 | 28.7 | 0.0 | 8.4 | 0.0 | 0.0 | 9.5 | 0.0 |
| LnGrp LOS | | | | C | A | C | A | A | | A | A | |
| Approach Vol, veh/h | | | | | 740 | | | 155 | A | | 485 | A |
| Approach Delay, s/veh | | | | | 27.3 | | | 8.4 | | | 9.5 | |
| Approach LOS | | | | | C | | | A | | | A | |

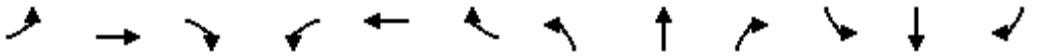
| Timer - Assigned Phs | 2 | | 6 | | 8 | | | |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 54.9 | | 54.9 | | 30.1 | | | |
| Change Period (Y+Rc), s | 6.8 | | 6.8 | | 6.4 | | | |
| Max Green Setting (Gmax), s | 36.2 | | 36.2 | | 35.6 | | | |
| Max Q Clear Time (g_c+I1), s | 3.7 | | 7.7 | | 13.3 | | | |
| Green Ext Time (p_c), s | 2.6 | | 8.7 | | 10.4 | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 18.9 | |
| HCM 6th LOS | B | |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 31 | 0 | 11 | 0 | 0 | 0 | 0 | 131 | 358 | 0 | 361 | 327 |
| Future Volume (veh/h) | 31 | 0 | 11 | 0 | 0 | 0 | 0 | 131 | 358 | 0 | 361 | 327 |
| Initial Q (Qb), veh | 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 |
| Parking Bus, Adj | 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 | |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1900 | | | | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 33 | 0 | 12 | | | | 0 | 138 | 0 | 0 | 380 | 0 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | | | | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 124 | 0 | 110 | | | | 0 | 1369 | | 0 | 2602 | |
| Arrive On Green | 0.07 | 0.00 | 0.07 | | | | 0.00 | 0.72 | 0.00 | 0.00 | 0.72 | 0.00 |
| Sat Flow, veh/h | 1810 | 0 | 1610 | | | | 0 | 1900 | 3220 | 0 | 3705 | 1610 |
| Grp Volume(v), veh/h | 33 | 0 | 12 | | | | 0 | 138 | 0 | 0 | 380 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 0 | 1610 | | | | 0 | 1900 | 1610 | 0 | 1805 | 1610 |
| Q Serve(g_s), s | 1.1 | 0.0 | 0.5 | | | | 0.0 | 1.4 | 0.0 | 0.0 | 2.1 | 0.0 |
| Cycle Q Clear(g_c), s | 1.1 | 0.0 | 0.5 | | | | 0.0 | 1.4 | 0.0 | 0.0 | 2.1 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | | | | 0.00 | | 1.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 124 | 0 | 110 | | | | 0 | 1369 | | 0 | 2602 | |
| V/C Ratio(X) | 0.27 | 0.00 | 0.11 | | | | 0.00 | 0.10 | | 0.00 | 0.15 | |
| Avail Cap(c_a), veh/h | 646 | 0 | 575 | | | | 0 | 1369 | | 0 | 2602 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | | | | 0.00 | 1.00 | 0.00 | 0.00 | 0.98 | 0.00 |
| Uniform Delay (d), s/veh | 28.7 | 0.0 | 28.4 | | | | 0.0 | 2.7 | 0.0 | 0.0 | 2.8 | 0.0 |
| Incr Delay (d2), s/veh | 5.2 | 0.0 | 2.0 | | | | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.6 | 0.0 | 0.2 | | | | 0.0 | 0.3 | 0.0 | 0.0 | 0.4 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 33.9 | 0.0 | 30.4 | | | | 0.0 | 2.9 | 0.0 | 0.0 | 2.9 | 0.0 |
| LnGrp LOS | C | A | C | | | | A | A | | A | A | |
| Approach Vol, veh/h | | 45 | | | | | | 138 | A | | 380 | A |
| Approach Delay, s/veh | | 33.0 | | | | | | 2.9 | | | 2.9 | |
| Approach LOS | | C | | | | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 53.7 | | 11.3 | | 53.7 | | | | | | |
| Change Period (Y+Rc), s | | 6.9 | | 6.8 | | 6.9 | | | | | | |
| Max Green Setting (Gmax), s | | 28.1 | | 23.2 | | 28.1 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 3.4 | | 3.1 | | 4.1 | | | | | | |
| Green Ext Time (p_c), s | | 1.9 | | 0.3 | | 6.2 | | | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 5.3 |
| HCM 6th LOS | | A |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10.8 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 53 | 279 | 59 | 67 | 199 | 17 | 17 | 94 | 67 | 28 | 50 | 21 |
| Future Vol, veh/h | 53 | 279 | 59 | 67 | 199 | 17 | 17 | 94 | 67 | 28 | 50 | 21 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 56 | 294 | 62 | 71 | 209 | 18 | 18 | 99 | 71 | 29 | 53 | 22 |
| Number of Lanes | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 3 | 3 |
| HCM Control Delay | 10.7 | 10.2 | 11.9 | 10.9 |
| HCM LOS | B | B | B | B |

| Lane | NBLn1 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 10% | 100% | 0% | 0% | 100% | 0% | 0% | 28% |
| Vol Thru, % | 53% | 0% | 100% | 61% | 0% | 100% | 80% | 51% |
| Vol Right, % | 38% | 0% | 0% | 39% | 0% | 0% | 20% | 21% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 178 | 53 | 186 | 152 | 67 | 133 | 83 | 99 |
| LT Vol | 17 | 53 | 0 | 0 | 67 | 0 | 0 | 28 |
| Through Vol | 94 | 0 | 186 | 93 | 0 | 133 | 66 | 50 |
| RT Vol | 67 | 0 | 0 | 59 | 0 | 0 | 17 | 21 |
| Lane Flow Rate | 187 | 56 | 196 | 160 | 71 | 140 | 88 | 104 |
| Geometry Grp | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.324 | 0.099 | 0.321 | 0.25 | 0.128 | 0.234 | 0.143 | 0.191 |
| Departure Headway (Hd) | 6.216 | 6.404 | 5.896 | 5.62 | 6.541 | 6.032 | 5.887 | 6.587 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 577 | 559 | 609 | 638 | 547 | 594 | 608 | 544 |
| Service Time | 3.965 | 4.149 | 3.64 | 3.364 | 4.289 | 3.78 | 3.635 | 4.342 |
| HCM Lane V/C Ratio | 0.324 | 0.1 | 0.322 | 0.251 | 0.13 | 0.236 | 0.145 | 0.191 |
| HCM Control Delay | 11.9 | 9.9 | 11.4 | 10.2 | 10.3 | 10.6 | 9.6 | 10.9 |
| HCM Lane LOS | B | A | B | B | B | B | A | B |
| HCM 95th-tile Q | 1.4 | 0.3 | 1.4 | 1 | 0.4 | 0.9 | 0.5 | 0.7 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 9 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 24 | 45 | 36 | 5 | 13 | 26 | 11 | 129 | 2 | 20 | 116 | 11 |
| Future Vol, veh/h | 24 | 45 | 36 | 5 | 13 | 26 | 11 | 129 | 2 | 20 | 116 | 11 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 25 | 47 | 38 | 5 | 14 | 27 | 12 | 136 | 2 | 21 | 122 | 12 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 2 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 2 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 2 | 2 |
| HCM Control Delay | 8.5 | 8.1 | 9.5 | 9 |
| HCM LOS | A | A | A | A |

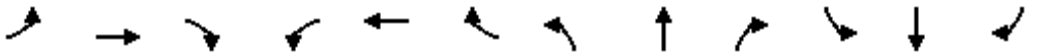
| Lane | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 8% | 100% | 0% | 100% | 0% | 15% | 0% |
| Vol Thru, % | 91% | 0% | 56% | 0% | 33% | 85% | 0% |
| Vol Right, % | 1% | 0% | 44% | 0% | 67% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 142 | 24 | 81 | 5 | 39 | 136 | 11 |
| LT Vol | 11 | 24 | 0 | 5 | 0 | 20 | 0 |
| Through Vol | 129 | 0 | 45 | 0 | 13 | 116 | 0 |
| RT Vol | 2 | 0 | 36 | 0 | 26 | 0 | 11 |
| Lane Flow Rate | 149 | 25 | 85 | 5 | 41 | 143 | 12 |
| Geometry Grp | 6 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.211 | 0.041 | 0.119 | 0.009 | 0.056 | 0.203 | 0.014 |
| Departure Headway (Hd) | 5.093 | 5.83 | 5.013 | 5.907 | 4.932 | 5.11 | 4.333 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 704 | 614 | 715 | 606 | 725 | 703 | 825 |
| Service Time | 3.125 | 3.563 | 2.746 | 3.645 | 2.67 | 2.841 | 2.064 |
| HCM Lane V/C Ratio | 0.212 | 0.041 | 0.119 | 0.008 | 0.057 | 0.203 | 0.015 |
| HCM Control Delay | 9.5 | 8.8 | 8.4 | 8.7 | 8 | 9.1 | 7.1 |
| HCM Lane LOS | A | A | A | A | A | A | A |
| HCM 95th-tile Q | 0.8 | 0.1 | 0.4 | 0 | 0.2 | 0.8 | 0 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 123.8 |
| Intersection LOS | F |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 37 | 220 | 79 | 57 | 182 | 67 | 165 | 661 | 95 | 34 | 324 | 50 |
| Future Vol, veh/h | 37 | 220 | 79 | 57 | 182 | 67 | 165 | 661 | 95 | 34 | 324 | 50 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 39 | 232 | 83 | 60 | 192 | 71 | 174 | 696 | 100 | 36 | 341 | 53 |
| Number of Lanes | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 3 | 3 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 3 | 3 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 3 | 3 | 3 | 3 |
| HCM Control Delay | 19.2 | 20.1 | 241.3 | 22.5 |
| HCM LOS | C | C | F | C |

| Lane | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 0% | 0% | 100% | 48% | 0% | 100% | 0% | 0% | 100% |
| Vol Right, % | 0% | 0% | 100% | 0% | 0% | 52% | 0% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 165 | 661 | 95 | 37 | 147 | 152 | 57 | 182 | 67 | 34 | 216 |
| LT Vol | 165 | 0 | 0 | 37 | 0 | 0 | 57 | 0 | 0 | 34 | 0 |
| Through Vol | 0 | 661 | 0 | 0 | 147 | 73 | 0 | 182 | 0 | 0 | 216 |
| RT Vol | 0 | 0 | 95 | 0 | 0 | 79 | 0 | 0 | 67 | 0 | 0 |
| Lane Flow Rate | 174 | 696 | 100 | 39 | 154 | 160 | 60 | 192 | 71 | 36 | 227 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.439 | 1.662 | 0.219 | 0.108 | 0.407 | 0.407 | 0.168 | 0.51 | 0.174 | 0.097 | 0.586 |
| Departure Headway (Hd) | 9.098 | 8.598 | 7.898 | 10.867 | 10.367 | 10.004 | 10.952 | 10.452 | 9.752 | 10.543 | 10.043 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 394 | 424 | 453 | 332 | 349 | 362 | 329 | 347 | 370 | 342 | 362 |
| Service Time | 6.873 | 6.373 | 5.673 | 8.567 | 8.067 | 7.704 | 8.652 | 8.152 | 7.452 | 8.243 | 7.743 |
| HCM Lane V/C Ratio | 0.442 | 1.642 | 0.221 | 0.117 | 0.441 | 0.442 | 0.182 | 0.553 | 0.192 | 0.105 | 0.627 |
| HCM Control Delay | 18.9 | 329.7 | 12.9 | 14.9 | 20 | 19.4 | 15.9 | 23.5 | 14.5 | 14.4 | 26 |
| HCM Lane LOS | C | F | B | B | C | C | C | C | B | B | D |
| HCM 95th-tile Q | 2.2 | 40.7 | 0.8 | 0.4 | 1.9 | 1.9 | 0.6 | 2.8 | 0.6 | 0.3 | 3.6 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 33 | 5 | 47 | 101 | 11 | 12 | 42 | 638 | 79 | 11 | 354 | 24 |
| Future Volume (veh/h) | 33 | 5 | 47 | 101 | 11 | 12 | 42 | 638 | 79 | 11 | 354 | 24 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 34 | 5 | 49 | 105 | 11 | 12 | 44 | 665 | 82 | 11 | 369 | 25 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 209 | 199 | 169 | 209 | 199 | 169 | 100 | 2603 | 1161 | 38 | 2479 | 1106 |
| Arrive On Green | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.06 | 0.72 | 0.72 | 0.02 | 0.69 | 0.69 |
| Sat Flow, veh/h | 1410 | 1900 | 1610 | 1371 | 1900 | 1610 | 1810 | 3610 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 34 | 5 | 49 | 105 | 11 | 12 | 44 | 665 | 82 | 11 | 369 | 25 |
| Grp Sat Flow(s),veh/h/ln | 1410 | 1900 | 1610 | 1371 | 1900 | 1610 | 1810 | 1805 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 2.3 | 0.2 | 3.0 | 7.8 | 0.5 | 0.7 | 2.5 | 6.6 | 1.6 | 0.6 | 3.7 | 0.5 |
| Cycle Q Clear(g_c), s | 2.9 | 0.2 | 3.0 | 8.1 | 0.5 | 0.7 | 2.5 | 6.6 | 1.6 | 0.6 | 3.7 | 0.5 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 209 | 199 | 169 | 209 | 199 | 169 | 100 | 2603 | 1161 | 38 | 2479 | 1106 |
| V/C Ratio(X) | 0.16 | 0.03 | 0.29 | 0.50 | 0.06 | 0.07 | 0.44 | 0.26 | 0.07 | 0.29 | 0.15 | 0.02 |
| Avail Cap(c_a), veh/h | 654 | 798 | 676 | 641 | 798 | 676 | 260 | 2603 | 1161 | 260 | 2479 | 1106 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.97 | 0.97 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 43.6 | 42.2 | 43.4 | 45.8 | 42.3 | 42.4 | 48.0 | 5.0 | 4.3 | 50.6 | 5.7 | 5.2 |
| Incr Delay (d2), s/veh | 0.9 | 0.1 | 2.2 | 4.3 | 0.3 | 0.4 | 1.1 | 0.2 | 0.1 | 1.6 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.8 | 0.1 | 1.3 | 2.8 | 0.3 | 0.3 | 1.1 | 2.0 | 0.4 | 0.3 | 1.2 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 44.5 | 42.3 | 45.6 | 50.2 | 42.6 | 42.8 | 49.2 | 5.2 | 4.4 | 52.2 | 5.9 | 5.3 |
| LnGrp LOS | D | D | D | D | D | D | D | A | A | D | A | A |
| Approach Vol, veh/h | | 88 | | | 128 | | | 791 | | | 405 | |
| Approach Delay, s/veh | | 45.0 | | | 48.8 | | | 7.6 | | | 7.1 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.7 | 77.4 | | 16.9 | 7.1 | 81.0 | | 16.9 | | | | |
| Change Period (Y+Rc), s | 4.9 | 5.3 | | 5.9 | 4.9 | 5.3 | | 5.9 | | | | |
| Max Green Setting (Gmax), s | 15.1 | 29.7 | | 44.1 | 15.1 | 29.7 | | 44.1 | | | | |
| Max Q Clear Time (g_c+I1), s | 4.5 | 5.7 | | 10.1 | 2.6 | 8.6 | | 5.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 4.8 | | 1.0 | 0.0 | 8.7 | | 0.6 | | | | |

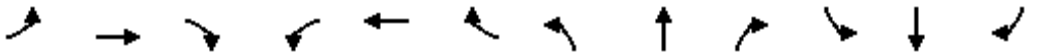
| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 13.5 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 34 | 9 | 750 | 14 | 4 | 497 |
| Future Volume (veh/h) | 34 | 9 | 750 | 14 | 4 | 497 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 36 | 9 | 789 | 15 | 4 | 523 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 114 | 102 | 2761 | 52 | 15 | 2962 |
| Arrive On Green | 0.06 | 0.06 | 0.76 | 0.76 | 0.01 | 0.82 |
| Sat Flow, veh/h | 1810 | 1610 | 3719 | 69 | 1810 | 3705 |
| Grp Volume(v), veh/h | 36 | 9 | 393 | 411 | 4 | 523 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1610 | 1805 | 1888 | 1810 | 1805 |
| Q Serve(g_s), s | 1.5 | 0.4 | 5.3 | 5.3 | 0.2 | 2.4 |
| Cycle Q Clear(g_c), s | 1.5 | 0.4 | 5.3 | 5.3 | 0.2 | 2.4 |
| Prop In Lane | 1.00 | 1.00 | | 0.04 | 1.00 | |
| Lane Grp Cap(c), veh/h | 114 | 102 | 1375 | 1438 | 15 | 2962 |
| V/C Ratio(X) | 0.31 | 0.09 | 0.29 | 0.29 | 0.26 | 0.18 |
| Avail Cap(c_a), veh/h | 588 | 523 | 1375 | 1438 | 362 | 2962 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.90 | 0.90 | 0.98 | 0.98 |
| Uniform Delay (d), s/veh | 35.8 | 35.3 | 2.9 | 2.9 | 39.4 | 1.5 |
| Incr Delay (d2), s/veh | 3.3 | 0.8 | 0.5 | 0.4 | 3.2 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.8 | 0.4 | 1.0 | 1.1 | 0.1 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 39.1 | 36.1 | 3.4 | 3.3 | 42.6 | 1.6 |
| LnGrp LOS | D | D | A | A | D | A |
| Approach Vol, veh/h | 45 | | 804 | | | 527 |
| Approach Delay, s/veh | 38.5 | | 3.4 | | | 1.9 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | | 2 | | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 70.9 | | 9.1 | 4.7 | 66.3 |
| Change Period (Y+Rc), s | | 5.3 | | 4.0 | 4.0 | 5.3 |
| Max Green Setting (Gmax), s | | 44.7 | | 26.0 | 16.0 | 24.7 |
| Max Q Clear Time (g_c+I1), s | | 4.4 | | 3.5 | 2.2 | 7.3 |
| Green Ext Time (p_c), s | | 5.6 | | 0.2 | 0.0 | 6.5 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 4.0 |
| HCM 6th LOS | A |

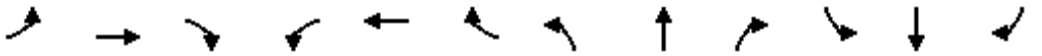


| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 372 | 0 | 620 | 0 | 218 | 18 | 0 | 498 | 47 |
| Future Volume (veh/h) | 0 | 0 | 0 | 372 | 0 | 620 | 0 | 218 | 18 | 0 | 498 | 47 |
| Initial Q (Qb), veh | | | | 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 |
| Parking Bus, Adj | | | | 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 | |
| Adj Sat Flow, veh/h/ln | | | | 1900 | 1900 | 1900 | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | | | | 392 | 0 | 653 | 0 | 229 | 0 | 0 | 524 | 0 |
| Peak Hour Factor | | | | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | | | | 1235 | 0 | 1099 | 0 | 1817 | | 0 | 1817 | |
| Arrive On Green | | | | 0.34 | 0.00 | 0.34 | 0.00 | 0.50 | 0.00 | 0.00 | 0.50 | 0.00 |
| Sat Flow, veh/h | | | | 3619 | 0 | 3220 | 0 | 3705 | 1610 | 0 | 3800 | 0 |
| Grp Volume(v), veh/h | | | | 392 | 0 | 653 | 0 | 229 | 0 | 0 | 524 | 0 |
| Grp Sat Flow(s),veh/h/ln | | | | 1810 | 0 | 1610 | 0 | 1805 | 1610 | 0 | 1805 | 0 |
| Q Serve(g_s), s | | | | 6.8 | 0.0 | 14.2 | 0.0 | 2.9 | 0.0 | 0.0 | 7.2 | 0.0 |
| Cycle Q Clear(g_c), s | | | | 6.8 | 0.0 | 14.2 | 0.0 | 2.9 | 0.0 | 0.0 | 7.2 | 0.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 0.00 | | 1.00 | 0.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | | | | 1235 | 0 | 1099 | 0 | 1817 | | 0 | 1817 | |
| V/C Ratio(X) | | | | 0.32 | 0.00 | 0.59 | 0.00 | 0.13 | | 0.00 | 0.29 | |
| Avail Cap(c_a), veh/h | | | | 1516 | 0 | 1349 | 0 | 1817 | | 0 | 1817 | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| Uniform Delay (d), s/veh | | | | 20.7 | 0.0 | 23.1 | 0.0 | 11.2 | 0.0 | 0.0 | 12.3 | 0.0 |
| Incr Delay (d2), s/veh | | | | 0.7 | 0.0 | 2.4 | 0.0 | 0.1 | 0.0 | 0.0 | 0.4 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 2.8 | 0.0 | 5.3 | 0.0 | 1.0 | 0.0 | 0.0 | 2.6 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 21.4 | 0.0 | 25.5 | 0.0 | 11.3 | 0.0 | 0.0 | 12.7 | 0.0 |
| LnGrp LOS | | | | C | A | C | A | B | | A | B | |
| Approach Vol, veh/h | | | | | 1045 | | | 229 | A | | 524 | A |
| Approach Delay, s/veh | | | | | 23.9 | | | 11.3 | | | 12.7 | |
| Approach LOS | | | | | C | | | B | | | B | |

| Timer - Assigned Phs | 2 | | 6 | | 8 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 49.6 | | 49.6 | | 35.4 | | | | | | | |
| Change Period (Y+Rc), s | 6.8 | | 6.8 | | 6.4 | | | | | | | |
| Max Green Setting (Gmax), s | 36.2 | | 36.2 | | 35.6 | | | | | | | |
| Max Q Clear Time (g_c+I1), s | 4.9 | | 9.2 | | 16.2 | | | | | | | |
| Green Ext Time (p_c), s | 3.9 | | 9.3 | | 12.8 | | | | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 19.0 | |
| HCM 6th LOS | B | |

| Notes |
|---|
| User approved volume balancing among the lanes for turning movement. |
| Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay. |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 35 | 0 | 22 | 0 | 0 | 0 | 0 | 201 | 296 | 0 | 518 | 352 |
| Future Volume (veh/h) | 35 | 0 | 22 | 0 | 0 | 0 | 0 | 201 | 296 | 0 | 518 | 352 |
| Initial Q (Qb), veh | 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 |
| Parking Bus, Adj | 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 | |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1900 | | | | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 37 | 0 | 23 | | | | 0 | 212 | 0 | 0 | 545 | 0 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | | | | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 147 | 0 | 131 | | | | 0 | 1345 | | 0 | 2555 | |
| Arrive On Green | 0.08 | 0.00 | 0.08 | | | | 0.00 | 0.71 | 0.00 | 0.00 | 0.71 | 0.00 |
| Sat Flow, veh/h | 1810 | 0 | 1610 | | | | 0 | 1900 | 3220 | 0 | 3705 | 1610 |
| Grp Volume(v), veh/h | 37 | 0 | 23 | | | | 0 | 212 | 0 | 0 | 545 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 0 | 1610 | | | | 0 | 1900 | 1610 | 0 | 1805 | 1610 |
| Q Serve(g_s), s | 1.2 | 0.0 | 0.9 | | | | 0.0 | 2.4 | 0.0 | 0.0 | 3.4 | 0.0 |
| Cycle Q Clear(g_c), s | 1.2 | 0.0 | 0.9 | | | | 0.0 | 2.4 | 0.0 | 0.0 | 3.4 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | | | | 0.00 | | 1.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 147 | 0 | 131 | | | | 0 | 1345 | | 0 | 2555 | |
| V/C Ratio(X) | 0.25 | 0.00 | 0.18 | | | | 0.00 | 0.16 | | 0.00 | 0.21 | |
| Avail Cap(c_a), veh/h | 646 | 0 | 575 | | | | 0 | 1345 | | 0 | 2555 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | | | | 0.00 | 1.00 | 0.00 | 0.00 | 0.96 | 0.00 |
| Uniform Delay (d), s/veh | 28.0 | 0.0 | 27.8 | | | | 0.0 | 3.1 | 0.0 | 0.0 | 3.3 | 0.0 |
| Incr Delay (d2), s/veh | 4.0 | 0.0 | 2.9 | | | | 0.0 | 0.3 | 0.0 | 0.0 | 0.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.7 | 0.0 | 0.4 | | | | 0.0 | 0.5 | 0.0 | 0.0 | 0.6 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 32.0 | 0.0 | 30.7 | | | | 0.0 | 3.4 | 0.0 | 0.0 | 3.5 | 0.0 |
| LnGrp LOS | C | A | C | | | | A | A | | A | A | |
| Approach Vol, veh/h | | 60 | | | | | | 212 | A | | 545 | A |
| Approach Delay, s/veh | | 31.5 | | | | | | 3.4 | | | 3.5 | |
| Approach LOS | | C | | | | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 52.9 | | 12.1 | | 52.9 | | | | | | |
| Change Period (Y+Rc), s | | 6.9 | | 6.8 | | 6.9 | | | | | | |
| Max Green Setting (Gmax), s | | 28.1 | | 23.2 | | 28.1 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 4.4 | | 3.2 | | 5.4 | | | | | | |
| Green Ext Time (p_c), s | | 3.1 | | 0.5 | | 8.8 | | | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 5.5 |
| HCM 6th LOS | A |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 12.3 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 55 | 285 | 28 | 68 | 248 | 37 | 35 | 56 | 87 | 44 | 112 | 37 |
| Future Vol, veh/h | 55 | 285 | 28 | 68 | 248 | 37 | 35 | 56 | 87 | 44 | 112 | 37 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 58 | 300 | 29 | 72 | 261 | 39 | 37 | 59 | 92 | 46 | 118 | 39 |
| Number of Lanes | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 3 | 3 |
| HCM Control Delay | 11.9 | 11.5 | 13 | 13.9 |
| HCM LOS | B | B | B | B |

| Lane | NBLn1 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 20% | 100% | 0% | 0% | 100% | 0% | 0% | 23% |
| Vol Thru, % | 31% | 0% | 100% | 77% | 0% | 100% | 69% | 58% |
| Vol Right, % | 49% | 0% | 0% | 23% | 0% | 0% | 31% | 19% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 178 | 55 | 190 | 123 | 68 | 165 | 120 | 193 |
| LT Vol | 35 | 55 | 0 | 0 | 68 | 0 | 0 | 44 |
| Through Vol | 56 | 0 | 190 | 95 | 0 | 165 | 83 | 112 |
| RT Vol | 87 | 0 | 0 | 28 | 0 | 0 | 37 | 37 |
| Lane Flow Rate | 187 | 58 | 200 | 129 | 72 | 174 | 126 | 203 |
| Geometry Grp | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.346 | 0.112 | 0.359 | 0.226 | 0.139 | 0.313 | 0.219 | 0.385 |
| Departure Headway (Hd) | 6.653 | 6.972 | 6.46 | 6.297 | 6.996 | 6.484 | 6.262 | 6.828 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 536 | 511 | 554 | 566 | 509 | 550 | 569 | 524 |
| Service Time | 4.444 | 4.757 | 4.245 | 4.082 | 4.784 | 4.271 | 4.049 | 4.617 |
| HCM Lane V/C Ratio | 0.349 | 0.114 | 0.361 | 0.228 | 0.141 | 0.316 | 0.221 | 0.387 |
| HCM Control Delay | 13 | 10.6 | 12.9 | 10.9 | 10.9 | 12.2 | 10.8 | 13.9 |
| HCM Lane LOS | B | B | B | B | B | B | B | B |
| HCM 95th-tile Q | 1.5 | 0.4 | 1.6 | 0.9 | 0.5 | 1.3 | 0.8 | 1.8 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 9.7 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 8 | 28 | 16 | 27 | 40 | 25 | 41 | 125 | 24 | 18 | 175 | 15 |
| Future Vol, veh/h | 8 | 28 | 16 | 27 | 40 | 25 | 41 | 125 | 24 | 18 | 175 | 15 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 8 | 29 | 17 | 28 | 42 | 26 | 43 | 132 | 25 | 19 | 184 | 16 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 2 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 2 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 2 | 2 |
| HCM Control Delay | 8.7 | 8.8 | 10.3 | 9.8 |
| HCM LOS | A | A | B | A |

