HILLTOP and EUCLID MIXED USE PROJECT

AIR QUALITY STUDY

Prepared for:

Affirmed Housing Group, Inc.
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November 2017

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Hilltop and Euclid Mixed Use Project
City of San Diego, California

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AIR QUALITY STUDY

This report is an analysis of the potential air quality impacts associated with the proposed Hilltop and Euclid Mixed Use Project located on a 9.35 vacant site northwest of the Hilltop Drive intersection with Euclid Avenue, if extended, in the Encanto Community, City of San Diego. The report has been prepared by Birdseye Planning Group under contract to Affirmed Housing Group, Inc., at the request of the City of San Diego to support the discretionary review process. This study analyzes the potential for temporary air quality impacts associated with construction and long-term air quality impacts associated with operation of the proposed project.

PROJECT DESCRIPTION

The proposed project is located on a 9.35 vacant site in the Encanto Community in the City of San Diego. The site is bordered by Euclid Avenue to the east, Hilltop Drive to the south, single family residential property to the west and the San Diego Earthlab educational facility and open space to the north. The site is currently bisected by an arroyo which is a tributary to Chollas Creek. The arroyo runs northwest to southeast through the center of the site. Areas of the site are vegetated with both native and non-native species. Remnant foundations from previous residential development occur on the eastern site boundary along Euclid Avenue.

The proposed project would construct a total of 47 single-family and townhome market-rate residences with related improvements west of the arroyo. A total of 113 affordable apartment units would be constructed on the east side of the site. These would range from studio units to four bedroom units. Approximately 8,300 square feet of commercial space would be installed on the ground floor of the apartment complex facing Euclid Avenue. The project would include various recreational amenities including a community swimming pool, basketball court, gardening space, community room and outdoor gathering areas.

Hilltop Drive is a two-lane east/west collector street that dead-ends at the arroyo crossing located at the southeast corner of the site. The proposed project would extend Hilltop Avenue east to the intersection with Euclid Avenue. This would require placement of fill material in the arroyo and extension of the existing drainage culvert. No fill material would be imported or exported. All graded material would be balanced on-site.

The existing arroyo would be graded, recontoured and restored to maintain water conveyance and habitat function. Approximately .98 acre of revegetation would occur within the arroyo corridor. The arroyo would provide an aesthetic benefit to the overall project.

The proposed project would begin construction in mid to late 2018 and be completed by 2020.

REGULATORY SETTING

Air pollutants are regulated at the national, State, and air basin level; each agency has a different degree of control. The United States Environmental Protection Agency (USEPA) regulates at the national level; the California Air Resources Control Board (CARB) regulates at the State level; and the San Diego Air Pollution Control District (SDAPCD) regulates air quality in San Diego County.

The federal and state governments have been empowered by the federal and state Clean Air Acts to regulate the emission of airborne pollutants and have established ambient air quality standards for the protection of public health. The USEPA is the federal agency designated to administer national air quality regulations, while CARB is the state equivalent in the California Environmental Protection Agency. Local control over air quality management is provided by CARB through multi-county and county-level Air Pollution Control Districts (APCDs) (also referred to as Air Quality Management Districts). CARB establishes statewide air quality standards and is responsible for the control of mobile emission sources, while the local APCDs are responsible for enforcing standards and regulating stationary sources. CARB has established 15 air basins statewide. The City of San Diego is located in the San Diego Air Basin (SDAB), which is under the jurisdiction of the SDAPCD.

California Air Resources Board

CARB, which became part of the California EPA (CalEPA) in 1991, is responsible for ensuring implementation of the California Clean Air Act (CCAA), meeting state requirements of the federal Clean Air Act and establishing California Ambient Air Quality Standards (CAAQSs). It is also responsible for setting emission standards for vehicles sold in California and for other emission sources such as consumer products and certain off-road equipment. CARB also established passenger vehicle fuel specifications and oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level. The CCAA is administered by CARB at the state level and by the Air Quality Management Districts at the regional level. Both state and federal standards are summarized in Table 1. The federal "primary" standards have been established to protect the public health. The federal "secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.

San Diego Air Pollution Control District

The SDAPCD was created to protect the public from the harmful effects of air pollution, achieve and maintain air quality standards, foster community involvement and develop and implement cost-effective programs that meet state and federal mandates while considering environmental and economic impacts.

Specifically, the SDAPCD is responsible for monitoring air quality and planning, implementing, and enforcing programs designed to attain and maintain state and federal ambient air quality standards in the district. Programs developed include air quality rules and regulations that regulate stationary source emissions, including area sources, point sources, and certain mobile source emissions. The SDAPCD is also responsible for establishing permitting requirements for stationary sources and ensuring that new, modified or relocated stationary sources do not create net emissions increases; and thus, are consistent with the region's air quality goals. The

Table 1
Current Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standards	California Standard
Ozone	1-Hour	---	0.09 ppm
	8-Hour	0.070 µg/m^3	0.070 µg/m^3
PM_{10}	24-Hour	150 µg/m^3	50 µg/m^3
	Annual	---	20 µg/m^3
$PM_{2.5}$	24-Hour	35 µg/m^3	---
	Annual	12 µg/m^3	12 µg/m^3
Carbon Monoxide	8-Hour	9.0 ppm	9.0 ppm
	1-Hour	35.0 ppm	20.0 ppm
Nitrogen Dioxide	Annual	0.053 ppm	0.030 ppm
	1-Hour	0.100 ppm	0.18 ppm
Sulfur Dioxide	24-Hour	---	0.04 ppm
	3-Hour	0.5 ppm (secondary)	---
	1-Hour	0.075 ppm (primary)	0.25 ppm
Lead	30-Day Average	---	1.5 µg/m^3
	3-Month Average	0.15 µg/m^3	---

ppm = parts per million
µg/m^3 = micrograms per cubic meter
Source: California Air Resources Board, http://www.arb.ca.gov/research/aaqs/aaqs2.pdf May 4, 2016.

SDAPCD provides significance thresholds in Regulation II, Rule 20.2, Table 20-2-1. "AQIA Trigger Levels." These trigger levels were established for stationary sources of air pollution and are commonly used for environmental evaluations. The SDAPCD enforces air quality rules and regulations through a variety of means, including inspections, educational or training programs, or fines, when necessary.

State Implementation Plan/Air Quality Management Plan/Regional Air Quality Strategy

The federal Clean Air Act Amendments (CAAA) mandate that states submit and implement a State Implementation Plan (SIP) for areas not meeting air quality standards. SIPs are

comprehensive plans that describe how an area will attain national and state ambient air quality standards. SIPs are a compilation of new and previously submitted plans, programs (i.e., monitoring, modeling and permitting programs), district rules, state regulations and federal controls and include pollution control measures that demonstrate how the standards will be met through those measures.

State law makes CARB the lead agency for all purposes related to the SIP. Local air districts and other agencies prepare SIP elements and submit them to CARB for review and approval. CARB forwards SIP revisions to the USEPA for approval and publication in the Federal Register. Thus, the Regional Air Quality Strategy (RAQS) and Air Quality Management Plan (AQMP) prepared by SDAPCD and referenced herein become part of the SIP as the material relates to efforts ongoing in San Diego to achieve the national and state ambient air quality standards. The most recent SIP element for San Diego County was submitted in December 2016. The document identifies control measures and associated emission reductions necessary to demonstrate attainment of the 2008 Federal 8-hour ozone standard by July 20, 2018.

The San Diego RAQS was developed pursuant to California Clean Air Act (CCAA) requirements. The RAQS was initially adopted in 1991 and was updated in 1995, 1998, 2001, 2004, 2009 and 2016. The RAQS can be found at the following: http://www.sdapcd.org/content/dam/sdc/apcd/PDF/Air%20Quality%20Planning/2016%20RAQS.pdf. The RAQS identifies feasible emission control measures to provide progress in San Diego County toward attaining the State ozone standard. The pollutants addressed in the RAQS are volatile organic compounds (VOC) and oxides of nitrogen (NOx), precursors to the photochemical formation of ozone (the primary component of smog). The RAQS was initially adopted by the San Diego County Air Pollution Control Board on June 30, 1992, and amended on March 2, 1993, in response to ARB comments. At present, no attainment plan for particulate matter less than 10 microns in diameter (PM_{10}) or particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) is required by the state regulations; however, SDAPCD has adopted measures to reduce particulate matter in San Diego County. These measures range from regulation against open burning to incentive programs that introduce cleaner technology. These measures can be found in a report titled "*Measures to Reduce Particulate Matter in San Diego County*" December 2005 and can be found at:
http://www.sdapcd.org/content/dam/sdc/apcd/PDF/Air%20Quality%20Planning/PM-Measures.pdf.

The RAQS relies on information from CARB and San Diego Association of Governments (SANDAG), including mobile and area source emissions, as well as information regarding projected growth in the County, to estimate future emissions and then determine strategies necessary for the reduction of emissions through regulatory controls. CARB mobile source emission projections and SANDAG growth projections are based on population and vehicle trends as well as land use plans developed by the cities and the County as part of the development of the individual General Plans. As such, projects that propose development consistent with the growth anticipated by the general plans would be consistent with the RAQS. In the event that a project would propose development which is less dense than anticipated

within the General Plan, the project would likewise be consistent with the RAQS. If a project proposes development that is greater than that anticipated in the General Plan and SANDAG's growth projections, the project might conflict with the RAQS and SIP; and thus, have a potentially significant impact on air quality.

Under state law, the SDAPCD is required to prepare an AQMP for pollutants for which the SDAB is designated non-attainment. Each iteration of the SDAPCD's AQMP is an update of the previous plan and has a 20-year horizon. Currently the SDAPCD has implemented a 2012 8-hour National Ozone Implementation/Maintenance Plan, a 2007 8-hour Ozone Plan, and a 2004 Carbon Monoxide Plan. The SDAPCD adopted the 2008 8-hour Ozone Attainment Plan for San Diego County on December 16, 2016. CARB adopted the ozone plan as a revision to the California SIP on March 23, 2017. The ozone plan was submitted to the USEPA for review on April 12, 2017. Comments from the USEPA are pending. These plans are available for download on the ARB website located at the following URL: http://www.arb.ca.gov/planning/sip/planarea/sansip.htm.

ENVIRONMENTAL SETTING

REGIONAL CLIMATE

The weather of San Diego County is profoundly influenced by the Pacific Ocean and its semi-permanent high-pressure systems that result in dry, warm summers and mild, occasionally wet winters. The average minimum temperature for January ranges from the mid-40s to the high-50s degrees Fahrenheit (4 to 15 degrees Celsius) across the county. July maximum temperatures average in the mid-80s to the high-90s degrees Fahrenheit (high-20s to the high-30s degrees Celsius). Most of the county's precipitation falls from November to April, with infrequent (approximately 10 percent) precipitation during the summer. The average seasonal precipitation along the coast is approximately 10 inches (254 millimeters); the amount increases with elevations as moist air is lifted over the mountains.

The interaction of ocean, land, and the Pacific High-Pressure Zone maintains clear skies for much of the year and drives the prevailing winds. Local terrain is often the dominant factor inland and winds in inland mountainous areas tend to blow upwards in the valleys during the day and down the hills and valleys at night.

In conjunction with the onshore/offshore wind patterns, there are two types of temperature inversions (reversals of the normal decrease of temperature with height), which occur within the region that affect atmospheric dispersive capability and that act to degrade local air quality. In the summer, an inversion at about 1,100 to 2,500 feet (335 to 765 meters) is formed over the entire coastal plain when the warm air mass over land is undercut by a shallow layer of cool marine air flowing onshore. The prevailing sunny days in this region further exacerbate the smog problem by inducing additional adverse photochemical reactions. During the winter, a nightly shallow inversion layer (usually at about 800 feet or 243 meters) forms between the

cooled air at the ground and the warmer air above, which can trap vehicular pollutants. The days of highest Carbon Monoxide (CO) concentrations occur during the winter months.

The predominant onshore/offshore wind pattern is sometimes interrupted by so-called Santa Ana conditions, when high pressure over the Nevada-Utah region overcomes the prevailing westerly wind direction. This draws strong, steady, hot, and dry winds from the east over the mountains and out to sea. Strong Santa Ana winds tend to blow pollutants out over the ocean, producing clear days. However, at the onset or breakdown of these conditions or if the Santa Ana is weak, prevailing northwesterly winds are reestablished which send polluted air from the Los Angeles basin ashore in the SDAB. "Smog transport from the South Coast Air Basin (the metropolitan areas of Los Angeles, Orange, San Bernardino, and Riverside counties) is a key factor on more than half the days San Diego exceeds clean air standards" (San Diego Air Pollution Control District, 2010).

Pollutants

The SDAPCD is required to monitor air pollutant levels to ensure that air quality standards are met and, if they are not met, to develop strategies to meet the standards. Depending on whether the standards are met or exceeded, the local air basin is classified as being in "attainment" or "non-attainment." San Diego County is listed as a federal non-attainment area for ozone (eight hour) and a state non-attainment area for ozone (one hour and eight-hour standards), PM_{10} and $PM_{2.5}$. As shown in Table 2, the SDAB is in attainment for the state and federal standards for nitrogen dioxide, carbon monoxide, sulfur dioxide and lead. Characteristics of ozone, carbon monoxide, nitrogen dioxide, and suspended particulates are described below.

Ozone. Ozone is produced by a photochemical reaction (triggered by sunlight) between nitrogen oxides (NO_X) and reactive organic gases (ROG)[1]. Nitrogen oxides are formed during the combustion of fuels, while reactive organic compounds are formed during combustion and evaporation of organic solvents. Because ozone requires sunlight to form, it mostly occurs in concentrations considered serious between the months of April and October. Ozone is a pungent, colorless, toxic gas with direct health effects on humans including respiratory and eye irritation and possible changes in lung functions. Groups most sensitive to ozone include children, the elderly, people with respiratory disorders, and people who exercise strenuously outdoors.

Carbon Monoxide. Carbon monoxide (CO) is a local pollutant that is found in high concentrations only near the source. The major source of carbon monoxide, a colorless, odorless,

[1] *Organic compound precursors of ozone are routinely described by a number of variations of three terms: hydrocarbons (HC), organic gases (OG), and organic compounds (OC). These terms are often modified by adjectives such as total, reactive, or volatile, and result in a rather confusing array of acronyms: HC, THC (total hydrocarbons), RHC (reactive hydrocarbons), TOG (total organic gases), ROG (reactive organic gases), TOC (total organic compounds), ROC (reactive organic compounds), and VOC (volatile organic compounds). While most of these differ in some significant way from a chemical perspective, from an air quality perspective two groups are important: non-photochemically reactive in the lower atmosphere, or photochemically reactive in the lower atmosphere (HC, RHC, ROG, ROC, and VOC).*

Table 2
San Diego County Attainment Status

Criteria Pollutant	Federal Designation	State Designation
Ozone (one hour)	Attainment*	Non-Attainment
Ozone (eight hour)	Non-Attainment	Non-Attainment
Carbon Monoxide	Attainment	Attainment
PM_{10}	Unclassifiable**	Non-Attainment
$PM_{2.5}$	Attainment	Non-Attainment
Nitrogen Dioxide	Attainment	Attainment
Sulfur Dioxide	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	No Federal Standard	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Visibility	No Federal Standard	Unclassified

** The federal 1-hour standard of 12 ppm was in effect from 1979 through June 1, 2005. The revoked standard is referenced here because it was used for such a long period and because this benchmark is addressed in State Implementation Plans (SIPs).*

*** At the time of designation, if the available data does not support a designation of attainment or non-attainment, the area is designated as unclassifiable.*

Source: San Diego Air Pollution Control District. June, 2016. http://www.sandiegocounty.gov/content/sdc/apcd/en/air-quality-planning/attainment-status.html

poisonous gas, is automobile exhaust. Elevated CO concentrations; therefore, are usually only found near areas of high traffic volumes operating in congested conditions. Carbon monoxide health effects are related to blood hemoglobin. At high concentrations, carbon monoxide reduces the amount of oxygen in the blood, causing heart difficulties in people with chronic diseases, reduced lung capacity and impaired mental abilities.

Nitrogen Dioxide. Nitrogen dioxide (NO_2) is a by-product of fuel combustion, with the primary source being motor vehicles and industrial boilers and furnaces. The principal form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts rapidly to form NO_2, creating the mixture of NO and NO_2 commonly called NO_x. Nitrogen dioxide is an acute irritant. A relationship between NO_2 and chronic pulmonary fibrosis may exist and an increase in bronchitis in young children at concentrations below 0.3 parts per million (ppm) may occur. Nitrogen dioxide absorbs blue light and causes a reddish-brown cast to the atmosphere and reduced visibility. It can also contribute to the formation of PM_{10} and acid rain.

Suspended Particulates. PM_{10} is particulate matter measuring no more than 10 microns in diameter, while $PM_{2.5}$ is fine particulate matter measuring no more than 2.5 microns in diameter. Suspended particulates are mostly dust particles, nitrates and sulfates. Both PM_{10} and $PM_{2.5}$ are by-products of fuel combustion and wind erosion of soil and unpaved roads, and are directly emitted into the atmosphere through these processes. Suspended particulates are also created in the atmosphere through chemical reactions. The characteristics, sources, and potential health effects associated with the small particulates (those between 2.5 and 10 microns

in diameter) and fine particulates ($PM_{2.5}$) can be very different. The small particulates generally come from windblown dust and dust kicked up from mobile sources. The fine particulates are generally associated with combustion processes as well as being formed in the atmosphere as a secondary pollutant through chemical reactions. Fine particulate matter is more likely to penetrate deeply into the lungs and poses a health threat to all groups, but particularly to the elderly, children, and those with respiratory problems. More than half of the small and fine particulate matter that is inhaled into the lungs remains there. These materials can damage health by interfering with the body's mechanisms for clearing the respiratory tract or by acting as carriers of an absorbed toxic substance.

SENSITIVE RECEPTORS

Sensitive receptors include, but are not limited to, hospitals, schools, daycare facilities, elderly housing and convalescent facilities. These are areas where the occupants are more susceptible to the adverse effects of exposure to air pollutants. Ambient air quality standards have been established to represent the levels of air quality considered sufficient, with an adequate margin of safety, to protect public health and welfare. They are designed to protect that segment of the public most susceptible to respiratory distress, such as children; the elderly; persons engaged in strenuous work or exercise and people with cardiovascular and chronic respiratory diseases. The nearest receptors are single-family residential receptors located adjacent and both west and south of the project site.

Monitored Air Quality

The SDAPCD monitors air quality conditions at locations throughout the SDAB. For this analysis, data from the San Diego Beardsley Street monitoring station west of the site were used to characterize existing ozone and $PM_{2.5}$ conditions in the vicinity of the project site. A summary of the data recorded at the Beardsley Street monitoring station from 2014 through 2016 is presented in Table 3.

Table 3
Ambient Air Quality Data

Pollutant	2014	2015	2016
Ozone, ppm - Worst 8-Hour Average	0.073	0.067	0.061
Number of days of State 1-hour exceedances (>0.09 ppm)	2	0	0
Number of days of Federal exceedances (>0.070 ppm)[1]	1	0	0
Particulate Matter <10 microns, $\mu g/m^3$ Worst 24 Hours*	41	54	51
Number of samples of State exceedances (>50 $\mu g/m^3$)	0	5.7	*
Number of samples of Federal exceedances (>150 $\mu g/m^3$)	0	0	*
Particulate Matter <2.5 microns, $\mu g/m^3$ Worst 24 Hours	37.2	44.9	34.4

Table 3
Ambient Air Quality Data

Pollutant	2014	2015	2016
Number of samples of State exceedances (>50 μg/m^3)	No Data	No Data	No Data
Number of samples of Federal exceedances (>150 μg/m^3)	1	0	*

[1] – Federal O3 standard reduced from 75 ppm to 70 ppm in October, 2015
*Insufficient data to determine number of exceedances
Data from the 1110 Beardsley Street Station in San Diego.
Source: California Air Resources Board, 2014, 2015, 2016 Air Quality Data Summaries available at: http://www.arb.ca.gov/adam/topfour/topfourdisplay.php Accessed May 30, 2017.

AIR QUALITY IMPACT ANALYSIS

METHODOLOGY AND SIGNIFICANCE THRESHOLDS

Air quality modeling was performed in general accordance with the methodologies outlined in the SDAPCD 2009 RAQS to identify both construction and operational emissions associated with the proposed project. All emissions were calculated using the California Emissions Estimator Model (CalEEMod) software version 2016.3.1 which incorporates current air emission data, planning methods and protocol approved by CARB.

As referenced, construction activities would include demolition of existing building foundation remnants, clearing and vegetation removal, grading, construction of the buildings/utilities and related improvements as well as paving streets and parking areas. Construction activities would require the use of equipment that would generate criteria air pollutant emissions. For modeling purposes, it was assumed that all construction equipment used would be diesel-powered. Construction emissions associated with development of the proposed project were quantified by estimating the types of equipment, including the number of individual pieces of equipment, that would be used on-site during each of the construction phases as well as off-site haul trips to remove demolition debris. Construction emissions are analyzed using the regional thresholds established by the SDAPCD and published under Rule 20-2.

Operational emissions include mobile source emissions, energy emissions and area source emissions. Mobile source emissions are generated by motor vehicle trips associated with operation of the project. Emissions attributable to energy use include electricity and natural gas consumption for space and water heating. Area source emissions are generated by landscape maintenance equipment, use of consumer products and painting. To determine whether a regional air quality impact would occur, the increase in emissions would be compared with the SDAPCD recommended regional thresholds for operational emissions.

Thresholds of Significance. Based on City of San Diego Significance Determination Thresholds Guidelines, a project would have a significant air quality impact if it would:

a) Conflict with or obstruct implementation of the applicable air quality plan;

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);

d) Expose sensitive receptors to substantial pollutant concentrations;

e) Create objectionable odors affecting a substantial number of people. or

f) Release substantial quantities of air contaminants beyond the boundaries of the premises upon which the stationary source emitting the contaminants is located.

A significant adverse air quality impact may occur when a project individually or cumulatively interferes with progress toward the attainment of the ozone standard by generating emissions that equal or exceed the established long term quantitative thresholds for pollutants, or exceed a state or federal ambient air quality standard for any criteria pollutant.

As referenced, the SDAPCD has established thresholds in Rule 20.2 for new or modified stationary sources (SDAPCD, 2015). With the exception of Volatile Organic Compounds (VOCs) and $PM_{2.5}$ thresholds, the City of San Diego screening quantities shown in the *California Environmental Quality Act Significance Determination Thresholds,* Table A-2, (City of San Diego, 2016) incorporate screening level thresholds from Rule 20.2 for use in air quality reports and for determining CEQA air quality impacts. The City does not show a standard for $PM_{2.5}$ but does include a threshold for Reactive Organic Gas/Volatile Organic Compounds (ROG/VOC) emissions. Collectively, the standards shown in Table A-2 of the City's 2016 CEQA Determination Thresholds and the $PM_{2.5}$ threshold shown in Table 20.2-1 of SDAPCD Rule 20.2, are used herein to determine whether project emissions would cause a significant air quality impact. The construction and operational emission thresholds for pollutants evaluated are as follows:

- Carbon Monoxide (CO) - 550 pounds/day;
- Nitrogen Oxides (NOx) - 100 pounds/day;
- Particulate Matter (PM_{10}) - 100 pounds/day;
- Particulate Matter ($PM_{2.5}$) - 67 pounds/day;
- Sulfur Oxides (SOx) - 250 pounds/day; and
- Volatile Organic Compounds(VOCs)/Reactive Organic Gases(ROGs) - 137 pounds/day.

CONSTRUCTION EMISSIONS

Project construction would generate temporary air pollutant emissions. These impacts are associated with fugitive dust (PM_{10} and $PM_{2.5}$) from soil disturbance and exhaust emissions (NO_x and CO) from heavy construction vehicles. For the purpose of estimating emissions, it was assumed that approximately 1 acre would be disturbed daily overall construction. The number of haul trips to remove demolition debris were estimated based on tonnage. As noted,

construction would generally consist of concrete and vegetation removal, site preparation, construction of the building improvements, paving and the application of architectural coating (painting).

Site preparation and grading would involve the greatest concentration of heavy equipment use and the highest potential for fugitive dust emissions. The project would be required to comply with SDAPCD Rules 52 and 54 which identify measures to reduce fugitive dust and is required to be implemented at all construction sites located within the SDAB. Therefore, the following conditions, which are required to reduce fugitive dust in compliance with SDAPCD Rules 52 and 54, were included in CalEEMod for site preparation and grading phases of construction.

1. **Minimization of Disturbance.** Construction contractors should minimize the area disturbed by clearing, grading, earth moving, or excavation operations to prevent excessive amounts of dust.

2. **Soil Treatment.** Construction contractors should treat all graded and excavated material, exposed soil areas and active portions of the construction site, including unpaved on-site roadways to minimize fugitive dust. Treatment shall include, but not necessarily be limited to, periodic watering, application of environmentally safe soil stabilization materials, and/or roll compaction as appropriate. Watering shall be done as often as necessary, and at least twice daily, preferably in the late morning and after work is done for the day. Note – it was assumed watering would occur three times daily for modeling purposes.

3. **Soil Stabilization.** Construction contractors should monitor all graded and/or excavated inactive areas of the construction site at least weekly for dust stabilization. Soil stabilization methods, such as water and roll compaction, and environmentally safe dust control materials shall be applied to portions of the construction site that are inactive for over four days. If no further grading or excavation operations are planned for the area, the area shall be seeded and watered until landscape growth is evident, or periodically treated with environmentally safe dust suppressants, to prevent excessive fugitive dust.

4. **No Grading During High Winds.** Construction contractors should stop all clearing, grading, earth moving, and excavation operations during periods of high winds (20 miles per hour or greater, as measured continuously over a one-hour period).

5. **Street Sweeping.** Construction contractors should sweep all on-site driveways and adjacent streets and roads at least once per day, preferably at the end of the day, if visible soil material is carried over to adjacent streets and roads.

Construction is assumed to begin in mid-2018 and be completed by December 2019. In addition to SDAPCD Rules 52 and 54 requirements, emissions modeling also accounts for the use of low-VOC paint (150 g/L for non-flat coatings) as required by SDAPCD Rule 67. Table 4 summarizes the estimated maximum daily emissions of pollutants occurring during the construction period.

As shown in Table 4, construction of the proposed project would not exceed the SDAPCD regional construction emission thresholds for daily emissions. Thus, the project construction would not conflict with the SIP, RAQS or AQMP, violate an air quality standard or contribute to an existing or projected violation, result in a cumulatively considerable increase in ozone or particulate matter emissions or expose receptors to substantial pollutant concentrations (thresholds a-d).

Table 4
Estimated Maximum Daily Construction Emissions

Construction Phase		Maximum Emissions (lbs/day)				
	ROG	NO_x	CO	SOx	PM_{10}	$PM_{2.5}$
2018 Maximum lbs/day	*8.4*	86.6	45.9	.08	28.5	17.1
2019 Maximum lbs/day	*86.1*	*40.7*	*38.8*	*.07*	*3.6*	2.5
City of San Diego Screening Thresholds	*137*	*100*	*550*	*250*	*100*	67
Threshold Exceeded 2017	**No**	**No**	**No**	**No**	**No**	**No**
Threshold Exceeded 2018	**No**	**No**	**No**	**No**	**No**	**No**

See Appendix for CalEEMod ver. 2016.3.1 computer model output for the demolition of existing development. Summer emissions shown.

LONG-TERM REGIONAL (OPERATIONAL) IMPACTS

Regional Pollutant Emissions

Table 5 summarizes emissions associated with operation of the proposed project. Operational emissions include emissions from electricity consumption (energy sources), vehicle trips (mobile sources), area sources, landscape equipment and evaporative emissions as the structures are repainted over the life of the project. The majority of operational emissions are associated with vehicle trips to and from the project site. As shown in Table 5, the net change in emissions would not exceed the SDAPCD thresholds for ROG, NO_x, CO, SO_x, PM_{10} or $PM_{2.5}$. Therefore, the project's regional air quality impacts (including impacts related to criteria pollutants, sensitive receptors and violations of air quality standards per threshold c-d) would be less than significant.

Table 5
Estimated Operational Emissions

	Estimated Emissions (lbs/day)					
	ROG	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Proposed Project						
Area	5.2	0.15	13.2	0.1	0.07	0.07
Energy	0.07	0.67	0.28	0.1	0.05	0.05
Mobile	2.6	10.2	27.6	0.1	7.1	1.9
Maximum lbs/day	**5.2**	**10.2**	**31.2**	**0.1**	**7.1**	**1.9**
SDAPCD Thresholds	*137*	*100*	*550*	*250*	*100*	67
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

See Appendix for CalEEMod ver. 2016.3.1 computer model output for the demolition of existing development. Summer emissions shown.

Objectionable Odors

The proposed project would involve the use of diesel powered construction equipment. Diesel exhaust may be noticeable temporarily at adjacent properties; however, construction activities would be temporary. The project does not include industrial or agricultural uses that are typically associated with objectionable odors. Therefore, impacts associated with objectionable odors (significance threshold e) would be less than significant.

Local Carbon Monoxide Emissions

As previously discussed, carbon monoxide is a colorless, odorless, poisonous gas that may be found in high concentrations near areas of high traffic volumes. CO emissions are a function of vehicle idling time, meteorological conditions, and traffic flow. The SDAB is in attainment of state and federal CO standards. The Beardsley Street monitoring site is the closest station to the project site that provides CO data. The maximum 8-hour average CO level recorded in 2012 (the last year data were recorded) was 1.81 parts per million (ppm). Concentrations are below the 9 ppm state and federal 8-hour standard.

Although CO is not a regional air quality concern in SDAB, elevated CO levels can occur at or near intersections that experience severe traffic congestion. A localized air quality impact is considered significant if the additional CO emissions resulting from the project create a "hot spot" where the California 1-hour standard of 20.0 ppm or the 8-hour standard of 9 ppm is exceeded. This can occur at severely congested intersections during cold winter temperatures. Screening for possible elevated CO levels is recommended for severely congested intersections experiencing levels of service E or F with project traffic where a significant project traffic impact may occur. The potential for CO hotspots is based on the University of California Davis CO Protocol defined in the Transportation Project-Level Carbon Monoxide Protocol Revised

December 1997 UCD-ITS-RR-97. Section 4.7 of the protocol provides specific criteria for performing a screening level CO review for projects within a CO attainment area. Specifically, project-related traffic that would worsen the LOS at intersections operating at LOS E or F, would be subject to a detailed evaluation. If not, no further review is necessary.

The Traffic Impact Analysis prepared for the project (Chen Ryan Associates September 2017) indicated that traffic associated with the proposed project would contribute to significant traffic impacts at the SR-94/Euclid Avenue eastbound and westbound ramp intersections. Mitigation measures were identified in the Traffic Impact Analysis that would improve traffic operations at these intersections. The mitigation measures are consistent with those proposed by the SR-94 Interchange project. The project was out for construction bid at the time this analysis was prepared. All improvements are expected to be completed by Summer 2018. Project impacts to these intersections would be reduced to less than significant with the proposed improvements. No additional project-specific mitigation would be required. With the SR-94 Interchange project improvements, project-related traffic impacts would be avoided. Receptors would not be exposed to substantial pollutant concentrations (threshold d) related to CO hotspots. No further evaluation with respect to CO hotspots is required.

SIP/AQMP/RAQS Consistency

As noted, the RAQS relies on information from CARB and SANDAG, including projected growth in the County, mobile, area and all other source emissions to project future emissions and determine from that the strategies necessary for the reduction of stationary source emissions through regulatory controls. Projects that propose development that is consistent with the growth anticipated by the general plan is consistent with the SIP, AQMP and RAQS. The proposed project involves the construction of 160 affordable and market rate units on a 9.35-acre site. The site is zoned RM-1-2 on the west side and CM-1-4 on the east side and proposed densities match the net acreage required per the Encanto Community Plan Update. No density bonus is being requested for the affordable housing component of the project. The project would not induce growth or otherwise add more units than allowed under current zoning. Operation of the proposed project would house existing residents and is not expected to increase the local population. The project would be consistent with the SIP, AQMP and RAQS and significance threshold (a - air quality plans) referenced above. Impacts related to this threshold would be less than significant.

REFERENCES

California Air Resources Board. *Ambient Air Quality Standards.* Updated May 2016. http://www.arb.ca.gov/research/aaqs/aaqs2.pdf

California Air Resources Board, *San Diego Air Quality Management Plans*, December 2016 http://www.arb.ca.gov/planning/sip/planarea/sansip.htm

California Air Resources Board. *2014, 2015, & 2016 Annual Air Quality Data Summaries.* http://www.arb.ca.gov/adam/topfour/topfour1.php. Accessed May 30, 2017.

California Emission Estimator Model Users Guide. September 2016.

City of San Diego, *California Environmental Quality Act Significance Determination Thresholds*, Development Services Department, January 2011.

Chen Ryan Associates, Inc. Hilltop and Euclid Traffic Study Results Summary, June 2017.

San Diego Air Pollution Control District. *Smog in San Diego Fact Sheet*. January 2010.

San Diego Air Pollution Control District. *Regional Air Quality Strategy*, December 2016. http://www.sdapcd.org/content/dam/sdc/apcd/PDF/Air%20Quality%20Planning/2016%20RAQS.pdf.

University of California Davis, *Transportation Project-Level Carbon Monoxide Protocol Revised*, December 1997.

Appendix A

CalEEMod Air Emission Model Results –
Summer Emissions for Construction and Operation

Hilltop and Euclid Mixed Use Project

San Diego County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Low Rise	113.00	Dwelling Unit	3.77	113,000.00	323
Condo/Townhouse	27.00	Dwelling Unit	1.69	27,000.00	77
Single Family Housing	20.00	Dwelling Unit	3.70	36,000.00	57
Strip Mall	8.30	1000sqft	0.19	8,300.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2020
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	720.49	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Hilltop and Euclid Mixed Use Project - San Diego County, Summer

Project Characteristics -

Land Use - Acreage estimated based on development type proposed.
Acreage for single family and low rise apartments were increased by 1 acre each to account for 2 acre disturbance along arroyo.
Total construction area disturbed would be 9.35 acres.

Construction Phase - Construction schedule approximated based on project start and finish dates.

Off-road Equipment - Default equipment mix assumed.

Off-road Equipment - Default equipment mix assumed.

Off-road Equipment - Default equipment mix assumed.

Off-road Equipment - Default equipment mix assumed.

Off-road Equipment - Default equipment mix assumed.

Off-road Equipment - Default equipment mix assumed.

Grading - Assumes 2 acres maximum disturbance area per day.

Woodstoves - Assumes no wood stoves or fireplaces.

Area Coating -

Construction Off-road Equipment Mitigation - Watering assumes reduction of 61% per SCAQMD

Mobile Land Use Mitigation - Dwelling unit per acre calculation assumes a reduction of 2 acres from 9.35 acre site to account for arroyo. 160 units/7.35 acres.
Of the unit total (160), 113 (or 70%) would be affordable.

Area Mitigation - Assumes compliance with SDAPCD Rule 67. 150 g/L of VOC for non-flat paint.

Water Mitigation - Assumes installation of low flow plumbing fixtures and water efficient irrigation system.

Waste Mitigation - San Diego acheived 68% recycling in 2012.

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	250	150
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	150
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	150
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	150
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0

tblConstructionPhase	NumDays	20.00	70.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	NumDays	20.00	60.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	NumDays	10.00	90.00
tblConstructionPhase	PhaseEndDate	9/20/2019	11/29/2019
tblConstructionPhase	PhaseEndDate	7/26/2019	10/11/2019
tblConstructionPhase	PhaseEndDate	7/27/2018	8/10/2018
tblConstructionPhase	PhaseEndDate	9/7/2018	11/23/2018
tblConstructionPhase	PhaseEndDate	8/23/2019	11/11/2019
tblConstructionPhase	PhaseEndDate	8/10/2018	11/30/2018
tblConstructionPhase	PhaseStartDate	9/8/2018	11/26/2018
tblConstructionPhase	PhaseStartDate	8/11/2018	9/3/2018
tblConstructionPhase	PhaseStartDate	7/27/2019	10/1/2019
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	62.15	0.00
tblFireplaces	NumberGas	14.85	0.00
tblFireplaces	NumberGas	11.00	0.00
tblFireplaces	NumberNoFireplace	11.30	0.00

tblFireplaces	NumberNoFireplace	2.70	0.00
tblFireplaces	NumberNoFireplace	2.00	0.00
tblFireplaces	NumberWood	39.55	0.00
tblFireplaces	NumberWood	9.45	0.00
tblFireplaces	NumberWood	7.00	0.00
tblGrading	AcresOfGrading	30.00	2.00
tblGrading	AcresOfGrading	0.00	2.00
tblLandUse	LotAcreage	7.06	3.77
tblLandUse	LotAcreage	6.49	3.70
tblProjectCharacteristics	OperationalYear	2018	2020
tblWoodstoves	NumberCatalytic	5.65	0.00
tblWoodstoves	NumberCatalytic	1.35	0.00
tblWoodstoves	NumberCatalytic	1.00	0.00
tblWoodstoves	NumberNoncatalytic	5.65	0.00
tblWoodstoves	NumberNoncatalytic	1.35	0.00
tblWoodstoves	NumberNoncatalytic	1.00	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	8.4222	86.6224	45.9100	0.0816	24.4184	4.5174	28.5485	13.3192	4.1774	17.1189	0.0000	8,146.7204	8,146.7204	2.2697	0.0000	8,194.6481
2019	86.1565	40.7956	38.8254	0.0706	1.3376	2.2674	3.6050	0.3576	2.1229	2.4805	0.0000	6,950.7561	6,950.7561	1.4515	0.0000	6,987.0426
Maximum	**86.1565**	**86.6224**	**45.9100**	**0.0816**	**24.4184**	**4.5174**	**28.5485**	**13.3192**	**4.1774**	**17.1189**	**0.0000**	**8,146.7204**	**8,146.7204**	**2.2697**	**0.0000**	**8,194.6481**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	8.4222	86.6224	45.9100	0.0816	9.6885	4.5174	13.8187	5.2383	4.1774	9.0381	0.0000	8,146.7204	8,146.7204	2.2697	0.0000	8,194.6481
2019	86.1565	40.7956	38.8254	0.0706	1.3376	2.2674	3.6050	0.3576	2.1229	2.4805	0.0000	6,950.7561	6,950.7561	1.4515	0.0000	6,987.0426
Maximum	**86.1565**	**86.6224**	**45.9100**	**0.0816**	**9.6885**	**4.5174**	**13.8187**	**5.2383**	**4.1774**	**9.0381**	**0.0000**	**8,146.7204**	**8,146.7204**	**2.2697**	**0.0000**	**8,194.6481**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**57.19**	**0.00**	**45.81**	**59.08**	**0.00**	**41.23**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.9087	0.1532	13.2449	7.0000e-004		0.0728	0.0728		0.0728	0.0728	0.0000	23.7702	23.7702	0.0232	0.0000	24.3497
Energy	0.0789	0.6747	0.2892	4.3000e-003		0.0545	0.0545		0.0545	0.0545		860.9769	860.9769	0.0165	0.0158	866.0933
Mobile	2.7907	11.2391	31.2710	0.1019	8.2501	0.0983	8.3484	2.2052	0.0922	2.2974		10,337.0922	10,337.0922	0.5506		10,350.8565
Total	**8.7783**	**12.0670**	**44.8052**	**0.1069**	**8.2501**	**0.2257**	**8.4758**	**2.2052**	**0.2196**	**2.4248**	**0.0000**	**11,221.8393**	**11,221.8393**	**0.5903**	**0.0158**	**11,241.2995**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.2842	0.1532	13.2449	7.0000e-004		0.0728	0.0728		0.0728	0.0728	0.0000	23.7702	23.7702	0.0232	0.0000	24.3497
Energy	0.0789	0.6747	0.2892	4.3000e-003		0.0545	0.0545		0.0545	0.0545		860.9769	860.9769	0.0165	0.0158	866.0933
Mobile	2.6305	10.2700	27.6110	0.0877	7.0294	0.0852	7.1146	1.8789	0.0799	1.9588		8,902.1782	8,902.1782	0.4854		8,914.3132
Total	**7.9936**	**11.0980**	**41.1451**	**0.0927**	**7.0294**	**0.2125**	**7.2419**	**1.8789**	**0.2073**	**2.0861**	**0.0000**	**9,786.9253**	**9,786.9253**	**0.5251**	**0.0158**	**9,804.7562**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**8.94**	**8.03**	**8.17**	**13.25**	**14.80**	**5.81**	**14.56**	**14.80**	**5.62**	**13.97**	**0.00**	**12.79**	**12.79**	**11.04**	**0.00**	**12.78**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/2/2018	8/10/2018	5	30	
2	Site Preparation	Site Preparation	7/28/2018	11/30/2018	5	90	
3	Grading	Grading	9/3/2018	11/23/2018	5	60	
4	Building Construction	Building Construction	11/26/2018	10/11/2019	5	230	
5	Paving	Paving	10/1/2019	11/11/2019	5	30	
6	Architectural Coating	Architectural Coating	8/24/2019	11/29/2019	5	70	

Acres of Grading (Site Preparation Phase): 2

Acres of Grading (Grading Phase): 2

Acres of Paving: 0

Residential Indoor: 356,400; Residential Outdoor: 118,800; Non-Residential Indoor: 12,450; Non-Residential Outdoor: 4,150; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Hilltop and Euclid Mixed Use Project - San Diego County, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	1	22.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	111.00	18.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.7190	38.3225	22.3040	0.0388		1.9386	1.9386		1.8048	1.8048		3,871.7665	3,871.7665	1.0667		3,898.4344
Total	**3.7190**	**38.3225**	**22.3040**	**0.0388**		**1.9386**	**1.9386**		**1.8048**	**1.8048**		**3,871.7665**	**3,871.7665**	**1.0667**		**3,898.4344**

3.2 Demolition - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0639	0.0460	0.5135	1.3500e-003	0.1232	8.9000e-004	0.1241	0.0327	8.2000e-004	0.0335		134.5837	134.5837	4.6100e-003		134.6988
Total	**0.0639**	**0.0460**	**0.5135**	**1.3500e-003**	**0.1232**	**8.9000e-004**	**0.1241**	**0.0327**	**8.2000e-004**	**0.0335**		**134.5837**	**134.5837**	**4.6100e-003**		**134.6988**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.7190	38.3225	22.3040	0.0388		1.9386	1.9386		1.8048	1.8048	0.0000	3,871.7665	3,871.7665	1.0667		3,898.4344
Total	**3.7190**	**38.3225**	**22.3040**	**0.0388**		**1.9386**	**1.9386**		**1.8048**	**1.8048**	**0.0000**	**3,871.7665**	**3,871.7665**	**1.0667**		**3,898.4344**

3.2 Demolition - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0639	0.0460	0.5135	1.3500e-003	0.1232	8.9000e-004	0.1241	0.0327	8.2000e-004	0.0335		134.5837	134.5837	4.6100e-003		134.6988
Total	**0.0639**	**0.0460**	**0.5135**	**1.3500e-003**	**0.1232**	**8.9000e-004**	**0.1241**	**0.0327**	**8.2000e-004**	**0.0335**		**134.5837**	**134.5837**	**4.6100e-003**		**134.6988**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0898	0.0000	18.0898	9.9332	0.0000	9.9332			0.0000			0.0000
Off-Road	4.5627	48.1988	22.4763	0.0380		2.5769	2.5769		2.3708	2.3708		3,831.6239	3,831.6239	1.1928		3,861.4448
Total	**4.5627**	**48.1988**	**22.4763**	**0.0380**	**18.0898**	**2.5769**	**20.6667**	**9.9332**	**2.3708**	**12.3040**		**3,831.6239**	**3,831.6239**	**1.1928**		**3,861.4448**

3.3 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0766	0.0552	0.6162	1.6200e-003	0.1479	1.0600e-003	0.1489	0.0392	9.8000e-004	0.0402		161.5004	161.5004	5.5300e-003		161.6386
Total	**0.0766**	**0.0552**	**0.6162**	**1.6200e-003**	**0.1479**	**1.0600e-003**	**0.1489**	**0.0392**	**9.8000e-004**	**0.0402**		**161.5004**	**161.5004**	**5.5300e-003**		**161.6386**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0550	0.0000	7.0550	3.8740	0.0000	3.8740			0.0000			0.0000
Off-Road	4.5627	48.1988	22.4763	0.0380		2.5769	2.5769		2.3708	2.3708	0.0000	3,831.6239	3,831.6239	1.1928		3,861.4448
Total	**4.5627**	**48.1988**	**22.4763**	**0.0380**	**7.0550**	**2.5769**	**9.6319**	**3.8740**	**2.3708**	**6.2447**	**0.0000**	**3,831.6239**	**3,831.6239**	**1.1928**		**3,861.4448**

3.3 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0766	0.0552	0.6162	1.6200e-003	0.1479	1.0600e-003	0.1489	0.0392	9.8000e-004	0.0402		161.5004	161.5004	5.5300e-003		161.6386
Total	**0.0766**	**0.0552**	**0.6162**	**1.6200e-003**	**0.1479**	**1.0600e-003**	**0.1489**	**0.0392**	**9.8000e-004**	**0.0402**		**161.5004**	**161.5004**	**5.5300e-003**		**161.6386**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0574	0.0000	6.0574	3.3140	0.0000	3.3140			0.0000			0.0000
Off-Road	2.7733	30.6725	16.5770	0.0297		1.5513	1.5513		1.4272	1.4272		2,988.0216	2,988.0216	0.9302		3,011.2769
Total	**2.7733**	**30.6725**	**16.5770**	**0.0297**	**6.0574**	**1.5513**	**7.6088**	**3.3140**	**1.4272**	**4.7413**		**2,988.0216**	**2,988.0216**	**0.9302**		**3,011.2769**

3.4 Grading - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0639	0.0460	0.5135	1.3500e-003	0.1232	8.9000e-004	0.1241	0.0327	8.2000e-004	0.0335		134.5837	134.5837	4.6100e-003		134.6988
Total	**0.0639**	**0.0460**	**0.5135**	**1.3500e-003**	**0.1232**	**8.9000e-004**	**0.1241**	**0.0327**	**8.2000e-004**	**0.0335**		**134.5837**	**134.5837**	**4.6100e-003**		**134.6988**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3624	0.0000	2.3624	1.2925	0.0000	1.2925			0.0000			0.0000
Off-Road	2.7733	30.6725	16.5770	0.0297		1.5513	1.5513		1.4272	1.4272	0.0000	2,988.0216	2,988.0216	0.9302		3,011.2769
Total	**2.7733**	**30.6725**	**16.5770**	**0.0297**	**2.3624**	**1.5513**	**3.9137**	**1.2925**	**1.4272**	**2.7197**	**0.0000**	**2,988.0216**	**2,988.0216**	**0.9302**		**3,011.2769**

3.4 Grading - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0639	0.0460	0.5135	1.3500e-003	0.1232	8.9000e-004	0.1241	0.0327	8.2000e-004	0.0335		134.5837	134.5837	4.6100e-003		134.6988
Total	**0.0639**	**0.0460**	**0.5135**	**1.3500e-003**	**0.1232**	**8.9000e-004**	**0.1241**	**0.0327**	**8.2000e-004**	**0.0335**		**134.5837**	**134.5837**	**4.6100e-003**		**134.6988**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099		2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**		**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

3.5 Building Construction - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0928	2.3716	0.6280	5.0200e-003	0.1219	0.0186	0.1404	0.0351	0.0177	0.0528		536.7418	536.7418	0.0425		537.8053
Worker	0.4725	0.3403	3.7998	0.0100	0.9118	6.5700e-003	0.9184	0.2419	6.0500e-003	0.2479		995.9193	995.9193	0.0341		996.7712
Total	**0.5653**	**2.7118**	**4.4278**	**0.0150**	**1.0337**	**0.0251**	**1.0588**	**0.2769**	**0.0238**	**0.3007**		**1,532.6610**	**1,532.6610**	**0.0766**		**1,534.5765**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099	0.0000	2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**	**0.0000**	**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

3.5 Building Construction - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0928	2.3716	0.6280	5.0200e-003	0.1219	0.0186	0.1404	0.0351	0.0177	0.0528		536.7418	536.7418	0.0425		537.8053
Worker	0.4725	0.3403	3.7998	0.0100	0.9118	6.5700e-003	0.9184	0.2419	6.0500e-003	0.2479		995.9193	995.9193	0.0341		996.7712
Total	**0.5653**	**2.7118**	**4.4278**	**0.0150**	**1.0337**	**0.0251**	**1.0588**	**0.2769**	**0.0238**	**0.3007**		**1,532.6610**	**1,532.6610**	**0.0766**		**1,534.5765**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.5 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0829	2.2318	0.5762	4.9700e-003	0.1219	0.0155	0.1374	0.0351	0.0149	0.0499		532.8299	532.8299	0.0411		533.8584
Worker	0.4358	0.3042	3.4345	9.7000e-003	0.9118	6.5000e-003	0.9183	0.2419	5.9900e-003	0.2479		965.9216	965.9216	0.0308		966.6927
Total	**0.5187**	**2.5359**	**4.0106**	**0.0147**	**1.0337**	**0.0220**	**1.0557**	**0.2769**	**0.0208**	**0.2978**		**1,498.7515**	**1,498.7515**	**0.0720**		**1,500.5511**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.5 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0829	2.2318	0.5762	4.9700e-003	0.1219	0.0155	0.1374	0.0351	0.0149	0.0499		532.8299	532.8299	0.0411		533.8584
Worker	0.4358	0.3042	3.4345	9.7000e-003	0.9118	6.5000e-003	0.9183	0.2419	5.9900e-003	0.2479		965.9216	965.9216	0.0308		966.6927
Total	**0.5187**	**2.5359**	**4.0106**	**0.0147**	**1.0337**	**0.0220**	**1.0557**	**0.2769**	**0.0208**	**0.2978**		**1,498.7515**	**1,498.7515**	**0.0720**		**1,500.5511**

3.6 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4544**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.6 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0589	0.0411	0.4641	1.3100e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		130.5300	130.5300	4.1700e-003		130.6342
Total	**0.0589**	**0.0411**	**0.4641**	**1.3100e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**130.5300**	**130.5300**	**4.1700e-003**		**130.6342**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4544**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.6 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0589	0.0411	0.4641	1.3100e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		130.5300	130.5300	4.1700e-003		130.6342
Total	**0.0589**	**0.0411**	**0.4641**	**1.3100e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**130.5300**	**130.5300**	**4.1700e-003**		**130.6342**

3.7 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	81.4105					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		282.0423
Total	**81.6769**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**282.0423**

3.7 Architectural Coating - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0864	0.0603	0.6807	1.9200e-003	0.1807	1.2900e-003	0.1820	0.0479	1.1900e-003	0.0491		191.4439	191.4439	6.1100e-003		191.5968
Total	**0.0864**	**0.0603**	**0.6807**	**1.9200e-003**	**0.1807**	**1.2900e-003**	**0.1820**	**0.0479**	**1.1900e-003**	**0.0491**		**191.4439**	**191.4439**	**6.1100e-003**		**191.5968**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	81.4105					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		282.0423
Total	**81.6769**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**282.0423**

3.7 Architectural Coating - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0864	0.0603	0.6807	1.9200e-003	0.1807	1.2900e-003	0.1820	0.0479	1.1900e-003	0.0491		191.4439	191.4439	6.1100e-003		191.5968
Total	**0.0864**	**0.0603**	**0.6807**	**1.9200e-003**	**0.1807**	**1.2900e-003**	**0.1820**	**0.0479**	**1.1900e-003**	**0.0491**		**191.4439**	**191.4439**	**6.1100e-003**		**191.5968**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Integrate Below Market Rate Housing

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.6305	10.2700	27.6110	0.0877	7.0294	0.0852	7.1146	1.8789	0.0799	1.9588		8,902.1782	8,902.1782	0.4854		8,914.3132
Unmitigated	2.7907	11.2391	31.2710	0.1019	8.2501	0.0983	8.3484	2.2052	0.0922	2.2974		10,337.0922	10,337.0922	0.5506		10,350.8565

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	744.67	809.08	685.91	2,128,563	1,813,610
Condo/Townhouse	156.87	153.09	130.68	435,687	371,220
Single Family Housing	190.40	198.20	172.40	539,489	459,664
Strip Mall	367.86	348.93	169.57	518,723	441,970
Total	1,459.80	1,509.30	1,158.56	3,622,462	3,086,464

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
Condo/Townhouse	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
Single Family Housing	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Low Rise	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Condo/Townhouse	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Single Family Housing	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Strip Mall	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0789	0.6747	0.2892	4.3000e-003		0.0545	0.0545		0.0545	0.0545		860.9769	860.9769	0.0165	0.0158	866.0933
NaturalGas Unmitigated	0.0789	0.6747	0.2892	4.3000e-003		0.0545	0.0545		0.0545	0.0545		860.9769	860.9769	0.0165	0.0158	866.0933

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Low Rise	4441.57	0.0479	0.4093	0.1742	2.6100e-003		0.0331	0.0331		0.0331	0.0331		522.5375	522.5375	0.0100	9.5800e-003	525.6427
Condo/Townhouse	1264.56	0.0136	0.1165	0.0496	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003		148.7721	148.7721	2.8500e-003	2.7300e-003	149.6561
Single Family Housing	1561.24	0.0168	0.1439	0.0612	9.2000e-004		0.0116	0.0116		0.0116	0.0116		183.6748	183.6748	3.5200e-003	3.3700e-003	184.7663
Strip Mall	50.937	5.5000e-004	4.9900e-003	4.1900e-003	3.0000e-005		3.8000e-004	3.8000e-004		3.8000e-004	3.8000e-004		5.9926	5.9926	1.1000e-004	1.1000e-004	6.0282
Total		**0.0789**	**0.6747**	**0.2892**	**4.3000e-003**		**0.0545**	**0.0545**		**0.0545**	**0.0545**		**860.9769**	**860.9769**	**0.0165**	**0.0158**	**866.0933**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Low Rise	4.44157	0.0479	0.4093	0.1742	2.6100e-003		0.0331	0.0331		0.0331	0.0331		522.5375	522.5375	0.0100	9.5800e-003	525.6427
Condo/Townhouse	1.26456	0.0136	0.1165	0.0496	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003		148.7721	148.7721	2.8500e-003	2.7300e-003	149.6561
Single Family Housing	1.56124	0.0168	0.1439	0.0612	9.2000e-004		0.0116	0.0116		0.0116	0.0116		183.6748	183.6748	3.5200e-003	3.3700e-003	184.7663
Strip Mall	0.050937	5.5000e-004	4.9900e-003	4.1900e-003	3.0000e-005		3.8000e-004	3.8000e-004		3.8000e-004	3.8000e-004		5.9926	5.9926	1.1000e-004	1.1000e-004	6.0282
Total		**0.0789**	**0.6747**	**0.2892**	**4.3000e-003**		**0.0545**	**0.0545**		**0.0545**	**0.0545**		**860.9769**	**860.9769**	**0.0165**	**0.0158**	**866.0933**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.2842	0.1532	13.2449	7.0000e-004		0.0728	0.0728		0.0728	0.0728	0.0000	23.7702	23.7702	0.0232	0.0000	24.3497
Unmitigated	5.9087	0.1532	13.2449	7.0000e-004		0.0728	0.0728		0.0728	0.0728	0.0000	23.7702	23.7702	0.0232	0.0000	24.3497

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.5613					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.9440					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4034	0.1532	13.2449	7.0000e-004		0.0728	0.0728		0.0728	0.0728		23.7702	23.7702	0.0232		24.3497
Total	**5.9087**	**0.1532**	**13.2449**	**7.0000e-004**		**0.0728**	**0.0728**		**0.0728**	**0.0728**	**0.0000**	**23.7702**	**23.7702**	**0.0232**	**0.0000**	**24.3497**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.9368					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.9440					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4034	0.1532	13.2449	7.0000e-004		0.0728	0.0728		0.0728	0.0728		23.7702	23.7702	0.0232		24.3497
Total	**5.2842**	**0.1532**	**13.2449**	**7.0000e-004**		**0.0728**	**0.0728**		**0.0728**	**0.0728**	**0.0000**	**23.7702**	**23.7702**	**0.0232**	**0.0000**	**24.3497**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Affirmed Housing, *92128, San Diego County* *Presented By: Jessica L. Johnson License # 0K95686*

Enrollment Worksheet for: Cristina Martinez

Female, DOB: 12-12-1993, Zip Code: 92128, San Diego County

Spouse/Partner: N/A, Child(ren): N/A

These rates reflect your cost after your employer's contribution of 75% toward employee and 0% toward dependent(s) based on Anthem BC - Anthem Gold PPO 500/20%/6500 (302Q) rates and are for an Effective Date of 10/1/2018.
The Contribution amounts listed on this report may not reflect actual final contribution totals.

MEDICAL Anthem **Anthem Blue Cross (CA) Prudent Buyer PPO w/ Traditional HMO/Select HMO**

Monthly Rate (12 pay periods)	Employee Cost Breakdown	Dependent Cost Breakdown	Deductible	Office Visits (PCP/ Specialist) *	Inpatient Hospital Services *	Out-of-Pocket Max	RX Tiers 1/2/3/4
Anthem Bronze PPO 5000/30%/7350 (301D) **$18.50** PPO/Bronze/ Prudent Buyer PPO	Employee: 323.68 Ped. Dental: Embedded *Employer Pays:* (305.18) **Enrollee Pays: 18.50**	Ped. Dental: Embedded *Employer Pays:* (0.00) **Enrollee Pays: 0.00**	$5,000/$10,000 embedded	$30 (ded. waived 3 visits) then 30%	30%	$7,350/$14,700 embedded; includes ded	$1,000/$2,000 Ded (2-4); $5; $20/$60/ $100/30%
Anthem Silver PPO 2000/40%/7350 (303F) **$55.35** PPO/Silver/ Prudent Buyer PPO	Employee: 360.53 Ped. Dental: Embedded *Employer Pays:* (305.18) **Enrollee Pays: 55.35**	Ped. Dental: Embedded *Employer Pays:* (0.00) **Enrollee Pays: 0.00**	$2,000/$4,000 embedded	$35/$70 (ded waived)	40%	$7,350/$14,700 embedded; includes ded	$5; $20/$50/$90/30%
Anthem Gold PPO 500/20%/6500 (302Q) **$101.73** PPO/Gold/ Prudent Buyer PPO	Employee: 406.91 Ped. Dental: Embedded *Employer Pays:* (305.18) **Enrollee Pays: 101.73**	Ped. Dental: Embedded *Employer Pays:* (0.00) **Enrollee Pays: 0.00**	$500/$1,500 embedded	$30/$60 (ded waived)	20%	$6,500/$13,000 embedded; includes ded	$250/$500 Ded (2-4); $5; $20/$40/$80/30%
Anthem Platinum PPO 200/10%/3000 (3037) **$175.77** PPO/Platinum/ Prudent Buyer PPO	Employee: 480.95 Ped. Dental: Embedded *Employer Pays:* (305.18) **Enrollee Pays: 175.77**	Ped. Dental: Embedded *Employer Pays:* (0.00) **Enrollee Pays: 0.00**	$200/$600 embedded	$10/$30 (ded waived)	10%	$3,000/$6,000 embedded; includes ded	$5; $15/$35/$70/30%
Anthem Silver HMO 2000/40%/7350 (2ZZ2) **$39.01** HMO/Silver/ California Care HMO	Employee: 344.19 Ped. Dental: Embedded *Employer Pays:* (305.18) **Enrollee Pays: 39.01**	Ped. Dental: Embedded *Employer Pays:* (0.00) **Enrollee Pays: 0.00**	$2,000/$4,000 embedded	$55/$100 (ded waived)	40%	$7,350/$14,700 embedded; includes ded	$5; $20/$70/ $110/30%
Anthem Gold HMO 40/20%/4500 (301V) **$72.53** HMO/Gold/ California Care HMO	Employee: 377.71 Ped. Dental: Embedded *Employer Pays:* (305.18) **Enrollee Pays: 72.53**	Ped. Dental: Embedded *Employer Pays:* (0.00) **Enrollee Pays: 0.00**	$0/$0	$40/$80	$750/day, 3 days max	$4,500/$9,000	$5; $20/$40/$80/30%
Anthem Silver PPO 2000/20%/6000 w/HSA - RxC (99A2/99AF) **$64.98** HSA/Silver/ Prudent Buyer PPO	Employee: 370.16 Ped. Dental: Embedded *Employer Pays:* (305.18) **Enrollee Pays: 64.98**	Ped. Dental: Embedded *Employer Pays:* (0.00) **Enrollee Pays: 0.00**	$2,000 (single); $2,700 (per member)/$4,000	20%	20%	$6,000/$12,000 embedded; includes ded	MedDed (1-4); $5; $20/$40/$80/30%

* Unless stated, all services are subject to deductible.
Final rates are determined by the Carrier. This quote is not valid without the separate general disclaimer.
Dependent children 21-25 years old are rated as adults. Dependent children may become ineligible for coverage on their 26th birthday; effective date of change may vary by carrier.

Sorted By: Carrier,PlanType,Premium(Ascending)

Create Date: 10/2/2018 Quote ID: 2574-8440

CLIMATE ACTION PLAN CONSISTENCY CHECKLIST INTRODUCTION

In December 2015, the City adopted a Climate Action Plan (CAP) that outlines the actions that City will undertake to achieve its proportional share of State greenhouse gas (GHG) emission reductions. The purpose of the Climate Action Plan Consistency Checklist (Checklist) is to, in conjunction with the CAP, provide a streamlined review process for proposed new development projects that are subject to discretionary review and trigger environmental review pursuant to the California Environmental Quality Act (CEQA).[1]

Analysis of GHG emissions and potential climate change impacts from new development is required under CEQA. The CAP is a plan for the reduction of GHG emissions in accordance with CEQA Guidelines Section 15183.5. Pursuant to CEQA Guidelines Sections 15064(h)(3), 15130(d), and 15183(b), a project's incremental contribution to a cumulative GHG emissions effect may be determined not to be cumulatively considerable if it complies with the requirements of the CAP.

This Checklist is part of the CAP and contains measures that are required to be implemented on a project-by-project basis to ensure that the specified emissions targets identified in the CAP are achieved. Implementation of these measures would ensure that new development is consistent with the CAP's assumptions for relevant CAP strategies toward achieving the identified GHG reduction targets. Projects that are consistent with the CAP as determined through the use of this Checklist may rely on the CAP for the cumulative impacts analysis of GHG emissions. Projects that are not consistent with the CAP must prepare a comprehensive project-specific analysis of GHG emissions, including quantification of existing and projected GHG emissions and incorporation of the measures in this Checklist to the extent feasible. Cumulative GHG impacts would be significant for any project that is not consistent with the CAP.

The Checklist may be updated to incorporate new GHG reduction techniques or to comply with later amendments to the CAP or local, State, or federal law.

[1] Certain projects seeking ministerial approval may be required to complete the Checklist. For example, projects in a Community Plan Implementation Overlay Zone may be required to use the Checklist to qualify for ministerial level review. See Supplemental Development Regulations in the project's community plan to determine applicability.

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CAP CONSISTENCY CHECKLIST SUBMITTAL APPLICATION

- The Checklist is required only for projects subject to CEQA review.[2]
- If required, the Checklist must be included in the project submittal package. Application submittal procedures can be found in Chapter 11: Land Development Procedures of the City's Municipal Code.
- The requirements in the Checklist will be included in the project's conditions of approval.
- The applicant must provide an explanation of how the proposed project will implement the requirements described herein to the satisfaction of the Planning Department.

Application Information

Contact Information

Project No./Name: Project No. 560527 - Hilltop and Euclid Gateway Mixed Use Project

Property Address: Northwest corner of Hilltop Drive and Euclid Avenue, San Diego, CA

Applicant Name/Co.: Affirmed Housing Group

Contact Phone: 858-386-5178 Contact Email: james@affirmedhousing.com

Was a consultant retained to complete this checklist? ☐ Yes ☐ No If Yes, complete the following

Consultant Name: Ryan Birdseye Contact Phone: 760-712-2199

Company Name: Birdseye Planning Group Contact Email: ryan@birdseyeplanninggroup.com

Project Information

1. What is the size of the project (acres)? 9.39 gross acres

2. Identify all applicable proposed land uses:
   - ■ Residential (indicate # of single-family units): 20
   - ■ Residential (indicate # of multi-family units): 113 apartment, 27 townhomes
   - ■ Commercial (total square footage): 8,485
   - ☐ Industrial (total square footage):
   - ☐ Other (describe):

3. Is the project or a portion of the project located in a Transit Priority Area? ☐ Yes ☐ No

4. Provide a brief description of the project proposed:

The proposed project is located on a 9.39 acre vacant site in the Encanto Community in the City of San Diego. The site is bordered by Euclid Avenue to the east, Hilltop Drive to the south, single family residential property to the west and the San Diego Earthlab educational facility and open space to the north. The site is currently bisected by an arroyo which is a tributary to Chollas Creek. The proposed project would construct a total of 20 single-family detached and 27 town-home market-rate residences with related improvements west of the arroyo. A total of 113 affordable apartment units would be constructed on the east side of the site. These would range from studio units to four bedroom units. Approximately 8,485 square feet of commercial space would be installed on the ground floor of the apartment complex facing Euclid Avenue. The project would include various recreational amenities including a community swimming pool, basketball court, gardening space, community room and outdoor gathering areas. In addition to these improvements, the existing arroyo would be restored and incorporated as a visual element of the proposed project.

[2] Certain projects seeking ministerial approval may be required to complete the Checklist. For example, projects in a Community Plan Implementation Overlay Zone may be required to use the Checklist to qualify for ministerial level review. See Supplemental Development Regulations in the project's community plan to determine applicability.

CAP CONSISTENCY CHECKLIST QUESTIONS

Step 1: Land Use Consistency

The first step in determining CAP consistency for discretionary development projects is to assess the project's consistency with the growth projections used in the development of the CAP. This section allows the City to determine a project's consistency with the land use assumptions used in the CAP.

Step 1: Land Use Consistency		
Checklist Item (Check the appropriate box and provide explanation and supporting documentation for your answer)	Yes	No
A. Is the proposed project consistent with the existing General Plan and Community Plan land use and zoning designations?;[3] OR,		
B. If the proposed project is not consistent with the existing land use plan and zoning designations, and includes a land use plan and/or zoning designation amendment, would the proposed amendment result in an increased density within a Transit Priority Area (TPA)[4] and implement CAP Strategy 3 actions, as determined in Step 3 to the satisfaction of the Development Services Department?; OR,	☐	☐
C. If the proposed project is not consistent with the existing land use plan and zoning designations, does the project include a land use plan and/or zoning designation amendment that would result in an equivalent or less GHG-intensive project when compared to the existing designations?		

If "***Yes***," proceed to Step 2 of the Checklist. For question B above, complete Step 3. For question C above, provide estimated project emissions under both existing and proposed designation(s) for comparison. Compare the maximum buildout of the existing designation and the maximum buildout of the proposed designation.

If "***No***," in accordance with the City's Significance Determination Thresholds, the project's GHG impact is significant. The project must nonetheless incorporate each of the measures identified in Step 2 to mitigate cumulative GHG emissions impacts unless the decision maker finds that a measure is infeasible in accordance with CEQA Guidelines Section 15091. Proceed and complete Step 2 of the Checklist.

The 9.39 gross acre site is zoned Neighborhood Mixed Use (CN-1-4) and Residential Medium (RM-1-2) and is within the Encanto Community Plan Update Implementation Zone, Area B (approved October 2015). The site could accommodate a minimum of 181 units under the current zoning designation; however, an existing arroyo, a tributary to Chollas Creek, conveys storm flows through the site and contains non-native grassland and disturbed Coastal sage scrub habitat. The arroyo will be retained and restored to maintain both hydrologic and habitat benefits. Restoration of the arroyo reduces the overall developable acreage on the site. To accommodate these design constraints, the proposed project would develop 160 units. This density is consistent with the developable acreage considering the on-site constraints. No change in zoning designation or community plan update would be required to accommodate the proposed project.

The project site is within the Encanto Community Village District, and will meet criteria set forth in the Encanto Community Plan for the Village District Community Plan Implementation Overlay Zone (CPIOZ) referenced above.

[3] This question may also be answered in the affirmative if the project is consistent with SANDAG Series 12 growth projections, which were used to determine the CAP projections, as determined by the Planning Department.

[4] This category applies to all projects that answered in the affirmative to question 3 on the previous page: Is the project or a portion of the project located in a transit priority area.

Step 2: CAP Strategies Consistency

The second step of the CAP consistency review is to review and evaluate a project's consistency with the applicable strategies and actions of the CAP. Step 2 only applies to development projects that involve permits that would require a certificate of occupancy from the Building Official or projects comprised of one and two family dwellings or townhouses as defined in the California Residential Code and their accessory structures.[5] All other development projects that would not require a certificate of occupancy from the Building Official shall implement Best Management Practices for construction activities as set forth in the Greenbook (for public projects).

Step 2: CAP Strategies Consistency			
Checklist Item (Check the appropriate box and provide explanation for your answer)	Yes	No	N/A
Strategy 1: Energy & Water Efficient Buildings			
1. *Cool/Green Roofs*. • Would the project include roofing materials with a minimum 3-year aged solar reflection and thermal emittance or solar reflection index equal to or greater than the values specified in the voluntary measures under California Green Building Standards Code (Attachment A)?; OR • Would the project roof construction have a thermal mass over the roof membrane, including areas of vegetated (green) roofs, weighing at least 25 pounds per square foot as specified in the voluntary measures under California Green Building Standards Code?; OR • Would the project include a combination of the above two options? Check "N/A" only if the project does not include a roof component. The proposed project is new construction and will have a total of 20 single-family residential units, 27 townhome units and 113 apartment units. Consistent with CAP Strategy 1, the applicant is committed to installing a white thermoplastic polyolefin (TPO) cool roof material with a minimum 3-year aged solar reflection and thermal emittance or solar reflection index equal to or greater than the values specified in the voluntary measures under the California Green Building Standards Code. The commercial element would be incorporated into the ground floor of a proposed building. No additional roofing material would be required for the commercial element. With incorporation of this roofing material, the project would be consistent with the Cool/Green Roof strategy.	☐	☐	☐

[5] Actions that are not subject to Step 2 would include, for example: 1) discretionary map actions that do not propose specific development, 2) permits allowing wireless communication facilities, 3) special events permits, 4) use permits or other permits that do not result in the expansion or enlargement of a building (e.g., decks, garages, etc.), and 5) non-building infrastructure projects such as roads and pipelines. Because such actions would not result in new occupancy buildings from which GHG emissions reductions could be achieved, the items contained in Step 2 would not be applicable.

2. *Plumbing fixtures and fittings* With respect to plumbing fixtures or fittings provided as part of the project, would those low-flow fixtures/appliances be consistent with each of the following: Residential buildings: • Kitchen faucets: maximum flow rate not to exceed 1.5 gallons per minute at 60 psi; • Standard dishwashers: 4.25 gallons per cycle; • Compact dishwashers: 3.5 gallons per cycle; and • Clothes washers: water factor of 6 gallons per cubic feet of drum capacity? Nonresidential buildings: • Plumbing fixtures and fittings that do not exceed the maximum flow rate specified in Table A5.303.2.3.1 (voluntary measures) of the California Green Building Standards Code (See Attachment A); and • Appliances and fixtures for commercial applications that meet the provisions of Section A5.303.3 (voluntary measures) of the California Green Building Standards Code (See Attachment A)? Check "N/A" only if the project does not include any plumbing fixtures or fittings. For the residential buildings, the project plumbing specifications would include low flow kitchen faucets with a flow rate not to exceed 1.5 gallons per minute at 60 psi. The architectural specifications will include installation of ENERGY STAR dish and clothes washers with the following specifications as applicable to the unit type constructed: Standard dishwashers: 4.25 gallons per cycle; Compact dishwashers: 3.5 gallons per cycle; and Clothes washers: water factor of 6 gallons per cubic feet of drum capacity Solar hot water systems would be installed in the multifamily apartment building. On-demand hot water recirculation systems would be installed in the market rate units. For the non-residential buildings, standard low flow fixtures and appliances would be installed in the community building and commercial space developed as part of the project. These fixtures would meet the specifications in Tables A5.303.2.3.1 and A5.303.3 referenced above. The proposed project would be consistent with CAP Strategy 1 (2).	☐	☐	☐

Strategy 3: Bicycling, Walking, Transit & Land Use			
3. *Electric Vehicle Charging* • Multiple-family projects of 17 dwelling units or less: Would 3% of the total parking spaces required, or a minimum of one space, whichever is greater, be provided with a listed cabinet, box or enclosure connected to a conduit linking the parking spaces with the electrical service, in a manner approved by the building and safety official, to allow for the future installation of electric vehicle supply equipment to provide electric vehicle charging stations at such time as it is needed for use by residents? • Multiple-family projects of more than 17 dwelling units: Of the total required listed cabinets, boxes or enclosures, would 50% have the necessary electric vehicle supply equipment installed to provide active electric vehicle charging stations ready for use by residents? • Non-residential projects: Of the total required listed cabinets, boxes or enclosures, would 50% have the necessary electric vehicle supply equipment installed to provide active electric vehicle charging stations ready for use? Check "N/A" only if the project is a single-family project or would not require the provision of listed cabinets, boxes, or enclosures connected to a conduit linking the parking spaces with electrical service, e.g., projects requiring fewer than 10 parking spaces. The project includes a multifamily element with a total of 113 apartment units. A total of 113 parking spaces would be provided for the apartments (one per unit). To meet the requirements of Strategy 3.3, Electrical Vehicle Charging, 5% of the parking supply, or a total of 6 parking electrical vehicle parking spaces will provided as required by current code. The spaces would contain a listed cabinet, box or enclosure connected to a conduit linking the parking spaces with the electrical service, in a manner approved by the City of San Diego Building and Safety Department. The electrical cabinet would provide active electric vehicle charging stations ready for use by residents and visitors. The project also includes 8,485 square feet of commercial space that will provide approximately 33 parking spaces. To meet the requirements of Strategy 3.3, Electrical Vehicle Charging, 6% of the parking supply, or two electric vehicle spaces, will be provided per current code. The electrical vehicle parking space would be available to employees and customers.	☐	☐	☐
Strategy 3: Bicycling, Walking, Transit & Land Use (Complete this section if project includes non-residential or mixed uses)			
4. *Bicycle Parking Spaces* Would the project provide more short- and long-term bicycle parking spaces than required in the City's Municipal Code (Chapter 14, Article 2, Division 5)?[6] Check "N/A" only if the project is a residential project. The 8,485-square foot commercial element is required to provide two short-term bicycle spaces and two long-term bicycle spaces. The short- and long-term bicycle parking calculations assume 5% of the total automobile parking spaces. This is not applicable to the residential component.	☐	☐	☐

[6] Non-portable bicycle corrals within 600 feet of project frontage can be counted towards the project's bicycle parking requirements.

5. *Shower facilities*

If the project includes nonresidential development that would accommodate over 10 tenant occupants (employees), would the project include changing/shower facilities in accordance with the voluntary measures under the California Green Building Standards Code as shown in the table below?

Number of Tenant Occupants (Employees)	Shower/Changing Facilities Required	Two-Tier (12" X 15" X 72") Personal Effects Lockers Required
0-10	0	0
11-50	1 shower stall	2
51-100	1 shower stall	3
101-200	1 shower stall	4
Over 200	1 shower stall plus 1 additional shower stall for each 200 additional tenant-occupants	1 two-tier locker plus 1 two-tier locker for each 50 additional tenant-occupants

Check "N/A" only if the project is a residential project, or if it does not include nonresidential development that would accommodate over 10 tenant occupants (employees).

The commercial element of the project would be 8,485 square feet. It is unknown exactly how many people would be employed on-site; however, it is reasonable to assume that at least 10 people would be collectively employed within the commercial area. Water supply stub outs and drains would be provided in the proposed building envelope to accommodate a shower/changing area with one shower stall and 2 personal effects lockers as required. The shower/lockers would be installed during tenant improvements. This is not applicable to the residential component.

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6. *Designated Parking Spaces*

If the project includes a nonresidential use in a TPA, would the project provide designated parking for a combination of low-emitting, fuel-efficient, and carpool/vanpool vehicles in accordance with the following table?

Number of Required Parking Spaces	Number of Designated Parking Spaces
0-9	0
10-25	2
26-50	4
51-75	6
76-100	9
101-150	11
151-200	18
201 and over	At least 10% of total

This measure does not cover electric vehicles. See Question 4 for electric vehicle parking requirements.

Note: Vehicles bearing Clean Air Vehicle stickers from expired HOV lane programs may be considered eligible for designated parking spaces. The required designated parking spaces are to be provided within the overall minimum parking requirement, not in addition to it.

Check "N/A" only if the project is a residential project, or if it does not include nonresidential use in a TPA.

The project would provide a total of 33 parking spaces for the commercial element of the project. A total of 4 spaces would be designated parking for low-emitting, fuel-efficient, and/or carpool/vanpool vehicles. The project would be consistent with CAP Strategy 3 (6). This is not applicable to the residential component.

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7. *Transportation Demand Management Program* If the project would accommodate over 50 tenant-occupants (employees), would it include a transportation demand management program that would be applicable to existing tenants and future tenants that includes: At least one of the following components: • Parking cash out program • Parking management plan that includes charging employees market-rate for single-occupancy vehicle parking and providing reserved, discounted, or free spaces for registered carpools or vanpools • Unbundled parking whereby parking spaces would be leased or sold separately from the rental or purchase fees for the development for the life of the development And at least three of the following components: • Commitment to maintaining an employer network in the SANDAG iCommute program and promoting its RideMatcher service to tenants/employees • On-site carsharing vehicle(s) or bikesharing • Flexible or alternative work hours • Telework program • Transit, carpool, and vanpool subsidies • Pre-tax deduction for transit or vanpool fares and bicycle commute costs • Access to services that reduce the need to drive, such as cafes, commercial stores, banks, post offices, restaurants, gyms, or childcare, either onsite or within 1,320 feet (1/4 mile) of the structure/use? Check "N/A" only if the project is a residential project or if it would not accommodate over 50 tenant-occupants (employees). Because the project would not accommodate more than 50 employees, the project would not be subject to the Transportation Demand Management element of the CAP. CAP Strategy 3 (7) would not be applicable to the proposed project. This is not applicable to the residential component.	☐	☐	☐

Step 3: Project CAP Conformance Evaluation (if applicable)

The third step of the CAP consistency review only applies if Step 1 is answered in the affirmative under option B. The purpose of this step is to determine whether a project that is located in a TPA but that includes a land use plan and/or zoning designation amendment is nevertheless consistent with the assumptions in the CAP because it would implement CAP Strategy 3 actions. In general, a project that would result in a reduction in density inside a TPA would not be consistent with Strategy 3.The following questions must each be answered in the affirmative and fully explained.

1. **Would the proposed project implement the General Plan's City of Villages strategy in an identified Transit Priority Area (TPA) that will result in an increase in the capacity for transit-supportive residential and/or employment densities?**
   Considerations for this question:
   - Does the proposed land use and zoning designation associated with the project provide capacity for transit-supportive residential densities within the TPA?
   - Is the project site suitable to accommodate mixed-use village development, as defined in the General Plan, within the TPA?
   - Does the land use and zoning associated with the project increase the capacity for transit-supportive employment intensities within the TPA?

2. **Would the proposed project implement the General Plan's Mobility Element in Transit Priority Areas to increase the use of transit?**
   Considerations for this question:
   - Does the proposed project support/incorporate identified transit routes and stops/stations?
   - Does the project include transit priority measures?

3. **Would the proposed project implement pedestrian improvements in Transit Priority Areas to increase walking opportunities?**
   Considerations for this question:
   - Does the proposed project circulation system provide multiple and direct pedestrian connections and accessibility to local activity centers (such as transit stations, schools, shopping centers, and libraries)?
   - Does the proposed project urban design include features for walkability to promote a transit supportive environment?

4. **Would the proposed project implement the City of San Diego's Bicycle Master Plan to increase bicycling opportunities?**
   Considerations for this question:
   - Does the proposed project circulation system include bicycle improvements consistent with the Bicycle Master Plan?
   - Does the overall project circulation system provide a balanced, multimodal, "complete streets" approach to accommodate mobility needs of all users?

5. **Would the proposed project incorporate implementation mechanisms that support Transit Oriented Development?**
   Considerations for this question:
   - Does the proposed project include new or expanded urban public spaces such as plazas, pocket parks, or urban greens in the TPA?
   - Does the land use and zoning associated with the proposed project increase the potential for jobs within the TPA?
   - Do the zoning/implementing regulations associated with the proposed project support the efficient use of parking through mechanisms such as: shared parking, parking districts, unbundled parking, reduced parking, paid or time-limited parking, etc.?

6. **Would the proposed project implement the Urban Forest Management Plan to increase urban tree canopy coverage?**
   Considerations for this question:
   - Does the proposed project provide at least three different species for the primary, secondary and accent trees in order to accommodate varying parkway widths?
   - Does the proposed project include policies or strategies for preserving existing trees?
   - Does the proposed project incorporate tree planting that will contribute to the City's 20% urban canopy tree coverage goal?

CLIMATE ACTION PLAN CONSISTENCY CHECKLIST
ATTACHMENT A

This attachment provides performance standards for applicable Climate Action Pan (CAP) Consistency Checklist measures.

Table 1 Roof Design Values for Question 1: Cool/Green Roofs supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan

Land Use Type	Roof Slope	Minimum 3-Year Aged Solar Reflectance	Thermal Emittance	Solar Reflective Index
Low-Rise Residential	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16
High-Rise Residential Buildings, Hotels and Motels	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16
Non-Residential	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16

Source: Adapted from the California Green Building Standards Code (CALGreen) Tier 1 residential and non-residential voluntary measures shown in Tables A4.106.5.1 and A5.106.11.2.2, respectively. Roof installation and verification shall occur in accordance with the CALGreen Code.

CALGreen does not include recommended values for low-rise residential buildings with roof slopes of ≤ 2:12 for San Diego's climate zones (7 and 10). Therefore, the values for climate zone 15 that covers Imperial County are adapted here.

Solar Reflectance Index (SRI) equal to or greater than the values specified in this table may be used as an alternative to compliance with the aged solar reflectance values and thermal emittance.

Table 2	Fixture Flow Rates for Non-Residential Buildings related to Question 2: Plumbing Fixtures and Fittings supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan
Fixture Type	**Maximum Flow Rate**
Showerheads	1.8 gpm @ 80 psi
Lavatory Faucets	0.35 gpm @60 psi
Kitchen Faucets	1.6 gpm @ 60 psi
Wash Fountains	1.6 [rim space(in.)/20 gpm @ 60 psi]
Metering Faucets	0.18 gallons/cycle
Metering Faucets for Wash Fountains	0.18 [rim space(in.)/20 gpm @ 60 psi]
Gravity Tank-type Water Closets	1.12 gallons/flush
Flushometer Tank Water Closets	1.12 gallons/flush
Flushometer Valve Water Closets	1.12 gallons/flush
Electromechanical Hydraulic Water Closets	1.12 gallons/flush
Urinals	0.5 gallons/flush

Source: Adapted from the California Green Building Standards Code (CALGreen) Tier 1 non-residential voluntary measures shown in Tables A5.303.2.3.1 and A5.106.11.2.2, respectively. See the California Plumbing Code for definitions of each fixture type.

Where complying faucets are unavailable, aerators rated at 0.35 gpm or other means may be used to achieve reduction.

Acronyms:
gpm = gallons per minute
psi = pounds per square inch (unit of pressure)
in. = inch

Table 3	**Standards for Appliances and Fixtures for Commercial Application related to Question 2: Plumbing Fixtures and Fittings supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan**	
Appliance/Fixture Type	**Standard**	
Clothes Washers	Maximum Water Factor (WF) that will reduce the use of water by 10 percent below the California Energy Commissions' WF standards for commercial clothes washers located in Title 20 of the *California Code of Regulations*.	
Conveyor-type Dishwashers	0.70 maximum gallons per rack (2.6 L) (High-Temperature)	0.62 maximum gallons per rack (4.4 L) (Chemical)
Door-type Dishwashers	0.95 maximum gallons per rack (3.6 L) (High-Temperature)	1.16 maximum gallons per rack (2.6 L) (Chemical)
Undercounter-type Dishwashers	0.90 maximum gallons per rack (3.4 L) (High-Temperature)	0.98 maximum gallons per rack (3.7 L) (Chemical)
Combination Ovens	Consume no more than 10 gallons per hour (38 L/h) in the full operational mode.	
Commercial Pre-rinse Spray Valves (manufactured on or after January 1, 2006)	Function at equal to or less than 1.6 gallons per minute (0.10 L/s) at 60 psi (414 kPa) and • Be capable of cleaning 60 plates in an average time of not more than 30 seconds per plate. • Be equipped with an integral automatic shutoff. • Operate at static pressure of at least 30 psi (207 kPa) when designed for a flow rate of 1.3 gallons per minute (0.08 L/s) or less.	

Source: Adapted from the California Green Building Standards Code (CALGreen) Tier 1 non-residential voluntary measures shown in Section A5.303.3. See the California Plumbing Code for definitions of each appliance/fixture type.

Acronyms:
L = liter
L/h = liters per hour
L/s = liters per second
psi = pounds per square inch (unit of pressure)
kPa = kilopascal (unit of pressure)

This report form shall be used when a site specific survey for historical resources was completed and no archaeological resources were identified within the project site (APE). This form may be used, rather than completion of an Archaeological Resource Management report, when archaeological resources were identified and, based on an evaluation, were determined to be non-significant or are potentially significant but will not be directly impacted by the proposed development project. Completion of the required site specific survey and this report form must conform to the Historical Resources Guidelines of the Land Development Manual.

I. PROJECT DESCRIPTION AND LOCATION

Birdseye Planning Group (BPG) was retained by Affirmed Housing Group to conduct an archaeological resources study for the proposed Hilltop/Euclid Project. The proposed project is located on a 9.35 vacant site in the Encanto Community in the City of San Diego. The site is bordered by Euclid Avenue to the east, Hilltop Drive to the south, single family residential property to the west, and the San Diego Earthlab educational facility and open space to the north. The proposed project would construct a total of 47 single-family and townhome market-rate residences with related improvements west of the arroyo that bisects the site generally from northwest to southeast. A total of 113 affordable apartment units would be constructed on the east side of the site. These would range from studio units to four bedroom units. Approximately 8,300 square feet of commercial space would be installed on the ground floor of the apartment complex facing Euclid Avenue. The project would include various recreational amenities including a community swimming pool, basketball court, gardening space, community room, and outdoor gathering areas.

Hilltop Drive is a two-lane east/west collector street that dead-ends at the arroyo crossing located at the southeast corner of the site. The proposed project would extend Hilltop Avenue east to the intersection with Euclid Avenue. This would require placement of fill material in the arroyo and extension of the existing drainage culvert. No fill material would be imported or exported. All graded material would be balanced on-site.

The existing arroyo would be graded, recontoured, and restored to maintain water conveyance and habitat function. Approximately .98 acre of revegetation would occur within the arroyo corridor. The arroyo would provide an aesthetic benefit to the overall project.

The proposed project would begin construction in mid to late 2018 and be completed by 2020.

II. SETTING

NATURAL ENVIRONMENT (PAST AND PRESENT)

The Hilltop and Euclid Mixed Use Project is located within the Encanto community of the City of San Diego in southern San Diego County, approximately 3.5 miles (5.6 km) northeast of San Diego Bay. To the south, east, and west of the project site are single family residential properties. North of the project site is the San Diego Earthlab educational facility and open space. The project site is generally located at 55 meters (180 feet) elevation (above mean sea level). The geology of the project site is described as very old, undivided paralic deposits dating to the middle to early Pleistocene (Kennedy and Tan 2008). The site is currently bisected by an arroyo which is a tributary to Chollas Creek. The arroyo runs northwest to southeast through the center of the site. Areas of the site are vegetated with both native and non-native species. Remnant foundations from previous residential development occur on the eastern site boundary along Euclid Avenue.

ETHNOGRAPHY/HISTORY

Southern California's prehistory, including San Diego, is typically divided into three major periods: Paleoindian (ca. 9500–6500 B.C.), Archaic (ca. 6500 B.C.–A.D. 500), and Late Prehistoric (A.D. 500–historic contact) (Jones and Klar, 2007; Moratto 1984). Paleoindian sites are generally identified by spear points associated with large game hunting, and crescentics. Archaic sites are generally characterized by a preponderance of marine shell middens and portable ground stone tools associated with a collecting subsistence strategy. Late Prehistoric sites are generally associated with small projectile points (which were often made of exotic lithic materials) for bow and arrow use, ceramic pottery, and cremation of the deceased.

The Kumeyaay (also called Tipai locally) occupied southern San Diego County including the current project site at the time of Spanish contact (Carrico 1987; Luomala 1978). The Kumeyaay language is considered a member of the Yuman language family. The Kumeyaay people practiced seasonal hunting and gathering with relatively large village centers. Acorns were a significant food staple because they were abundant and could be stored easily (Moratto 1984).

The establishment of the Presidio at San Diego and the Mission San Diego de Alcalá in A.D. 1769 started the historic period in the San Diego region Carrico 1987). European presence in the region expanded during the Spanish Period (1769–1822), Mexican Period (1822–1848), and American Period (1848–present), decimating and displacing the Kumeyaay until and through their placement on reservations (Carrico 1987). California achieved U.S. statehood in 1850 and the City of San Diego was incorporated the same year (Pryde 2004). Also that same year, William Heath Davis and other investors purchased 160 acres of land adjacent to San Diego Bay and laid out streets and plots they called New Town where Downtown San Diego now exists. However, the charter of incorporation was lost in 1852 due to a lack of growth and Davis's New Town foundered. Alonzo E. Horton arrived in 1867, purchased 800 acres in the now Downtown area, and in 1869 also purchased Davis's 160 acres. Horton's purchases and infrastructure investments sparked the first real estate boom in San Diego, and the City was incorporated for the final time in 1872.

The Encanto area was platted in 1891 but not developed until 1907 (Page & Turnbull 2013). The town of Encanto was primarily comprised of small farms and suburban homes with rail access to the city. Encanto was annexed to the City of San Diego in 1916. As early as the 1920s, Southeast San Diego, including the Encanto area, developed more densely and with greater ethnic diversity than other communities in the city (Page & Turnbull 2013). This pattern intensified after World War II during the "baby boom." Construction of Highway 15, Highway 94, Interstate 5, and Interstate 805 in the 1950s and 1960s further segregated neighborhoods. Today, Southeast San Diego remains one of the most ethnically diverse regions of the City of San Diego, which itself is the most diverse part of the county.

III. AREA OF POTENTIAL EFFECTS (APE)

For this study, the APE is defined as the project site shown in Attachment C, Figure 1. No structures are currently located within the project site and no historical resources are recorded adjacent to the project site that could be indirectly impacted.

IV. STUDY METHODS (Include a description of the specific methods used in the identification and evaluation of archaeological resources for this study.)

On May 7, 2017, BPG requested a records search of the California Historical Resources Information System (CHRIS) at the South Coastal Information Center (SCIC) located at San Diego State University.

The search was conducted to identify all previously performed cultural resources work within the project site and a 0.5-mile radius around it, as well as to identify previously recorded cultural resources within or near the project site. The CHRIS search included a review of the National Register of Historic Places (NRHP), the CRHR, the California Points of Historical Interest list, the California Historical Landmarks list, the Archaeological Determinations of Eligibility list, and the California State Historic Resources Inventory list. The records search also included a review of all available historical United States Geological Survey (USGS) 7.5- and 15-minute quadrangle maps.

BPG initiated Native American coordination for this project on May 7, 2017. As part of the cultural resources identification process, BPG contacted the Native American Heritage Commission (NAHC) to request a review of the Sacred Lands File (SLF). The SLF search results, received on June 16, 2017, failed to identify Native American cultural resources within the project site. The NAHC provided a contact list of 20 Native American individuals or tribal organizations that may have knowledge of cultural resources in or near the project site. On June 19, BPG sent letters to the local Native American contacts provided by the NAHC requesting information regarding cultural resources in the vicinity of the project. On June 20, 2017, BPG emailed all contacts (13) for which the NAHC provided email addresses. BPG also left voicemails with each tribal organization on June 23, 2017. Carmen Lucas of the Kwaaymii Laguna Band of Mission Indians returned BPG's call on June 23, 2017, and said that she had no concerns, but if archaeological monitoring is recommended for the project, she requests that a Native American monitor be present as well.

BPG Senior Archaeologist Scott Mattingly, M.A., RPA, conducted a pedestrian survey of the project on May 16, 2017. Copies of project field notes and photographs are on file at BPG's Vista, California office.

V. RESULTS OF STUDY

BACKGROUND RESEARCH

The SCIC records search identified 37 previous studies within a 0.5-mile radius of the project site, two of which (SD-12520 and SD-15977) included the project site. The SCIC records search identified four previously recorded cultural resources within a 0.5-mile radius of the project site, none of which was within the project site. Two historic addresses were identified within a 0.5-mile radius of the project site, neither of which was within or adjacent to the project site.

AECOM's (2015) *Community Plan Update for the Communities of Southeastern San Diego and Encanto Prehistoric Cultural Resources, City of San Diego, California. On file at South Coastal Information Center, San Diego State University* (SD-15977) identified the entire Encanto planning area as of moderate or high prehistoric archaeological sensitivity. The project site is mapped as moderate sensitivity (AECOM 2015:45).

ASM Affiliates Inc.'s (ASM; 2006a; SD-12520) *Historical Building Evaluations for the Central Imperial Redevelopment Project, San Diego, California* inspected 76 buildings constructed prior to 1960, including inspection of eight parcels within the current project APE. ASM found only 16 of the 76 buildings worthy of California Register of Historical Resources (CRHR) eligibility evaluation, none of which were within the current project APE (ASM 2006:1-3).

One additional study included the project APE that was not identified in the SCIC records search but found during BPG's online document review: ASM Affiliates, Inc. (2006b) *Cultural and Historic Resource Inventory for the Central Imperial Redevelopment Project, San Diego, California.* This study was prepared in support of the Fifth Amendment to the Central Imperial Redevelopment Plan

Environmental Impact Report and repeats much of the results of SD-12520. Of note, this study included intensive pedestrian survey of the current project APE and noted evidence of surface scraping and fill pushed into the arroyo (ASM 2006b:40). At that time, eight buildings were standing within the APE, all of which have since been demolished. ASM found no prehistoric or historic archaeological resources during the survey but noted only 25-30 percent ground visibility. ASM determined that the eight buildings were constructed in the 1940s and evaluated them as not eligible for the City Register.

A review of in-house copies of the 1887, 1888, 1906, 1920-1940, and 1920-1950 Sanborn Fire Insurance maps was undertaken to assess historic period use of the project area. However, the project area could not be located in any of the Sanborn Fire Insurance Maps. All available historical USGS topographic maps were also reviewed; the results of that review are presented below in Table 1.

Table 1
Historical USGS Topographic Map Data for the Project area

Map Title and Year	Number of Structures	Comments
San Diego: 1904	None	No structures depicted
Southern California: 1904	None	No structures depicted
San Diego: 1930	None	Euclid Avenue is visible to the east of the project area
National City: 1944	1	1 structure is present on the east side of the project area, adjacent to Euclid Avenue.
National City: 1953	5	5 structures are visible on the east side of the project area, adjacent to Euclid Avenue.

A review of historic aerial photographs dating between 1953 and 2005 indicate that the buildings on the project site were built prior to 1953. Buildings that once occupied the project site were demolished between 2005 and 2009 (HistoricAerials.com 2017).

FIELD RECONNAISSANCE

The project site was surveyed on May 16, 2017. The entire project site was surveyed using pedestrian transects spaced no greater than 10 meters apart and generally oriented north-south, with minor adjustment within and adjacent to the arroyo, where its course was followed. Ground visibility varied greatly within the APE but averaged approximately 30 percent overall. Ground visibility was best along the southern boundary (approximately 70 percent) and eastern boundary (approximately 60 percent) but very poor (approximately 10-20 percent within the arroyo and west of it). Vegetation west of the arroyo was dominated by disturbed grasses. East of the arroyo, some historic period artifacts (e.g., solarized glass, rusted metal) were observed within a large predominantly modern refuse scatter that appears to be fill pushed onto and down the eastern bank of the arroyo from the former residences facing Euclid Avenue. None of the eight buildings that faced Euclid Avenue remain extant. Only concrete foundations and driveways remain.

EVALUATION

No archaeological or historic built environment resources are present within the APE. The buildings formerly present within the APE were evaluated and recommended not eligible for City Register (ASM 2006b:46) and subsequently demolished. The historic period artifacts present within the largely modern

refuse scatter are clearly in a secondary (disturbed) context. The surface scatter lacks the potential to provide significant data and therefore is not considered a potential historical resource.

VI. RECOMMENDATIONS (Include recommendations for mitigation of significant indirect and cumulative impacts and monitoring, as appropriate.)

No archaeological resources have been identified within the project APE. Based on the findings of this study, Birdseye Planning Group recommends no further cultural resources work for the Hilltop/Euclid Project. The project site is highly disturbed and does not appear to possess the potential to impact cultural resources directly or indirectly.

If previously unidentified cultural resources are encountered during ground-disturbing activities associated with construction, work in the immediate area must halt and an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for archaeology (National Park Service 1983) must be contacted immediately to evaluate the find. If the discovery proves to be significant under the CEQA, additional work such as data recovery excavation may be warranted to mitigate any adverse effects.

The discovery of human remains is always a possibility during ground disturbance. California Health and Safety Code Section 7050.5 addresses such findings. This code section states that no further disturbance shall occur until the county coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. In the event of an unanticipated discovery of human remains, the San Diego County Medical Examiner (county coroner) must be notified immediately. If the human remains are determined to be prehistoric, the coroner will notify the NAHC, which will determine and notify a most likely descendant (MLD). The MLD shall complete the inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

VII. SOURCES CONSULTED DATE

National Register of Historic Places	Month and Year: June 2017
California Register of Historical Resources	Month and Year: June 2017
City of San Diego Historical Resources Register	Month and Year: June 2017
Archaeological/Historical Site Records:	
South Coastal Information Center	Month and Year: June 2017
San Diego Museum of Man	Month and Year: N/A
Other Sources Consulted:	
Historical USGS Topographic Maps	Month and Year: June 2017

VIII. CERTIFICATION

Preparer: Scott A. Mattingly, M.A., RPA	Title: Cultural Resources Principal Investigator
Signature: 	Date: June 23, 2017

IX. ATTACHMENTS

Attachment A. National Archaeological Data Base Information
Attachment B. Bibliography
Attachment C. Maps
Attachment D. Photographs
Attachment E. Personnel Qualifications

X. CONFIDENTIAL APPENDICES (Bound separately)

Confidential Attachment F. Records search results
Confidential Attachment G. Historical resource location maps and site maps
Confidential Attachment H. NAHC Response Letter and Sample Contact Letter

NATIONAL ARCHAEOLOGICAL DATABASE

INFORMATION SHEET

Author:	Scott Mattingly
Report date:	June 2017
Report title:	Archaeological Resource Report Form for the Hilltop and Euclid Mixed Use Project
Submitted to:	Affirmed Housing Group 13520 Evening Creek Drive North San Diego, CA 92128
Submitted by:	Birdseye Planning Group 1354 York Drive Vista, CA 92084
USGS Quadrangles:	National City, CA 7.5-minute, 2001 (electronic)
Key words:	Pedestrian survey; negative survey; no impacts; City of San Diego; Encanto; San Diego County

BIBLIOGRAPHY

AECOM

2015 Community Plan Update for the Communities of Southeastern San Diego and Encanto Prehistoric Cultural Resources, City of San Diego, California. On file at South Coastal Information Center, San Diego State University.

ASM Affiliates, Inc.

2006a Historical Building Evaluations for the Central Imperial Redevelopment Project, San Diego, California. On file at South Coastal Information Center, San Diego State University.

2006b "Cultural and Historic Resource Inventory for the Central Imperial Redevelopment Project, San Diego, California." Fifth Amendment to the Central Imperial Redevelopment Plan EIR, Appendix E1. Prepared for BRG Consulting, Inc. On file at City of San Diego.

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1987 *Strangers in a Stolen Land.* Sierra Oaks Publishing Company, Sacramento, California.

Jones, Terry L. and Kathryn A. Klar

2007 *California Prehistory: Colonization, Culture, and Complexity*. AltaMira Press, Berkeley, California.

Kennedy, Michael P. and Siang S. Tan

2008 Geologic Map of the San Diego 30' x 60' Quadrangle, California. California Geological Survey, Sacramento, California

Luomala, Katherine

1978 Tipai and Ipai. In *California*, edited by Robert F. Heizer, pp. 592-609. *Handbook of North American Indians*, Vol. 8, William G. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

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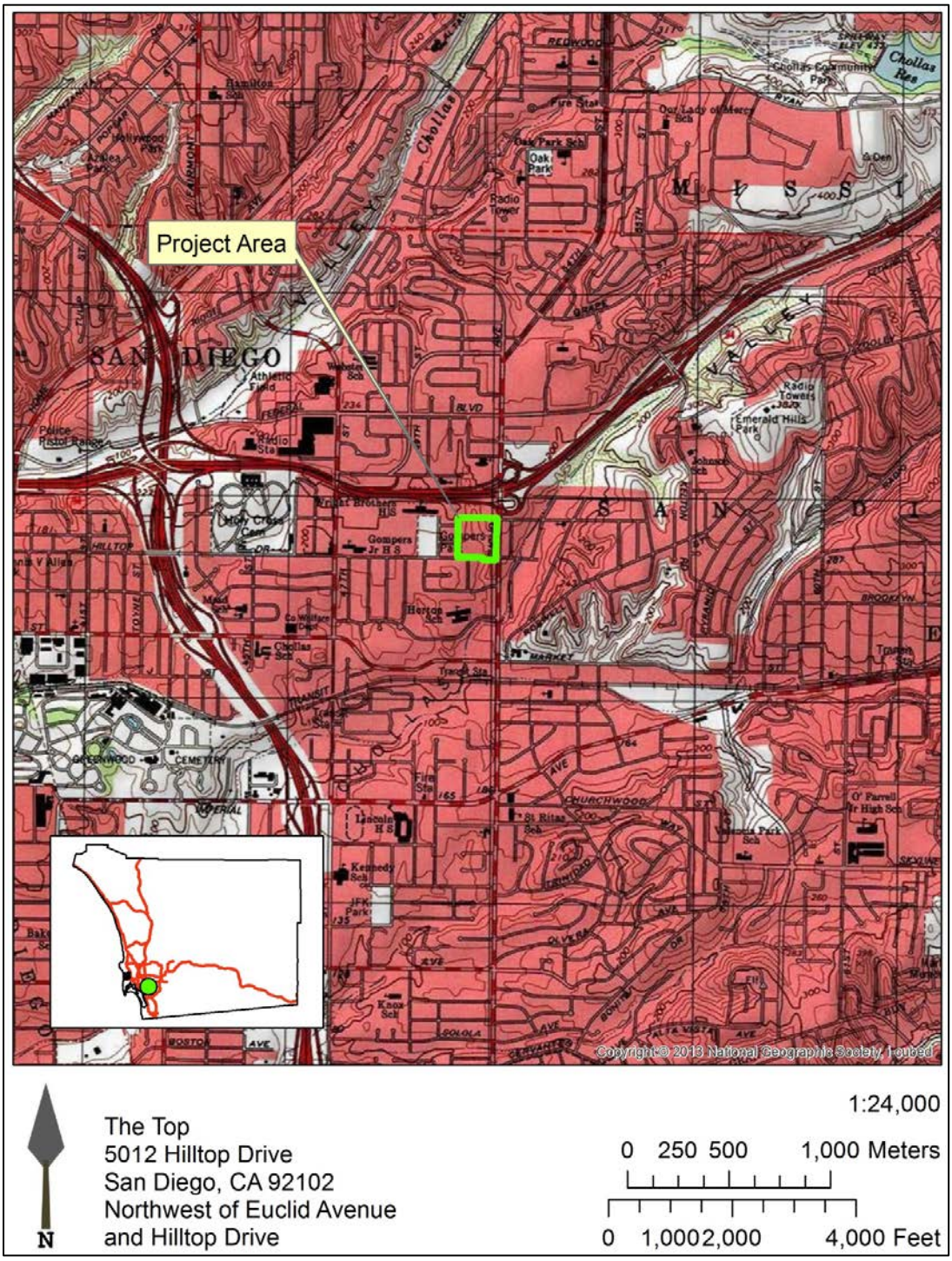
Pryde, Philip R.

2004 *San Diego: An Introduction to the Region*. Fourth Edition. Sunbelt Publications, San Diego, California.

Map 1. Regional Map



Map 2. Project Location Depicted on 7.5 Minute National City USGS Quadrangle

Map 3. Aerial Photograph of Project Area

Photograph 1. View of vegetation in southeast corner of project APE.

Photograph 2. View of foundations and driveways along Euclid Avenue, facing north.

Photograph 3. Detail of foundation along Euclid Avenue, facing southeast.

Photograph 4. View of arroyo in southern portion of APE, facing west-northwest.

Photograph 5. View of refuse and debris scatter on eastern bank of arroyo, facing south.

Photograph 6. View north from atop western bank of arroyo.

Photograph 7. View of western portion of APE, facing south.

Photograph 8. View of arroyo in central portion of APE, facing south-southeast.

Scott A. Mattingly, M.A., RPA
Cultural Resources Principal Investigator and GIS Specialist,
Birdseye Planning Group

Education
M.A., Anthropology, 2007, San Diego State University, California

B.A, Anthropology, 1996, University of Central Florida, Orlando, Florida

Certificate of Performance: Geographic Information Systems (GIS) Technician, 2010, Mesa College, San Diego, California

Publications
Gamble, Lynn H., and Scott Mattingly
2012 Pine Nut Processing in Southern California: Is the Absence of Evidence the Evidence of Absence? *American Antiquity* 77:263-278.
Hyde, David Gerrit, Keshia Montifolca, and Scott Mattingly
2012 Archaeological Applications of GIS at the San Diego Presidio Chapel. *Proceedings of the Society for California Archaeology* 26:26-39. Chico, California

Affiliations
Registry of Professional Archaeologists

Society for California Archaeology

Scott Mattingly has more than 17 years of experience in California cultural resources management and he meets and exceeds the Secretary of the Interior's Professional Qualifications Standards for prehistoric and historic archaeology. Mr. Mattingly has experience as a private consultant, local agency staff for California Environmental Quality Act (CEQA) compliance, and federal agency staff focused on National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) compliance. This broad range of experience results in defensible work products that comply with project-specific regulatory requirements. Mr. Mattingly has considerable experience consulting with Native American tribes and contacts throughout California. He is also an expert at cultural resources mapping and data management using Geographic Information Systems (GIS).

Relevant Project Experience:

Cultural Resources Study for the Carlsbad Village Center Project, Carlsbad, San Diego County, California. Mr. Mattingly managed and prepared a cultural resources technical study in support of a CEQA Initial Study/MND for a four-story mixed-use development project in downtown Carlsbad.

Additional Experience. Mr. Mattingly has served as a Staff Archaeologist for the United States Marine Corps managing the execution of numerous cultural resources studies. In addition, as Archaeologist/ Contracting Officer's Representative at Naval Facilities Engineering Command (NAVFAC) Southwest he oversaw the execution of hundreds of NEPA and Section 106 projects throughout California, Arizona, and Nevada. For two years Mr. Mattingly was Associate State Archeologist for the Humboldt/Del Norte Unit of the California Department of Forestry and Fire Protection, where he managed the protection of many significant archaeological sites during wildfires. Finally, his experience as Assistant Coordinator / GIS Manager at the South Coastal Information Center at San Diego State University, where he also lectured, afforded him a deep understanding of the site recordation and data management process.

Resource List

Primary No.	Trinomial	Other IDs	Type	Age	Attribute codes	Recorded by	Reports
P-37-011959	CA-SDI-011959						SD-05476, SD-05506, SD-08458, SD-09627
P-37-028964		Other - Market and Euclid Project				2007 (ASM Affiliates, Inc.)	
P-37-032678	CA-SDI-020704	Other - Sewer Goup 748	Site	Historic	AH04 (Privies/dumps/trash scatters)	2012 (Brian F. Smith & Associates)	
P-37-035944							

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
SD-01218	NADB-R - 1121218; Voided - CROTTEAU03	1983	Crotteau, Karen	Archaeological Survey Report for the Proposed MTDB Urban Transit Corridor (11812-634517-6T11232B).	CALTRANS	37-005816
SD-01573	NADB-R - 1121573; Voided - SMITHB 68	1989	Smith, Brian F.	The Results of an Archaeological Survey and the Evaluation of Cultural Resources for the South Chollas Valley Trunk Sewer Project Dep. No. 88-0710	Brian F. Smith and Associates	37-011165
SD-01772	NADB-R - 1121772; Voided - SMITHB 52	1989	Smith, Brian F.	The Results of an Archaeological Survey and the Evaluation of Cultural Resources Within the South Chollas Valley Sewer Interceptor Line EQD No. 88-0710	Brian F. Smith and Associates	37-005580, 37-010252, 37-011165
SD-02577	NADB-R - 1122577; Other - 93-0146; Voided - KYLE 24	1993	KYLE, CAROLYN and ROXANA PHILIPS	CULTURAL RESOURCE SURVEY FOR THE VALENCIA PARK LIBRARY PROJECT, SAN DIEGO	GALLEGOS & ASSOCIATES	
SD-03789	NADB-R - 1123789; Voided - KYLE80	1999	KYLE, CAROLYN E, LARRY TIFT, and DENNIS R. GALLEGOS	FINAL:CULTURAL RESOURCE SURVEY FOR THE POTTER TRACT AND SIGNIFICANCE TEST OF A PORTION OF SITE SDM-W-311 SAN DIEGO, CALIFORNIA	BRG CONSULTING	
SD-05506	NADB-R - 1125506; Voided - ROBBINS67	1991	ROBBINS-WADE, MARY	Cultural Resources Inventory and Significant Assessment of CA-SDI-11959 for the Encanto Trunk Sewer Project San Diego, California	Affinis	37-010252, 37-011959, 37-011960, 37-012087
SD-05778	NADB-R - 1125778; Voided - COOKJ 59	1987	COOK, JOHJ	FAIRMOUNT AVENUE REALIGNMENT HISTORIC PROPERTY SURVEY REPORT	ASM AFFILIATES	
SD-06182	NADB-R - 1126182; Voided - KYLE 127	1998	KYLE, CAROLYN, LARRY TIFT, and DENNIS GALLEGOS	CULTURAL RESOURCE SURVEY FOR THE PORTER TRACT AND SIGNIFICANCE TEST OF A PORTION OF SITE SDM-W-311 SAN DIEGO, CALIFORNIA	GALLEGOS & ASSOC.	
SD-06221	NADB-R - 1126221; Voided - MCKENNAJ06	2000	MCKENNA, JEANETTE A	A PHASE 1 CULTURAL RESOURCES INVESTIGATION OF THE VESTA TELECOMMUNICATIONS INC FIBER OPTIC ALIGNMENT, RIVER COUNTY TO SAN DIEGO COUNTY CALIFORNIA	MCKENNA ETAL	
SD-06320	NADB-R - 1126320; Other - 96-7710; Voided - CITYSD 403	1998	CITY OF SAN DIEGO	MITIGATED NEGATIVE DECLARATION: HOLY CROSS MAUSOLEUM; A CONDITIONAL USE PERMIT AMENDMENT AND A SOUTHEAST SAN DIEGO DEVELOPMENT PERMIT AMENDMENT # 96-7710	CITY OF SAN DIEGO	

Page 1 of 4

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Report List

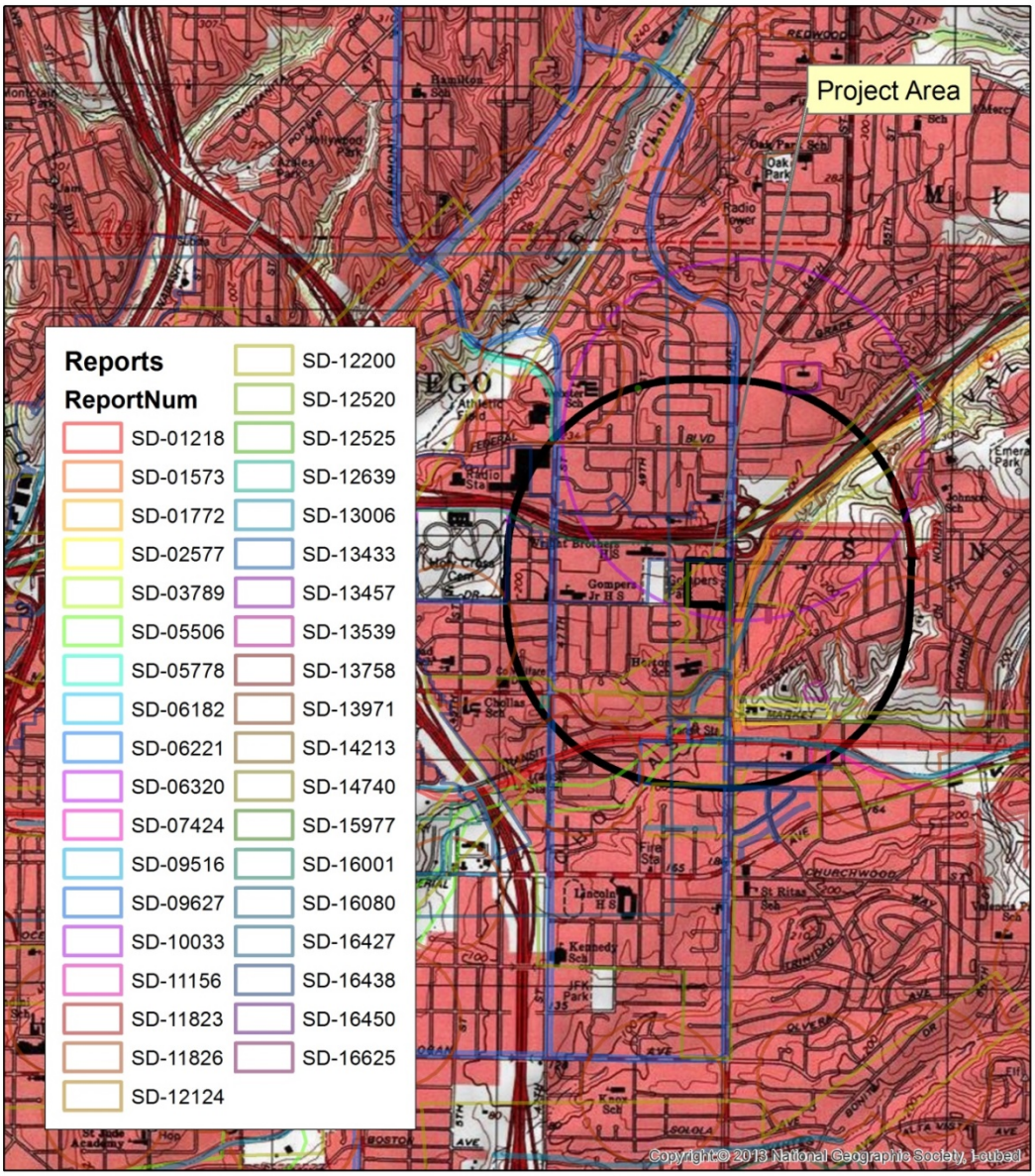
Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
SD-07424	NADB-R - 1127424; Voided - PIGNIO 131	2002	PIGNIOLO, ANDREW and STEPHANIE MURRAY	CULTURAL RESOURCES MONITORING REPORT FOR THE VALENCIA PALMS BUSINESS PARK PROJECT, SAN DIEGO, CALIFORNIA	TIERRA	
SD-09516	NADB-R - 1129516; Voided - CATERINO01	2005	Caterino, David	The Cemeteries and Gravestones of San Diego County: An Archaeological Study	David Caterino	
SD-09627	NADB-R - 1129627; Voided - SCHAEFER43	2005	Schaefer, Jerry and Jim Eighmey	An Archaeological Survey of the Market Street Plaza Project, a 19 acre Parcel in the City of San Diego, California	ASM Affiliates	37-011959
SD-10033	NADB-R - 1130033; Voided - BONNEW04	2005	Bonner, Wayne and Mernie Aislin-Kay	Cultural Resource Records Search and Site Visit Results for Cingular Telecommunications Facility Candidate SS-051-01 (Jacobs Community Center) 5160 Federal Boulevard, San Diego, San Diego County, California.	Michael Brandman Associates	
SD-11156	NADB-R - 1131156; Voided - NIGHAS60	2006	NI GHABHLAIN, SINEAD	CREEKSIDE SEWER LATERAL PROJECT, AN ADDENDUM TO THE NARANJA APARTMENT PROJECT, SUBMITTED TO MR. ERICH LATHERS OF BRG CONSULTING, INC., 304 IVY STREET, SAN DIEGO, CALIFORNIA 92101	ASM AFFILIATES, INC.	
SD-11823	NADB-R - 1131823; Voided - KICKM01	2007	KICK, MAUREEN S.	CULTURAL RESOURCES TECHNICAL REPORT FOR THE SAN DIEGO VEGETATION MANGEMENT PROJECT	URS	
SD-11826	NADB-R - 1131826; Voided - ROBBINS255	2008	ROBBINS-WADE, MARY	ARCHAEOLOGICAL RESOURCES ANALYSIS FOR THE MASTER STORMWATER SYSTEM MAINTENANCE PROGRAM, SAN DIEGO, CALIFORNIA PROJECT NO. 42891	AFFINIS	
SD-12124	NADB-R - 1132124; Voided - ROBBINS268	2009	ROBBINS-WADE, MARY	ARCHAEOLOGICAL RESOURCES INVENTORY: 4744 MARKET STREET, SAN DIEGO, CALIFORNIA	AFFINIS	37-026964
SD-12200	NADB-R - 1132200; Voided - CITYSD1081	2009	HERRMANN, MYRA	DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE MASTER STORM WATER SYSTEM MAINTENANCE PROGRAM (MSWSMP)	CITY OF SAN DIEGO DEVELOPMENT SERVICES DEPARTMENT	
SD-12520	NADB-R - 1132520; Voided - NIGHAS69	2006	NI GHABHLAIN, SINEAD	HISTORIC BUILDING EVALUATIONS FOR THE CENTRAL IMPERIAL REDEVELOPMENT PROJECT SAN DIEGO, CALIFORNIA	ASM AFFILIATES, INC.	

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
SD-12525	NADB-R - 1132525; Voided - BONNEW233	2008	BONNER, WAYNE and SARAH WILLIAMS	CULTURAL RESOURCES RECORDS SEARCH AND SITE VISIT RESULTS FOR T-MOBILE USA CANDIDATE SD07064A (ELM STREET ROW) AT THE INTERSECTION OF ELM AND 49TH STREETS, SAN DIEGO, SAN DIEGO COUNTY, CALIFORNIA	MICHAEL BRANDMAN ASSOCIATES	
SD-12639	NADB-R - 1132639; Voided - ALTER137	2009	ALTER, RUTH	CULTURAL RESOURCES REPORT FOR THE GASOLINE STATION PUMP BAYS, 4689 MARKET STREET, SAN DIEGO, CALIFORNIA 92102	ARCHAEOS	
SD-13006	NADB-R - 1133006; Voided - ROBBINS316	2011	ROBBINS-WADE, MARY	MASTER STORM WATER SYSTEM MAINTENANCE PROGRAM	AFFINIS	
SD-13433	NADB-R - 1133433; Voided - PIERSON227	2012	PIERSON, LARRY J.	ARCHAEOLOGICAL RESOURCE REPORT FORM: MITIGATION MONITORING OF SEWER GROUP 748 SAN DIEGO, CALIFORNIA WBS B-00356 PROJECT #27526	BRIAN F. SMITH & ASSOCIATES, INC.	37-032269
SD-13457	NADB-R - 1133457; Voided - PEREZD13	2011	PEREZ, DON	SUBMISSION PACKET, FCC FORM 620, FOR PROPOSED NEW TOWER PROJECT 1765 PENTECOST WAY, SAN DIEGO, SAN DIEGO COUNTY, CA 92105 BAYVIEW HEIGHTS/ ENSITE #1028	EBI CONSULTING	37-011165
SD-13539	NADB-R - 1133539; Voided - STROPT32	2012	STROPES, TRACY A. and BRIAN F. SMITH	A PHASE I CULTURAL RESOURCE STUDY FOR THE PAYAN PROPERTY PROJECT SAN DIEGO, CALIFORNIA	BRIAN F. SMITH AND ASSOCIATES, INC.	
SD-13758	NADB-R - 1133758; Voided - CASER105	2011	CASE, ROBERT P.	CULTURAL RESOURCE TESTING AND EVALUATION REPORT FOR THE DIAMOND NEIGHBORHOODS FAMILY HEALTH CENTER PROJECT 545 47TH STREET SAN DIEGO, CALIFORNIA	LAGUNA MOUNTAIN ENVIRONMENTAL, INC.	37-026962
SD-13971	NADB-R - 1133971; Voided - ROBBINS369	2012	ROBBINS-WADE, MARY	SOUTH CHOLLAS LONG TERM ACCESS PLAN PROJECT CULTURAL RESOURCES SURVEY	AFFINIS	37-011165
SD-14213	NADB-R - 1134213; Voided - DANIEJ14	2011	DANIELS, JAMES T.	A CULTURAL RESOURCES SURVEY USING THE ARCHAEOLOGICAL RESOURCES REPORT FORM FOR THE NORTHWEST VILLAGE CREEK CONSTRUCTION PROJECT, CHOLLAS CREEK, SAN DIEGO COUNTY, CALIFORNIA	ASM AFFILIATES, INC.	

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
SD-14740	NADB-R - 1134740; Voided - CITYSD1136	2014	CITY OF SAN DIEGO	SEWER GROUP JOB 743	CITY OF SAN DIEGO	
SD-15977	NADB-R - 1135977	2015	Cheryl Bowden-Renna, Stephanie Jow, and Andrew York	COMMUNITY PLAN UPDATE FOR THE COMMUNITIES OF SOUTHEASTERN SAN DIEGO AND ENCANTO PREHISTORIC CULTURAL RESOURCES, CITY OF SAN DIEGO, CALIFORNIA	AECOM	
SD-16001	NADB-R - 1136001	2015	Martha Blake	SOUTHEASTERN SAN DIEGO AND ENCANTO NEIGHBORHOODS COMMUNITY PLAN UPDATES PROJECT FINAL ENVIRONMENTAL IMPACT REPORT	Dyett & Bhatia	
SD-16080	NADB-R - 1136080	2012	James T. Daniels	A CULTURAL RESOURCES SURVEY USING THE ARCHAEOLOGICAL RESOURCES REPORT FORM (APPENDIX D) FOR THE NORTHWEST WILLAGE CREEK CONSTRUCTION PROJECT, CHOLLAS CREEK, SAN DIEGO COUNTY, CALIFORNIA	ASM Affiliates, Inc	
SD-16427		1987	MIKESELL, STEPHEN D.	ARCHIE MOORE HOME, 3517 E STREET, SAN DIEGO, CA 92102		
SD-16438		2015	CALPO, JANICE	FINDING OF NO ADVERSE EFFECT STATE ROUTE 94 EXPRESS LANES PROJECT SAN DIEGO, SAN DIEGO COUNTY, CALIFORNIA		
SD-16450		2016	GARCIA-HERBST, ARLEEN	CULTURAL RESOURCES INVENTORY FOR THE LENOX DRIVE VECTOR CONTROL PROJECT, CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, CALIFORNIA		
SD-16625		2016	SMITH, BRIAN F.	HISTORICAL RESOURCE RESEARCH REPORT FOR THE 5147 HILLTOP DRIVE BUILDING, SAN DIEGO, CALIFORNIA 92114 PROJECT NO. 451707		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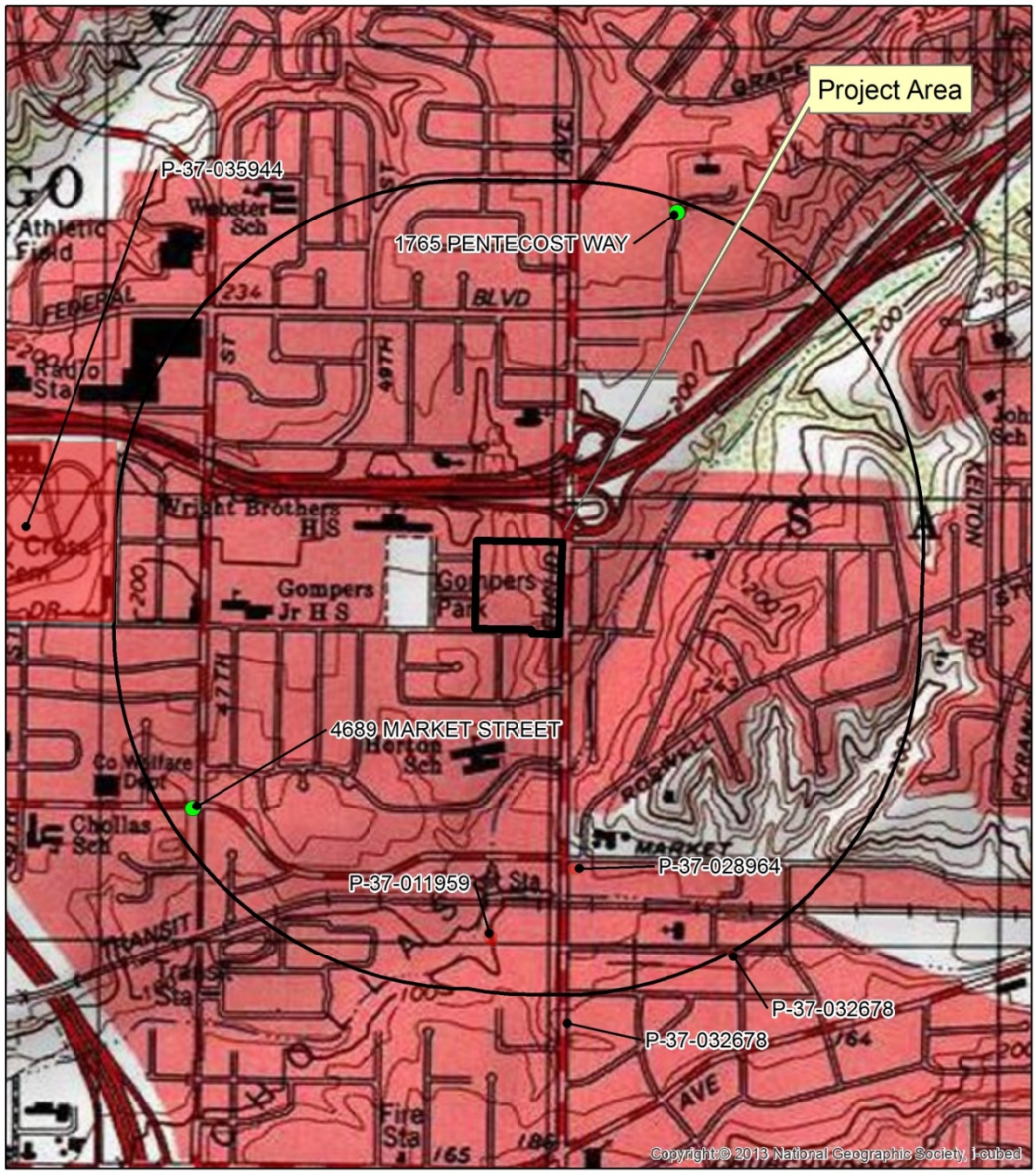

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San Diego, CA 92102

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STATE OF CALIFORNIA — Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
Environmental and Cultural Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710

May 8, 2017

Scott Mattingly
Black Mountain Resource Consultants

Sent via e-mail: scottmattingly@gmail.com

RE: The Proposed Top Project, City of San Diego; National City USGS Quadrangle, San Diego County, California

Dear Mr. Mattingly:

Attached is a consultation list of tribes with traditional lands or cultural places located within the boundaries of the above referenced counties. Please note that the intent of the reference codes below is to avoid or mitigate impacts to tribal cultural resources, as defined, for California Environmental Quality Act (CEQA) projects under AB-52.

As of July 1, 2015, Public Resources Code Sections 21080.3.1 and 21080.3.2 **require public agencies** to consult with California Native American tribes identified by the Native American Heritage Commission (NAHC) for the purpose mitigating impacts to tribal cultural resources:

> **Within 14 days** of determining that an application for a project is complete or a decision by a public agency to undertake a project, the lead agency shall provide formal notification to the designated contact of, or a tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, which shall be accomplished by means of at least one written notification that includes a brief description of the proposed project and its location, the lead agency contact information, and a notification that the California Native American tribe has 30 days to request consultation pursuant to this section. (Public Resources Code Section 21080.3.1(d))

The law does not preclude agencies from initiating consultation with the tribes that are culturally and traditionally affiliated with their jurisdictions. The NAHC believes that in fact that this is the best practice to ensure that tribes are consulted commensurate with the intent of the law.

In accordance with Public Resources Code Section 21080.3.1(d), formal notification must include a brief description of the proposed project and its location, the lead agency contact information, and a notification that the California Native American tribe has 30 days to request consultation. The NAHC believes that agencies should also include with their notification letters information regarding any cultural resources assessment that has been completed on the APE, such as:

1. The results of any record search that may have been conducted at an Information Center of the California Historical Resources Information System (CHRIS), including, but not limited to:

   - A listing of any and all known cultural resources have already been recorded on or adjacent to the APE;
   - Copies of any and all cultural resource records and study reports that may have been provided by the Information Center as part of the records search response;
   - If the probability is low, moderate, or high that cultural resources are located in the APE.
   - Whether the records search indicates a low, moderate or high probability that unrecorded cultural resources are located in the potential APE; and
   - If a survey is recommended by the Information Center to determine whether previously unrecorded cultural resources are present.