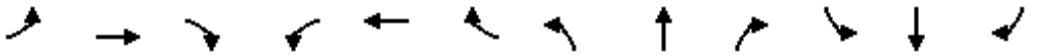
| Lane | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 22% | 100% | 0% | 100% | 0% | 9% | 0% |
| Vol Thru, % | 66% | 0% | 64% | 0% | 62% | 91% | 0% |
| Vol Right, % | 13% | 0% | 36% | 0% | 38% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 190 | 8 | 44 | 27 | 65 | 193 | 15 |
| LT Vol | 41 | 8 | 0 | 27 | 0 | 18 | 0 |
| Through Vol | 125 | 0 | 28 | 0 | 40 | 175 | 0 |
| RT Vol | 24 | 0 | 16 | 0 | 25 | 0 | 15 |
| Lane Flow Rate | 200 | 8 | 46 | 28 | 68 | 203 | 16 |
| Geometry Grp | 6 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.286 | 0.014 | 0.07 | 0.048 | 0.102 | 0.29 | 0.019 |
| Departure Headway (Hd) | 5.142 | 6.189 | 5.427 | 6.132 | 5.355 | 5.142 | 4.392 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 698 | 576 | 657 | 582 | 666 | 697 | 812 |
| Service Time | 3.186 | 3.952 | 3.189 | 3.888 | 3.11 | 2.884 | 2.134 |
| HCM Lane V/C Ratio | 0.287 | 0.014 | 0.07 | 0.048 | 0.102 | 0.291 | 0.02 |
| HCM Control Delay | 10.3 | 9 | 8.6 | 9.2 | 8.7 | 10 | 7.2 |
| HCM Lane LOS | B | A | A | A | A | A | A |
| HCM 95th-tile Q | 1.2 | 0 | 0.2 | 0.2 | 0.3 | 1.2 | 0.1 |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 11 | 3 | 581 | 19 | 5 | 441 |
| Future Volume (veh/h) | 11 | 3 | 581 | 19 | 5 | 441 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 14 | 4 | 726 | 24 | 6 | 551 |
| Peak Hour Factor | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 60 | 53 | 2811 | 93 | 23 | 3071 |
| Arrive On Green | 0.03 | 0.03 | 0.79 | 0.79 | 0.01 | 0.85 |
| Sat Flow, veh/h | 1810 | 1610 | 3661 | 118 | 1810 | 3705 |
| Grp Volume(v), veh/h | 14 | 4 | 367 | 383 | 6 | 551 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1610 | 1805 | 1879 | 1810 | 1805 |
| Q Serve(g_s), s | 0.6 | 0.2 | 4.3 | 4.3 | 0.3 | 2.2 |
| Cycle Q Clear(g_c), s | 0.6 | 0.2 | 4.3 | 4.3 | 0.3 | 2.2 |
| Prop In Lane | 1.00 | 1.00 | | 0.06 | 1.00 | |
| Lane Grp Cap(c), veh/h | 60 | 53 | 1423 | 1481 | 23 | 3071 |
| V/C Ratio(X) | 0.23 | 0.08 | 0.26 | 0.26 | 0.27 | 0.18 |
| Avail Cap(c_a), veh/h | 588 | 523 | 1423 | 1481 | 362 | 3071 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.86 | 0.86 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 37.7 | 37.5 | 2.3 | 2.3 | 39.1 | 1.1 |
| Incr Delay (d2), s/veh | 4.2 | 1.3 | 0.4 | 0.4 | 2.3 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 0.2 | 0.7 | 0.7 | 0.1 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 41.9 | 38.8 | 2.6 | 2.6 | 41.4 | 1.2 |
| LnGrp LOS | D | D | A | A | D | A |
| Approach Vol, veh/h | 18 | | 750 | | | 557 |
| Approach Delay, s/veh | 41.2 | | 2.6 | | | 1.6 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | | 2 | | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 73.4 | | 6.6 | 5.0 | 68.4 |
| Change Period (Y+Rc), s | | 5.3 | | 4.0 | 4.0 | 5.3 |
| Max Green Setting (Gmax), s | | 44.7 | | 26.0 | 16.0 | 24.7 |
| Max Q Clear Time (g_c+I1), s | | 4.2 | | 2.6 | 2.3 | 6.3 |
| Green Ext Time (p_c), s | | 6.0 | | 0.0 | 0.0 | 6.2 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 2.7 |
| HCM 6th LOS | A |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 193 | 0 | 477 | 0 | 111 | 11 | 0 | 438 | 33 |
| Future Volume (veh/h) | 0 | 0 | 0 | 193 | 0 | 477 | 0 | 111 | 11 | 0 | 438 | 33 |
| Initial Q (Qb), veh | | | | 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 |
| Parking Bus, Adj | | | | 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 | |
| Adj Sat Flow, veh/h/ln | | | | 1900 | 1900 | 1900 | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | | | | 268 | 0 | 662 | 0 | 154 | 0 | 0 | 608 | 0 |
| Peak Hour Factor | | | | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 |
| Percent Heavy Veh, % | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | | | | 1201 | 0 | 1068 | 0 | 1852 | | 0 | 1852 | |
| Arrive On Green | | | | 0.33 | 0.00 | 0.33 | 0.00 | 0.51 | 0.00 | 0.00 | 0.51 | 0.00 |
| Sat Flow, veh/h | | | | 3619 | 0 | 3220 | 0 | 3705 | 1610 | 0 | 3800 | 0 |
| Grp Volume(v), veh/h | | | | 268 | 0 | 662 | 0 | 154 | 0 | 0 | 608 | 0 |
| Grp Sat Flow(s),veh/h/ln | | | | 1810 | 0 | 1610 | 0 | 1805 | 1610 | 0 | 1805 | 0 |
| Q Serve(g_s), s | | | | 4.5 | 0.0 | 14.7 | 0.0 | 1.8 | 0.0 | 0.0 | 8.4 | 0.0 |
| Cycle Q Clear(g_c), s | | | | 4.5 | 0.0 | 14.7 | 0.0 | 1.8 | 0.0 | 0.0 | 8.4 | 0.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 0.00 | | 1.00 | 0.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | | | | 1201 | 0 | 1068 | 0 | 1852 | | 0 | 1852 | |
| V/C Ratio(X) | | | | 0.22 | 0.00 | 0.62 | 0.00 | 0.08 | | 0.00 | 0.33 | |
| Avail Cap(c_a), veh/h | | | | 1516 | 0 | 1349 | 0 | 1852 | | 0 | 1852 | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| Uniform Delay (d), s/veh | | | | 20.5 | 0.0 | 23.9 | 0.0 | 10.5 | 0.0 | 0.0 | 12.1 | 0.0 |
| Incr Delay (d2), s/veh | | | | 0.4 | 0.0 | 2.7 | 0.0 | 0.1 | 0.0 | 0.0 | 0.5 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 1.8 | 0.0 | 5.5 | 0.0 | 0.7 | 0.0 | 0.0 | 3.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 20.9 | 0.0 | 26.6 | 0.0 | 10.6 | 0.0 | 0.0 | 12.6 | 0.0 |
| LnGrp LOS | | | | C | A | C | A | B | | A | B | |
| Approach Vol, veh/h | | | | | 930 | | | 154 | A | | 608 | A |
| Approach Delay, s/veh | | | | | 25.0 | | | 10.6 | | | 12.6 | |
| Approach LOS | | | | | C | | | B | | | B | |

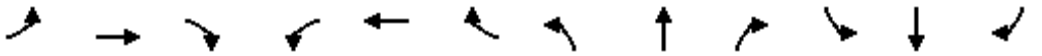
| Timer - Assigned Phs | 2 | | 6 | | 8 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 50.4 | | 50.4 | | 34.6 | | | | | | | |
| Change Period (Y+Rc), s | 6.8 | | 6.8 | | 6.4 | | | | | | | |
| Max Green Setting (Gmax), s | 36.2 | | 36.2 | | 35.6 | | | | | | | |
| Max Q Clear Time (g_c+I1), s | 3.8 | | 10.4 | | 16.7 | | | | | | | |
| Green Ext Time (p_c), s | 2.5 | | 10.6 | | 11.5 | | | | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 19.2 | |
| HCM 6th LOS | B | |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 31 | 0 | 11 | 0 | 0 | 0 | 0 | 92 | 246 | 0 | 309 | 320 |
| Future Volume (veh/h) | 31 | 0 | 11 | 0 | 0 | 0 | 0 | 92 | 246 | 0 | 309 | 320 |
| Initial Q (Qb), veh | 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 |
| Parking Bus, Adj | 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 | |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1900 | | | | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 34 | 0 | 12 | | | | 0 | 100 | 0 | 0 | 336 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 126 | 0 | 112 | | | | 0 | 1368 | | 0 | 2598 | |
| Arrive On Green | 0.07 | 0.00 | 0.07 | | | | 0.00 | 0.72 | 0.00 | 0.00 | 0.72 | 0.00 |
| Sat Flow, veh/h | 1810 | 0 | 1610 | | | | 0 | 1900 | 3220 | 0 | 3705 | 1610 |
| Grp Volume(v), veh/h | 34 | 0 | 12 | | | | 0 | 100 | 0 | 0 | 336 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 0 | 1610 | | | | 0 | 1900 | 1610 | 0 | 1805 | 1610 |
| Q Serve(g_s), s | 1.2 | 0.0 | 0.5 | | | | 0.0 | 1.0 | 0.0 | 0.0 | 1.9 | 0.0 |
| Cycle Q Clear(g_c), s | 1.2 | 0.0 | 0.5 | | | | 0.0 | 1.0 | 0.0 | 0.0 | 1.9 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | | | | 0.00 | | 1.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 126 | 0 | 112 | | | | 0 | 1368 | | 0 | 2598 | |
| V/C Ratio(X) | 0.27 | 0.00 | 0.11 | | | | 0.00 | 0.07 | | 0.00 | 0.13 | |
| Avail Cap(c_a), veh/h | 646 | 0 | 575 | | | | 0 | 1368 | | 0 | 2598 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | | | | 0.00 | 1.00 | 0.00 | 0.00 | 0.96 | 0.00 |
| Uniform Delay (d), s/veh | 28.7 | 0.0 | 28.4 | | | | 0.0 | 2.7 | 0.0 | 0.0 | 2.8 | 0.0 |
| Incr Delay (d2), s/veh | 5.2 | 0.0 | 1.9 | | | | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.6 | 0.0 | 0.2 | | | | 0.0 | 0.2 | 0.0 | 0.0 | 0.3 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 33.9 | 0.0 | 30.3 | | | | 0.0 | 2.8 | 0.0 | 0.0 | 2.9 | 0.0 |
| LnGrp LOS | C | A | C | | | | A | A | | A | A | |
| Approach Vol, veh/h | | 46 | | | | | | 100 | A | | 336 | A |
| Approach Delay, s/veh | | 33.0 | | | | | | 2.8 | | | 2.9 | |
| Approach LOS | | C | | | | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 53.7 | | 11.3 | | 53.7 | | | | | | |
| Change Period (Y+Rc), s | | 6.9 | | 6.8 | | 6.9 | | | | | | |
| Max Green Setting (Gmax), s | | 28.1 | | 23.2 | | 28.1 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 3.0 | | 3.2 | | 3.9 | | | | | | |
| Green Ext Time (p_c), s | | 1.3 | | 0.3 | | 5.4 | | | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 5.8 |
| HCM 6th LOS | A |

**Notes**

User approved volume balancing among the lanes for turning movement.

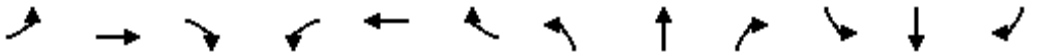
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 32 | 8 | 766 | 13 | 4 | 486 |
| Future Volume (veh/h) | 32 | 8 | 766 | 13 | 4 | 486 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 35 | 9 | 833 | 14 | 4 | 528 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 113 | 100 | 2771 | 47 | 15 | 2965 |
| Arrive On Green | 0.06 | 0.06 | 0.76 | 0.76 | 0.01 | 0.82 |
| Sat Flow, veh/h | 1810 | 1610 | 3728 | 61 | 1810 | 3705 |
| Grp Volume(v), veh/h | 35 | 9 | 414 | 433 | 4 | 528 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1610 | 1805 | 1889 | 1810 | 1805 |
| Q Serve(g_s), s | 1.5 | 0.4 | 5.6 | 5.6 | 0.2 | 2.4 |
| Cycle Q Clear(g_c), s | 1.5 | 0.4 | 5.6 | 5.6 | 0.2 | 2.4 |
| Prop In Lane | 1.00 | 1.00 | | 0.03 | 1.00 | |
| Lane Grp Cap(c), veh/h | 113 | 100 | 1377 | 1441 | 15 | 2965 |
| V/C Ratio(X) | 0.31 | 0.09 | 0.30 | 0.30 | 0.26 | 0.18 |
| Avail Cap(c_a), veh/h | 588 | 523 | 1377 | 1441 | 362 | 2965 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.85 | 0.85 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 35.9 | 35.4 | 2.9 | 2.9 | 39.4 | 1.5 |
| Incr Delay (d2), s/veh | 3.3 | 0.8 | 0.5 | 0.5 | 3.3 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.8 | 0.4 | 1.1 | 1.1 | 0.1 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 39.1 | 36.2 | 3.4 | 3.4 | 42.7 | 1.6 |
| LnGrp LOS | D | D | A | A | D | A |
| Approach Vol, veh/h | 44 | | 847 | | | 532 |
| Approach Delay, s/veh | 38.5 | | 3.4 | | | 1.9 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | | 2 | | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 71.0 | | 9.0 | 4.7 | 66.3 |
| Change Period (Y+Rc), s | | 5.3 | | 4.0 | 4.0 | 5.3 |
| Max Green Setting (Gmax), s | | 44.7 | | 26.0 | 16.0 | 24.7 |
| Max Q Clear Time (g_c+I1), s | | 4.4 | | 3.5 | 2.2 | 7.6 |
| Green Ext Time (p_c), s | | 5.7 | | 0.2 | 0.0 | 6.8 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 3.9 |
| HCM 6th LOS | A |

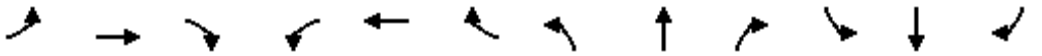


| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 270 | 0 | 624 | 0 | 171 | 16 | 0 | 472 | 44 |
| Future Volume (veh/h) | 0 | 0 | 0 | 270 | 0 | 624 | 0 | 171 | 16 | 0 | 472 | 44 |
| Initial Q (Qb), veh | | | | 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 |
| Parking Bus, Adj | | | | 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 | |
| Adj Sat Flow, veh/h/ln | | | | 1900 | 1900 | 1900 | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | | | | 333 | 0 | 770 | 0 | 211 | 0 | 0 | 583 | 0 |
| Peak Hour Factor | | | | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |
| Percent Heavy Veh, % | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | | | | 1315 | 0 | 1170 | 0 | 1738 | | 0 | 1738 | |
| Arrive On Green | | | | 0.36 | 0.00 | 0.36 | 0.00 | 0.48 | 0.00 | 0.00 | 0.48 | 0.00 |
| Sat Flow, veh/h | | | | 3619 | 0 | 3220 | 0 | 3705 | 1610 | 0 | 3800 | 0 |
| Grp Volume(v), veh/h | | | | 333 | 0 | 770 | 0 | 211 | 0 | 0 | 583 | 0 |
| Grp Sat Flow(s),veh/h/ln | | | | 1810 | 0 | 1610 | 0 | 1805 | 1610 | 0 | 1805 | 0 |
| Q Serve(g_s), s | | | | 5.5 | 0.0 | 17.0 | 0.0 | 2.7 | 0.0 | 0.0 | 8.5 | 0.0 |
| Cycle Q Clear(g_c), s | | | | 5.5 | 0.0 | 17.0 | 0.0 | 2.7 | 0.0 | 0.0 | 8.5 | 0.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 0.00 | | 1.00 | 0.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | | | | 1315 | 0 | 1170 | 0 | 1738 | | 0 | 1738 | |
| V/C Ratio(X) | | | | 0.25 | 0.00 | 0.66 | 0.00 | 0.12 | | 0.00 | 0.34 | |
| Avail Cap(c_a), veh/h | | | | 1516 | 0 | 1349 | 0 | 1738 | | 0 | 1738 | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| Uniform Delay (d), s/veh | | | | 19.0 | 0.0 | 22.6 | 0.0 | 12.1 | 0.0 | 0.0 | 13.6 | 0.0 |
| Incr Delay (d2), s/veh | | | | 0.5 | 0.0 | 2.9 | 0.0 | 0.1 | 0.0 | 0.0 | 0.5 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 2.2 | 0.0 | 6.3 | 0.0 | 1.0 | 0.0 | 0.0 | 3.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 19.4 | 0.0 | 25.5 | 0.0 | 12.3 | 0.0 | 0.0 | 14.1 | 0.0 |
| LnGrp LOS | | | | B | A | C | A | B | | A | B | |
| Approach Vol, veh/h | | | | | 1103 | | | 211 | A | | 583 | A |
| Approach Delay, s/veh | | | | | 23.7 | | | 12.3 | | | 14.1 | |
| Approach LOS | | | | | C | | | B | | | B | |

| Timer - Assigned Phs | 2 | | 6 | | 8 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 47.7 | | 47.7 | | 37.3 | | | | | | | |
| Change Period (Y+Rc), s | 6.8 | | 6.8 | | 6.4 | | | | | | | |
| Max Green Setting (Gmax), s | 36.2 | | 36.2 | | 35.6 | | | | | | | |
| Max Q Clear Time (g_c+I1), s | 4.7 | | 10.5 | | 19.0 | | | | | | | |
| Green Ext Time (p_c), s | 3.6 | | 10.1 | | 11.9 | | | | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 19.5 | |
| HCM 6th LOS | B | |

| Notes |
|---|
| User approved volume balancing among the lanes for turning movement. |
| Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay. |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 34 | 0 | 21 | 0 | 0 | 0 | 0 | 152 | 286 | 0 | 391 | 347 |
| Future Volume (veh/h) | 34 | 0 | 21 | 0 | 0 | 0 | 0 | 152 | 286 | 0 | 391 | 347 |
| Initial Q (Qb), veh | 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 |
| Parking Bus, Adj | 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 | |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1900 | | | | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 37 | 0 | 23 | | | | 0 | 165 | 0 | 0 | 425 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 147 | 0 | 131 | | | | 0 | 1345 | | 0 | 2555 | |
| Arrive On Green | 0.08 | 0.00 | 0.08 | | | | 0.00 | 0.71 | 0.00 | 0.00 | 0.71 | 0.00 |
| Sat Flow, veh/h | 1810 | 0 | 1610 | | | | 0 | 1900 | 3220 | 0 | 3705 | 1610 |
| Grp Volume(v), veh/h | 37 | 0 | 23 | | | | 0 | 165 | 0 | 0 | 425 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 0 | 1610 | | | | 0 | 1900 | 1610 | 0 | 1805 | 1610 |
| Q Serve(g_s), s | 1.2 | 0.0 | 0.9 | | | | 0.0 | 1.8 | 0.0 | 0.0 | 2.5 | 0.0 |
| Cycle Q Clear(g_c), s | 1.2 | 0.0 | 0.9 | | | | 0.0 | 1.8 | 0.0 | 0.0 | 2.5 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | | | | 0.00 | | 1.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 147 | 0 | 131 | | | | 0 | 1345 | | 0 | 2555 | |
| V/C Ratio(X) | 0.25 | 0.00 | 0.18 | | | | 0.00 | 0.12 | | 0.00 | 0.17 | |
| Avail Cap(c_a), veh/h | 646 | 0 | 575 | | | | 0 | 1345 | | 0 | 2555 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | | | | 0.00 | 1.00 | 0.00 | 0.00 | 0.96 | 0.00 |
| Uniform Delay (d), s/veh | 28.0 | 0.0 | 27.8 | | | | 0.0 | 3.0 | 0.0 | 0.0 | 3.1 | 0.0 |
| Incr Delay (d2), s/veh | 4.0 | 0.0 | 2.9 | | | | 0.0 | 0.2 | 0.0 | 0.0 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.7 | 0.0 | 0.4 | | | | 0.0 | 0.4 | 0.0 | 0.0 | 0.5 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 32.0 | 0.0 | 30.7 | | | | 0.0 | 3.2 | 0.0 | 0.0 | 3.3 | 0.0 |
| LnGrp LOS | C | A | C | | | | A | A | | A | A | |
| Approach Vol, veh/h | | 60 | | | | | | 165 | A | | 425 | A |
| Approach Delay, s/veh | | 31.5 | | | | | | 3.2 | | | 3.3 | |
| Approach LOS | | C | | | | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 52.9 | | 12.1 | | 52.9 | | | | | | |
| Change Period (Y+Rc), s | | 6.9 | | 6.8 | | 6.9 | | | | | | |
| Max Green Setting (Gmax), s | | 28.1 | | 23.2 | | 28.1 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 3.8 | | 3.2 | | 4.5 | | | | | | |
| Green Ext Time (p_c), s | | 2.3 | | 0.5 | | 6.9 | | | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 5.9 |
| HCM 6th LOS | A |

**Notes**

User approved volume balancing among the lanes for turning movement.

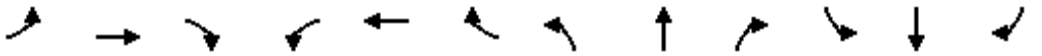
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 12 | 3 | 616 | 20 | 5 | 463 |
| Future Volume (veh/h) | 12 | 3 | 616 | 20 | 5 | 463 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 13 | 3 | 648 | 21 | 5 | 487 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 54 | 48 | 2831 | 92 | 19 | 3082 |
| Arrive On Green | 0.03 | 0.03 | 0.79 | 0.79 | 0.01 | 0.85 |
| Sat Flow, veh/h | 1810 | 1610 | 3664 | 116 | 1810 | 3705 |
| Grp Volume(v), veh/h | 13 | 3 | 328 | 341 | 5 | 487 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1610 | 1805 | 1879 | 1810 | 1805 |
| Q Serve(g_s), s | 0.6 | 0.1 | 3.7 | 3.7 | 0.2 | 1.8 |
| Cycle Q Clear(g_c), s | 0.6 | 0.1 | 3.7 | 3.7 | 0.2 | 1.8 |
| Prop In Lane | 1.00 | 1.00 | | 0.06 | 1.00 | |
| Lane Grp Cap(c), veh/h | 54 | 48 | 1432 | 1491 | 19 | 3082 |
| V/C Ratio(X) | 0.24 | 0.06 | 0.23 | 0.23 | 0.26 | 0.16 |
| Avail Cap(c_a), veh/h | 588 | 523 | 1432 | 1491 | 362 | 3082 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.89 | 0.89 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 37.9 | 37.7 | 2.1 | 2.1 | 39.3 | 1.0 |
| Incr Delay (d2), s/veh | 4.8 | 1.1 | 0.3 | 0.3 | 2.7 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 0.1 | 0.5 | 0.6 | 0.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 42.7 | 38.9 | 2.4 | 2.4 | 42.0 | 1.1 |
| LnGrp LOS | D | D | A | A | D | A |
| Approach Vol, veh/h | 16 | | 669 | | | 492 |
| Approach Delay, s/veh | 42.0 | | 2.4 | | | 1.5 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | | 2 | | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 73.6 | | 6.4 | 4.8 | 68.8 |
| Change Period (Y+Rc), s | | 5.3 | | 4.0 | 4.0 | 5.3 |
| Max Green Setting (Gmax), s | | 44.7 | | 26.0 | 16.0 | 24.7 |
| Max Q Clear Time (g_c+I1), s | | 3.8 | | 2.6 | 2.2 | 5.7 |
| Green Ext Time (p_c), s | | 5.2 | | 0.0 | 0.0 | 5.5 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 2.6 |
| HCM 6th LOS | A |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 227 | 0 | 516 | 0 | 147 | 15 | 0 | 471 | 37 |
| Future Volume (veh/h) | 0 | 0 | 0 | 227 | 0 | 516 | 0 | 147 | 15 | 0 | 471 | 37 |
| Initial Q (Qb), veh | | | | 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 |
| Parking Bus, Adj | | | | 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 | |
| Adj Sat Flow, veh/h/ln | | | | 1900 | 1900 | 1900 | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | | | | 239 | 0 | 543 | 0 | 155 | 0 | 0 | 496 | 0 |
| Peak Hour Factor | | | | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | | | | 1059 | 0 | 942 | 0 | 1993 | | 0 | 1993 | |
| Arrive On Green | | | | 0.29 | 0.00 | 0.29 | 0.00 | 0.55 | 0.00 | 0.00 | 0.55 | 0.00 |
| Sat Flow, veh/h | | | | 3619 | 0 | 3220 | 0 | 3705 | 1610 | 0 | 3800 | 0 |
| Grp Volume(v), veh/h | | | | 239 | 0 | 543 | 0 | 155 | 0 | 0 | 496 | 0 |
| Grp Sat Flow(s),veh/h/ln | | | | 1810 | 0 | 1610 | 0 | 1805 | 1610 | 0 | 1805 | 0 |
| Q Serve(g_s), s | | | | 4.3 | 0.0 | 12.2 | 0.0 | 1.7 | 0.0 | 0.0 | 6.1 | 0.0 |
| Cycle Q Clear(g_c), s | | | | 4.3 | 0.0 | 12.2 | 0.0 | 1.7 | 0.0 | 0.0 | 6.1 | 0.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 0.00 | | 1.00 | 0.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | | | | 1059 | 0 | 942 | 0 | 1993 | | 0 | 1993 | |
| V/C Ratio(X) | | | | 0.23 | 0.00 | 0.58 | 0.00 | 0.08 | | 0.00 | 0.25 | |
| Avail Cap(c_a), veh/h | | | | 1516 | 0 | 1349 | 0 | 1993 | | 0 | 1993 | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| Uniform Delay (d), s/veh | | | | 22.8 | 0.0 | 25.6 | 0.0 | 8.9 | 0.0 | 0.0 | 9.9 | 0.0 |
| Incr Delay (d2), s/veh | | | | 0.5 | 0.0 | 2.6 | 0.0 | 0.1 | 0.0 | 0.0 | 0.3 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 1.8 | 0.0 | 4.6 | 0.0 | 0.6 | 0.0 | 0.0 | 2.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 23.3 | 0.0 | 28.1 | 0.0 | 9.0 | 0.0 | 0.0 | 10.2 | 0.0 |
| LnGrp LOS | | | | C | A | C | A | A | | A | B | |
| Approach Vol, veh/h | | | | | 782 | | | 155 | A | | 496 | A |
| Approach Delay, s/veh | | | | | 26.7 | | | 9.0 | | | 10.2 | |
| Approach LOS | | | | | C | | | A | | | B | |