2. The results of any archaeological inventory survey that was conducted, including:

- Any report that may contain site forms, site significance, and suggested mitigation measurers.

  All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure in accordance with Government Code Section 6254.10.

3. The results of any Sacred Lands File (SFL) check conducted through Native American Heritage Commission. A search of the SFL was completed for the project with negative results.

4. Any ethnographic studies conducted for any area including all or part of the potential APE; and

5. Any geotechnical reports regarding all or part of the potential APE.

Lead agencies should be aware that records maintained by the NAHC and CHRIS is not exhaustive, and a negative response to these searches does not preclude the existence of a cultural place. A tribe may be the only source of information regarding the existence of a tribal cultural resource.

This information will aid tribes in determining whether to request formal consultation. In the case that they do, having the information beforehand well help to facilitate the consultation process.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance we are able to assure that our consultation list contains current information.

If you have any questions, please contact me at my email address: gayle.totton@nahc.ca.gov.

Sincerely,

Gayle Totton

Gayle Totton, M.A., PhD.
Associate Governmental Program Analyst

Native American Heritage Commission
Native American Contact List
San Diego County
5/8/2017

Barona Group of the Capitan Grande
Edwin Romero, Chairperson
1095 Barona Road Kumeyaay
Lakeside, CA, 92040
Phone: (619) 443 - 6612
Fax: (619) 443-0681
clloyd@barona-nsn.gov

Campo Band of Mission Indians
Ralph Goff, Chairperson
36190 Church Road, Suite 1 Kumeyaay
Campo, CA, 91906
Phone: (619) 478 - 9046
Fax: (619) 478-5818
rgoff@campo-nsn.gov

Ewiiaapaayp Tribal Office
Robert Pinto, Chairperson
4054 Willows Road Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 6315
Fax: (619) 445-9126

Ewiiaapaayp Tribal Office
Michael Garcia, Vice Chairperson
4054 Willows Road Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 6315
Fax: (619) 445-9126
michaelg@leaningrock.net

Iipay Nation of Santa Ysabel
Virgil Perez, Chairperson
P.O. Box 130 Kumeyaay
Santa Ysabel, CA, 92070
Phone: (760) 765 - 0845
Fax: (760) 765-0320

Iipay Nation of Santa Ysabel
Clint Linton, Director of Cultural Resources
P.O. Box 507 Kumeyaay
Santa Ysabel, CA, 92070
Phone: (760) 803 - 5694
cjlinton73@aol.com

Inaja Band of Mission Indians
Rebecca Osuna, Chairperson
2005 S. Escondido Blvd. Kumeyaay
Escondido, CA, 92025
Phone: (760) 737 - 7628
Fax: (760) 747-8568

Jamul Indian Village
Erica Pinto, Chairperson
P.O. Box 612 Kumeyaay
Jamul, CA, 91935
Phone: (619) 669 - 4785
Fax: (619) 669-4817

Kwaaymii Laguna Band of Mission Indians
Carmen Lucas,
P.O. Box 775 Kumeyaay
Pine Valley, CA, 91962
Phone: (619)709-4207

La Posta Band of Mission Indians
Javaughn Miller, Tribal Administrator
8 Crestwood Road Kumeyaay
Boulevard, CA, 91905
Phone: (619) 478 - 2113
Fax: (619) 478-2125
jmiller@LPtribe.net

La Posta Band of Mission Indians
Gwendolyn Parada, Chairperson
8 Crestwood Road Kumeyaay
Boulevard, CA, 91905
Phone: (619) 478 - 2113
Fax: (619) 478-2125
LP13boots@aol.com

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed The Top Project, San Diego County.

Native American Heritage Commission
Native American Contact List
San Diego County
5/8/2017

Manzanita Band of Kumeyaay Nation
Nick Elliott, Cultural Resources Coordinator
P. O. Box 1302 Kumeyaay
Boulevard, CA, 91905
Phone: (619) 766 - 4930
Fax: (619) 766-4957
nickmepa@yahoo.com

Manzanita Band of Kumeyaay Nation
Angela Elliott Santos, Chairperson
P.O. Box 1302 Kumeyaay
Boulevard, CA, 91905
Phone: (619) 766 - 4930
Fax: (619) 766-4957

Mesa Grande Band of Mission Indians
Virgil Oyos, Chairperson
P.O Box 270 Kumeyaay
Santa Ysabel, CA, 92070
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Fax: (760) 782-9092
mesagrandeband@msn.com

San Pasqual Band of Mission Indians
Allen E. Lawson, Chairperson
P.O. Box 365 Kumeyaay
Valley Center, CA, 92082
Phone: (760)749-3200
Fax: (760)749-3876
allenl@sanpasqualtribe.org

San Pasqual Band of Mission Indians
John Flores, Environmental Coordinator
P. O. Box 365 Kumeyaay
Valley Center, CA, 92082
Phone: (760) 749 - 3200
Fax: (760) 749-3876
johnf@sanpasqualtribe.org

Sycuan Band of the Kumeyaay Nation
Cody J. Martinez, Chairperson
1 Kwaaypaay Court Kumeyaay
El Cajon, CA, 92019
Phone: (619)445-2613
Fax: (619)445-1927
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Sycuan Band of the Kumeyaay Nation
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Viejas Band of Kumeyaay Indians
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Viejas Band of Kumeyaay Indians
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jhagen@viejas-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed The Top Project, San Diego County.

June 19, 2017

Barona Band of Mission Indians
Chairperson Edwin Romero
1095 Barona Road
Lakeside, CA 92040

RE: Cultural Resources Assessment Report for the Proposed "The Top" Mixed Use Development Project, City of San Diego, San Diego County, California

Dear Chairperson Romero:

Birdseye Planning Group (BPG) was retained by Affirmed Housing Group, Inc. to provide a cultural resources assessment report for the proposed "The Top" Mixed Use Development Project (project) in the City of San Diego, in San Diego County, California. The project is located northwest of the intersection of Euclid Avenue and Hilltop Drive in the Encanto community. The project area is a 9.35 acre vacant lot bisected north/south by an existing unnamed drainage channel within the Chollas Creek watershed. Affirmed Housing Group, Inc. is proposing to develop 116 affordable apartments, 50 single-family residences, 8,300 square-feet of commercial use with related amenities, and a publically accessible park. Hilltop Drive would be extended east to intersect with Euclid Avenue.

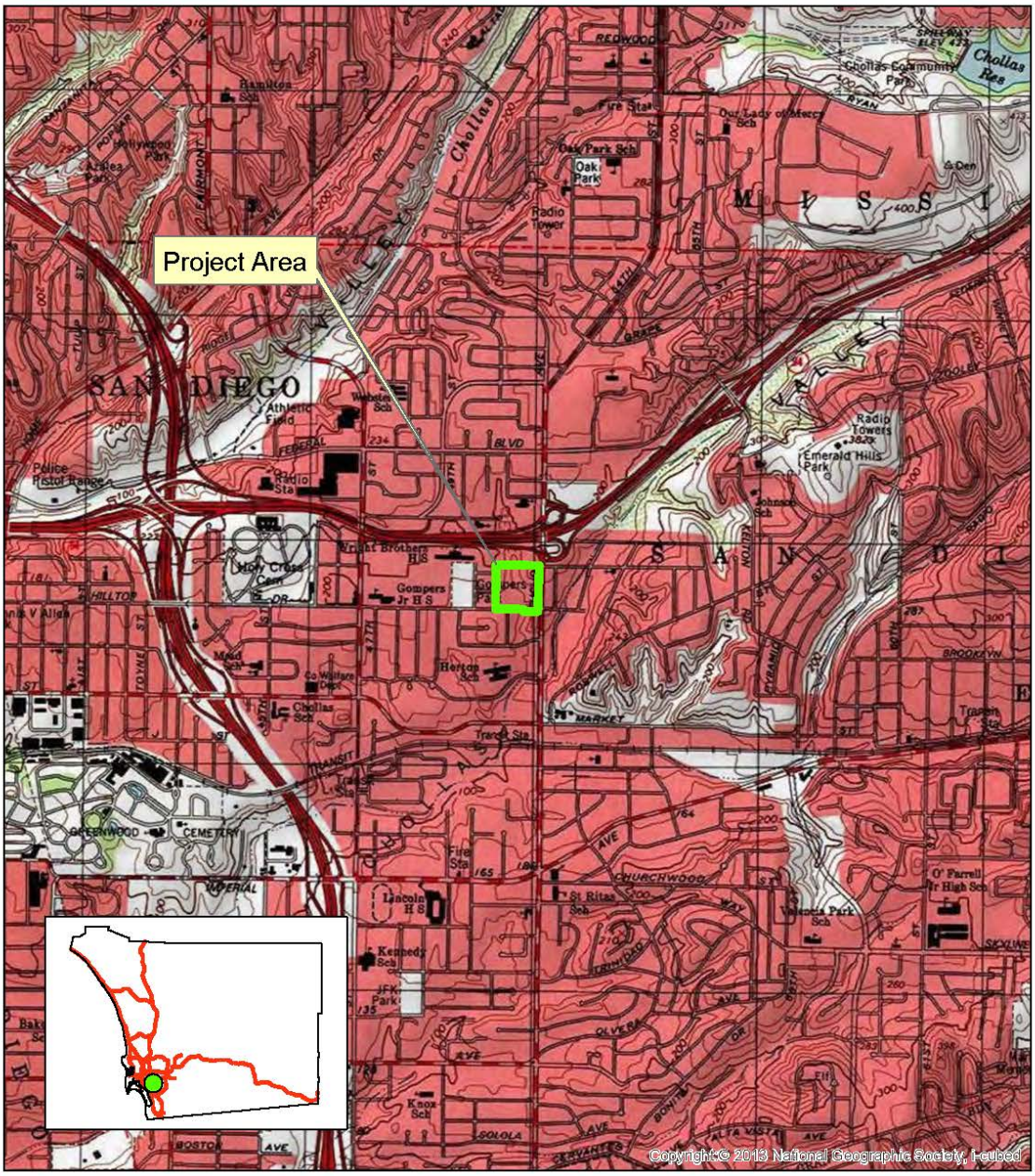
As part of the process of identifying cultural resources issues for this project, BPG contacted the Native American Heritage Commission and requested a Sacred Lands File (SLF) search and a list of Native American tribal organizations and individuals who may have knowledge of sensitive cultural resources in or near the project area. BPG received a response from the NAHC on June 16, 2017, which stated that the SLF search had been completed with "negative results". The NAHC suggested we contact you to discuss this project further.

If you have knowledge of cultural resources that may exist within or near the project site, please contact me in writing at the address below, at scottamattingly@gmail.com, or by telephone at (858) 527-2551. Thank you for your assistance.

Sincerely,

Scott Mattingly, M.A., RPA
Principal Investigator/Senior Archaeologist
Birdseye Planning Group
32030 Corte Albano
Temecula, CA 92592

Enclosure: Project Location Map



N

The Top
5012 Hilltop Drive
San Diego, CA 92102
Northwest of Euclid Avenue
and Hilltop Drive

1:24,000

0 250 500 1,000 Meters

0 1,0002,000 4,000 Feet

Hilltop and Euclid Mixed-Use Development Project

Biological Survey Report

prepared for
Birdseye Planning Group
Attention: Ryan Birdseye
1354 York Drive
Vista, California 92084

prepared by
Rincon Consultants, Inc.
2215 Faraday Avenue, Suite A
Carlsbad, California 92008

July 2018

Rincon Consultants, Inc.
Environmental Scientists Planners Engineers
www.rinconconsultants.com

Hilltop and Euclid Mixed-Use Development Project

Biological Survey Report

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July 2018

Rincon Consultants, Inc.
Environmental Scientists Planners Engineers
www.rinconconsultants.com

This report prepared on 50 percent recycled paper with 50 percent post-consumer content.

Rincon Consultants, Inc.

2018 *Biological Survey Report Hilltop and Euclid Mixed-Use Development Project, San Diego, California.* Rincon Consultants Project No. 17-03963.

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Executive Summary

This general biological survey report documents the findings of a biological survey conducted by Rincon Consultants, Inc. (Rincon) for the Hilltop and Euclid Project located in the City of San Diego (City), California. The project site is located in the Encanto Neighborhoods Community Plan Area within the City. Specifically, the project site is located at the intersection of Hilltop Drive and Euclid Avenue. The site is disturbed, largely undeveloped, and is surrounded by residential and commercial development. The proposed project consists of 47 single-family and townhome market-rate residences with related improvements west of the arroyo. A total of 113 affordable apartment units would be constructed on the east side of the site. These would range from studio units to four bedroom units. Approximately 8,300 square feet of commercial space would be installed on the ground floor of the apartment complex facing Euclid Avenue. The project would include various recreational amenities including a community swimming pool, basketball court, gardening space, community room and outdoor gathering areas.

The topography of the project site is varied, consisting of a flat mesa and a ravine area that is bisected by a small unnamed drainage. The drainage only conveys urban runoff and seasonal flows. The drainage appears to have been significantly altered between 1953 and 1964 and redirected into the stormwater system that created the current conditions onsite. Hilltop Drive is a two-lane east/west collector street that dead-ends at the drainage crossing located at the southeast corner of the site. The proposed project would extend Hilltop Avenue east to the intersection with Euclid Avenue. This would require impacts in the drainage and extension of the existing underground pipe.

The project site or drainage does not provide suitable habitat to support special-status plant or wildlife species and has minimal function or value as sensitive habitat. Nonetheless, the drainage is subject to the jurisdiction of the regulatory agencies. Any proposed development in areas identified as jurisdictional waters will be subject to the permit requirements of the United States Army Corps of Engineers (USACE), under Section 404 of the Clean Water Act (CWA), Regional Water Quality Control Board (RWQCB), under Section 401 of the CWA and Porter-Cologne Water Quality Act, and a Streambed Alteration Agreement (SAA) from CDFW pursuant to Section 1600 *et. seq*. of the CFGC. The unnamed drainage contains approximately 0.13 acre of arundo (*Arundo donax*)-dominated riparian habitat subject to the jurisdiction of CDFW, but is not considered a City wetland. The drainage would be graded, recontoured, enhanced and restored to maintain water conveyance and improve habitat function.

The site is located within the boundaries of the City of San Diego's Multiple Species Conservation Program (MSCP) Subarea Plan but is not within a Multi-Habitat Planning Area (MHPA) or the Coastal Zone. The project is not expected to result in any significant impacts to special-status plant or wildlife species, including MSCP covered species and narrow endemic species. The project will directly impact two sensitive vegetation communities; coastal sage scrub and non-native grassland. To offset project impacts to Diegan coastal sage scrub and non-native grassland, approximately 1.07 acres of ecologically valuable habitat will be mitigated offsite through payment into the City of San Diego's Habitat Acquisition Fund (Fund #10571).

1 Introduction

This report provides information pertaining to the existing biological resources observed by Rincon Consultants Inc. (Rincon) for the Hilltop and Euclid Project located within the City of San Diego (City). The purpose of this report is to document the existing conditions of the project site and to evaluate the potential for impacts to biological resources, facilitating the City's environmental review of the project during the California Environmental Quality Act (CEQA) process.

1.1 Project Location

The project site is an approximate 9.35-acre vacant lot located at the northwest corner of the intersection at Hilltop Drive and Euclid Avenue in San Diego, California (Figure 1). It is bordered by Martin Luther King Jr. Freeway (SR-94) to the north and residential development to the west, east, and south. Specifically, development would occur on Assessor's Parcel Numbers (APN) 542-480-03, 09, 10, 12, 14, 16, 18, and 20. The parcels are depicted in Township 17 South, Range 2 West, Section 9 of the U.S. Geological Survey (USGS) *National City*, California 7.5-minute topographic quadrangle (Figure 2).

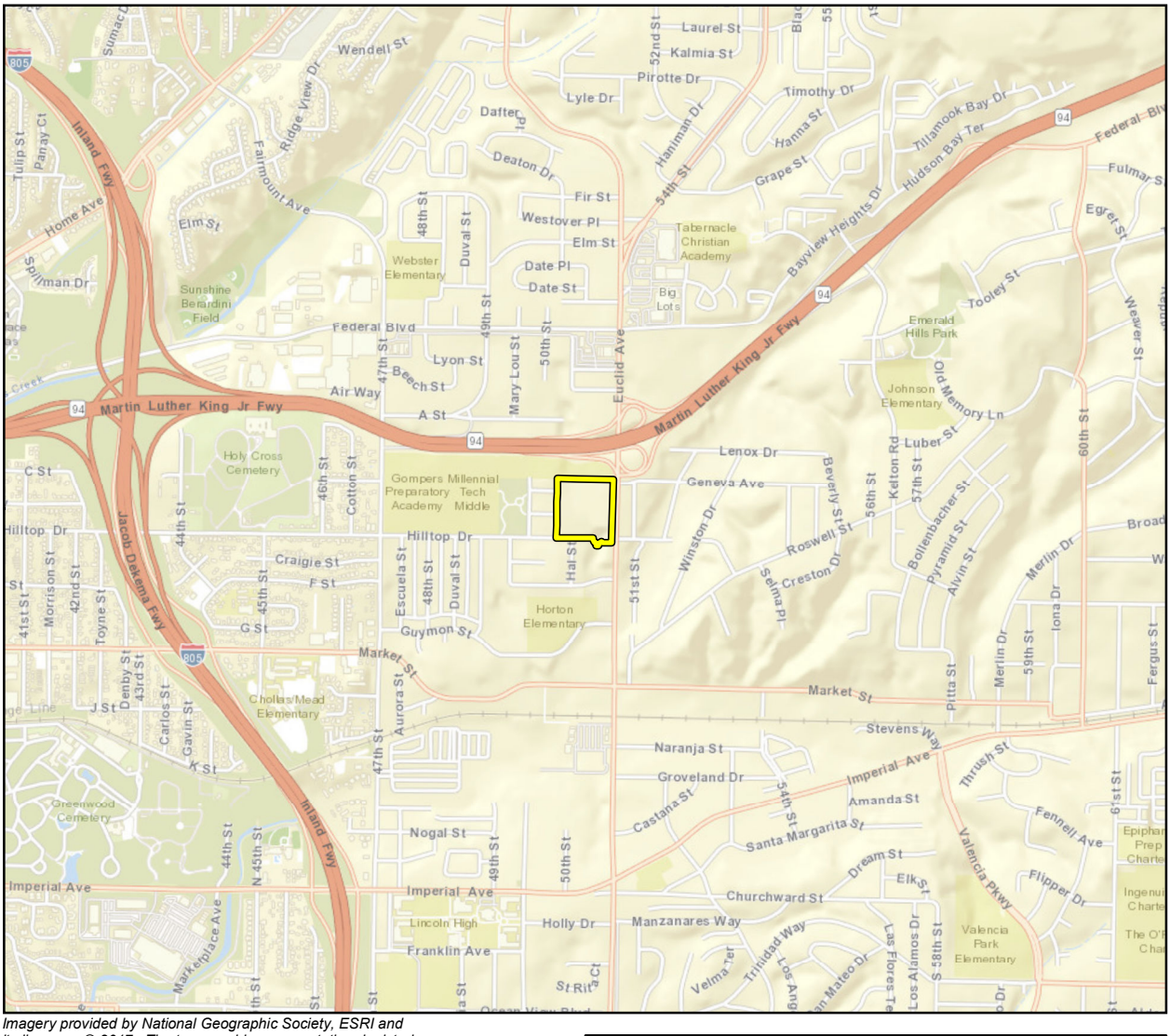
The project is within the Encanto Neighborhoods Community Plan area and is located within the boundaries of the City's Multiple Species Conservation Program (MSCP) Subarea Plan, but does not occur within a Multi-Habitat Planning Area (MHPA, Figure 3). The site is also not within the Coastal Zone.

The project site is bisected by an unnamed drainage that flows north to south through the project site. The project site has been disturbed by past human activities, but has remained largely undeveloped except for a few buildings along Euclid Avenue that were present in the 1950s.

1.2 Project Description

The proposed project would construct a total of 47 single-family and townhome market-rate residences. A total of 113 affordable apartment units would be constructed on the east side of the site. These would range from studio units to four bedroom units. Approximately 8,300 square feet of commercial space would be installed on the ground floor of the apartment complex facing Euclid Avenue. The project would include various recreational amenities including a community swimming pool, basketball court, gardening space, community room, outdoor gathering areas, and a pedestrian plaza and bridge that would extend over the ephemeral unnamed drainage.

The proposed project would also extend Hilltop Drive east to the intersection with Euclid Avenue. Extension of the road would require improvements within the ephemeral drainage to construct the road and bridge. This would require placement of fill material in the drainage and extension of the underground pipe. Under the existing conditions, the underground pipe is undersized and water would flood over the existing berm near the south end of the site during the 100-year storm. The project would also establish retention basins or swales to capture runoff in the project site before it enters the drainage and continues downstream. It is anticipated that the proposed project would begin construction in mid to late 2018 and be completed by 2020. No fill material would be imported or exported. All graded material would be balanced on-site.



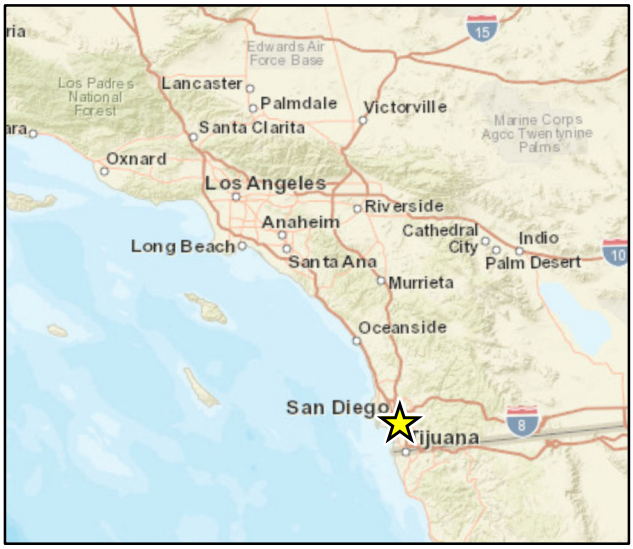
Imagery provided by National Geographic Society, ESRI and its licensors © 2017. The topographic representation depicted in this map may not portray all of the features currently found in the vicinity today and/or features depicted in this map may have changed since the original topographic map was assembled.

Project Location

N

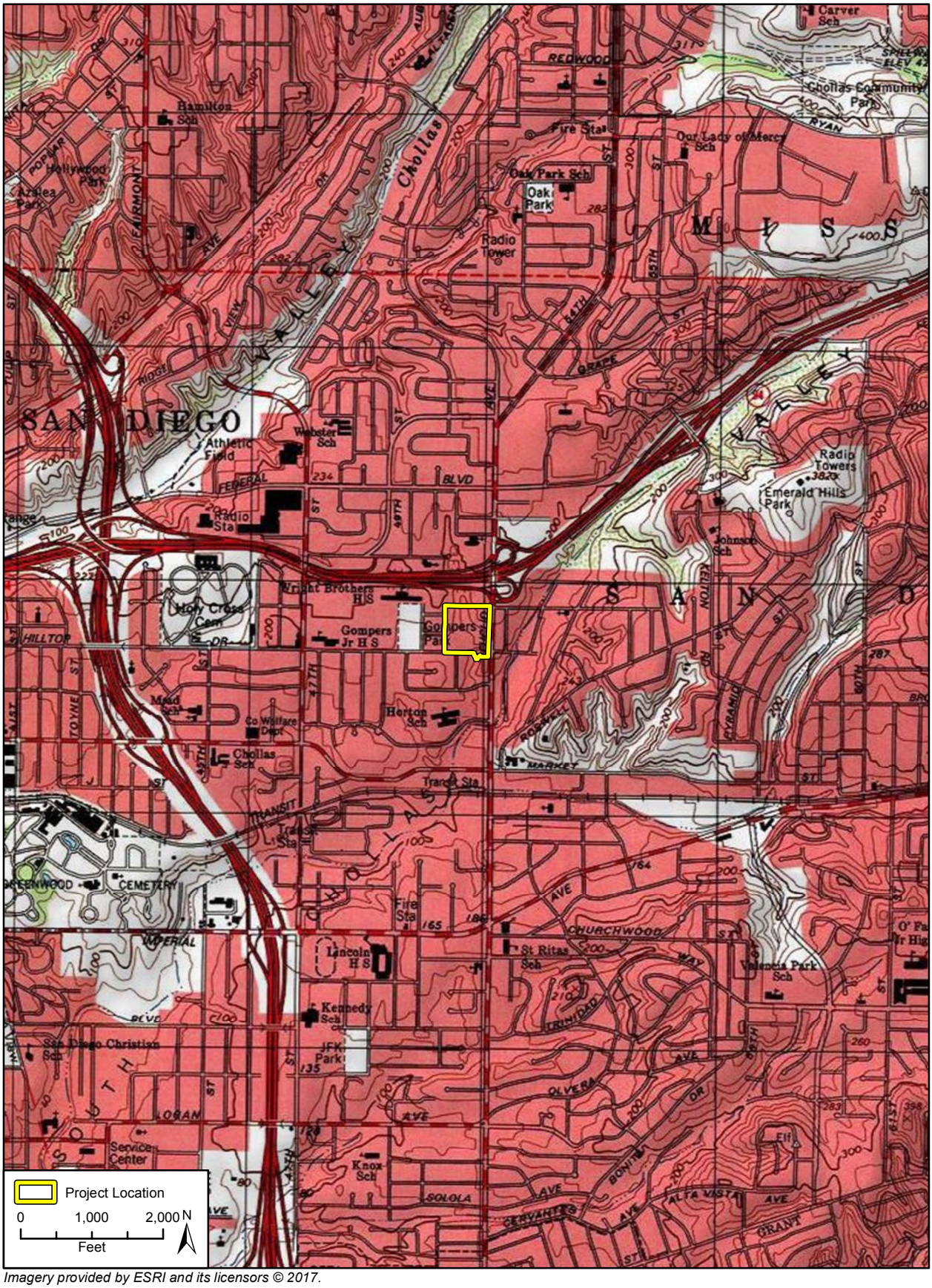
0 1,000 2,000

Feet



Regional Location

Figure 1



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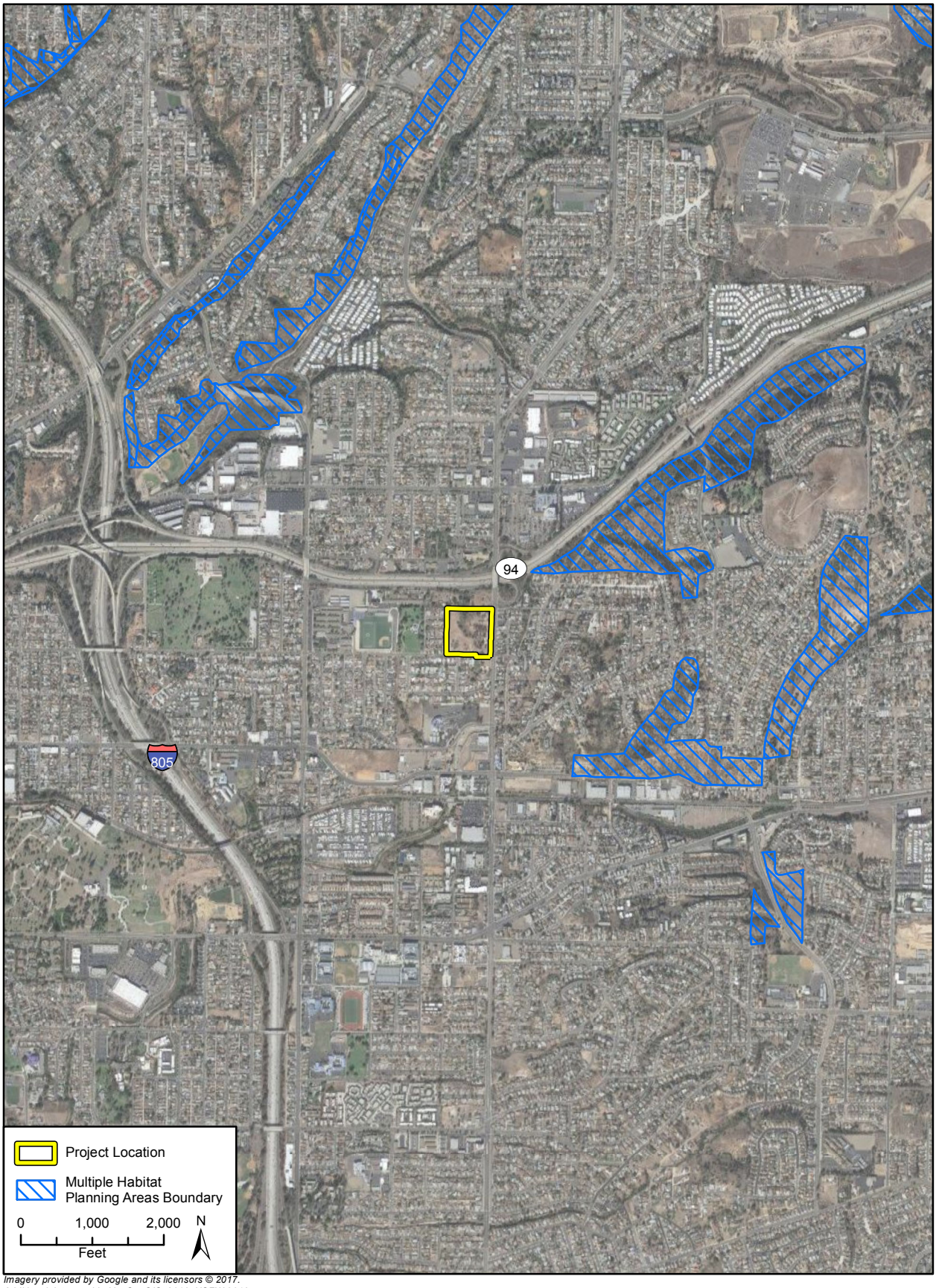
Location of Project Site on USGS Topographic Map Figure 2



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Additional data provided by SanGIS, 2016, USFW 2016.

Multiple Habitat Planning Area

Figure 3

2 Methodology

Biological conditions within the project site were evaluated by confirming applicable biological regulations, policies, and standards; reviewing biological literature pertinent to the site and vicinity; and conducting a reconnaissance-level biological survey of the site. The methods employed are described in detail below. The findings and opinions conveyed in this report are based on this methodology, therefore all quantitative impact assumption are estimates.

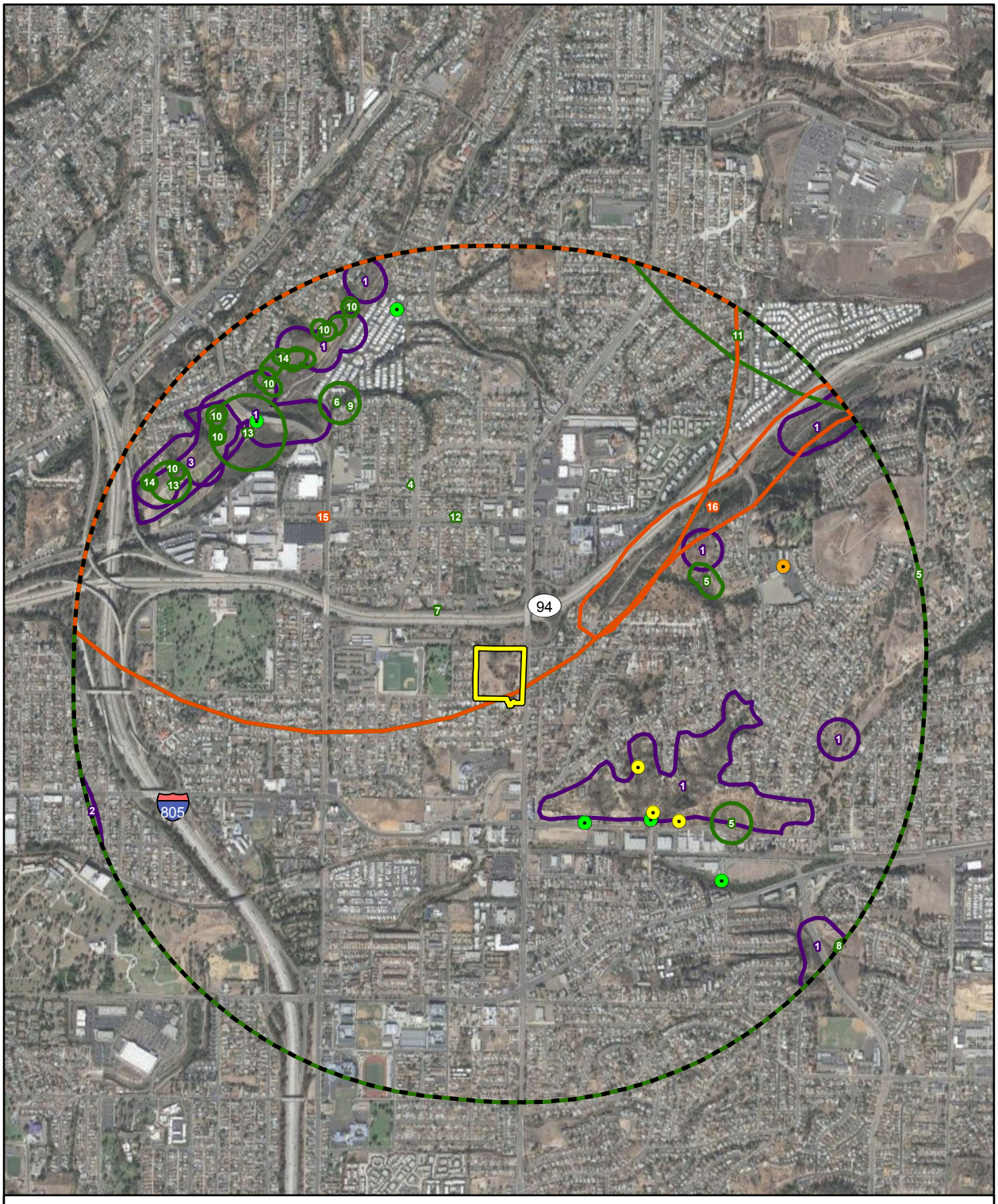
2.1 Literature Review

Prior to the field survey, Rincon conducted a literature review to better characterize the nature and extent of biological resources on and adjacent to the site. The literature review included an evaluation of current and historical aerial photographs of the site (Google Earth 2015), regional and site specific topographic maps *National City, California* USGS 7.5-minute topographic quadrangle, geologic maps, climatic data, and other available background information.

SanBIOS 2016 was reviewed to determine areas designated as MHPA for the MSCP Subarea Plan. The National Wetlands Inventory (NWI) wetlands mapper (https://www.fws.gov/wetlands/Data/Mapper.html), historic aerial imagery and topographic maps (https://www.historicaerials.com), and the National Hydrography Dataset (USGS 2016) were reviewed to determine if any wetland and/or non- wetland waters had been previously documented and mapped on or in the vicinity of the project site.

The California Natural Diversity Data Base (CNDDB), Biogeographic Information and Observation System (BIOS – http://www.bios.dfg.ca.gov), the United States Fish and Wildlife Service (USFWS) Critical Habitat Portal (http://criticalhabitat.fws.gov), and SanGIS/ SanBIOS (http://www.sangis.org/) were also reviewed to determine if any special-status wildlife, plant or vegetation communities were previously recorded on site (Figure 4).

Other resources included the California Native Plant Society (CNPS) online Inventory of Rare and Endangered Plants of California (July 2016), CDFW Special Animals List (July 2016), CDFW Special Vascular Plants, Bryophytes, and Lichens List (July 2016),The Jepson Manual: Vascular Plants of California(Baldwin et al. 2012), Calflora(2014), CDFW Habitat Classification Rules California Wildlife Habitat Relationships System (CWHR) (2005), and the City of San Diego Land Development Code, Land Development Manual and Biology Guidelines, and Environmentally Sensitive Land regulations, and amendments (City of San Diego 2012).



Imagery provided by Google and its licensors © 2017. Additional data provided by SanGIS, 2016, California Natural Diversity Database, August 2016.
Additional suppressed records reported by the CNDDB known to occur or potentially occur within this search radius include: western beach tiger beetle, western tidal-flat tiger beetle.
For more information please contact the Department of Fish and Game.

Existing Biological Resources

Figure 4

2.2 Field Reconnaissance Survey

On July 13, 2016, between the hours of 1300-1700, Rincon Biologist Jennifer Kendrick and Senior Biologist Chris Julian conducted a general biological survey and jurisdictional delineation. The survey area included the parcels mentioned above in Section 2.1 and a 100-foot buffer (study area). The purpose of the survey was to document the existing biological conditions within the project site, including plant and wildlife species, general vegetation communities, jurisdictional waters and wetlands, the potential for presence of sensitive species and/or habitats, and to determine presence/absence of special-status plant species and vegetation communities. The biologists conducted the survey on foot. Where portions of the site were inaccessible (e.g., steep slopes), the biologists visually inspected those areas with binoculars (10 x 40). Weather conditions during the survey included an average temperature of 90 degrees Fahrenheit (°F), with winds between 10 and 15 miles per hour (mph) with 10-25% cloud cover.

Biologists Jennifer Kendrick and Megan Marshall conducted a supplemental survey between the hours of 1400 and 1700 on April 10, 2018. The purpose of the survey was to observe current site conditions at a time of year that would maximize species detection. Temperature conditions ranged from 75 to 81°F, and winds were calm.

2.2.1 Biological Resource Mapping

Biological resources observed on-site were mapped on a site-specific aerial photograph at a scale of one-inch-equals-2000-feet. All accessible portions of the study area were covered on foot. Inaccessible areas were mapped using binoculars and aerial photography interpretation. Vegetation classification was based on the classification systems provided in the *Draft Vegetation Communities of San Diego County* (Oberbauer, Thomas, Meghan Kelly, and Jeremy Buegge [March 2008] [Draft]); and modified as appropriate to reflect the existing site conditions. Upland vegetation communities are divided into four tiers of biological sensitivity based on rarity and ecological importance. Tier I represents the most sensitive vegetation communities while Tier IV represents the least sensitive vegetation community. The Tier system will be applied as an indication of habitat sensitivity pursuant to the Guidelines.

2.2.2 Flora

All plant species observed on the property were noted, and plants that could not be identified in the field were identified later using taxonomic keys. The reconnaissance survey included a directed search for special-status plants that would have been apparent at the time of the survey. Vegetation classification was based on the classification systems provided in the *Draft Vegetation Communities of San Diego County* (Oberbauer, Thomas, Meghan Kelly, and Jeremy Buegge [March 2008] [Draft]).

2.2.3 Fauna

Animal species observed directly or detected from calls, tracks, scat, nests, or other sign were documented. Zoological nomenclature for birds is in accordance with the American Ornithologists' Union Checklist (2016); for mammals, Wilson & DeeAnn M. Reeder (2005). The detection of wildlife species was limited by seasonal and temporal factors. The biological survey was conducted during summer; therefore, potentially occurring spring or fall migrants may not have been observed. As the survey was performed during the day, identification of nocturnal animals was limited to sign if present on-site.

2.2.4 Jurisdictional Waters and Wetlands Delineation

The field survey also included a delineation of jurisdictional features (including wetlands) and streambeds. Waters potentially subject to United States Army Corps of Engineers (USACE) and Regional Water Quality Control Board (RWQCB) jurisdiction were delineated in accordance with the USACE's *Wetlands Delineation Manual* (1987), *Guidelines for Jurisdictional Determinations for Waters of the United States in the Arid Southwest* (2001), *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (2006), *A Field Guide to the identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (2008), and *Jurisdictional Determination Form Instructional Guidebook* (2007). The limits of CDFW jurisdiction were delineated in accordance with Section 1602(a) of the CFGC and with consideration for currently accepted agency practices. City of San Diego jurisdictional wetlands were delineated in accordance with the Guidelines.

Drainage features, riparian habitat, width measurements, and wetland sample points were mapped on recent aerial photography. The channel alignment and extent of channel-associated vegetation were mapped in the field with a Trimble. Width measurements for USACE and RWQCB jurisdiction were determined based on the lateral extent of the Ordinary High Water Mark (OHWM). CDFW jurisdictional limits were measured laterally from bank to bank at the top of the channel, or to the outer drip-line of stream-associated vegetation, if present. Width measurements were taken at approximately 100-foot intervals or based on changes in drainage width, using a 100-foot tape.

One wetland sample point was taken to determine the presence/absence of wetland indicators, such as hydrophytic vegetation, hydric soils, and wetland hydrology. The point was taken at a location in the bottom of the channel, which appeared to be the likeliest area to exhibit wetland characteristics. Data from the sample point was entered on a standardized Wetland Determination Data Form. At the sample point, a test pit was excavated to evaluate hydrologic and soil conditions. Soils were investigated using a Munsell soil color chart. Dominant vegetation was determined and evaluated in accordance with USACE methods. Results of the jurisdictional delineation are documented in the Jurisdictional Delineation Report, Hilltop and Euclid Mixed Use Development Project, San Diego California (Rincon 2018).

2.2.5 Survey Limitations

The original reconnaissance-level survey was conducted during the summer season. Many residual annual plants were withered and dead and some perennial species were dormant. However, the supplemental survey subsequently conducted on April 10, 2018 was appropriately timed to detect or accurately determine the potential for occurrence of special-status species.

The potential presence of special-status species is also informed by a literature review and a general biological field survey to assess habitat suitability. The southern extent of the drainage (Arundo-[*Arundo donax*] dominated riparian) could not be accessed due to fencing and homeless encampments and findings for this area are based on visual observations from the road. The findings and opinions conveyed in this report are based on this methodology.

3 Regulatory Overview

Regulated or sensitive biological resources studied and analyzed herein include special-status plant and wildlife species, sensitive plant communities, jurisdictional waters and wetlands, wildlife movement, and locally protected resources, such as protected trees.

3.1 Federal and State Environmental Statutes

For the purpose of this report, the following statutes are applicable:

- **California Environmental Quality Act (CEQA).** Requires environmental review prior to approval of discretionary projects, and requires significant impacts to be mitigated if feasible.
- **Endangered Species Act (ESA) and California Endangered Species Act (CESA).** These laws prohibit the unauthorized take of federally and state-listed threatened and endangered species.
- **Clean Water Act (CWA) and Porter-Cologne Water Quality Control Act.** These laws prohibit unauthorized discharges of pollutants, including fill material for construction, into jurisdictional waters of the United States and waters of the State.
- **California Fish and Game Code (CFGC) Sections 1600 and 3503 *et seq*.** These sections of the CFGC set forth the Lake/ Streambed Alteration Agreement program, through which the California Department of Fish and Wildlife (CDFW) regulates activities that would divert, obstruct, or alter streambeds.
- **Migratory Bird Treaty Act (MBTA).** Under the provisions of the Migratory Bird Treaty Act of 1918 (MBTA), it is unlawful "by any means or manner to pursue, hunt, take, capture (or) kill" any migratory birds except as permitted by regulations issued by the USFWS. The term "take" is defined by the USFWS regulation to mean to "pursue, hunt, shoot, wound, kill, trap, capture or collect" any migratory bird or any part, nest, or egg of any migratory bird covered by the conventions, or to attempt those activities. It is anticipated that the project will comply with the provisions of the MBTA.
- **CFGC Section 3503.** The California Fish and Game Code (CFGC) provides similar protection (Section 3513) and extends additional protection to any birds in the orders Falconiformes and Strigiformes (raptors or birds-of-prey) (CFGC Section 3503.5). It is anticipated that the project will comply with CDFC Section 3503.

3.2 Guidelines for Determining CEQA Significance

The following threshold criteria, as defined by the CEQA Guidelines Initial Study Checklist, were used to evaluate potential environmental effects. Based on these criteria, the proposed project would have a significant effect on biological resources if it would:

a) Would the project result in a substantial adverse impact, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in the MSCP or other local or regional plans, policies or regulations, or by the CDFW or USFWS?

b) Have a substantial adverse impact on any riparian habitat, Tier I habitat, Tier II habitat, Tier IIIA habitat or Tier IIIB habitat or other sensitive natural community as identified in the Biology Guidelines of the Land Development Manual or in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service.

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

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, including linkages identified in the MSCP Plan, or impede the use of native wildlife nursery sites

e) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan, either within the MSCP plan area or the surrounding region

f) Introduce land use in an area adjacent to the MHPA that would result in adverse edge effects

g) Conflict with any local policies or ordinances protecting biological resources.

h) Result in an introduction of invasive species of plants in a natural open space area.

3.3 Local Regulations

The Multiple Species Conservation Program/Multiple Habitat Planning Area

The site is located within the boundaries of the City of San Diego's MSCP Subarea Plan but is not within a MHPA or the Coastal Zone. The MSCP is a comprehensive habitat conservation planning program for San Diego County. Goals of the MSCP include preserving a network of habitat and open space to protect biodiversity, and conserving viable populations of sensitive species and regional biodiversity while allowing for reasonable economic growth. The City implements portions of the MSCP through subarea plans, which describe specific implementing mechanisms such as the MHPA pursuant to Section 10(a) of the Federal ESA and the Natural Community Conservation Program (NCCP) plan pursuant to the California NCCP Act of 1991 and the California ESA.

Encanto Neighborhoods Community Plan - Urban Habitat Areas

The project is within the Encanto Neighborhoods Community Plan area, which is within the Urban Habitat Areas within the MSCP. These areas are typically concentrated in existing developed/urbanized locations, and are not incorporated in the major planned areas of the MHPA. The majority of these areas are located in relative proximity to other MHPA areas providing habitat. Currently, for the Encanto Neighborhoods Community Plan area, no specific management policies or directives have been established (City of San Diego 1997). The project does not conflict with the Chollas Creek Enhancement Program (City of San Diego 2002), as it is not located within any areas proposed for restoration or management.

City of San Diego Environmentally Sensitive Lands Regulations

The purpose of the Environmentally Sensitive Lands (ESL) Regulations is to "protect, preserve, and, where damaged restore, the *environmentally sensitive lands* of San Diego and the viability of the species supported by those lands." A few purposes of these regulations is to ensure that

development occurs in such a way that protects the overall quality of the resources and the natural and topographic character of the area and retains biodiversity and interconnected habitats. Specific development regulations pertaining to sensitive biological resources exist in the City's Municipal Code in both the Environmentally Sensitive Lands Regulations (Chapter 14, Division 1, Section 143.0141) and the OR-1-2 Zone (Chapter 13, Division 2, Section 131.0230).

The ESL defines sensitive biological resources as lands included within the MHPA as identified in the City's MSCP Subarea Plan and other lands outside the MHPA that contain wetlands; Tier I, II, IIIA, or IIIB vegetation communities; habitat for rare, endangered, or threatened species; or narrow endemic species. Impacts to sensitive biological resources are addressed in this report and any mitigation required must follow Section III of the Guidelines.

4 Environmental Setting

4.1 Topography and Soils

At an elevation range of approximately 60 to 100 feet above mean sea level, the topography of the project site is varied, consisting of a flat mesa and a ravine area that is traversed by a small unnamed drainage course. The site is currently vacant of structures but contains the foundations/driveways from its previous residential uses. The site is bisected by a drainage channel with a mixture of non-native and native vegetation, disturbed and ornamental areas containing patches of eucalyptus (*Eucalyptus* sp.) woodland and disturbed coastal sage scrub on either side. Based on the most recent soil survey (USDA 2016), the site is underlain by a single mapped soil type:

- HuC – Huerhuero-Urban land complex, 2 to 9 percent slopes

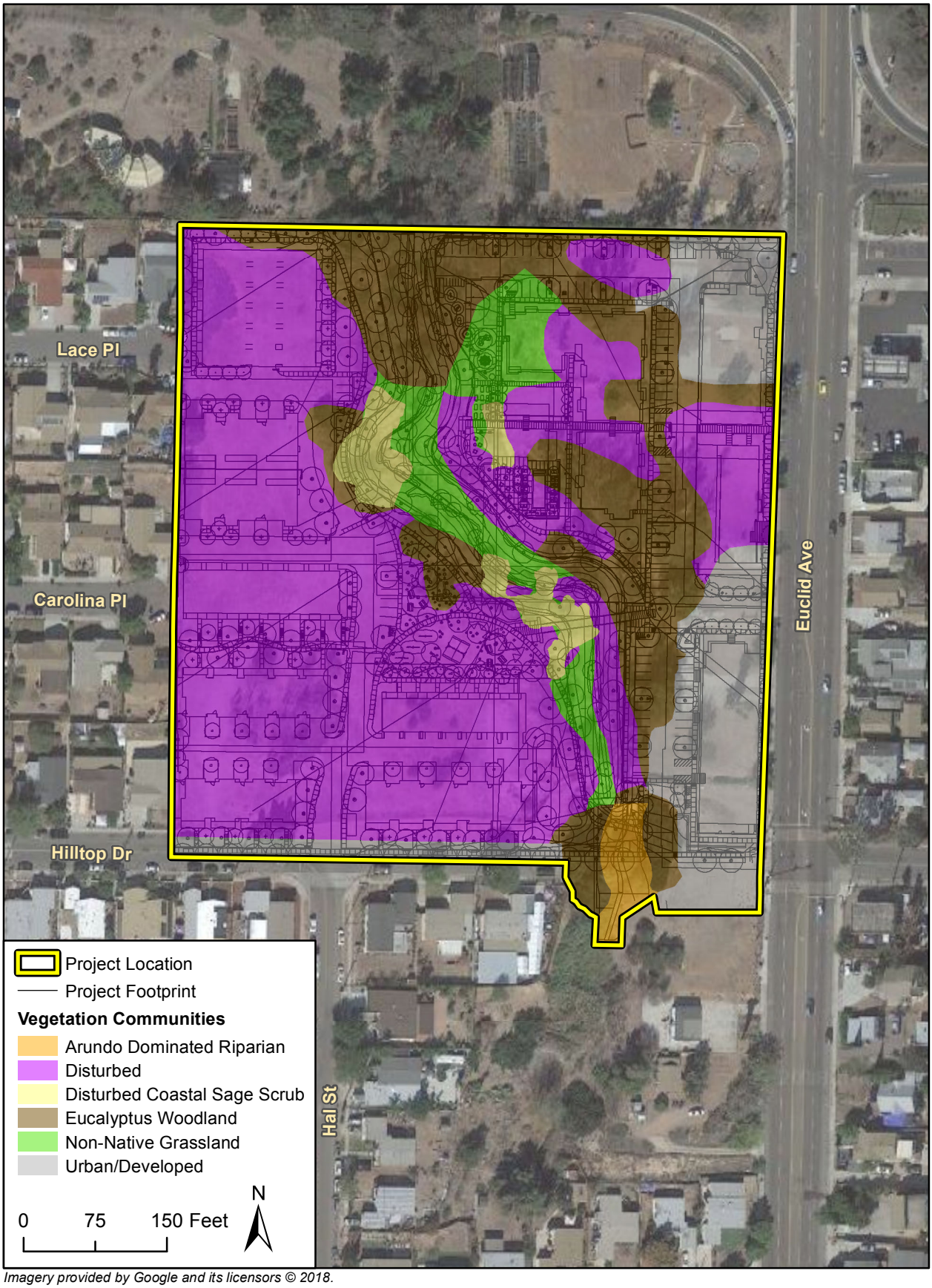
Soils of the Huerhuero-Urban land complex series consists of moderately well drained, very high runoff soils found on marine terraces that form from calcareous alluvium derived from sedimentary rock.

4.2 Vegetation Communities

Six vegetation communities or land cover types were mapped within the project site, including arundo-dominated riparian, eucalyptus woodland, non-native grassland, urban/developed, disturbed coastal sage scrub, and disturbed habitat (Figure 5). Table 1 lists the vegetation communities/land cover types and their acreages. Refer to Appendix A for the complete list of plant species observed. Refer to Appendix B for photographs of the project site.

Table 1 Vegetation Community/Land Cover Type

Tier	Vegetation Community/Land Cover Type by Holland (Holland Code)	Acreage Within Project Site
N/A	Arundo-Dominated Riparian (65100)	0.13
	Urban/Developed (12000)	1.14
II	Disturbed Coastal Sage Scrub (32000)	0.30
IIIB	Non-Native Grassland (42200)	0.62
IV	Eucalyptus Woodland (79100)	2.09
	Disturbed Habitat (11300)	5.07
	Total	**9.35**



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Biological Resources Map

Figure 5

Many of the vegetation communities identified within the project site do not contain definitive typical dominant species associations as described within the Draft. Therefore, in order to effectively classify the wide variety of species observed onsite, the vegetation communities identified in this report reflect the closest vegetation community found within Draft.

4.2.1 Disturbed Coastal Sage Scrub (32000)

Coastal sage scrub is a plant community comprised of low-growing, aromatic, drought-deciduous soft-woody shrubs that have an average height of approximately three to four feet. The plant community is typically dominated by facultative drought deciduous species such as California sagebrush (*Artemisia californica*), black sage (*Salvia mellifera*), California buckwheat (*Eriogonum fasciculatum*), laurel sumac (*Malosma laurina*), and white sage (*Salvia apiana*). The community typically is found on low-moisture sites with steep, xeric slopes or clay rich soils that are slow to release stored water. These sites often include drier south and west facing slopes and occasionally north facing slopes, where the community can act as a successional phase of chaparral development. Disturbed coastal sage scrub has similar habitat characteristics as coastal sage scrub but the ratio of non-native plant species is higher than native plant species and there are more areas of human disturbance. Non-native species prevalent in disturbed CSS typically include black mustard (*Brassica nigra*), thistle (*Silybum* spp.), and non-native grasses (e.g., *Bromus* spp.).

The 0.30 acre of coastal sage scrub occurs as patchy, disturbed areas with a high ratio of non-native species such as curly dock (*Rumex crispus*), black mustard, castor bean (*Ricinus communis*), and tree tobacco (*Nicotiana glauca*). A low ratio of native species were observed and include species such as black sage, California sagebrush, laurel sumac, lemonade berry (*Rhus integrifolia*), coast prickly pear (*Opuntia littoralis*), tall flat sedge (*Cyperus eragrostis*), western ragweed (*Ambrosia psilostachya*), and yerba mansa (*Anemopsis californica*).

The disturbed coastal sage scrub is dominated by species such as yerba mansa and castor bean which are largely inconsistent species to classify habitat as coastal sage scrub. In addition, the project site is surrounded by urban development and native species observed such as California sagebrush, laurel sumac, and lemonade berry were isolated and have been exposed to human disturbance, therefore the coastal sage scrub is considered to be of very low quality.

4.2.2 Non-Native Grassland (42200)

Non-native grassland is an herbaceous habitat type dominated by one or several non-native species. Non-native grasslands typically occur in disturbed areas and are often associated with numerous species of showy, flowered, native annual forbs. In San Diego County, some characteristic species include oats (*Avena* sp.), bromes (*Bromus* sp.), and mustards (*Brassica* sp.).

Approximately 0.62 acre of non-native grassland occurs in the northeast and southwest portion of the project site. The area was dominated with Lewis' evening-primrose (*Camissonia lewisii*) which is a showy, flowered, native annual forb, as well as Bermuda grass (*Cynodon dactylon*), ripgut brome (*Bromus diandrus*), fountain grass (*Pennisetum setaceum*), black mustard, and rabbit's foot grass (*Polypogon monspeliensis*). This habitat type occurs as isolated patches and is not directly connected to any larger, more expansive grassland blocks.

4.2.3 Disturbed Habitat (11300)

The Draft classifies areas of disturbed habitat as areas that have been physically disturbed (by previous legal human activity) and are no longer recognizable as native or naturalized vegetation association, but continues to retain a soil substrate.

Approximately 5.07 acres of disturbed habitat occurs within the project site. These areas are mostly dominated by Russian thistle (*Salsola tragus*) and bare ground but also include species such as hottentot fig (*Carpobrotus edulis*), curly dock, and five-hook Bassia (*Bassia hyssopifolia*).

4.2.4 Urban/Developed (12000)

The Draft classifies urban/developed as areas that have been constructed upon or otherwise physically altered to an extent that native vegetation is no longer supported or contains permanent or semi-permanent structures, pavement or hardscape. Characteristic species are usually ornamental or non-native species.

Approximately 1.14 acres of urban/developed occurs within the project site. These areas include species such as Peruvian pepper tree (*Schinus molle*), pine tree (*Pinus* sp.), bottlebrush tree (*Callistemon* sp.), fan palm (*Washingtonia* sp.), and other ornamental flowering species.

4.2.5 Eucalyptus Woodland (79100)

Eucalyptus woodland habitats can range from single-species thickets with little or no shrubby understory to scattered trees over a well-developed herbaceous and shrubby understory. These habitats are often dense strands with a closed canopy and produce a large amount of leaf and bark litter which limits the ability of other species to grow within the understory resulting in a decrease of floristic diversity. Characteristic species are the gum tree (*Eucalyptus* sp.), with the most common species consisting of blue gum (*Eucalyptus globulus*) and red gum (*Eucalyptus camaldulensis).*

Approximately 2.09 acres of eucalyptus woodland occurs within the project site. These areas include species such as blue gum, Peruvian pepper tree, tall flat sedge, and western coastal wattle (*Acacia cyclops*).

4.2.6 Non-Native (Arundo Dominated) Riparian (65000)

Non-native riparian usually consists of densely vegetated riparian thickets dominated by non-native, invasive species and is found in a variety of wetland habitats, often where disturbance has occurred. Some characteristic species include arundo, tamarisk (*Tamarix* spp.), and Bermuda grass (*Cynodon dactylon*).

South of the existing fill area, approximately 0.13 acre of non-native arundo riparian occurs within the project site. This area is almost entirely arundo.

4.3 Common Wildlife

Part of the project site was previously disturbed by development and does not provide extensive high quality habitat for wildlife species. Overall, wildlife activity during the survey was low and typical wildlife species that commonly occur in southern California urban areas were observedAll wildlife species observed/detected on or adjacent to the project site are included in Appendix A.

5 Special-Status Biological Resources

The project site contains special-status biological resources, including sensitive vegetation communities, suitable habitat for nesting birds, and jurisdictional waters. This section discusses special-status biological resources observed within the project site, and evaluates the potential for the project site to support other sensitive resources.

Local, state, and federal agencies regulate special-status resources and require an assessment of their presence or potential presence to be conducted on-site prior to the approval of any proposed development on a property. Assessments for the potential occurrence of special-status species are based upon known ranges, habitat preferences for the species, species occurrence records from the CNDDB, species occurrence records from other sites in the vicinity of the study area, and previous reports for the study area. The potential for each special status species to occur in the study area was evaluated according to the following criteria:

- **Not Expected.** Habitat on and adjacent to the site is clearly unsuitable for the species requirements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).
- **Low Potential.** Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.
- **Moderate Potential.** Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.
- **High Potential.** All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.
- **Present.** Species is observed on the site or has been recorded (e.g., CNDDB, other reports) on the site recently (within the last 5 years).

For the purpose of this report, special-status species are those plants and animals listed, proposed for listing, or candidates for listing as Threatened or Endangered by the USFWS and National Marine Fisheries Service (NMFS) under the ESA; those listed as Threatened, or Endangered by the CDFW under the California Endangered Species Act (CESA) or Native Plant Protection Act; those recognized as Species of Special Concern (SSC) by the CDFW; are covered species under the City of San Diego MSCP subarea plan; and/or narrow endemic (plant) species identified in the City of San Diego MSCP Subarea Plan and regulations and plants occurring on lists 1 and 2 of the CNPS California Rare Plant Rank (CRPR) system per the following definitions:

- List 1A = Plants presumed extinct in California;
- List 1B.1 = Rare or endangered in California and elsewhere; seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat);
- List 1B.2 = Rare or endangered in California and elsewhere; fairly endangered in California (20-80% occurrences threatened);

- List 1B.3 = Rare or endangered in California and elsewhere, not very endangered in California (<20% of occurrences threatened or no current threats known); and
- List 2 = Rare, threatened or endangered in California, but more common elsewhere.

In addition, special-status species are ranked globally (G) and subnationally (S) 1 through 5 based on NatureServe's (2010) methodologies:

- G1 or S1 - Critically Imperiled Globally or Subnationally (state)
- G2 or S2 - Imperiled Globally or Subnationally (state)
- G3 or S3 - Vulnerable to extirpation or extinction Globally or Subnationally (state)
- G4 or S4 - Apparently secure Globally or Subnationally (state)
- G5 or S5 - Secure Globally or Subnationally (state)
  - ? - Inexact Numeric Rank
  - T - Infraspecific Taxon (subspecies, varieties, and other designations below the level of species)
  - Q – Questionable taxonomy that may reduce conservation priority

No federally or State-listed endangered or threatened wildlife species were observed. However, one sensitive raptor species, Cooper's hawk (*Accipiter cooperii*; COHA) (a CDFW Watch List species and MSCP covered species) was observed nesting on site during the April 10th Survey. Table 2 provides the complete list of all special-status resources tracked within the CNDDB and SanBIOS within a one mile radius of the project site.