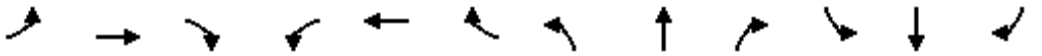
| Timer - Assigned Phs | 2 | | 6 | | 8 | | | |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 53.7 | | 53.7 | | 31.3 | | | |
| Change Period (Y+Rc), s | 6.8 | | 6.8 | | 6.4 | | | |
| Max Green Setting (Gmax), s | 36.2 | | 36.2 | | 35.6 | | | |
| Max Q Clear Time (g_c+I1), s | 3.7 | | 8.1 | | 14.2 | | | |
| Green Ext Time (p_c), s | 2.6 | | 8.9 | | 10.7 | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 19.0 | |
| HCM 6th LOS | B | |

**Notes**

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 32 | 0 | 11 | 0 | 0 | 0 | 0 | 131 | 358 | 0 | 361 | 336 |
| Future Volume (veh/h) | 32 | 0 | 11 | 0 | 0 | 0 | 0 | 131 | 358 | 0 | 361 | 336 |
| Initial Q (Qb), veh | 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 |
| Parking Bus, Adj | 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 | |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1900 | | | | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 34 | 0 | 12 | | | | 0 | 138 | 0 | 0 | 380 | 0 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | | | | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 126 | 0 | 112 | | | | 0 | 1368 | | 0 | 2598 | |
| Arrive On Green | 0.07 | 0.00 | 0.07 | | | | 0.00 | 0.72 | 0.00 | 0.00 | 0.72 | 0.00 |
| Sat Flow, veh/h | 1810 | 0 | 1610 | | | | 0 | 1900 | 3220 | 0 | 3705 | 1610 |
| Grp Volume(v), veh/h | 34 | 0 | 12 | | | | 0 | 138 | 0 | 0 | 380 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 0 | 1610 | | | | 0 | 1900 | 1610 | 0 | 1805 | 1610 |
| Q Serve(g_s), s | 1.2 | 0.0 | 0.5 | | | | 0.0 | 1.4 | 0.0 | 0.0 | 2.1 | 0.0 |
| Cycle Q Clear(g_c), s | 1.2 | 0.0 | 0.5 | | | | 0.0 | 1.4 | 0.0 | 0.0 | 2.1 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | | | | 0.00 | | 1.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 126 | 0 | 112 | | | | 0 | 1368 | | 0 | 2598 | |
| V/C Ratio(X) | 0.27 | 0.00 | 0.11 | | | | 0.00 | 0.10 | | 0.00 | 0.15 | |
| Avail Cap(c_a), veh/h | 646 | 0 | 575 | | | | 0 | 1368 | | 0 | 2598 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | | | | 0.00 | 1.00 | 0.00 | 0.00 | 0.98 | 0.00 |
| Uniform Delay (d), s/veh | 28.7 | 0.0 | 28.4 | | | | 0.0 | 2.8 | 0.0 | 0.0 | 2.9 | 0.0 |
| Incr Delay (d2), s/veh | 5.2 | 0.0 | 1.9 | | | | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.6 | 0.0 | 0.2 | | | | 0.0 | 0.3 | 0.0 | 0.0 | 0.4 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 33.9 | 0.0 | 30.3 | | | | 0.0 | 2.9 | 0.0 | 0.0 | 3.0 | 0.0 |
| LnGrp LOS | C | A | C | | | | A | A | | A | A | |
| Approach Vol, veh/h | | 46 | | | | | | 138 | A | | 380 | A |
| Approach Delay, s/veh | | 33.0 | | | | | | 2.9 | | | 3.0 | |
| Approach LOS | | C | | | | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 53.7 | | 11.3 | | 53.7 | | | | | | |
| Change Period (Y+Rc), s | | 6.9 | | 6.8 | | 6.9 | | | | | | |
| Max Green Setting (Gmax), s | | 28.1 | | 23.2 | | 28.1 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 3.4 | | 3.2 | | 4.1 | | | | | | |
| Green Ext Time (p_c), s | | 1.9 | | 0.3 | | 6.2 | | | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 5.4 |
| HCM 6th LOS | | A |

**Notes**

User approved volume balancing among the lanes for turning movement.

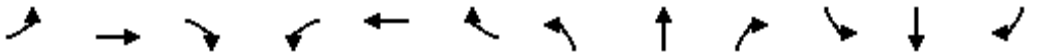
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 34 | 9 | 800 | 14 | 4 | 509 |
| Future Volume (veh/h) | 34 | 9 | 800 | 14 | 4 | 509 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 36 | 9 | 842 | 15 | 4 | 536 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 114 | 102 | 2765 | 49 | 15 | 2962 |
| Arrive On Green | 0.06 | 0.06 | 0.76 | 0.76 | 0.01 | 0.82 |
| Sat Flow, veh/h | 1810 | 1610 | 3724 | 65 | 1810 | 3705 |
| Grp Volume(v), veh/h | 36 | 9 | 419 | 438 | 4 | 536 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1610 | 1805 | 1888 | 1810 | 1805 |
| Q Serve(g_s), s | 1.5 | 0.4 | 5.8 | 5.8 | 0.2 | 2.5 |
| Cycle Q Clear(g_c), s | 1.5 | 0.4 | 5.8 | 5.8 | 0.2 | 2.5 |
| Prop In Lane | 1.00 | 1.00 | | 0.03 | 1.00 | |
| Lane Grp Cap(c), veh/h | 114 | 102 | 1375 | 1439 | 15 | 2962 |
| V/C Ratio(X) | 0.31 | 0.09 | 0.30 | 0.30 | 0.26 | 0.18 |
| Avail Cap(c_a), veh/h | 588 | 523 | 1375 | 1439 | 362 | 2962 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.89 | 0.89 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 35.8 | 35.3 | 2.9 | 2.9 | 39.4 | 1.5 |
| Incr Delay (d2), s/veh | 3.3 | 0.8 | 0.5 | 0.5 | 3.3 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.8 | 0.4 | 1.1 | 1.2 | 0.1 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 39.1 | 36.1 | 3.5 | 3.4 | 42.7 | 1.6 |
| LnGrp LOS | D | D | A | A | D | A |
| Approach Vol, veh/h | 45 | | 857 | | | 540 |
| Approach Delay, s/veh | 38.5 | | 3.4 | | | 2.0 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | | 2 | | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 70.9 | | 9.1 | 4.7 | 66.3 |
| Change Period (Y+Rc), s | | 5.3 | | 4.0 | 4.0 | 5.3 |
| Max Green Setting (Gmax), s | | 44.7 | | 26.0 | 16.0 | 24.7 |
| Max Q Clear Time (g_c+I1), s | | 4.5 | | 3.5 | 2.2 | 7.8 |
| Green Ext Time (p_c), s | | 5.8 | | 0.2 | 0.0 | 6.8 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 4.0 |
| HCM 6th LOS | A |

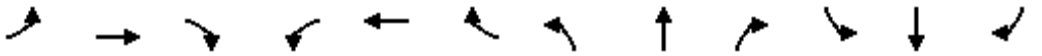


| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 372 | 0 | 670 | 0 | 220 | 18 | 0 | 509 | 47 |
| Future Volume (veh/h) | 0 | 0 | 0 | 372 | 0 | 670 | 0 | 220 | 18 | 0 | 509 | 47 |
| Initial Q (Qb), veh | | | | 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 |
| Parking Bus, Adj | | | | 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 | |
| Adj Sat Flow, veh/h/ln | | | | 1900 | 1900 | 1900 | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | | | | 392 | 0 | 705 | 0 | 232 | 0 | 0 | 536 | 0 |
| Peak Hour Factor | | | | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | | | | 1280 | 0 | 1139 | 0 | 1773 | | 0 | 1773 | |
| Arrive On Green | | | | 0.35 | 0.00 | 0.35 | 0.00 | 0.49 | 0.00 | 0.00 | 0.49 | 0.00 |
| Sat Flow, veh/h | | | | 3619 | 0 | 3220 | 0 | 3705 | 1610 | 0 | 3800 | 0 |
| Grp Volume(v), veh/h | | | | 392 | 0 | 705 | 0 | 232 | 0 | 0 | 536 | 0 |
| Grp Sat Flow(s),veh/h/ln | | | | 1810 | 0 | 1610 | 0 | 1805 | 1610 | 0 | 1805 | 0 |
| Q Serve(g_s), s | | | | 6.7 | 0.0 | 15.4 | 0.0 | 3.0 | 0.0 | 0.0 | 7.5 | 0.0 |
| Cycle Q Clear(g_c), s | | | | 6.7 | 0.0 | 15.4 | 0.0 | 3.0 | 0.0 | 0.0 | 7.5 | 0.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 0.00 | | 1.00 | 0.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | | | | 1280 | 0 | 1139 | 0 | 1773 | | 0 | 1773 | |
| V/C Ratio(X) | | | | 0.31 | 0.00 | 0.62 | 0.00 | 0.13 | | 0.00 | 0.30 | |
| Avail Cap(c_a), veh/h | | | | 1516 | 0 | 1349 | 0 | 1773 | | 0 | 1773 | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| Uniform Delay (d), s/veh | | | | 19.9 | 0.0 | 22.7 | 0.0 | 11.8 | 0.0 | 0.0 | 12.9 | 0.0 |
| Incr Delay (d2), s/veh | | | | 0.6 | 0.0 | 2.5 | 0.0 | 0.2 | 0.0 | 0.0 | 0.4 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 2.7 | 0.0 | 5.7 | 0.0 | 1.1 | 0.0 | 0.0 | 2.8 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 20.5 | 0.0 | 25.3 | 0.0 | 11.9 | 0.0 | 0.0 | 13.4 | 0.0 |
| LnGrp LOS | | | | C | A | C | A | B | | A | B | |
| Approach Vol, veh/h | | | | | 1097 | | | 232 | A | | 536 | A |
| Approach Delay, s/veh | | | | | 23.6 | | | 11.9 | | | 13.4 | |
| Approach LOS | | | | | C | | | B | | | B | |

| Timer - Assigned Phs | 2 | | 6 | | 8 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 48.5 | | 48.5 | | 36.5 | | | | | | | |
| Change Period (Y+Rc), s | 6.8 | | 6.8 | | 6.4 | | | | | | | |
| Max Green Setting (Gmax), s | 36.2 | | 36.2 | | 35.6 | | | | | | | |
| Max Q Clear Time (g_c+I1), s | 5.0 | | 9.5 | | 17.4 | | | | | | | |
| Green Ext Time (p_c), s | 4.0 | | 9.4 | | 12.7 | | | | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | 19.2 | |
| HCM 6th LOS | B | |

| Notes |
|---|
| User approved volume balancing among the lanes for turning movement. |
| Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay. |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 36 | 0 | 22 | 0 | 0 | 0 | 0 | 201 | 296 | 0 | 517 | 364 |
| Future Volume (veh/h) | 36 | 0 | 22 | 0 | 0 | 0 | 0 | 201 | 296 | 0 | 517 | 364 |
| Initial Q (Qb), veh | 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 |
| Parking Bus, Adj | 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 | |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1900 | | | | 0 | 1900 | 1900 | 0 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 38 | 0 | 23 | | | | 0 | 212 | 0 | 0 | 544 | 0 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | | | | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 149 | 0 | 132 | | | | 0 | 1343 | | 0 | 2553 | |
| Arrive On Green | 0.08 | 0.00 | 0.08 | | | | 0.00 | 0.71 | 0.00 | 0.00 | 0.71 | 0.00 |
| Sat Flow, veh/h | 1810 | 0 | 1610 | | | | 0 | 1900 | 3220 | 0 | 3705 | 1610 |
| Grp Volume(v), veh/h | 38 | 0 | 23 | | | | 0 | 212 | 0 | 0 | 544 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 0 | 1610 | | | | 0 | 1900 | 1610 | 0 | 1805 | 1610 |
| Q Serve(g_s), s | 1.3 | 0.0 | 0.9 | | | | 0.0 | 2.4 | 0.0 | 0.0 | 3.4 | 0.0 |
| Cycle Q Clear(g_c), s | 1.3 | 0.0 | 0.9 | | | | 0.0 | 2.4 | 0.0 | 0.0 | 3.4 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | | | | 0.00 | | 1.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 149 | 0 | 132 | | | | 0 | 1343 | | 0 | 2553 | |
| V/C Ratio(X) | 0.26 | 0.00 | 0.17 | | | | 0.00 | 0.16 | | 0.00 | 0.21 | |
| Avail Cap(c_a), veh/h | 646 | 0 | 575 | | | | 0 | 1343 | | 0 | 2553 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | | | | 0.00 | 1.00 | 0.00 | 0.00 | 0.96 | 0.00 |
| Uniform Delay (d), s/veh | 28.0 | 0.0 | 27.8 | | | | 0.0 | 3.1 | 0.0 | 0.0 | 3.3 | 0.0 |
| Incr Delay (d2), s/veh | 4.1 | 0.0 | 2.8 | | | | 0.0 | 0.3 | 0.0 | 0.0 | 0.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.7 | 0.0 | 0.4 | | | | 0.0 | 0.5 | 0.0 | 0.0 | 0.6 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 32.1 | 0.0 | 30.6 | | | | 0.0 | 3.4 | 0.0 | 0.0 | 3.5 | 0.0 |
| LnGrp LOS | C | A | C | | | | A | A | | A | A | |
| Approach Vol, veh/h | | 61 | | | | | | 212 | A | | 544 | A |
| Approach Delay, s/veh | | 31.5 | | | | | | 3.4 | | | 3.5 | |
| Approach LOS | | C | | | | | | A | | | A | |

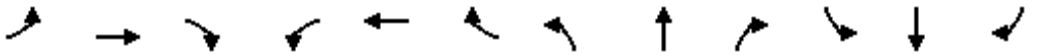
| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 52.9 | | 12.1 | | 52.9 | | | | | | |
| Change Period (Y+Rc), s | | 6.9 | | 6.8 | | 6.9 | | | | | | |
| Max Green Setting (Gmax), s | | 28.1 | | 23.2 | | 28.1 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 4.4 | | 3.3 | | 5.4 | | | | | | |
| Green Ext Time (p_c), s | | 3.1 | | 0.5 | | 8.8 | | | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 5.5 |
| HCM 6th LOS | A |

**Notes**

User approved volume balancing among the lanes for turning movement.

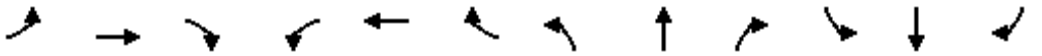
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 24 | 127 | 94 | 52 | 78 | 11 | 50 | 268 | 70 | 39 | 449 | 28 |
| Future Volume (veh/h) | 24 | 127 | 94 | 52 | 78 | 11 | 50 | 268 | 70 | 39 | 449 | 28 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 29 | 153 | 113 | 63 | 94 | 13 | 60 | 323 | 84 | 47 | 541 | 34 |
| Peak Hour Factor | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 54 | 235 | 163 | 85 | 252 | 214 | 83 | 1087 | 921 | 73 | 2046 | 912 |
| Arrive On Green | 0.03 | 0.12 | 0.12 | 0.05 | 0.13 | 0.13 | 0.05 | 0.57 | 0.57 | 0.04 | 0.57 | 0.57 |
| Sat Flow, veh/h | 1810 | 2039 | 1412 | 1810 | 1900 | 1610 | 1810 | 1900 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 29 | 134 | 132 | 63 | 94 | 13 | 60 | 323 | 84 | 47 | 541 | 34 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1805 | 1646 | 1810 | 1900 | 1610 | 1810 | 1900 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 1.3 | 5.7 | 6.2 | 2.7 | 3.6 | 0.6 | 2.6 | 7.0 | 1.9 | 2.0 | 6.1 | 0.7 |
| Cycle Q Clear(g_c), s | 1.3 | 5.7 | 6.2 | 2.7 | 3.6 | 0.6 | 2.6 | 7.0 | 1.9 | 2.0 | 6.1 | 0.7 |
| Prop In Lane | 1.00 | | 0.86 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 54 | 208 | 190 | 85 | 252 | 214 | 83 | 1087 | 921 | 73 | 2046 | 912 |
| V/C Ratio(X) | 0.54 | 0.65 | 0.69 | 0.74 | 0.37 | 0.06 | 0.72 | 0.30 | 0.09 | 0.64 | 0.26 | 0.04 |
| Avail Cap(c_a), veh/h | 147 | 417 | 381 | 170 | 463 | 392 | 215 | 1087 | 921 | 215 | 2046 | 912 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 38.3 | 33.8 | 34.0 | 37.6 | 31.7 | 30.3 | 37.7 | 8.8 | 7.7 | 37.8 | 8.8 | 7.7 |
| Incr Delay (d2), s/veh | 8.2 | 3.3 | 4.5 | 11.8 | 0.9 | 0.1 | 11.1 | 0.7 | 0.2 | 9.0 | 0.3 | 0.1 |
| 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 | 0.7 | 2.6 | 2.6 | 1.5 | 1.7 | 0.2 | 1.4 | 2.8 | 0.6 | 1.1 | 2.2 | 0.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 46.4 | 37.2 | 38.6 | 49.4 | 32.6 | 30.5 | 48.7 | 9.5 | 7.9 | 46.8 | 9.2 | 7.7 |
| LnGrp LOS | D | D | D | D | C | C | D | A | A | D | A | A |
| Approach Vol, veh/h | | 295 | | | 170 | | | 467 | | | 622 | |
| Approach Delay, s/veh | | 38.7 | | | 38.6 | | | 14.3 | | | 11.9 | |
| Approach LOS | | D | | | D | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 7.7 | 50.3 | 8.3 | 13.7 | 8.2 | 49.8 | 6.9 | 15.1 |
| 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 | 9.5 | 26.5 | 7.5 | 18.5 | 9.5 | 26.5 | 6.5 | 19.5 |
| Max Q Clear Time (g_c+I1), s | 4.0 | 9.0 | 4.7 | 8.2 | 4.6 | 8.1 | 3.3 | 5.6 |
| Green Ext Time (p_c), s | 0.0 | 2.0 | 0.0 | 1.1 | 0.0 | 3.6 | 0.0 | 0.4 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 20.6 |
| HCM 6th LOS | C |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 24 | 174 | 72 | 52 | 126 | 53 | 99 | 596 | 80 | 25 | 293 | 26 |
| Future Volume (veh/h) | 24 | 174 | 72 | 52 | 126 | 53 | 99 | 596 | 80 | 25 | 293 | 26 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 27 | 198 | 82 | 59 | 143 | 60 | 112 | 677 | 91 | 28 | 333 | 30 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 51 | 294 | 118 | 83 | 255 | 216 | 145 | 1109 | 940 | 52 | 1922 | 857 |
| Arrive On Green | 0.03 | 0.12 | 0.12 | 0.05 | 0.13 | 0.13 | 0.08 | 0.58 | 0.58 | 0.03 | 0.53 | 0.53 |
| Sat Flow, veh/h | 1810 | 2517 | 1006 | 1810 | 1900 | 1610 | 1810 | 1900 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 27 | 140 | 140 | 59 | 143 | 60 | 112 | 677 | 91 | 28 | 333 | 30 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1805 | 1719 | 1810 | 1900 | 1610 | 1810 | 1900 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 1.2 | 5.9 | 6.3 | 2.6 | 5.6 | 2.7 | 4.9 | 18.4 | 2.0 | 1.2 | 3.8 | 0.7 |
| Cycle Q Clear(g_c), s | 1.2 | 5.9 | 6.3 | 2.6 | 5.6 | 2.7 | 4.9 | 18.4 | 2.0 | 1.2 | 3.8 | 0.7 |
| Prop In Lane | 1.00 | | 0.59 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 51 | 211 | 201 | 83 | 255 | 216 | 145 | 1109 | 940 | 52 | 1922 | 857 |
| V/C Ratio(X) | 0.53 | 0.66 | 0.70 | 0.71 | 0.56 | 0.28 | 0.77 | 0.61 | 0.10 | 0.53 | 0.17 | 0.04 |
| Avail Cap(c_a), veh/h | 113 | 406 | 387 | 113 | 428 | 362 | 342 | 1109 | 940 | 113 | 1922 | 857 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 38.3 | 33.8 | 34.0 | 37.7 | 32.4 | 31.1 | 36.1 | 10.8 | 7.4 | 38.3 | 9.6 | 8.9 |
| Incr Delay (d2), s/veh | 8.2 | 3.6 | 4.3 | 12.4 | 1.9 | 0.7 | 8.3 | 2.5 | 0.2 | 8.2 | 0.2 | 0.1 |
| 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 | 0.6 | 2.7 | 2.8 | 1.4 | 2.7 | 1.1 | 2.4 | 7.5 | 0.7 | 0.7 | 1.4 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 46.6 | 37.4 | 38.3 | 50.1 | 34.4 | 31.8 | 44.3 | 13.3 | 7.6 | 46.5 | 9.8 | 9.0 |
| LnGrp LOS | D | D | D | D | C | C | D | B | A | D | A | A |
| Approach Vol, veh/h | | 307 | | | 262 | | | 880 | | | 391 | |
| Approach Delay, s/veh | | 38.6 | | | 37.3 | | | 16.6 | | | 12.4 | |
| Approach LOS | | D | | | D | | | B | | | B | |

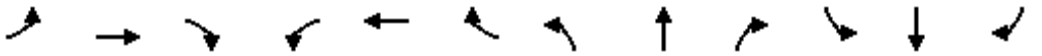
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 6.8 | 51.2 | 8.2 | 13.8 | 10.9 | 47.1 | 6.8 | 15.2 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 5.0 | 34.0 | 5.0 | 18.0 | 15.1 | 23.9 | 5.0 | 18.0 |
| Max Q Clear Time (g_c+I1), s | 3.2 | 20.4 | 4.6 | 8.3 | 6.9 | 5.8 | 3.2 | 7.6 |
| Green Ext Time (p_c), s | 0.0 | 4.2 | 0.0 | 1.1 | 0.1 | 2.1 | 0.0 | 0.6 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 22.3 |
| HCM 6th LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 25 | 145 | 98 | 54 | 99 | 12 | 55 | 281 | 74 | 42 | 474 | 31 |
| Future Volume (veh/h) | 25 | 145 | 98 | 54 | 99 | 12 | 55 | 281 | 74 | 42 | 474 | 31 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 30 | 175 | 118 | 65 | 119 | 14 | 66 | 339 | 89 | 51 | 571 | 37 |
| Peak Hour Factor | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 55 | 261 | 167 | 86 | 267 | 227 | 87 | 1067 | 904 | 77 | 2006 | 895 |
| Arrive On Green | 0.03 | 0.12 | 0.12 | 0.05 | 0.14 | 0.14 | 0.05 | 0.56 | 0.56 | 0.04 | 0.56 | 0.56 |
| Sat Flow, veh/h | 1810 | 2113 | 1349 | 1810 | 1900 | 1610 | 1810 | 1900 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 30 | 148 | 145 | 65 | 119 | 14 | 66 | 339 | 89 | 51 | 571 | 37 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1805 | 1657 | 1810 | 1900 | 1610 | 1810 | 1900 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 1.3 | 6.3 | 6.7 | 2.8 | 4.6 | 0.6 | 2.9 | 7.6 | 2.1 | 2.2 | 6.7 | 0.8 |
| Cycle Q Clear(g_c), s | 1.3 | 6.3 | 6.7 | 2.8 | 4.6 | 0.6 | 2.9 | 7.6 | 2.1 | 2.2 | 6.7 | 0.8 |
| Prop In Lane | 1.00 | | 0.81 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 55 | 223 | 205 | 86 | 267 | 227 | 87 | 1067 | 904 | 77 | 2006 | 895 |
| V/C Ratio(X) | 0.55 | 0.66 | 0.71 | 0.75 | 0.44 | 0.06 | 0.76 | 0.32 | 0.10 | 0.67 | 0.28 | 0.04 |
| Avail Cap(c_a), veh/h | 147 | 417 | 383 | 170 | 463 | 392 | 215 | 1067 | 904 | 215 | 2006 | 895 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 38.2 | 33.5 | 33.7 | 37.6 | 31.5 | 29.8 | 37.6 | 9.4 | 8.1 | 37.7 | 9.4 | 8.1 |
| Incr Delay (d2), s/veh | 8.1 | 3.4 | 4.5 | 12.3 | 1.2 | 0.1 | 12.6 | 0.8 | 0.2 | 9.5 | 0.4 | 0.1 |
| 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 | 0.7 | 2.9 | 2.9 | 1.5 | 2.1 | 0.2 | 1.6 | 3.1 | 0.7 | 1.2 | 2.5 | 0.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 46.4 | 36.9 | 38.2 | 49.9 | 32.7 | 29.9 | 50.2 | 10.1 | 8.4 | 47.2 | 9.7 | 8.2 |
| LnGrp LOS | D | D | D | D | C | C | D | B | A | D | A | A |
| Approach Vol, veh/h | | 323 | | | 198 | | | 494 | | | 659 | |
| Approach Delay, s/veh | | 38.3 | | | 38.1 | | | 15.2 | | | 12.5 | |
| Approach LOS | | D | | | D | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 7.9 | 49.4 | 8.3 | 14.4 | 8.3 | 49.0 | 6.9 | 15.8 |
| 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 | 9.5 | 26.5 | 7.5 | 18.5 | 9.5 | 26.5 | 6.5 | 19.5 |
| Max Q Clear Time (g_c+I1), s | 4.2 | 9.6 | 4.8 | 8.7 | 4.9 | 8.7 | 3.3 | 6.6 |
| Green Ext Time (p_c), s | 0.0 | 2.1 | 0.0 | 1.2 | 0.0 | 3.8 | 0.0 | 0.5 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 21.3 |
| HCM 6th LOS | C |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 25 | 197 | 76 | 55 | 147 | 55 | 107 | 630 | 85 | 26 | 310 | 29 |
| Future Volume (veh/h) | 25 | 197 | 76 | 55 | 147 | 55 | 107 | 630 | 85 | 26 | 310 | 29 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 28 | 224 | 86 | 62 | 167 | 62 | 122 | 716 | 97 | 30 | 352 | 33 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 52 | 324 | 121 | 85 | 273 | 231 | 157 | 1087 | 921 | 55 | 1862 | 830 |
| Arrive On Green | 0.03 | 0.13 | 0.13 | 0.05 | 0.14 | 0.14 | 0.09 | 0.57 | 0.57 | 0.03 | 0.52 | 0.52 |
| Sat Flow, veh/h | 1810 | 2574 | 959 | 1810 | 1900 | 1610 | 1810 | 1900 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 28 | 155 | 155 | 62 | 167 | 62 | 122 | 716 | 97 | 30 | 352 | 33 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1805 | 1727 | 1810 | 1900 | 1610 | 1810 | 1900 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 1.2 | 6.6 | 6.9 | 2.7 | 6.6 | 2.7 | 5.3 | 20.7 | 2.2 | 1.3 | 4.2 | 0.8 |
| Cycle Q Clear(g_c), s | 1.2 | 6.6 | 6.9 | 2.7 | 6.6 | 2.7 | 5.3 | 20.7 | 2.2 | 1.3 | 4.2 | 0.8 |
| Prop In Lane | 1.00 | | 0.56 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 52 | 227 | 217 | 85 | 273 | 231 | 157 | 1087 | 921 | 55 | 1862 | 830 |
| V/C Ratio(X) | 0.53 | 0.68 | 0.71 | 0.73 | 0.61 | 0.27 | 0.78 | 0.66 | 0.11 | 0.55 | 0.19 | 0.04 |
| Avail Cap(c_a), veh/h | 113 | 406 | 389 | 113 | 428 | 362 | 342 | 1087 | 921 | 113 | 1862 | 830 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | 0.98 | 0.98 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 38.3 | 33.4 | 33.6 | 37.6 | 32.2 | 30.5 | 35.8 | 11.8 | 7.8 | 38.2 | 10.4 | 9.6 |
| Incr Delay (d2), s/veh | 8.2 | 3.6 | 4.3 | 15.1 | 2.2 | 0.6 | 7.8 | 3.1 | 0.2 | 8.1 | 0.2 | 0.1 |
| 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 | 0.7 | 3.0 | 3.1 | 1.5 | 3.1 | 1.1 | 2.6 | 8.5 | 0.7 | 0.7 | 1.6 | 0.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 46.5 | 37.1 | 37.9 | 52.8 | 34.4 | 31.1 | 43.6 | 14.8 | 8.0 | 46.4 | 10.6 | 9.7 |
| LnGrp LOS | D | D | D | D | C | C | D | B | A | D | B | A |
| Approach Vol, veh/h | | 338 | | | 291 | | | 935 | | | 415 | |
| Approach Delay, s/veh | | 38.2 | | | 37.6 | | | 17.9 | | | 13.1 | |
| Approach LOS | | D | | | D | | | B | | | B | |