Table 2 Special-Status Species with Potential to Occur in the Project Site

Scientific Name Common Name	Status Fed / State ESA CRPR G-Rank / S-Rank	Habitat Preference/Requirements	Potential for Occurrence / Basis for Determination	Other Status: BLM, USFS, and MSCP Covered
Plants				
Acanthomintha ilicifolia San Diego thorn-mint	FT / SE 1B.1 G1 / S1	Annual herb. Blooms Apr-Jun. Chaparral, coastal scrub, valley and foothill grassland, vernal pools. Endemic to active vertisol clay soils of mesas and valleys. Usually on clay lenses w/in grassland or chap communities. 10-960 m (30-3150ft).	**Low Potential.** Disturbed coastal sage scrub present onsite. However, existing disturbances, surrounding development, and the prevalence of non-native species reduce the potential for occurrence. Species was not observed during the field survey.	MSCP covered
Adolphia californica California adolphia	-- / -- 2B.1 G3 / S2	Perennial deciduous shrub. Blooms Dec-May. Chaparral, coastal sage scrub, valley and foothill grassland. From sandy/gravelly to clay soils within grassland, coastal sage scrub, or chaparral; various exposures. 15-300m (50-985ft).	**Low Potential.** Disturbed coastal sage scrub present onsite. However, existing disturbances, surrounding development, and the prevalence of non-native species reduce the potential for occurrence. Species was not observed during the field survey.	-
Ambrosia monogyra Singlewhorl burrobrush	-- / -- 2B.2 G5/ S2	Perennial shrub. Blooms Aug-Nov. Chaparral, Sonoran desert scrub. Sandy soils. 10-500m (33-1640ft).	**Not Expected.** Habitat requirements for this species such as chaparral and Sonoran desert scrub not present on site.	-

Scientific Name Common Name	Status Fed / State ESA CRPR G-Rank / S-Rank	Habitat Preference/Requirements	Potential for Occurrence / Basis for Determination	Other Status: BLM, USFS, and MSCP Covered
Aphanisma blitoides Aphanisma	--/ -- 1B.2 G3G4/S3	Annual herb. Blooms Mar-Jun. Coastal bluff scrub, coastal dunes, coastal scrub. On bluffs and slopes near the ocean in sandy or clay soils. In steep decline on the islands and the mainland. 1-305m (3-1000ft).	**Not Expected.** Habitat requirements for this species such as bluffs and slopes near the ocean not present on site.	MSCP covered
Ceanothus verrucosus Wart-stemmed ceanothus	-- / -- 2B.2 G3 / S2	Perennial evergreen shrub. Blooms Dec-May. Chaparral. 1-380m (3-1245ft).	**Not Expected.** Habitat requirements for this species such as chaparral not present on site.	MSCP covered
Cylindropuntia californica var. *californica* Snake cholla	-- / -- 1B.1 G3T2 /S1	Perennial stem succulent. Blooms Apr-May. Chaparral, coastal scrub. 30-150m (100-490ft).	**Low Potential.** Disturbed coastal sage scrub present onsite. However, this species is conspicuous and was not observed during the field survey.	MSCP covered
Deinandra conjugens Otay tarplant	FT / SE 1B.1 G1 / S1	Annual herb. Blooms May-Jun. Coastal scrub, valley and foothill grassland. Coastal plains, mesas, and river bottoms; often in open, disturbed areas; clay soils. 25-300m (80-985ft).	**Low Potential.** Disturbed coastal sage scrub present onsite. However, existing disturbances, surrounding development, and the prevalence of non-native species reduce the potential for occurrence. Species was not observed during the field survey.	MSCP covered
Ericameria palmeri var. *palmeri* Palmer's goldenbush	-- / -- 1B.1 G4T2T3 / S1	Perennial evergreen shrub. Blooms Jul-Nov. Coastal scrub, chaparral. On granitic soils, on steep hillsides. Mesic sites. 30-600m (100-1970ft).	**Low Potential.** The project site is disturbed and coastal scrub is present. However, the survey was conducted during this species blooming period and was not observed.	BLM_S, MSCP covered
Isocoma menziesii var. *decumbens* Decumbent goldenbush	-- / -- 1B.2 G3G5T2T3 / S2	Perennial shrub. Blooms Apr-Nov. Coastal scrub. Sandy soils; often in disturbed sites. 10-910m (30-2985ft).	**Low Potential.** The project site is disturbed and coastal scrub is present. However, the survey was conducted during this species blooming period and was not observed.	-
Ferocactus viridescens San Diego barrel cactus	-- / -- 2B.1 G3 / S3	Perennial stem succulent. Blooms May-Jun. Chaparral, Diegan coastal scrub, valley and foothill grassland. Often on exposed, level or south-sloping areas; often in coastal scrub near crest of slopes. 3-485m (9-1590ft).	**Not Expected.** This species is conspicuous and was not observed during the field survey.	-
Stylocline citroleum Oil neststraw	-- / -- 1B.1 G2 / S2	Annual herb. Blooms Mar-Apr. Chenopod scrub, coastal scrub. Flats, clay soils in oil-producing areas. 50-300m (165-985ft).	**Not Expected.** This species occurs at higher elevations. The project site occurs at an elevation of 60-100 feet.	BLM_S

Scientific Name Common Name	Status Fed / State ESA CRPR G-Rank / S-Rank	Habitat Preference/Requirements	Potential for Occurrence / Basis for Determination	Other Status: BLM, USFS, and MSCP Covered
Reptiles				
Thamnophis hammondii two-striped garter snake	-- / -- SSC G4/ S3S4	Coastal California from vicinity of Salinas to northwest Baja California. From sea to about 7,000 ft. elevation. Highly aquatic, found in or near permanent fresh water. Often along streams with rocky beds and riparian growth.	**Not Expected.** Habitat requirements for this species such as permanent fresh water not present on site.	BLM_S CDFW_SSC IUCN_LC USFS_S
Birds				
Accipiter cooperii Cooper's Hawk (nesting)	-- / -- WL G5 / S4	Woodland, chiefly of open, interrupted or marginal type. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also live oaks.	**Present.** Open woodlands present within project site. Species observed incubating a nest during field survey.	MSCP covered, Group 1 CDFW_WL IUCN_LC
Polioptila californica californica coastal California gnatcatcher	FT / -- SSC G3T2/ S2	Obligate, permanent resident of coastal sage scrub below 2500 ft. in Southern California. Low, coastal sage scrub in arid washes, on mesas and slopes. Not all areas classified as coastal sage scrub are occupied.	**Low Potential.** Elements of the habitat requirements for this species such as sage scrub in arid washes and slopes are present on site. However, the coastal sage scrub on the project site is highly disturbed, does not support the primary constituent elements and is generally unsuitable to support this species. In addition, the species was not observed during field survey.	MSCP covered, NABCI_YWL CDFW_SSC
San Diego cactus wren Campylorhynchus brunneicapillus sandiegensis	FSS / -- CSC --/ --	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	**Not Expected.** Habitat requirements for this species such as cactus scrub is not present on site. Species not observed at time of survey.	USFWS_ BCC, MSCP covered, *, Group 1
Mammals				
Choeronycteris mexicana Mexican long-tongued bat	-- / -- SSC G4 / S1	Occasionally found in San Diego Co., which is on the periphery of their range. Feeds on nectar and pollen of night-blooming succulents. Roosts in relatively well-lit caves, and in and around buildings.	**Not Expected.** Habitat requirements for this species such as well – lit caves and buildings are not present on site.	CDFW_SSC IUCN_NT WBWG_H

5.1 Special-Status Plant Species

The CNDDB and SanBIOS document eleven (11) special-status plant species as potentially occurring within a one-mile radius of the project site. No special-status plant species were observed within the project site during the field surveys.

The area within the project site is substantially disturbed, and consists mostly of non-native habitat surrounded by urban development. Of the eleven (11) special-status plant species documented within a one-mile radius of the project site, only six (6) species have a low potential to occur. All other special-status plant species are note expected to occur due to the existing conditions of the project site. The six (6) species with a low potential to occur include, San Diego thorn-mint (*Acanthomintha ilicifolia;* 1B.1), California adolphia (*Adolphia californica*; 2B.1), decumbent goldenbush (*Isocoma menziesii* var*. decumbens*; 1B.2), Palmer's goldenbush (*Ericameria palmeri* var*. palmeri*; 1B.1), Otay tarplant (*Deinandra conjugens;* 1B.1) and snake cholla (*Cylindropuntia californica* var*. californica*; 1B.1).

The field survey was conducted during the blooming season for Decumbent goldenbush (April through November) and Palmer's goldenbush (July through November), therefore these species would have most likely been observed by their abundant inflorescences. The initial field survey was conducted outside of the blooming period for snake cholla (April through May), Otay tarplant (May through June), and San Diego thornmint (April through June). However, these species would have been evident during the supplemental survey, due to their perennial nature . Their potential for occurrence is limited, as the project site has been previously developed, is small in size, surrounded by development, and contains significant coverage by non-native, ruderal plant species.

5.2 Special-Status Wildlife Species

The CNDDB and SanBIOS documents five (5) special-status wildlife species as potentially occurring within a one-mile radius of the project site. No special-status wildlife species are tracked within the project site and based on the existing disturbances, prevalence of non-native species, and surrounding development, it was determined that the project site does not have suitable habitat necessary to support the majority of the special-status wildlife species identified by the CNDDB and SanBIOS.

One of the special-status wildlife species, coastal California gnatcatcher (*Polioptila californica californica*; CAGN), has a low potential to occur within the project site and one sensitive raptor species, COHA was observed within the project site during the field surveys. CAGN are a Federally-listed threatened species and are afforded special protections. COHA are a City covered species as well as CDFW watch list species, with no Federal or State protections aside from the general protection afforded to nesting birds by the MBTA and Section 3503.5 of the CFGC.

CAGN nest in coastal sage scrub, which occurs onsite. However, the coastal sage scrub found onsite is limited, disturbed, and patchy. In addition, the project site is surrounded by urban development and does not meet the primary constituent elements required to support this species. Therefore, it is unlikely that CAGN would occupy this area.

One adult COHA was observed perching in a eucalyptus tree within the project site during the initial field survey. The species was also observed incubating a nest within a eucalyptus tree during the supplemental survey. COHA's are known to occur in various types of open woodlands, mixed deciduous forests, and in urban/suburban areas.

5.3 Special-Status Vegetation Communities

Plant communities are also considered sensitive biological resources if they have limited distributions, have high wildlife value, include sensitive species, or are particularly susceptible to disturbance. CDFW ranks sensitive communities as "threatened" or "very threatened" and keeps records of their occurrences in CNDDB. Similar to special-status plant and wildlife species, vegetation alliances are ranked 1 through 5 based on NatureServe's (2010) methodology, with those alliances ranked globally (G) or statewide (S) as 1 through 3 considered sensitive. In addition, vegetation communities that are considered to be of high importance for MHCP species are combined by the MHCP into habitat groups for purposes of assigning mitigation ratios.

The CNDDB and SanBIOS identified two (2) special-status vegetation communities occurring within one mile of the project site; southern riparian scrub and maritime succulent scrub with southern riparian scrub overlapping within the project site. These special-status vegetation communities were not observed during the field survey. In addition, no sensitive terrestrial natural community or habitat types as defined by CNDDB and SanBIOS were observed during the field survey.

As previously discussed, disturbed coastal sage scrub (MSCP Tier II) and non-native grassland (MSCP Tier III) occur within the project site.

5.4 Jurisdictional Waters and Wetlands

The drainage feature within the project site is a small, well-defined single uniform channel that was dry at the time of the assessment (Rincon, 2018) and field surveys. Although the NWI identified the unnamed drainage as a freshwater emergent wetland, Rincon found that the unnamed drainage feature exhibits an OHWM but lacks indicators of hydric soils, and is primarily devoid of wetland hydrology and hydrophytic vegetation.

The drainage enters the project site from the property to the north, which is situated between the project site and SR-94 (built between 1960 and 1963). Flows appear to originate from the southern edge of the freeway off-ramp, and flow south into the project site. Near the downstream boundary of the project site, the drainage enters a concrete pipe covered with fill material (berm). The underground pipe transports flow downstream into a patch of arundo. Downstream of the pipe, channel characteristics are similar to those within the site, but the vegetation is almost entirely composed of dense stands of arundo.

Acreage of jurisdictional waters within the project site are included in Table 3. Due to the level of past human disturbance above, the unnamed drainage is considered to have low function and value for biological resources.

Rincon reviewed historic topographic maps to evaluate the relationship of this drainage feature with Chollas Creek. These maps (1904, 1908, 1911, 1915, 1920, 1928, 1932, 1941, 1944; historicaerials.com) show Chollas Creek south of the project site, but do not depict the drainage feature until 1944. The feature is identified as an “intermittent stream” in topographic figures and is depicted inconsistently in maps between 1944 and 1963.

Rincon also reviewed historical imagery (1953, 1964; www.historicaerials.com) and found evidence of a drainage feature, but no indication of riparian or wetland vegetation. Between 1953 and 1964, part of this drainage was filled to provide access across the drainage (referred to as fill area or

berm), and several residential developments were built around the drainage, including State Route (SR) 94 directly upstream of the project site.

Approximately 250 feet south of the project site, the lower reach of the drainage was also filled between 1953 and 1964, and flows were redirected into a storm drain system to allow for fill and developments to be built along Lakiba Palmer Avenue (formerly Lise Avenue). South of the project site the drainage was filled to build houses and pipes were installed to redirect flows into the storm drain system.

Historic imagery indicates that the creek did connect to Chollas Creek prior to the flows being redirected into the storm drain system. However, it is likely that this ephemeral drainage carried storm water flows to Chollas Creek and did not support riparian species until increased runoff from development and man-made impoundments within the drainage resulted in ponding of water. Visual appearance of riparian habitat and invasive species do not become evident in historical imagery until 1971 (www.historicaerials.com), many years after the drainage was altered as described above.

The presence of remnant patches of native habitat interspersed with non-native habitat indicates that this unnamed drainage feature was most likely dominated by native shrub and grassland communities prior to disturbance and development of neighboring areas. The hydrology does not appear suitable to support aquatic or semi-aquatic species and there is evidence such as rocks, broken bricks, concrete, asphalt, and trash (glass, rusting metal parts) that indicate imported fill or dumping occurred.

Table 3 Jurisdictional Waters Within the Project Site

Jurisdictional Waters	Acreage Within Project Site
USACE / RWQCB Waters	0.07
CDFW Streambed / Riparian	0.52
City Wetlands	—

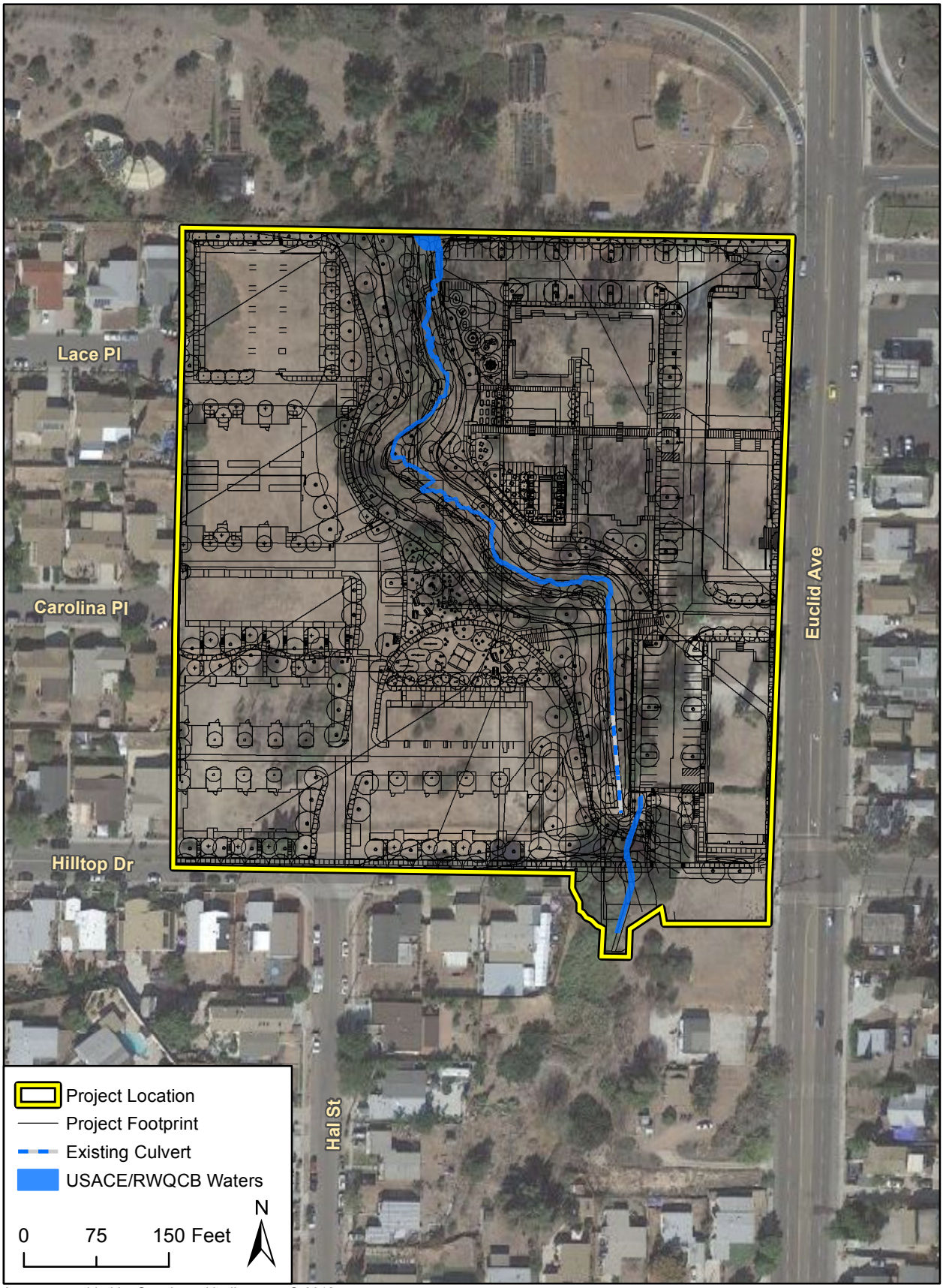
5.4.1 USACE and RWQCB Jurisdiction

The unnamed drainage contains approximately 0.07 acre of waters subject to the jurisdiction of the USACE and RWQCB. The drainage's measured OHWM is fairly uniform and is between two and three feet in most locations. No USACE wetlands are present within or adjacent to the drainage due to lack of hydric soils and dominant hydrophytic vegetation, and the ACOE requirement for all three - vegetation, soils, and hydrology - to occur in order to designate an area as ACOE jurisdictional wetlands. Figure 6 depicts the location and extent of USACE and RWQCB jurisdiction.

5.4.2 CDFW Jurisdiction

The unnamed drainage contains approximately 0.52 acre of streambed and stream-associated habitat subject to the jurisdiction of CDFW. The width of the jurisdictional area at the edge of stream-associated vegetation and/or top of bank ranged from one (1) foot to 15 feet. The extent of CDFW jurisdiction was mapped as the top of the physical bank (coterminous with the OHWM due to the small, singular nature of the drainage) plus the extent of the adjacent vegetation supported by the drainage. Figure 7 depicts the location and extent of CDFW jurisdiction.

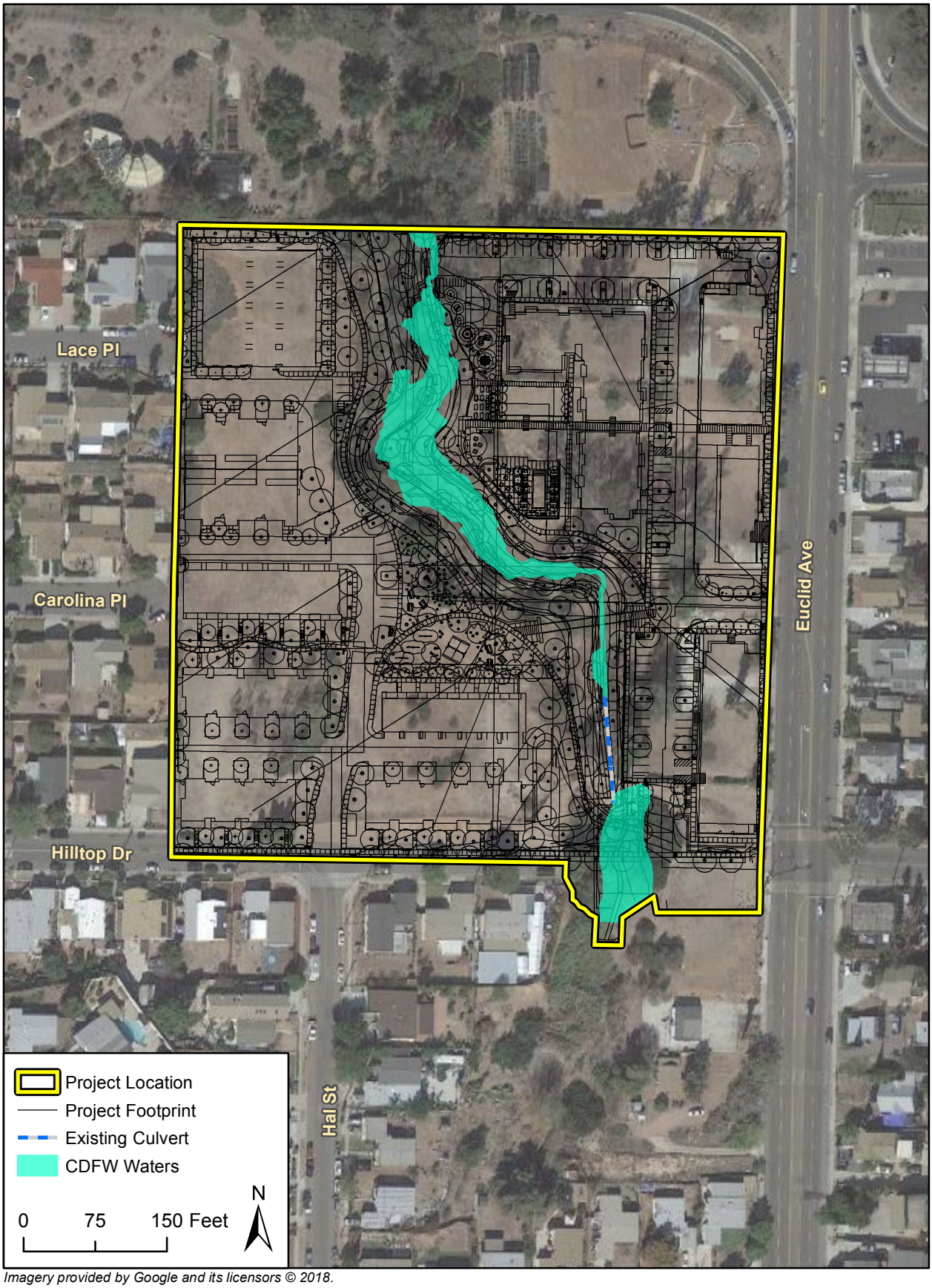
Of the 0.52 acre of streambed, the unnamed drainage contains approximat.13 acre of arundo-dominated riparian habitat. The riparian habitat onsite is considered of low biological quality. Federal and/or state endangered, threatened, sensitive, rare species, and other indigenous species are not likely to utilize the area given the high level of disturbance. The vegetation community is monotypic, comprised almost entirely of arundo and, as described previously, ponded water that supports the arundo is likely the result of man-made changes to the landscape. The habitat contains no hydrologic or ecologically rare features and is not contiguous with larger areas of open space. Thus, this area is not expected to serve as a significant local or regional movement crridor for wildlife. Use of the area by common wildlife species is discussed further in Section 5.5.



Imagery provided by Google and its licensors © 2018.

USACE/RWQCB Jurisdiction

Figure 6



CDFW Jurisdiction

Figure 7

5.4.3 City of San Diego Wetlands

Wetlands are defined in the City's Environmentally Sensitive Lands Municipal Code as:

1. All areas persistently or periodically containing naturally occurring wetland vegetation communities characteristically dominated by hydrophytic vegetation, including but not limited to salt marsh, brackish marsh, freshwater marsh, riparian forest, oak riparian forest, riparian woodlands, riparian scrub, and vernal pools;
2. Areas that have hydric soils or wetland hydrology and lack naturally occurring wetland vegetation communities because human activities have removed the historic wetland vegetation or catastrophic or recurring natural events or processes have acted to preclude the establishment of wetland vegetation as in the case of salt pannes and mudflats;
3. Areas lacking wetland vegetation communities, hydric soils and wetland hydrology due to non-permitted filling of previously existing wetlands; or
4. Areas mapped as wetlands on Map No. C713 as shown in Chapter 13, Article 2, Division 6 (Sensitive Coastal Overlay Zone).

The unnamed drainage does not qualify as a City Wetland because it was not historically a naturally occurring wetland, and has only accumulated invasive hydrophytic vegetation as a result of past human disturbance in the immediate and surrounding area. Such disturbance includes changes in flow entering the drainage as a result of the construction of the highway immediately upstream, fill and piping placed directly in the channel, and development and fill downstream of the project site, which occurred between 1953 and 1964. Prior to development in and around the drainage, the drainage carried ephemeral flows, but did not have the hydrology to support wetland or riparian species. Vegetation in the channel did not appear on aerial photographs until 1971 (www.historicaerials.com). Because this drainage did not historically support riparian or wetlands, it is not considered a City wetland.

5.5 Wildlife Corridors

Wildlife movement corridors are linear features that connect larger patches of natural open space and provide habitat conditions for the movement of small and large animals (CBI 2003). They can serve as routes for dispersal and migration of animals, as well as the distribution of plants via wildlife vectors. In San Diego County, important corridors and linkages have been identified to provide connections between undeveloped lands, especially to significant public lands.

The eastern edge of the project site ranges approximately 320 to 500 feet from Chollas Creek. However, according to USFWS Critical Habitat portal CDFW BIOS, and the San Diego County General Plan (2011), the project site is not located within any known regional wildlife movement corridors or any other special-status biological areas. The proposed project is situated within a fenced-in, disturbed vacant lot. In addition, it is surrounded by roads, commercial and residential development, does not eventually connect to a larger patch of open space, and does not support habitat that would contribute substantially to allow for the function of any local or regional wildlife or corridor linkages.

The drainage could possibly be used as a local wildlife travel route for common species. However, the habitat onsite has been reduced to small, fragmented, and low quality stands and any animal species that would potentially use this route would be challenged to find access to any substantial

habitat within the project site and immediate vicinity. Therefore, the project site does not contain areas important for wildlife movement.

6 Impact Analysis and Recommended Actions

The City of San Diego's Significance Determination Guidelines under CEQA (Significance Determination Guidelines) require that direct impacts, indirect impacts, and cumulative impacts of a proposed project be analyzed for significance. Mitigation, monitoring, and reporting are provided in Section 6.0.

The proposed project would directly impact special-status vegetation communities. The project would also impact jurisdictional waters.

6.1 Issue 1: Special-Status Species

The proposed project would have a significant effect on biological resources if it would:

a) Result in a substantial adverse impact, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in the MSCP or other local or regional plans, policies or regulations, or by the CDFW or USFWS?

6.1.1 Special-Status Plant Species

No special-status plant species were determined to have moderate to high potential to occur within the project site. Additionally, no special-status plant species were observed in the survey area during the field survey. The project would result in direct impacts to existing habitat that is highly disturbed and generally unsuitable for special-status plant species. Given the project site's existing disturbances and habitat characteristics, including prior site development, limited habitat area, prevalence of non-native species, no special-status plant species are expected to occur in the proposed impact areas. Therefore, the project is not anticipated to result in any significant impacts to special-status plant species, therefore no mitigation is required.

6.1.2 Special-Status Wildlife Species

The project site's existing level of disturbance and habitat characteristics, including prior site development, limited habitat area, and prevalence of non-native species, substantially reduces the potential for special-status wildlife to occur. In addition, the limited amount of habitat that occurs within the project site is not connected to a preservation area and is surrounded by development. Therefore, it would not be expected to support any permanent populations of special-status animal species.

One sensitive species, COHA, was observed perching in a eucalyptus tree during the initial field survey. The COHA was observed incubating a nest during the April 10th survey.. As previously mentioned, COHA's are a CDFW watch list species, with no specific Federal or State protections, but are an MSCP-covered species, and protected by the CFGC Sections 3503, 3503.3, (see Section 3 Regulatory Overview). The proposed project occurs outside of the MHPA and is not anticipated to result in any significant impacts to special-status animal species, therefore no mitigation is required.

6.2 Issue 2: Sensitive Natural Communities

The proposed project would have a significant effect on biological resources if it would:

b) Have a substantial adverse impact on any riparian habitat, Tier I habitat, Tier II habitat, Tier IIIA habitat or Tier IIIB habitat or other sensitive natural community as identified in the Biology Guidelines of the Land Development Manual or in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service.

6.2.1 Special-Status Vegetation Communities

The proposed project would directly impact two special-status vegetation communities, coastal sage scrub, and non-native grassland (Figure 8). Approximately 0.30 acre of disturbed coastal sage scrub and 0.62 acre of non-native grassland occurs onsite. As previously discussed, the existing coastal sage scrub, though disturbed, is classified as a Tier II habitat, and non-native grassland is classified as a Tier III habitat within the Guidelines.

Eucalyptus woodland and disturbed habitat are Tier IV habitats within the Guidelines and are not considered sensitive. Impacts to Tier II and Tier III habitats would be considered significant and would require mitigation. Impacts to sensitive natural communities are shown in Table 4. This is discussed further in Section 6.0.

Table 4 Impacts to Sensitive Natural Communities

Sensitive Natural Communities	Impacts (acres)
Coastal Sage Scrub (TII)	0.30
Non-native Grassland (TIII)	0.62
Eucalyptus Woodland (IV)	2.09
Disturbed Habitat (IV)	5.07

6.3 Issue 3: Wetlands

The proposed project would have a significant effect on biological resources if it would:

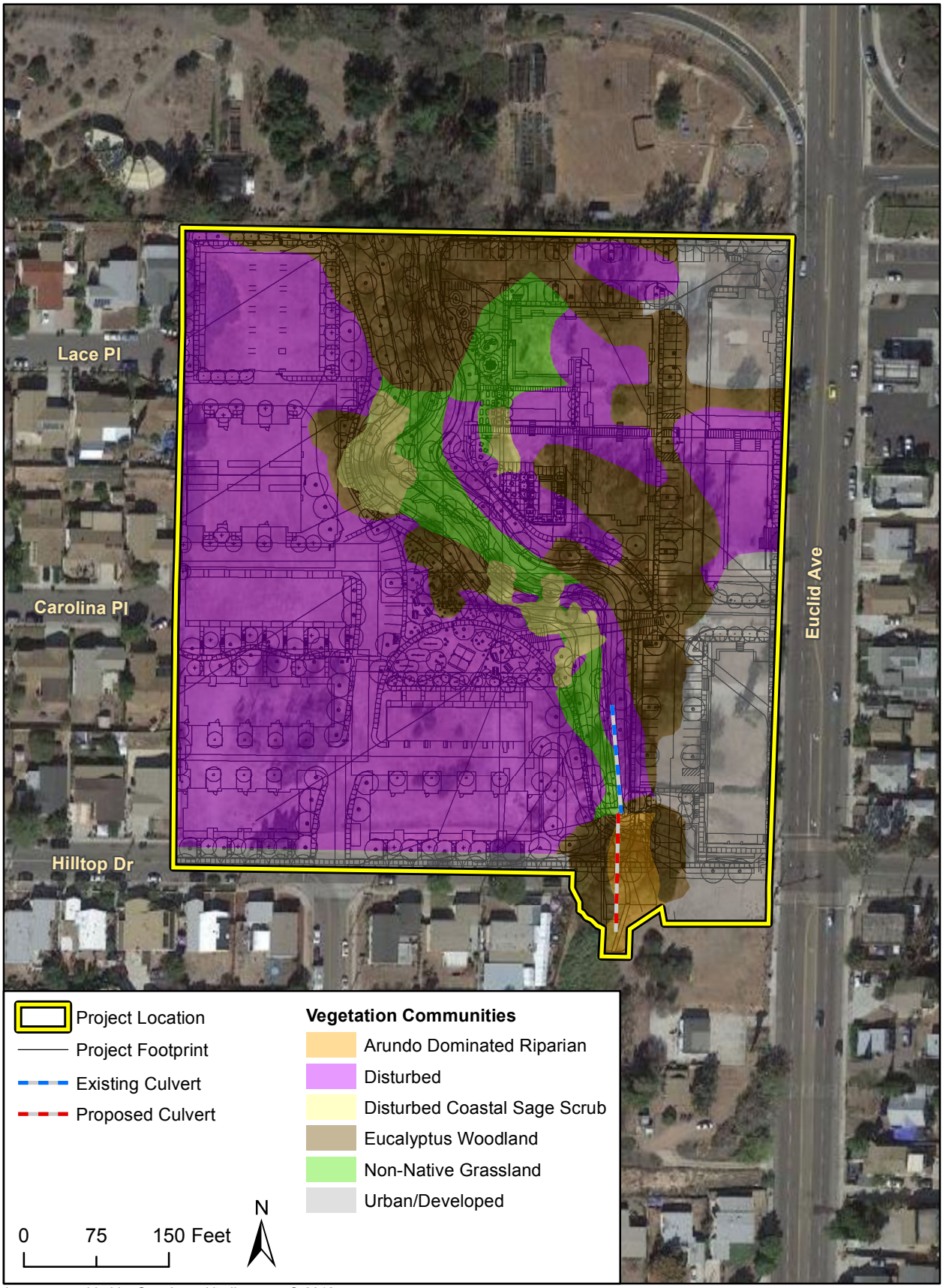
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.…) through direct removal, filling, hydrological interruption, or other means.

6.3.1 Jurisdictional Waters

Impacted acreage of jurisdictional waters is shown in Table 5.

Table 5 Impacts to Waters

Jurisdictional Waters	Impact Acreage
USACE / RWQCB	0.07
CDFW	0.52



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Impacts to Biological Resources

Figure 8

The unnamed drainage that occurs within the project site contains waters subject to the jurisdiction of the USACE, RWQCB, and CDFW. Grading for the project site would impact 0.07 acre of USACE/ RWQCB non-wetland waters and 0.52 acre of CDFW streambed. Approximately 0.13 acre of CDFW riparian habitat would be impacted by the extension of the existing culvert under what is proposed to be the extension of Hilltop Drive.

The portion of the drainage that has been diverted underground into a concrete pipe is not considered in the total impact acreage calculations for USACE, RWQCB of CDFW since this portion of the drainage is already permanently impacted.

Impacts mitigated at no less than a 1:1 ratio, would be considered less than significant. Impacts to USACE/RWQCB jurisdiction would require an application for the CWA Section 404 permit and Section 401 water quality certification. Impacts to CDFW jurisdiction would require an SAA. Compensatory mitigation will be negotiated with the appropriate agencies as needed.

6.3.2 City of San Diego Wetlands

The City does not regulate artificially created wetlands in historically non-wetland areas; therefore, no City wetlands occur or would be impacted onsite.

6.4 Issue 4: Wildlife Corridors

The proposed project would have a significant effect on biological resources if it would:

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, including linkages identified in the MSCP Plan, or impede the use of native wildlife nursery sites.

6.4.1 Wildlife Corridors

No known wildlife corridors or linkages occur within the survey area (SanBIOS 2016). Furthermore, the survey area is constrained by existing developments and does not support habitat that would contribute substantially to the assembly and function of any local or regional wildlife corridors or linkages. Therefore, the project would not interfere substantially with the movement of any migratory fish, wildlife species or with established native residents. Nor would it interfere with any migratory wildlife corridors, including linkages identified in the MSCP Plan, or impede the use of native wildlife nursery sites. Because no wildlife movement corridor is present within the project site, no impacts related to wildlife movement would occur and no mitigation is required.

6.5 Issue 5: Habitat Conservation Plans

The proposed project would have a significant effect on biological resources if it would:

e) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan, either within the MSCP plan area or the surrounding region.

6.5.1 Habitat Conservation Plans

The project site is within the MSCP Subarea but not within a MHPA. The project is not expected to result in any significant impacts to special-status species, including MSCP covered species and narrow endemic species. As mentioned above, the project would not result in impacts to any wildlife corridors or linkages, including lands identified in the MSCP Subarea Plan as important habitat linkages or other areas of local or regional wildlife movement importance. The project would also not prevent the City of San Diego from attaining the conservation goals and objectives of the MSCP Subarea Plan area. Therefore, potential impacts are less than significant and no mitigation is required.

6.6 Issue 7: Local Policies and Ordinances

The proposed project would have a significant effect on biological resources if it would:

g) Conflict with any local policies or ordinances protecting biological resources.

6.6.1 Local Policies and Ordinances

The project is consistent with the City's MSCP and does not significantly impact any MSCP-covered species. As described above, special-status vegetation communities will be impacted and adequately compensated pursuant to the City of San Diego guidelines. Therefore, potential impacts are less than significant and no mitigation is required.

6.7 Issue 8: Invasive Species

The proposed project would have a significant effect on biological resources if it would:

h) Result in an introduction of invasive species of plants in a natural open space area.

6.7.1 Invasive Species

No natural open space areas will be directly or indirectly impacted by the proposed project. Therefore, the project would not result in the introduction or spread of invasive species into a natural open space and no mitigation is required. The project would remove invasive species, including highly invasive arundo from the drainage and site.

6.8 Indirect Impacts

Indirect impacts are physical changes to the environment which are not immediately related to a project but are caused indirectly. As listed in the Guidlines, indirect impacts include the introduction of meso-predators (e.g. dogs and cats), urban runoff, invasive plant species, noise and lighting effects, alteration of the dynamic portion of a system (e.g. stream flow characteristics), and loss of a wetland buffer. The proposed project has the potential to result in increased noise within the project site. The site was previously developed, is zoned for residential development, is surrounded by development and a freeway, and would most likely require a Stormwater Pollution Prevention Plan (SWPPP)/MS4 permit. Therefore, indirect impacts associated with urban runoff, meso-predator and invasive plant species introduction, lighting, and alteration of stream flow characteristics are not expected to be significant.

6.8.1 Urban Runoff

The project has the potential to result in increased urban runoff from the project site. An increase in hardscape areas such as parking lots is proposed. These effects may result in increased urban runoff on the project site, potentially affecting water quality within the unnamed drainage. The drainage currently receives nuisance runoff from the surrounding urban area most likely as sheet flow. However, the project would be required to implement a SWPPP during construction and comply with all post-construction requirements within the MS4 permit, therefore preventing long and short term effects of urban runoff. The project would also establish permanent retention basins or swales to capture runoff in the project site before it enters the drainage and continues downstream.

6.8.3 Lighting

The proposed project will result in an increase in lighting in the project area. However, the site is surrounded on all sides by development, and no open space areas are located adjacent to the site. Therefore, the project is not expected to substantially increase lighting in the area beyond what is currently present, and indirect impacts are not significant.

6.8.4 Meso-Predator Introduction

The project site currently contains significant vegetative coverage by non-native, invasive plant species due to prior development on and adjacent to the site. The proposed project is not expected to substantially increase meso-predators in the project area given the surrounding level of development that currently exists and the fact that the project site is not in close in proximity to any natural areas. Therefore, indirect impacts associated with introduction of meso-predators are not expected.

7 Mitigation, Monitoring, and Reporting

The following mitigation measures are proposed to reduce potential project impacts to below a level of significance.

7.1 Mitigation for Sensitive Species

7.1.1 Sensitive Vegetation Communities

The proposed project will directly impact coastal sage scrub and non-native grassland. Although the coastal sage scrub onsite is disturbed, in accordance with the Biological Guidelines (City of San Diego 2012), it is still considered Tier II special-status habitat. Non-native grassland is considered Tier III special-status habitat. Impacts to these sensitive vegetation communities are potentially significant if not mitigated.

The proposed project would mitigate for impacts to 0.3 acre of Tier II coastal sage scrub (CSS) and 0.62 acre of Tier III non-native grassland through offsite mitigation of 1.07 acres of ecologically valuable habitat. This will provide mitigation for project impacts to non-native grassland at a 1:1 ratio and for impacts to CSS at a 1.5:1 ratio (Table 6).

Table 6 Mitigation for Impacts to Sensitive Natural Communities

Sensitive Natural Communities	Impacts (acres)	Mitigation Ratio	Required Mitigation (acres)
Coastal Sage Scrub (TII)	0.30	1.5:1	0.45
Non-native Grassland (TIII)	0.62	1:1	0.62
Eucalyptus Woodland (IV)	2.09	0:1	--
Disturbed Habitat (IV)	5.07	0:1	--
Total	8.08		1.07

The 1.07 acres will be mitigated offsite through payment into the City of San Diego's Habitat Acquisition Fund (HAF) (Fund #10571). The project site is disturbed and surrounded by development that results in the relative isolation of the site from native vegetation communities. Therefore, on-site creation of Tier II habitat would result in suboptimal mitigation for project impacts. Vegetation installed on-site as mitigation would not likely provide the long-term viability that is required for proposed mitigation (City of San Diego 2012: Biology Guidelines, Page 46). In contrast, payment into the HAF would accomplish mitigation through the purchase of ecologically valuable Tier II and Tier III habitat contiguous with larger areas of similar habitat quality.

7.1.2 Mitigation for State and Federal Jurisdictional Waters

No City jurisdictional wetlands exist onsite; therefore, mitigation would not be required. The unnamed drainage contains approximately 0.07 acre of non-wetland waters subject to the

jurisdiction of the USACE and RWQCB and approximately 0.52 acre of CDFW streambed and stream-associated habitat subject to the jurisdiction of CDFW.

Impacts and associated mitigation must be approved and permitted through the regulatory permit process for waters subject to the jurisdiction of the USACE, RWQCB, and CDFW. Although the agencies have provided preliminary input regarding the proposed impacts and mitigation, coordination to obtain final determinations on the necessity of permits and required mitigation measures would be necessary once the project plans have been finalized and the project moves into the permitting phase.

8 Limitations, Assumptions, and Use Reliance

This Biological Resources Assessment has been performed in accordance with professionally accepted biological resources investigation practices conducted at this time and in this geographic area. The Biological Resources Assessment is limited by the scope of work performed. The Biological Resources Assessment survey is limited also by the environmental conditions present at the time of the survey. Our field studies were based on current industry practices, which change over time and may not be applicable in the future. No other guarantees or warranties, expressed or implied, are provided. The findings and opinions conveyed in this report are based on findings derived from site reconnaissance and specified historical and literature sources. Although Rincon believes the data sources are reasonably reliable, Rincon cannot and does not guarantee the authenticity or reliability of the data sources it has used. Additionally, pursuant to our contract, the data sources reviewed included only those that are practically reviewable without the need for extraordinary research and analysis.

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- Development Services Department –MSCP
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- Development Services Department –Mitigation Monitoring Coordination

Additionally, the following City staff assisted in the editing and finalization of this report:

- Anita Eng
- Elizabeth Shearer-Nguyen

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Appendix A

Plant and Wildlife Species Observed

Species Observed During Field Reconnaisance Surveys

Scientific Name	Common Name	Status	Native or Introduced
PLANTS			
Aizoaceae: Iceplant Family			
Carpobrotus edulis	Hottentot fig	None	Introduced
Amaranthaceae: Amaranth Family			
Bassia hyssopifolia	five-hook bassia	None	Introduced
Anacardiaceae: Sumac Family			
Malosma laurina	laurel sumac	None	Native
Rhus integrifolia	lemonadeberry	None	Native
Schinus molle	Peruvian pepper tree	None	Introduced
Arecaceae: Palm Family			
Phoenix canariensis	Canary Island date palm	None	Naturalized
Washingtonia sp.	fan palm	None	Native/Naturalized
Anacardiaceae: Sumac Family			
Schinus molle	Peruvian peppertree	None	Introduced
Asteraceae: Sunflower Family			
Ambrosia artemisiifolia	Common ragweed	None	Introduced
Artemisia californica	California sagebrush	None	Native
Erigeron canadensis	horseweed	None	Native
Brassicaceae: Mustard Family			
Brassica nigra	black mustard	None	Introduced
Cactaceae: Cactus Family			
Opuntia littoralis	coast prickly pear	None	Native
Chenopodiaceae: Goosefoot Family			
Salsola tragus	Russian thistle	None	Introduced
Cyperaceae: Sedge Family			
Cyperus eragrostis	tall flatsedge	None	Introduced
Euphorbiaceae: Spurge Family			
Ricinus communis	castorbean	None	Introduced
Fabaceae: Legume, Pea, Bean Family			
Acacia cyclops	western coastal wattle	None	Introduced
Fagaceae: Oak and Beech Family			
Quercus agrifolia	coast live oak	None	Native
Lamiaceae: Mint Family			
Salvia mellifera	black sage	None	Native
Myrsinaceae: Myrsine Family			
Anagallis arvensis	scarlet pimpernel	None	Introduced
Myrtaceae: Myrtle Family			
Eucalyptus globulus	blue gum	None	Introduced
Callistemon sp.	bottlebrush	None	Introduced
Agavaceae: Century Plant Family			
Yucca schidigera	Mojave yucca	None	Native
Poaceae: Grass Family			
Bromus diandrus	ripgut brome	None	Introduced
Cynodon dactylon	Bermuda grass	None	Introduced
Pennisetum setaceum	fountaingrass	None	Introduced
Polypogon sp.	rabbitsfoot grass	None	Introduced
Polygonaceae: Knotweed Family			
Rumex crispus	curly dock	None	Introduced
Saururaceae: Lizard Tail Family			
Anemopsis californica	yerba mansa	None	Introduced
Solanaceae: Nightshade Family			
Nicotiana glauca	tree tobacco	None	Introduced

Species Observed During Field Reconnaisance Surveys

Scientific Name	Common Name	Status	Native or Introduced
Solanum americanum	American black nightshade	None	Native
ANIMALS			
Mammals			
Sylvilagus sp.	cottontail	None	Native
Reptiles			
Sceloporus occidentalis	western fence lizard	None	Native
Birds			
Accipiter cooperi	Cooper's hawk	SSC	Native
Calypte anna	Anna's hummingbird	None	Native
Chamaea fasciata	wrentit	None	Native
Corvus brachyrhynchos	American crow	None	Native
Haemorhous mexicanus	house finch	None	Native
Picoides villosus	hairy woodpecker	None	Native
Psaltriparus minimus	bushtit	None	Native
Spinus psaltria	lesser goldfinch	None	Native
Sayornis nigricans	black phoebe	None	Native
Sayornis saya	Say's phoebe	None	Native

Appendix B

Site Photographs

Photo 1. Unnamed drainage facing northeast.

Photo 2. Culvert in unnamed drainage facing south.

Photo 3. Project site adjacent to Hilltop Drive facing south.

Photo 4. Project site facing west.

Photo 5. Project site facing southwest.

Photo 6. Project site facing east.

Birdseye Planning Group

Hilltop and Euclid Mixed-Use Development Project

Jurisdictional Delineation Report

March 2018

rincon

HILLTOP AND EUCLID MIXED-USE DEVELOPMENT PROJECT
SAN DIEGO, CALIFORNIA

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March 2018

Rincon Consultants, Inc.

2018 *Jurisdictional Delineation Report Update, Hilltop and Euclid Mixed-Use Development Project, San Diego, California.* Rincon Consultants Project No. 17-03963.

TABLE OF CONTENTS

1.0 INTRODUCTION

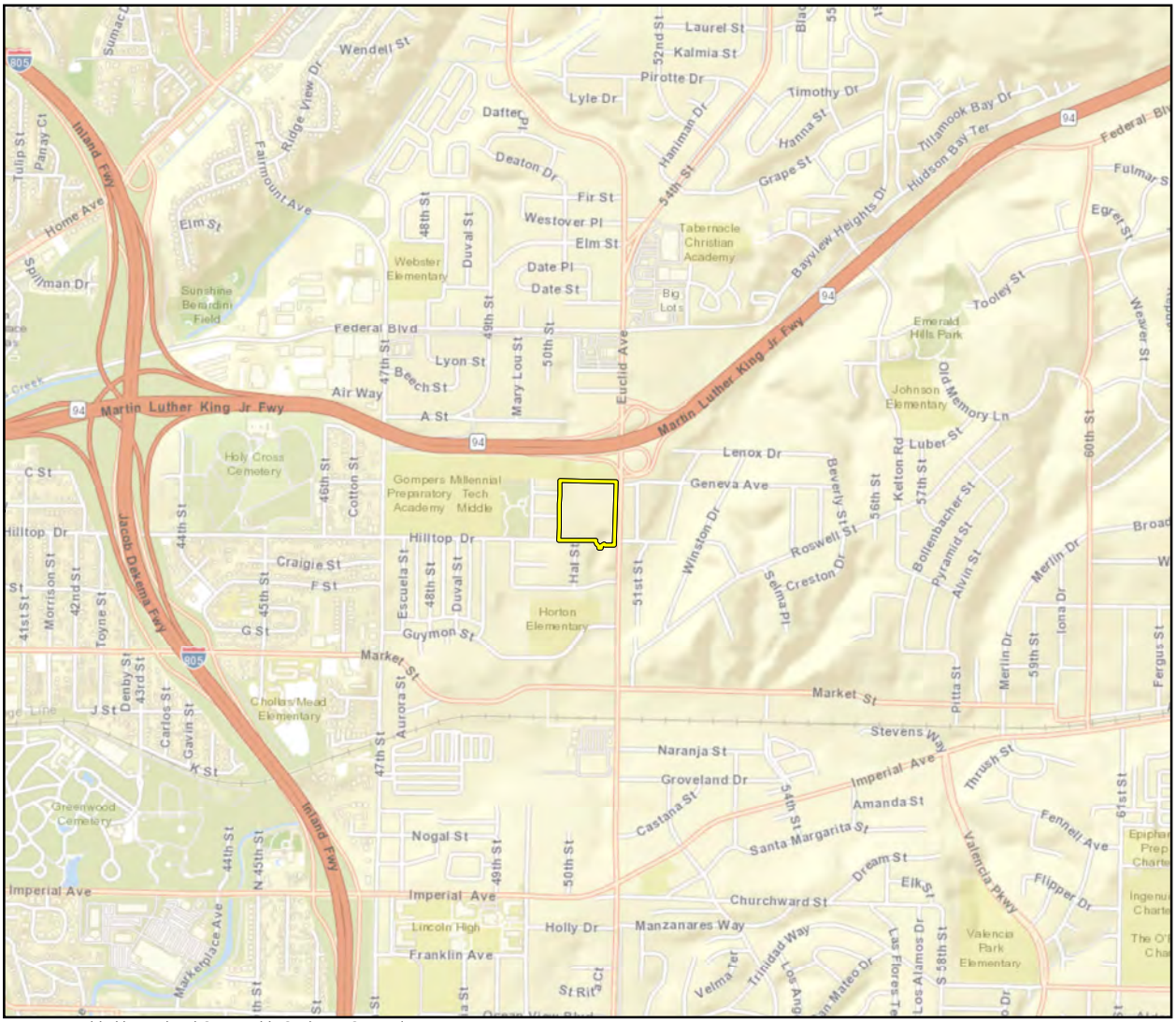
Rincon Consultants, Inc. (Rincon) conducted a jurisdictional waters and wetland delineation for the proposed Hilltop and Euclid Mixed-Use Development Project located in the City of San Diego (City), San Diego County, California. The delineation was conducted to determine the location and extent of potentially jurisdictional aquatic resources within the project site and to analyze project impacts. Potentially jurisdictional resources include waters of the United States (U.S.) that are subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE) and the San Diego Regional Water Quality Control Board (RWQCB), and streambed/banks and associated riparian vegetation potentially subject to the jurisdiction of California Department of Fish and Wildlife (CDFW).

This report delineates the areas Rincon has determined as potentially jurisdictional based on criteria established by the aforementioned resource agencies.

1.1 PROJECT LOCATION

The proposed project is located on a 9.35 vacant site bisected by a small, ephemeral drainage within the Encanto Community in the City of San Diego. The site is bordered by Euclid Avenue to the east, Hilltop Drive, when extended, to the south, single family residential property to the west and the San Diego Earthlab educational facility and Martin Luther King Jr. Freeway (SR-94) to the north (Figure 1).

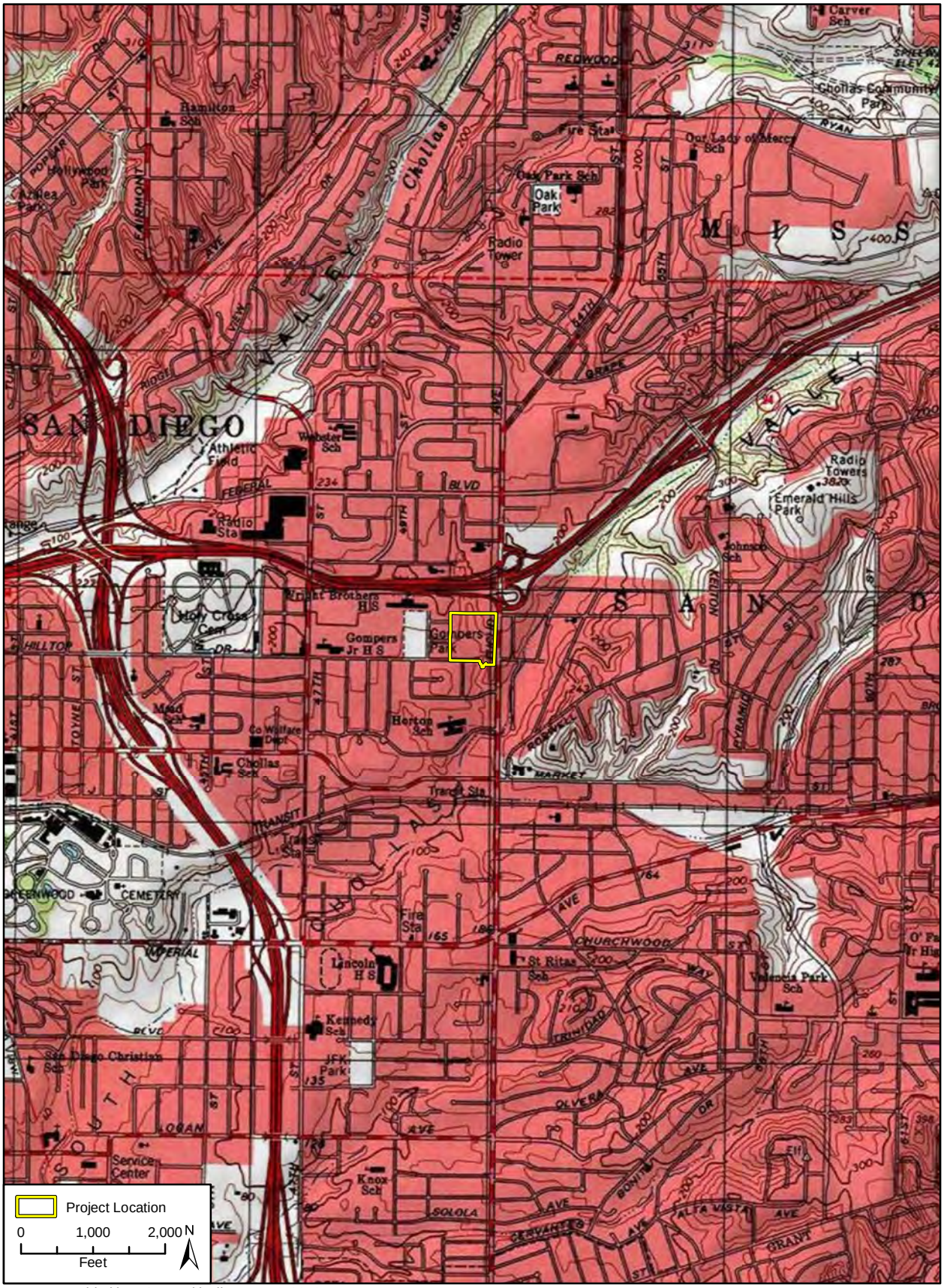
Specifically, development would occur on Assessor's Parcel Numbers (APN) 542-480-03, 09, 10, 12, 14, 16, 18, and 20. The parcels are depicted in Township 17 South, Range 2 West, Section 9 of the U.S. Geological Survey (USGS) *National City*, California 7.5-minute topographic quadrangle (Figure 2). The site is located within the boundaries of the City's MSCP Subarea Plan, but does not occur within a MHPA. The site is also not within the Coastal Zone.



Imagery provided by National Geographic Society, ESRI and its licensors © 2016. The topographic representation depicted in this map may not portray all of the features currently found in the vicinity today and/or features depicted in this map may have changed since the original topographic map was assembled.

Regional Location

Figure 1



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Location of Project Site on USGS Topographic Map Figure 2

1.2 PROJECT DESCRIPTION

The proposed project would construct a total of 47 single-family and townhome market-rate residences. A total of 113 affordable apartment units would be constructed on the east side of the site. These would range from studio units to four bedroom units. Approximately 8,300 square feet of commercial space would be installed on the ground floor of the apartment complex facing Euclid Avenue. The project would include various recreational amenities including a community swimming pool, basketball court, gardening space, community room, outdoor gathering areas, and a pedestrian plaza and bridge that would extend over the ephemeral unnamed drainage. The proposed project would also extend Hilltop Drive east to the intersection with Euclid Avenue. Extension of the road would require improvements within the ephemeral drainage to construct the road and bridge. This would require placement of fill material in the drainage and extension of the underground pipe. No fill material would be imported or exported. All graded material would be balanced on-site.

As part of the project, the ephemeral drainage would be graded, recontoured, and restored to maintain water conveyance, natural and habitat function. Approximately 0.86 acre of coastal sage scrub (CSS) and 0.91 acre of streambed and/ or riparian habitat would be installed within the existing drainage and upland slopes following construction. The Conceptual Revegetation/ Restoration Plan (Rincon, 2018; Appendix A) for the project outlines in further detail the proposed methodologies for mitigating impacts to jurisdictional resources. The project would also establish retention basins or swales to capture runoff in the project site before it enters the drainage and continues downstream. It is anticipated that the proposed project would begin construction in mid to late 2018 and be completed by 2020.

1.3 ENVIRONMENTAL SETTING

The San Diego region has a Mediterranean climate, with mild, wet winters and warm, dry summers. Typical summertime highs are in the 80s (degrees Fahrenheit) with wintertime temperatures generally in the low 60s. Average annual precipitation in the City is approximately 10 inches per year, most of which falls between December and March. Total precipitation for the current year was two inches below average at the time of the field survey.

At an elevation range of approximately 60 to 100 feet above mean sea level, the topography of the project site is varied, consisting of a flat mesa and a ravine area that is traversed by a small unnamed drainage course. The unnamed ephemeral drainage flows north to south through the project site. The drainage is within a significant topographic ravine between the eastern and western areas of the site, and evidence suggests that the drainage is ephemeral and only conveys water flows seasonally.

The drainage feature within the project site is a small, but well-defined single uniform channel that was dry at the time of the assessment. Although the NWI identified the unnamed drainage as a freshwater emergent wetland, Rincon found that the unnamed drainage feature exhibits an OHWM but lacks indicators of hydric soils, and is primarily void of wetland hydrology, and hydrophytic vegetation. The drainage contains rocks, broken bricks, concrete, asphalt, and trash (glass, rusting metal parts) and imported fill near the terminus of Hilltop Drive.

The project site has been disturbed by past human activities, but has remained largely undeveloped except for a few buildings along Euclid Avenue that were present in the 1950's. Rincon biologists reviewed historical imagery (1953, 1964; www.historicaerials.com) and found evidence of a drainage feature, but no indication of riparian or wetland vegetation. Between 1953 and 1964 part of this drainage was filled to provide access across the drainage (referred to as fill area or berm), and several residential developments were built around the drainage, including State Route (SR) 94 directly upstream of the project site. Historic topographic maps (1904, 1908, 1911, 1915, 1920, 1928, 1932, 1941, 1944; historicaerials.com) show Cholas Creek (south of the project site) but do not show the drainage feature until 1944. The feature is identified as an "intermittent stream" in topographic figures and disappears and reappears in maps through 1944 to 1963. In addition, between 1953 and 1964 the lower reach of the drainage (approximately 250 feet south of the project site) was filled and redirected into the storm drain system to allow for fill and developments to be built along Lakiba Palmer Avenue (formerly Lise Avenue). Visual appearance of riparian habitat and invasive species becomes predominant in the imagery starting as early as 1971 (www.historicaerials.com).

It is likely that this ephemeral drainage historically carried storm water flows to Cholas Creek, but did not support riparian species until increased runoff and impoundments within the drainage resulted in accumulation of water that would have, under natural conditions, flowed downstream. Therefore, the project site is substantially disturbed and contains a mixture of non-native and native vegetation with disturbed and ornamental areas containing patches of eucalyptus woodland and disturbed coastal sage scrub.

2.0 METHODOLOGY

This jurisdictional delineation was conducted using currently accepted regulatory guidance and field procedures as described by USACE, RWQCB, and CDFW. The final determination regarding jurisdictional resources will be made by the resource agencies upon their review of this report and their concurrence with its findings.

Waters of the U.S, including wetlands potentially subject to USACE jurisdiction under Section 404 of CWA were delineated in accordance with the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987), the *Arid West Regional Supplement* to that manual (USACE 2008a) and Section 3.2 (Preliminary Delineation Procedure) of the *A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West: A Delineation Manual* (USACE 2008b). In the absence of published guidelines or rulemaking directing differently, the San Diego RWQCB's jurisdiction under the Porter-Cologne Act was determined in accordance with the previously listed methodologies to identify waters subject to federal (USACE) jurisdiction; and thus, mirrors the lateral limits of federal CWA jurisdiction pursuant to Section 401 of the CWA.

Under Sections 1600-1616 of the CFGC, CDFW regulates activities that would divert or obstruct the natural flow or substantially alter the bed, bank or channel of any river, stream, or lake. Although CDFW has not adopted a definition of "stream" for use in the Lake/Streambed Alteration Agreement program, the agency has a consistent and long-standing practice of delineating the lateral limits of the streambed as the top of the physical bank or the landward edge of riparian vegetation, whichever is broader. This practice was applied in delineating CDFW jurisdictional areas at the project site.

Vegetation classification was based on the classification systems provided in the *Draft Vegetation Communities of San Diego County* (Oberbauer, Thomas, Meghan Kelly, and Jeremy Buegge (March 2008) (Draft) and *A Manual of California Vegetation, Second Edition* (Sawyer et al. 2009); and modified as appropriate to reflect the existing site conditions. Descriptions for the vegetation types present on-site are provided below and include the wetland indicator status for each dominant plant species. Wetland indicator status for plant species is based on *The National Wetland Plant List*: 2016 wetland ratings (Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016) and includes the following categories:

- Obligate Wetland (OBL) – Plants that occur almost always in wetlands
- Facultative Wetland (FACW) – Plants that usually occur in wetlands, but also occur in non-wetlands (i.e., uplands)
- Facultative (FAC) – Plants with a similar likelihood of occurring in both wetlands and uplands
- Facultative Upland (FACU) – Plants that usually occur in uplands, but also occur in wetlands
- Obligate Upland (UPL) – Plants that occur almost always in uplands (includes those species not listed in Reed [1988])

Appendix B presents a more detailed discussion of applicable regulations and definitions pertaining to this jurisdictional delineation.

2.1 LITERATURE REVIEW

Prior to the field survey, potential locations of aquatic resources were determined through review of available literature, mapping, and aerial photographs. Specifically, aerial photographs (Google Earth), historic aerials (www.historicaerials.com), orthophoto imagery, and regional and site specific topographic maps (*National City, California* United States Geological Survey [USGS] 7.5-minute topographic quadrangle), were analyzed to identify mapped streams, differences in vegetative cover, and the presence of breaks in slope that may be associated with the active floodplain/low terrace boundary. The *National Wetlands Inventory* (NWI; United States Fish and Wildlife Service [USFWS] 2016) and the National Hydrography Dataset (NHD; USGS 2016) were reviewed to determine if any wetlands or flow paths were mapped on or in the vicinity of the proposed project site. The United States Department of Agriculture, Natural Resources Conservation Service *National Hydric Soils List* (USDA 2016a) was also reviewed to determine if any soil types mapped on or in the vicinity of the proposed project site were classified as hydric.

2.2 FIELD DELINEATION

On July 13, 2016, between the hours of 1300-1700, Rincon biologists Jennifer Kendrick and Chris Julian conducted a general biological survey and jurisdictional delineation. On April 28, 2017, between the hours of 1000-1200, Rincon biologists Jennifer Kendrick and Jillian Moore conducted an additional survey. Both survey areas included the parcels mentioned above in Section 2.1 and a 100-foot buffer. The purpose of the survey was to document the existing biological conditions within the project site, including plant and wildlife species, general vegetation communities, jurisdictional waters and wetlands, the potential for presence of sensitive species and/or habitats, and to determine presence/absence of special-status plant species and vegetation communities. The biologists conducted the survey on foot. Where portions of the site were inaccessible (e.g., steep slopes), the biologists visually inspected those areas with binoculars (10 x 40). Weather conditions during the survey included an average temperature of 90 degrees Fahrenheit (°F), with winds between 10 and 15 miles per hour (mph) with 10-25% cloud cover.

During the survey, the site was inspected for drainage features exhibiting jurisdictional characteristics such as a defined bed, banks, or channel, ordinary high water mark (OHWM), or potential wetland indicators. A single drainage channel was identified (see Appendix C for site photos). The centerline of the drainage was mapped using a GPS unit capable of sub-meter accuracy, and the channel width at the OHWM was measured at several representative locations using a transect tape. The drainage was within a deep ravine and exhibited a narrow, well-defined channel. In some locations, vibrant herbaceous vegetation including a mixture of hydrophytes and upland species was present beyond the bank. Taxonomic nomenclature for plant species is in accordance with The Jepson Manual (Baldwin et al. 2012). The limits of CDFW jurisdiction were mapped by GPS at the outer edge of the stream-associated vegetation, or at the edge of the well-defined channel where no changes in vegetation were evident.

Because wetland indicator species were observed among the vegetation near the drainage, a Routine Wetland Delineation Data Form (see Appendix D) was completed in accordance with

USACE (1987, 2008a) methods. The sample point for the wetlands evaluation was sited in the bottom of the channel, which appeared to be the likeliest area to exhibit wetland characteristics based on landscape position, local topography, and vegetation indicators. A soil pit was excavated to a depth of 18 inches, and was inspected for indicators of wetland hydrology (standing water, saturated soil, etc.) and hydric soils (colors or features in the soil profile indicative of reducing conditions). Soils were investigated using a Munsell soil color chart. Vegetation at the sample location was identified and evaluated for predominance of hydrophytic species. A complete listing of the indicators evaluated is provided on the data form.

Potential Dominance of hydrophytic vegetation (i.e., wetland plants) was determined by creating a species list for dominant plants occurring within the drainage, assigning an indicator status category to each species using the *National Wetland Plant List*: 2016 wetland ratings ([2016 NWPL] Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016) and determining whether wetland plants dominated the subject area using the dominance test. The dominance test is when more than 50 percent of the dominant plant species across all strata are rated OBL, FACW, or FAC (Environmental Laboratory 2008).

An area was determined to support hydrophytic vegetation if more than 50% of the dominant species was listed as OBL, FACW, or FAC species on the 2016. Vegetation was assessed using the "50/20 Rule" to determine dominant species. The 50/20 Rule is a dominance ratio. When using the 50/20 Rule, greater than 50% of the plants must be facultative, facultative wet, or obligate wet species to consider the vegetation community as hydrophytic. In addition, the cumulative total of all dominant plants must be equal to or greater than 50% of the areal coverage of the plot, and any plant species that equals or exceeds 20% of the total percentage areal coverage of the plot is also considered a dominant plant. If no plant species equals or exceeds 20% of the cumulative total areal coverage of the plot, then the dominant plants are the plants that, when ranked in decreasing order of abundance and summed, immediately exceed 50% of the plot's areal coverage when added together (Federal Interagency Committee for Wetland Delineation 1989). By definition, dominant species are the most abundant plant species (when ranked in descending order of abundance and cumulatively totaled) that immediately exceed 50% of the total dominance measure (e.g., basal area or areal coverage) for the stratum, plus any additional species that individually compose 20% or more of the total dominance measure for the stratum (Tiner 1999). All observation points were also surveyed for the presence of surface wetland hydrological field indicators such as inundation, saturation, water marks, drift lines, drainage patterns, and sediment deposits occurring within a hydrophytic vegetation community.