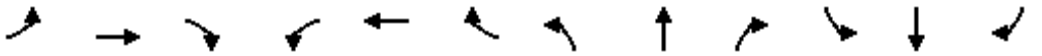
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 6.9 | 50.3 | 8.2 | 14.6 | 11.4 | 45.8 | 6.8 | 16.0 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 5.0 | 34.0 | 5.0 | 18.0 | 15.1 | 23.9 | 5.0 | 18.0 |
| Max Q Clear Time (g_c+I1), s | 3.3 | 22.7 | 4.7 | 8.9 | 7.3 | 6.2 | 3.2 | 8.6 |
| Green Ext Time (p_c), s | 0.0 | 4.1 | 0.0 | 1.2 | 0.2 | 2.2 | 0.0 | 0.7 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 23.3 |
| HCM 6th LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 31 | 239 | 120 | 56 | 104 | 13 | 74 | 295 | 96 | 73 | 496 | 32 |
| Future Volume (veh/h) | 31 | 239 | 120 | 56 | 104 | 13 | 74 | 295 | 96 | 73 | 496 | 32 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 33 | 252 | 126 | 59 | 109 | 14 | 78 | 311 | 101 | 77 | 522 | 34 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 59 | 349 | 169 | 83 | 306 | 259 | 101 | 1000 | 847 | 100 | 1897 | 846 |
| Arrive On Green | 0.03 | 0.15 | 0.15 | 0.05 | 0.16 | 0.16 | 0.06 | 0.53 | 0.53 | 0.06 | 0.53 | 0.53 |
| Sat Flow, veh/h | 1810 | 2357 | 1142 | 1810 | 1900 | 1610 | 1810 | 1900 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 33 | 191 | 187 | 59 | 109 | 14 | 78 | 311 | 101 | 77 | 522 | 34 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1805 | 1694 | 1810 | 1900 | 1610 | 1810 | 1900 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 1.4 | 8.1 | 8.5 | 2.6 | 4.1 | 0.6 | 3.4 | 7.4 | 2.5 | 3.4 | 6.4 | 0.8 |
| Cycle Q Clear(g_c), s | 1.4 | 8.1 | 8.5 | 2.6 | 4.1 | 0.6 | 3.4 | 7.4 | 2.5 | 3.4 | 6.4 | 0.8 |
| Prop In Lane | 1.00 | | 0.67 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 59 | 267 | 251 | 83 | 306 | 259 | 101 | 1000 | 847 | 100 | 1897 | 846 |
| V/C Ratio(X) | 0.56 | 0.72 | 0.75 | 0.71 | 0.36 | 0.05 | 0.77 | 0.31 | 0.12 | 0.77 | 0.28 | 0.04 |
| Avail Cap(c_a), veh/h | 147 | 417 | 392 | 170 | 463 | 392 | 215 | 1000 | 847 | 215 | 1897 | 846 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 38.1 | 32.5 | 32.6 | 37.7 | 29.9 | 28.4 | 37.2 | 10.7 | 9.6 | 37.3 | 10.5 | 9.2 |
| Incr Delay (d2), s/veh | 8.1 | 3.6 | 4.4 | 10.8 | 0.7 | 0.1 | 11.5 | 0.8 | 0.3 | 11.6 | 0.4 | 0.1 |
| 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 | 0.8 | 3.7 | 3.7 | 1.4 | 1.9 | 0.2 | 1.8 | 3.1 | 0.9 | 1.8 | 2.4 | 0.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 46.3 | 36.1 | 37.0 | 48.5 | 30.6 | 28.5 | 48.7 | 11.6 | 9.9 | 48.9 | 10.9 | 9.3 |
| LnGrp LOS | D | D | D | D | C | C | D | B | A | D | B | A |
| Approach Vol, veh/h | | 411 | | | 182 | | | 490 | | | 633 | |
| Approach Delay, s/veh | | 37.3 | | | 36.2 | | | 17.1 | | | 15.4 | |
| Approach LOS | | D | | | D | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.9 | 46.6 | 8.2 | 16.3 | 9.0 | 46.5 | 7.1 | 17.4 |
| 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 | 9.5 | 26.5 | 7.5 | 18.5 | 9.5 | 26.5 | 6.5 | 19.5 |
| Max Q Clear Time (g_c+I1), s | 5.4 | 9.4 | 4.6 | 10.5 | 5.4 | 8.4 | 3.4 | 6.1 |
| Green Ext Time (p_c), s | 0.0 | 2.0 | 0.0 | 1.4 | 0.0 | 3.4 | 0.0 | 0.4 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 23.4 |
| HCM 6th LOS | C |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 37 | 220 | 79 | 57 | 182 | 67 | 165 | 661 | 95 | 34 | 324 | 50 |
| Future Volume (veh/h) | 37 | 220 | 79 | 57 | 182 | 67 | 165 | 661 | 95 | 34 | 324 | 50 |
| 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 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adj Flow Rate, veh/h | 39 | 232 | 83 | 60 | 192 | 71 | 174 | 696 | 100 | 36 | 341 | 53 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 66 | 333 | 116 | 83 | 260 | 220 | 215 | 1078 | 914 | 62 | 1744 | 778 |
| Arrive On Green | 0.04 | 0.13 | 0.13 | 0.05 | 0.14 | 0.14 | 0.12 | 0.57 | 0.57 | 0.03 | 0.48 | 0.48 |
| Sat Flow, veh/h | 1810 | 2626 | 914 | 1810 | 1900 | 1610 | 1810 | 1900 | 1610 | 1810 | 3610 | 1610 |
| Grp Volume(v), veh/h | 39 | 157 | 158 | 60 | 192 | 71 | 174 | 696 | 100 | 36 | 341 | 53 |
| Grp Sat Flow(s),veh/h/ln | 1810 | 1805 | 1735 | 1810 | 1900 | 1610 | 1810 | 1900 | 1610 | 1810 | 1805 | 1610 |
| Q Serve(g_s), s | 1.7 | 6.7 | 7.0 | 2.6 | 7.8 | 3.2 | 7.5 | 20.0 | 2.3 | 1.6 | 4.3 | 1.4 |
| Cycle Q Clear(g_c), s | 1.7 | 6.7 | 7.0 | 2.6 | 7.8 | 3.2 | 7.5 | 20.0 | 2.3 | 1.6 | 4.3 | 1.4 |
| Prop In Lane | 1.00 | | 0.53 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 66 | 229 | 220 | 83 | 260 | 220 | 215 | 1078 | 914 | 62 | 1744 | 778 |
| V/C Ratio(X) | 0.59 | 0.69 | 0.72 | 0.72 | 0.74 | 0.32 | 0.81 | 0.65 | 0.11 | 0.58 | 0.20 | 0.07 |
| Avail Cap(c_a), veh/h | 113 | 406 | 390 | 113 | 428 | 362 | 342 | 1078 | 914 | 113 | 1744 | 778 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | 0.98 | 0.98 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 38.0 | 33.4 | 33.5 | 37.7 | 33.2 | 31.2 | 34.4 | 11.8 | 8.0 | 38.1 | 11.8 | 11.0 |
| Incr Delay (d2), s/veh | 8.3 | 3.6 | 4.3 | 13.3 | 4.1 | 0.8 | 7.4 | 2.9 | 0.2 | 8.2 | 0.3 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.9 | 3.1 | 3.1 | 1.4 | 3.8 | 1.3 | 3.7 | 8.2 | 0.8 | 0.8 | 1.7 | 0.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 46.3 | 37.0 | 37.8 | 50.9 | 37.3 | 32.0 | 41.8 | 14.7 | 8.2 | 46.3 | 12.0 | 11.2 |
| LnGrp LOS | D | D | D | D | D | C | D | B | A | D | B | B |
| Approach Vol, veh/h | | 354 | | | 323 | | | 970 | | | 430 | |
| Approach Delay, s/veh | | 38.4 | | | 38.6 | | | 18.9 | | | 14.8 | |
| Approach LOS | | D | | | D | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 7.3 | 49.9 | 8.2 | 14.7 | 14.0 | 43.2 | 7.4 | 15.4 |
| 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 | 34.0 | 5.0 | 18.0 | 15.1 | 23.9 | 5.0 | 18.0 |
| Max Q Clear Time (g_c+I1), s | 3.6 | 22.0 | 4.6 | 9.0 | 9.5 | 6.3 | 3.7 | 9.8 |
| Green Ext Time (p_c), s | 0.0 | 4.1 | 0.0 | 1.2 | 0.2 | 2.2 | 0.0 | 0.8 |

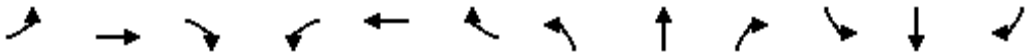
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 24.4 |
| HCM 6th LOS | C |

# APPENDIX E:

# QUEUING ANALYSIS WORKSHEETS

## Intersection: 1: Marks Avenue & Belmont Avenue

| Movement | EB | EB | EB | WB | WB | WB | NB | NB | NB | SB | SB | SB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | R | L | T | R | L | T | TR |
| Maximum Queue (ft) | 31 | 56 | 53 | 48 | 48 | 44 | 55 | 96 | 55 | 27 | 93 | 80 |
| Average Queue (ft) | 14 | 36 | 32 | 20 | 30 | 10 | 28 | 59 | 38 | 19 | 54 | 29 |
| 95th Queue (ft) | 39 | 52 | 39 | 39 | 48 | 30 | 54 | 88 | 57 | 38 | 82 | 55 |
| Link Distance (ft) | | 721 | | 2483 | 2483 | | | 2528 | 2528 | | 647 | |
| Upstream Blk Time (%) | | | | | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | | | | | |
| Storage Bay Dist (ft) | 105 | | 105 | | | 125 | 230 | | | 135 | | 50 |
| Storage Blk Time (%) | | | | | | | | | | | 6 | 1 |
| Queuing Penalty (veh) | | | | | | | | | | | 17 | 3 |



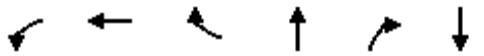
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 15 | 9 | 52 | 22 | 5 | 12 | 77 | 431 | 86 | 11 | 423 | 42 |
| v/c Ratio | 0.12 | 0.05 | 0.24 | 0.17 | 0.03 | 0.06 | 0.47 | 0.15 | 0.06 | 0.08 | 0.16 | 0.04 |
| Control Delay | 45.2 | 43.3 | 7.7 | 46.6 | 42.8 | 0.5 | 54.4 | 3.5 | 1.3 | 46.6 | 6.6 | 0.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 45.2 | 43.3 | 7.7 | 46.6 | 42.8 | 0.5 | 54.4 | 3.5 | 1.3 | 46.6 | 6.6 | 0.4 |
| Queue Length 50th (ft) | 9 | 6 | 0 | 14 | 3 | 0 | 50 | 25 | 0 | 7 | 49 | 0 |
| Queue Length 95th (ft) | 26 | 19 | 14 | 34 | 14 | 0 | 85 | 64 | 12 | 23 | 73 | 1 |
| Internal Link Dist (ft) | | 651 | | | 2488 | | | 502 | | | 2547 | |
| Turn Bay Length (ft) | 55 | | 55 | 215 | | 210 | 240 | | 215 | 245 | | 215 |
| Base Capacity (vph) | 601 | 798 | 721 | 600 | 798 | 721 | 259 | 2943 | 1332 | 259 | 2622 | 1195 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.02 | 0.01 | 0.07 | 0.04 | 0.01 | 0.02 | 0.30 | 0.15 | 0.06 | 0.04 | 0.16 | 0.04 |

Intersection Summary



| Lane Group | WBL | WBR | NBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 10 | 4 | 607 | 4 | 499 |
| v/c Ratio | 0.05 | 0.02 | 0.18 | 0.02 | 0.14 |
| Control Delay | 32.9 | 21.7 | 2.1 | 33.0 | 0.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 32.9 | 21.7 | 2.1 | 33.0 | 0.8 |
| Queue Length 50th (ft) | 5 | 0 | 0 | 2 | 0 |
| Queue Length 95th (ft) | 17 | 8 | 77 | 10 | 32 |
| Internal Link Dist (ft) | 203 | | 557 | | 502 |
| Turn Bay Length (ft) | 75 | | | 110 | |
| Base Capacity (vph) | 586 | 527 | 3330 | 361 | 3445 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.02 | 0.01 | 0.18 | 0.01 | 0.14 |

Intersection Summary



| Lane Group | WBL | WBT | WBR | NBT | NBR | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 125 | 125 | 549 | 114 | 15 | 591 |
| v/c Ratio | 0.38 | 0.38 | 0.56 | 0.05 | 0.01 | 0.25 |
| Control Delay | 32.4 | 32.4 | 4.9 | 6.1 | 0.0 | 6.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 32.4 | 32.4 | 4.9 | 6.1 | 0.0 | 6.8 |
| Queue Length 50th (ft) | 62 | 62 | 0 | 10 | 0 | 60 |
| Queue Length 95th (ft) | 82 | 82 | 6 | 17 | 0 | 76 |
| Internal Link Dist (ft) | | 1020 | | 815 | | 557 |
| Turn Bay Length (ft) | 340 | | 205 | | 475 | |
| Base Capacity (vph) | 718 | 718 | 1509 | 2362 | 1615 | 2346 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.17 | 0.17 | 0.36 | 0.05 | 0.01 | 0.25 |

Intersection Summary



| Lane Group | EBL | EBT | NBT | NBR | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 11 | 12 | 211 | 121 | 316 | 316 |
| v/c Ratio | 0.04 | 0.02 | 0.08 | 0.08 | 0.10 | 0.20 |
| Control Delay | 23.7 | 0.1 | 1.8 | 0.1 | 2.9 | 0.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 23.7 | 0.1 | 1.8 | 0.1 | 2.9 | 0.3 |
| Queue Length 50th (ft) | 4 | 0 | 0 | 0 | 0 | 0 |
| Queue Length 95th (ft) | 16 | 0 | 17 | 0 | 37 | 0 |
| Internal Link Dist (ft) | | 833 | 375 | | 815 | |
| Turn Bay Length (ft) | | | | 270 | | 460 |
| Base Capacity (vph) | 644 | 849 | 2712 | 1470 | 3077 | 1615 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.02 | 0.01 | 0.08 | 0.08 | 0.10 | 0.20 |

Intersection Summary

## Intersection: 6: Hughes Avenue & Belmont Avenue

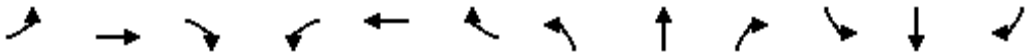
| Movement | EB | EB | EB | WB | WB | WB | NB | SB |
|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | TR | LTR | LTR |
| Maximum Queue (ft) | 54 | 56 | 55 | 31 | 54 | 32 | 55 | 54 |
| Average Queue (ft) | 15 | 33 | 38 | 17 | 34 | 26 | 32 | 27 |
| 95th Queue (ft) | 43 | 44 | 55 | 42 | 47 | 44 | 54 | 47 |
| Link Distance (ft) | | 2483 | 2483 | | 704 | 704 | 2526 | 321 |
| Upstream Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |
| Storage Bay Dist (ft) | 145 | | | 165 | | | | |
| Storage Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |

## Intersection: 7: Hughes Avenue & Nielsen Avenue

| Movement | EB | EB | WB | NB | SB | SB |
|---|---|---|---|---|---|---|
| Directions Served | L | TR | TR | LTR | LT | R |
| Maximum Queue (ft) | 26 | 45 | 31 | 75 | 54 | 30 |
| Average Queue (ft) | 7 | 20 | 15 | 32 | 32 | 7 |
| 95th Queue (ft) | 26 | 35 | 39 | 56 | 54 | 27 |
| Link Distance (ft) | | 2470 | 752 | 448 | 2526 | |
| Upstream Blk Time (%) | | | | | | |
| Queuing Penalty (veh) | | | | | | |
| Storage Bay Dist (ft) | 205 | | | | | 100 |
| Storage Blk Time (%) | | | | | | |
| Queuing Penalty (veh) | | | | | | |

## Intersection: 1: Marks Avenue & Belmont Avenue

| Movement | EB | EB | EB | WB | WB | WB | NB | NB | NB | SB | SB | SB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | R | L | T | R | L | T | TR |
| Maximum Queue (ft) | 31 | 77 | 156 | 133 | 66 | 44 | 344 | 435 | 165 | 48 | 458 | 241 |
| Average Queue (ft) | 19 | 48 | 38 | 32 | 36 | 22 | 53 | 237 | 39 | 24 | 63 | 46 |
| 95th Queue (ft) | 43 | 79 | 76 | 79 | 57 | 41 | 159 | 349 | 89 | 49 | 190 | 137 |
| Link Distance (ft) | | 721 | | 2483 | 2483 | | | 2528 | 2528 | | 647 | |
| Upstream Blk Time (%) | | | | | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | | | | | |
| Storage Bay Dist (ft) | 105 | | 105 | | | 125 | 230 | | | 135 | | 50 |
| Storage Blk Time (%) | | | 3 | | | | | 13 | | | 16 | 10 |
| Queuing Penalty (veh) | | | 4 | | | | | 12 | | | 29 | 16 |



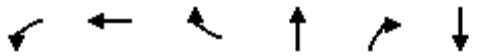
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 25 | 3 | 43 | 81 | 9 | 11 | 39 | 592 | 38 | 10 | 331 | 21 |
| v/c Ratio | 0.14 | 0.01 | 0.16 | 0.44 | 0.04 | 0.04 | 0.27 | 0.21 | 0.03 | 0.07 | 0.13 | 0.02 |
| Control Delay | 40.4 | 37.3 | 4.0 | 48.9 | 37.9 | 0.3 | 50.6 | 5.2 | 0.2 | 46.5 | 6.9 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 40.4 | 37.3 | 4.0 | 48.9 | 37.9 | 0.3 | 50.6 | 5.2 | 0.2 | 46.5 | 6.9 | 0.1 |
| Queue Length 50th (ft) | 15 | 2 | 0 | 51 | 5 | 0 | 25 | 47 | 0 | 6 | 42 | 0 |
| Queue Length 95th (ft) | 39 | 10 | 11 | 94 | 19 | 0 | 58 | 125 | 2 | 23 | 72 | 0 |
| Internal Link Dist (ft) | | 651 | | | 2488 | | | 502 | | | 2547 | |
| Turn Bay Length (ft) | 55 | | 55 | 215 | | 210 | 240 | | 215 | 245 | | 215 |
| Base Capacity (vph) | 600 | 798 | 721 | 603 | 798 | 721 | 259 | 2810 | 1275 | 259 | 2623 | 1195 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.04 | 0.00 | 0.06 | 0.13 | 0.01 | 0.02 | 0.15 | 0.21 | 0.03 | 0.04 | 0.13 | 0.02 |

Intersection Summary



| Lane Group | WBL | WBR | NBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 18 | 7 | 701 | 4 | 470 |
| v/c Ratio | 0.09 | 0.04 | 0.22 | 0.02 | 0.14 |
| Control Delay | 33.1 | 19.5 | 2.9 | 33.0 | 1.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 33.1 | 19.5 | 2.9 | 33.0 | 1.4 |
| Queue Length 50th (ft) | 8 | 0 | 0 | 2 | 0 |
| Queue Length 95th (ft) | 27 | 11 | 108 | 11 | 36 |
| Internal Link Dist (ft) | 661 | | 557 | | 502 |
| Turn Bay Length (ft) | 75 | | | 110 | |
| Base Capacity (vph) | 586 | 529 | 3161 | 361 | 3275 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.03 | 0.01 | 0.22 | 0.01 | 0.14 |

Intersection Summary



| Lane Group | WBL | WBT | WBR | NBT | NBR | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 149 | 150 | 640 | 178 | 19 | 553 |
| v/c Ratio | 0.41 | 0.42 | 0.58 | 0.08 | 0.01 | 0.24 |
| Control Delay | 31.4 | 31.5 | 4.5 | 6.9 | 0.0 | 7.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 31.4 | 31.5 | 4.5 | 6.9 | 0.0 | 7.6 |
| Queue Length 50th (ft) | 73 | 73 | 0 | 16 | 0 | 57 |
| Queue Length 95th (ft) | 105 | 105 | 22 | 32 | 0 | 89 |
| Internal Link Dist (ft) | | 1017 | | 815 | | 557 |
| Turn Bay Length (ft) | 340 | | 205 | | 475 | |
| Base Capacity (vph) | 718 | 718 | 1562 | 2290 | 1615 | 2275 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.21 | 0.21 | 0.41 | 0.08 | 0.01 | 0.24 |

Intersection Summary



| Lane Group | EBL | EBT | NBT | NBR | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 21 | 22 | 297 | 144 | 390 | 335 |
| v/c Ratio | 0.08 | 0.04 | 0.11 | 0.10 | 0.13 | 0.21 |
| Control Delay | 23.7 | 0.1 | 1.9 | 0.1 | 3.0 | 0.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 23.7 | 0.1 | 1.9 | 0.1 | 3.0 | 0.3 |
| Queue Length 50th (ft) | 7 | 0 | 0 | 0 | 0 | 0 |
| Queue Length 95th (ft) | 24 | 0 | 25 | 0 | 47 | 0 |
| Internal Link Dist (ft) | | 821 | 375 | | 815 | |
| Turn Bay Length (ft) | | | | 270 | | 460 |
| Base Capacity (vph) | 644 | 794 | 2741 | 1470 | 3062 | 1615 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.03 | 0.03 | 0.11 | 0.10 | 0.13 | 0.21 |

Intersection Summary

## Intersection: 6: Hughes Avenue & Belmont Avenue

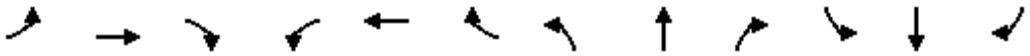
| Movement | EB | EB | EB | WB | WB | WB | NB | SB |
|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | TR | LTR | LTR |
| Maximum Queue (ft) | 31 | 77 | 58 | 70 | 55 | 55 | 56 | 31 |
| Average Queue (ft) | 24 | 34 | 39 | 30 | 33 | 34 | 35 | 31 |
| 95th Queue (ft) | 45 | 51 | 57 | 55 | 44 | 47 | 60 | 31 |
| Link Distance (ft) | | 2483 | 2483 | | 704 | 704 | 2526 | 321 |
| Upstream Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |
| Storage Bay Dist (ft) | 145 | | | 165 | | | | |
| Storage Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |

## Intersection: 7: Hughes Avenue & Nielsen Avenue

| Movement | EB | EB | WB | WB | NB | SB | SB |
|---|---|---|---|---|---|---|---|
| Directions Served | L | TR | L | TR | LTR | LT | R |
| Maximum Queue (ft) | 26 | 22 | 31 | 31 | 56 | 55 | 31 |
| Average Queue (ft) | 2 | 12 | 4 | 26 | 32 | 35 | 7 |
| 95th Queue (ft) | 14 | 29 | 21 | 43 | 54 | 55 | 27 |
| Link Distance (ft) | | 2470 | | 752 | 448 | 2526 | |
| Upstream Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |
| Storage Bay Dist (ft) | 205 | | 205 | | | | 100 |
| Storage Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |

## Intersection: 1: Marks Avenue & Belmont Avenue

| Movement | EB | EB | EB | WB | WB | WB | NB | NB | NB | SB | SB | SB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | R | L | T | R | L | T | TR |
| Maximum Queue (ft) | 31 | 55 | 53 | 48 | 48 | 21 | 55 | 103 | 53 | 27 | 109 | 44 |
| Average Queue (ft) | 24 | 39 | 31 | 20 | 23 | 5 | 27 | 63 | 32 | 19 | 64 | 27 |
| 95th Queue (ft) | 45 | 57 | 51 | 40 | 46 | 20 | 47 | 96 | 50 | 38 | 99 | 47 |
| Link Distance (ft) | | 721 | | 2483 | 2483 | | | 2528 | 2528 | | 647 | |
| Upstream Blk Time (%) | | | | | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | | | | | |
| Storage Bay Dist (ft) | 105 | | 105 | | | 125 | 230 | | | 135 | | 50 |
| Storage Blk Time (%) | | | | | | | | | | | 12 | 0 |
| Queuing Penalty (veh) | | | | | | | | | | | 35 | 1 |



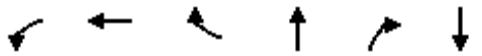
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 15 | 10 | 52 | 31 | 5 | 12 | 77 | 431 | 121 | 11 | 423 | 42 |
| v/c Ratio | 0.11 | 0.06 | 0.23 | 0.23 | 0.03 | 0.05 | 0.47 | 0.15 | 0.09 | 0.08 | 0.16 | 0.04 |
| Control Delay | 44.1 | 42.5 | 7.4 | 47.2 | 42.0 | 0.5 | 54.4 | 3.7 | 1.2 | 46.6 | 6.8 | 0.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 44.1 | 42.5 | 7.4 | 47.2 | 42.0 | 0.5 | 54.4 | 3.7 | 1.2 | 46.6 | 6.8 | 0.4 |
| Queue Length 50th (ft) | 9 | 6 | 0 | 20 | 3 | 0 | 50 | 26 | 0 | 7 | 50 | 0 |
| Queue Length 95th (ft) | 26 | 20 | 14 | 43 | 13 | 0 | 85 | 67 | 14 | 23 | 75 | 1 |
| Internal Link Dist (ft) | | 651 | | | 2488 | | | 502 | | | 2547 | |
| Turn Bay Length (ft) | 55 | | 55 | 215 | | 210 | 240 | | 215 | 245 | | 215 |
| Base Capacity (vph) | 601 | 798 | 721 | 599 | 798 | 721 | 259 | 2923 | 1330 | 259 | 2602 | 1187 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.02 | 0.01 | 0.07 | 0.05 | 0.01 | 0.02 | 0.30 | 0.15 | 0.09 | 0.04 | 0.16 | 0.04 |