3.0 DELINEATION RESULTS

3.1 WATERS AND STREAMBEDS

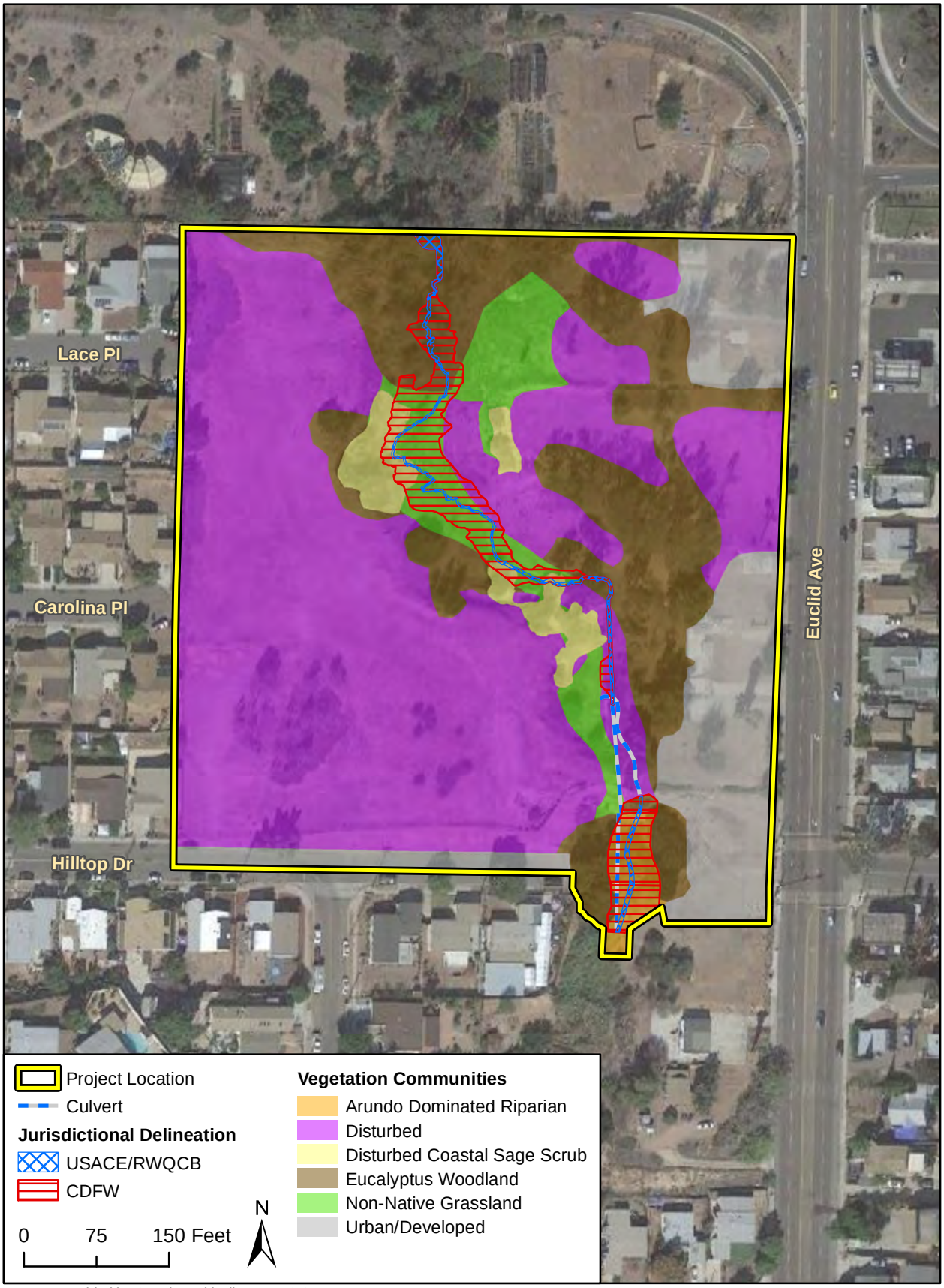
The drainage enters the project site from the property to the north, which is situated between the site and SR94. Flows appear to originate from the southern edge of the freeway off-ramp and flow southward towards the project site. Based on a review of aerial photographs, the drainage upstream of the site does not appear to receive flows from any sources other than the off-ramp and localized runoff from the surrounding properties. A trash rack is present where the drainage enters the project site, which may serve a dual purpose by collecting debris while also deterring unauthorized access under the site fence. Active channel indicators upstream of the trash rack were observed to be muted, suggesting that flows in this area are likely of low volume and velocity. Near the downstream boundary of the project site, the drainage enters an underground concrete pipe under a broad, filled area. Downstream of the culvert (to the south), channel characteristics are similar to those upstream of the culvert except that the vegetation is almost entirely composed of fan palms (*Washingtonia robusta*) and dense stands of arundo (*Arundo donax*). This area was not able to be delineated due to a homeless encampment. No connection to a body of water beyond this point was observed in the field. Review of the NWI and the NHD did not show a connection downstream; the NHD does not register the feature at all and the NWI depicts the drainage as isolated. However, approximately 250 feet south and downstream of the project site, flows are directed into a storm drain system.

The depth of the channel is greater than one foot in most locations, but never more than two feet. The banks are sharply incised, vertical, and appear stable, possibly due to extensive adjacent vegetation. The channel bed is unvegetated and sandy/loamy, but is covered completely by overhanging grasses in most areas. The width of the channel at the OHWM is fairly uniform, and is between two and three feet at most locations. Width is greatest near the northern site boundary, where water moves as sheet flow across an area approximately 15 feet wide. The evaluation of a wetland delineation data point indicated that wetlands are not present.

Based on vegetation mapping (Figure 3) the only riparian vegetation community present is approximately 0.13 acre of non-native arundo that is located within the southeast extent of the project site.

3.2.1 Hydrology

Wetland hydrology refers to the presence of water at or above the soil surface for a sufficient period of the year as to significantly influence the plant types and soils that occur in the area. Wetland hydrology was determined by reviewing historical aerial imagery and ground truthing during the field assessment. The drainage is within a significant topographic ravine between the eastern and western areas of the site, and evidence suggests that the drainage only conveys water flows seasonally. Neither standing nor flowing water is evident in Google Earth historical imagery, and no water was observed during the July 13, 2016, field survey. Between 1953 and 1964, portions of the ephemeral drainage were filled and underground pipes were installed to



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Biological Resources Map

Figure 3

convey flows into the storm drain system. The existing underground pipe is undersized and water would flood over the existing berm near the south end of the site during the 100-year storm. Impoundments both on and off site have created conditions for water to pool during storm events, creating artificial conditions that support species such as arundo.

3.2.2 Vegetation

Six vegetation communities or land cover types occur within the project site, including; arundo-dominated riparian, eucalyptus woodland, non-native grassland, urban/developed, disturbed coastal sage scrub (CSS), and disturbed habitat. It should be noted that many of the vegetation communities identified within the project site do not contain definitive typical dominant species associations as described within the Draft. Therefore, in order to effectively apply this classification method to the site, each on-site community was assigned the most closely corresponding community described by the Draft.

The northern portion of the channel is surrounded by dense herbaceous cover approaching 100 percent, and has an overstory of non-native trees such as river red gum (*Eucalyptus camaldulensis)*, Peruvian pepper tree (*Schinus molle*), and bottlebrush tree (*Callistemon viminalis*). The species composition is a mixture of hydrophytic and upland species, primarily grasses such as Bermuda grass (*Cynodon dactylon*), ripgut brome (*Bromus diandrus*), and fountain grass (*Pennisetum setaceum*). Within the center and southern portion of the channel, the vegetation is less dense and does not overhang the channel. The center portion is characterized by a mixture of hydrophytic and upland species such as CSS, Bermuda grass, and ripgut brome with the area is mostly being dominated with evening primrose (*Oenothera elata*). The southern portion of the site is characterized by upland species including ice plant (*Carpobrotus edulis*) and Russian thistle (*Salsola tragus*).

Disturbed CSS occurs along the banks of the drainage course as patchy areas with a high ratio of non-native species such as curly dock, black mustard (*Brassica nigra*), castor bean (*Ricinus communis*), and tree tobacco (*Nicotiana glauca*). A low ratio of native species occur in this area and include species such as black sage (*Salvia mellifera*), laurel sumac (*Malosma laurina*), lemonade berry (*Rhus integrifolia*), coast prickly pear (*Opuntia littoralis*), western ragweed (*Ambrosia psilostachya*), tall flat sedge (*Cyperus eragrostis*), and yerba mansa (*Anemopsis californica*).

Hydrophytic Vegetation

Hydrophytic vegetation observed during the field delineation includes OBL, FACW, and FAC indicator species. Of the four plant species recorded in the survey area during the field delineation, one was classified as FACW (barnyard grass [*Echinochloa crus-galli*]) and one was classified as a FAC (river red gum [*Eucalyptus camaludulensis*]). Therefore, since no more than 50% of the dominant species observed during the delineation were listed as OBL, FACW, or FAC the survey area was not determined to support a hydrophytic vegetation community.

Non-Hydrophytic Vegetation

Non-hydrophytic vegetation includes FACU and UPL. Non-hydrophytic vegetation communities present on site include urban/developed lands, disturbed coastal sage scrub, non-native grassland, and eucalyptus woodland. Disturbed habitat is found along the outer edges of the riparian corridor and is dominated by upland species including Peruvian pepper tree (FACU), black mustard (*Brassica nigra;* UPL), tocalote (*Centaurea melitensis;* UPL), Russian thistle, tree tobacco (*Nicotiana glauca;* FAC), bush mallow (*Malacothamnus fasciculatus*), horseweed (*Conyza canadensis*; FACU), horehound (*Marrubium vulgare*; FACU), calabazilla (*Cucurbita foetidissima;* UPL), fig (*Ficus* sp.; UPL), California buckwheat (*Eriogonum fasciculatum;* UPL), prickly pear (*Opuntia* sp.; UPL), mulefat (*Baccharis salicifolia;* FAC), coyote brush (*Baccharis pilularis;* UPL), and gum trees (*Eucalyptus* sp; UPL).

Areas identified as urban/developed lands are characterized by permanent structures, irrigated landscaping, or grading such that native vegetation is no longer supported. These sites do not have a distinctive, natural vegetation community. The dominance of non-hydrophytic vegetation in areas defined as disturbed habitat and urban/developed lands delineates the edges of the riparian corridor.

3.2.3 Soils

Based on the most recent soil survey (USDA 2016), one mapped soil type is present and listed below.

- HuC – Huerhuero-Urban land complex, 2 to 9 percent slopes (Figure 4).

Soils of the Huerhuero-Urban land complex series consists of moderately well drained, very high runoff soils found on marine terraces that form from calcareous alluvium derived from sedentary rock.

A hydric soil is defined by the National Technical Committee for Hydric Soils (NTCHS) as "soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part" to support the growth and regeneration of hydrophytic vegetation (USDA 2015a). Huerhuero-Urban land complex is not listed on the Natural Resources Conservation Service (NRCS) Hydric Soils List, and no hydric soil indicators were observed in the soil pit excavated in the field. Below the layer of imported fill, the soil was sandy loam and disarticulated when removed from the pit. Photography of the soil profile was not possible due to dense overlying vegetation and confined channel, and because the soil profile could not be extracted from the pit intact. Due to the presence of historic fill, the soils are considered to be significantly disturbed. However, the fill is not recent and the current conditions represent normal circumstances.

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Additional data provided by SSURGO, 2014.

USDA Soils Map

Figure 4

4.0 ASSESSMENT OF JURISDICTIONAL RESOURCES

The delineation of waters of the U.S./state, and CDFW-jurisdictional streambeds in the study area identified jurisdictional non-wetland waters, and streambed/riparian habitats that may be subject to USACE, San Diego RWQCB, and CDFW permitting authority. No wetlands, as defined by USACE were identified. Final jurisdictional determinations of the boundaries of waters and riparian habitats are made by each agency, typically at the time that authorizations to impact such features are requested. Table 1 summarizes the total area (acres) and linear length (feet) of the jurisdictional feature within the study area. Locations of potential USACE/RWQCB resources and CDFW resources are illustrated in Figures 5a and 5b respectively. ArcGIS was used to calculate the approximate acreages and/or linear feet of jurisdictional wetlands, waters and riparian habitats.

Table 1: Resource Agency Jurisdiction within the Study Area

	USACE/San Diego RWQCB Jurisdiction		CDFW Jurisdiction
Drainage	Non-wetland Waters Acres (Lin. Ft.)	Wetland Waters Acres (Lin. Ft.)	Streambed/Riparian Acres (Lin. Ft.)
Unnamed	0.07 (1,010)	None	0.52 (1,038)

4.1 USACE AND SAN DIEGO RWQCB JURISDICTION

The unnamed drainage contains approximately 0.07 acre of non-wetland waters potentially subject to the jurisdiction of the USACE and RWQCB. The drainage width at the OHWM is fairly uniform and is between two and three feet in most locations. Due to the lack of dominate hydrophytic vegetation, wetland hydrology, and hydric soils, no wetlands are present within or adjacent to the drainage (Figure 5a).

4.2 CDFW JURISDICTION

CDFW jurisdictional limits of the on-site drainage were delineated at the outer edge of stream-dependent vegetation (a combination of riparian and upland species, but visibly more vigorous than the adjacent upland vegetation) where present, and by the edge of the channel where vegetation was absent. The unnamed drainage contains approximately 0.52 acre of streambed and stream-associated habitat subject to the jurisdiction of CDFW. The width of the jurisdictional area ranged from one foot to 15 feet. The extent of CDFW jurisdiction included areas within the well-defined channel (coterminous with the OHWM due to the small, singular nature of the drainage) plus the extent of the adjacent vegetation supported by the drainage (Figure 5b).

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Potential Jurisdictional Resources - USACE & RWQCB Figure 5a

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Potential Jurisdictional Resources - CDFW

Figure 5b

5.0 IMPACT ANALYSIS AND RECOMMENDATIONS

Within the project site, the drainage contains waters subject to the jurisdiction of the USACE, RWQCB, and CDFW. These agencies acknowledge the important hydrologic, biogeochemical, and ecological functions provided by waters and streams, and direct that impacts to aquatic resources be avoided or minimized when possible. When impacts are unavoidable, compensatory mitigation to offset the loss of resources is usually required.

The USACE may issue two types of permits under Section 404 of the CWA to authorize the discharge of dredged or fill material into Waters of the US: a General Permit (GP) or an individual permit (IP). Nationwide Permits (NWPs) are a type of General Permits authorizing specific categories of activities that result in minimal impacts to aquatic resources. They are issued by the USACE and renewed every five years, and are available to the public for use when proposing an activity that meets the criteria for coverage under a NWP. Given that project activities propose to restore the drainage, the 0.07 acres of temporary impacts to USACE jurisdiction would qualify for coverage under NWP 27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities). Submittal of a pre-construction notification (PCN) is required, and the USACE may require mitigation depending on the nature of the impact. Compensatory mitigation is not normally required for activities authorized by NWP 27, since these activities must result in net increases in aquatic resource functions and services. Acquiring a Section 404 NWP generally takes 4-6 months, with the bulk of this time devoted to addressing RWQCB requirements, unless extraordinary circumstances such as endangered species or cultural resources are present.

The acreage subject to San Diego RWQCB jurisdiction for impacts to Waters of the U.S./State is 0.07 acres. A Water Quality Certification (CWA Section 401), or waiver of certification, is required from the RWQCB for any activity that requires a Federal license or permit (such as a Section 404 NWP) for a discharge to jurisdictional waters. Therefore, a 401 certification may be required prior to project authorization. The San Diego RWQCB may also issue Waste Discharge Requirements pursuant to the Porter-Cologne Act, if deemed necessary. Terms and conditions are likely to include seasonal work restrictions, measures to protect and monitor water quality during construction, contingency plans addressing the possibility of high flows, demonstrated compliance with post-construction stormwater control requirements, and compensatory mitigation. Acquiring a Section 401 WQC generally takes 4-6 months, during which time RWQCB staff are likely to request additional information demonstrating that impacts to waters have been minimized to the extent feasible.

The acreage subject to CDFW jurisdiction for impacts to the drainage is 0.52 acre. Unlike USACE, CDFW regulates not only the discharge of dredged or fill material, but all activities that alter streams and lakes and their associated habitat. CDFW has no abbreviated permitting process comparable to the USACE nationwide permits. Prior to diverting, obstructing, or substantially altering CDFW-jurisdictional streams, an application (termed "Notification") must be provided to CDFW. If the agency determines that a fish or wildlife resource could be adversely affected, a Lake/Streambed Alteration Agreement will be required. Terms and conditions are likely to include seasonal work restrictions, measures to protect biological

resources and water quality during construction, restoration and compensatory mitigation requirements. Acquiring a Lake/Streambed Alteration Agreement generally takes 4-6 months.

6.0 LIMITATIONS, ASSUMPTIONS, AND USE RELIANCE

This Jurisdictional Delineation has been performed in accordance with professionally accepted jurisdictional investigation practices conducted at this time and in this geographic area. The jurisdictional investigation is limited by the scope of work performed. The jurisdictional survey is limited also by the environmental conditions present at the time of the survey. Our field studies were based on current industry practices, which change over time and may not be applicable in the future. No other guarantees or warranties, expressed or implied, are provided. The findings and opinions conveyed in this report are based on findings derived from site reconnaissance, jurisdictional delineation, and specified historical and literature sources. Although Rincon believes the data sources are reasonably reliable, Rincon cannot and does not guarantee the authenticity or reliability of the data sources it has used. Additionally, pursuant to our contract, the data sources reviewed included only those that are practically reviewable without the need for extraordinary research and analysis.

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Appendix A

Conceptual Revegetation/ Restoration Plan Hilltop and Euclid Mixed-Use Development Project

Appendix B

Regulatory Overview and Definitions

USACE JURISDICTION

The U.S. Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (USACE) on June 29, 2015 published a new Clean Water Rule (effective August 28, 2015,) that updates the definition of "Waters of the United States" regulated under the federal Clean Water Act (CWA) (33 U.S.C. Section 1344). The CWA prohibits the unauthorized discharge of pollutants (including fill material) into "navigable waters", which are defined as waters of the U.S. Following adoption of the CWA in 1972, the EPA and USACE issued their own definitions of waters of the U.S., and the interpretation of these definitions has been subject to litigation in several Supreme Court cases, including most recently the "SWANCC" and "Rapanos" decisions in 2001 and 2006, respectively.

WATERS OF THE U.S.

For purposes of the Clean Water Act, the USACE defines "Waters of the United States" as:

i. All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
ii. All interstate waters, including interstate "wetlands";
iii. The territorial sea;
iv. All impoundments of waters otherwise defined as waters of the United States under Section 404;
v. Tributaries of waters defined as "characterized by the presence of the physical indicators of bed and banks and an ordinary high water mark."
vi. Wetlands adjacent ("bordering, contiguous, or neighboring") to waters, and all non-wetland waters within 100 feet of jurisdictional waters (categories i – iv, above), or within the 100-year floodplain to a maximum of 1,500 feet from the ordinary high water mark of these waters. Specific isolated waters, such as "western vernal pools", are waters of the U.S. if they are determined to have a significant nexus with categories 1 through 3, above. Other isolated waters are jurisdictional if they occur within the 100-year floodplain of categories i-iii above, or within 4,000 feet of the ordinary high water mark of categories i-v, and are determined to have a significant nexus with these waters.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA are not waters of the United States (40 CFR 122.2).

WETLANDS

Under Section 404 of the Clean Water Act, wetlands are defined as areas that are "inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (40 CFR 230.3 and CFR 328.3). AS mentioned above, jurisdictional wetlands are a subset of Waters of the U.S., which include wetlands as defined above and areas subject to the ebb and flow of the tide and areas that are within the limits of ordinary high water. Although the term ordinary high water continues to be refined, it can be generally defined as the average annual

level of high flows (not necessarily the highest flood level) within a system period over a 2-year return interval flow level.

The USACE definition of wetlands utilizes the "three-parameter test" for permitting and planning purposes. These three parameters are hydrology, hydrophytic vegetation, and hydric soils as described below. Under this definition an area is considered a wetland only if all three conditions are present.

Hydrology

Wetland hydrology is inundation or soil saturation with a frequency and duration long enough to cause the development of hydric soils and plant communities dominated by hydrophytic vegetation. If direct observation of wetland hydrology is not possible (as in seasonal wetlands), or records of wetland hydrology are not available (such as stream gauges), assessment of wetland hydrology is frequently supported by field indicators, such as water marks, drift lines, sediment deposits, or drainage patterns in wetlands.

Hydrophytic Vegetation

Hydrophytic vegetation dominates areas where frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species are assigned wetland indicator status according to the probability of their occurring in wetlands. More than fifty percent of the dominant plant species must have a wetland indicator status to meet the hydrophytic vegetation criterion. The U.S. Fish and Wildlife Service (USFWS) published the National List of Plant Species That Occur In Wetlands (Lichvar, 2013), which separates vascular plants into the following four basic categories based on plant species frequency of occurrence in wetlands:

- Obligate Wetland (OBL). Occur almost always (estimated probability >99%) under natural conditions in wetlands.
- Facultative Wetland (FACW). Usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.
- Facultative (FAC). Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).
- Facultative Upland (FACU). Usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%).
- Obligate Upland (UPL). May occur in wetlands in another region, but occur almost always (estimated probability >99%) under natural conditions in non-wetlands in the region specified.

The USACE considers OBL, FACW and FAC species to be indicators of wetlands. An area is considered to have hydrophytic vegetation when greater than 50 percent of the dominant species in each vegetative stratum (tree, shrub, and herb) fall within these categories. Any species not appearing on the USACE list is assumed to be an upland species, almost never occurring in wetlands. In addition, an area needs to contain at least 5% vegetative cover to be considered as a vegetated wetland.

Hydric Soils

Hydric soils are saturated or inundated for a sufficient duration during the growing season to develop anaerobic or reducing conditions that favor the growth and regeneration of hydrophytic vegetation. Field indicators of wetland soils include observations of ponding, inundation, or saturation, dark (low chroma) soil colors, bright mottles (concentrations of oxidized minerals such as iron), gleying, which indicates reducing conditions by a blue-grey color, or accumulation of organic material. Additional supporting information includes documentation of soil as hydric or reference to wet conditions in the local soils survey, both of which must be verified in the field.

NON-JURISDICTIONAL AREAS

Areas not considered to be jurisdictional waters include non-tidal drainage and irrigation ditches excavated on dry land, artificially-irrigated areas, artificial lakes or ponds excavated on dry land used for irrigation or stock watering, small artificial water bodies such as swimming pools, and water filled depressions (51 Fed. Reg. 41, 217 1986). In addition, a Supreme Court ruling (Solid Waste Agency of Northern Cook Counties [SWANCC] vs. USACE, January 9, 2001) determined that the USACE exceeded its statutory authority by asserting Clean Water Act jurisdiction over "an abandoned sand and gravel pit in northern Illinois, which provides habitat for migratory birds." Based solely on the use of such waters by migratory birds, the Supreme Court's holding was strictly limited to waters that are "non-navigable, isolated, and intrastate."

The Supreme Court further addressed the extent of the USACE jurisdiction in Rapanos v. US (June 19, 2006). There, a sharply divided Court issued multiple opinions, none of which garnered the support of a majority of Justices. This created substantial uncertainty as to which jurisdictional test should be used. The Ninth Circuit Court of Appeal, which encompasses California, answered this in Northern California River Watch v. City of Healdsburg (August 11, 2006). There, the Court held that Justice Kennedy's opinion in Rapanos provides the controlling rule of law. Under that rule, wetlands or other waters which are not navigable in fact are subject to USACE jurisdiction if they have a "significant nexus" to a navigable-in-fact waterway. As Justice Kennedy explained, whether a significant nexus exists in any given situation will have to be decided on a case-by-case basis, depending on site-specific circumstances.

USACE Headquarters in Washington, D.C. issued substantive guidance on June 5, 2007, to its District Offices as to how to apply these rulings. Based on this guidance, additional quantitative, qualitative, and other physical data is required for the USACE to make a determination of jurisdictional authority. This determination is reviewed by the United States Environmental Protection Agency (USEPA).

In accordance with the Rapanos guidance, the USACE will assert jurisdiction over traditional navigable waters (TNWs), non-navigable tributaries of TNWs that are relatively permanent waters (RPWs), and wetlands that directly abut such tributaries. TNWs include all of the "navigable waters of the US," defined in 33 CFR Part 329 and by pertinent federal court decisions. RPWs convey water flow seasonally, typically for at least 3 months. In addition, non-navigable tributaries that are not relatively permanent (non-RPWs), wetlands adjacent to non-RPWs, and wetlands adjacent to but that do not directly abut a TNW will be found jurisdictional based on a fact-specific analysis that they have a significant nexus with a TNW. The significant nexus evaluation considers the volume, duration, and frequency of water flow

in the tributary and the proximity of the tributary to a TNW, as well as the hydrologic, ecologic, and other functions performed by the tributary and all of its adjacent wetlands.

RWQCB JURISDICTION

The State Water Resources Control Board (SWRCB) and local Regional Water Quality Control Board (RWQCB) have jurisdiction over "waters of the State," which are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. Section 401 of the Clean Water Act (33 U.S.C. Section 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into Waters of the U.S. to obtain certification from the State in which the discharge originates. As a result, fill proposed to be deposited in waters and wetlands requires coordination with the appropriate RWQCB that administers Section 401 and provides certification. The RWQCB also plays a role in review of water quality and wetland issues, including avoidance and minimization of impacts. Section 401 certification is required prior to issuance of a Section 404 permit.

The SWRCB has issued general Waste Discharge Requirements (WDRs) regarding discharges to "isolated" waters of the State (Water Quality Order No. 2004-0004-DWQ, Statewide General Waste Discharge Requirements for Dredged or Fill Discharges to Waters Deemed by the USACE to be Outside of Federal Jurisdiction). The local RWQCB enforces actions under this general order.

The Porter-Cologne Water Quality Control Act provides the State with very broad authority to regulate "waters of the State" (which are defined as any surface water or groundwater, including saline waters). The Porter-Cologne Water Quality Control Act has become an important tool in the post-SWANCC and Rapanos era with respect to the State's authority over isolated waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a "Report of Waste Discharge" (ROWD) when there is no federal nexus, such as under Section 404(b)(1) of the CWA. Although "waste" is partially defined as any waste substance associated with human habitation, the RWQCB interprets this to include fill discharge into water bodies.

It should be noted that the RWQCB typically shares USACE jurisdiction unless isolated conditions are present. If isolated waters conditions are present, the RWQCB typically takes jurisdiction using the USACE's OHWM and/or wetlands methodologies.

CDFW JURISDICTION

In addition to being responsible for the maintenance and protection of California's fish and wildlife, the California Department of Fish and Wildlife (CDFW) has authorities under California's Public Resources Code, and the federal Fish and Wildlife Coordination Act to regulate or comment on activities in wetland and riparian areas. The CDFW also assumes primary responsibility for implementation of the California State Endangered Species Act, and the Streambed Alteration Agreement (Fish and Game Code Sections 1601–1603).

In conjunction with adopting a wetlands policy on March 9, 1987 the California Fish and Game Commission assigned the CDFW the task of recommending a wetlands definition. The CDFW found the USFWS wetland definition and classification system to be the most biologically valid. The CDFW staff use this definition as a guide in identifying wetlands while conducting on-site inspections for the implementation of its Commission's wetlands policy. This definition states the following:

> "Wetlands are lands transitional between terrestrial and an aquatic system where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports hydrophytes, (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year."

The USFWS definition includes, swamps; freshwater, brackish water, and saltwater marshes; bogs; vernal pools, periodically inundated saltflats; intertidal mudflats; wet meadows; wet pastures; springs and seeps; portions of lakes, ponds, rivers and streams; and all other areas which are periodically or permanently covered by shallow water, or dominated by hydrophytic vegetation, or in which the soils are predominantly hydric in nature.

Water features that are regulated by CDFW include those defined by USFWS as well as man-made watercourses with or without wetlands, if they contain a definable bed and bank and support a fish or wildlife resource. The CDFW's jurisdiction is defined as the top of the bank to the top of the bank of the stream, channel, or basin or to the outer limit of riparian vegetation located within or immediately adjacent to the river, stream, creek, pond, or lake or other impoundment, whichever is greater.

CCC JURISDICTION

The California Coastal Commission (CCC), with the assistance of CDFW is responsible for determining the presence of wetlands subject to regulation under the California Coastal Act. As the primary wetland consultant to the CCC, the CDFW essentially relies on the USFWS wetland definition and classification system, with some minor changes in classification terminology, as the methodology for wetland determinations. A major difference is that the CDFW and the CCC require the presence of only one wetland parameter (e.g., hydrology, hydric soils, or hydrophytic vegetation) for an area to qualify as a wetland. Section 30121 of the California Coastal Act (1976), the statute governing the CCC, broadly defines wetlands as:

> "Lands within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, or fens."

However, the CCC Administrative Regulations (Section 13577 (b)) provides a more explicit definition:

> "Wetlands are lands where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils or to support the growth of hydrophytes, and shall also include those types of wetlands where vegetation is lacking and soil is poorly developed or absent as a result of frequent or drastic fluctuations of surface water levels, wave action, water flow, turbidity or high concentrations of salt or other substance in the substrate. Such wetlands can be recognized by the presence of surface water or saturated substrate at some time during each year and their location within, or adjacent to, vegetated wetlands or deepwater habitats."

Further, although a data point is considered to be within a USACE jurisdictional wetland if the area meets all three wetland parameters, the CCC generally requires the presence of only one wetland parameter for an area to qualify as a wetland. However, by definition, facultative (FAC) species are equally like to occur in wetlands or non-wetlands. Therefore, in isolated stands where FAC species are observed without associated facultative wetland (FACW) or obligate wetland (OBL) species, or without connectivity to hydric soils or wetland hydrology, hydrophytic vegetation for the purposes of CCC wetland delineation is assumed to be absent.

Appendix C

Site Photographs

Photo 1. Unnamed drainage facing northeast.

Photo 2. Culvert in unnamed drainage facing south.

Photo 3. Project site adjacent to Hilltop Drive facing south.

Photo 4. Project site facing west.

Photo 5. Project site facing southwest.

Photo 6. Project site facing east.

Appendix D

Routine Wetland Delineation Data Form

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Hilltop and Euclid City/County: San Diego/San Diego Sampling Date: 7/13/16

Applicant/Owner: Civic San Diego State: CA Sampling Point: 1

Investigator(s): Chris Julian and Jennifer Kendrick, Rincon Section, Township, Range: N/A (Mission San Diego Land Grant)----------

Landform (hillslope, terrace, etc.): Channel bottom Local relief (concave, convex, none): Concave Slope (%): ~1%

Subregion (LRR): Mediterranean California-C Lat: 32°42'58.88"N Long: -117° 5'10.73"W Datum: NAD83

Soil Map Unit Name: Huerhuero-Urban land complex, 2 to 9 percent slopes NWI classification: Freshwater Emergent (PEM1Ax)

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation **N**, Soil **Y**, or Hydrology **N** significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation **N**, Soil **N**, or Hydrology **N** naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☐	No ☒	
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks: The project site contains relatively flat areas on the eastern and western sides, with a broad valley transecting the center of the site. The valley area contains a single drainage channel that is small (OWHM 2-5 feet in most areas) and clearly defined, showing signs of regular scouring flows (no vegetation in channel bottom). Adjacent to the channel vegetation is dense and mostly herbaceous, with a mix of hydrophytic and non-hydrophytic species. The site has been previously developed, and the channel substrate includes imported debris/fill including rock, concrete, asphalt, and some trash. No water was present during the assessment. The wetland data point was situated in the portion of the site believed most likely to exhibit wetland characteristics, based on evident topography and vegetation.

VEGETATION – Use Scientific Names

Tree Stratum (Plot Size 30ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Eucalyptus camaldulensis	5	Y	FAC
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum (Plot Size 20ft radius)			
1. Ricinus communis	5	Y	FACU
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum (Plot Size 10ft radius)			
1. Echinochloa crus-galli	40	Y	FACW
2. Cynodon dactylon	30	Y	FACU
3. Festuca perennis	10	N	FAC
4. Cyperus eragrostis	7	N	FACW
5. Oenothera elata	5	N	FACW
6. Bromus diandrus	2	N	UPL
7. Rumex crispus	1	N	FAC
8. Others (see remarks)	~5%	N	
Total Cover:	100%		
Woody Vine Stratum (Plot Size N/A)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: In addition to those listed above, herbs present included *Pennisetum setaceum*, *Anemopsis californica*, *Hordeum brachyantherum*, and two unidentified annual plants, all with cover of less than 1 percent. None of these species were dominant.

The plot location is heavily vegetated with herbaceous vegetation, primarily grasses. Dense cover of *Echinochloa crus-galli*, *Cynodon dactylon*, and *Festuca perennis* completely obscures the ground surface, and other species are present in limited extent protruding through this cover. Tree and shrub cover is minimal. Woody vines are absent.

SOIL

Sampling Point:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	THATCH	100	N/A					Several inches of dead annual plants/roots
4-6 (Approx.)	IMPORTED FILL	100	N/A					Rocks, brick, asphalt, some glass and trash
6-18	10YR 2/2	100	N/A	0			Loamy Sand	High root content throughout

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: N/A

Depth (inches): N/A

Hydric Soil Present? Yes ☐ No ☒

Remarks: No hydric soil indicators were observed. Below the layer of imported fill, soil was sandy loam and disarticulated when removed from pit. Photography of soil profile was not possible due to dense overlying vegetation and confined channel. It is possible that the soils may have been disturbed or imported, as the site shows signs of significant disturbance overall. Due to the presence of historic fill the soils are considered to be significantly disturbed; however, the fill is not recent and the current conditions represent normal circumstances.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial photos indicate presence of a stream channel based on vegetation and limited visible scour. Gage data or other evidence of flow frequency or duration are not available.

Remarks: Aside from drainage patterns associated with the primary channel, no hydrology indicators were observed. The channel was dry at the time of assessment, and no saturation, inundation, or other moisture was evident in the pit.

Transportation Impact Analysis

Hilltop + Euclid

Final Report

September 12, 2018

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Executive Summary

ES.1 Study Purpose and Project Description

The purpose of this Transportation Impact Analysis (TIA) is to identify and document potential transportation impacts associated with the development of the Hilltop + Euclid affordable housing development (Proposed Project), as well as to recommend mitigation measures, as necessary.

The Proposed Project will construct 47 single family dwelling units (DU), 113 multifamily DU, and 8,485 square feet (SF) of commercial retail. The Proposed Project is located at the northwest corner of Hilltop Drive and Euclid Avenue, in the Encanto community of the City of San Diego and requires a Site Development Permit and a Vesting Tentative Map. The Proposed Project includes the following project features:

- Construction of the extension of Hilltop Drive from the existing eastern terminus point approximately 200 feet west of Euclid Avenue to Euclid Avenue. This improvement will convert the signalized intersection of Hilltop Drive/Euclid Avenue to a four-legged intersection with one eastbound left/through/right shared lane.

- Construction of a raised center median along Euclid Avenue, between SR-94 EB Ramps and Hilltop Drive, and install a southbound buffered bike lane by dedicating and widening Euclid Avenue along the site's frontage with adequate signage and re-striping.

The Proposed Project will provide access via three driveways, one on Euclid Avenue (280 ft north of Hilltop Drive) and two on Hilltop Drive. The Proposed Project also includes the extension of Hilltop Drive from its current eastern terminus point approximately 200 feet west of Euclid Avenue to Euclid Avenue. A discussion of each driveway is provided below:

- Project Driveway #1, proposed to be located on Euclid Avenue approximately 280 feet north of the Euclid Avenue / Hilltop Drive intersection. This driveway would be constructed as a right-in / right-out only via the project's installation of a raised median on Euclid Avenue. This driveway will provide access to the multifamily and commercial portion of the Proposed Project site.

- Proposed Driveway #2 is proposed to be located off of Hilltop Drive, approximately 500 feet west of the Euclid Avenue / Hilltop Drive intersection and will form the fourth leg of the intersection of Hilltop Drive / Hal Street. This driveway will provide access to the single-family portion of the Proposed Project site.

  Proposed Driveway #3 is proposed to be located off of Hilltop Drive, approximately 160 feet west of the Euclid Avenue / Hilltop Drive intersection. This driveway will provide access to the multifamily and commercial portion of the Proposed Project site.

All driveways are projected to operate at an acceptable LOS under all analysis scenarios.

Intersection geometrics under the Plus Project scenario are provided in Figure 5-1. A signal modification plus striping and signage plan is required for the intersection of Euclid Avenue/Hilltop Drive, as well as the adjacent roadway segments of Euclid Avenue, and Hilltop Drive.

ES.2 Project Trip Generation, Distribution and Study Methodology

The trip generation rate for the Proposed Project was calculated utilizing the City of San Diego's *Trip Generation Manual* (2003). The Proposed Project is projected to generate 2,040 daily trips with 166 (60-in:106-out) trips during the AM peak hour and 180 (117-in:63-out) trips during the PM peak hour. Since the Proposed Project is located approximately 0.3 miles from the Euclid Trolley Station and includes a mix of land uses, transit and mixed-use trip reductions for trips associated with single family and multifamily dwelling units were applied, as per Table 3 and Table 4 of the City of San Diego's *Traffic Impact Study Manual* (1998). Trip Generation discussions are provided in Section 3.0.

This traffic analysis was performed in accordance with City of San Diego's *Traffic Impact Study Manual* (1998) (TIS Manual). The City of San Diego guidelines require that the defined study area include roadway segments, and intersections where the Proposed Project would add 50 or more peak hour trips in either direction, any metered freeway ramps where the project would add 20 or more peak hour trips, as well as all freeway segments where the Proposed Project would add 150 or more peak hour trips.

The following fourteen (14) key study area roadway segments were analyzed in this study:

1. 47th Street between SR-94 EB Ramps and Hilltop Drive
2. 47th Street between Hilltop Drive and Market Street
3. Euclid Avenue between Federal Boulevard and SR-94 WB Ramps
4. Euclid Avenue between SR-94 WB Ramps and SR-94 EB Ramps
5. Euclid Avenue between SR-94 EB Ramps and Proposed Driveway #1
6. Euclid Avenue between Proposed Driveway #1 and Hilltop Drive
7. Euclid Avenue between Hilltop Drive and Market Street
8. Euclid Avenue between Market Street and Naranja Street
9. Hilltop Drive between 47th Street and Proposed Driveway #2
10. Hilltop Drive between Proposed Driveway #2 and Proposed Driveway #3
11. Hilltop Drive between Proposed Driveway #3 and Euclid Avenue
12. Market Street between Cotton Street and 47th Street
13. Market Street between 47th Street and Euclid Avenue
14. Market Street between Euclid Avenue and 60th Street

The following eight (8) key study area intersections were analyzed in the study:

1. 47th Street & Hilltop Drive (Signal);
2. Euclid Avenue & SR-94 WB Ramps (Side Street Stop Control);
3. Euclid Avenue & SR-94 EB Ramps (Side Street Stop Control);
4. Euclid Avenue & Hilltop Drive (Signal);
5. Euclid Avenue & Market Street (Signal);
6. Euclid Avenue & Project Driveway #1 (Side Street Stop Control);
7. Project Driveway #2 & Hilltop Avenue (Side Street Stop Control);
8. Project Driveway #3 & Hilltop Avenue (Side Street Stop Control).

It should be noted, the Proposed Project would not contribute enough traffic (150 peak hour trips) to any state facilities, which would require analysis of State Route 94 (SR-94) or any other freeway or State Highway.

ES.3 Project Impacts and Mitigation Measures

Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would cause the following significant impacts:

Significant Direct Impact - Existing Plus Project

Roadway Segments:
Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would have a significant impact on Market Street, between Euclid Avenue and 54th Street. However, the roadway is already constructed to its ultimate classification per the Encanto Community Plan FEIR, and the Encanto Community Plan FEIR found it to be a significant and unmitigated impact. Thus, no additional mitigation would be required. Refer to Roadway Segment Analysis in Section 5.3.

Intersections:
- Euclid Avenue & SR-94 WB Ramps – LOS F during both the AM and PM peak hours; and
- Euclid Avenue & SR-94 EB Ramps – LOS E during AM peak hour and LOS F during PM peak hour.

Ramp Metering:
No significant impact.

Significant Direct Impact - Near-Term Plus Project (Opening Day 2020)

Roadways:
Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would have a significant impact on Market Street, between Euclid Avenue and 54th Street. However, the roadway is already constructed to its ultimate classification per the Encanto Community Plan FEIR, and the Encanto Community Plan FEIR found it to be a significant and unmitigated impact. Thus, no additional mitigation would be required. Refer to Roadway Segment Analysis in Section 6.5.

Intersections**:**
No significant impact.
The SR-94 Interchange project is (City CIP #S-14009) is assumed to be fully implemented under this scenario.

Ramp Metering:
No significant impact.

Significant Cumulative Impact - Horizon Year 2035 Plus Project

Roadway Segments:
Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would have a significant impact on Market Street, between Euclid Avenue and 54th Street. However, the roadway is already constructed to its ultimate classification per the Encanto Community Plan FEIR, and the Encanto Community Plan FEIR found it to be a significant and unmitigated impact. Thus, no additional mitigation would be required. Refer to section 7.3.

Intersections:
No significant impact.

The SR-94 Interchange project (City CIP #S-14009) is assumed to be fully implemented under this scenario.

Ramp Metering:
No significant impact.

Mitigation Measures

The following mitigation measures would be required to mitigate the Proposed Project impacts.

Mitigation Measures - Existing Plus Project

Roadway Segments:
Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would have a significant impact on Market Street, between Euclid Avenue and 54th Street. However, the roadway is already constructed to its ultimate classification per the Encanto Community Plan FEIR, and the Encanto Community Plan FEIR found it to be a significant and unmitigated impact. Thus, no additional mitigation would be required.

Intersections:

- *Euclid Avenue & SR-94 WB Ramps*
  - Signalize this intersection
  - Convert the existing westbound free right-turn lane into a permissive right-turn lane
  - Convert the existing northbound free right turn lane into a permissive right-turn lane

- *Euclid Avenue & SR-94 EB Ramps*
  - Signalize this intersection
  - Remove the existing eastbound free right-turn lane
  - Convert the existing westbound free right-turn lane into a westbound permissive left-turn lane
  - Construct a dual westbound left-turn lane

The mitigation measures provided above are consistent with those proposed by the SR-94 Interchange project. The SR-94 Interchange project is fully funded and is currently under construction. Construction for the SR-94 interchange project began May 2018 and is expected to be completed by June 2019. Since completion of the SR-94 project would address the above impacts by improving all locations to LOS D or better, no additional mitigation would be required of the project. Information regarding the SR-94 Interchange Project is provided in **Appendix A**.

Ramp Metering:

No significant impacts were identified, therefore no mitigation measure required.

Significant Direct Impact - Near-Term Plus Project (Opening Day - Late 2020)

Roadways:

Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would have a significant impact on Market Street, between Euclid Avenue and 54th Street. However, the roadway is already constructed to its ultimate classification per the Encanto Community Plan FEIR, and the Encanto Community Plan FEIR found it to be a significant and unmitigated impact. Thus, no additional mitigation would be required.

Intersections**:**

No significant impacts were identified, therefore no mitigation measure required.

Ramp Metering:

No significant impacts were identified, therefore no mitigation measure required.

Significant Cumulative Impact - Horizon Year 2035 Plus Project

Roadway Segments:

Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would have a significant impact on Market Street, between Euclid Avenue and 54th Street. However, the roadway is already constructed to its ultimate classification per the Encanto Community Plan FEIR, and the Encanto Community Plan FEIR found it to be a significant and unmitigated impact. Thus, no additional mitigation would be required.

Intersections:

No significant impacts were identified; therefore, no mitigation measure required.

Ramp Metering:

No significant impacts were identified; therefore, no mitigation measure required.

1.0 Introduction

1.1 Purpose of the Report

The purpose of this Transportation Impact Study (TIS) is to identify and document potential transportation impacts associated with the development of the Hilltop + Euclid affordable housing development (Proposed Project), as well as to recommend mitigation measures, as necessary, for any identified transportation impacts of the Proposed Project.

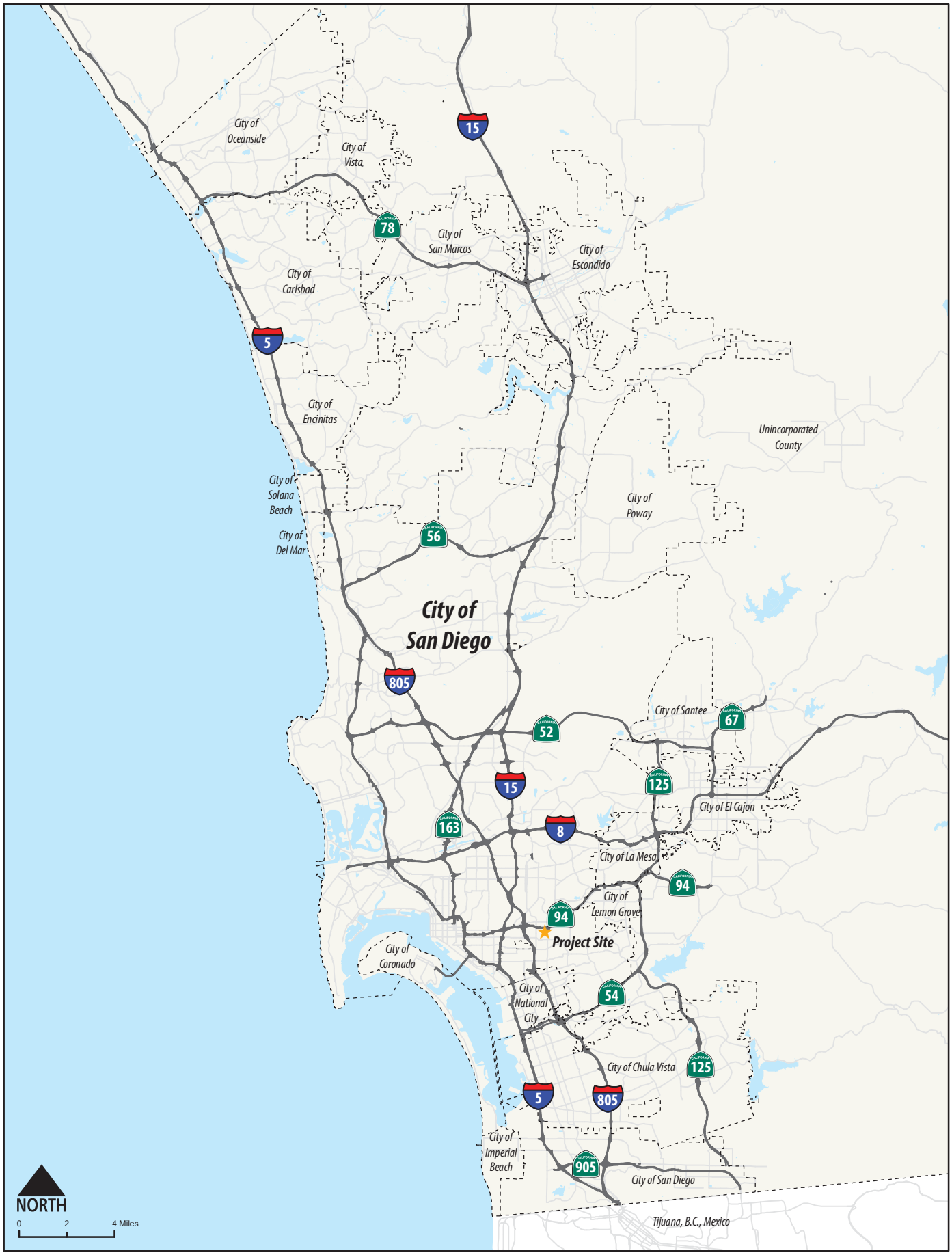
1.2 Study Area and Project Background

The Proposed Project will construct 47 single family dwelling units (DU), 113 multifamily DU, and 8,485 SF of retail commercial. The Proposed Project is located at the northwest corner of Hilltop Drive and Euclid Avenue within the Encanto Community of the City of San Diego. The Proposed Project also includes the extension of Hilltop Drive from the existing eastern terminus approximately 200 feet west of Euclid Avenue to Euclid Avenue, converting the signalized intersection of Euclid Avenue/Hilltop Drive to a four-legged intersection with one eastbound left/ through/right shared lane.

Figure 1-1 displays the project's regional location and **Figure 1-2** illustrates the project study area.

Six (6) scenarios were analyzed in this study, including:

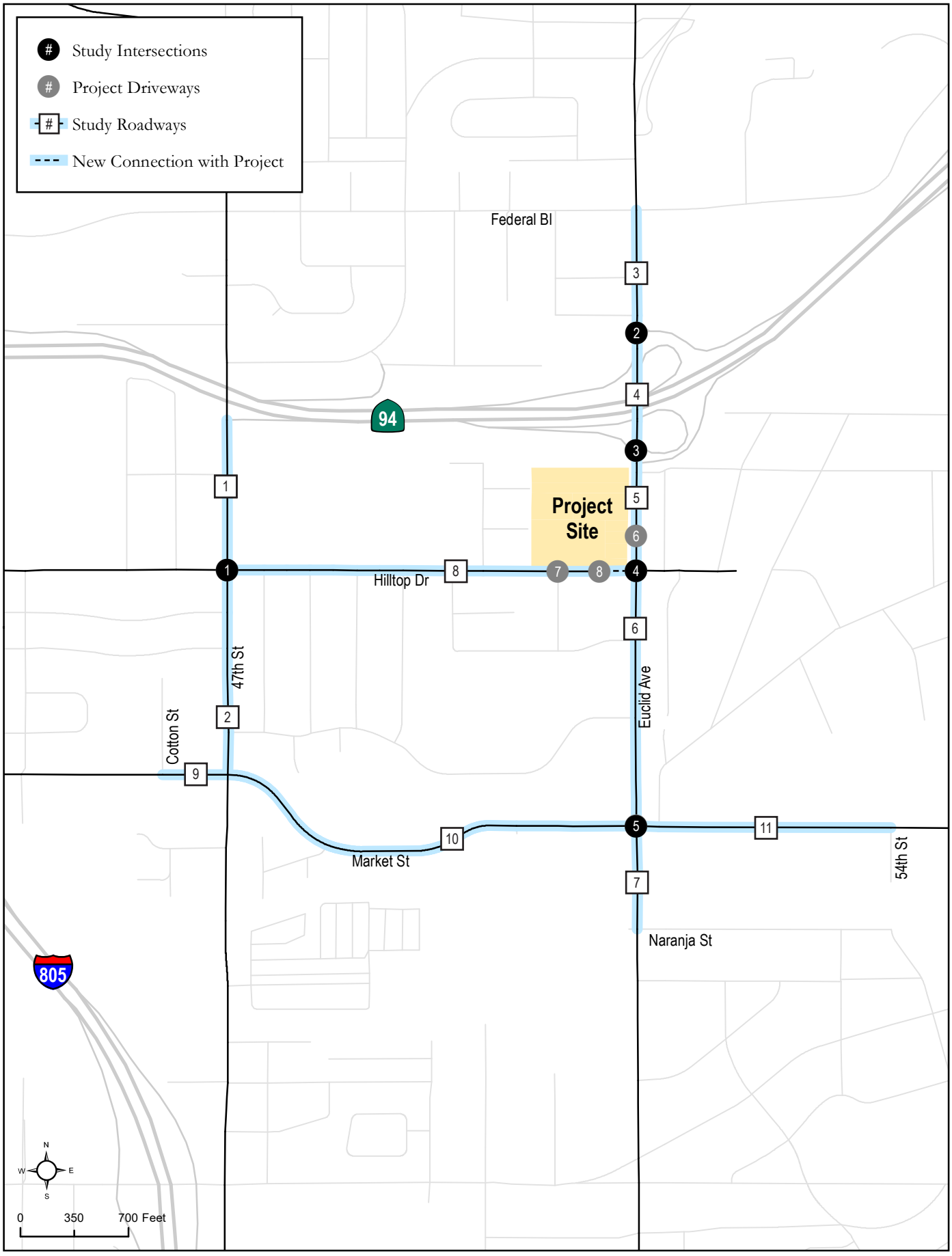
- *Existing Conditions* – utilized to establish the existing baseline traffic operations within the study area.
- *Existing Plus Project Conditions* – represents existing traffic conditions with the addition of the traffic from the Proposed Project.
- *Near-Term Year 2020 Base Conditions* – establishes a near-term baseline against which traffic generated by the Proposed Project can be compared. The Year 2020 represents the Proposed Project's opening day.
- *Near-Term Year 2020 Base Plus Project Conditions* – represents 2020 baseline traffic conditions with the addition of traffic generated by the Proposed Project.
- *Horizon Year 2035 Base Conditions* – represents projected long-range baseline traffic conditions for the Year 2035. Volumes for Year 2035 Base conditions were obtained from the Encanto Community Plan EIR, November 2015, SCH No. 2014051075.
- *Horizon Year 2035 Base Plus Project Conditions* – represents Year 2035 base traffic conditions with the addition of traffic generated by the Proposed Project.



Hilltop + Euclid TIA

Figure 1-1
Project Regional Location

CHEN RYAN



Hilltop + Euclid TIA

Figure 1-2
Project Study Area

CHEN RYAN

This traffic analysis was performed in accordance with City of San Diego's *Traffic Impact Study Manual* (1998) (TIS Manual). The City of San Diego guidelines require that the defined study area include roadway segments, and intersections where the Proposed Project would add 50 or more peak hour trips in either direction, any metered freeway ramps where the project would add 20 or more peak hour trips, as well as all freeway segments where the Proposed Project would add 150 or more peak hour trips.

The Proposed Project will not contribute more than 150 peak hour trips to State Route 94 (SR-94); therefore, mainline freeway segment impact analyses were not conducted. Mitigation measures and required site access improvements to maintain acceptable transportation operations were also documented as part of this analysis. The roadway segment analyses included herein are based upon the Level of Service (LOS) criteria outlined in the City's TIS Manual. The City's LOS standards are included in Chapter 2.0.

1.3 Report Organization

Following this introductory chapter, the report is organized into the following chapters:

2.0 *Analysis Methodology* – This chapter describes the methodologies and standards utilized to analyze roadway and intersection traffic conditions.

3.0 *Project Description* – This chapter describes the Proposed Project including project traffic generation, trip distribution patterns, and project trip assignments.

4.0 *Existing Conditions* – This chapter describes the existing transportation network within the study area and provides analysis results for existing traffic conditions.

5.0 *Existing Plus Project Conditions* – This chapter describes the existing traffic network with the addition of the Proposed Project. Mitigation measures, if necessary, for project-related impacts are also identified.

6.0 *Near-Term Year 2020 Traffic Conditions* – This chapter describes near-term developments anticipated to generate additional study area trips by Year 2020, the Proposed Project's opening year. Analysis results are provided for the Year 2020 Base and Year 2020 Base Plus Project conditions, along with recommended mitigation measures (if necessary).

7.0 *Horizon Year 2035 Cumulative Traffic Conditions* – This chapter describes projected long-range future cumulative traffic conditions. Traffic analysis results are presented for the Year 2035 Base and Year 2035 Base Plus Project conditions. Mitigation measures for project-related impacts are identified for Horizon Year 2035 Base Plus Project Conditions, as appropriate.

8.0 *Site Access and Parking* – This chapter addresses access to the project site based on the proposed site plan as well as parking requirement for the Proposed Project.

9.0 *Active Transportation and Transportation Demand Management* – This chapter focuses on pedestrian, bicycle, and transit access to and from the project.

10.0 *47th Street Reconfiguration* – This chapter focuses on 47th Street and analyzes its future configuration as identified in the Encanto Community Plan.

2.0 Analysis Methodology

This TIS was performed in accordance with the requirements of the City of San Diego's *Traffic Impact Study Manual* (1998) and the City of San Diego's *Significance Determination Thresholds* (2011). Detailed information on roadway segment and intersection analysis methodologies, standards, and thresholds are discussed in the following sections.

2.1 LOS Definition

LOS is a quantitative measure describing operational conditions within a traffic stream, and the motorist's and/or passengers' perception of operations. A LOS definition generally describes these conditions in terms of such factors as delay, speed, travel time, freedom to maneuver, interruptions in traffic flow, queuing, comfort, and convenience. **Table 2.1** describes generalized definitions of the various LOS categories (A through F) as applied to roadway operations.

Table 2.1 LOS Definitions

LOS Category	Definition of Operation
A	This LOS represents a completely free-flow condition, where the operation of vehicles is virtually unaffected by the presence of other vehicles and only constrained by the geometric features of the highway and by driver preferences.
B	This LOS represents a relatively free-flow condition, although the presence of other vehicles becomes noticeable. Average travel speeds are the same as in LOS A, but drivers have slightly less freedom to maneuver.
C	At this LOS the influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream is clearly affected by other vehicles.
D	At this LOS, the ability to maneuver is notably restricted due to traffic congestion, and only minor disruptions can be absorbed without extensive queues forming and the service deteriorating.
E	This LOS represents operations at or near capacity. LOS E is an unstable level, with vehicles operating with minimum spacing for maintaining uniform flow. At LOS E, disruptions cannot be dissipated readily thus causing deterioration down to LOS F.
F	At this LOS, forced or breakdown of traffic flow occurs, although operations appear to be at capacity, queues form behind these breakdowns. Operations within queues are highly unstable, with vehicles experiencing brief periods of movement followed by stoppages.

Source: Highway Capacity Manual 2010

2.2 Roadway Segment LOS Standards and Thresholds

Roadway segment LOS standards and thresholds provide the basis for analysis of arterial roadway segment performance. The analysis of roadway segment LOS is based on the functional classification of the roadway, the maximum capacity, roadway geometrics, and existing or forecast Average Daily Traffic (ADT) volumes. **Table 2.2** presents the roadway segment capacity and LOS standards utilized to analyze roadways evaluated in this report.

Table 2.2 City of San Diego - Roadway Classifications and LOS Standards

Roadway Classification	LOS A	LOS B	LOS C	LOS D	LOS E
Expressway (6-lane)	< 30,000	< 42,000	< 60,000	< 70,000	< 80,000
Prime Arterial (6-lane)	< 25,000	< 35,000	< 50,000	< 55,000	< 60,000
Major Arterial (6-lane, divided)	< 20,000	< 28,000	< 40,000	< 45,000	< 50,000
Major Arterial (4-lane, divided)	< 15,000	< 21,000	< 30,000	< 35,000	< 40,000
Collector (5-lane w/ center lane)	< 12,500	< 17,500	< 25,000	< 31,250	< 37,500
Collector (4-lane w/ center lane)	< 10,000	< 14,000	< 20,000	< 25,000	< 30,000
Collector (4-lane w/o center lane)	< 5,000	< 7,000	< 10,000	< 13,000	< 15,000
Collector (2-lane w/ center lane)	< 5,000	< 7,000	< 10,000	< 13,000	< 15,000
Collector (2-lane no fronting property)	< 4,000	< 5,500	< 7,500	< 9,000	< 10,000
Collector (2-lane w/commercial fronting)	< 2,500	< 3,500	< 5,000	< 6,500	< 8,000
Collector (2-lane multi-family)	< 2,500	< 3,500	< 5,000	< 6,500	< 8,000
Sub-Collector (2-lane single-family)	-	-	< 2,200	-	-

City of San Diego Traffic Impact Study Manual (1998)

Note:
The Collector (5-lane, w/ center lane) roadway classification is not a City of San Diego Standard and was estimated by taking the midpoint Level of Service Capacity Thresholds of a 4-lane Collector (w/ center lane) and a 4-lane Major Arterial.

These standards are generally used as planning guidelines to determine the functional classification of roadways. The actual capacity of a roadway facility varies according to its physical attributes. Typically, the performance and LOS of a roadway segment is heavily influenced by the ability of its intersections to accommodate peak hour traffic volumes. For the purposes of this traffic analysis, LOS D is considered acceptable for circulation element roadway segments.

2.3 Peak Hour Intersection LOS Standards and Thresholds

This section presents the methodologies used to perform peak hour intersection capacity analysis, including both signalized and unsignalized intersections. The following assumptions were utilized in conducting all intersection level of service analyses:

- *Pedestrian Calls per Hour:* 10 calls per hour for each pedestrian movement was assumed.
- *Heavy Vehicle Factor:* A 2% heavy vehicle factor was assumed for all intersections within the study area.
- *Signal Timing:* Based on existing signal timing plans (as of October 2016), provided in **Appendix B**
- *Peak Hour Factor*: Based on existing peak hour count data for existing and near-term conditions. A peak hour factor of 0.92 was assumed for the horizon year scenarios, consistent with the Encanto Community Plan EIR, November 2015, SCH No. 2014051075.

Signalized Intersection Analysis

The analysis of signalized intersections utilized the operational analysis procedures as outlined in the *2010 Highway Capacity Manual (HCM)*. This method defines LOS in terms of delay, or more specifically, average stopped delay per vehicle. Delay is a measure of driver and/or passenger discomfort, frustration, fuel consumption and lost travel time. This technique uses 1,900 vehicles per hour per lane (VPHPL) as the maximum saturation volume of an intersection. This saturation volume is adjusted to account for lane width, on-street parking, pedestrians, traffic composition (i.e., percentage trucks) and shared lane movements (i.e. through and right-turn movements originating from the same lane). The LOS criteria used for this technique are described in **Table 2.3**. The computerized analysis of intersection operations was performed utilizing the *SYNCHRO 9.0* traffic analysis software.

Table 2.3 Signalized Intersection LOS Criteria

Average Stopped Delay Per Vehicle (seconds)	Level of Service (LOS) Characteristics
<10.0	*LOS A* describes operations with very low delay. This occurs when progression is extremely favorable, and most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
10.1 – 20.0	*LOS B* describes operations with generally good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
20.1 – 35.0	*LOS C* describes operations with higher delays, which may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
35.1 – 55.0	*LOS D* describes operations with high delay, resulting from some combination of unfavorable progression, long cycle lengths, or high volumes. The influence of congestion becomes more noticeable, and individual cycle failures are noticeable.
55.1 – 80.0	*LOS E* is considered the limit of acceptable delay. Individual cycle failures are frequent occurrences.
>80.0	*LOS F* describes a condition of excessively high delay, considered unacceptable to most drivers. This condition often occurs when arrival flow rates exceed the LOS D capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay.

Source: Highway Capacity Manual 2010, TRB Special Report 209

Unsignalized Intersection Analysis

Unsignalized intersections, including side-street and all-way stop controlled intersections, were analyzed using the 2010 Highway Capacity Manual (Chapter 19 & Chapter 20) unsignalized intersection analysis methodology. The *SYNCHRO 9.0* Traffic Analysis software supports this methodology and was utilized to produce LOS results. The LOS for Side Street Stop Controlled (SSSC) intersection is determined by the computed control delay and is defined for each minor movement. **Table 2.4** summarizes the LOS criteria for unsignalized intersections. The City of San Diego considers LOS D or better during the AM and PM peak hours to be acceptable for intersection LOS.

Table 2.4 Unsignalized Intersection LOS Criteria

Average Control Delay (sec/veh)	Level of Service (LOS)
≤10	A
>10 and ≤15	B
>15 and ≤25	C
>25 and ≤35	D
>35 and ≤50	E
>50	F

Source: Highway Capacity Manual 2010

2.4 Ramp Metering Analysis

Ramp metering analysis was conducted to calculate delays and queues at the study area freeway on-ramps. The demand per hour per lane was calculated using the following equation:

$$D_{vol} = \frac{(P_{vol} - H_{vol})}{N}$$

- D_{vol} (Demand Volume per hour per Lane): total peak hour demand expected to use the on-ramp (non-HOV lane only);
- P_{vol} (Peak Hour Ramp Volume): sum of all peak hour volumes using the on-ramp;
- H_{vol} (HOV lane volume): based on data obtained from Caltrans; and
- N: number of non-HOV lanes at the on-ramp.

Ramp Metering Rate and field observation are provided in **Appendix A**.

2.5 Determination of Significant Impacts

The City of San Diego's *Significance Determination Thresholds* defines project impact thresholds by facility type. These thresholds are generally based upon an acceptable increase in the Volume / Capacity (V/C) ratio for roadway and freeway segments, and upon increases in vehicle delays for intersections and ramps.

In the City of San Diego, LOS D is considered acceptable for roadway and intersection operations. A project is considered to have a significant impact if it degrades the operations of a roadway or intersection from an acceptable LOS (D or better) to an unacceptable LOS (E or F), or if it adds additional delay to a facility already operating an unacceptable level.

Roadway segments are analyzed on an average daily trip basis by calculating the percent increase in volume to capacity (V/C) with the addition of project traffic. If project impacts are projected to result in an increase in V/C greater than 0.02 for a segment operating at LOS E without the project, or greater than 0.01 for a segment operating at LOS F without the project, the intersection at each end of the segment operates at acceptable level of service, and the segment is built to its ultimate classification, an alternative analysis can be provided to assess segment impacts under CEQA.