Intersection Summary



| Lane Group | WBL | WBR | NBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 10 | 4 | 642 | 4 | 508 |
| v/c Ratio | 0.05 | 0.02 | 0.19 | 0.02 | 0.15 |
| Control Delay | 32.9 | 21.7 | 2.1 | 33.0 | 0.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 32.9 | 21.7 | 2.1 | 33.0 | 0.8 |
| Queue Length 50th (ft) | 5 | 0 | 0 | 2 | 0 |
| Queue Length 95th (ft) | 17 | 8 | 82 | 10 | 32 |
| Internal Link Dist (ft) | 203 | | 557 | | 502 |
| Turn Bay Length (ft) | 75 | | | 110 | |
| Base Capacity (vph) | 586 | 527 | 3330 | 361 | 3445 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.02 | 0.01 | 0.19 | 0.01 | 0.15 |

Intersection Summary



| Lane Group | WBL | WBT | WBR | NBT | NBR | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 125 | 125 | 581 | 121 | 15 | 601 |
| v/c Ratio | 0.38 | 0.38 | 0.57 | 0.05 | 0.01 | 0.26 |
| Control Delay | 31.8 | 31.8 | 4.8 | 6.3 | 0.0 | 7.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 31.8 | 31.8 | 4.8 | 6.3 | 0.0 | 7.1 |
| Queue Length 50th (ft) | 62 | 62 | 0 | 11 | 0 | 61 |
| Queue Length 95th (ft) | 81 | 81 | 5 | 19 | 0 | 80 |
| Internal Link Dist (ft) | | 1020 | | 815 | | 557 |
| Turn Bay Length (ft) | 340 | | 205 | | 475 | |
| Base Capacity (vph) | 718 | 718 | 1527 | 2346 | 1615 | 2331 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.17 | 0.17 | 0.38 | 0.05 | 0.01 | 0.26 |

Intersection Summary



| Lane Group | EBL | EBT | NBT | NBR | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 13 | 12 | 214 | 121 | 316 | 324 |
| v/c Ratio | 0.05 | 0.02 | 0.08 | 0.08 | 0.10 | 0.20 |
| Control Delay | 23.7 | 0.1 | 1.8 | 0.1 | 2.9 | 0.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 23.7 | 0.1 | 1.8 | 0.1 | 2.9 | 0.3 |
| Queue Length 50th (ft) | 5 | 0 | 0 | 0 | 0 | 0 |
| Queue Length 95th (ft) | 18 | 0 | 17 | 0 | 37 | 0 |
| Internal Link Dist (ft) | | 833 | 375 | | 815 | |
| Turn Bay Length (ft) | | | | 270 | | 460 |
| Base Capacity (vph) | 644 | 849 | 2712 | 1470 | 3073 | 1615 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.02 | 0.01 | 0.08 | 0.08 | 0.10 | 0.20 |

Intersection Summary

## Intersection: 6: Hughes Avenue & Belmont Avenue

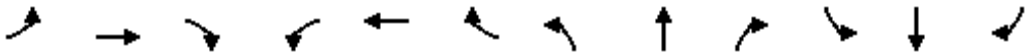
| Movement | EB | EB | EB | WB | WB | WB | NB | SB |
|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | TR | LTR | LTR |
| Maximum Queue (ft) | 31 | 52 | 53 | 55 | 55 | 32 | 74 | 56 |
| Average Queue (ft) | 14 | 33 | 32 | 29 | 32 | 22 | 34 | 31 |
| 95th Queue (ft) | 38 | 42 | 40 | 50 | 40 | 44 | 57 | 52 |
| Link Distance (ft) | | 2483 | 2483 | | 704 | 704 | 2526 | 321 |
| Upstream Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |
| Storage Bay Dist (ft) | 145 | | | 165 | | | | |
| Storage Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |

## Intersection: 7: Hughes Avenue & Nielsen Avenue

| Movement | EB | EB | WB | WB | NB | SB | SB |
|---|---|---|---|---|---|---|---|
| Directions Served | L | TR | L | TR | LTR | LT | R |
| Maximum Queue (ft) | 25 | 46 | 31 | 31 | 55 | 55 | 30 |
| Average Queue (ft) | 5 | 22 | 1 | 16 | 33 | 33 | 8 |
| 95th Queue (ft) | 21 | 37 | 12 | 41 | 44 | 52 | 29 |
| Link Distance (ft) | | 2470 | | 752 | 448 | 2526 | |
| Upstream Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |
| Storage Bay Dist (ft) | 205 | | 205 | | | | 100 |
| Storage Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |

## Intersection: 1: Marks Avenue & Belmont Avenue

| Movement | EB | EB | EB | WB | WB | WB | NB | NB | NB | SB | SB | SB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | R | L | T | R | L | T | TR |
| Maximum Queue (ft) | 52 | 121 | 116 | 68 | 61 | 43 | 344 | 533 | 56 | 26 | 239 | 193 |
| Average Queue (ft) | 21 | 50 | 37 | 22 | 33 | 17 | 114 | 281 | 34 | 19 | 58 | 39 |
| 95th Queue (ft) | 46 | 85 | 69 | 51 | 53 | 34 | 333 | 484 | 56 | 38 | 130 | 107 |
| Link Distance (ft) | | 721 | | 2483 | 2483 | | | 2528 | 2528 | | 647 | |
| Upstream Blk Time (%) | | | | | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | | | | | |
| Storage Bay Dist (ft) | 105 | | 105 | | | 125 | 230 | | | 135 | | 50 |
| Storage Blk Time (%) | | 0 | 1 | | | | | 29 | | | 11 | 7 |
| Queuing Penalty (veh) | | 1 | 1 | | | | | 29 | | | 21 | 12 |



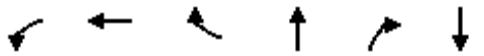
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 25 | 4 | 43 | 91 | 9 | 11 | 39 | 592 | 77 | 10 | 331 | 21 |
| v/c Ratio | 0.13 | 0.02 | 0.15 | 0.47 | 0.04 | 0.04 | 0.27 | 0.21 | 0.06 | 0.07 | 0.13 | 0.02 |
| Control Delay | 39.5 | 36.5 | 3.9 | 49.1 | 37.1 | 0.3 | 50.6 | 5.4 | 1.8 | 46.5 | 7.2 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 39.5 | 36.5 | 3.9 | 49.1 | 37.1 | 0.3 | 50.6 | 5.4 | 1.8 | 46.5 | 7.2 | 0.1 |
| Queue Length 50th (ft) | 15 | 2 | 0 | 57 | 5 | 0 | 25 | 50 | 0 | 6 | 43 | 0 |
| Queue Length 95th (ft) | 38 | 12 | 11 | 103 | 19 | 0 | 58 | 128 | 18 | 23 | 73 | 0 |
| Internal Link Dist (ft) | | 651 | | | 2488 | | | 502 | | | 2547 | |
| Turn Bay Length (ft) | 55 | | 55 | 215 | | 210 | 240 | | 215 | 245 | | 215 |
| Base Capacity (vph) | 600 | 798 | 721 | 602 | 798 | 721 | 259 | 2789 | 1266 | 259 | 2602 | 1186 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.04 | 0.01 | 0.06 | 0.15 | 0.01 | 0.02 | 0.15 | 0.21 | 0.06 | 0.04 | 0.13 | 0.02 |

Intersection Summary



| Lane Group | WBL | WBR | NBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 18 | 7 | 743 | 4 | 479 |
| v/c Ratio | 0.09 | 0.04 | 0.24 | 0.02 | 0.15 |
| Control Delay | 33.1 | 19.5 | 2.9 | 33.0 | 1.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 33.1 | 19.5 | 2.9 | 33.0 | 1.4 |
| Queue Length 50th (ft) | 8 | 0 | 0 | 2 | 0 |
| Queue Length 95th (ft) | 27 | 11 | 116 | 11 | 37 |
| Internal Link Dist (ft) | 661 | | 557 | | 502 |
| Turn Bay Length (ft) | 75 | | | 110 | |
| Base Capacity (vph) | 586 | 529 | 3161 | 361 | 3275 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.03 | 0.01 | 0.24 | 0.01 | 0.15 |

Intersection Summary



| Lane Group | WBL | WBT | WBR | NBT | NBR | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 149 | 150 | 679 | 184 | 19 | 564 |
| v/c Ratio | 0.41 | 0.42 | 0.60 | 0.08 | 0.01 | 0.25 |
| Control Delay | 31.4 | 31.5 | 4.6 | 6.9 | 0.0 | 7.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 31.4 | 31.5 | 4.6 | 6.9 | 0.0 | 7.6 |
| Queue Length 50th (ft) | 73 | 73 | 0 | 17 | 0 | 59 |
| Queue Length 95th (ft) | 105 | 105 | 21 | 32 | 0 | 91 |
| Internal Link Dist (ft) | | 1017 | | 815 | | 557 |
| Turn Bay Length (ft) | 340 | | 205 | | 475 | |
| Base Capacity (vph) | 718 | 718 | 1584 | 2290 | 1615 | 2278 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.21 | 0.21 | 0.43 | 0.08 | 0.01 | 0.25 |

Intersection Summary



| Lane Group | EBL | EBT | NBT | NBR | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 23 | 22 | 300 | 144 | 391 | 343 |
| v/c Ratio | 0.08 | 0.04 | 0.12 | 0.10 | 0.14 | 0.21 |
| Control Delay | 23.7 | 0.1 | 2.5 | 0.1 | 4.0 | 0.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 23.7 | 0.1 | 2.5 | 0.1 | 4.0 | 0.3 |
| Queue Length 50th (ft) | 8 | 0 | 10 | 0 | 28 | 0 |
| Queue Length 95th (ft) | 25 | 0 | 25 | 0 | 47 | 0 |
| Internal Link Dist (ft) | | 821 | 375 | | 815 | |
| Turn Bay Length (ft) | | | | 270 | | 460 |
| Base Capacity (vph) | 644 | 793 | 2516 | 1470 | 2797 | 1615 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.04 | 0.03 | 0.12 | 0.10 | 0.14 | 0.21 |

Intersection Summary

## Intersection: 6: Hughes Avenue & Belmont Avenue

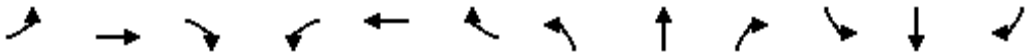
| Movement | EB | EB | EB | WB | WB | WB | NB | SB |
|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | TR | LTR | LTR |
| Maximum Queue (ft) | 54 | 54 | 56 | 31 | 54 | 53 | 77 | 78 |
| Average Queue (ft) | 21 | 35 | 34 | 29 | 36 | 31 | 38 | 36 |
| 95th Queue (ft) | 47 | 54 | 53 | 40 | 51 | 44 | 60 | 63 |
| Link Distance (ft) | | 2483 | 2483 | | 704 | 704 | 2526 | 321 |
| Upstream Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |
| Storage Bay Dist (ft) | 145 | | | 165 | | | | |
| Storage Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |

## Intersection: 7: Hughes Avenue & Nielsen Avenue

| Movement | EB | EB | WB | WB | NB | SB | SB |
|---|---|---|---|---|---|---|---|
| Directions Served | L | TR | L | TR | LTR | LT | R |
| Maximum Queue (ft) | 25 | 44 | 28 | 52 | 54 | 56 | 31 |
| Average Queue (ft) | 4 | 15 | 1 | 27 | 33 | 36 | 13 |
| 95th Queue (ft) | 20 | 34 | 11 | 46 | 44 | 53 | 37 |
| Link Distance (ft) | | 2470 | | 752 | 448 | 2526 | |
| Upstream Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |
| Storage Bay Dist (ft) | 205 | | 205 | | | | 100 |
| Storage Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |

## Intersection: 1: Marks Avenue & Belmont Avenue

| Movement | EB | EB | EB | WB | WB | WB | NB | NB | NB | SB | SB | SB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | R | L | T | R | L | T | TR |
| Maximum Queue (ft) | 31 | 100 | 73 | 71 | 45 | 45 | 54 | 122 | 56 | 26 | 152 | 63 |
| Average Queue (ft) | 13 | 46 | 39 | 25 | 26 | 7 | 33 | 73 | 34 | 24 | 64 | 35 |
| 95th Queue (ft) | 37 | 77 | 60 | 52 | 46 | 27 | 56 | 114 | 49 | 36 | 107 | 58 |
| Link Distance (ft) | | 721 | | 2483 | 2483 | | | 2528 | 2528 | | 647 | |
| Upstream Blk Time (%) | | | | | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | | | | | |
| Storage Bay Dist (ft) | 105 | | 105 | | | 125 | 230 | | | 135 | | 50 |
| Storage Blk Time (%) | | 0 | | | | | | | | | 14 | 1 |
| Queuing Penalty (veh) | | 0 | | | | | | | | | 42 | 4 |



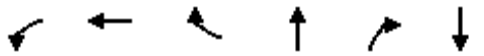
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 16 | 10 | 56 | 35 | 5 | 12 | 80 | 458 | 132 | 11 | 451 | 44 |
| v/c Ratio | 0.11 | 0.05 | 0.25 | 0.25 | 0.03 | 0.05 | 0.48 | 0.16 | 0.10 | 0.08 | 0.17 | 0.04 |
| Control Delay | 43.8 | 42.1 | 8.6 | 47.4 | 41.5 | 0.4 | 54.6 | 3.8 | 1.2 | 46.6 | 7.1 | 0.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 43.8 | 42.1 | 8.6 | 47.4 | 41.5 | 0.4 | 54.6 | 3.8 | 1.2 | 46.6 | 7.1 | 0.6 |
| Queue Length 50th (ft) | 10 | 6 | 0 | 22 | 3 | 0 | 52 | 29 | 0 | 7 | 55 | 0 |
| Queue Length 95th (ft) | 28 | 19 | 18 | 47 | 13 | 0 | 87 | 72 | 15 | 23 | 82 | 2 |
| Internal Link Dist (ft) | | 651 | | | 2488 | | | 502 | | | 2547 | |
| Turn Bay Length (ft) | 55 | | 55 | 215 | | 210 | 240 | | 215 | 245 | | 215 |
| Base Capacity (vph) | 601 | 798 | 721 | 599 | 798 | 721 | 259 | 2913 | 1328 | 259 | 2588 | 1181 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.03 | 0.01 | 0.08 | 0.06 | 0.01 | 0.02 | 0.31 | 0.16 | 0.10 | 0.04 | 0.17 | 0.04 |

Intersection Summary



| Lane Group | WBL | WBR | NBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 14 | 4 | 700 | 6 | 539 |
| v/c Ratio | 0.07 | 0.02 | 0.22 | 0.03 | 0.16 |
| Control Delay | 32.9 | 21.3 | 2.8 | 33.0 | 1.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 32.9 | 21.3 | 2.8 | 33.0 | 1.4 |
| Queue Length 50th (ft) | 6 | 0 | 0 | 3 | 0 |
| Queue Length 95th (ft) | 20 | 8 | 91 | 12 | 35 |
| Internal Link Dist (ft) | 203 | | 557 | | 502 |
| Turn Bay Length (ft) | 75 | | | 110 | |
| Base Capacity (vph) | 586 | 527 | 3156 | 361 | 3280 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.02 | 0.01 | 0.22 | 0.02 | 0.16 |

Intersection Summary



| Lane Group | WBL | WBT | WBR | NBT | NBR | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 134 | 134 | 607 | 154 | 15 | 640 |
| v/c Ratio | 0.39 | 0.39 | 0.57 | 0.07 | 0.01 | 0.28 |
| Control Delay | 31.6 | 31.6 | 4.7 | 6.6 | 0.0 | 7.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 31.6 | 31.6 | 4.7 | 6.6 | 0.0 | 7.4 |
| Queue Length 50th (ft) | 66 | 66 | 0 | 14 | 0 | 66 |
| Queue Length 95th (ft) | 85 | 85 | 4 | 24 | 0 | 86 |
| Internal Link Dist (ft) | | 1020 | | 815 | | 557 |
| Turn Bay Length (ft) | 340 | | 205 | | 475 | |
| Base Capacity (vph) | 718 | 718 | 1543 | 2322 | 1615 | 2300 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.19 | 0.19 | 0.39 | 0.07 | 0.01 | 0.28 |

Intersection Summary



| Lane Group | EBL | EBT | NBT | NBR | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 33 | 12 | 234 | 133 | 336 | 338 |
| v/c Ratio | 0.11 | 0.02 | 0.09 | 0.09 | 0.12 | 0.21 |
| Control Delay | 23.8 | 0.1 | 2.3 | 0.1 | 4.2 | 0.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 23.8 | 0.1 | 2.3 | 0.1 | 4.2 | 0.3 |
| Queue Length 50th (ft) | 11 | 0 | 7 | 0 | 24 | 0 |
| Queue Length 95th (ft) | 32 | 0 | 20 | 0 | 42 | 0 |
| Internal Link Dist (ft) | | 833 | 375 | | 815 | |
| Turn Bay Length (ft) | | | | 270 | | 460 |
| Base Capacity (vph) | 644 | 833 | 2467 | 1470 | 2782 | 1615 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.05 | 0.01 | 0.09 | 0.09 | 0.12 | 0.21 |

Intersection Summary

## Intersection: 6: Hughes Avenue & Belmont Avenue

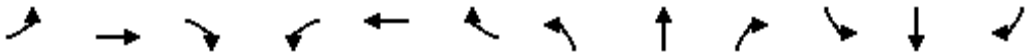
| Movement | EB | EB | EB | WB | WB | WB | NB | SB |
|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | TR | LTR | LTR |
| Maximum Queue (ft) | 31 | 54 | 56 | 56 | 55 | 55 | 55 | 31 |
| Average Queue (ft) | 19 | 31 | 36 | 30 | 33 | 29 | 33 | 27 |
| 95th Queue (ft) | 44 | 31 | 52 | 50 | 44 | 50 | 53 | 42 |
| Link Distance (ft) | | 2483 | 2483 | | 704 | 704 | 2526 | 321 |
| Upstream Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |
| Storage Bay Dist (ft) | 145 | | | 165 | | | | |
| Storage Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |

## Intersection: 7: Hughes Avenue & Nielsen Avenue

| Movement | EB | EB | WB | WB | NB | SB | SB |
|---|---|---|---|---|---|---|---|
| Directions Served | L | TR | L | TR | LTR | LT | R |
| Maximum Queue (ft) | 26 | 45 | 31 | 31 | 52 | 55 | 31 |
| Average Queue (ft) | 6 | 25 | 4 | 22 | 27 | 34 | 5 |
| 95th Queue (ft) | 23 | 42 | 22 | 44 | 50 | 53 | 23 |
| Link Distance (ft) | | 2470 | | 752 | 448 | 2526 | |
| Upstream Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |
| Storage Bay Dist (ft) | 205 | | 205 | | | | 100 |
| Storage Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |

## Intersection: 1: Marks Avenue & Belmont Avenue

| Movement | EB | EB | EB | WB | WB | WB | NB | NB | NB | SB | SB | SB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | R | L | T | R | L | T | TR |
| Maximum Queue (ft) | 31 | 78 | 52 | 47 | 63 | 45 | 345 | 883 | 512 | 27 | 96 | 88 |
| Average Queue (ft) | 15 | 51 | 34 | 25 | 38 | 25 | 224 | 485 | 148 | 21 | 59 | 40 |
| 95th Queue (ft) | 40 | 80 | 48 | 47 | 60 | 45 | 468 | 923 | 450 | 38 | 85 | 75 |
| Link Distance (ft) | | 721 | | 2483 | 2483 | | | 2528 | 2528 | | 647 | |
| Upstream Blk Time (%) | | | | | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | | | | | |
| Storage Bay Dist (ft) | 105 | | 105 | | | 125 | 230 | | | 135 | | 50 |
| Storage Blk Time (%) | | | | | | | | 59 | | | 12 | 1 |
| Queuing Penalty (veh) | | | | | | | | 63 | | | 24 | 2 |



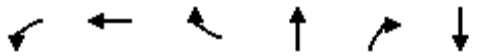
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 29 | 5 | 47 | 101 | 10 | 11 | 42 | 632 | 80 | 10 | 352 | 24 |
| v/c Ratio | 0.14 | 0.02 | 0.16 | 0.50 | 0.04 | 0.04 | 0.29 | 0.24 | 0.07 | 0.07 | 0.14 | 0.02 |
| Control Delay | 39.0 | 36.0 | 4.5 | 49.1 | 36.4 | 0.3 | 51.0 | 6.1 | 2.0 | 46.5 | 7.9 | 0.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 39.0 | 36.0 | 4.5 | 49.1 | 36.4 | 0.3 | 51.0 | 6.1 | 2.0 | 46.5 | 7.9 | 0.0 |
| Queue Length 50th (ft) | 17 | 3 | 0 | 63 | 6 | 0 | 27 | 56 | 0 | 6 | 47 | 0 |
| Queue Length 95th (ft) | 42 | 13 | 15 | 111 | 20 | 0 | 62 | 141 | 19 | 23 | 81 | 0 |
| Internal Link Dist (ft) | | 651 | | | 2488 | | | 502 | | | 2547 | |
| Turn Bay Length (ft) | 55 | | 55 | 215 | | 210 | 240 | | 215 | 245 | | 215 |
| Base Capacity (vph) | 599 | 798 | 721 | 601 | 798 | 721 | 259 | 2624 | 1195 | 259 | 2434 | 1115 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.05 | 0.01 | 0.07 | 0.17 | 0.01 | 0.02 | 0.16 | 0.24 | 0.07 | 0.04 | 0.14 | 0.02 |

Intersection Summary



| Lane Group | WBL | WBR | NBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 35 | 9 | 792 | 4 | 515 |
| v/c Ratio | 0.17 | 0.05 | 0.27 | 0.02 | 0.17 |
| Control Delay | 33.4 | 18.0 | 3.8 | 33.0 | 2.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 33.4 | 18.0 | 3.8 | 33.0 | 2.1 |
| Queue Length 50th (ft) | 16 | 0 | 45 | 2 | 26 |
| Queue Length 95th (ft) | 41 | 13 | 132 | 11 | 44 |
| Internal Link Dist (ft) | 661 | | 557 | | 502 |
| Turn Bay Length (ft) | 75 | | | 110 | |
| Base Capacity (vph) | 586 | 530 | 2972 | 361 | 3089 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.06 | 0.02 | 0.27 | 0.01 | 0.17 |

Intersection Summary



| Lane Group | WBL | WBT | WBR | NBT | NBR | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 166 | 167 | 709 | 209 | 20 | 623 |
| v/c Ratio | 0.43 | 0.43 | 0.60 | 0.09 | 0.01 | 0.28 |
| Control Delay | 30.5 | 30.6 | 4.3 | 7.6 | 0.0 | 8.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 30.5 | 30.6 | 4.3 | 7.6 | 0.0 | 8.4 |
| Queue Length 50th (ft) | 80 | 81 | 0 | 21 | 0 | 71 |
| Queue Length 95th (ft) | 111 | 111 | 21 | 38 | 0 | 106 |
| Internal Link Dist (ft) | | 1017 | | 815 | | 557 |
| Turn Bay Length (ft) | 340 | | 205 | | 475 | |
| Base Capacity (vph) | 718 | 718 | 1602 | 2234 | 1615 | 2211 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.23 | 0.23 | 0.44 | 0.09 | 0.01 | 0.28 |

Intersection Summary



| Lane Group | EBL | EBT | NBT | NBR | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 36 | 23 | 321 | 155 | 426 | 364 |
| v/c Ratio | 0.12 | 0.04 | 0.13 | 0.11 | 0.15 | 0.23 |
| Control Delay | 23.7 | 0.1 | 2.6 | 0.1 | 4.3 | 0.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 23.7 | 0.1 | 2.6 | 0.1 | 4.3 | 0.3 |
| Queue Length 50th (ft) | 12 | 0 | 12 | 0 | 32 | 0 |
| Queue Length 95th (ft) | 34 | 0 | 28 | 0 | 53 | 0 |
| Internal Link Dist (ft) | | 821 | 375 | | 815 | |
| Turn Bay Length (ft) | | | | 270 | | 460 |
| Base Capacity (vph) | 644 | 771 | 2502 | 1470 | 2777 | 1615 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.06 | 0.03 | 0.13 | 0.11 | 0.15 | 0.23 |

Intersection Summary

## Intersection: 6: Hughes Avenue & Belmont Avenue

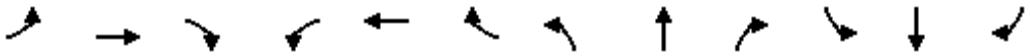
| Movement | EB | EB | EB | WB | WB | WB | NB | SB |
|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | TR | LTR | LTR |
| Maximum Queue (ft) | 55 | 55 | 56 | 75 | 56 | 55 | 56 | 58 |
| Average Queue (ft) | 20 | 35 | 37 | 30 | 36 | 39 | 47 | 36 |
| 95th Queue (ft) | 50 | 55 | 54 | 60 | 51 | 57 | 65 | 52 |
| Link Distance (ft) | | 2483 | 2483 | | 704 | 704 | 2526 | 321 |
| Upstream Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |
| Storage Bay Dist (ft) | 145 | | | 165 | | | | |
| Storage Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |

## Intersection: 7: Hughes Avenue & Nielsen Avenue

| Movement | EB | EB | WB | WB | NB | SB | SB |
|---|---|---|---|---|---|---|---|
| Directions Served | L | TR | L | TR | LTR | LT | R |
| Maximum Queue (ft) | 26 | 41 | 31 | 54 | 77 | 31 | 31 |
| Average Queue (ft) | 8 | 19 | 1 | 27 | 37 | 28 | 11 |
| 95th Queue (ft) | 28 | 33 | 12 | 47 | 57 | 43 | 34 |
| Link Distance (ft) | | 2470 | | 752 | 448 | 2526 | |
| Upstream Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |
| Storage Bay Dist (ft) | 205 | | 205 | | | | 100 |
| Storage Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |

## Intersection: 1: Marks Avenue & Belmont Avenue

| Movement | EB | EB | EB | WB | WB | WB | NB | NB | NB | SB | SB | SB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | R | L | T | R | L | T | TR |
| Maximum Queue (ft) | 31 | 141 | 160 | 46 | 69 | 21 | 75 | 184 | 93 | 66 | 137 | 110 |
| Average Queue (ft) | 21 | 63 | 49 | 19 | 32 | 5 | 37 | 81 | 36 | 29 | 69 | 42 |
| 95th Queue (ft) | 44 | 107 | 100 | 44 | 56 | 20 | 62 | 141 | 60 | 47 | 109 | 77 |
| Link Distance (ft) | | 721 | | 2483 | 2483 | | | 2528 | 2528 | | 647 | |
| Upstream Blk Time (%) | | | | | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | | | | | |
| Storage Bay Dist (ft) | 105 | | 105 | | | 125 | 230 | | | 135 | | 50 |
| Storage Blk Time (%) | | 2 | 0 | | | | | | | | 19 | 3 |
| Queuing Penalty (veh) | | 5 | 0 | | | | | | | | 66 | 8 |