The analysis would determine whether a peak hour Highway Capacity Manual (HCM) arterial analysis for the same segment shows that the segment operates at an acceptable LOS with the project. If both intersections at the end of the segment operate acceptably, the segment is constructed to its ultimate community plan classification, and the peak hour HCM arterial analysis for the same segment shows the segment operates acceptably then the project impacts are determined to be less than significant and no mitigation is required.

Table 2.5 summarizes the impact significance thresholds as identified by the City of San Diego beyond which mitigation measures are required.

Table 2.5 Measure of Significant Project Traffic Impacts

Level of Service (LOS) with Project*	Allowable Change Due to Impact**					
	Freeways		Roadway Segments		Intersections	Ramp Metering
	V/C	Speed (mph)	V/C	Speed (mph)	Delay (sec)	Delay (min.)
LOS E (or ramp meter delays > 15 min.)	0.010	1.0	0.02	1.0	2.0	2.0
LOS F (or ramp meter delays > 15 min.)	0.005	0.5	0.01	0.5	1.0	2.0

Source: City of San Diego, Significance Determination Thresholds (January 2011)

Note 1: The allowable increase in delay at a ramp meter with more than 15 minutes of delay and freeway LOS E is 2 minutes.
Note 2: The allowable increase in delay at a ramp meter with more than 15 minutes of delay and freeway LOS F is 1 minute.

* All level of service (LOS) measurements are based upon HCM procedures for peak-hour conditions. However, vehicle to capacity (V/C) ratios for roadway segments may be estimated on an ADT/24-hour traffic volume basis (using Table 2.1 or a similar LOS chart for each jurisdiction). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped or not densely developed locations per jurisdiction definitions). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.

** If a Proposed Project's traffic causes the values shown in the table to be exceeded, the impacts are determined to be significant. These impact changes may be measured from appropriate computer programs or expanded manual spreadsheets. The project applicant shall then identify feasible mitigation (within the Traffic Impact Study report) that will maintain the traffic facility at an acceptable LOS. If the LOS with the Proposed Project becomes unacceptable (see above * note), or if the project adds a significant amount of peak-hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating significant impact changes.

3.0 Proposed Project

This section describes the Proposed Project, including land uses and estimated trip generation, trip distribution, and trip assignment.

3.1 Project Description

The Proposed Project will construct 47 single family dwelling units (DU), 113 multifamily DU, and 8,485 square feet (SF) of commercial retail. The Proposed Project is located at the northwest corner of Hilltop Drive and Euclid Avenue, in the Encanto community of the City of San Diego and requires SDP and VTM. The Proposed Project also includes an extension of Hilltop Drive, from its existing eastern terminus point approximately 200 feet west of Euclid Avenue to Euclid Avenue. This improvement will convert the signalized intersection of Hilltop Drive/Euclid Avenue to a four-legged signalized "T" intersection with one eastbound left/through/right shared lane. This improvement is consistent with the Encanto Community Plan (November, 2015).

The Proposed Project will also construct a raised center median along its frontage on Euclid Avenue, between SR-94 EB Ramps and Hilltop Drive, as a project feature.

The Proposed Project will provide access via three driveways, one on Euclid Avenue (280 ft north of Hilltop Drive) and two on Hilltop Drive. A discussion of each driveway is provided below:

- Project Driveway #1, proposed to be located on Euclid Avenue approximately 280 feet north of the Euclid Avenue / Hilltop Drive intersection. This driveway would be constructed as a right-in / right-out only via the project's installation of a raised median on Euclid Avenue. This driveway will provide access to the multifamily and commercial portion of the Proposed Project site.

- Proposed Driveway #2 is proposed to be located off of Hilltop Drive, approximately 500 feet west of the Euclid Avenue / Hilltop Drive intersection and will form the fourth leg of the intersection of Hilltop Drive / Hal Street. This driveway will provide access to the single-family portion of the Proposed Project site.

- Proposed Driveway #3 is proposed to be located off of Hilltop Drive, approximately 160 feet west of the Euclid Avenue / Hilltop Drive intersection. This driveway will provide access to the multifamily and commercial portion of the Proposed Project site.

A signal modification plus striping and signage plan is required for the intersection of Euclid Avenue/Hilltop Drive, Euclid Avenue, and Hilltop Drive.

Figure 3-1 illustrates the Proposed Project site plan. **Figure 3-2a** displays the proposed raised median and conceptual design along Euclid Avenue, and **Figure 3-2b** displays the proposed design of Hilltop Drive

3.2 Project Trip Generation Rate, Trip Generation, Distribution, and Assignment

Project Trip Generation

Trip generation rates for the Proposed Project were derived from the City of San Diego's *Trip Generation Manual* (2003). **Table 3.1** displays the daily project trip generation, as well as the AM and PM peak hour project trip generation.

Table 3.1 Proposed Project Trip Generation

Land Use	Units	Trip Rate	ADT	AM Peak Hour					PM Peak Hour				
				%	Trips	Split	In	Out	%	Trips	Split	In	Out
Single Family Detached (Urbanized Area)	47 DU	9/DU	423	8%	34	(2:8)	7	27	10%	43	(7:3)	30	13
Multi-Family (Over 20 DU/acre)	113 DU	6/DU	678	8%	55	(2:8)	11	44	9%	62	(7:3)	43	19
Sub-Total			1,101		89		18	71		105		73	32
Residential Transit Reduction (5%)*			-55		-4		-1	-3		-5		-3	-2
Residential Mixed-Use Reduction (10%)**			-110		-8		-2	-6		-9		-6	-3
Total Transit & Mixed-Use Reduction			**-165**		**-12**		**-3**	**-9**		**-14**		**-9**	**-5**
High turnover (sit-down) restaurant[1]	8,485 SF	130/KSF	1,104	8%	89	(5:5)	45	44	8%	89	(6:4)	53	36
Total			**2,040**		**166**		**60**	**106**		**180**		**117**	**63**

Source: *City of San Diego Land Development Code – Trip Generation Manual (2003)*.

Note:
* The Proposed Project is located adjacent to the Euclid Avenue & Hilltop Drive bus stops which serves MTS Bus Route #917 and MTS Bus Route #955, and within 0.3 miles of the Euclid Trolley Station. Based on Table 3 of the City of San Diego Traffic Impact Study Manual, a transit trip reduction was applied to the residential trips generated by the Proposed Project.
** Based on Table 4 of the City of San Diego Traffic Impact Study Manual, a trip reduction for Mixed-Use development, which includes commercial retail, was applied to the residential trips generated by the Proposed Project.

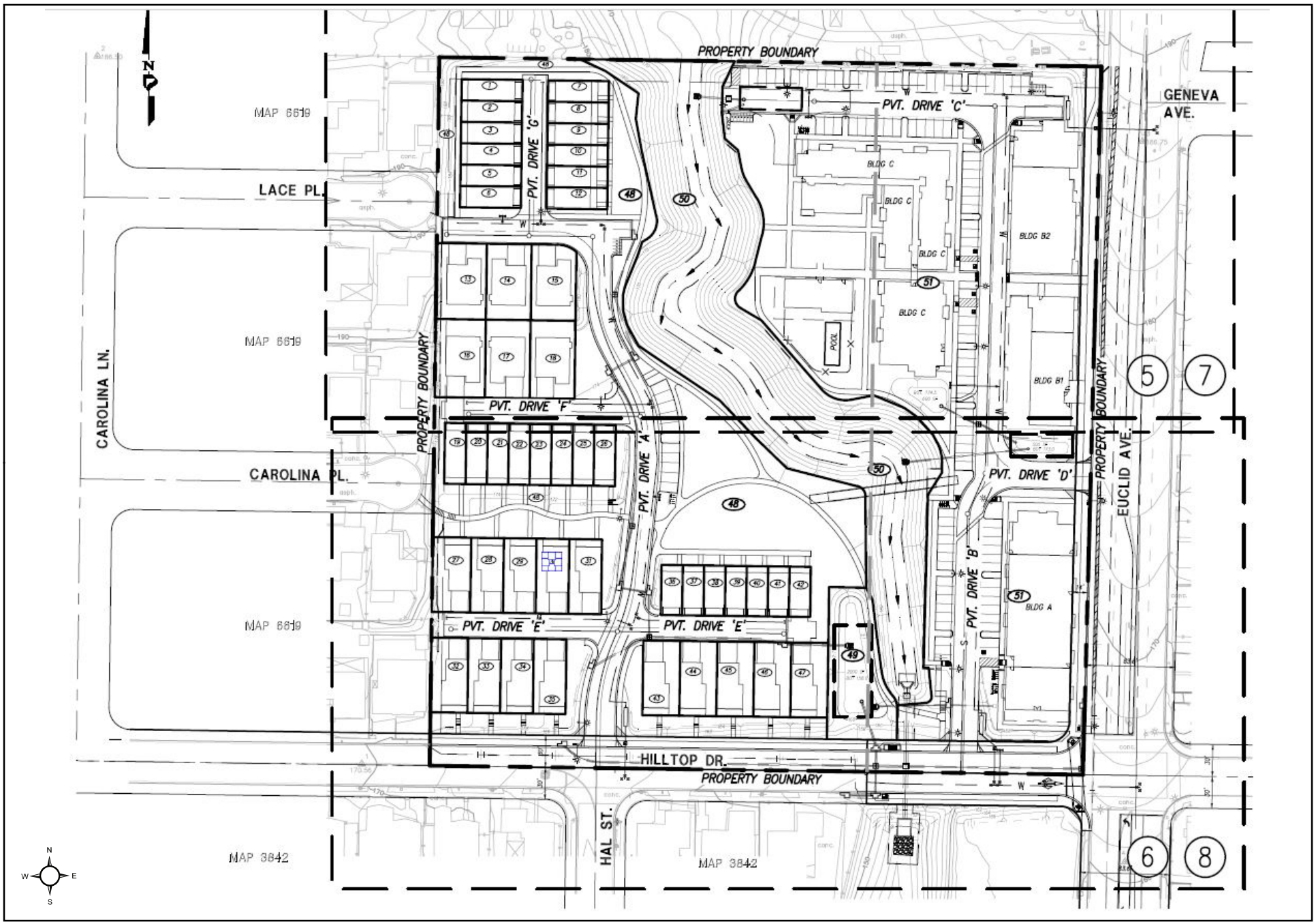
As shown in Table 3.1, the Proposed Project is anticipated to generate a net total of 2,040 daily trips, including 166 (60-in / 106-out) AM peak hour trips and 180 (117-in / 63-out) PM peak hour trips.

Project Trip Distribution

The project trip distribution patterns were developed based on existing travel patterns, the Proposed Project location in relation to nearby land uses and freeway access. **Figure 3-3** displays the trip distribution for the Proposed Project.

Project Trip Assignment

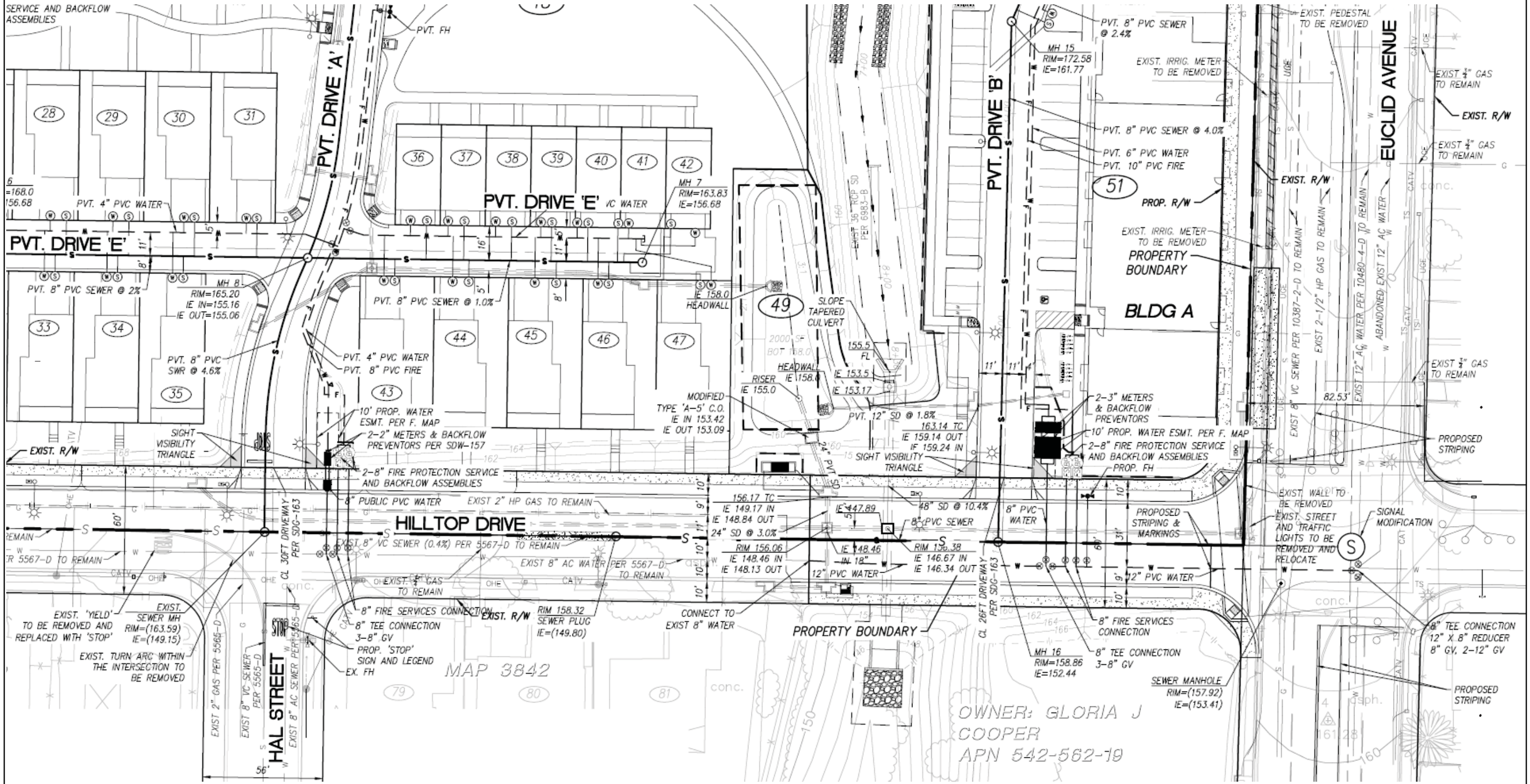
Based on the assumed project trip distribution, daily and AM/PM peak hour project trips were assigned to the adjacent roadway network, as displayed in **Figure 3-4**.



Hilltop + Euclid TIA

Figure 3-1
Project Site Plan

CHEN RYAN



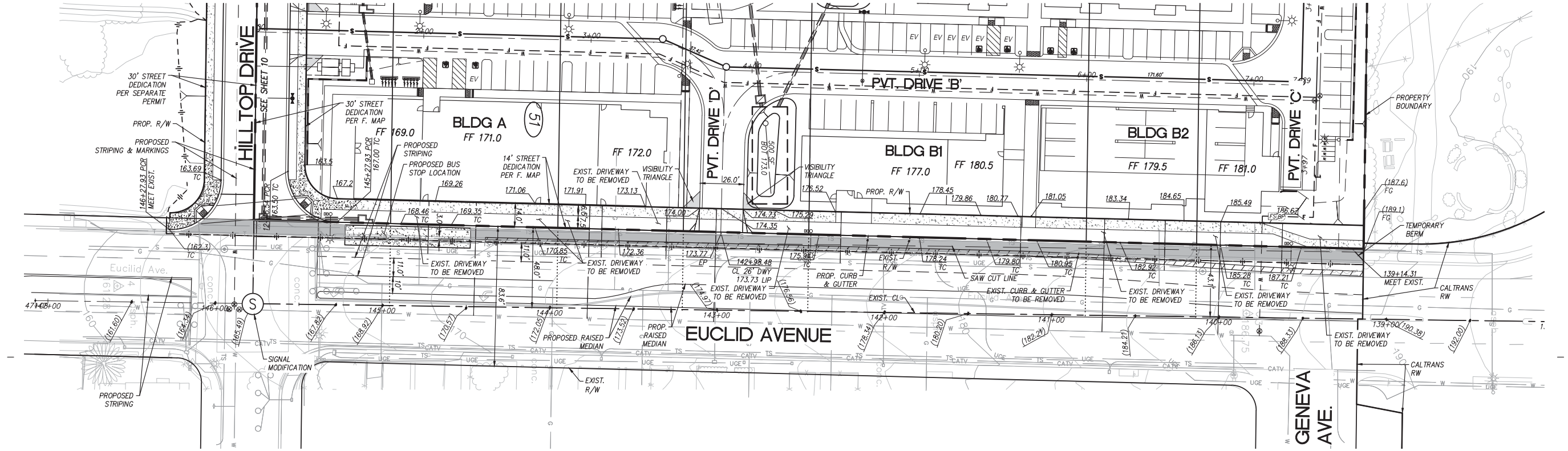
Hilltop + Euclid TIA

CHEN RYAN

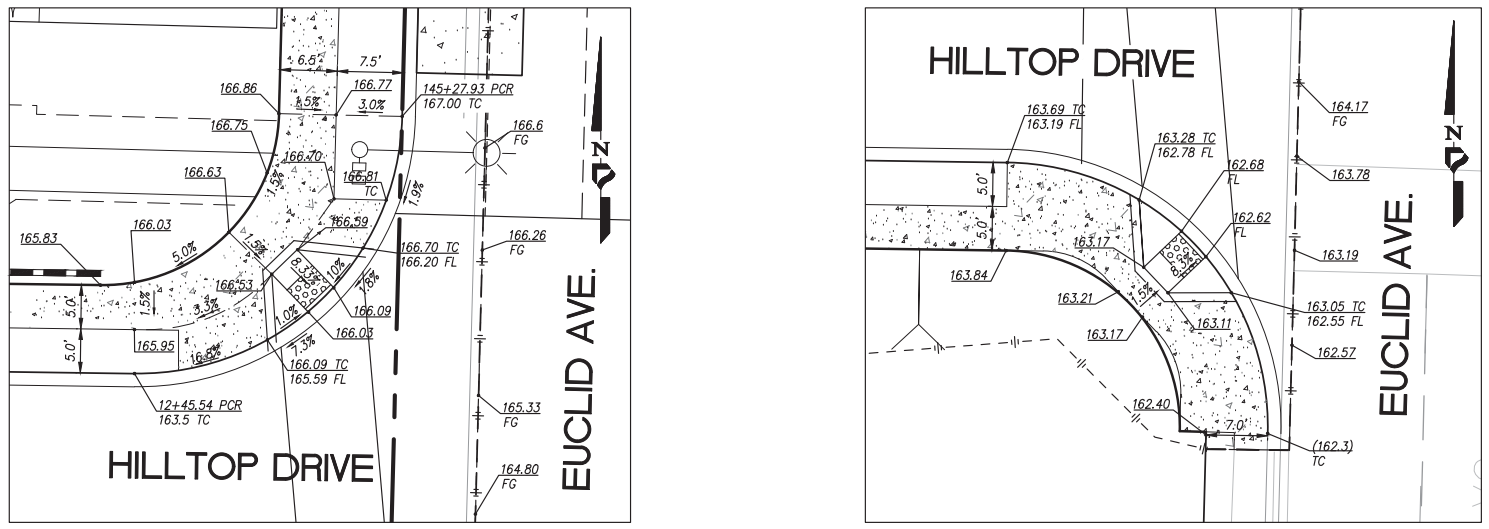
Figure 3-2A
Proposed Striping Plan for Hilltop Drive & Euclid Avenue

mail@studioearchitects.com

T 619.235.9262 F 619.235.0522



PLAN: EUCLID AVENUE



PLAN: CURB RETURNS

SCALE: 1" = 10'

LEGEND

PROPOSED AC PAVEMENT .....

BUS STOP SLAB (SDG-102) ..... 12' x 75'

SIGHT VISIBILITY TRIANGLE ..... PER MUNICIPAL CODE 113.0273

GRAPHICAL SCALE
SCALE: 1" = 30'

PROJECT DESIGN CONSULTANTS
Planning | Engineering | Survey

Hilltop and Euclid

Hilltop and Euclid Gateway Mixed-Use

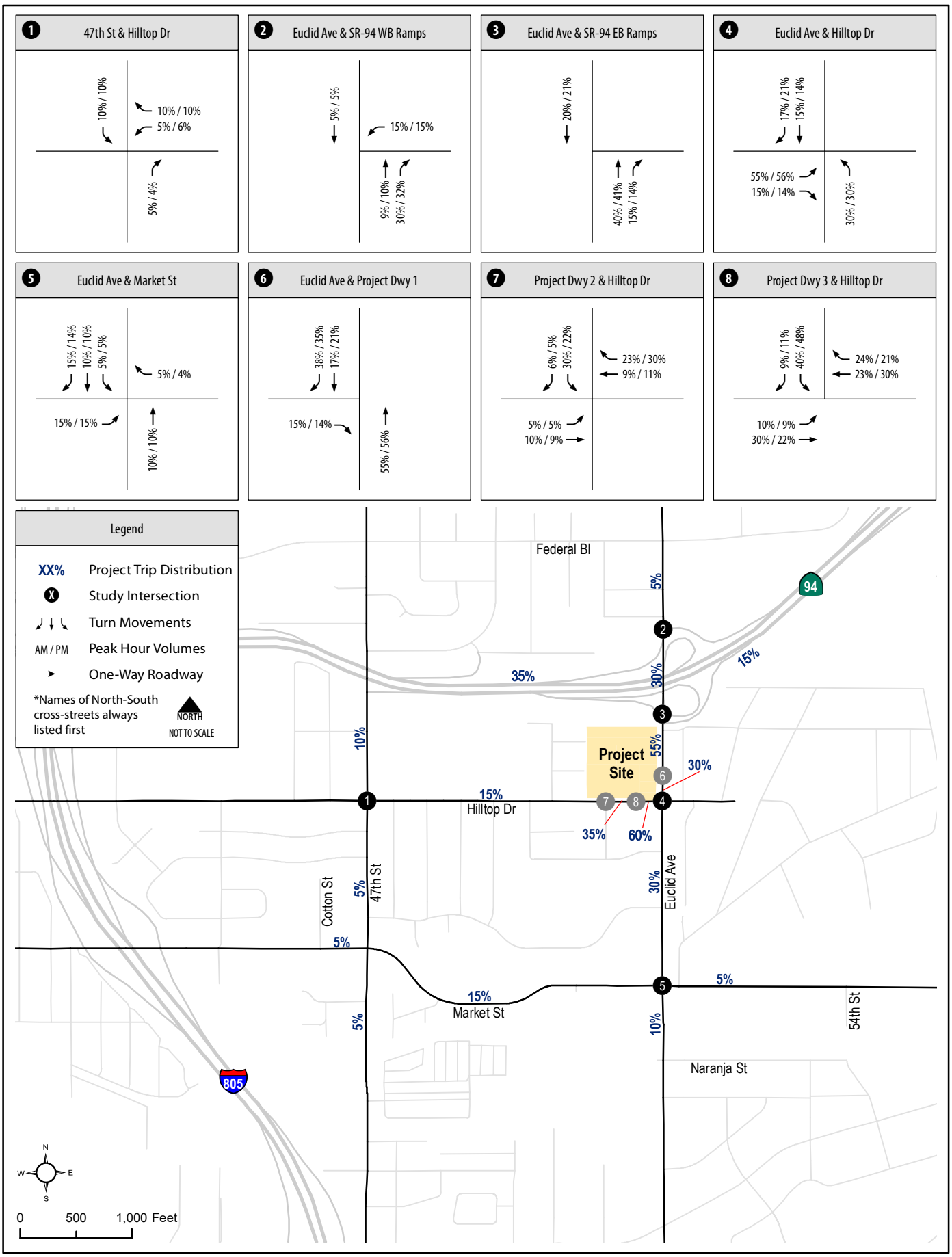
Project 16115

06/29/17	COMPLETENESS
07/20/17	INITIAL SUBMITTAL
09/20/17	FULL SUBMITTAL
11/29/17	RESUBMITTAL #1
01/18/18	RESUBMITTAL #2
03/15/18	RESUBMITTAL #3
05/07/18	RESUBMITTAL #4

STREET WIDENING (EUCLID AVE.)

C-11

Figure 3-2B
Proposed Street Plan for Hilltop Drive & Euclid Avenue



Hilltop + Euclid TIA

Figure 3-3
Project Trip Distribution

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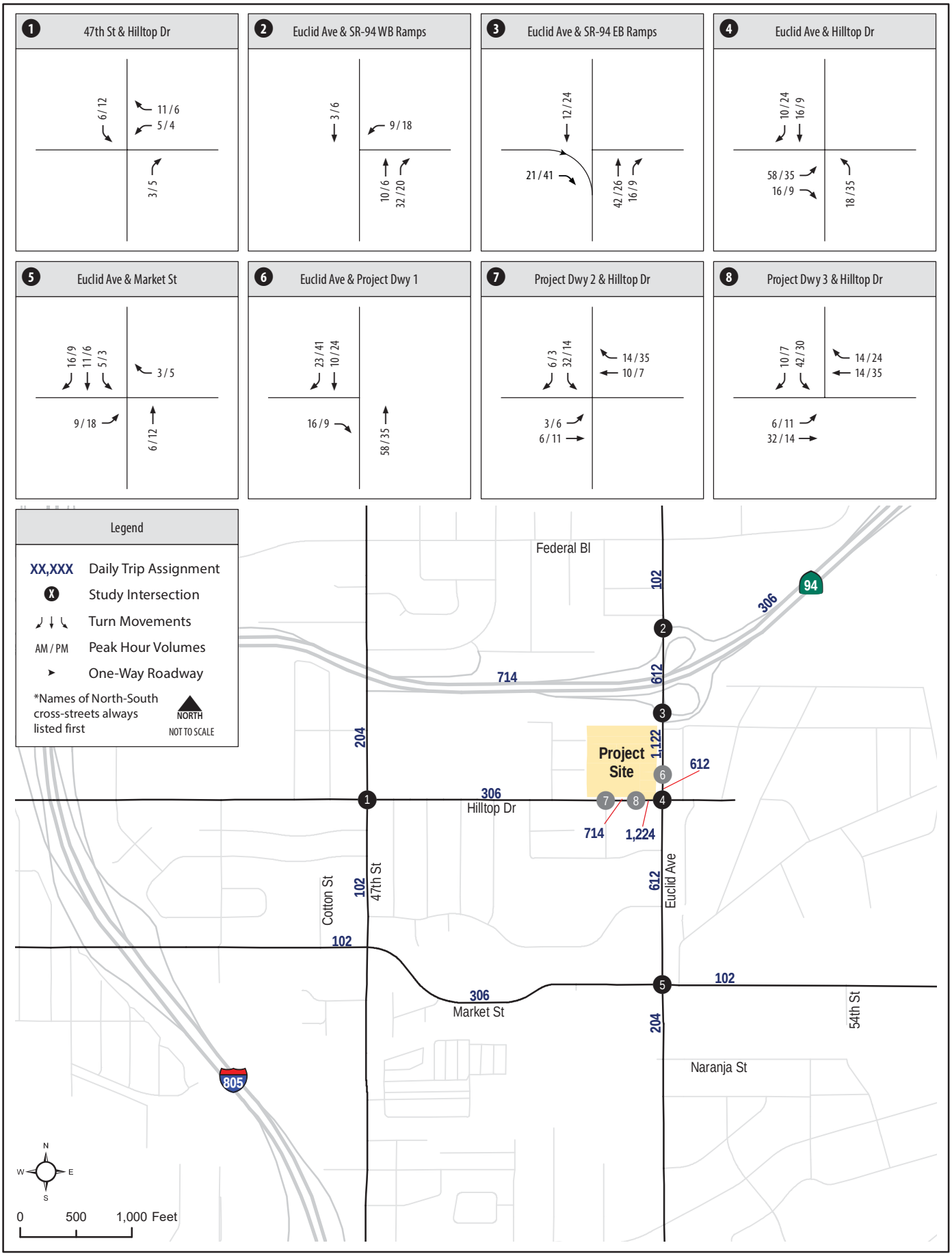

Hilltop + Euclid TIA

Figure 3-4
Project Trip Assignment

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4.0 Existing Conditions

This section describes key roadways segments and intersections, existing daily roadway and peak hour intersection traffic volume information, and LOS analysis results under Existing conditions.

4.1 Existing Roadway Network

Four (4) regionally and locally significant roadways traverse the study area. Each of the key roadways, as well as the associated study intersections within the study area are discussed in this section.

North-South Facilities

47th Street – Within the project study area, 47th Street is a 4-lane roadway with a posted speed limit of 35 mph and 25 mph when children are present. A raised median is present from 350' north of Guymon Street to Market Street, and sidewalks are present on both sides of the roadway. Bicycle facilities are not present within the project study area. On-street parking is available on both sides of the street between SR-94 EB Ramps and the Chollas View United Methodist Driveway, as well as between F Street and Guymon Street. The Encanto Community Plan EIR, SCH No. 2014051075 classifies this roadway as 2-lane Collector with Center Left Turn Lane with a One-Way Cycle Tracks on both sides of the roadway. Bus Route 13 has a stop located at the southeastern corner of the 47th Street and Hilltop Drive intersection, providing service between Kaiser Hospital located at 4647 Zion Avenue in the community of Grantville and 24th Street Trolley.

Euclid Avenue – Within the project study area, Euclid Avenue currently varies between four- and five-lanes, with a posted speed limit of 35 mph. The Encanto Community Plan EIR classifies this roadway as a 4-lane Major Arterial (within the project study area) with Buffered Bike Lanes on both sides of the roadway. The following features are present:

- Euclid Avenue is a 5-lane roadway (3 lanes NB and 2 lanes SB) with a continuous left turn lane between Federal Boulevard and Lyon Street, and raised median between Lyon Street and SR-94 WB ramps. It is designated as a Class III bike route, with sidewalks present on both sides of the roadway. On-Street parking is currently prohibited along this segment. Transit stops are present in the southbound direction for Route 917 (Oak Park-Emerald Hills Loop around College Grove) and Route 955 (between 8th Street Transit Center and San Diego State University).
- Euclid Avenue is a 4-lane roadway with a raised median between SR-94 WB ramps and SR-94 EB ramps. It is designated as a Class III bike route, with sidewalks present on both sides of the roadway. On-Street parking is currently prohibited along this segment.
- Euclid Avenue is a 4-lane undivided roadway between SR-94 EB ramps and Hilltop Drive. It is designated as a Class III bike route, with sidewalks present on both sides of the roadway. On-street parallel parking is allowed on both sides of the roadway, between 60' and 210' north of Hilltop drive. Two transit stops are present in the northwestern and southeastern corner of Euclid Avenue and Hilltop Drive for Route 917 (northbound

direction and Route 916 for the southbound direction of Oak Park-Emerald Hills Loop around College Grove) and 955 (between 8th Street Transit Center and SDSU).

- Euclid Avenue is a 4-lane roadway with a continuous left turn lane between Hilltop Drive and Guymon Street. It is designated as a Class III bike route, with sidewalks present on both sides of the roadway. On-street parallel parking permitted with the exception of 90' North of Guymon Street (along the southbound direction) and 100' south of Hilltop Drive (along the northbound direction). Two transit stops are present in the northwestern and southeastern corner of Euclid Avenue and Hilltop Drive for Route 917 (Oak Park-Emerald Hills Loop around College Grove) and Route 955 (between 8th Street Transit Center and San Diego State University).
- Euclid Avenue is a 4-lane roadway between Guymon Street and Naranja Street. Class II bike lanes are present between Guymon Street and Market Street, transitioning to a Class III bike route between Market Street and Naranja Street. On-Street parking is currently prohibited along this segment. The following Bus Routes provide service from the northwestern and southeastern corner of Euclid Avenue and Naranja Street:

    - Route 3 between UCSD Hospital and the Euclid Transit Center;
    - Route 4 between 12th & Imperial Trolley and Lomita Village;
    - Route 13 between Kaiser Hospital and 24th Street Trolley; and

    Route 955 between National City and San Diego State University.

East-West Facilities

Hilltop Drive – Hilltop Drive is currently constructed as a 2-lane undivided roadway between 47th Street and the eastern terminus, with a posted speed limit of 25 mph and no bicycle facilities. Sidewalks are missing along the north side of Hilltop Drive for the easternmost 400' of this segment. On-street parallel parking is allowed except between 90' and 220' east of Carolina Lane (along the eastbound direction). Between the segment of 47th Street to 1,230' east (along the eastbound direction), on-street parallel parking along Gompers Preparatory Academy property is only allowed between 7:00 AM to 4:00 PM. Bus Route 13 has a stop located at the southeastern corner of the 47th Street and Hilltop Drive intersection, providing service between Kaiser Hospital located at 4647 Zion Avenue in the community of Grantville and 24th Street Trolley. Hilltop Drive is not classified as a Circulation Element roadway in the Encanto Community Plan EIR. However, for the purpose of this analysis, it is assumed that Hilltop Drive would have the same capacity as a 2-lane Collector.

Market Street – Market Street is a two- to four-lane roadway within the project study area, with a posted speed limit of 35 mph between Cotton Street and Euclid Avenue, and 40 mph between Euclid Avenue and 54th Street. Within the project study area, the Encanto Community Plan EIR classifies this roadway as a 4-lane Major Arterial with One-Way Cycle Tracks on both sides of the roadway. The following variations are present:

- Market Street is a 4-lane undivided roadway between Cotton Street and 47th Street with sidewalks present on both sides. It is designated as a Class III bike route. On-street parallel parking allowed in the westbound direction between 140' east of Cotton Street and 47th Street.
- Market Street is a 4-lane undivided roadway between 47th Street and Euclid Avenue, and transitions to include a center left-turn lane between the Market Creek Place Driveway and Euclid Avenue. Sidewalks are present on both directions and Class II bike lanes are present between 200' east of 47th Street and 330' west of Market Creek Place Driveway. On-street parking is prohibited. Two transit stops exist in the northeastern and southeastern corner of 47th Street and Market Street for Bus Route 5 (between Downtown San Diego and Euclid Transit Center) and Route 13 (eastbound direction between Kaiser Hospital and 24th St Trolley).
- Market Street is a 4-lane roadway with a continuous left-turn lane between Euclid Avenue and 630' to the east. It transitions to a 2-lane undivided roadway from the Malcolm X library driveway to 54th Street. Two lanes merge into one lane between Euclid Avenue to 51st Street in the eastbound direction. One lane diverges into two lanes beginning at 820' west of 54th Street on the westbound direction. On-street parallel parking is allowed between 51st Street to 770' east on the westbound direction. It is designated as a Class III bike route. Sidewalks are missing from 54th Street to 600' west (along the eastbound direction).

Study Intersections

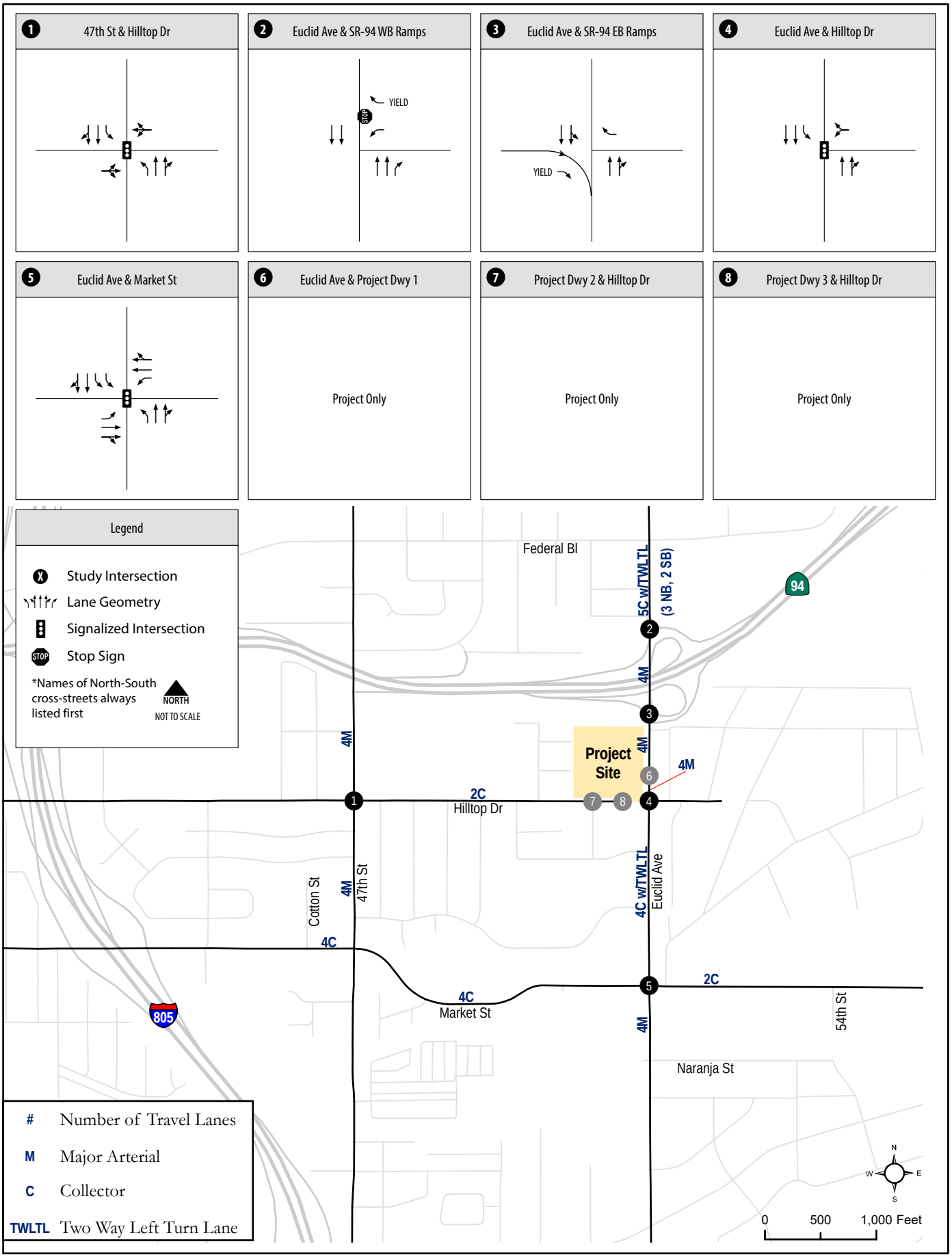
The following eight (8) intersections were included in the study area:

1. 47th Street & Hilltop Drive (Signal);
2. Euclid Avenue & SR-94 WB Ramps (Side Street Stop Control);
3. Euclid Avenue & SR-94 EB Ramps (Side Street Stop Control);
4. Euclid Avenue & Hilltop Drive (Signal);
5. Euclid Avenue & Market Street (Signal);
6. Euclid Avenue & Project Driveway #1 (Side Street Stop Control);
7. Project Driveway #2 & Hilltop Avenue (Side Street Stop Control);
8. Project Driveway #3 & Hilltop Avenue (Side Street Stop Control).

The existing roadway and intersection geometrics are shown in **Figure 4-1**.

4.2 Existing Intersection and Roadway Volumes

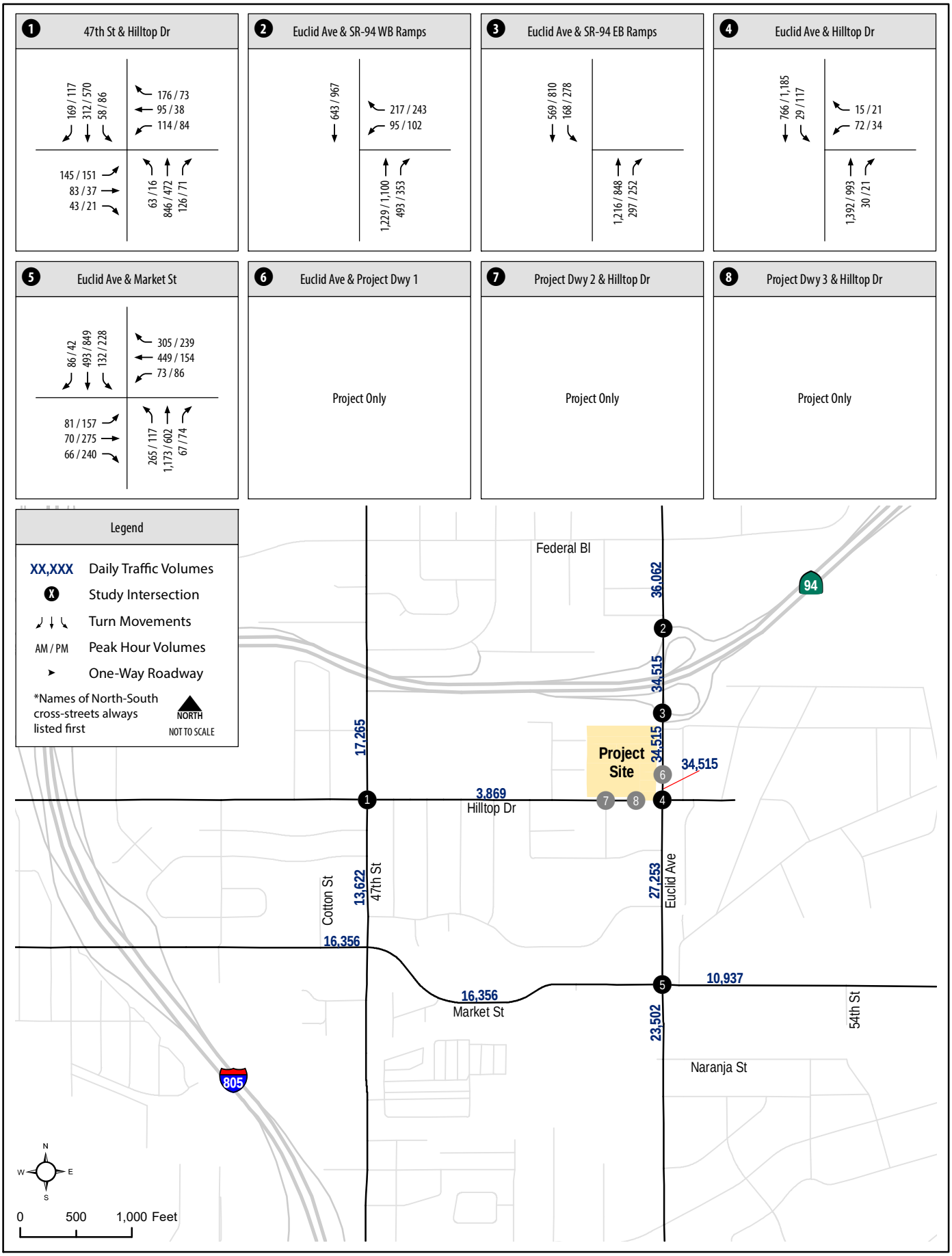
Figure 4-2 shows both the existing ADT volumes for study area roadway segments and the AM/PM peak hour traffic volumes for the key study area intersections. The roadway segment and study area intersection traffic counts were conducted on Tuesday 2/14/2017, and are provided in **Appendix B**.



Hilltop + Euclid TIA

Figure 4-1
Roadway and Intersection Geometrics - Existing Conditions

CHEN RYAN



Hilltop + Euclid TIA

Figure 4-2
Traffic Volumes - Existing Conditions

CHEN RYAN

4.3 Existing LOS Analysis

Level of service analyses under Existing conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS, as well as freeway ramp metering analysis results are discussed separately in this section.

Roadway Segment Analysis

Table 4.1 displays the LOS analysis results for key study area roadway segments under Existing conditions.

Table 4.1 Roadway Segment LOS Results - Existing Conditions

Roadway	Segment	Cross-Section	Threshold (LOS E)	ADT	V/C	LOS
47th Street	SR-94 EB Ramps and Hilltop Drive	4-Lane Collector (w/TWLTL)	30,000	17,265	0.576	C
	Hilltop Drive and Market Street	4-Lane Collector (w/TWLTL)	30,000	13,622	0.454	B
Euclid Avenue	Federal Boulevard and SR-94 WB Ramps	5-Lane Collector (w/TWLTL)	37,500	36,062	0.962	**E**
	SR-94 WB Ramps and SR-94 EB Ramps	4-Lane Major Arterial	40,000	34,515	0.863	D
	SR-94 EB Ramps and Hilltop Drive	4-Lane Collector (w/TWLTL)	30,000	34,515	1.151	**F**
	Hilltop Drive and Market Street	4-Lane Collector (w/TWLTL)	30,000	27,253	0.908	**E**
	Market Street and Naranja Street	4-Lane Major Arterial	40,000	23,502	0.588	C
Hilltop Drive	47th Street and Eastern Terminus	2-Lane Collector	8,000	3,869	0.484	C
Market Street	Cotton Street and 47th Street	4-Lane Collector (w/TWLTL)	30,000	16,356	0.545	C
	47th Street and Euclid Avenue	4-Lane Collector	15,000	16,356	1.090	**F**
	Euclid Avenue and 54th Street	2-Lane Collector	8,000	10,937	1.367	**F**

Source: NDS, Chen Ryan Associates; August 2018

Notes:
Bold letter indicates unacceptable LOS E or F
ADT = Average Daily Traffic
V/C = Volume to Capacity Ratio
LOS = Level of Service

As shown in Table 4.1, all of the key study area roadway segments are currently operating at acceptable LOS D or better, with the exception of the following roadway segments:

- Euclid Avenue, between Federal Boulevard and SR-94 WB Ramps (LOS E);
- Euclid Avenue, between SR-94 EB Ramps and Hilltop Drive (LOS F);
- Euclid Avenue, between Hilltop Drive and Market Street (LOS E);
- Market Street, between 47th Street and Euclid Avenue (LOS F);
- Market Street, between Euclid Avenue and 54th Street (LOS F).

Intersection Analysis

Table 4.2 displays intersection level of service and average vehicle delay results for the key study area intersections under Existing conditions. Level of service calculation worksheets for Existing conditions are provided in **Appendix C**.

Table 4.2 Peak Hour Intersection LOS Results - Existing Conditions

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1. 47th St and Hilltop Dr	Signal	14.8	B	8.2	A
2. Euclid Ave and SR-94 WB Ramps	SSSC	436.9	**F**	280.7	**F**
3. Euclid Ave and SR-94 EB Ramps	SSSC	25.3	D	86.1	**F**
4. Euclid Ave and Hilltop Dr	Signal	7.5	A	6.8	A
5. Euclid Ave and Market St	Signal	41.6	D	28.8	C

Source: Accurate Video Count, Chen Ryan Associates; August 2018

Notes:
Bold letter indicates unacceptable LOS E or F
SSSC = Side Street Stop Controlled

As shown, all study area intersections are currently operating at acceptable LOS D or better during both the AM and PM peak hours, with the exception of the following:

- Euclid Avenue & SR-94 WB Ramps – LOS F during both the AM and PM peak hours;
- Euclid Avenue & SR-94 EB Ramps – LOS F during PM peak hour.

Ramp Metering Analysis

Table 4.3 summarizes the freeway ramp metering analysis results under Existing conditions.

Table 4.3 Ramp Metering Analysis - Existing Conditions

Location	Peak Hour	Demand [1] (veh/hr/pl)	Max Observed Queue / Max Observed Queue Delay	Meter Rate [2] (veh/hr/pl)	Excess Demand [3] (veh/hr/pl)	Excess Delay [4] (min)	Excess Queue [5] (ft)
SR-94 WB On-Ramp (southbound approach) @ Euclid Avenue	AM	13	0 vehicles / 0 minutes	526	0	0	0
SR-94 WB On-Ramp (northbound approach) @ Euclid Avenue	AM	493	0 vehicles / 0 minutes	526	0	0	0
SR-94 EB On-Ramp @ Euclid Avenue	PM	528	12 vehicles / 5 minutes	372	156	25.16	4,525

Source: Chen Ryan Associates; August 2018

Notes:
[1] Demand is the peak hour demand expected to use the on-ramp per lane.
[2] Meter Rate is the lowest peak hour capacity (most restrictive rate) expected to be processed through the ramp meter per lane. This value was obtained from Caltrans.
[3] Excess Demand = (Demand) – (Meter Rate) or zero, whichever is greater.
[4] Excess Delay = (Excess Demand / Meter Rate) X 60 min/hr.
[5] Excess Queue = (Excess Demand) X 29 ft/veh.

As shown in Table 4.3, existing peak hour demand does not exceed the most restrictive ramp meter rate at either of the study ramp meter locations, with the exception of the SR-94 EB On-Ramp @ Euclid Avenue during the PM peak hour. The maximum queue occurs at the SR-94 EB On-Ramp @ Euclid Avenue during the PM peak hour. Field observations of the ramp found that the maximum observed queue was 12 vehicles with 5 minutes of delay (from when the last vehicle reaches the queue).

5.0 Existing Plus Project Conditions

This section provides an analysis of existing traffic conditions with the addition of Proposed Project traffic.

5.1 Existing Plus Project Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Existing Plus Project conditions are assumed to be the same as Existing conditions, with the exception of the following project features:

- Construction of the extension of Hilltop Drive from the existing eastern terminus point approximately 200 feet west of Euclid Avenue to Euclid Avenue. This improvement will convert the signalized intersection of Hilltop Drive/Euclid Avenue to a four-legged intersection with one eastbound left/through/right shared lane.

- Construction of a raised center median along Euclid Avenue, between SR-94 EB Ramps and Hilltop Drive, and install a southbound buffered bike lane by dedicating and widening Euclid Avenue along the site's frontage with adequate signage and re-striping.

The Proposed Project will provide access via three driveways, one on Euclid Avenue (280 ft north of Hilltop Drive) and two on Hilltop Drive. A discussion of each driveway is provided below:

- Project Driveway #1, proposed to be located on Euclid Avenue approximately 280 feet north of the Euclid Avenue / Hilltop Drive intersection. This driveway would be constructed as a right-in / right-out only via the project's installation of a raised median on Euclid Avenue. This driveway will provide access to the multifamily and commercial portion of the Proposed Project site.

- Proposed Driveway #2 is proposed to be located off of Hilltop Drive, approximately 500 feet west of the Euclid Avenue / Hilltop Drive intersection and will form the fourth leg of the intersection of Hilltop Drive / Hal Street. This driveway will provide access to the single-family portion of the Proposed Project site.

- Proposed Driveway #3 is proposed to be located off of Hilltop Drive, approximately 160 feet west of the Euclid Avenue / Hilltop Drive intersection. This driveway will provide access to the multifamily and commercial portion of the Proposed Project site.

Roadway and intersection geometrics under the Existing Plus Project conditions are displayed in **Figure 5-1**.

It is assumed that 50% of the existing traffic from Gompers Preparatory Academy would utilize the new roadway connection (Hilltop Drive between 47th Street and Euclid Avenue) due to the location between Gompers Preparatory Academy and the surrounding residential neighborhood. It is also assumed that approximately 30% of the existing trips along Hilltop Drive would utilize the Euclid Avenue / Hilltop Drive intersection. The existing trips that are assumed to be rerouted due to the new roadway connection are shown in **Figure 5-2**.

Existing Plus Project traffic volumes were derived by combining the existing traffic volumes (displayed in Figure 4-2), with the project trip assignment volumes (displayed in Figure 3-3) and trips rerouting (Figure 5-2). Daily roadway and peak hour intersection volumes for this scenario are displayed in **Figure 5-3**.

5.2 Existing Plus Project Traffic Conditions

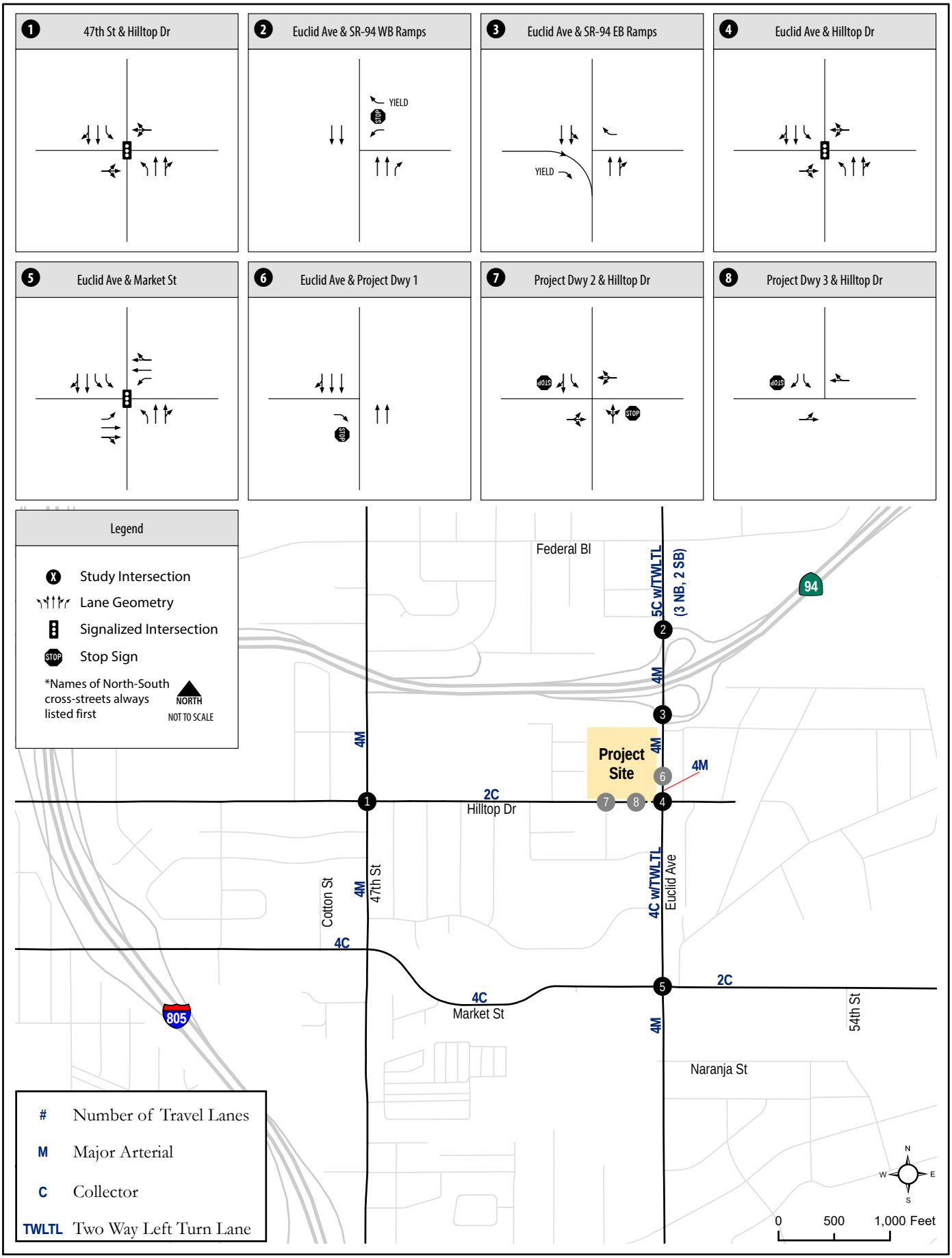
Analyses were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS, as well as freeway ramp metering analysis results are discussed separately in this section.

Roadway Segment Analysis

Table 5.1 displays the LOS analysis results for key roadway segments under Existing Plus Project conditions.

As shown in Table 5.1, all of the study area roadway segments are projected to operate at an acceptable LOS with the addition of project traffic with the exception of the following roadway segments:

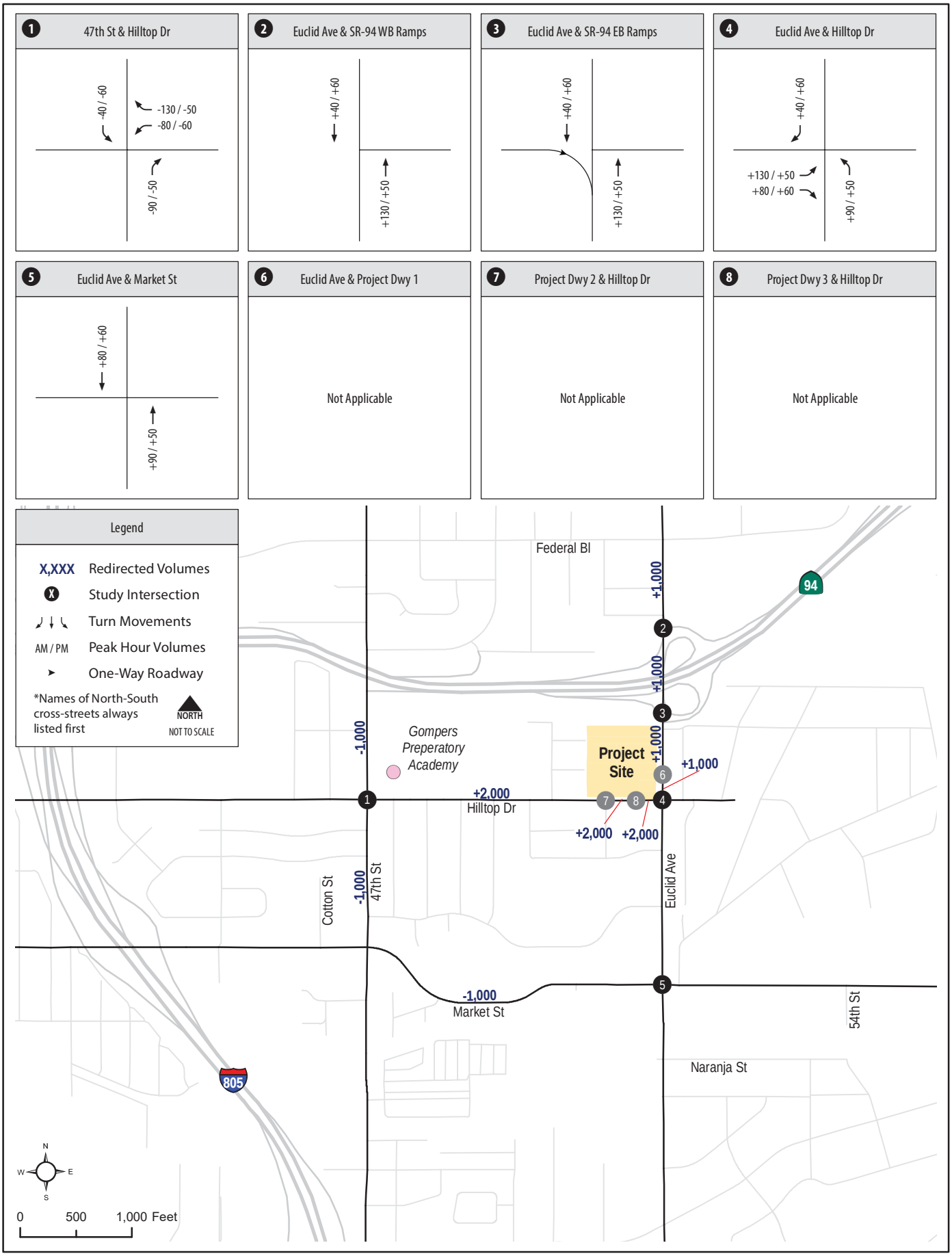
- Euclid Avenue, between Federal Boulevard and SR-94 WB Ramps (LOS E);
- Euclid Avenue, between SR-94 WB Ramps and SR-94 EB Ramps (LOS E);
- Euclid Avenue, between SR-94 EB Ramps and Project Driveway #1 (LOS E);
- Euclid Avenue, between Project Driveway #1 and Hilltop Drive (LOS E);
- Euclid Avenue, between Hilltop Drive and Market Street (LOS E);
- Market Street, between 47th Street and Euclid Avenue (LOS F); and.
- Market Street, between Euclid Avenue and 54th Street (LOS F).



Hilltop + Euclid TIA

Figure 5-1
Roadway and Intersection Geometrics - Existing Plus Project Conditions

CHEN RYAN



Hilltop + Euclid TIA

Figure 5-2

Traffic Volumes - Trips Rerouting due to New Roadway Connection

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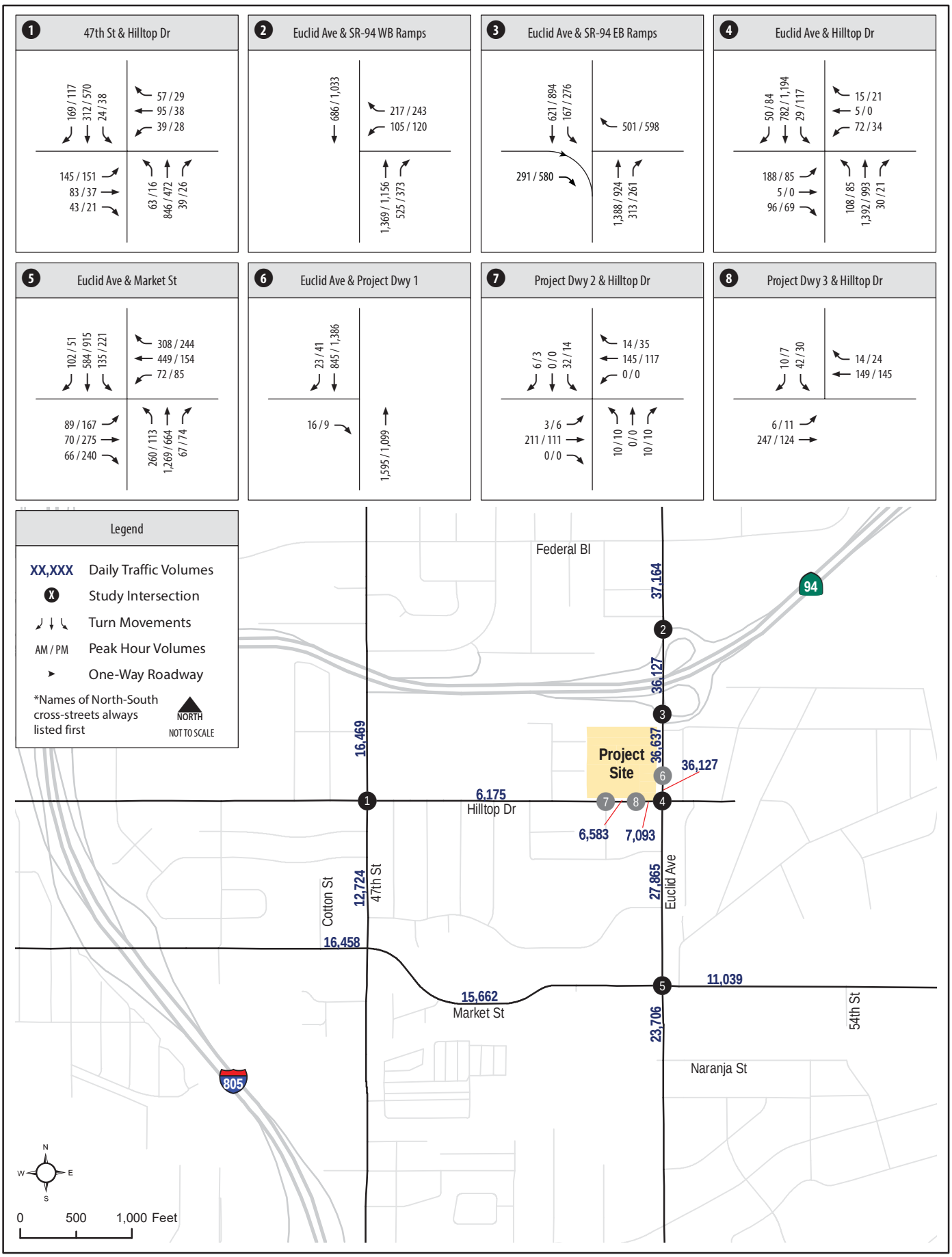

Hilltop + Euclid TIA

Figure 5-3
Traffic Volumes - Existing Plus Project Conditions

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Table 5.1 Roadway Segment LOS Results - Existing Plus Project Conditions

Roadway	Segment	Cross-Section	Existing				Existing + Project				Δ	S?
			Threshold (LOS E)	ADT	V/C	LOS	Threshold (LOS E)	ADT	V/C	LOS		
47th Street	SR-94 EB Ramps and Hilltop Drive	4-Lane Collector (w/TWLTL)	30,000	17,265	0.576	C	30,000	16,469	0.549	C	-0.027	No
	Hilltop Drive and Market Street	4-Lane Collector (w/TWLTL)	30,000	13,622	0.454	B	30,000	12,724	0.424	B	-0.030	No
Euclid Avenue	Federal Boulevard and SR-94 WB Ramps	5-Lane Collector (w/TWLTL)	37,500	36,062	0.962	**E**	37,500	37,164	0.991	**E**	0.029	**Yes****
	SR-94 WB Ramps and SR-94 EB Ramps	4-Lane Major Arterial	40,000	34,515	0.863	D	40,000	36,127	0.903	**E**	0.040	**Yes****
	SR-94 EB Ramps and Proposed Project Driveway #1	4-Lane Major Arterial*	30,000	34,515	1.151	**F**	40,000	36,637	0.916	**E**	-0.235	No
	Proposed Project Driveway #1 and Hilltop Drive	4-Lane Major Arterial*	30,000	34,515	1.151	**F**	40,000	36,127	0.903	**E**	-0.247	No
	Hilltop Drive and Market Street	4-Lane Collector (w/TWLTL)	30,000	27,253	0.908	**E**	30,000	27,865	0.929	**E**	0.020	No
	Market Street and Naranja Street	4-Lane Major Arterial	40,000	23,502	0.588	C	40,000	24,706	0.618	C	0.030	No
Hilltop Drive	47th Street and Proposed Project Driveway #2	2-Lane Collector	8,000	3,869	0.484	C	8,000	6,175	0.772	D	0.288	No
	Proposed Project Driveway #2 and Proposed Project Driveway #3	2-Lane Collector	8,000	3,869	0.484	C	8,000	6,583	0.823	D	0.339	No
	Proposed Project Driveway #3 and Euclid Avenue	2-Lane Collector	8,000	3,869	0.484	C	8,000	7,093	0.887	D	0.403	No
Market Street	Cotton Street and 47th Street	4-Lane Collector (w/TWLTL)	30,000	16,356	0.545	C	30,000	16,458	0.549	C	0.003	No
	47th Street and Euclid Avenue	4-Lane Collector	15,000	16,356	1.090	**F**	15,000	15,662	1.044	**F**	-0.046	No
	Euclid Avenue and 54th Street	2-Lane Collector	8,000	10,937	1.367	**F**	8,000	11,039	1.380	**F**	0.013	**Yes*****

Source: Chen Ryan Associates; August 2018

Notes: Bold letter indicates unacceptable LOS E or F.
ADT = Average Daily Traffic
V/C = Volume to Capacity Ratio
S? = Indicates if change in V/C ratio is significant
Δ = Change in V/C Ratio
* Assumed that the project will construct the center raised median, thus converting this portion of the roadway into a 4-Lane Major Arterial
** See alternative analysis in Section 5.3
*** This roadway segment is buildout to its ultimate classification and this impact is consistent with the Encanto Community Plan FEIR, thus no additional mitigation would be require. See Section 5.3.