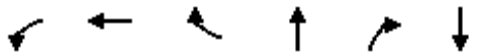
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 15 | 11 | 48 | 23 | 4 | 12 | 72 | 411 | 98 | 15 | 403 | 41 |
| v/c Ratio | 0.12 | 0.06 | 0.22 | 0.18 | 0.02 | 0.06 | 0.45 | 0.14 | 0.08 | 0.11 | 0.15 | 0.03 |
| Control Delay | 45.0 | 43.5 | 6.7 | 46.7 | 42.5 | 0.5 | 54.0 | 4.4 | 1.4 | 47.2 | 6.4 | 0.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 45.0 | 43.5 | 6.7 | 46.7 | 42.5 | 0.5 | 54.0 | 4.4 | 1.4 | 47.2 | 6.4 | 0.3 |
| Queue Length 50th (ft) | 9 | 7 | 0 | 15 | 3 | 0 | 47 | 24 | 0 | 10 | 46 | 0 |
| Queue Length 95th (ft) | 29 | 24 | 18 | 39 | 13 | 0 | 91 | 70 | 17 | 31 | 78 | 3 |
| Internal Link Dist (ft) | | 651 | | | 2488 | | | 502 | | | 2547 | |
| Turn Bay Length (ft) | 55 | | 55 | 215 | | 210 | 240 | | 215 | 245 | | 215 |
| Base Capacity (vph) | 602 | 798 | 721 | 598 | 798 | 721 | 259 | 2852 | 1296 | 259 | 2627 | 1197 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.02 | 0.01 | 0.07 | 0.04 | 0.01 | 0.02 | 0.28 | 0.14 | 0.08 | 0.06 | 0.15 | 0.03 |

Intersection Summary



| Lane Group | WBL | WBR | NBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 13 | 3 | 598 | 5 | 469 |
| v/c Ratio | 0.07 | 0.02 | 0.19 | 0.03 | 0.14 |
| Control Delay | 32.9 | 22.3 | 2.7 | 33.0 | 1.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 32.9 | 22.3 | 2.7 | 33.0 | 1.4 |
| Queue Length 50th (ft) | 6 | 0 | 0 | 2 | 0 |
| Queue Length 95th (ft) | 22 | 8 | 89 | 13 | 35 |
| Internal Link Dist (ft) | 203 | | 557 | | 502 |
| Turn Bay Length (ft) | 75 | | | 110 | |
| Base Capacity (vph) | 586 | 526 | 3158 | 361 | 3281 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.02 | 0.01 | 0.19 | 0.01 | 0.14 |

Intersection Summary



| Lane Group | WBL | WBT | WBR | NBT | NBR | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 119 | 120 | 477 | 149 | 16 | 517 |
| v/c Ratio | 0.37 | 0.37 | 0.52 | 0.06 | 0.01 | 0.22 |
| Control Delay | 32.4 | 32.4 | 4.9 | 6.0 | 0.0 | 6.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 32.4 | 32.4 | 4.9 | 6.0 | 0.0 | 6.5 |
| Queue Length 50th (ft) | 58 | 58 | 0 | 13 | 0 | 50 |
| Queue Length 95th (ft) | 102 | 103 | 39 | 28 | 0 | 86 |
| Internal Link Dist (ft) | | 1020 | | 815 | | 557 |
| Turn Bay Length (ft) | 340 | | 205 | | 475 | |
| Base Capacity (vph) | 718 | 718 | 1467 | 2371 | 1615 | 2349 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.17 | 0.17 | 0.33 | 0.06 | 0.01 | 0.22 |

Intersection Summary



| Lane Group | EBL | EBT | NBT | NBR | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 31 | 12 | 324 | 188 | 380 | 337 |
| v/c Ratio | 0.11 | 0.02 | 0.12 | 0.13 | 0.12 | 0.21 |
| Control Delay | 23.7 | 0.1 | 1.8 | 0.2 | 3.2 | 0.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 23.7 | 0.1 | 1.8 | 0.2 | 3.2 | 0.3 |
| Queue Length 50th (ft) | 11 | 0 | 0 | 0 | 0 | 0 |
| Queue Length 95th (ft) | 31 | 0 | 25 | 0 | 47 | 0 |
| Internal Link Dist (ft) | | 833 | 375 | | 815 | |
| Turn Bay Length (ft) | | | | 270 | | 460 |
| Base Capacity (vph) | 644 | 801 | 2694 | 1470 | 3050 | 1615 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.05 | 0.01 | 0.12 | 0.13 | 0.12 | 0.21 |

Intersection Summary

## Intersection: 6: Hughes Avenue & Belmont Avenue

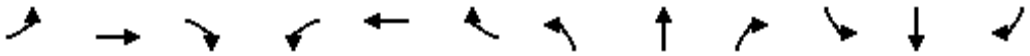
| Movement | EB | EB | EB | WB | WB | WB | NB | SB |
|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | TR | LTR | LTR |
| Maximum Queue (ft) | 54 | 55 | 78 | 54 | 55 | 51 | 122 | 56 |
| Average Queue (ft) | 28 | 35 | 48 | 28 | 39 | 30 | 51 | 35 |
| 95th Queue (ft) | 50 | 50 | 71 | 47 | 57 | 43 | 84 | 56 |
| Link Distance (ft) | | 2483 | 2483 | | 704 | 704 | 2526 | 321 |
| Upstream Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |
| Storage Bay Dist (ft) | 145 | | | 165 | | | | |
| Storage Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |

## Intersection: 7: Hughes Avenue & Nielsen Avenue

| Movement | EB | EB | WB | WB | NB | SB | SB |
|---|---|---|---|---|---|---|---|
| Directions Served | L | TR | L | TR | LTR | LT | R |
| Maximum Queue (ft) | 49 | 44 | 31 | 31 | 96 | 55 | 31 |
| Average Queue (ft) | 24 | 22 | 4 | 20 | 36 | 44 | 15 |
| 95th Queue (ft) | 45 | 33 | 19 | 43 | 60 | 63 | 39 |
| Link Distance (ft) | | 2470 | | 752 | 448 | 2526 | |
| Upstream Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |
| Storage Bay Dist (ft) | 205 | | 205 | | | | 100 |
| Storage Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |

## Intersection: 1: Marks Avenue & Belmont Avenue

| Movement | EB | EB | EB | WB | WB | WB | NB | NB | NB | SB | SB | SB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | R | L | T | R | L | T | TR |
| Maximum Queue (ft) | 31 | 95 | 55 | 48 | 111 | 44 | 345 | 907 | 520 | 27 | 71 | 46 |
| Average Queue (ft) | 30 | 79 | 40 | 28 | 59 | 30 | 286 | 622 | 214 | 21 | 51 | 30 |
| 95th Queue (ft) | 32 | 104 | 59 | 56 | 118 | 48 | 479 | 1092 | 588 | 38 | 78 | 49 |
| Link Distance (ft) | | 721 | | 2483 | 2483 | | | 2528 | 2528 | | 647 | |
| Upstream Blk Time (%) | | | | | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | | | | | |
| Storage Bay Dist (ft) | 105 | | 105 | | | 125 | 230 | | | 135 | | 50 |
| Storage Blk Time (%) | | 0 | | | 0 | | | 76 | | | 10 | 1 |
| Queuing Penalty (veh) | | 1 | | | 0 | | | 124 | | | 24 | 2 |



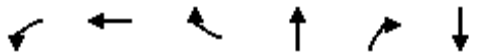
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 34 | 4 | 49 | 96 | 11 | 13 | 44 | 665 | 43 | 11 | 369 | 25 |
| v/c Ratio | 0.18 | 0.02 | 0.17 | 0.48 | 0.04 | 0.05 | 0.31 | 0.24 | 0.03 | 0.08 | 0.14 | 0.02 |
| Control Delay | 40.1 | 36.2 | 5.1 | 49.1 | 36.9 | 0.3 | 51.3 | 5.7 | 0.5 | 46.6 | 7.5 | 0.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 40.1 | 36.2 | 5.1 | 49.1 | 36.9 | 0.3 | 51.3 | 5.7 | 0.5 | 46.6 | 7.5 | 0.0 |
| Queue Length 50th (ft) | 20 | 2 | 0 | 60 | 7 | 0 | 29 | 58 | 0 | 7 | 48 | 0 |
| Queue Length 95th (ft) | 47 | 12 | 16 | 107 | 22 | 0 | 64 | 147 | 4 | 25 | 84 | 0 |
| Internal Link Dist (ft) | | 651 | | | 2488 | | | 502 | | | 2547 | |
| Turn Bay Length (ft) | 55 | | 55 | 215 | | 210 | 240 | | 215 | 245 | | 215 |
| Base Capacity (vph) | 598 | 798 | 721 | 602 | 798 | 721 | 259 | 2777 | 1261 | 259 | 2586 | 1180 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.06 | 0.01 | 0.07 | 0.16 | 0.01 | 0.02 | 0.17 | 0.24 | 0.03 | 0.04 | 0.14 | 0.02 |

Intersection Summary



| Lane Group | WBL | WBR | NBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 36 | 9 | 764 | 4 | 514 |
| v/c Ratio | 0.17 | 0.05 | 0.26 | 0.02 | 0.17 |
| Control Delay | 33.4 | 18.0 | 3.8 | 33.0 | 2.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 33.4 | 18.0 | 3.8 | 33.0 | 2.1 |
| Queue Length 50th (ft) | 17 | 0 | 43 | 2 | 26 |
| Queue Length 95th (ft) | 42 | 13 | 126 | 11 | 45 |
| Internal Link Dist (ft) | 661 | | 557 | | 502 |
| Turn Bay Length (ft) | 75 | | | 110 | |
| Base Capacity (vph) | 586 | 530 | 2970 | 361 | 3087 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.06 | 0.02 | 0.26 | 0.01 | 0.17 |

Intersection Summary



| Lane Group | WBL | WBT | WBR | NBT | NBR | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 196 | 196 | 619 | 224 | 19 | 564 |
| v/c Ratio | 0.48 | 0.48 | 0.54 | 0.10 | 0.01 | 0.26 |
| Control Delay | 30.6 | 30.6 | 3.9 | 8.2 | 0.0 | 8.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 30.6 | 30.6 | 3.9 | 8.2 | 0.0 | 8.8 |
| Queue Length 50th (ft) | 94 | 94 | 0 | 24 | 0 | 65 |
| Queue Length 95th (ft) | 143 | 143 | 38 | 48 | 0 | 115 |
| Internal Link Dist (ft) | | 1017 | | 815 | | 557 |
| Turn Bay Length (ft) | 340 | | 205 | | 475 | |
| Base Capacity (vph) | 718 | 718 | 1550 | 2185 | 1615 | 2162 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.27 | 0.27 | 0.40 | 0.10 | 0.01 | 0.26 |

Intersection Summary



| Lane Group | EBL | EBT | NBT | NBR | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 35 | 23 | 358 | 162 | 544 | 362 |
| v/c Ratio | 0.12 | 0.05 | 0.14 | 0.11 | 0.20 | 0.22 |
| Control Delay | 23.8 | 0.2 | 2.8 | 0.1 | 4.4 | 0.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 23.8 | 0.2 | 2.8 | 0.1 | 4.4 | 0.3 |
| Queue Length 50th (ft) | 12 | 0 | 15 | 0 | 42 | 0 |
| Queue Length 95th (ft) | 33 | 0 | 32 | 0 | 68 | 0 |
| Internal Link Dist (ft) | | 821 | 375 | | 815 | |
| Turn Bay Length (ft) | | | | 270 | | 460 |
| Base Capacity (vph) | 644 | 711 | 2529 | 1470 | 2779 | 1615 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.05 | 0.03 | 0.14 | 0.11 | 0.20 | 0.22 |

Intersection Summary

## Intersection: 6: Hughes Avenue & Belmont Avenue

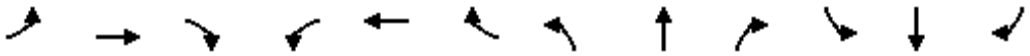
| Movement | EB | EB | EB | WB | WB | WB | NB | SB |
|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | TR | LTR | LTR |
| Maximum Queue (ft) | 53 | 78 | 85 | 31 | 55 | 54 | 73 | 56 |
| Average Queue (ft) | 26 | 35 | 43 | 26 | 37 | 35 | 45 | 41 |
| 95th Queue (ft) | 47 | 50 | 73 | 43 | 54 | 49 | 66 | 60 |
| Link Distance (ft) | | 2483 | 2483 | | 704 | 704 | 2526 | 321 |
| Upstream Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |
| Storage Bay Dist (ft) | 145 | | | 165 | | | | |
| Storage Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |

## Intersection: 7: Hughes Avenue & Nielsen Avenue

| Movement | EB | EB | WB | WB | NB | SB | SB |
|---|---|---|---|---|---|---|---|
| Directions Served | L | TR | L | TR | LTR | LT | R |
| Maximum Queue (ft) | 26 | 22 | 31 | 53 | 56 | 56 | 31 |
| Average Queue (ft) | 5 | 13 | 19 | 26 | 46 | 46 | 11 |
| 95th Queue (ft) | 20 | 30 | 43 | 51 | 64 | 64 | 35 |
| Link Distance (ft) | | 2470 | | 752 | 448 | 2526 | |
| Upstream Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |
| Storage Bay Dist (ft) | 205 | | 205 | | | | 100 |
| Storage Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |

## Intersection: 1: Marks Avenue & Belmont Avenue

| Movement | EB | EB | EB | WB | WB | WB | NB | NB | NB | SB | SB | SB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | R | L | T | R | L | T | TR |
| Maximum Queue (ft) | 31 | 118 | 74 | 65 | 64 | 22 | 71 | 122 | 55 | 51 | 180 | 148 |
| Average Queue (ft) | 22 | 69 | 42 | 26 | 34 | 6 | 33 | 80 | 35 | 30 | 94 | 67 |
| 95th Queue (ft) | 44 | 110 | 65 | 50 | 58 | 21 | 63 | 123 | 51 | 54 | 158 | 136 |
| Link Distance (ft) | | 721 | | 2483 | 2483 | | | 2528 | 2528 | | 647 | |
| Upstream Blk Time (%) | | | | | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | | | | | |
| Storage Bay Dist (ft) | 105 | | 105 | | | 125 | 230 | | | 135 | | 50 |
| Storage Blk Time (%) | | 1 | | | | | | | | | 40 | 4 |
| Queuing Penalty (veh) | | 3 | | | | | | | | | 140 | 12 |



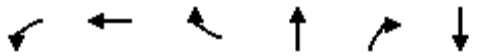
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 15 | 12 | 48 | 31 | 4 | 12 | 72 | 411 | 127 | 15 | 403 | 41 |
| v/c Ratio | 0.11 | 0.07 | 0.22 | 0.23 | 0.02 | 0.05 | 0.45 | 0.15 | 0.10 | 0.11 | 0.15 | 0.03 |
| Control Delay | 44.0 | 42.7 | 6.4 | 47.1 | 41.8 | 0.5 | 54.0 | 4.6 | 1.4 | 47.2 | 6.7 | 0.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 44.0 | 42.7 | 6.4 | 47.1 | 41.8 | 0.5 | 54.0 | 4.6 | 1.4 | 47.2 | 6.7 | 0.4 |
| Queue Length 50th (ft) | 9 | 7 | 0 | 20 | 2 | 0 | 47 | 25 | 0 | 10 | 47 | 0 |
| Queue Length 95th (ft) | 29 | 25 | 18 | 49 | 13 | 0 | 91 | 72 | 19 | 31 | 81 | 3 |
| Internal Link Dist (ft) | | 651 | | | 2488 | | | 502 | | | 2547 | |
| Turn Bay Length (ft) | 55 | | 55 | 215 | | 210 | 240 | | 215 | 245 | | 215 |
| Base Capacity (vph) | 602 | 798 | 721 | 598 | 798 | 721 | 259 | 2833 | 1294 | 259 | 2608 | 1189 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.02 | 0.02 | 0.07 | 0.05 | 0.01 | 0.02 | 0.28 | 0.15 | 0.10 | 0.06 | 0.15 | 0.03 |

Intersection Summary



| Lane Group | WBL | WBR | NBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 13 | 3 | 627 | 5 | 477 |
| v/c Ratio | 0.07 | 0.02 | 0.20 | 0.03 | 0.15 |
| Control Delay | 32.9 | 22.3 | 2.7 | 33.0 | 1.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 32.9 | 22.3 | 2.7 | 33.0 | 1.4 |
| Queue Length 50th (ft) | 6 | 0 | 0 | 2 | 0 |
| Queue Length 95th (ft) | 22 | 8 | 94 | 13 | 36 |
| Internal Link Dist (ft) | 203 | | 557 | | 502 |
| Turn Bay Length (ft) | 75 | | | 110 | |
| Base Capacity (vph) | 586 | 526 | 3158 | 361 | 3281 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.02 | 0.01 | 0.20 | 0.01 | 0.15 |

Intersection Summary



| Lane Group | WBL | WBT | WBR | NBT | NBR | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 119 | 120 | 501 | 155 | 16 | 524 |
| v/c Ratio | 0.37 | 0.37 | 0.53 | 0.07 | 0.01 | 0.22 |
| Control Delay | 32.4 | 32.4 | 4.9 | 6.0 | 0.0 | 6.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 32.4 | 32.4 | 4.9 | 6.0 | 0.0 | 6.5 |
| Queue Length 50th (ft) | 58 | 58 | 0 | 13 | 0 | 51 |
| Queue Length 95th (ft) | 102 | 103 | 40 | 28 | 0 | 87 |
| Internal Link Dist (ft) | | 1020 | | 815 | | 557 |
| Turn Bay Length (ft) | 340 | | 205 | | 475 | |
| Base Capacity (vph) | 718 | 718 | 1481 | 2371 | 1615 | 2349 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.17 | 0.17 | 0.34 | 0.07 | 0.01 | 0.22 |

Intersection Summary



| Lane Group | EBL | EBT | NBT | NBR | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 33 | 12 | 327 | 188 | 380 | 344 |
| v/c Ratio | 0.11 | 0.02 | 0.13 | 0.13 | 0.14 | 0.21 |
| Control Delay | 23.8 | 0.1 | 2.2 | 0.2 | 4.2 | 0.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 23.8 | 0.1 | 2.2 | 0.2 | 4.2 | 0.3 |
| Queue Length 50th (ft) | 11 | 0 | 9 | 0 | 27 | 0 |
| Queue Length 95th (ft) | 32 | 0 | 25 | 0 | 47 | 0 |
| Internal Link Dist (ft) | | 833 | 375 | | 815 | |
| Turn Bay Length (ft) | | | | 270 | | 460 |
| Base Capacity (vph) | 644 | 801 | 2476 | 1470 | 2782 | 1615 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.05 | 0.01 | 0.13 | 0.13 | 0.14 | 0.21 |

Intersection Summary

## Intersection: 6: Hughes Avenue & Belmont Avenue

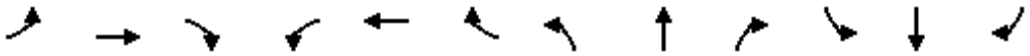
| Movement | EB | EB | EB | WB | WB | WB | NB | SB |
|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | TR | LTR | LTR |
| Maximum Queue (ft) | 50 | 55 | 76 | 53 | 56 | 55 | 91 | 56 |
| Average Queue (ft) | 26 | 40 | 42 | 27 | 37 | 32 | 52 | 36 |
| 95th Queue (ft) | 47 | 58 | 63 | 49 | 53 | 47 | 80 | 58 |
| Link Distance (ft) | | 2483 | 2483 | | 704 | 704 | 2526 | 321 |
| Upstream Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |
| Storage Bay Dist (ft) | 145 | | | 165 | | | | |
| Storage Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |

## Intersection: 7: Hughes Avenue & Nielsen Avenue

| Movement | EB | EB | WB | WB | NB | SB | SB |
|---|---|---|---|---|---|---|---|
| Directions Served | L | TR | L | TR | LTR | LT | R |
| Maximum Queue (ft) | 26 | 47 | 31 | 53 | 56 | 55 | 30 |
| Average Queue (ft) | 11 | 28 | 10 | 28 | 44 | 39 | 5 |
| 95th Queue (ft) | 32 | 51 | 33 | 49 | 63 | 56 | 24 |
| Link Distance (ft) | | 2470 | | 752 | 448 | 2526 | |
| Upstream Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |
| Storage Bay Dist (ft) | 205 | | 205 | | | | 100 |
| Storage Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |

## Intersection: 1: Marks Avenue & Belmont Avenue

| Movement | EB | EB | EB | WB | WB | WB | NB | NB | NB | SB | SB | SB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | R | L | T | R | L | T | TR |
| Maximum Queue (ft) | 51 | 98 | 50 | 48 | 90 | 46 | 345 | 1698 | 1136 | 87 | 112 | 20 |
| Average Queue (ft) | 25 | 59 | 29 | 34 | 51 | 22 | 204 | 1040 | 661 | 35 | 57 | 20 |
| 95th Queue (ft) | 57 | 99 | 51 | 52 | 84 | 49 | 473 | 1738 | 1289 | 70 | 102 | 20 |
| Link Distance (ft) | | 721 | | 2483 | 2483 | | | 2528 | 2528 | | 647 | |
| Upstream Blk Time (%) | | | | | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | | | | | |
| Storage Bay Dist (ft) | 105 | | 105 | | | 125 | 230 | | | 135 | | 50 |
| Storage Blk Time (%) | | 0 | | | | | | 91 | | | 16 | |
| Queuing Penalty (veh) | | 1 | | | | | | 150 | | | 39 | |



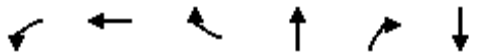
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 34 | 5 | 49 | 105 | 11 | 13 | 44 | 665 | 82 | 11 | 369 | 25 |
| v/c Ratio | 0.17 | 0.02 | 0.16 | 0.51 | 0.04 | 0.04 | 0.31 | 0.25 | 0.07 | 0.08 | 0.15 | 0.02 |
| Control Delay | 39.2 | 35.6 | 4.9 | 49.2 | 36.2 | 0.2 | 51.3 | 6.3 | 2.1 | 46.6 | 8.1 | 0.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 39.2 | 35.6 | 4.9 | 49.2 | 36.2 | 0.2 | 51.3 | 6.3 | 2.1 | 46.6 | 8.1 | 0.0 |
| Queue Length 50th (ft) | 20 | 3 | 0 | 66 | 6 | 0 | 29 | 60 | 0 | 7 | 50 | 0 |
| Queue Length 95th (ft) | 47 | 13 | 16 | 115 | 22 | 0 | 64 | 151 | 20 | 25 | 86 | 0 |
| Internal Link Dist (ft) | | 651 | | | 2488 | | | 502 | | | 2547 | |
| Turn Bay Length (ft) | 55 | | 55 | 215 | | 210 | 240 | | 215 | 245 | | 215 |
| Base Capacity (vph) | 598 | 798 | 721 | 601 | 798 | 721 | 259 | 2614 | 1192 | 259 | 2424 | 1111 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.06 | 0.01 | 0.07 | 0.17 | 0.01 | 0.02 | 0.17 | 0.25 | 0.07 | 0.04 | 0.15 | 0.02 |

Intersection Summary



| Lane Group | WBL | WBR | NBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 36 | 9 | 804 | 4 | 523 |
| v/c Ratio | 0.17 | 0.05 | 0.27 | 0.02 | 0.17 |
| Control Delay | 33.4 | 18.0 | 3.9 | 33.0 | 2.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 33.4 | 18.0 | 3.9 | 33.0 | 2.1 |
| Queue Length 50th (ft) | 17 | 0 | 46 | 2 | 27 |
| Queue Length 95th (ft) | 42 | 13 | 134 | 11 | 45 |
| Internal Link Dist (ft) | 661 | | 557 | | 502 |
| Turn Bay Length (ft) | 75 | | | 110 | |
| Base Capacity (vph) | 586 | 530 | 2970 | 361 | 3087 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.06 | 0.02 | 0.27 | 0.01 | 0.17 |

Intersection Summary



| Lane Group | WBL | WBT | WBR | NBT | NBR | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 196 | 196 | 653 | 229 | 19 | 573 |
| v/c Ratio | 0.47 | 0.47 | 0.55 | 0.11 | 0.01 | 0.27 |
| Control Delay | 30.4 | 30.4 | 3.9 | 8.3 | 0.0 | 9.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 30.4 | 30.4 | 3.9 | 8.3 | 0.0 | 9.0 |
| Queue Length 50th (ft) | 94 | 94 | 0 | 24 | 0 | 67 |
| Queue Length 95th (ft) | 143 | 143 | 39 | 50 | 0 | 117 |
| Internal Link Dist (ft) | | 1017 | | 815 | | 557 |
| Turn Bay Length (ft) | 340 | | 205 | | 475 | |
| Base Capacity (vph) | 718 | 718 | 1569 | 2178 | 1615 | 2155 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.27 | 0.27 | 0.42 | 0.11 | 0.01 | 0.27 |

Intersection Summary



| Lane Group | EBL | EBT | NBT | NBR | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 37 | 23 | 359 | 165 | 545 | 371 |
| v/c Ratio | 0.13 | 0.05 | 0.14 | 0.11 | 0.20 | 0.23 |
| Control Delay | 23.7 | 0.2 | 2.8 | 0.2 | 4.4 | 0.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 23.7 | 0.2 | 2.8 | 0.2 | 4.4 | 0.3 |
| Queue Length 50th (ft) | 13 | 0 | 15 | 0 | 42 | 0 |
| Queue Length 95th (ft) | 34 | 0 | 33 | 0 | 69 | 0 |
| Internal Link Dist (ft) | | 821 | 375 | | 815 | |
| Turn Bay Length (ft) | | | | 270 | | 460 |
| Base Capacity (vph) | 644 | 711 | 2530 | 1470 | 2776 | 1615 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.06 | 0.03 | 0.14 | 0.11 | 0.20 | 0.23 |

Intersection Summary

## Intersection: 6: Hughes Avenue & Belmont Avenue

| Movement | EB | EB | EB | WB | WB | WB | NB | SB |
|---|---|---|---|---|---|---|---|---|
| Directions Served | L | T | TR | L | T | TR | LTR | LTR |
| Maximum Queue (ft) | 55 | 78 | 77 | 54 | 55 | 56 | 56 | 56 |
| Average Queue (ft) | 23 | 35 | 39 | 30 | 39 | 38 | 47 | 47 |
| 95th Queue (ft) | 48 | 62 | 60 | 44 | 57 | 55 | 63 | 64 |
| Link Distance (ft) | | 2483 | 2483 | | 704 | 704 | 2526 | 321 |
| Upstream Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |
| Storage Bay Dist (ft) | 145 | | | 165 | | | | |
| Storage Blk Time (%) | | | | | | | | |
| Queuing Penalty (veh) | | | | | | | | |

## Intersection: 7: Hughes Avenue & Nielsen Avenue

| Movement | EB | EB | WB | WB | NB | SB | SB |
|---|---|---|---|---|---|---|---|
| Directions Served | L | TR | L | TR | LTR | LT | R |
| Maximum Queue (ft) | 25 | 22 | 31 | 31 | 56 | 55 | 31 |
| Average Queue (ft) | 2 | 17 | 19 | 25 | 41 | 45 | 9 |
| 95th Queue (ft) | 14 | 32 | 43 | 45 | 60 | 63 | 32 |
| Link Distance (ft) | | 2470 | | 752 | 448 | 2526 | |
| Upstream Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |
| Storage Bay Dist (ft) | 205 | | 205 | | | | 100 |
| Storage Blk Time (%) | | | | | | | |
| Queuing Penalty (veh) | | | | | | | |