Based on the City of San Diego Significance Criteria outlined in Section 2.5, the traffic associated with the Proposed Project would cause an increase in V/C greater than 0.02 for the following roadways segments:

- Euclid Avenue, between Federal Boulevard and SR-94 WB Ramps – LOS E; and
- Euclid Avenue, between SR-94 WB Ramps and SR-94 EB Ramps – LOS E; and
- Market Street, between Euclid Avenue and 54th Street.

Based on Section 2.5, an alternative analysis was conducted to assess segment impacts under CEQA. As shown in **Table 5.5**, the signalized intersections on both ends of these roadway segments (Euclid Avenue and Federal Boulevard) – Euclid Avenue as per the Encanto CPU & Market Street as per Table 5.5 – are operating at acceptable LOS. These roadway segments are also built out to their ultimate classification as identified in the Encanto Community Plan. Based upon the criteria stated above, a Synchro HCM arterial analysis, which estimates average travel speed and facility level of service according to the roadway functional classification, was conducted for these roadway segment. **Table 5.2** displays the arterial level of service for the identified roadway segment under the Existing Plus Project conditions. As shown in the table, these roadway segments are projected to operate at acceptable LOS D or better under the Existing Plus Project conditions, with the infrastructure upgrades as part of the SR-94 Interchange project. Therefore, no significant impacts are identified on these segments, when assuming the intersection improvements identified in the SR-94 Interchange project (see next section). Arterial analysis worksheets are provided in **Appendix D.**

Table 5.2 Arterial Analysis Results - Existing Plus Project Conditions

Arterial Segment	Direction	Posted (Free Flow) Speed (mph)	AM Peak Hour		PM Peak Hour	
			Arterial Speed	LOS	Arterial Speed	LOS
Euclid Avenue, between Federal Boulevard and SR-94 WB Ramps	NB	35	17.8	D	17.1	D
	SB	35	20.2	C	18.6	C
Euclid Avenue, between SR-94 WB Ramps and SR-94 EB Ramps	NB	35	17.1	D	19.0	C
	SB	35	23.3	C	20.4	C

Source: Chen Ryan Associates; January 2018

Intersection Analysis

Table 5.3 displays intersection LOS and average vehicle delay results under Existing Plus Project conditions. LOS calculation worksheets for the Existing Plus Project conditions are provided in Appendix D.

Table 5.3 Peak Hour Intersection LOS Results - Existing Plus Project Conditions

Intersection	Control	w/o Project				with Project				Change in Delay (sec)	SI?
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS		
1. 47th St and Hilltop Dr	Signal	14.8	B	8.2	A	10.4	B	7.8	A	-4.4/-0.4 *	No
2. Euclid Ave and SR-94 WB Ramps	SSSC	N/A[1]	**F**	N/A1	**F**	N/A[1]	**F**	N/A1	**F**	N/A[1] / N/A[1]	**Yes**
3. Euclid Ave and SR-94 EB Ramps	SSSC	25.3	D	86.1	**F**	36.6	**E**	147.7	**F**	11.3/61.6	**Yes**
4. Euclid Ave and Hilltop Dr	Signal	7.5	A	6.8	A	18.4	B	12.6	B	10.9/5.8	No
5. Euclid Ave and Market St	Signal	41.6	D	28.8	C	47.9	D	31.1	C	6.3/2.3	No
6. Euclid Ave and Project Driveway #1	SSSC	N/A	N/A	N/A	N/A	13.1	B	17.8	C	N/A	No
7. Hilltop Avenue and Project Driveway #2	SSSC	N/A	N/A	N/A	N/A	12	B	10.6	B	N/A	No
8. Hilltop Avenue and Project Driveway #3	SSSC	N/A	N/A	N/A	N/A	11.6	B	10.5	B	N/A	No

Source: Chen Ryan Associates; August 2018

Notes:
Bold letter indicates unacceptable LOS E or F.
SSSC = Side Street Stop Controlled
* = Decrease in delay due to new connection
[1] Exceeds maximum calculable delay.

As shown in Table 5.3, all of the study area intersections will continue to operate at acceptable LOS D or better, during both the AM and PM peak hours, with the addition of project traffic, with the exception of the following intersections:

- Euclid Avenue & SR-94 WB Ramps – LOS F during both the AM and PM peak hours; and
- Euclid Avenue & SR-94 EB Ramps – LOS E during AM peak hour and LOS F during PM peak hour.

Based on the City of San Diego Significance Criteria outlined in Section 2.5, the traffic associated with the Proposed Project would cause a significant impact to both intersections listed above under the Existing Plus Project Conditions.

Ramp Metering Analysis

Table 5.4 summarizes the freeway ramp metering analysis results under Existing Plus Project conditions.

Similar to Existing conditions, the anticipated Existing Plus Project peak hour demand would not exceed the most restrictive ramp meter rate at either of the study ramp meter locations, with the exception of the SR-94 EB On-Ramp @ Euclid Avenue during the PM peak hour. Based on the City of San Diego Significance Criteria outlined in Section 2.5, since the proposed project does not cause the ramp meters delay to increase by more than 2 minutes. Therefore, the traffic associated with the Proposed Project would not cause a significant impact to the SR-94 EB On-Ramp @ Euclid Avenue ramp meter.

Table 5.4 Ramp Metering Analysis - Existing Plus Project Conditions

Location	# of Lanes		Peak Hour	Demand [1] (veh/hr/pl)	Meter Rate [2] (veh/hr/pl)	Excess Demand [3] (veh/hr/pl)	Excess Delay [4] (min)	Excess Queue [5] (ft)	Storage Length (ft)	Existing Excess Queue (ft)	Existing Excess Delay (min)	Δ Excess Delay (min)	S?
	SOV	HOV											
SR-94 WB On-Ramp (southbound approach) @ Euclid Avenue	1	0	AM	13	526	0	0	0	360	0	0	0	No
SR-94 WB On-Ramp (northbound approach) @ Euclid Avenue	1	0	AM	525	526	0	0	0	510	0	0	0	No
SR-94 EB On-Ramp @ Euclid Avenue	1	0	PM	537	372	165	26.61	4,775	580	4,195	25.16	1.45	No

Source: Chen Ryan Associates; August 2018

Notes:
[1] Demand is the peak hour demand expected to use the on-ramp per lane.
[2] Meter Rate is the lowest peak hour capacity expected to be processed through the ramp meter per lane. This value was obtained from Caltrans.
[3] Excess Demand = (Demand) – (Meter Rate) or zero, whichever is greater.
[4] Excess Delay = (Excess Demand / Meter Rate) X 60 min/hr.
[5] Excess Queue = (Excess Demand) X 29 ft/veh.
S?: Significant Impact

5.3 Impact Significance and Mitigation

Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would cause significant impacts to one roadway segment, and two intersections within the project study area under Existing Plus Project conditions. Mitigation measures for the Proposed Project impacts are discussed below.

Roadway Segment

Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would have a significant impact on Market Street, between Euclid Avenue and 54th Street. However, the roadway is already constructed to its ultimate classification per the Encanto Community Plan FEIR, and the Encanto Community Plan FEIR found it to be a significant and unmitigated impact. Thus, no additional mitigation would be required.

Intersection

Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would have a direct impact on two intersections within the project study area. The following mitigation measures are required to mitigate the project intersection impact to less than significant:

- *Euclid Avenue & SR-94 WB Ramps*
  - Signalize this intersection
  - Convert the existing westbound free right-turn lane into a permissive right-turn lane
  - Convert the existing northbound free right turn lane into a permissive right-turn lane
- *Euclid Avenue & SR-94 EB Ramps*
  - Signalize this intersection
  - Remove the existing eastbound free right-turn lane
  - Convert the existing westbound free right-turn lane into a westbound permissive left-turn lane
  - Construct a dual westbound left-turn lane

The mitigation measures provided above are consistent with those proposed by the SR-94 Interchange project. The SR-94 Interchange project is fully funded and is currently under construction. Construction for the SR-94 interchange project began May 2018 and is expected to be completed by June 2019.

Table 5.5 displays intersection LOS and average vehicle delay results under Existing Plus Project with Mitigation conditions.

Table 5.5 Peak Hour Intersection LOS Results - Existing Plus Project with Mitigation Conditions

Intersection	Control	Without Mitigation				With Mitigation				Change in Delay (sec)	M?	S?
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour				
		LOS	Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	Avg. Delay (sec)			
2. Euclid Ave and SR-94 WB Ramps	Signal	**F**	436.9	**F**	280.7	B	10.1	A	8.2	-426.8/-272.5	Yes	No
3. Euclid Ave and SR-94 EB Ramps	Signal	D	25.3	**F**	86.1	D	48	C	31.4	22.7/-54.7	Yes	No

Bold letter indicates unacceptable LOS E or F.
M? = Impact Mitigated?,
S? = Impact remains significant after mitigation?

As shown in Table 5.5, the operations at the intersections which the Proposed Project is anticipated to impact will improve to better than pre-project conditions. Therefore, with the identified improvements the impacts will be less than significant. LOS calculation worksheets for the Existing Plus Project with Mitigation conditions are provided in **Appendix D**.

The mitigation measures provided above are consistent with those proposed by the SR-94 Interchange project. The SR-94 Interchange project is fully funded and is currently under construction. Construction for the SR-94 interchange project began May 2018 and is expected to be completed by June 2019. Since completion of the SR-94 project would address the above impacts by improving all locations to LOS D or better, no additional mitigation would be required of the project. Information regarding the SR-94 Interchange Project is provided in Appendix A.

Ramp Meters:

No significant impacts were identified; therefore, no mitigation is required.

6.0 Near-Term Year 2020 Traffic Conditions (Opening Day)

This section provides an analysis of Year 2020 traffic conditions both with and without the Proposed project. The scenarios analyzed in this section include:

- Near-Term Year 2020 Base
- Near-Term Year 2020 Base Plus Project

6.1 Near-Term Year 2020 Base Roadway Network and Traffic Volumes

The SR-94 Interchange project (City CIP #S-14009), which is fully funded, out to bid for construction, and expected to be completed by the October 2018, is therefore assumed to be a part of the Near-Term Year 2020 Base conditions. The SR-94 Interchange project proposes the following improvements to the SR-94 / Euclid Interchange:

- *Euclid Avenue & SR-94 WB Ramps*
  - Signalize this intersection
  - Convert the existing westbound free right-turn lane into a permissive right-turn lane
  - Convert the existing northbound free right turn lane into a permissive right-turn lane
- *Euclid Avenue & SR-94 EB Ramps*
  - Signalize this intersection
  - Remove the existing eastbound free right-turn lane
  - Convert the existing westbound free right-turn lane into a westbound permissive left-turn lane
  - Construct a dual westbound left-turn lane

Figure 6-1 displays the Near-Term Year 2020 Base conditions roadway and intersection geometrics.

Cumulative Projects

Based on review of the Open DSD website (accessed on April 7, 2017), and consultation with City staff, the North West Village project and Creekside Point project are anticipated to add traffic to the project study area. The locations of these projects, trip distribution, and trip assignment assumptions are provided in **Appendix E**. It should be noted that the trip generation of Drug Store/Pharmacy in the North West Village project was removed due to the Drug Store/Pharmacy's existing operation when the counts were taken on February 2017. **Table 6.1** displays the cumulative projects trip generation while Figure 6-1 shows the location of the cumulative projects.

Table 6.1 Cumulative Projects - Trip Generation

Cumulative Project	Land Use	Daily Trips	AM Peak Hour (In / Out)	PM Peak Hour (In / Out)
1. North West Village	Mixed-Use Residential/Commercial (100 dwelling units,	8,583	418 (223-in / 195-out)	854 (443-in / 411-out)
2. Creekside Pointe	Residential (24 townhomes)	144	12 (2-in / 10-out)	13 (9-in / 4-out)
Cumulative Total		**8,727**	**430 (225-in / 205-out)**	**867 (452-in / 415-out)**

Source: Chen Ryan Associates; August 2018.

As shown the cumulative projects would generate a total of 8,727 daily trips, 430 during the AM peak hour (225-in / 205-out) and 867 during the PM peak hour (452-in/415-out).

Figure 6-2 displays average daily roadway and peak hour intersection volumes for the study roadway segments and intersections under the Near-Term Year 2020 Base conditions.

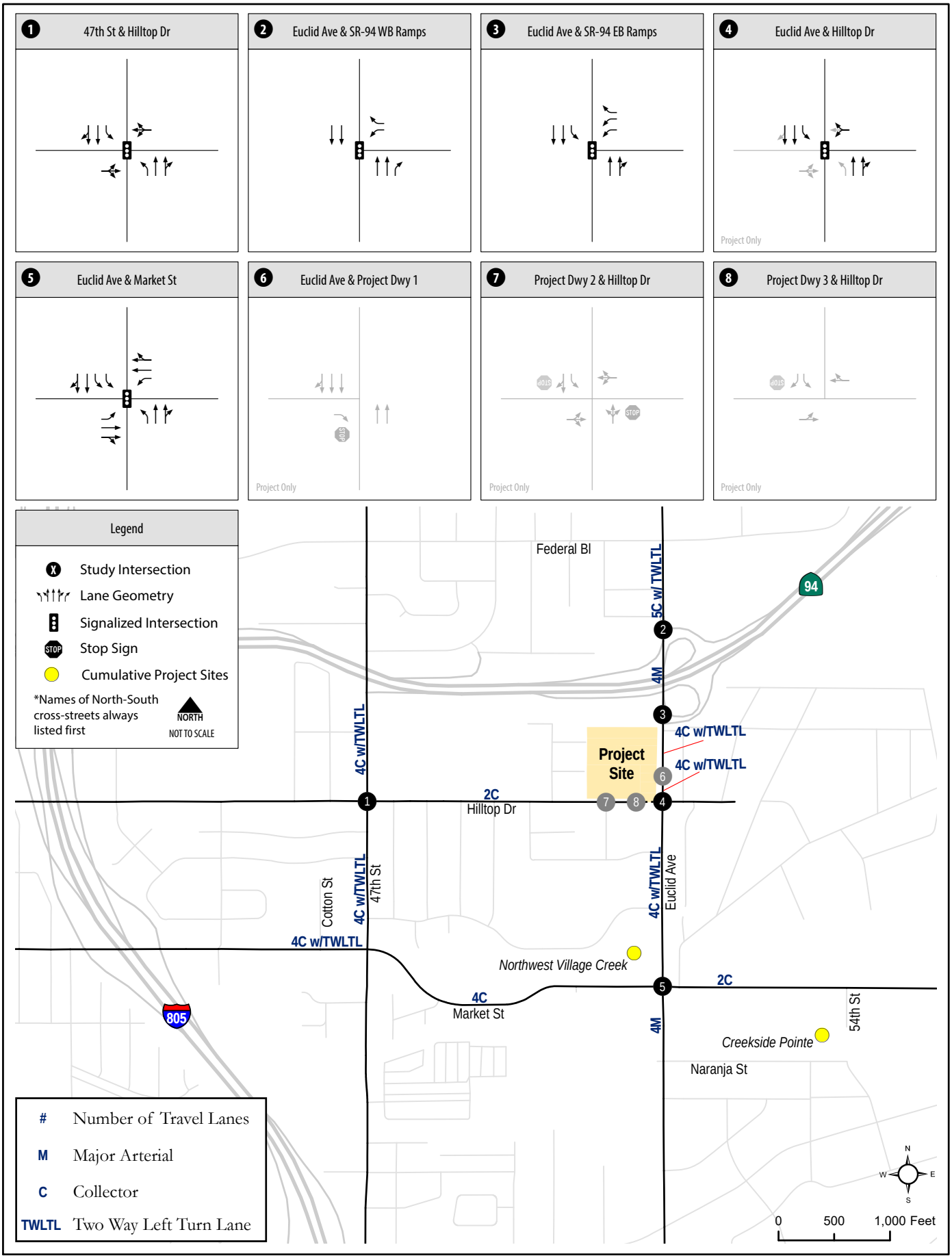
6.2 Near-Term Year 2020 Base Traffic Conditions

LOS analyses for the Near-Term Year 2020 Base conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS, as well as freeway ramp metering analysis results for Year 2020 Base conditions are discussed separately below.

Roadway Segment Analysis

Table 6.2 displays the LOS analysis results for key roadway segments under Near-Term Year 2020 Base conditions. As shown in Table 6.1, all of the study area roadway segments are projected to operate at an acceptable LOS under the Near-Term Year 2020 Base conditions with the exception of the following roadway segments:

- Euclid Avenue, between Federal Boulevard and SR-94 WB Ramps - LOS E;
- Euclid Avenue, between SR-94 WB Ramps and SR-94 EB Ramps - LOS E;
- Euclid Avenue, between SR-94 EB Ramps and Hilltop Drive - LOS F;
- Euclid Avenue, between Hilltop Drive and Market Street - LOS E;
- Market Street, between 47th Street and Euclid Avenue - LOS F; and
- Market Street, between Euclid Avenue and 54th Street - LOS F.



Hilltop + Euclid TIA

Figure 6-1

Roadway and Intersection Geometrics - Near-Term Year 2020 Base Conditions

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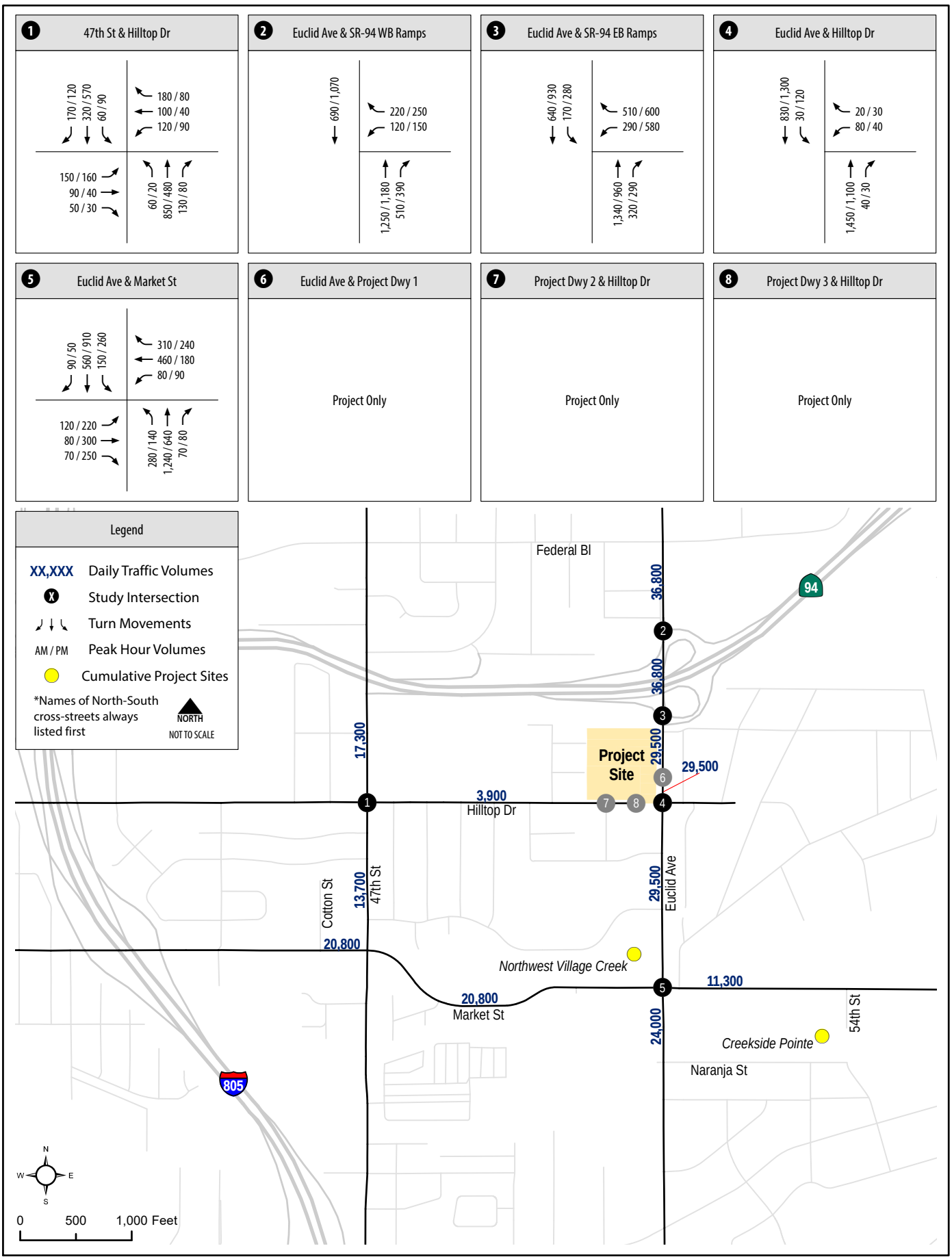

Hilltop + Euclid TIA

Figure 6-2
Traffic Volumes - Near-Term Year 2020 Base Conditions

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Table 6.2 Roadway Segment LOS Results - Near-Term Year 2020 Base Conditions

Roadway	Segment	Cross-Section	Threshold (LOS E)	ADT	V/C	LOS
47th Street	SR-94 EB Ramps and Hilltop Drive	4-Lane Collector (w/TWLTL)	30,000	17,270	0.576	C
	Hilltop Drive and Market Street	4-Lane Collector (w/TWLTL)	30,000	13,620	0.454	B
Euclid Avenue	Federal Boulevard and SR-94 WB Ramps	5-Lane Collector (w/TWLTL)	37,500	36,790	0.981	**E**
	SR-94 WB Ramps and SR-94 EB Ramps	4-Lane Major Arterial	40,000	36,360	0.909	**E**
	SR-94 EB Ramps and Hilltop Drive	4-Lane Collector (w/TWLTL)	30,000	36,360	1.212	**F**
	Hilltop Drive and Market Street	4-Lane Collector (w/TWLTL)	30,000	29,090	0.970	**E**
	Market Street and Naranja Street	4-Lane Major Arterial	40,000	23,930	0.598	C
Hilltop Drive	47th Street and Eastern Terminus	2-Lane Collector	8,000	3,870	0.484	C
Market Street	Cotton Street and 47th Street	4-Lane Collector (w/TWLTL)	30,000	20,780	0.693	D
	47th Street and Euclid Avenue	4-Lane Collector	15,000	20,780	1.385	**F**
	Euclid Avenue and 54th Street	2-Lane Collector	8,000	11,300	1.413	**F**

Source: Chen Ryan Associates; January 2018

Notes:
ADT = Average Daily Traffic
V/C = Volume to Capacity Ratio
LOS = Level of Service

Intersection Analysis

Table 6.3 displays intersection LOS and average vehicle delay results under Near-Term Year 2020 Base conditions. LOS calculation worksheets for the Near-Term Year 2020 Base conditions are provided in **Appendix F**.

Table 6.3 Peak Hour Intersection LOS Results – Near-Term Year 2020 Base Conditions

		AM Peak Hour		PM Peak Hour	
Intersection	Control	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1. 47th St and Hilltop Dr	Signal	16.1	B	8.8	A
2. Euclid Ave and SR-94 WB Ramps	Signal	9.9	A	8.6	A
3. Euclid Ave and SR-94 EB Ramps	Signal	30.4	C	29.2	C
4. Euclid Ave and Hilltop Dr	Signal	8.0	A	7.6	A
5. Euclid Ave and Market St	Signal	51.9	D	36.0	D

Source: Chen Ryan Associates; January 2018

Notes:
SSSC = Side Street Stop Controlled

As shown, all of the study area intersections are projected to operate at acceptable LOS D or better during both the AM and PM peak hours, under Near-Term Year 2020 Base conditions.

Ramp Metering Analysis

Table 6.4 summarizes the freeway ramp metering analysis results under Near-Term Year 2020 Base conditions.

Table 6.4 Ramp Metering Analysis – Near-Term Year 2020 Base Conditions

Location	Peak Hour	Demand [1] (veh/hr/pl)	Meter Rate [2] (veh/hr/pl)	Excess Demand [3] (veh/hr/pl)	Excess Delay [4] (min)	Excess Queue [5] (ft)
SR-94 WB On-Ramp (southbound approach) @ Euclid Avenue	AM	20	526	0	0	0
SR-94 WB On-Ramp (northbound approach) @ Euclid Avenue	AM	510	526	0	0	0
SR-94 EB On-Ramp @ Euclid Avenue	PM	570	372	198	31.94	5,750

Source: Chen Ryan Associates; January 2018

Notes:
[1] Demand is the peak hour demand expected to use the on-ramp per lane.
[2] Meter Rate is the lowest peak hour capacity expected to be processed through the ramp meter per lane. This value was obtained from Caltrans.
[3] Excess Demand = (Demand) – (Meter Rate) or zero, whichever is greater.
[4] Excess Delay = (Excess Demand / Meter Rate) X 60 min/hr.
[5] Excess Queue = (Excess Demand) X 29 ft/veh.

As shown in the table, the anticipated peak hour demand would not exceed the (most restrictive) ramp meter rate at either of the study ramp meter locations, with the exception of the SR-94 EB On-Ramp @ Euclid Avenue during the PM peak hour.

6.3 Near-Term Year 2020 Base Plus Project Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Near-Term Year 2020 Base Plus Project conditions were assumed to be identical to Existing Plus Project Base Conditions geometrics, with the exception of the SR-94 interchange improvements described in Section 6.1.

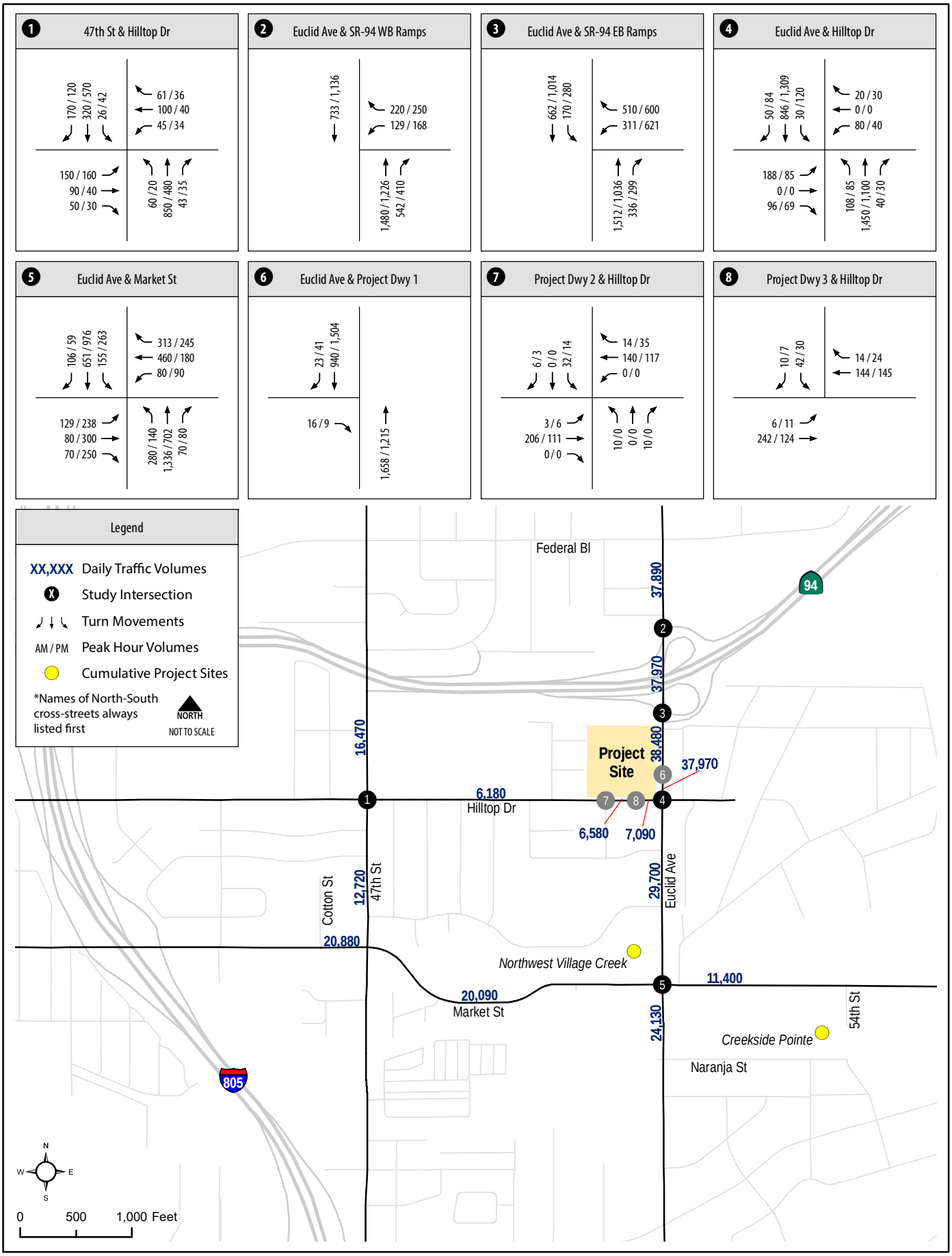
Near-Term Year 2020 Base Plus Project traffic volumes were derived by combining the Near-Term Year 2020 Base traffic volumes (displayed in Figure 6-1) with the project trip assignment volumes (displayed in Figure 3-3) and trips rerouting (Figure 5-2). Daily and peak hour intersection volumes for this scenario are displayed in **Figure 6-3**.

6.4 Near-Term Year 2020 Base Plus Project Traffic Conditions

Analyses were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS, as well as freeway ramp metering analysis results are discussed in the following sections.

Roadway Segment Analysis

Table 6.5 displays the LOS analysis results for key roadway segments under Near-Term Year 2020 Base Plus Project conditions.



Hilltop + Euclid TIA

Figure 6-3

Traffic Volumes - Near-Term Year 2020 Base Plus Project Conditions

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Table 6.5 Roadway Segment LOS Results - Near-Term Year 2020 Base Plus Project Conditions

Roadway	Segment	Cross-Section	Near-Term				Near-Term + Project				Δ	S?
			Threshold (LOS E)	ADT	V/C	LOS	Threshold (LOS E)	ADT	V/C	LOS		
47th Street	SR-94 EB Ramps and Hilltop Drive	4-Lane Collector (w/TWLTL)	30,000	17,270	0.576	C	30,000	16,470	0.549	C	-0.027	No
	Hilltop Drive and Market Street	4-Lane Collector (w/TWLTL)	30,000	13,620	0.454	D	30,000	12,720	0.424	B	-0.030	No
Euclid Avenue	Federal Boulevard and SR-94 WB Ramps	5-Lane Collector (w/TWLTL)	37,500	36,790	0.981	E	37,500	37,890	1.010	**F**	0.029	**Yes****
	SR-94 WB Ramps and SR-94 EB Ramps	4-Lane Major Arterial*	40,000	36,360	0.909	E	40,000	37,970	0.949	**E**	0.040	**Yes****
	SR-94 EB Ramps and Proposed Project Driveway #1	4-Lane Major Arterial*	30,000	36,720	1.212	**F**	40,000	38,480	0.962	**E**	-0.250	No
	Proposed Project Driveway #1 and Hilltop Drive	4-Lane Major Arterial	30,000	36,720	1.212	**F**	40,000	37,970	0.949	**E**	-0.263	No
	Hilltop Drive and Market Street	4-Lane Collector (w/TWLTL)	30,000	29,450	0.970	E	30,000	29,700	0.990	**E**	0.020	No
	Market Street and Naranja Street	4-Lane Major Arterial	40,000	23,930	0.598	C	40,000	24,130	0.603	C	0.005	No
Hilltop Drive	47th Street and Proposed Project Driveway #2	2-Lane Collector	8,000	3,870	0.484	C	8,000	6,180	0.648	D	0.289	No
	Proposed Project Driveway #2 and Proposed Project Driveway #3	2-Lane Collector	8,000	3,870	0.484	C	8,000	6,580	0.698	D	0.339	No
	Proposed Project Driveway #3 and Euclid Avenue	2-Lane Collector	8,000	3,870	0.484	C	8,000	7,090	0.800	D	0.403	No
Market Street	Cotton Street and 47th Street	4-Lane Collector (w/TWLTL)	30,000	20,780	0.693	D	30,000	20,880	0.696	D	0.003	No
	47th Street and Euclid Avenue	4-Lane Collector	15,000	20,780	1.385	**F**	15,000	20,090	1.339	**F**	-0.046	No
	Euclid Avenue and 54th Street	2-Lane Collector	8,000	11,300	1.413	**F**	8,000	11,400	1.425	**F**	0.013	Yes***

Source: Chen Ryan Associates; January 2018

Notes: ADT = Average Daily Traffic
V/C = Volume to Capacity Ratio
S? = Indicates if change in V/C ratio is significant
Δ = Change in V/C Ratio
* Assumed that the project will construct the center median, thus converting this portion of the roadway into a 4-Lane Major Arterial.
** See alternative analysis in Table 6.6
*** This roadway segment is buildout to its ultimate classification and this impact is consistent with the Encanto Community Plan FEIR, thus no additional mitigation would be require. See Section 6.5

As shown in the Table 6.5, similar to Near-Term 2020 Base conditions, all of the study area roadway segments are projected to continue operating at acceptable LOS D or better under Near-Term Year 2020 Base Plus Project conditions with the exceptions of the following:

- Euclid Avenue, between Federal Boulevard and SR-94 WB Ramps - LOS E;
- Euclid Avenue, between SR-94 WB Ramps and SR-94 EB Ramps - LOS E;
- Euclid Avenue, between SR-94 EB Ramps and Project Driveway #1 - LOS E;
- Euclid Avenue, between Project Driveway #1 and Hilltop Drive - LOS E;
- Euclid Avenue, between Hilltop Drive and Market Street -LOS E;
- Market Street, between 47th Street and Euclid Avenue -LOS F; and
- Market Street, between Euclid Avenue and 54th Street - LOS F.

Based on the City of San Diego Significance Criteria outlined in Section 2.5, the traffic associated with the Proposed Project would cause an increase in V/C greater than 0.02 for the following roadways segments:

- Euclid Avenue, between Federal Boulevard and SR-94 WB Ramps – LOS E; and
- Euclid Avenue, between SR-94 WB Ramps and SR-94 EB Ramps – LOS E;

Based on Section 2.5, an alternative analysis was conducted to assess segment impacts. As shown in Table 6.7, the signalized intersections on both ends of these roadway segments (Euclid Avenue and Federal Boulevard) – Euclid Avenue as per the Encanto CPU & Market Street as per Table 5.5 – are operating at acceptable LOS. These roadway segments are also built out to their ultimate classification as identified in the Encanto Community Plan. Based upon the criteria stated above, a Synchro HCM arterial analysis, which estimates average travel speed and facility level of service according to the roadway functional classification, was conducted for these roadway segment. **Table 6.6** displays the arterial level of service for the roadway segments under the Near-Term Year 2020 Base Plus Project conditions.

Table 6.6 Arterial Analysis Results - Near-Term Year 2020 Base Plus Project Conditions

Arterial Segment	Direction	Posted (Free Flow) Speed (mph)	AM Peak Hour		PM Peak Hour	
			Arterial Speed	LOS	Arterial Speed	LOS
Euclid Avenue, between SR-94 WB Ramps and SR-94 EB Ramps	NB	35	18.6	C*	16.5	D
	SB	35	20.2	C	18.3	C
Euclid Avenue, between SR-94 WB Ramps and SR-94 EB Ramps	NB	35	17.2	D	18.6	C
	SB	35	23.5	C	20.6	C

Source: Chen Ryan Associates; January 2018

Note:
* The Near-Term scenario includes the infrastructure upgrade SR-94 Interchange project which is expected to improve roadway operations, including the arterial speed.

As shown in the table, these roadway segments are projected to operate at acceptable LOS D or better under the Near-Term Year 2020 Plus Project conditions with the infrastructure upgrades as part of the SR-94 Interchange project. Therefore, no significant impacts are identified.

Intersection Analysis

Table 6.7 displays intersection LOS and average vehicle delay results under Near-Term Year 2020 Base Plus Project conditions. LOS calculation worksheets for the Year 2020 Base Plus Project conditions are provided in **Appendix G**.

Table 6.7 Peak Hour Intersection LOS Results –
Near-Term Year 2020 Base Plus Project Conditions

Intersection	Control	w/o Project				with Project				Change in Delay (sec)	SI?
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS		
1. 47th St and Hilltop Dr	Signal	16.1	B	8.8	A	11.1	B	8.1	A	-5.0*/ -0.7*	No
2. Euclid Ave and SR-94 WB Ramps	SSSC	9.9	A	8.6	A	11.2	B	8.8	A	1.3/0.2	No
3. Euclid Ave and SR-94 EB Ramps	SSSC	30.4	C	29.2	C	35.6	D	30	C	5.2/0.8	No
4. Euclid Ave and Hilltop Dr	Signal	8	A	7.6	A	19	B	16	B	11.0/8.4	No
5. Euclid Ave and Market St	Signal	51.9	D	36	D	53.2	D	40.6	D	1.3/4.6	No
6. Euclid Ave and Project Driveway #1	SSSC	N/A	N/A	N/A	N/A	13.8	B	19.1	C	N/A	No
7. Hilltop Avenue and Project Driveway #2	SSSC	N/A	N/A	N/A	N/A	11.9	B	10.6	B	N/A	No
8. Hilltop Avenue and Project Driveway #3	SSSC	N/A	N/A	N/A	N/A	11.5	B	10.5	B	N/A	No

Source: Chen Ryan Associates; January 2018

Notes:
SSSC = Side Street Stop Control
* = Decrease in delay due to new connection

As shown in Table 6.7, all of the study area intersections are projected to operate at acceptable LOS D or better during both the AM and PM peak hours under Near-Term Year 2020 Base Plus Project conditions. Based on the City of San Diego Significance Criteria outlined in Section 2.5, the traffic associated with the Proposed Project would not be associated with any impacts.

Ramp Metering Analysis

Table 6.8 summarizes the freeway ramp metering analysis results under Near-Term Year 2020 Base Plus Project conditions. As shown in the table, the anticipated peak hour demand would not exceed the most restrictive ramp meter rate at either of the study ramp meter locations, with the exception of the SR-94 EB On-Ramp @ Euclid Avenue during the PM peak hour. Based on the City of San Diego Significance Criteria outlined in Section 2.5, since the Proposed Project would not cause the ramp meter delay to increase by more than 2 minutes, therefore the traffic associated with the Proposed Project would not cause a significant impact to the SR-94 EB On-Ramp @ Euclid Avenue ramp meter.

Table 6.8 Ramp Metering Analysis - Near-Term Year 2020 Base Plus Project Conditions

Location	# of Lanes		Peak Hour	Demand [1] (veh/hr/pl)	Meter Rate [2] (veh/hr/pl)	Excess Demand [3] (veh/hr/pl)	Excess Delay [4] (min)	Excess Queue [5] (ft)	Storage Length (ft)	Near-Term Excess Queue (ft)	Near-Term Excess Delay (min)	Δ Excess Delay (min)	S?
	SOV	HOV											
SR-94 WB On-Ramp (southbound approach) @ Euclid Avenue	1	0	AM	20	526	0	0	0	360	0	0	0	No
SR-94 WB On-Ramp (northbound approach) @ Euclid Avenue	1	0	AM	542	526	16	1.83	475	510	0	0	0	No
SR-94 EB On-Ramp @ Euclid Avenue	1	0	PM	579	372	207	33.39	6,000	580	5,420	31.94	1.45	No

Source: Chen Ryan Associates; January 2018

Notes:

[1] Demand is the peak hour demand expected to use the on-ramp per lane.

[2] Meter Rate is the lowest peak hour capacity expected to be processed through the ramp meter per lane. This value was obtained from Caltrans.

[3] Excess Demand = (Demand) – (Meter Rate) or zero, whichever is greater.

[4] Excess Delay = (Excess Demand / Meter Rate) X 60 min/hr.

[5] Excess Queue = (Excess Demand) X 29 ft/veh

6.5 Impact Significance and Mitigation

Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would not cause a significant impact to any intersections, or ramp meters, within the project study area under Near-Term Year 2020 Base Plus Project conditions. The addition of project traffic would cause a significant impact to one roadway segment within the project study area under Near-Term Year 2020 Base Plus Project conditions.

Roadway Segment

Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would have a significant impact on Market Street, between Euclid Avenue and 54th Street. However, the roadway is already constructed to its ultimate classification per the Encanto Community Plan FEIR, and the Encanto Community Plan FEIR found it to be a significant and unmitigated impact. Thus, no additional mitigation would be required.

Intersection

No significant impacts were identified; therefore, no mitigation is required.

Ramp Meters

No significant impacts were identified; therefore, no mitigation is required.

7.0 Horizon Year 2035 Traffic Conditions

This section provides a description of Horizon Year 2035 Traffic conditions both with and without the Proposed Project. Scenarios analyzed in this section included:

- Horizon Year 2035 Base Conditions
- Horizon Year 2035 Base Plus Project Conditions

7.1 Horizon Year 2035 Base Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Horizon Year 2035 Base conditions were assumed to be identical to the Near-Term Year 2020 conditions, with the SR-94 interchange improvements completed.

Horizon Year 2035 daily traffic volumes were developed from the Encanto Community Plan EIR, SCH No. 2014051075 (Community Plan). Based on data obtained from the Community Plan land use shape file, the Encanto Community Plan EIR assumed that up to 236 residential and 26,704 SF of commercial uses would be constructed on the proposed project site. This land use assumption would generate approximately 2,552 average daily trips (149 during the AM peak hour and 243 during the PM peak hour. A screen shot of the land uses assumed in the Encanto Community Plan are provided in **Appendix H.** Since the Encanto Community Plan EIR assumed a land use that would generate more trips than the Proposed Project, trips associated with the site in the Encanto Community Plan EIR were subtracted from the Encanto Community Plan traffic projection in order to arrive at the Horizon Year 2035 Base (without project) conditions. Trip distribution patterns for the adopted land uses were assumed to be the same as the Proposed Project (as shown in Figure 3-3). An excerpt of the Community Plan and the Horizon Year 2035 Base conditions intersection turning movement volumes (see Intersection # 65, 66 and 67) are provided in Appendix H.

Figure 7-1 displays average daily roadway and peak hour intersection volumes for the study roadway segments and intersections under the Horizon Year 2035 Base Conditions

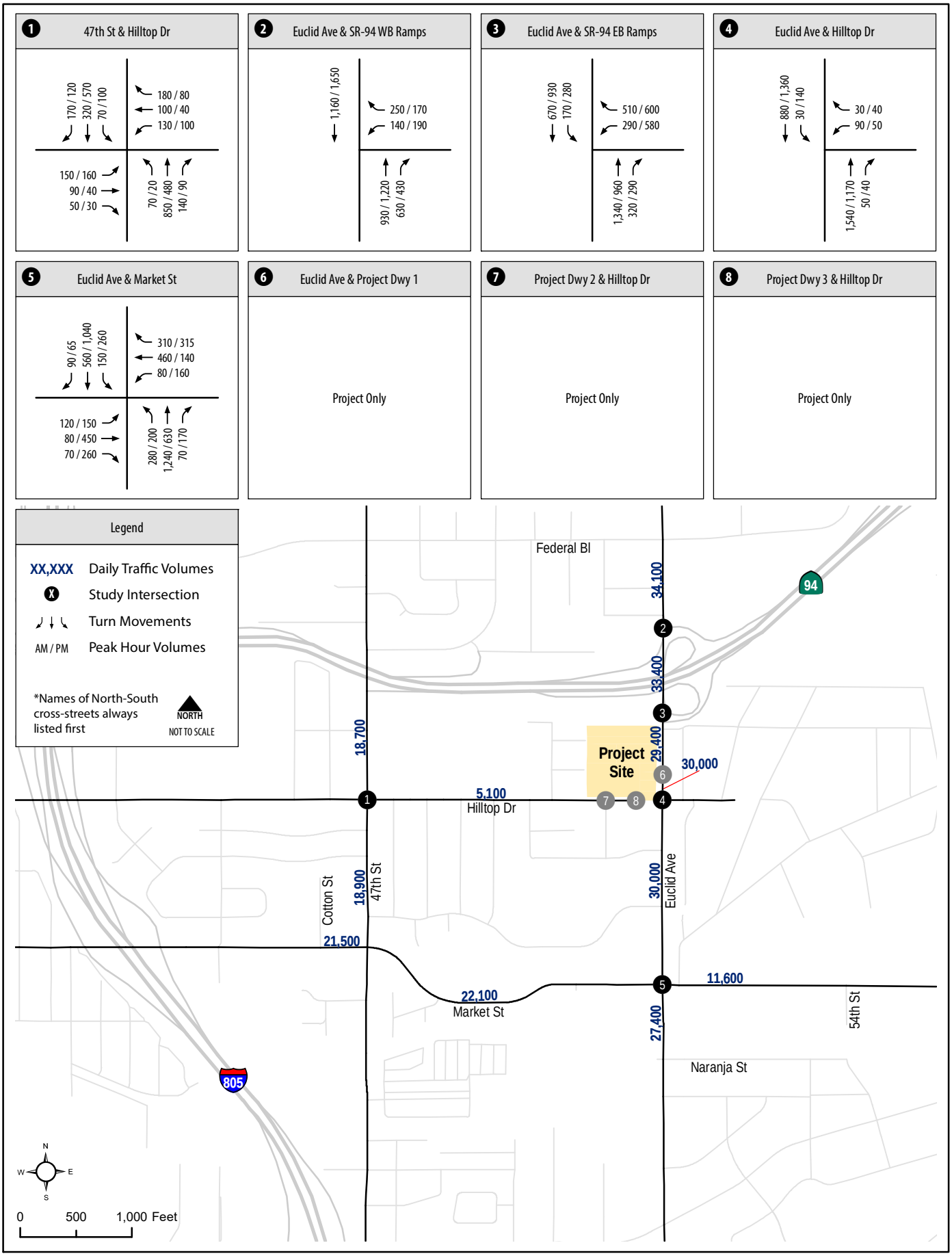
7.2 Horizon Year 2035 Base Traffic Conditions

LOS analyses for Horizon Year 2035 Base conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS, as well as freeway ramp metering analysis results are discussed in the following sections.

Similar to the Encanto Community Plan EIR, all signalized intersection operations/timing are also optimized under both horizon year scenarios.

Roadway Segment Analysis

Table 7.1 displays the LOS analysis results for key roadway segments under the Horizon Year 2035 Base conditions.



Hilltop + Euclid TIA

Figure 7-1
Traffic Volumes - Future Year 2035 Base Conditions

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Table 7.1 Roadway Segment LOS Results - Horizon Year 2035 Base Conditions

Roadway	Segment	Cross-Section	Threshold (LOS E)	ADT	V/C	LOS
47th Street	SR-94 EB Ramps and Hilltop Drive	4-Lane Collector (w/TWLTL)	30,000	18,700	0.623	C
	Hilltop Drive and Market Street	4-Lane Collector (w/TWLTL)	30,000	18,900	0.630	C
Euclid Avenue	Federal Boulevard and SR-94 WB Ramps	5-Lane Collector (w/TWLTL)	37,500	34,100	0.909	**E**
	SR-94 WB Ramps and SR-94 EB Ramps	4-Lane Major Arterial	40,000	33,400	0.835	D
	SR-94 EB Ramps and Hilltop Drive	4-Lane Collector (w/TWLTL)	30,000	29,400	0.980	**E**
	Hilltop Drive and Market Street	4-Lane Collector (w/TWLTL)	30,000	30,000	1.000	**E**
	Market Street and Naranja Street	4-Lane Major Arterial	40,000	27,400	0.685	C
Hilltop Drive	47th Street and Eastern Terminus	2-Lane Collector	8,000	5,100	0.638	D
Market Street	Cotton Street and 47th Street	4-Lane Collector (w/TWLTL)	30,000	21,500	0.717	D
	47th Street and Euclid Avenue	4-Lane Collector	15,000	22,100	1.473	**F**
	Euclid Avenue and 54th Street	2-Lane Collector	8,000	11,600	1.450	**F**

Source: Chen Ryan Associates; August 2018

Notes:
Bold letters indicate unacceptable LOS E or F
ADT = Average Daily Traffic
V/C = Volume to Capacity Ratio
LOS = Level of Service

As shown, all of the study area roadway segments are projected to continue operating at acceptable LOS D or better under Horizon Year 2035 Base conditions with the exception of the following:

- Euclid Avenue, between Federal Boulevard and SR-94 WB Ramps (LOS E)
- Euclid Avenue, between SR-94 EB Ramps and Hilltop Drive (LOS E);
- Euclid Avenue, between Hilltop Drive and Market Street (LOS E);
- Market Street, between 47th Street and Euclid Avenue (LOS F); and
- Market Street, between Euclid Avenue and 54th Street (LOS F).

Intersection Analysis

Table 7.2 displays intersection LOS and average vehicle delay results under Horizon Year 2035 Base conditions. LOS calculation worksheets are provided in **Appendix I**.

Table 7.2 Peak Hour Intersection LOS Results – Horizon Year 2035 Base Conditions*

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1. 47th St and Hilltop Dr	Signal	13.8*	B	8.1*	A
2. Euclid Ave and SR-94 WB Ramps	Signal	7.0*	A	7.9*	A
3. Euclid Ave and SR-94 EB Ramps	Signal	23.9*	C	25.3*	C
4. Euclid Ave and Hilltop Dr	Signal	8.7*	A	8.5*	A
5. Euclid Ave and Market St	Signal	45.4*	D	57.3*	**E**

Source: Chen Ryan Associates; August 2018

Note:
* As stated in Section 7.1, the Encanto Community Plan EIR assumed that up to 236 residential and 26,704 SF of commercial uses would be constructed on the proposed project site. This land use assumption would generate approximately 2,552 average daily trips (149 during the AM peak hour and 243 during the PM peak hour. Since the Encanto Community Plan EIR assumed a land use that would generate more trips than the Proposed Project, trips associated with the site in the Encanto Community Plan EIR were subtracted from the Encanto Community Plan traffic projection in order to arrive at the Horizon Year 2035 Base (without project) conditions

As shown in the table, all of the study area intersections would continue to operate at acceptable LOS D or better during the AM and PM peak hours under Horizon Year 2035 Base conditions with the exception of the following:

- Euclid Avenue & and Market Street – LOS E during the PM peak hour.

Ramp Metering Analysis

Table 7.3 summarizes the freeway ramp metering analysis results under Horizon Year 2035 Base conditions.

Table 7.3 Ramp Metering Analysis - Horizon Year 2035 Base Conditions

Location	Peak Hour	Demand [1] (veh/hr/pl)	Meter Rate [2] (veh/hr/pl)	Excess Demand [3] (veh/hr/pl)	Excess Delay [4] (min)	Excess Queue [5] (ft)
SR-94 WB On-Ramp (southbound approach) @ Euclid Avenue	AM	20*	526	0	0	0
SR-94 WB On-Ramp (northbound approach) @ Euclid Avenue	AM	510*	526	0	0	0
SR-94 EB On-Ramp @ Euclid Avenue	PM	570*	372	198	31.94	5,750

Source: Chen Ryan Associates; August 2018

Notes:
[1] Demand is the peak hour demand expected to use the on-ramp per lane.
[2] Meter Rate is the lowest peak hour capacity expected to be processed through the ramp meter per lane. This value was obtained from Caltrans.
[3] Excess Demand = (Demand) – (Meter Rate) or zero, whichever is greater.
[4] Excess Delay = (Excess Demand / Meter Rate) X 60 min/hr.
[5] Excess Queue = (Excess Demand) X 29 ft/veh.
* As stated in Section 7.1, the Encanto Community Plan EIR assumed that up to 236 residential and 26,704 SF of commercial uses would be constructed on the proposed project site. This land use assumption would generate approximately 2,552 average daily trips (149 during the AM peak hour and 243 during the PM peak hour. Since the Encanto Community Plan EIR assumed a land use that would generate more trips than the Proposed Project, trips associated with the site in the Encanto Community Plan EIR were subtracted from the Encanto Community Plan traffic projection in order to arrive at the Horizon Year 2035 Base (without project) conditions

As shown in the table, the anticipated peak hour demand would not exceed the lowest ramp meter rate at either of the study ramp meter locations, with the exception of the SR-94 EB On-Ramp @ Euclid Avenue during the PM peak hour.

As shown in the table, all of the study area intersections are projected to operate at acceptable LOS D or better during the AM and PM peak hours under Horizon Year 2035 Base conditions.

7.3 Horizon Year 2035 Base Plus Project Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Horizon Year 2035 Base Plus Project conditions were assumed to be identical to Near-term Year 2020 Base Plus Project conditions.

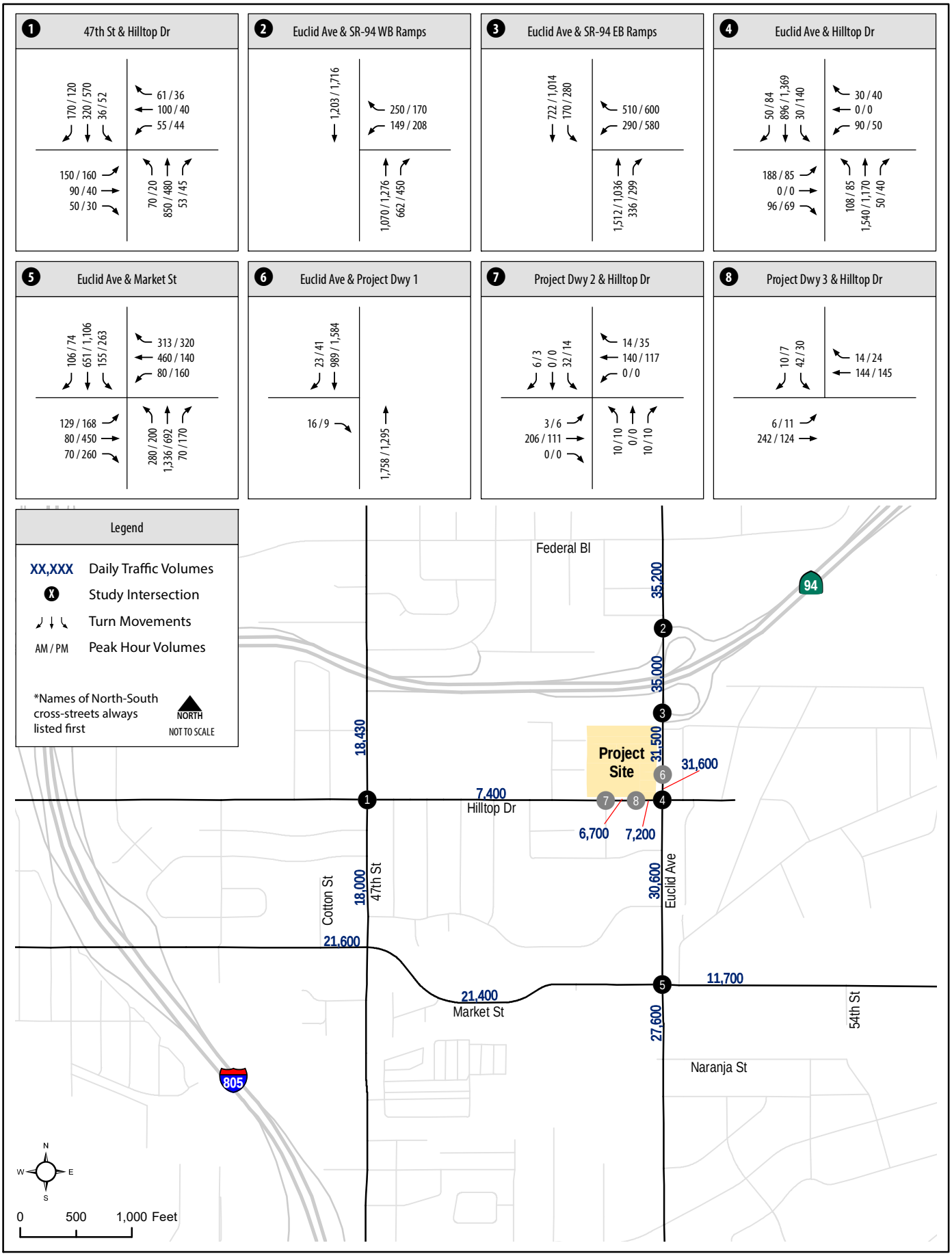
Horizon Year 2035 Base Plus Project traffic volumes were derived by combining the Horizon Year 2035 Base traffic volumes (displayed in Figure 7-1) with the project trip assignment volumes (displayed in Figure 3-3) and the trips rerouting (Figure 5-2). Daily and peak hour intersection volumes for this scenario are displayed in **Figure 7-2**.

7.4 Horizon Year 2035 Base Plus Project Traffic Conditions

LOS analyses were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS, as well as freeway ramp metering analysis results are discussed in the following sections.

Roadway Segment Analysis

Table 7.4 displays the LOS analysis results for key roadway segments under Horizon Year 2035 Base Plus Project conditions.



Hilltop + Euclid TIA

Figure 7-2
Traffic Volumes - Future Year 2035 Base Plus Project Conditions

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Table 7.4 Roadway Segment LOS Results - Horizon Year 2035 Base Plus Project Conditions

Roadway	Segment	Cross-Section	Future Year Base				Future Year + Project				Δ	S?
			ADT	V/C	LOS	Threshold (LOS E)	ADT	V/C	LOS	Threshold (LOS E)		
47th Street	SR-94 EB Ramp and Hilltop Drive	4-Lane Collector (w/TWLTL)	18,700	0.623	C	30,000	18,430	0.614	C	30,000	-0.009	No
	Hilltop Drive and Market Street	4-Lane Collector (w/TWLTL)	18,900	0.630	C	30,000	18,000	0.600	C	30,000	-0.030	No
Euclid Avenue	Federal Boulevard and SR-94 WB Ramps	5-Lane Collector (w/TWLTL)	34,100	0.909	**E**	37,500	35,200	0.939	**E**	37,500	0.030	**Yes****
	SR-94 WB Ramps and SR-94 EB Ramps	4-Lane Major Arterial	33,400	0.835	D	40,000	35,000	0.875	D	40,000	0.040	No
	SR-94 EB Ramps and Proposed Project Driveway #1	4-Lane Major Arterial	29,400	0.980	**E**	30,000	31,500	0.788	D	40,000	-0.192	No
	Proposed Project Driveway #1 and Hilltop Drive	4-Lane Major Arterial	30,000	1.000	**E**	30,000	31,600	0.770	D	40,000	-0.230	No
	Hilltop Drive and Market Street	4-Lane Major Arterial	30,000	1.000	**E**	30,000	30,600	0.765	D	40,000	-0.235	No
	Market Street and Naranja Street	4-Lane Major Arterial	27,400	0.685	C	40,000	27,600	0.690	C	40,000	0.005	No
Hilltop Drive	47th Street and Proposed Project Driveway #2	2-Lane Collector	5,100	0.638	D	8,000	7,400	0.925	**E**	8,000	0.287	**Yes****
	Proposed Project Driveway #2 and Proposed Project Driveway #3	2-Lane Collector	4,000	0.500	C	8,000	6,700	0.838	**E**	8,000	0.338	**Yes****
	Proposed Project Driveway #3 and Euclid Avenue	2-Lane Collector	4,000	0.500	C	8,000	7,200	0.900	**E**	8,000	0.400	**Yes****
Market Street	Cotton Street and 47th Street	4-Lane Collector (w/TWLTL)	21,500	0.717	D	30,000	21,600	0.720	D	30,000	0.003	No
	47th Street and Euclid Avenue	4-Lane Collector	22,100	1.473	**F**	15,000	21,400	1.427	**F**	15,000	-0.046	No
	Euclid Avenue and 54th Street	2-Lane Collector	11,600	1.450	**F**	8,000	11,700	1.463	**F**	8,000	0.013	Yes***

Source: Chen Ryan Associates; August 2018

Notes: Bold letters indicate unacceptable LOS E or F
ADT = Average Daily Traffic
V/C = Volume to Capacity Ratio
S? = Indicates if change in V/C ratio is significant
Δ = Change in V/C Ratio
** See alternative analysis in Table 7.5
*** This roadway segment is buildout to its ultimate classification and this impact is consistent with the Encanto Community Plan FEIR, thus no additional mitigation would be require. See Section 7.5

As shown in the Table 7.4, similar to Horizon Year 2035 Base conditions, all of the study area roadway segments are projected to continue operating at acceptable LOS D or better under Horizon Year 2035 Base Plus Project conditions with the exceptions of the following roadway segments:

- Euclid Avenue, between Federal Boulevard and SR-94 WB Ramps -LOS E;
- Hilltop Drive, between 47th Street and Proposed Project Driveway #2 – LOS E;
- Hilltop Drive, between Proposed Project Driveway #2 and Proposed Project Driveway #3 – LOS E;
- Hilltop Drive, between Proposed Project Driveway #3 and Euclid Avenue – LOS E;
- Market Street, between 47th Street and Euclid Avenue - LOS F; and
- Market Street, between Euclid Avenue and 54th Street - LOS F.

Based on the City of San Diego Significance Criteria outlined in Section 2.5, the traffic associated with the Proposed Project would cause an increase in V/C greater than 0.02 for the following roadways segments:

- Euclid Avenue, between Federal Boulevard and SR-94 WB Ramps – LOS E;
- Hilltop Drive, between 47th Street and Proposed Project Driveway #2 – LOS E;
- Hilltop Drive, between Proposed Project Driveway #2 and Proposed Project Driveway #3 – LOS E;
- Hilltop Drive, between Proposed Project Driveway #3 and Euclid Avenue – LOS E; and
- Market Street, between Euclid Avenue and 54th Street – LOS F.

Based on Section 2.5, an alternative analysis was conducted to assess segment impacts. As shown in Table 7.6, the signalized intersections on both ends of these roadway segments are anticipated to operate at acceptable LOS under Horizon Year 2035 Base Plus Project conditions. These roadway segments are also built out to their ultimate classification, as identified in the Encanto Community Plan. Based upon the criteria stated above, a Synchro HCM arterial analysis, which estimates average travel speed and facility level of service according to the roadway functional classification, was conducted for these roadway segment. **Table 7.5** displays the arterial level of service for the roadway segments under the Horizon Year 2035 Plus Project conditions.