# APPENDIX F:

# FREEWAY LEVELS OF SERVICE ANALYSIS WORKSHEET

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Analyst | | Date | 9/8/2021 |
| Agency | LSA | Analysis Year | 2023 Near Term Approved and Pending |
| Jurisdiction | Caltrans | Time Period Analyzed | A.M. Peak Hour |
| Project Description | | Unit | United States Customary |
| Segment Number | 1 | Segment Name | West of Marks Avenue |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 2530 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2082 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.892 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1242 |
| Total Trucks, % | 12.10 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.52 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.2 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 17.0 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Diverge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 2 | Segment Name | Marks Avenue Off-Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Deceleration Length (LA),ft | 1500 | 165 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 2082 | 42 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.10 | 0.00 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.892 | 1.000 |
| Flow Rate (vi),pc/h | 2483 | 45 |
| Capacity (c), pc/h | 4800 | 2100 |
| Volume-to-Capacity Ratio (v/c) | 0.52 | 0.02 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (DS) | 0.302 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | Off-Ramp Influence Area Speed (SR), mi/h | 65.3 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFD) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 82.7 |
| Flow in Lanes 1 and 2 (v12), pc/h | 2483 | Ramp Junction Speed (S), mi/h | 65.3 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | - | Average Density (D), pc/mi/ln | 19.0 |
| Level of Service (LOS) | C | Density in Ramp Influence Area (DR), pc/mi/ln | 24.1 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 3 | Segment Name | Marks Avenue Off-Ramp to Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 1560 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2040 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1219 |
| Total Trucks, % | 12.40 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.51 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 72.9 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 16.6 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Merge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 4 | Segment Name | Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 25.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1360 | 930 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 2040 | 260 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.40 | 23.00 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.890 | 0.813 |
| Flow Rate (vi),pc/h | 2438 | 340 |
| Capacity (c), pc/h | 4800 | 1900 |
| Volume-to-Capacity Ratio (v/c) | 0.58 | 0.18 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 0.337 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 64.1 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.4 |
| Flow in Lanes 1 and 2 (v12), pc/h | 2438 | Ramp Junction Speed (S), mi/h | 64.1 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 2778 | Average Density (D), pc/mi/ln | 21.7 |
| Level of Service (LOS) | C | Density in Ramp Influence Area (DR), pc/mi/ln | 21.2 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 5 | Segment Name | Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 3 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1500 | 800 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 2300 | 237 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 13.60 | 3.70 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.880 | 0.964 |
| Flow Rate (vi),pc/h | 2780 | 262 |
| Capacity (c), pc/h | 7200 | 2100 |
| Volume-to-Capacity Ratio (v/c) | 0.42 | 0.12 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | 9999.0 | Number of Outer Lanes on Freeway (NO) | 1 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 55.000 |
| Downstream Equilibrium Distance (LEQ), ft | 9999.0 | Flow Outer Lanes (vOA), pc/h/ln | 0 |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 75.4 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.0 |
| Flow in Lanes 1 and 2 (v12), pc/h | 0 | Ramp Junction Speed (S), mi/h | 74.3 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 0 | Average Density (D), pc/mi/ln | 13.4 |
| Level of Service (LOS) | B | Density in Ramp Influence Area (DR), pc/mi/ln | 13.4 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 6 | Segment Name | East of Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 3 | Terrain Type | Level |
| Segment Length (L), ft | 4335 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2537 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1011 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.42 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.6 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 13.7 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

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# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Analyst | | Date | 9/8/2021 |
| Agency | LSA | Analysis Year | 2023 Near Term Approved and Pending |
| Jurisdiction | Caltrans | Time Period Analyzed | A.M. Peak Hour |
| Project Description | | Unit | United States Customary |
| Segment Number | 1 | Segment Name | East of Marks Avenue |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 3 | Terrain Type | Level |
| Segment Length (L), ft | 2300 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2258 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.898 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 892 |
| Total Trucks, % | 11.40 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.37 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.6 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 12.1 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 2 | Segment Name | East of Marks Avenue |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 4 | Terrain Type | Level |
| Segment Length (L), ft | 185 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2258 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.898 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 669 |
| Total Trucks, % | 11.40 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.28 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.6 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 9.1 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | A |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Diverge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 3 | Segment Name | Marks Avenue Off-Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 4 | 2 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Deceleration Length (LA),ft | 1500 | 1500 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided Two-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 2258 | 616 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 11.40 | 8.80 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.898 | 0.919 |
| Flow Rate (vi),pc/h | 2675 | 713 |
| Capacity (c), pc/h | 9600 | 4200 |
| Volume-to-Capacity Ratio (v/c) | 0.28 | 0.17 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 2 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (DS) | 0.362 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | 726 |
| Distance to Downstream Ramp (LDOWN), ft | - | Off-Ramp Influence Area Speed (SR), mi/h | 63.3 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFD) | 0.260 | Outer Lanes Freeway Speed (SO), mi/h | 82.7 |
| Flow in Lanes 1 and 2 (v12), pc/h | 1223 | Ramp Junction Speed (S), mi/h | 72.5 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | - | Average Density (D), pc/mi/ln | 9.2 |
| Level of Service (LOS) | A | Density in Ramp Influence Area (DR), pc/mi/ln | 1.3 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 4 | Segment Name | Marks Avenue Off-Ramp to Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 3 | Terrain Type | Level |
| Segment Length (L), ft | 10 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 1642 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 654 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.27 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.3 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 8.9 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | A |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 5 | Segment Name | Marks Avenue Off-Ramp to Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 1500 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 1642 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 982 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.41 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.5 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 13.3 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Merge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 6 | Segment Name | Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 25.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1120 | 800 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 1642 | 11 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.30 | 0.00 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.890 | 1.000 |
| Flow Rate (vi),pc/h | 1963 | 12 |
| Capacity (c), pc/h | 4800 | 1900 |
| Volume-to-Capacity Ratio (v/c) | 0.41 | 0.01 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 0.309 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 65.1 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.4 |
| Flow in Lanes 1 and 2 (v12), pc/h | 1963 | Ramp Junction Speed (S), mi/h | 65.1 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 1975 | Average Density (D), pc/mi/ln | 15.2 |
| Level of Service (LOS) | B | Density in Ramp Influence Area (DR), pc/mi/ln | 15.9 |

# HCS7 Freeway Merge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 7 | Segment Name | Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1500 | 900 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 1653 | 26 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.30 | 26.30 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.890 | 0.792 |
| Flow Rate (vi),pc/h | 1976 | 35 |
| Capacity (c), pc/h | 4800 | 2100 |
| Volume-to-Capacity Ratio (v/c) | 0.42 | 0.02 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 0.269 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 66.4 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.4 |
| Flow in Lanes 1 and 2 (v12), pc/h | 1976 | Ramp Junction Speed (S), mi/h | 66.4 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 2011 | Average Density (D), pc/mi/ln | 15.1 |
| Level of Service (LOS) | B | Density in Ramp Influence Area (DR), pc/mi/ln | 15.6 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 8 | Segment Name | West of Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 2060 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 1679 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.889 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1004 |
| Total Trucks, % | 12.50 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.42 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.2 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 13.6 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

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# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Analyst | | Date | 9/8/2021 |
| Agency | LSA | Analysis Year | 2023 Near Term Approved and Pending WP |
| Jurisdiction | Caltrans | Time Period Analyzed | P.M. Peak Hour |
| Project Description | | Unit | United States Customary |
| Segment Number | 1 | Segment Name | West of Marks Avenue |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 2530 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 1499 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 896 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.37 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.6 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 12.2 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Diverge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 2 | Segment Name | Marks Avenue Off-Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Deceleration Length (LA),ft | 1500 | 165 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 1499 | 49 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.30 | 11.40 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.890 | 0.898 |
| Flow Rate (vi),pc/h | 1792 | 58 |
| Capacity (c), pc/h | 4800 | 2100 |
| Volume-to-Capacity Ratio (v/c) | 0.37 | 0.03 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (DS) | 0.303 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | Off-Ramp Influence Area Speed (SR), mi/h | 65.3 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFD) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 82.7 |
| Flow in Lanes 1 and 2 (v12), pc/h | 1792 | Ramp Junction Speed (S), mi/h | 65.3 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | - | Average Density (D), pc/mi/ln | 13.7 |
| Level of Service (LOS) | B | Density in Ramp Influence Area (DR), pc/mi/ln | 18.2 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 3 | Segment Name | Marks Avenue Off-Ramp to Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 1560 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 1450 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 866 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.36 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 72.9 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 11.8 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Merge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 4 | Segment Name | Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 25.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1360 | 930 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 1450 | 328 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.30 | 5.80 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.890 | 0.945 |
| Flow Rate (vi),pc/h | 1733 | 369 |
| Capacity (c), pc/h | 4800 | 1900 |
| Volume-to-Capacity Ratio (v/c) | 0.44 | 0.19 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 0.306 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 65.2 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.4 |
| Flow in Lanes 1 and 2 (v12), pc/h | 1733 | Ramp Junction Speed (S), mi/h | 65.2 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 2102 | Average Density (D), pc/mi/ln | 16.1 |
| Level of Service (LOS) | B | Density in Ramp Influence Area (DR), pc/mi/ln | 15.9 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 5 | Segment Name | Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 3 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1500 | 800 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 1778 | 284 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 11.10 | 0.80 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.900 | 0.992 |
| Flow Rate (vi),pc/h | 2102 | 305 |
| Capacity (c), pc/h | 7200 | 2100 |
| Volume-to-Capacity Ratio (v/c) | 0.33 | 0.15 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | 9999.0 | Number of Outer Lanes on Freeway (NO) | 1 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 55.000 |
| Downstream Equilibrium Distance (LEQ), ft | 9999.0 | Flow Outer Lanes (vOA), pc/h/ln | 0 |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 75.4 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.0 |
| Flow in Lanes 1 and 2 (v12), pc/h | 0 | Ramp Junction Speed (S), mi/h | 74.4 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 0 | Average Density (D), pc/mi/ln | 10.6 |
| Level of Service (LOS) | A | Density in Ramp Influence Area (DR), pc/mi/ln | 10.6 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 6 | Segment Name | East of Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 3 | Terrain Type | Level |
| Segment Length (L), ft | 4335 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2062 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.912 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 802 |
| Total Trucks, % | 9.70 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.33 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.6 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 10.9 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | A |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

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# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Analyst | | Date | 9/8/2021 |
| Agency | LSA | Analysis Year | 2023 Near Term Approved and Pending |
| Jurisdiction | Caltrans | Time Period Analyzed | P.M. Peak Hour |
| Project Description | | Unit | United States Customary |
| Segment Number | 1 | Segment Name | East of Marks Avenue |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 3 | Terrain Type | Level |
| Segment Length (L), ft | 2300 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2761 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.889 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1101 |
| Total Trucks, % | 12.50 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.46 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.6 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 15.0 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 2 | Segment Name | East of Marks Avenue |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 4 | Terrain Type | Level |
| Segment Length (L), ft | 185 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2761 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.889 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 826 |
| Total Trucks, % | 12.50 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.34 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.6 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 11.2 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Diverge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 3 | Segment Name | Marks Avenue Off-Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 4 | 2 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Deceleration Length (LA),ft | 1500 | 1500 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided Two-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 2761 | 793 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.50 | 12.80 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.889 | 0.887 |
| Flow Rate (vi),pc/h | 3304 | 951 |
| Capacity (c), pc/h | 9600 | 4200 |
| Volume-to-Capacity Ratio (v/c) | 0.34 | 0.23 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 2 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (DS) | 0.384 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | 871 |
| Distance to Downstream Ramp (LDOWN), ft | - | Off-Ramp Influence Area Speed (SR), mi/h | 62.6 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFD) | 0.260 | Outer Lanes Freeway Speed (SO), mi/h | 82.7 |
| Flow in Lanes 1 and 2 (v12), pc/h | 1563 | Ramp Junction Speed (S), mi/h | 71.8 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | - | Average Density (D), pc/mi/ln | 11.5 |
| Level of Service (LOS) | A | Density in Ramp Influence Area (DR), pc/mi/ln | 4.2 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 4 | Segment Name | Marks Avenue Off-Ramp to Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 3 | Terrain Type | Level |
| Segment Length (L), ft | 10 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 1968 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 784 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.33 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.1 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 10.7 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | A |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 5 | Segment Name | Marks Avenue Off-Ramp to Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 1500 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 1968 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1176 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.49 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.4 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 16.0 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Merge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 6 | Segment Name | Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 25.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1120 | 800 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 1968 | 16 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.30 | 0.00 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.890 | 1.000 |
| Flow Rate (vi),pc/h | 2352 | 17 |
| Capacity (c), pc/h | 4800 | 1900 |
| Volume-to-Capacity Ratio (v/c) | 0.49 | 0.01 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 0.323 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 64.6 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.4 |
| Flow in Lanes 1 and 2 (v12), pc/h | 2352 | Ramp Junction Speed (S), mi/h | 64.6 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 2369 | Average Density (D), pc/mi/ln | 18.3 |
| Level of Service (LOS) | B | Density in Ramp Influence Area (DR), pc/mi/ln | 19.0 |

# HCS7 Freeway Merge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 7 | Segment Name | Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1500 | 900 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 1984 | 38 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.20 | 15.00 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.891 | 0.870 |
| Flow Rate (vi),pc/h | 2369 | 46 |
| Capacity (c), pc/h | 4800 | 2100 |
| Volume-to-Capacity Ratio (v/c) | 0.50 | 0.02 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 0.284 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 65.9 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.4 |
| Flow in Lanes 1 and 2 (v12), pc/h | 2369 | Ramp Junction Speed (S), mi/h | 65.9 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 2415 | Average Density (D), pc/mi/ln | 18.3 |
| Level of Service (LOS) | B | Density in Ramp Influence Area (DR), pc/mi/ln | 18.7 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 8 | Segment Name | West of Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 2060 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2022 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1208 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.50 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.2 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 16.5 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

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# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Analyst | | Date | 9/8/2021 |
| Agency | LSA | Analysis Year | 2040 |
| Jurisdiction | Caltrans | Time Period Analyzed | A.M. Peak Hour |
| Project Description | | Unit | United States Customary |
| Segment Number | 1 | Segment Name | West of Marks Avenue |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 2530 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2655 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.891 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1585 |
| Total Trucks, % | 12.20 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.66 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 70.5 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 22.5 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | C |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Diverge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 2 | Segment Name | Marks Avenue Off-Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Deceleration Length (LA),ft | 1500 | 165 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 2655 | 43 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.20 | 0.00 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.891 | 1.000 |
| Flow Rate (vi),pc/h | 3170 | 46 |
| Capacity (c), pc/h | 4800 | 2100 |
| Volume-to-Capacity Ratio (v/c) | 0.66 | 0.02 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (DS) | 0.302 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | Off-Ramp Influence Area Speed (SR), mi/h | 65.3 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFD) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 82.7 |
| Flow in Lanes 1 and 2 (v12), pc/h | 3170 | Ramp Junction Speed (S), mi/h | 65.3 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | - | Average Density (D), pc/mi/ln | 24.3 |
| Level of Service (LOS) | D | Density in Ramp Influence Area (DR), pc/mi/ln | 30.0 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 3 | Segment Name | Marks Avenue Off-Ramp to Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 1560 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2612 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1561 |
| Total Trucks, % | 12.40 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.65 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 70.7 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 22.1 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | C |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Merge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 4 | Segment Name | Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 25.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1360 | 930 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 2612 | 273 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.40 | 23.00 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.890 | 0.813 |
| Flow Rate (vi),pc/h | 3122 | 357 |
| Capacity (c), pc/h | 4800 | 1900 |
| Volume-to-Capacity Ratio (v/c) | 0.72 | 0.19 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 0.401 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 62.0 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.4 |
| Flow in Lanes 1 and 2 (v12), pc/h | 3122 | Ramp Junction Speed (S), mi/h | 62.0 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 3479 | Average Density (D), pc/mi/ln | 28.1 |
| Level of Service (LOS) | C | Density in Ramp Influence Area (DR), pc/mi/ln | 26.7 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 5 | Segment Name | Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 3 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1500 | 800 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 2885 | 345 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 13.40 | 3.70 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.882 | 0.964 |
| Flow Rate (vi),pc/h | 3480 | 381 |
| Capacity (c), pc/h | 7200 | 2100 |
| Volume-to-Capacity Ratio (v/c) | 0.54 | 0.18 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | 9999.0 | Number of Outer Lanes on Freeway (NO) | 1 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 55.000 |
| Downstream Equilibrium Distance (LEQ), ft | 9999.0 | Flow Outer Lanes (vOA), pc/h/ln | 0 |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 74.4 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.0 |
| Flow in Lanes 1 and 2 (v12), pc/h | 0 | Ramp Junction Speed (S), mi/h | 74.1 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 0 | Average Density (D), pc/mi/ln | 17.3 |
| Level of Service (LOS) | B | Density in Ramp Influence Area (DR), pc/mi/ln | 17.3 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 6 | Segment Name | East of Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 3 | Terrain Type | Level |
| Segment Length (L), ft | 4335 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 3230 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1287 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.54 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.0 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 17.6 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

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# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Analyst | | Date | 9/8/2021 |
| Agency | LSA | Analysis Year | 2035 Cumulative WP |
| Jurisdiction | Caltrans | Time Period Analyzed | A.M. Peak Hour |
| Project Description | | Unit | United States Customary |
| Segment Number | 1 | Segment Name | East of Marks Avenue |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 3 | Terrain Type | Level |
| Segment Length (L), ft | 2300 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2564 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.898 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1012 |
| Total Trucks, % | 11.40 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.42 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.6 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 13.8 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 2 | Segment Name | East of Marks Avenue |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 4 | Terrain Type | Level |
| Segment Length (L), ft | 185 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2564 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.898 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 759 |
| Total Trucks, % | 11.40 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.32 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.6 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 10.3 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | A |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Diverge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 3 | Segment Name | Marks Avenue Off-Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 4 | 2 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Deceleration Length (LA),ft | 1500 | 1500 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided Two-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 2564 | 683 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 11.40 | 8.80 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.898 | 0.919 |
| Flow Rate (vi),pc/h | 3037 | 791 |
| Capacity (c), pc/h | 9600 | 4200 |
| Volume-to-Capacity Ratio (v/c) | 0.32 | 0.19 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 2 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (DS) | 0.369 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | 831 |
| Distance to Downstream Ramp (LDOWN), ft | - | Off-Ramp Influence Area Speed (SR), mi/h | 63.1 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFD) | 0.260 | Outer Lanes Freeway Speed (SO), mi/h | 82.7 |
| Flow in Lanes 1 and 2 (v12), pc/h | 1375 | Ramp Junction Speed (S), mi/h | 72.5 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | - | Average Density (D), pc/mi/ln | 10.5 |
| Level of Service (LOS) | A | Density in Ramp Influence Area (DR), pc/mi/ln | 2.6 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 4 | Segment Name | Marks Avenue Off-Ramp to Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 3 | Terrain Type | Level |
| Segment Length (L), ft | 10 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 1881 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 749 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.31 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.3 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 10.2 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | A |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 5 | Segment Name | Marks Avenue Off-Ramp to Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 1500 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 1881 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1124 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.47 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.5 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 15.3 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Merge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 6 | Segment Name | Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 25.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1120 | 800 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 1881 | 15 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.30 | 0.00 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.890 | 1.000 |
| Flow Rate (vi),pc/h | 2248 | 16 |
| Capacity (c), pc/h | 4800 | 1900 |
| Volume-to-Capacity Ratio (v/c) | 0.47 | 0.01 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 0.319 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 64.7 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.4 |
| Flow in Lanes 1 and 2 (v12), pc/h | 2248 | Ramp Junction Speed (S), mi/h | 64.7 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 2264 | Average Density (D), pc/mi/ln | 17.5 |
| Level of Service (LOS) | B | Density in Ramp Influence Area (DR), pc/mi/ln | 18.2 |

# HCS7 Freeway Merge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 7 | Segment Name | Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1500 | 900 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 1896 | 29 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.20 | 26.30 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.891 | 0.792 |
| Flow Rate (vi),pc/h | 2264 | 39 |
| Capacity (c), pc/h | 4800 | 2100 |
| Volume-to-Capacity Ratio (v/c) | 0.48 | 0.02 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 0.279 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 66.1 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.4 |
| Flow in Lanes 1 and 2 (v12), pc/h | 2264 | Ramp Junction Speed (S), mi/h | 66.1 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 2303 | Average Density (D), pc/mi/ln | 17.4 |
| Level of Service (LOS) | B | Density in Ramp Influence Area (DR), pc/mi/ln | 17.8 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 8 | Segment Name | West of Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 2060 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 1925 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.889 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1152 |
| Total Trucks, % | 12.50 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.48 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.2 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 15.7 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

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# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Analyst | | Date | 9/8/2021 |
| Agency | LSA | Analysis Year | 2035 |
| Jurisdiction | Caltrans | Time Period Analyzed | P.M. Peak Hour |
| Project Description | | Unit | United States Customary |
| Segment Number | 1 | Segment Name | West of Marks Avenue |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 2530 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 1846 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1104 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.46 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.6 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 15.0 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Diverge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 2 | Segment Name | Marks Avenue Off-Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Deceleration Length (LA),ft | 1500 | 165 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 1846 | 52 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.20 | 11.40 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.891 | 0.898 |
| Flow Rate (vi),pc/h | 2204 | 62 |
| Capacity (c), pc/h | 4800 | 2100 |
| Volume-to-Capacity Ratio (v/c) | 0.46 | 0.03 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (DS) | 0.304 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | Off-Ramp Influence Area Speed (SR), mi/h | 65.2 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFD) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 82.7 |
| Flow in Lanes 1 and 2 (v12), pc/h | 2204 | Ramp Junction Speed (S), mi/h | 65.2 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | - | Average Density (D), pc/mi/ln | 16.9 |
| Level of Service (LOS) | C | Density in Ramp Influence Area (DR), pc/mi/ln | 21.7 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 3 | Segment Name | Marks Avenue Off-Ramp to Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 1560 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 1794 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1072 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.45 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 72.9 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 14.6 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Merge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 4 | Segment Name | Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 25.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1360 | 930 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 1794 | 344 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.30 | 5.80 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.890 | 0.945 |
| Flow Rate (vi),pc/h | 2144 | 387 |
| Capacity (c), pc/h | 4800 | 1900 |
| Volume-to-Capacity Ratio (v/c) | 0.53 | 0.20 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 0.324 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 64.6 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.4 |
| Flow in Lanes 1 and 2 (v12), pc/h | 2144 | Ramp Junction Speed (S), mi/h | 64.6 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 2531 | Average Density (D), pc/mi/ln | 19.6 |
| Level of Service (LOS) | B | Density in Ramp Influence Area (DR), pc/mi/ln | 19.3 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 5 | Segment Name | Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 3 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1500 | 800 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 2138 | 294 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 11.30 | 0.80 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.898 | 0.992 |
| Flow Rate (vi),pc/h | 2533 | 315 |
| Capacity (c), pc/h | 7200 | 2100 |
| Volume-to-Capacity Ratio (v/c) | 0.40 | 0.15 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | 9999.0 | Number of Outer Lanes on Freeway (NO) | 1 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 55.000 |
| Downstream Equilibrium Distance (LEQ), ft | 9999.0 | Flow Outer Lanes (vOA), pc/h/ln | 0 |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 75.4 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.0 |
| Flow in Lanes 1 and 2 (v12), pc/h | 0 | Ramp Junction Speed (S), mi/h | 74.3 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 0 | Average Density (D), pc/mi/ln | 12.6 |
| Level of Service (LOS) | B | Density in Ramp Influence Area (DR), pc/mi/ln | 12.6 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 6 | Segment Name | East of Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 3 | Terrain Type | Level |
| Segment Length (L), ft | 4335 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2432 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.909 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 949 |
| Total Trucks, % | 10.00 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.40 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.6 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 12.9 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

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# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Analyst | | Date | 9/8/2021 |
| Agency | LSA | Analysis Year | 2035 Cumulative WP |
| Jurisdiction | Caltrans | Time Period Analyzed | P.M. Peak Hour |
| Project Description | | Unit | United States Customary |
| Segment Number | 1 | Segment Name | East of Marks Avenue |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 3 | Terrain Type | Level |
| Segment Length (L), ft | 2300 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 3547 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.889 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1415 |
| Total Trucks, % | 12.50 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.59 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 72.2 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 19.6 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | C |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 2 | Segment Name | East of Marks Avenue |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 4 | Terrain Type | Level |
| Segment Length (L), ft | 185 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 3547 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.889 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1061 |
| Total Trucks, % | 12.50 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.44 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.4 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 14.4 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Diverge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 3 | Segment Name | Marks Avenue Off-Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 4 | 2 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Deceleration Length (LA),ft | 1500 | 1500 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided Two-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 3547 | 924 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.50 | 12.80 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.889 | 0.887 |
| Flow Rate (vi),pc/h | 4245 | 1108 |
| Capacity (c), pc/h | 9600 | 4200 |
| Volume-to-Capacity Ratio (v/c) | 0.44 | 0.26 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 2 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (DS) | 0.398 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | 1161 |
| Distance to Downstream Ramp (LDOWN), ft | - | Off-Ramp Influence Area Speed (SR), mi/h | 62.1 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFD) | 0.260 | Outer Lanes Freeway Speed (SO), mi/h | 82.1 |
| Flow in Lanes 1 and 2 (v12), pc/h | 1924 | Ramp Junction Speed (S), mi/h | 71.6 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | - | Average Density (D), pc/mi/ln | 14.8 |
| Level of Service (LOS) | A | Density in Ramp Influence Area (DR), pc/mi/ln | 7.3 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 4 | Segment Name | Marks Avenue Off-Ramp to Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 3 | Terrain Type | Level |
| Segment Length (L), ft | 10 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2623 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1045 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.44 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 73.0 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 14.2 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | B |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 5 | Segment Name | Marks Avenue Off-Ramp to Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 1500 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2623 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.890 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1568 |
| Total Trucks, % | 12.30 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.65 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 70.7 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 22.2 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | C |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

# HCS7 Freeway Merge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 6 | Segment Name | Marks Avenue Loop-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 25.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1120 | 800 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 2623 | 18 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.30 | 0.00 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.890 | 1.000 |
| Flow Rate (vi),pc/h | 3135 | 19 |
| Capacity (c), pc/h | 4800 | 1900 |
| Volume-to-Capacity Ratio (v/c) | 0.66 | 0.01 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 0.372 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 63.0 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.4 |
| Flow in Lanes 1 and 2 (v12), pc/h | 3135 | Ramp Junction Speed (S), mi/h | 63.0 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 3154 | Average Density (D), pc/mi/ln | 25.0 |
| Level of Service (LOS) | C | Density in Ramp Influence Area (DR), pc/mi/ln | 25.1 |

# HCS7 Freeway Merge Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 7 | Segment Name | Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | Freeway | Ramp |
|---|---|---|
| Number of Lanes (N), ln | 2 | 1 |
| Free-Flow Speed (FFS), mi/h | 75.4 | 45.0 |
| Segment Length (L) / Acceleration Length (LA),ft | 1500 | 900 |
| Terrain Type | Level | Level |
| Percent Grade, % | - | - |
| Segment Type / Ramp Type | Freeway | Right-Sided One-Lane |

## Adjustment Factors

| | | |
|---|---|---|
| Driver Population | All Familiar | All Familiar |
| Weather Type | Non-Severe Weather | Non-Severe Weather |
| Incident Type | No Incident | - |
| Final Speed Adjustment Factor (SAF) | 1.000 | 1.000 |
| Final Capacity Adjustment Factor (CAF) | 1.000 | 1.000 |
| Demand Adjustment Factor (DAF) | 1.000 | 1.000 |

## Demand and Capacity

| | | |
|---|---|---|
| Demand Volume (Vi) | 2641 | 41 |
| Peak Hour Factor (PHF) | 0.94 | 0.94 |
| Total Trucks, % | 12.30 | 15.00 |
| Single-Unit Trucks (SUT), % | - | - |
| Tractor-Trailers (TT), % | - | - |
| Heavy Vehicle Adjustment Factor (fHV) | 0.890 | 0.870 |
| Flow Rate (vi),pc/h | 3157 | 50 |
| Capacity (c), pc/h | 4800 | 2100 |
| Volume-to-Capacity Ratio (v/c) | 0.67 | 0.02 |

## Speed and Density

| | | | |
|---|---|---|---|
| Upstream Equilibrium Distance (LEQ), ft | - | Number of Outer Lanes on Freeway (NO) | 0 |
| Distance to Upstream Ramp (LUP), ft | - | Speed Index (MS) | 0.336 |
| Downstream Equilibrium Distance (LEQ), ft | - | Flow Outer Lanes (vOA), pc/h/ln | - |
| Distance to Downstream Ramp (LDOWN), ft | - | On-Ramp Influence Area Speed (SR), mi/h | 64.2 |
| Prop. Freeway Vehicles in Lane 1 and 2 (PFM) | 1.000 | Outer Lanes Freeway Speed (SO), mi/h | 75.4 |
| Flow in Lanes 1 and 2 (v12), pc/h | 3157 | Ramp Junction Speed (S), mi/h | 64.2 |
| Flow Entering Ramp-Infl. Area (vR12), pc/h | 3207 | Average Density (D), pc/mi/ln | 25.0 |
| Level of Service (LOS) | C | Density in Ramp Influence Area (DR), pc/mi/ln | 24.9 |

# HCS7 Basic Freeway Report

## Project Information

| | | | |
|---|---|---|---|
| Segment Number | 8 | Segment Name | West of Marks Avenue Slip-On Ramp |
| Time Period Number | 1 | Segment Analysis Time Period | 07:00-07:15 |

## Geometric Data

| | | | |
|---|---|---|---|
| Number of Lanes, ln | 2 | Terrain Type | Level |
| Segment Length (L), ft | 2060 | Percent Grade, % | - |
| Measured or Base Free-Flow Speed | Base | Grade Length, mi | - |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 0.50 |
| Lane Width, ft | 12 | Free-Flow Speed (FFS), mi/h | 73.6 |
| Right-Side Lateral Clearance, ft | 10 | | |

## Adjustment Factors

| | | | |
|---|---|---|---|
| Driver Population | All Familiar | Final Speed Adjustment Factor (SAF) | 1.000 |
| Weather Type | Non-Severe Weather | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Incident Type | No Incident | Demand Adjustment Factor (DAF) | 1.000 |

## Demand and Capacity

| | | | |
|---|---|---|---|
| Demand Volume veh/h | 2682 | Heavy Vehicle Adjustment Factor ($f_{HV}$) | 0.889 |
| Peak Hour Factor | 0.94 | Flow Rate ($V_p$), pc/h/ln | 1604 |
| Total Trucks, % | 12.50 | Capacity (c), pc/h/ln | 2400 |
| Single-Unit Trucks (SUT), % | - | Adjusted Capacity ($c_{adj}$), pc/h/ln | 2400 |
| Tractor-Trailers (TT), % | - | Volume-to-Capacity Ratio (v/c) | 0.67 |
| Passenger Car Equivalent ($E_T$) | 2.000 | | |

## Speed and Density

| | | | |
|---|---|---|---|
| Lane Width Adjustment ($f_{LW}$) | 0.0 | Average Speed (S), mi/h | 70.2 |
| Right-Side Lateral Clearance Adj. ($f_{RLC}$) | 0.0 | Density (D), pc/mi/ln | 22.8 |
| Total Ramp Density Adjustment | 1.8 | Level of Service (LOS) | C |
| Adjusted Free-Flow Speed ($FFS_{adj}$), mi/h | 73.6 | | |

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# APPENDIX G:

# VEHICLE MILES TRAVELED ANALYSIS WORKSHEET

LSA

# Appendix G

**VMT Calculation Worksheet**

## 2740 W Nielsen Ave - VMT Analysis

*Dt: 11/21/2021*

| 2019 | Project | Regional Threshold * |
|---|---|---|
| Total Employees (a) | 4,920 | |
| Internal-Internal (II) employee tour and sub-tour VMT (b) | 63,890 | |
| II VMT per employee (c=b/a) | 13.0 | |
| | | |
| External-Internal (XI) VMT per employee (TAZ 1375) (d) | 6.4 | |
| Total (II+XI) VMT per employee (e=c+d) | 19.4 | |
| Adjustment for new base (City of Fresno) (f) | 1.02 | |
| | | |
| **VMT per employee (g=e*f)** | **19.8** | **25.6** |

**: Regional Threshold obtained from CEQA Guidelines for Vehicle Miles Traveled Thresholds for the City of Fresno , Adopted: June 25, 2020*

*notes: Original/Parent TAZ for the project is 723. No development was included in the model for the TAZ 723 resulting in 0 XI VMT. TAZ 1375 was chosen as it has similar characters as project - high employment (303 emp), no residential uses.*

# APPENDIX H:

# CRASH DATA

LSA

## Table H-A - Non-Freeway Collision Summary

| Collision Date | 1/15/2019 | 12/19/2018 |
|---|---|---|
| Collision Time | 17:30 | 17:52 |
| Primary Road | Hughes Avenue | SR-180 Westbound to Marks Avenue |
| Secondary Road | Nielsen Avenue | Marks Avenue |
| Distance from Intersection (ft) | 1185 | 5 |
| Severity of Collision | Fatal | Complaint of Pain |
| Fatality | 1 | 0 |
| Injury | 0 | 1 |
| Pedestrian Involvement | Yes | No |
| Bike Involvement | No | No |
| Motorcycle Involvement | No | No |
| Truck Involvement | No | No |

**Notes:**

Data obtained from the Statewide Integrated Traffic Records System (SWITRS) for the time period of January 2018 to December 2020.

## CALIFORNIA STATE HIGHWAYS
## STATEWIDE TRAVEL AND CRASH RATES

| LANE TYPE | 2018 ROAD MILES | 2018 TRAVEL (MVM) | 2018 CRASHES TOTAL PER MVM | 2018 CRASHES FATAL+ INJURY PER MVM | 2018 VICTIMS FATALITIES PER 100 MVM | 3-YR Rates ( 2016, 2017, 2018) CRASHES TOTAL PER MVM | 3-YR Rates ( 2016, 2017, 2018) CRASHES FATAL + INJURY PER MVM | 3-YR Rates ( 2016, 2017, 2018) VICTIMS FATALITIES PER 100 MVM |
|---|---|---|---|---|---|---|---|---|
| *RURAL (INSIDE + OUTSIDE CITY)* | | | | | | | | |
| 2 AND 3 LN | 7,081.8 | 10,363.0 | 1.04 | 0.46 | 3.45 | 1.10 | 0.49 | 3.55 |
| 4+ UND | 69.1 | 238.5 | 1.13 | 0.44 | 3.77 | 1.09 | 0.42 | 3.67 |
| 4+ DIV | 321.9 | 1,757.0 | 0.81 | 0.29 | 1.42 | 0.88 | 0.32 | 1.47 |
| SUBTOTAL | 7,472.7 | 12,358.5 | 1.01 | 0.44 | 3.17 | 1.07 | 0.46 | 3.27 |
| 2 AND 3 LN EXP | 712.5 | 1,671.2 | 0.72 | 0.29 | 2.09 | 0.75 | 0.32 | 2.32 |
| 4+ DIV EXP | 568.9 | 3,774.2 | 0.61 | 0.22 | 1.17 | 0.64 | 0.23 | 1.27 |
| NON FWY | 8,754.2 | 17,804.0 | 0.90 | 0.38 | 2.65 | 0.95 | 0.40 | 2.76 |
| FREEWAY | 1,719.3 | 24,489.7 | 0.50 | 0.17 | 0.88 | 0.51 | 0.17 | 0.88 |
| TOTAL | 10,473.5 | 42,293.7 | 0.67 | 0.25 | 1.62 | 0.69 | 0.27 | 1.67 |
| *URBAN (INSIDE + OUTSIDE CITY)* | | | | | | | | |
| 2 AND 3 LN | 918.2 | 3,639.0 | 1.29 | 0.54 | 1.84 | 1.32 | 0.56 | 1.93 |
| 4+ UND | 86.5 | 702.5 | 1.46 | 0.68 | 2.28 | 1.61 | 0.72 | 2.06 |
| 4+ DIV | 591.2 | 6,958.4 | 1.24 | 0.62 | 1.55 | 1.32 | 0.64 | 1.50 |
| SUBTOTAL | 1,595.9 | 11,299.9 | 1.27 | 0.60 | 1.69 | 1.34 | 0.62 | 1.67 |
| 2 AND 3 LN EXP | 101.4 | 403.0 | 0.86 | 0.32 | 1.24 | 0.90 | 0.36 | 1.34 |
| 4+ DIV EXP | 185.1 | 2,452.0 | 0.84 | 0.32 | 0.94 | 0.86 | 0.34 | 1.05 |
| NON FWY | 1,882.4 | 14,154.9 | 1.18 | 0.54 | 1.55 | 1.24 | 0.56 | 1.55 |
| FREEWAY | 2,687.3 | 134,454.1 | 1.04 | 0.33 | 0.47 | 1.04 | 0.33 | 0.49 |
| TOTAL | 4,569.7 | 148,609.0 | 1.06 | 0.35 | 0.58 | 1.06 | 0.35 | 0.59 |
| *STATEWIDE* | | | | | | | | |
| 2 AND 3 LN | 8,000.0 | 14,002.0 | 1.11 | 0.48 | 3.04 | 1.16 | 0.51 | 3.13 |
| 4+ UND | 155.5 | 941.0 | 1.37 | 0.62 | 2.66 | 1.48 | 0.65 | 2.47 |
| 4+ DIV | 913.1 | 8,715.4 | 1.15 | 0.55 | 1.53 | 1.24 | 0.58 | 1.50 |
| SUBTOTAL | 9,068.7 | 23,658.4 | 1.13 | 0.51 | 2.46 | 1.20 | 0.54 | 2.50 |
| 2 AND 3 LN EXP | 813.9 | 2,074.3 | 0.74 | 0.29 | 1.93 | 0.78 | 0.32 | 2.12 |
| 4+ DIV EXP | 754.1 | 6,226.2 | 0.70 | 0.26 | 1.08 | 0.73 | 0.28 | 1.19 |
| NON FWY | 10,636.6 | 31,958.9 | 1.02 | 0.45 | 2.16 | 1.08 | 0.47 | 2.22 |
| FREEWAY | 4,406.6 | 158,943.8 | 0.96 | 0.30 | 0.54 | 0.96 | 0.31 | 0.55 |
| TOTAL | 15,043.2 | 190,902.7 | 0.97 | 0.33 | 0.81 | 0.98 | 0.33 | 0.83 |

# Statewide Travel / Crash Summary

**FOR 2018 PREPARED 10/08/2020**

**TRAVEL AND CRASH SUMMARY FOR FRE COUNTY**

| LANE TYPE | ROAD MILES | TRAVEL (MVM) | CRASHES TOTAL | CRASHES PDO | CRASHES INJURY | CRASHES FATAL | VICTIMS KILLED | VICTIMS INJURED |
|---|---|---|---|---|---|---|---|---|
| *RURAL* | | | | | | | | |
| 2 AND 3 LN | 308.6 | 521.6 | 467 | 262 | 193 | 12 | 14 | 322 |
| 4+ UND | 1.8 | 6.1 | 18 | 9 | 7 | 2 | 2 | 9 |
| 4+ DIV | 9.2 | 84.2 | 93 | 56 | 34 | 3 | 3 | 68 |
| SUBTOTAL | 319.5 | 611.8 | 578 | 327 | 234 | 17 | 19 | 399 |
| 2 AND 3 LN EXP | 8.0 | 37.8 | 38 | 24 | 14 | 0 | 0 | 24 |
| 4+ DIV EXP | 9.3 | 21.4 | 11 | 7 | 4 | 0 | 0 | 4 |
| NON FWY | 336.9 | 671.1 | 627 | 358 | 252 | 17 | 19 | 427 |
| FREEWAY | 67.0 | 986.2 | 321 | 207 | 107 | 7 | 10 | 199 |
| TOTAL | 403.9 | 1,657.3 | 948 | 565 | 359 | 24 | 29 | 626 |
| *URBAN* | | | | | | | | |
| 2 AND 3 LN | 39.4 | 72.6 | 72 | 40 | 32 | 0 | 0 | 61 |
| 4+ UND | 2.5 | 6.0 | 10 | 6 | 4 | 0 | 0 | 5 |
| 4+ DIV | 4.1 | 14.6 | 27 | 16 | 11 | 0 | 0 | 20 |
| SUBTOTAL | 46.0 | 93.2 | 109 | 62 | 47 | 0 | 0 | 86 |
| 2 AND 3 LN EXP | 0.2 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4+ DIV EXP | 0.0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NON FWY | 46.3 | 93.5 | 109 | 62 | 47 | 0 | 0 | 86 |
| FREEWAY | 68.4 | 2,147.1 | 2,192 | 1,550 | 635 | 7 | 7 | 965 |
| TOTAL | 114.6 | 2,240.7 | 2,301 | 1,612 | 682 | 7 | 7 | 1,051 |
| *COUNTYWIDE* | | | | | | | | |
| 2 AND 3 LN | 348.0 | 594.2 | 539 | 302 | 225 | 12 | 14 | 383 |
| 4+ UND | 4.3 | 12.1 | 28 | 15 | 11 | 2 | 2 | 14 |
| 4+ DIV | 13.3 | 98.7 | 120 | 72 | 45 | 3 | 3 | 88 |
| SUBTOTAL | 365.6 | 705.0 | 687 | 389 | 281 | 17 | 19 | 485 |
| 2 AND 3 LN EXP | 8.2 | 38.2 | 38 | 24 | 14 | 0 | 0 | 24 |
| 4+ DIV EXP | 9.3 | 21.4 | 11 | 7 | 4 | 0 | 0 | 4 |
| NON FWY | 383.1 | 764.6 | 736 | 420 | 299 | 17 | 19 | 513 |
| FREEWAY | 135.4 | 3,133.4 | 2,513 | 1,757 | 742 | 14 | 17 | 1,164 |
| TOTAL | 518.6 | 3,898.0 | 3,249 | 2,177 | 1,041 | 31 | 36 | 1,677 |

10/6/2020

## BASIC AVERAGE CRASH RATE TABLE FOR HIGHWAYS

| RATE GROUP | | BASE RATE | + ADT FACTOR | | PCT FAT | PCT INJ | PCT F+I | HIGHWAY TYPE | TERRAIN OR ADT | DESIGN SPEED | AREA | CRASH COSTS ($1,000) F+I | CRASH COSTS ($1,000) ALL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H | 01 | 0.78 | 0.29900 | / | 2.5 | 40.2 | 42.7 | CONVENTIONAL 2 LANES OR LESS | FLAT | <=55 | RURAL | 806.8 | 349.4 |
| H | 02 | 0.70 | 0.00000 | | 3.2 | 38.9 | 42.1 | CONVENTIONAL 2 LANES OR LESS | FLAT | >55 | RURAL | 1001.4 | 426.6 |
| H | 03 | 1.14 | 0.72800 | / | 2.6 | 44.3 | 46.9 | CONVENTIONAL 2 LANES OR LESS | ROLL | <=55 | RURAL | 772.1 | 366.7 |
| H | 04 | 0.65 | 0.47100 | / | 3.5 | 41.5 | 45.0 | CONVENTIONAL 2 LANES OR LESS | ROLL | >55 | RURAL | 1021.1 | 464.2 |
| H | 05 | 1.57 | 0.42100 | / | 2.6 | 47.0 | 49.6 | CONVENTIONAL 2 LANES OR LESS | MTN | <=55 | RURAL | 738.5 | 370.6 |
| H | 06 | 0.91 | 0.47600 | / | 2.8 | 42.3 | 45.1 | CONVENTIONAL 2 LANES OR LESS | MTN | >55 | RURAL | 846.2 | 386.3 |
| H | 07 | 1.60 | 0.00000 | | 1.0 | 38.3 | 39.3 | CONVENTIONAL 2 LANES OR LESS | | <45 | SUBURBAN | 417.1 | 170.6 |
| H | 08 | 1.32 | 0.00000 | | 1.7 | 44.3 | 46.0 | CONVENTIONAL 2 LANES OR LESS | | 45-55 | SUBURBAN | 538.5 | 253.7 |
| H | 09 | 0.62 | 0.02100 | * | 1.7 | 39.4 | 41.1 | CONVENTIONAL 2 LANES OR LESS | | >55 | SUBURBAN | 585.0 | 246.9 |
| H | 10 | 1.20 | 0.00000 | | 1.0 | 39.9 | 40.9 | CONVENTIONAL 2 LANES OR LESS | | <45 | URBAN | 409.2 | 173.1 |
| H | 11 | 0.82 | 0.00000 | | 1.6 | 47.2 | 48.8 | CONVENTIONAL 2 LANES OR LESS | | >=45 | URBAN | 498.0 | 248.0 |
| H | 12 | 1.12 | 0.00000 | | 2.9 | 39.4 | 42.3 | CONVENTIONAL 3 LANES | | | RURAL | 918.3 | 393.4 |
| H | 13 | 1.44 | 0.00000 | | 1.4 | 37.9 | 39.3 | CONVENTIONAL 3 LANES | | | SUBURBAN | 524.5 | 212.8 |
| H | 14 | 1.17 | 0.00000 | | 2.1 | 38.8 | 40.9 | CONVENTIONAL 3 LANES | | | URBAN | 695.7 | 290.3 |
| H | 15 | 0.61 | 0.00000 | | 2.1 | 36.7 | 38.8 | EXPRESSWAY 3 LANES OR LESS | FLAT | | RURAL | 757.5 | 299.2 |
| H | 16 | 0.68 | 0.00000 | | 3.2 | 36.8 | 40.0 | EXPRESSWAY 3 LANES OR LESS | ROLL | | RURAL | 1045.9 | 423.5 |
| H | 17 | 0.97 | 0.00000 | | 2.6 | 40.3 | 42.9 | EXPRESSWAY 3 LANES OR LESS | MTN | | RURAL | 829.7 | 360.9 |
| H | 18 | 0.64 | 0.00000 | | 2.8 | 41.7 | 44.5 | EXPRESSWAY 3 LANES OR LESS | | <=55 | SUBURBAN | 812.5 | 367.7 |
| H | 19 | 0.86 | 0.00000 | | 2.6 | 33.5 | 36.1 | EXPRESSWAY 3 LANES OR LESS | | >55 | SUBURBAN | 908.5 | 335.0 |
| H | 20 | 0.62 | 0.00000 | | 3.0 | 48.8 | 51.8 | EXPRESSWAY 3 LANES OR LESS | | | URBAN | 765.7 | 401.3 |
| H | 21 | 1.05 | 0.00000 | | 1.9 | 34.9 | 36.8 | UNDIVIDED 4 LANES | FLAT | | RURAL | 729.7 | 274.0 |
| H | 22 | 0.73 | 0.00000 | | 2.0 | 34.4 | 36.4 | UNDIVIDED 4 LANES | ROLL/MTN | | RURAL | 766.6 | 284.5 |
| H | 23 | 0.93 | 0.00000 | | 2.1 | 27.4 | 29.5 | UNDIVIDED 4 LANES | | <=55 | SUBURBAN | 899.7 | 273.2 |
| H | 24 | 1.23 | 0.00000 | | 2.0 | 35.5 | 37.5 | UNDIVIDED 4 LANES | | >55 | SUBURBAN | 711.3 | 273.6 |
| H | 25 | 0.94 | 0.00000 | | 0.7 | 38.2 | 38.9 | UNDIVIDED 4 LANES | | <45 | URBAN | 340.5 | 138.4 |
| H | 26 | 0.67 | 0.00000 | | 1.0 | 38.9 | 39.9 | UNDIVIDED 4 LANES | | >=45 | URBAN | 415.7 | 171.7 |
| H | 27 | 0.91 | 0.00000 | | 3.1 | 31.3 | 34.4 | UNDIVIDED 5-6 LANES | FLAT | | RURAL | 1158.6 | 404.2 |
| H | 28 | 0.91 | 0.00000 | | 3.1 | 31.3 | 34.4 | UNDIVIDED 5-6 LANES | ROLL/MTN | | RURAL | 1158.6 | 404.2 |
| H | 29 | 0.41 | 0.00000 | | 2.6 | 48.7 | 51.3 | UNDIVIDED 5-6 LANES | | <=55 | SUBURBAN | 683.4 | 355.9 |
| H | 30 | 0.41 | 0.00000 | | 2.6 | 48.7 | 51.3 | UNDIVIDED 5-6 LANES | | >55 | SUBURBAN | 683.4 | 355.9 |
| H | 31 | 1.37 | 0.00000 | | 1.0 | 33.3 | 34.3 | UNDIVIDED 5-6 LANES | | <45 | URBAN | 459.3 | 163.9 |
| H | 32 | 3.02 | 0.00000 | | 0.4 | 27.0 | 27.4 | UNDIVIDED 5-6 LANES | | >=45 | URBAN | 304.3 | 90.4 |

## BASIC AVERAGE CRASH RATE TABLE FOR INTERSECTIONS

| RATE GROUP | | BASE RATE | + ADT FACTOR | PCT FAT | PCT INJ | PCT F+ I | INTERSECTION TYPE* | CONTROL TYPE | AREA | CRASH COST ($1000) F+I | CRASH COST ($1000) ALL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I | 01 | 0.130 | 0.00000 | 1.4 | 44.4 | 45.8 | F, M and S | NO CONTROL | RURAL | 494.9 | 231.3 |
| I | 02 | 0.250 | 0.00000 | 2.5 | 44.1 | 46.6 | F, M and S | STOP & YIELD SIGNS (EXC 4WAY) | RURAL | 752.2 | 355.1 |
| I | 03 | 0.490 | 0.00000 | 0.8 | 32.7 | 33.5 | F, M and S | 4 WAY STOP | RURAL | 420.4 | 146.5 |
| I | 04 | 0.540 | 0.00000 | 1.0 | 37.0 | 38.0 | F, M and S | SIGNALS | RURAL | 447.5 | 175.4 |
| I | 05 | 0.460 | 0.00000 | 1.5 | 36.0 | 37.5 | F, M and S | 4 WAY FLASHERS | RURAL | 600.0 | 230.4 |
| I | 06 | 0.160 | 0.00000 | 0.8 | 45.8 | 46.6 | F, M and S | NO CONTROL | SUBURBAN | 329.7 | 159.5 |
| I | 07 | 0.240 | 0.00000 | 1.7 | 41.2 | 42.9 | F, M and S | STOP & YIELD SIGNS (EXC 4WAY) | SUBURBAN | 566.7 | 249.4 |
| I | 08 | 0.430 | 0.00000 | 0.7 | 40.3 | 41.0 | F, M and S | 4 WAY STOP | SUBURBAN | 328.7 | 141.3 |
| I | 09 | 0.420 | 0.00000 | 0.5 | 37.4 | 37.9 | F, M and S | SIGNALS | SUBURBAN | 287.8 | 115.9 |
| I | 10 | 0.340 | 0.00000 | 0.8 | 39.9 | 40.7 | F, M and S | 4 WAY FLASHERS | SUBURBAN | 356.0 | 151.4 |
| I | 11 | 0.050 | 0.00000 | 2.6 | 44.9 | 47.5 | F, M and S | NO CONTROL | URBAN | 731.8 | 352.7 |
| I | 12 | 0.140 | 0.00000 | 1.1 | 46.2 | 47.3 | F, M and S | STOP & YIELD SIGNS (EXC 4WAY) | URBAN | 396.5 | 192.7 |
| I | 13 | 0.170 | 0.00000 | 0.4 | 26.8 | 27.2 | F, M and S | 4 WAY STOP | URBAN | 305.4 | 90.1 |
| I | 14 | 0.240 | 0.00000 | 0.5 | 46.9 | 47.4 | F, M and S | SIGNALS | URBAN | 261.2 | 128.9 |
| I | 15 | 0.260 | 0.00000 | 1.5 | 41.4 | 42.9 | F, M and S | 4 WAY FLASHERS | URBAN | 521.2 | 229.1 |
| I | 16 | 0.130 | 0.00000 | 1.4 | 41.0 | 42.4 | T, Y and Z | NO CONTROL | RURAL | 522.2 | 226.4 |
| I | 17 | 0.190 | 0.00000 | 1.7 | 39.8 | 41.5 | T, Y and Z | STOP & YIELD SIGNS (EXC 4WAY) | RURAL | 610.8 | 258.5 |
| I | 18 | 0.560 | 0.00000 | 2.0 | 35.7 | 37.7 | T, Y and Z | 4 WAY STOP | RURAL | 745.5 | 286.4 |
| I | 19 | 0.450 | 0.00000 | 0.5 | 34.6 | 35.1 | T, Y and Z | SIGNALS | RURAL | 313.0 | 115.4 |
| I | 20 | 0.560 | 0.00000 | 2.0 | 35.7 | 37.7 | T, Y and Z | 4 WAY FLASHERS | RURAL | 745.5 | 286.4 |
| I | 21 | 0.140 | 0.00000 | 0.6 | 39.1 | 39.7 | T, Y and Z | NO CONTROL | SUBURBAN | 308.1 | 128.9 |
| I | 22 | 0.170 | 0.00000 | 1.2 | 39.9 | 41.1 | T, Y and Z | STOP & YIELD SIGNS (EXC 4WAY) | SUBURBAN | 456.7 | 194.2 |
| I | 23 | 0.180 | 0.00000 | 1.7 | 25.5 | 27.2 | T, Y and Z | 4 WAY STOP | SUBURBAN | 808.1 | 227.8 |
| I | 24 | 0.290 | 0.00000 | 0.5 | 37.7 | 38.2 | T, Y and Z | SIGNALS | SUBURBAN | 286.7 | 116.3 |
| I | 25 | 0.180 | 0.00000 | 2.9 | 25.5 | 28.4 | T, Y and Z | 4 WAY FLASHERS | SUBURBAN | 1226.0 | 356.1 |
| I | 26 | 0.060 | 0.00000 | 1.9 | 41.7 | 43.6 | T, Y and Z | NO CONTROL | URBAN | 613.0 | 272.7 |
| I | 27 | 0.090 | 0.00000 | 1.2 | 46.9 | 48.1 | T, Y and Z | STOP & YIELD SIGNS (EXC 4WAY) | URBAN | 414.5 | 204.4 |
| I | 28 | 0.070 | 0.00000 | 1.1 | 38.6 | 39.7 | T, Y and Z | 4 WAY STOP | URBAN | 443.9 | 182.1 |
| I | 29 | 0.200 | 0.00000 | 0.5 | 46.8 | 47.3 | T, Y and Z | SIGNALS | URBAN | 261.4 | 128.8 |
| I | 30 | 0.070 | 0.00000 | 2.6 | 38.6 | 41.2 | T, Y and Z | 4 WAY FLASHERS | URBAN | 821.0 | 343.9 |
| I | 31 | 0.740 | 0.00000 | 0.8 | 19.1 | 19.9 | R | YIELD ON ALL APPROACHES | ALL* | 585.5 | 125.0 |