Table 7.5 Arterial Analysis Results – Horizon Year 2035 Base Plus Project Conditions

Arterial Segment	Direction	Posted (Free Flow) Speed (mph)	AM Peak Hour		PM Peak Hour	
			Arterial Speed	LOS	Arterial Speed	LOS
Euclid Avenue, between Federal Boulevard and SR-94 WB Ramps	NB	35	20.4	C	20.3	C
	SB	35	19.6	C	16.9	D
Euclid Avenue, between SR-94 WB Ramps and SR-94 EB Ramps	NB	35	19.4	C	18.8	C
	SB	35	23.8	C	20.0	C
Hilltop Drive, between Proposed Project Driveway #2 and Proposed Project Driveway #3	EB	25	23.5	B	28.3	B
	WB	25	20.2	B	24.8	B
Hilltop Drive, between Proposed Project Driveway #3 and Euclid Avenue	NB	25	23.5	B	28.3	B
	SB	25	20.2	B	24.8	B

Source: Chen Ryan Associates; January 2018

As shown in the table, these roadway segments are projected to operate at acceptable LOS D or better under the Horizon Year 2035 Plus Project conditions with the infrastructure upgrades as part of the SR-94 Interchange project. Therefore, no significant impacts were identified.

Intersection Analysis

Table 7.6 displays intersection LOS and average vehicle delay results under Horizon Year 2035 Base Plus Project conditions. LOS calculation worksheets for this scenario are provided in **Appendix J**.

Table 7.6 Peak Hour Intersection LOS Results – Horizon Year 2035 Base Plus Project Conditions

Intersection	Control	Without Project				With Project				Change in Delay (sec)	SI?
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
1. 47th St and Hilltop Dr	Signal	13.8	B	8.1	A	9.4	A	7.4	A	-4.4/-0.7*	No
2. Euclid Ave and SR-94 WB Ramps	Signal	7	A	7.9	A	8.6	A	8.6	A	1.6/0.7	No
3. Euclid Ave and SR-94 EB Ramps	Signal	23.9	C	25.3	C	26.8	C	27.3	C	2.9/2.0	No
4. Euclid Ave and Hilltop Dr	Signal	8.7	A	8.5	A	21.8	C	12.1	B	13.1/3.6	No
5. Euclid Ave and Market St	Signal	45.4	D	57.3	**E**	51.3	D	58.0	**E**	5.9/0.7	No
6. Euclid Ave and Project Driveway #1	SSSC	N/A	N/A	N/A	N/A	14.2	B	20.1	C	N/A	No
7. Hilltop Avenue and Project Driveway #2	SSSC	N/A	N/A	N/A	N/A	11.9	B	10.6	B	N/A	No
8. Hilltop Avenue and Project Driveway #3	SSSC	N/A	N/A	N/A	N/A	12	B	10.9	B	N/A	No

Source: Chen Ryan Associates; August 2018

Notes:
SSSC = Side Street Stop Controlled
* = Decrease in delay due to new connection

As shown in the table, all of the study area intersections are anticipated to operate at acceptable LOS D or better during the AM and PM peak hours under Horizon Year 2035 Base Plus Project conditions with the exception of the following:

- Euclid Avenue & Market Street – LOS E during the PM peak hour.

Based upon the impact significance criteria presented in Section 2.5, the addition of the Proposed Project traffic would not result in a cumulative impact to any of the study intersections under Horizon Year 2035 Base Plus Project conditions.

Ramp Metering Analysis

Table 7.6 summarizes the freeway ramp metering analysis results under Horizon Year 2035 Base Plus Projects conditions.

As shown in the table, the anticipated peak hour demand would not exceed the lowest ramp meter rate at either of the study ramp meter locations, with the exception of the SR-94 EB On-Ramp @ Euclid Avenue during the PM peak hour. Based on the City of San Diego Significance Criteria outlined in Section 2.5, since the Proposed Project would not cause the ramp meter delay to increase by more than 2 minutes, therefore the traffic associated with the Proposed Project would not cause a significant impact to the SR-94 EB On-Ramp @ Euclid Avenue ramp meter.

Table 7.7 Ramp Metering Analysis - Horizon Year 2035 Base Plus Project Conditions

Location	# of Lanes SOV	# of Lanes HOV	Peak Hour	Demand [1] (veh/hr/pl)	Meter Rate [2] (veh/hr/pl)	Excess Demand [3] (veh/hr/pl)	Excess Delay [4] (min)	Excess Queue [5] (ft)	Storage Length (ft)	Horizon Year 2035 Excess Queue (ft)	Horizon Year 2035 Excess Delay (min)	Δ Excess Delay (min)	S?
SR-94 WB On-Ramp (southbound approach) @ Euclid Avenue	1	0	AM	20	526	0	0	0	360	0	0	0	No
SR-94 WB On-Ramp (northbound approach) @ Euclid Avenue	1	0	AM	632	526	106	12.09	3,075	510	0	0	0	No
SR-94 EB On-Ramp @ Euclid Avenue	1	0	PM	579	372	207	33.39	6,000	580	5,420	31.94	1.45	No

Source: Chen Ryan Associates; August 2018

Notes:
[1] Demand is the peak hour demand expected to use the on-ramp per lane.
[2] Meter Rate is the lowest peak hour capacity expected to be processed through the ramp meter per lane. This value was obtained from Caltrans.
[3] Excess Demand = (Demand) – (Meter Rate) or zero, whichever is greater.
[4] Delay = (Excess Demand / Meter Rate) X 60 min/hr.
[5] Queue = (Excess Demand) X 29 ft/veh.

7.5 Impact Significance and Mitigation

Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would not cause a significant impact to any intersections, or freeway ramp meter under Horizon Year 2035 Plus Project conditions. The addition of project traffic would cause a cumulative impact to one roadway segment under Horizon Year 2035 Plus Project conditions.

Roadway Segment

Based upon the significance criteria presented in Section 2.5 of this report, the addition of project traffic would have a significant impact on Market Street, between Euclid Avenue and 54th Street. However, the roadway is already constructed to its ultimate classification per the Encanto Community Plan FEIR, and the Encanto Community Plan FEIR found it to be a significant and unmitigated impact. Thus, no additional mitigation would be required.

Intersection

No significant impacts were identified; therefore, no mitigation is required.

Ramp Meters:

No significant impacts were identified; therefore, no mitigation is required.

It should be noted that the Encanto Community Plan identified 47th Street between Market Street and the northern Encanto Community limit as a 2-lane roadway with continuous left turn lane. However, since the road diet is currently not identified in the City of San Diego's CIP list, this study did not assume the road diet. However, for informational purposes an additional analysis was conducted assuming the reconfiguration of 47th Street between Market Street and the northern Encanto Community limit as a 2-lane roadway with continuous left-turn lane. This analysis is provided in Section 10 and **Appendix K**.

8.0 Site Access and Parking

This chapter addresses site access and parking based on the proposed site plan.

8.1 Site Access

The Proposed Project will provide access via three driveways, one on Euclid Avenue (280 ft north of Hilltop Drive) and two on Hilltop Drive. A discussion of each driveway is provided below:

- Project Driveway #1, proposed to be located on Euclid Avenue approximately 280 feet north of the Euclid Avenue / Hilltop Drive intersection. This driveway would be constructed as a right-in / right-out only via the project's installation of a raised median on Euclid Avenue. This driveway will provide access to the multifamily and commercial portion of the Proposed Project site.

- Proposed Driveway #2 is proposed to be located off of Hilltop Drive, approximately 500 feet west of the Euclid Avenue / Hilltop Drive intersection and will form the fourth leg of the intersection of Hilltop Drive / Hal Street. This driveway will provide access to the single-family portion of the Proposed Project site.

- Proposed Driveway #3 is proposed to be located off of Hilltop Drive, approximately 160 feet west of the Euclid Avenue / Hilltop Drive intersection. This driveway will provide access to the multifamily and commercial portion of the Proposed Project site.

The three driveways are anticipated to operate at acceptable levels of service or better under all project study scenarios.

8.2 Parking

The project is proposing to provide 237 parking spaces, and 7 ADA compliant parking spaces (3 of which will be Accessible Van parking spaces). Per City Municipal Code (Article 2, Division 5 Parking Regulations, Table 142-05C) regarding Multiple Dwelling Units and related Accessory Uses, and City Municipal Code Table 142-05E (Parking Ratios for Retail Sales, Commercial Services, Offices, and Mixed-Use Development), and Assembly Bill 744 (Planning and Zoning: Density Bonuses – Approved on 10/09/2015), the following minimum parking requirement would be applicable to the Proposed Project:

- Single Family Housing Units – 2.0 automobile spaces per dwelling unit (DU);
- Retail Sales – 2.5 spaces per 1,000 SF; and
- Affordable housing near transit – 0.5 parking spaces per DU (Table 143-07D). .1 motorcycle spaces per DU, and 0.4-0.6 bicycle parking spaces per DU.;

Table 8.1 summarizes the required number of parking spaces in which the Proposed Project must provide for automobiles, motorcycles and bicycles.

Table 8.1 Minimum Parking Spaces Required

Type	Requirement	Rate	Units	Required number of Parking Spaces	Proposed Parking Spaces
Single Family Site					
Single Family Homes (3-4 Bedrooms)	Project Requirement	2 spaces / DU	20 DU	40 parking spaces	94 (assigned) parking spaces 12 (unassigned) visitor spaces
Town Homes	Project Requirement	2 spaces / DU	27 DU	54 parking spaces	
	N/A	0.1 space / unit	54 parking spaces	5 motorcycle spaces	5 motorcycle spaces
Mixed-Use Site					
Affordable housing	(Table 143-07D)	0.5 spaces / DU	113 DU	57 parking spaces	99 parking spaces (assigned)
Affordable housing – ADA	CBC 1109A.4	2% of Assigned Residential Spaces	57 parking spaces	1 standard accessible parking space & 1 van accessible parking space	3 standard accessible parking spaces & 1 van accessible parking space
Electric Vehicle Stations	Project Requirement	-	-	5 Standard Spaces 1 Standard Accessible 1 Van Accessible	5 Standard Spaces 1 Standard Accessible 1 Van Accessible
Motorcycle Parking	(SDMC Table 142-05C)	0.1 spaces / DU	113 DU	11.3 motorcycle parking spaces	12 motorcycle parking spaces
Bicycle Parking	Project Requirement (SDMC Table 142-05C)	Studio : 0.4/unit 1 BDR : 0.4/unit 2 BDR : 0.5/unit 3-4 BDR : 0.6/unit	Studio : 14 1 BDR : 23 2 BDR : 37 3 BDR : 21 4 BDR : 18	57 long term bike lockers	57 long term bike lockers
Specialty Commercial	Project Requirement	2.5 spaces / 1 ksf	8.5 ksf	21 parking spaces	20 standard parking spaces
Specialty Commercial – ADA	CBC Table 11B-208.2	-	-	1 van accessible parking space	1 van accessible parking spaces
Motorcycle Parking	Project Requirement	2% of total parking spaces	21 parking spaces	1 motorcycle parking spaces	2 motorcycle parking spaces
Bicycle Parking	Project Requirement	5% of total parking spaces	21 parking spaces	1 bicycle parking spaces	2 short term bike racks
Off Street Loading Space	SDMC Table 142-10B	1 space / 200 ksf	145 ksf	1 loading space	1 loading space

Source: City of San Diego Municipal Code, Article 2, Division 5 Parking Regulations; AB744

As shown in Table 8.1, the Proposed Project will provide 106 parking spaces for the single family / town home site and 131 parking spaces for the mixed-use site. In compliance with the City of San Diego Climate Action Plan, 7 out of the 237 parking spaces will be electrical vehicle charging spaces (1 accessible parking space). Detailed parking calculations are provided in **Appendix L.** Additionally, the Proposed Project will remove 6 existing on-street parking spaces on Euclid Avenue but add 19 on-street parking spaces by constructing Hilltop Drive, yielding a net gain of 13 on-street parking spaces.

9.0 Transport ation Demand Management (TDM), Pedestrian, Bicycle and Transit Assessment

This chapter discusses the project's potential impacts to active transportation modes (bicycling and walking) and transit.

9.1 Transportation Demand Management (TDM)

The project applicant will implement a Transportation Demand Management (TDM) program to reduce single occupant vehicle trips in favor of alternative modes of transportation. The TDM program would facilitate increased opportunities for transit, bicycling, and pedestrian travel, as well as provide the resources, means and incentives for ridesharing and carpooling opportunities. The project will:

1. The Property Management Company shall coordinate with SANDAG's iCommute program to setup a Carpool, Vanpool, and rideshare programs for the Proposed Project and provide these information as part of the "new resident/renter" package.
2. Affirmed Housing shall coordinate with SANDAG's iCommute program to setup Carpool, Vanpool, and rideshare programs for the Proposed Project and provide this information as part of the "new resident/home owner" package.
3. The Project Applicant shall promote available websites (such as MTS transit website or SANDAG iCommute) providing transportation options for residents and businesses via the new resident package as well as on the project website.
4. Create and distribute a "new resident" information packet containing information on alternative modes of transportation.

9.2 Active Transportation Facilities and Connectivity

Pedestrians

Sidewalks are currently provided on both sides of Euclid Avenue within the project study area. The Proposed Project will reconstruct the sidewalk along the project frontage on Hilltop Drive and Euclid Avenue as a part of the project feature. Along Hilltop Drive, sidewalks are existing along the northern side of the roadway (between 47th Street and the western project boundary) and along the southern side of Hilltop Drive (between 47th Street and the existing eastern terminus. Hilltop Drive provides connection from the project site to Gompers Preparatory Academy to the west, and a residential neighborhood to the east, whereas Euclid Avenue provides connection to commercial shopping centers located both to north of SR-94 and south of the proposed project site. Euclid Avenue also provides connection to the Euclid Avenue Trolley Station, which is located within walking distance (0.3 miles) from the project site. Decorative crosswalk (colored pavement crosswalk) are currently existing along the northern, eastern, and southern leg of the Euclid Avenue & Hilltop Drive intersection, and continental crosswalks will be installed on all 4 legs of the Euclid Avenue & Hilltop Drive intersection.

The following pedestrian improvement will be provided as a part of the project:

- Install continental crosswalks across all approaches of the Euclid Avenue & Hilltop Drive intersection.
- Includes a comprehensive pedestrian network that was designed to provide safe bicycle and pedestrian access between the residential, and commercial areas of the project site. Pedestrian access to the Proposed Project are provided via sidewalks located at each of the driveways, as well as a pedestrian path connecting the Proposed Project to Euclid Avenue, the pedestrian path is located between building B1 and B2 (as shown in Figure 3-1). The project will also provide a pedestrian walkway connecting the project to Carolina Place, connecting existing residents along Carolina Place to the commercial area of the Proposed Project. Access from the western part of the Proposed Project to the eastern part of the Proposed Project will be provided via a pedestrian bridge across the existing creek.
- The Project Applicant shall provide 2 short-term bicycle racks and 2 long-term bicycle storage lockers adjacent to commercial developments and affordable housing area within the Proposed Project site.

Sidewalks are also provided along all streets within the project study area. All of the signalized intersections in the study area include crosswalks, pedestrian signal heads, and American with Disabilities Act (ADA)-compliant ramps, where crossings are allowed, with the exception of the following:

- The eastern leg of Euclid Avenue and SR-94 westbound ramps currently lack yellow truncated domes on the pedestrian ramps.
- The western leg of Euclid Avenue and SR-94 eastbound ramps current lack yellow truncated domes on the pedestrian ramps.

It is assumed that the missing truncated dome at the two SR-94 interchanges would be improved as a part of the SR-94 interchange project.

Bicyclists

There are currently no bicycle facilities directly accessing the project site on Hilltop Drive but "Bike Route" and "Share the Road" signs are present on both sides of Euclid Avenue, indicating the presence of a Class III bike route along Euclid Avenue encompassing the study area. The Encanto Community Plan identifies the following planned bicycle facilities within the project study area:

- 47th Street – One-way cycle track with on-street parking in both directions between SR-94 EB on-ramp and Hartley Street;
- Euclid Avenue – Buffered Class II bike lanes in both directions between SR-94 EB Ramps and Market Street;
- Hilltop Drive – Enhanced Class III bike route between 47th Street and Euclid Avenue;
- Market Street – One-way cycle track without on-street parking in both directions between 47th Street and Euclid Avenue.

The Proposed Project will construct a Buffered Class II bike lane along the project frontage (western side of Euclid Avenue between SR-94 EB Ramp and Hilltop Drive) as a part of the project feature.

Transit

The proposed project will provide a bench at the bus stop located at the proposed project frontage at the intersection of Euclid Avenue and Hilltop Drive. In addition, the project applicant will apply for grants in order to further enhance the bus stop.

The Proposed Project is located near the Orange Line (0.3 miles from the Euclid Avenue Trolley Station and 0.9 miles from the 47th Street Station), and MTS bus routes 916/917 & 955 currently stop directly in front of the Proposed Project site.

MTS Bus Route #916/917 – Runs in a two-way loop from the Euclid Avenue Trolley Station, to the College Grove Shopping Center, then Lemon Grove, along Massachusetts Avenue, back to the Euclid Avenue Trolley Station. The route serves the communities of Encanto, City Heights, Eastern, College and the City of Lemon Grove. Route 916/917 currently runs between 5:20 AM and 10:35 PM on weekdays; 6:20 AM and 9:35 PM on Saturdays; and does not operate on Sundays. Route 916/917 runs at 30-minute headways along the western half of the loop (Euclid Avenue Trolley Station via 54th Street to the College Grove Shopping Center) during its weekday morning and afternoon peak periods, and 1-hour headways during the remaining hours of service. Along the eastern half of the loop (Euclid Avenue Trolley Station via Massachusetts Avenue to the College Grove Shopping Center), Route 916/917 runs at 1-hour headways.

MTS Bus Route #955– Runs from San Diego State University in the College Community to the 8th Street Trolley Station in National City. Within the community of Southeastern, Route 955 runs along Logan Avenue and 43rd Avenue, providing service to the Euclid Avenue Trolley Station. Route 955 currently runs between 4:55 AM and 11:40 PM on weekdays; 5:34 AM and 11:40 PM

on Saturdays; and 5:58 AM and 9:41 PM on Sundays. Route 955 runs at 15-minute headways during weekday peak periods, and 30-minute headways during the remaining hours of service.

Trolley (Orange Line) – The Euclid Trolley Station is currently served by the San Diego Trolley Orange Line, with stops at 47th Street Station and Euclid Trolley Station. The Orange Line runs between downtown San Diego and the Santee Town Center. The Orange Line covers 20.7 miles with 15-minute service Mondays to Saturdays, and 30-minute service during the late-evenings, weekend mornings, and Sundays. It serves a total of 23 stations. The Euclid Trolley Station also provides transfer/stops for the following MTS bus routes:

- *MTS Bus Route #3* - (UCSD Hospital to Euclid Transit Center);
- *MTS Bus Route #4* - (12th & Imperial Trolley to Lomita Village);
- *MTS Bus Route #5* - (Downtown San Diego to Euclid Transit Center);
- *MTS Bus Route #13* - (Kaiser Hospital to 24th Street Trolley);
- *MTS Bus Route #60* - (Euclid Trolley Station to UTC via Convoy);
- *MTS Bus Route #916 & #917* (Oak Park to Emerald Hills Loop CW); and
- *MTS Bus Route #955* - (National City to San Diego State University).

Table 9.1 displays the observed boardings and alightings at the bus routes that serve Euclid Avenue, collected on Thursday, January 18, 2018.

Table 9.1 Bus Routes along Euclid Avenue – Boardings and Alightings

Route	Time	Direction	Passengers	Boardings	Alightings	Capacity	% Occupancy
917	7:36 AM	SB	6	0	0	26	23%
955	7:41 AM	NB	17	0	0	36	47%
955	7:58 AM	SB	9	0	0	36	25%
917	8:04 AM	SB	2	0	0	35	6%
955	8:13 AM	NB	24	1	0	36	67%
916	8:24 AM	NB	1	0	0	35	3%
955	8:27 AM	NB	18	0	0	35	51%
955	8:28 AM	SB	5	1	1	36	14%
917	4:07 PM	SB	10	0	1	26	38%
955	4:12 PM	NB	19	0	0	36	53%
955	4:32 PM	SB	7	0	0	36	19%
917	4:39 PM	SB	13	0	1	35	37%
955	4:50 PM	NB	27	0	2	36	75%
916	5:39 PM	NB	5	0	0	35	14%
955	5:54 PM	NB	21	0	0	35	60%
955	5:55 PM	SB	4	0	0	36	11%

Source: Chen Ryan Associates; August 2018.

As shown in Table 9.1, the highest percentage occupancy observed at the bus routes serving Euclid Avenue was 75% for bus route 955 during the PM peak period. The rest of the bus routes were observed between 3% and 67% capacity. Therefore, the proposed project is not anticipated to have a negative impact to transit capacity.

Project Impacts

Potential impacts relating to pedestrian, bicycle and transit circulation would be considered significant if the Proposed Project would substantially increase hazards due to a design feature, or would conflict with the adopted policies plans, or programs supporting alternative transportation, as outlined in Appendix G of the *California Environmental Quality Act (CEQA) Guidelines*. Based on an initial review of the project site plan the Proposed Project would not generate any significant impacts associated with pedestrian, bicycle or transit facilities.

10.0 47th Street Reconfiguration

This section focuses on 47th Street and analyzes its future configuration as identified in the Encanto Community Plan. The Encanto Community Plan identified 47th Street between Market Street and the northern Encanto Community limit as a 2-lane roadway with continuous left turn lane. However, since the road diet is currently not identified in the City of San Diego's CIP list, the analysis presented below is for informational purposes only.

Scenarios analyzed in this section included:

- Horizon Year 2035 Base with 47th Street Road Diet Conditions
- Horizon Year 2035 Base with 47th Street Road Diet Plus Project Conditions

10.1 Horizon Year 2035 Base with 47th Street Road Diet Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Horizon Year 2035 Base conditions are consistent with the Encanto Community Plan.

10.2 Horizon Year 2035 Base with 47th Street Road Diet Traffic Conditions

Roadway and intersection volumes under Horizon Year 2035 Base with 47th Street Road Diet conditions are identical to those in Figure 7-1. LOS analyses for Horizon Year 2035 Base with 47th Street Road Diet conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS analysis results are discussed in the following sections.

Roadway Segment Analysis

Table 10.1 displays the LOS analysis results for key roadway segments under the Horizon Year 2035 Base with 47th Street Road Diet conditions.

Table 10.1 Roadway Segment LOS Results - Horizon Year 2035 with 47th Street Road Diet Base Conditions

Roadway	Segment	Cross-Section	Threshold (LOS E)	ADT	V/C	LOS
47th Street	SR-94 EB Ramps and Hilltop Drive	2-Lane Collector (w/TWLTL)	15,000	18,700	1.247	**F**
	Hilltop Drive and Market Street	2-Lane Collector (w/TWLTL)	15,000	18,900	1.260	**F**

Source: Chen Ryan Associates; August 2018

Notes:
Bold letters indicate unacceptable LOS E or F
ADT = Average Daily Traffic
V/C = Volume to Capacity Ratio
LOS = Level of Service

As shown, the two study area roadway segments are projected to operate at substandard LOS F under Horizon Year 2035 Base with 47th Street Road Diet conditions.

Intersection Analysis

Table 10.2 displays intersection LOS and average vehicle delay results under Horizon Year 2035 Base with 47th Street Road Diet conditions. LOS calculation worksheets are provided at the end of this appendix.

Table 10.2 Peak Hour Intersection LOS Results – Horizon Year 2035 with 47th Street Road Diet Base Conditions

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1. 47th Street and Hilltop Drive	Signal	41.5	D	11.4	B

Source: Chen Ryan Associates; August 2018

As shown in the table, the study area intersection is anticipated to operate at acceptable LOS D or better during the AM and PM peak hours under Horizon Year 2035 Base with 47th Street Road Diet conditions.

10.3 Horizon Year 2035 Base Plus Project with 47th Street Road Diet Traffic Conditions

LOS analyses were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS analysis results are discussed in the following sections.

Roadway Segment Analysis

Table 10.3 displays the LOS analysis results for key roadway segments under Horizon Year 2035 Base with 47th Street Road Diet Plus Project conditions.

Table 10.3 Roadway Segment LOS Results - Horizon Year 2035 Base with 47th Street Road Diet Plus Project Conditions

Roadway	Segment	Cross-Section	Threshold (LOS E)	Future Year Base			Future Year + Project			Δ	S?
				ADT	V/C	LOS	ADT	V/C	LOS		
47th Street	SR-94 EB Ramp and Hilltop Drive	2-Lane Collector (w/TWLTL)	15,000	18,700	1.247	**F**	18,430	1.229	**F**	-0.018	No
	Hilltop Drive and Market Street	2-Lane Collector (w/TWLTL)	15,000	18,900	1.260	**F**	18,565	1.238	**F**	-0.022	No

Source: Chen Ryan Associates; August 2018

Notes:
Bold letters indicate unacceptable LOS E or F
ADT = Average Daily Traffic
V/C = Volume to Capacity Ratio
S? = Indicates if change in V/C ratio is significant
Δ = Change in V/C Ratio

As shown in the Table 10.3, similar to Horizon Year 2035 Base conditions, all of the study area roadway segments are projected to operate at substandard LOS F.

Based on the City of San Diego Significance Criteria, outlined in Section 2.5, the traffic associated with the Proposed Project traffic would not result in a cumulative impact to any of the study roadway segments under Horizon Year 2035 Base with 47th Street Road Diet Plus Project conditions.

Intersection Analysis

Table 10.4 displays intersection LOS and average vehicle delay results under Horizon Year 2035 Base with 47th Street Road Diet Plus Project conditions. LOS calculation worksheets for this scenario are provided after this appendix.

Table 10.4 Peak Hour Intersection LOS Results –
Horizon Year 2035 Base Plus Project Conditions

Intersection	Control	Without Project				With Project				Change in Delay (sec)	SI?
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
1. 47th St and Hilltop Dr	Signal	41.5	D	11.4	B	19.2	B	10.1	B	-22.3/-1.3*	No

Source: Chen Ryan Associates; August 2018

Notes:
* = Decrease in delay due to new connection

As shown in the table, the study area intersection is projected to operate at acceptable LOS B during the AM and PM peak hours under Horizon Year 2035 Base with 47th Street Road Diet Plus Project conditions.

Based upon the impact significance criteria presented in Section 2.5, the addition of the Proposed Project traffic would not result in a cumulative impact to any of the study intersections under Horizon Year 2035 Base with 47th Street Road Diet Plus Project conditions.

Appendix A SR-94 Interchange Project

LINSCOTT LAW & GREENSPAN engineers

TRAFFIC OPERATIONS STUDY

SR 94 / EUCLID AVENUE INTERCHANGE
PRELIMINARY TRAFFIC ENGINEERING

San Diego, California
September 14, 2012

LLG Ref. 3-07-6350-47

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TRAFFIC OPERATIONS STUDY

SR 94 / EUCLID AVENUE INTERCHANGE PROJECT
PRELIMINARY TRAFFIC ENGINEERING

San Diego, California
September 14, 2012

1.0 INTRODUCTION

Linscott, Law & Greenspan, Engineers (LLG) has prepared the following preliminary traffic engineering study for the SR 94 / Euclid Avenue Interchange project in the City of San Diego. The following study evaluates existing and future traffic operations of the Euclid Avenue corridor at State Route 94 between Federal Boulevard and Market Street.

The purpose of this study is to develop project alternatives to improve traffic operations, safety and overall mobility for all users at this interchange. The estimated cost of these alternatives will help guide the City of San Diego to determine an appropriate project initiation process such as a Permit Engineering Evaluation Report (PEER) or a Project Study Report (PSR).

The traffic analysis presented in this report encompasses the following key areas:

- Project description
- Existing conditions assessment
- Planned roadway improvements
- Cumulative projects
- Forecast volumes
- Analysis approach and methodology
- Near-Term and Long-Term analyses
- Alternatives evaluation
- Recommendations

The study area for this project encompasses areas of anticipated impact related to the project. The scope of the study area was developed under the direction from the City of San Diego and Caltrans in conjunction with traffic study guidelines of the region, a review of approved traffic studies in the project area, and a working knowledge of the local transportation system.

No engineering feasibility or opinions of probable costs are included in this study.

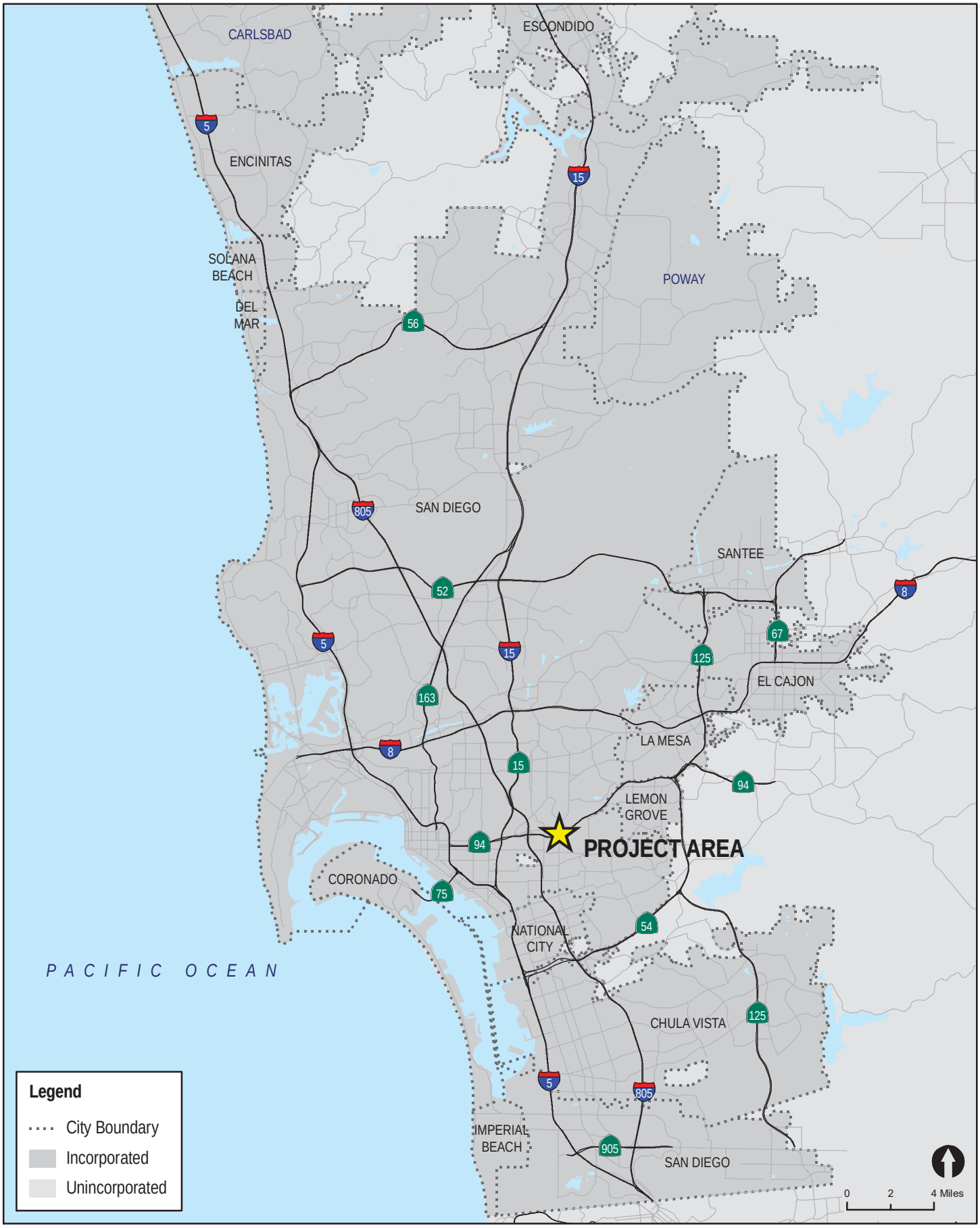

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Figure 1-1

Vicinity Map

SR-94 / Euclid Avenue Interchange

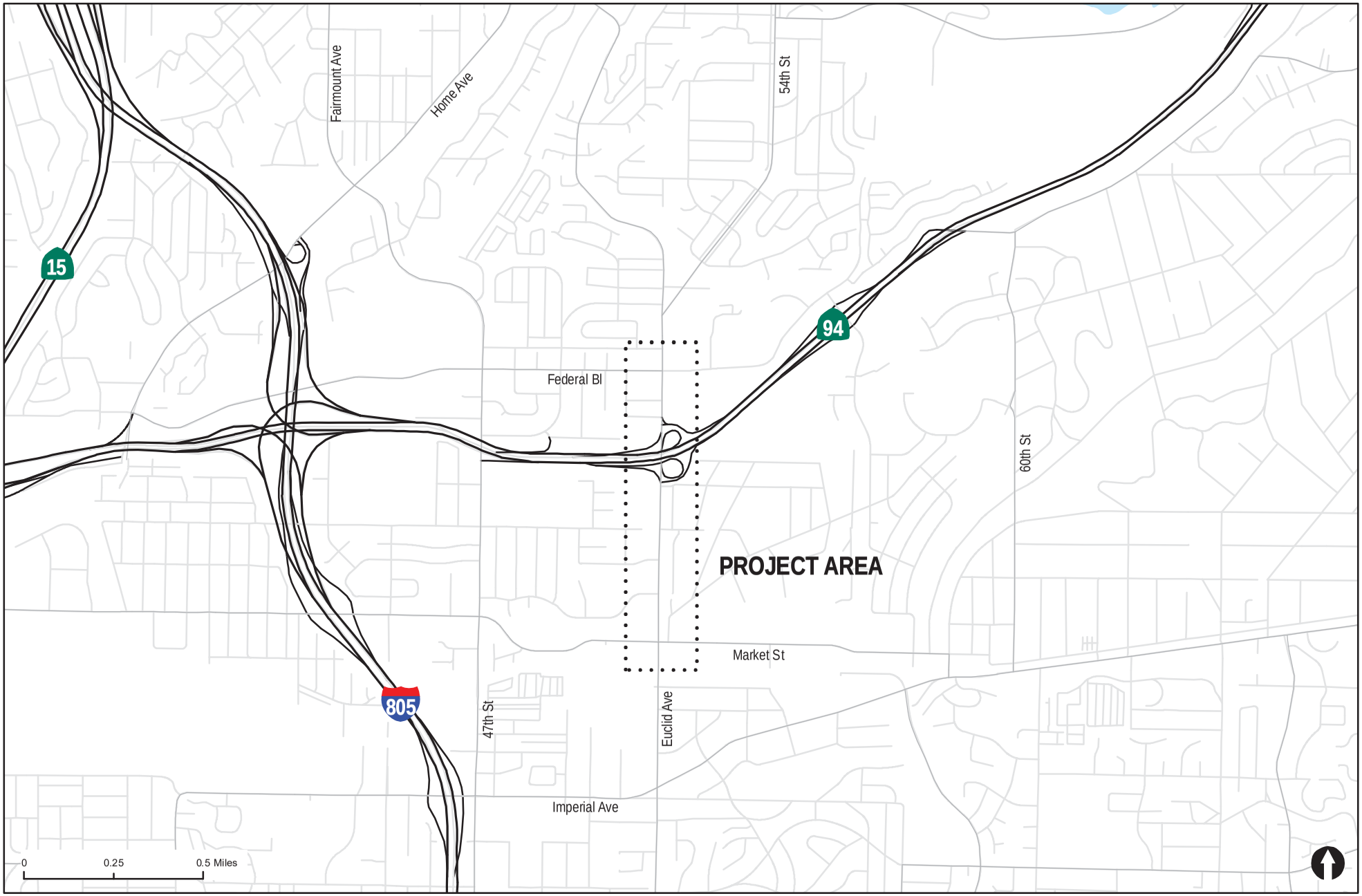

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Figure 1-2

Project Area Map

SR-94 / Euclid Avenue Interchange

2.0 PROJECT DESCRIPTION

The SR 94 / Euclid Avenue Interchange is one of the primary freeway access points to/from the Central Imperial Redevelopment area. Currently the SR 94 ramps at Euclid Avenue are unsignalized and operate at unacceptable levels of service during peak periods. In addition, the current design of the interchange includes high-speed ramps, many free movements and weaving sections between the ramps that pose traffic operational issues compromising safety for motorized and non-motorized users (pedestrians, bicyclists etc.).

The following traffic operations study presents the existing and future traffic conditions at the SR 94 / Euclid Avenue Interchange and the Euclid Avenue corridor between Federal Boulevard and Market Street. The study identifies four (4) alternatives to improve traffic flow and safety at this interchange. The estimated cost of these alternatives will help guide the City of San Diego to determine an appropriate project initiation process such as a Permit Engineering Evaluation Report (PEER) or a Project Study Report (PSR).

3.0 EXISTING CONDITIONS

Effective evaluation of the traffic operations requires an understanding of the existing transportation system within the project area. ***Figure 3–1*** shows an existing conditions diagram, including signalized intersections and lane configurations.

3.1 Existing Street Network

The following is a description of the existing street network in the study area.

State Route 94 (SR 94) is currently built as an 8-lane freeway facility (4 lanes in each direction) in the project area. SR 94 is one the primary east-west freeway facilities in the San Diego County connecting I-5 and SR-125. A future Express Lane Project is proposed on SR 94 that includes two High Occupancy Vehicle (HOV) lanes from Interstate 5 (I-5) to Interstate 805 (I-805) and a direct HOV connector at I-805. This is included as part of the 2050 San Diego Regional Transportation Plan (RTP) developed by the San Diego Association of Governments (SANDAG). The RTP also proposes to have Bus Rapid Transit operate along SR-94 to Downtown San Diego. The final project footprint will include a flexible freeway system that meets the transportation goals for the next 30 years and beyond. The speed limit of SR 94 is 65 mph.

Euclid Avenue is generally built as a 4-lane Major Roadway in the project study area. North of SR 94, it is currently built as a 4-lane roadway with a two-way left-turn lane (TWLTL) between Federal Boulevard and Beech Street. It is classified as a 6-lane Major roadway between Federal Boulevard and SR 94 in the City Heights Community Plan.

The SR 94 / Euclid Avenue overcrossing currently includes four travel lanes with an auxiliary lane (two lanes southbound and three lanes northbound). The current design of the interchange design includes high speed ramps, free movements and weaving sections that compromise safety for vehicular and non-vehicular traffic.

South of the interchange, Euclid Avenue is currently built as a 4-lane roadway with a TWLTL between Hilltop Drive to Guymon Street and as a 4-lane divided roadway between Guymon Street and Market Street. South of SR 94, Euclid Avenue is classified as 4-lane Major roadway in the Southeastern San Diego Community Plan.

The land uses on Euclid Avenue in this corridor include a mix of residential and retail/commercial land uses. The speed limit of Euclid Avenue in the study area is generally 35 mph. On-street parking is prohibited on Euclid Avenue, north of SR 94. South of SR 94, parking is allowed only on the east side.

3.2 Existing Bicycle Network

Currently, there are no dedicated bike lanes on the Euclid Avenue corridor. The City of San Diego Bicycle Master Plan and the Community Plans for the area identify either a Class II (dedicated bike lane) or Class III (bike route) along Euclid Avenue.

3.3 Existing Pedestrian Conditions

Continuous sidewalks are provided along the both sides of Euclid Avenue in the study area. Crosswalks are provided at all the major intersections along Euclid Avenue in the project study area except at the EB and WB ramps.

3.4 Existing Transit Conditions

Transit service by Metropolitan Transit Services (MTS) is provided to the area via the bus routes 916, 917 and 955. Routes 916 and 917 connect the Euclid Avenue transit station to College Grove area. Route 955 connects 8th Street in National City to SDSU trolley station.

In addition to the bus services, light rail service is provided by the San Diego Trolley Orange Line at the nearby Euclid Avenue transit center. The Orange Line connects Gillespie Field to the downtown San Diego.

3.5 Existing Traffic Volumes

LLG commissioned average daily traffic (ADT) and peak hour turning movement (7:00–9:00 AM; 4:00–6:00 PM) on Tuesday, May 8, 2012. During the time of the counts, area schools were in session. ***Table 3–1*** is a summary of the average daily traffic volumes (ADTs) on Euclid Avenue.

TABLE 3–1
EXISTING TRAFFIC VOLUMES

Euclid Avenue	ADT[a]	Date	Source
Federal Boulevard to SR 94	33,760	May 2012	LLG
SR 94 WB ramps to SR 94 EB ramps	28,950	May 2012	LLG
SR 94 EB ramps to Hilltop Drive	27,410	May 2012	LLG
Hilltop Drive to Market Street	25,860	May 2012	LLG

Footnotes:

a. Average Daily Traffic Volumes.

Figure 3–2 shows the existing traffic volumes. ***Appendix A*** contains the manual count sheets.

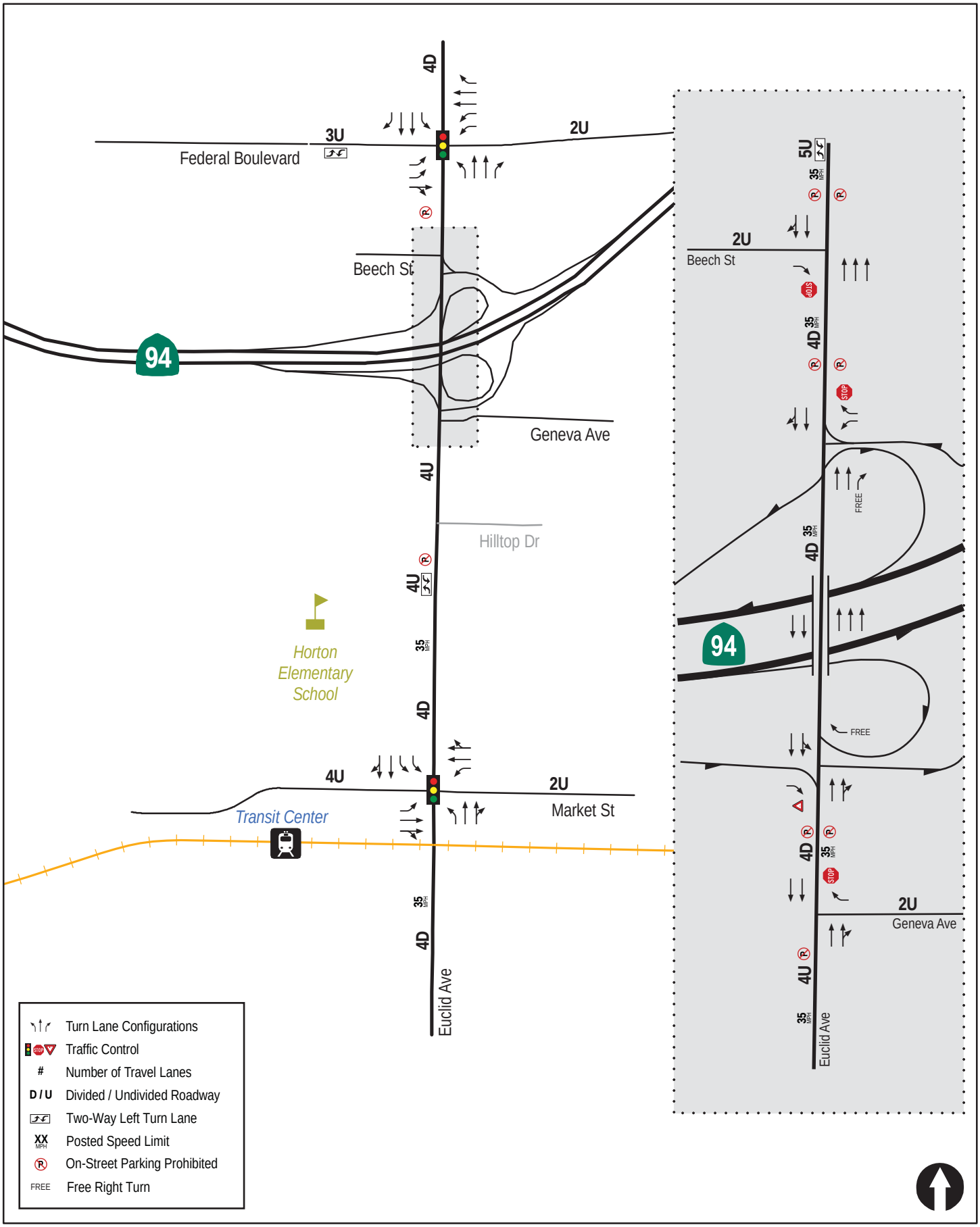

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Figure 3-1

Existing Conditions Diagram

SR-94 / Euclid Avenue Interchange

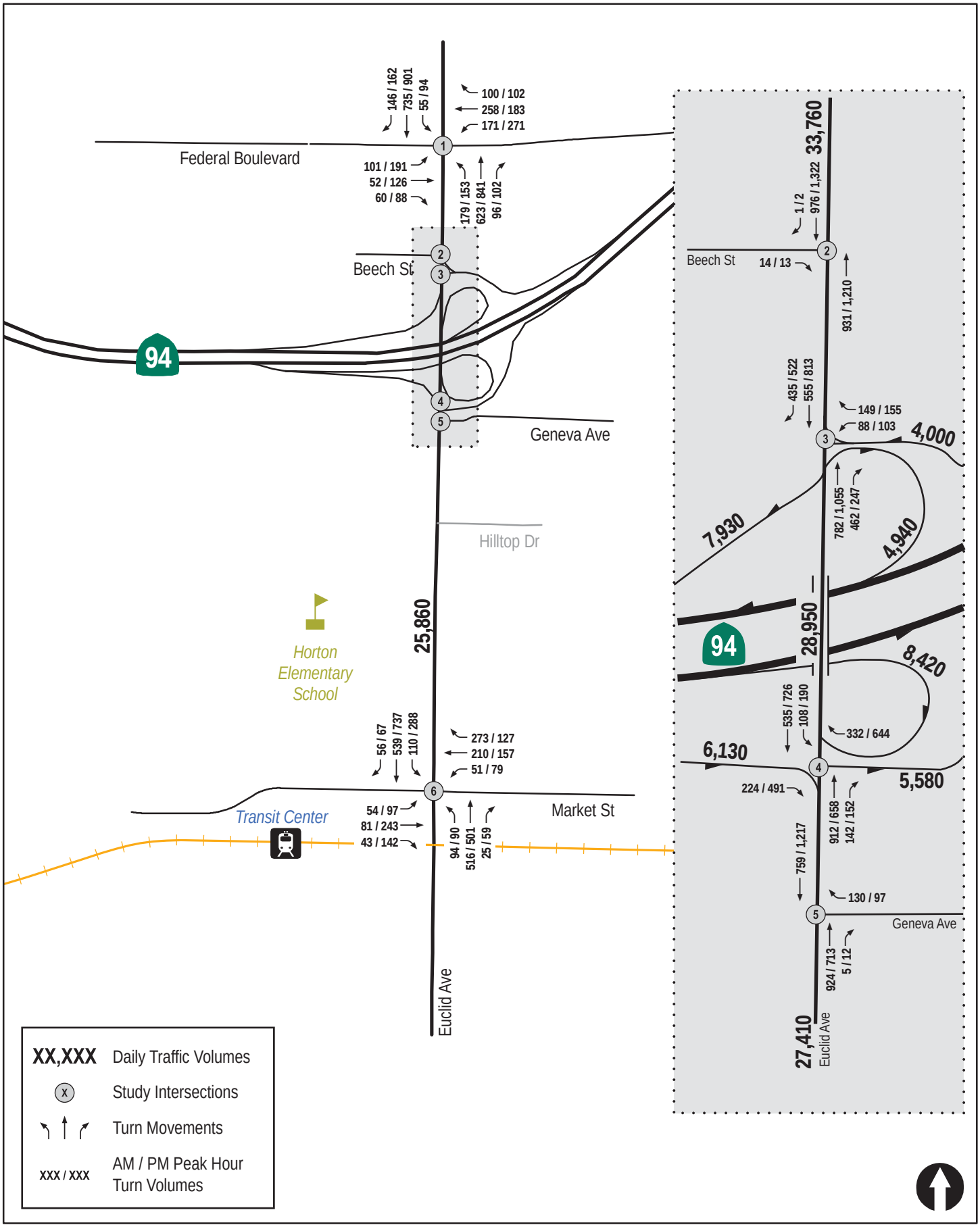

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Figure 3-2

Existing Traffic Volumes

SR-94 / Euclid Avenue Interchange

4.0 ANALYSIS APPROACH AND METHODOLOGY

Level of Service (LOS) is the term used to denote the different operating conditions which occur on a given roadway facility under various traffic volume loads. It is a qualitative measure used to describe a quantitative analysis taking into account factors such as roadway geometries, signal phasing, speed, travel delay, freedom to maneuver, and safety. Level of Service provides an index to the operational qualities of a roadway facility. Level of Service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. Additional categories of LOS F have been developed to identify varying degrees of congestion on freeway facilities. The "measures of effectiveness" (MOEs) represented by the Level of Service designation are reported differently for signalized and unsignalized intersections, as well as for local roadway segments, freeway segments, freeway merge and freeway diverge locations.

For the analysis purposes, "LOS D or better" operations have been adopted as a performance goal for this project. The alternatives identified and evaluated in this report were designed to achieve LOS D or better operations.

4.1 Intersections

Signalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay was determined utilizing the methodology found in Chapter 16 of the *2000 Highway Capacity Manual (HCM),* with the assistance of the *Synchro* (version 7.0) computer software. The delay values (represented in seconds) were qualified with a corresponding intersection Level of Service (LOS). Signalized intersection calculation worksheets and a more detailed explanation of the methodology are attached in ***Appendix B***.

Unsignalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay and Levels of Service (LOS) was determined based upon the procedures found in Chapter 17 of the *2000 Highway Capacity Manual (HCM),* with the assistance of the *Synchro* (version 7.0) computer software. Unsignalized intersection calculation worksheets and a more detailed explanation of the methodology are attached in *Appendix B.*

4.2 Street Segments

Street segment analysis is based upon the comparison of daily traffic volumes (ADTs) to the City of San Diego's *Roadway Classification, Level of Service, and ADT Table*. This table provides segment capacities for different street classifications, based on traffic volumes and roadway characteristics. The City of San Diego's *Roadway Classification, Level of Service, and ADT Table* is attached in ***Appendix C***.

4.3 Intersection Queuing Analysis

Intersection queue lengths were obtained from the Synchro software package. The queue lengths In Synchro are calculated based on traffic volumes, traffic signal phasing, green times (i.e. splits) from *Synchro* and represent estimated lengths.

The queuing analysis was conducted for the SR 94 / Euclid Avenue ramp intersections. The study reports the 95th percentile intersection queue length (per lane) as well as the maximum available storage for a particular movement. The 95th percentile queue is defined to be the queue length that has only a 5% probability of being exceeded during the analysis period.

While this is a useful parameter to help guide the design of turn pocket lengths, there are limitations with the analysis. The classical queuing analysis may be too restrictive to model real-world situations under certain conditions. The following planning-level document best represents anticipated queues within this limitation. A more detailed operational analysis (or alternative methodology such as simulation) may be warranted to fully test the results.

5.0 ANALYSIS OF EXISTING CONDITIONS

5.1 Peak Hour Intersection Levels of Service

Table 5–1 summarizes the Existing peak hour intersection operations. As seen in *Table 5–1*, majority of the study area intersections are calculated to currently operate at LOS D or better with the exception of the following.

- Euclid Ave / SR 94 WB Ramps—LOS F, PM peak hour
- Euclid Ave / SR 94 EB Ramps —LOS E, PM peak hour

The above intersections are calculated to currently operate at failing levels of service because of their unsignalized control and the inability of the minor street critical movements to find a suitable gap in oncoming traffic.

Appendix D contains the calculation sheets.

TABLE 5–1
EXISTING INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing	
			Delay[a]	LOS[b]
1. Euclid Ave/Federal Blvd	Signal	AM	25.4	C
		PM	31.5	C
2. Euclid Ave/Beech St	OWSC[c]	AM	9.2	A
		PM	9.5	A
3. Euclid Ave/SR 94 WB Ramps	OWSC[c]	AM	26.5	D
		PM	**>100.0**	**F**
4. Euclid Ave/SR 94 EB Ramps	Yield	AM	12.8	B
		PM	**39.9**	**E**
5. Euclid Ave/Geneva Ave	OWSC[c]	AM	14.7	B
		PM	12.2	B
6. Euclid Ave/Market St	Signal	AM	21.8	C
		PM	27.3	C

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. OWSC – One-Way Stop Controlled intersection. Minor street right-turn delay is reported for Beech Street and Geneva Avenue intersections. Minor street left-turn delay is reported for SR 94 WB ramps intersection.

General Notes
1. **Bold** indicates LOS E or F operations.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

5.2 Daily Street Segment Levels of Service

Table 5–2 summarizes the Existing segment operations. As seen in *Table 5–2*, the following segments are calculated to currently operate at LOS E:

- Euclid Avenue, Federal Boulevard to Beech Street — LOS E
- Euclid Avenue, Geneva Avenue to Market Street — LOS E

TABLE 5–2
EXISTING STREET SEGMENT OPERATIONS

Street Segment	Classification	Capacity (LOS E) [a]	ADT [b]	LOS [c]	V/C [d]
Euclid Avenue					
Federal Boulevard to Beech Street	5-lane Collector	35,000	33,760	**0.965**	**E**
SR 94 WB Ramps to SR 94 EB Ramps	4-lane Major Arterial	40,000	28,950	0.724	C
Geneva Avenue to Market Street	4-lane Collector	30,000	27,410	**0.914**	**E**

Footnotes:

a. Capacities based on *City of San Diego Roadway Classification & LOS table* Roadway Classification Table.
b. Average Daily Traffic Volumes.
c. Level of Service.
d. Volume to Capacity.

General Notes

1. **Bold** indicates LOS E or F operations.

5.3 Intersection Queuing Analysis

Queuing analyses were conducted to determine if queue lengths at the two unsignalized intersections at the SR 94/ Euclid Avenue interchange exceed the available storage. ***Table 5–3*** summarizes the results of this analysis.

The critical movements at the ramp intersections were analyzed. As shown in *Table 5–3*, the 95th percentile queue lengths were calculated to be contained within the available storage provided. No significant queuing issues were identified. *Appendix D* contains the calculation sheets.

TABLE 5–3
QUEUING ANALYSIS

SR 94/ Euclid Avenue Interchange	Movement	Available Storage Length (feet)	Total Existing Peak Hour Queue (Feet/Lane)[b]	
			AM	PM
3. Euclid Ave/SR 94 WB Ramps	WB L	470' [a]	60'	210'
4. Euclid Ave/SR 94 EB Ramps	EB R	575' [a]	40'	260'
	SB L	375' [a]	20'	30'

Footnotes:

a. Available storage for ramps that do not have a storage bay assumed to be 50% of the distance from the intersection limit line to ramp gore or adjacent intersection.

b. 95th percentile queue lengths from Synchro software reported. 95th percentile queues are defined as the queue length that has only a 5% probability of being exceeded. All queues rounded to the nearest 10.

5.4 Accident Analysis

LLG also researched the accident history for the SR 94/ Euclid Avenue interchange for the previous five years (2006 through 2010). The purpose of the reviewing the accident data was to identify high-accident locations, trends or patterns in collision types, accident severity etc. and thereby help develop the alternatives. ***Table 5–4*** reports the accident history.

TABLE 5–4
SR 94/ EUCLID AVENUE ACCIDENT HISTORY

No.	Year of Accident	Location	Reason and Collision Type		Fatality	Injury
			Reason for Accident	Type of Accident		
1	2006	94 (EB On Ramp)	Unsafe Speed	Rear End	–	6
2	2007	94 (WB Off Ramp)	Automobile Right of Way	Broadside	–	1
3	2007	94 (EB On Ramp)	Unsafe Speed	Rear End	–	1
4	2007	94 (EB On Ramp)	Automobile Right of Way	Side Swipe	–	2
5	2008	94	Unsafe Starting or Backing	Side Swipe	–	0
6	2008	94 (EB On Ramp)	*No data*	Rear End	–	1
7	2010	94	Unsafe Speed	Rear End	–	2

As shown in *Table 5–4*, a total of 7 accidents were identified at the SR 94/ Euclid Avenue interchange. The majority of the accidents occurred at the SR 94 EB ramps / Euclid Avenue intersection and the primary collision factor was determined as "unsafe speed". Based on a review of the accident location and type, the study suggests that this may be due to lack of traffic control at this location (i.e. traffic signal). The SR 94 EB ramps currently include no control and high speed free movement off-ramps that compromise safety for roadway users.

6.0 CUMULATIVE PROJECTS AND FORECAST VOLUMES

Cumulative Projects represent planned development that contributes to background cumulative traffic conditions for both the near-term and long-term scenarios.

6.1 Cumulative Project Research

LLG coordinated with the City regarding the planned projects in the project vicinity. The City provided LLG with a traffic assessment for Southeastern Development Corporation (SEDC) that included the following eleven (11) redevelopment areas within the overall SEDC planning boundary. This study was completed in October 2011 and represents the latest information available to the City at the time this report was prepared. This list was used to forecast cumulative traffic conditions for the subject project.

1. 61st – 69th Street Imperial Corridor
2. Valencia Business Park to Naranja
3. Market Creek Area
4. Imperial Crest
5. Imperial Market Place
6. 252 corridor and 43rd corridor
7. Gamma Area
8. 40th and Alpha
9. Mount Hope Area
10. Gateway Center West Project Area
11. Euclid and Federal area

Based on our review of these redevelopment areas, several projects are proposed within these redevelopment areas. ***Table 6–1*** shows the redevelopment planned for each of these areas. The location of each redevelopment area is shown in ***Figure 6–1***.

The City is currently conducting Master Plans for the Euclid Avenue and National Avenue corridors. These efforts will be folded into the Southeastern San Diego Community Plan Update, which will review underlying land uses of this community and surrounding areas. It is expected that the revised land uses will be less intensive than previously studied. Therefore, the cumulative project traffic forecast in this study may be over-represented. A future study may be conducted when the land use assumptions have been completed and approved by City staff.

TABLE 6–1
CUMULATIVE PROJECT SUMMARY

No.	Project Name	General Location	Proposed Uses	Density
1	61st - 69th Street Imperial Corridor	61st St-62nd St, Imperial Ave	Commercial Multi Family Residential (2-4 Story) Multi Family (2-3 Story) Multi Family (4-6 Story)	19,350 SF 202 DU 270 DU 561 DU 123 DU
2	Valencia Business Park to Naranja	55th St-Valencia Pkwy, Imperial Ave	Medium High Residential Light Industrial / Business Park Open Space	373 DU 602,430 SF 207,350 SF
3	Market Creek Area	51st St and Market St	Community Commercial Community Village Light Industrial / Business Park Medium High Residential Medium Residential Neighborhood Village Open Space Park Residential	902,130 SF 2,512,670 SF 1,185,270 SF 647 DU 588 DU 839 DU 142,440 SF 358,060 SF 1,822 DU
4	Imperial Crest	47th St and Imperial Ave, Euclid Av and Imperial Ave	Single Row (3-4 Story) Multi Family (2-3 Story) Retail / Commercial YMCA Expansion	249 DU 187 DU 246,110 SF 507,040 SF
5	Imperial Market Place	San Pasqual St-Elizabeth	Multi Family	192 DU
6	252 Corridor & 43rd Corridor	43rd St and Alpha St, 47th St and Magnus Way	Community Village Multi Family Medium Density Residential High Density Residential Commercial Office Light Industrial Parkland / Open Space	256 DU 104 DU 86 DU 158 DU 217,800 SF 718,740 SF 217,800 SF
7	Gamma Area	40th St and Gamma St	Multi Family	46 DU
8	40th & Alpha	40th St and Alpha St	Multi Family	12 DU
9	Mt. Hope Area	Hilltop Dr-F St, Boundary St	Office / Light Industrial Office / Light Industrial Retail	5,546,930 SF 1,477,550 SF 250,470 SF
10	Gateway Center West Project	C St and 33rd St	Office / Light Industrial	3,097,120 SF
11	Euclid & Federal (Fam Mart)	Euclid Ave and Federal Blvd	Mix Use Retail	501 DU 632,060

General Notes:

1. DU – dwelling units
2. SF – square-foot.

6.2 Cumulative Projects Trips Forecast

The SEDC study used the land use and density information shown in *Table 6–1* for the eleven redevelopment areas and ran the SANDAG Series 11 forecast models. The redevelopment areas in *Table 6–1* represent a total redevelopment of the Central Imperial area assuming a worst case scenario. There may be projects that may not materialize or downsized than originally proposed. However to be conservative, this study assumes the redevelopment land uses and density shown in *Table 6–1* occurs as planned.

The forecast model contains planned development and transportation infrastructure, as dictated by the Southeastern San Diego Community Plan and Greater Golden Hill Community Plan. In an effort to accurately and conservatively estimate cumulative traffic, all cumulative projects under these redevelopment areas were assumed completed and fully occupied prior to Year 2020 (opening day). It is understood that some projects are phased with opening day after the Year 2020; however, to be conservative, the entire project was incorporated in the opening day forecast.

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Figure 6-1

Cumulative Projects Map

SR-94 / EUCLID AVENUE INTERCHANGE

7.0 PLANNED ROADWAY IMPROVEMENTS

The following section discusses potential planned roadway improvements in the project study area.

7.1 Planned Local Improvements

In assessing the operations of the Euclid Avenue corridor, it was necessary to review planned, on-going, and future roadway improvements in the study area. LLG reviewed the *Southeastern San Diego Public Facilities Financing Plan and Facilities Benefit Assessment, Fiscal Year 2003 report* (*dated June 2003)* and the *Golden Hill Public Facilities Financing Plan and Facilities Benefit Assessment, Fiscal Year 2005 report (dated August 2004).*

Table 7–1 identifies one (1) planned local improvement within the study area. Excerpts from these documents pertaining to the study area can be found in ***Appendix E***.

TABLE 7–1
PLANNED LOCAL IMPROVEMENTS

Project Name (Community/Project No.)	Improvements	Schedule/ Funding
Market Street – Euclid Avenue to 32nd Street (SESD-T11)	This project involves widening of Market to a 4-lane Major.	Design and construction will be scheduled once funding is identified. *Currently no funding is identified in the FBA.*

In addition to the above improvement and according to the City Heights Community Plan, Euclid Avenue between Federal Boulevard and SR 94 is classified to be built to 6-lanes. No CIP project or FBA projects to widen this stretch of Euclid Avenue have been identified yet.

For the purposes of this preliminary engineering study, the implementation of the above FBA project or the widening of Euclid Avenue to 6-lanes between Federal Boulevard and SR 94 was not assumed.

7.2 Planned Regional Improvements

SANDAG has identified future improvements on SR 94 within the project area.

- ***SR-94 Express Lanes Project—***SANDAG's 2050 Regional Transportation Plan has identified the addition of managed lanes) on SR-94 from I-5 to I-805. This project proposes to construct two High Occupancy Vehicle (HOV)/Express Lanes along SR-94 from Interstate 5 (I-5) to Interstate 805 (I-805) and a direct HOV connector at I-805. The RTP also proposes to have Bus Rapid Transit operate along SR-94 to Downtown San Diego. The end result will be a flexible freeway system that meets the transportation goals for the next 30 years and beyond. The project cost is estimated at $600 million. The funding for this project comes from Federal, State and Local sources.

8.0 FORECAST VOLUMES

8.1 Forecast Methodology

Year 2030 traffic volumes were forecasted for the study area based on the *SANDAG Series 11* Model conducted for the SEDC study. This model was deemed the most accurate and conservative given its community level calibration. The model includes the land use types and densities proposed in the eleven redevelopment areas within the SEDC planning boundary.

The SEDC study included Year 2015 as the interim forecast year and Year 2030 as the horizon year. For the SR 94 / Euclid Avenue interchange project, Year 2020 is considered as the opening year and Year 2035 is considered as the horizon year. To account for the change in the forecast years, a growth factor was developed.

A growth factor per year was calculated by comparing the existing (Year 2012) average daily traffic (ADT) counts and the Year 2030 Series 11 Model ADT volumes developed for the SEDC study. This growth factor was applied to the existing counts for 8 years to derive the Year 2020 traffic ADT volumes. On an average, the calculated growth factor was approximately 3% per year.

Since background cumulative projects were assumed completed prior to opening day, the calculated growth factor was not used to determine Year 2030 volumes. This approach would over represent the horizon year volumes. Therefore, a lesser growth factor of 1% was applied to derive Year 2035 Horizon Year volumes. Similar logic and growth rates were applied to derive the freeway ramps as well.

The forecast ADT volumes were then used to calculate peak hour volumes based partially on the existing relationship between ADT and peak hour volumes. The forecast volumes were also checked for consistency between intersections, where no driveways or roadways exist between intersections (such as Beech Street and Geneva Avenue), and were compared to existing volumes for accuracy.

8.2 Series 12 Comparison

LLG also conducted a comparison of the calculated ADT's against the recently adopted SANDAG Series 12 Model. The comparison revealed that the projected ADT's were slightly higher than the SANDAG Series 12 Model ADT's representing a worst-case scenario. This was expected since the Series 12 model has not been calibrated at a community level compared to the Series 11 SEDC model. ***Appendix F*** shows the growth factor calculations.

Figure 8–1 shows the Year 2020 opening day traffic volumes and ***Figure 8–2*** shows the Year 2035 horizon year traffic volumes.

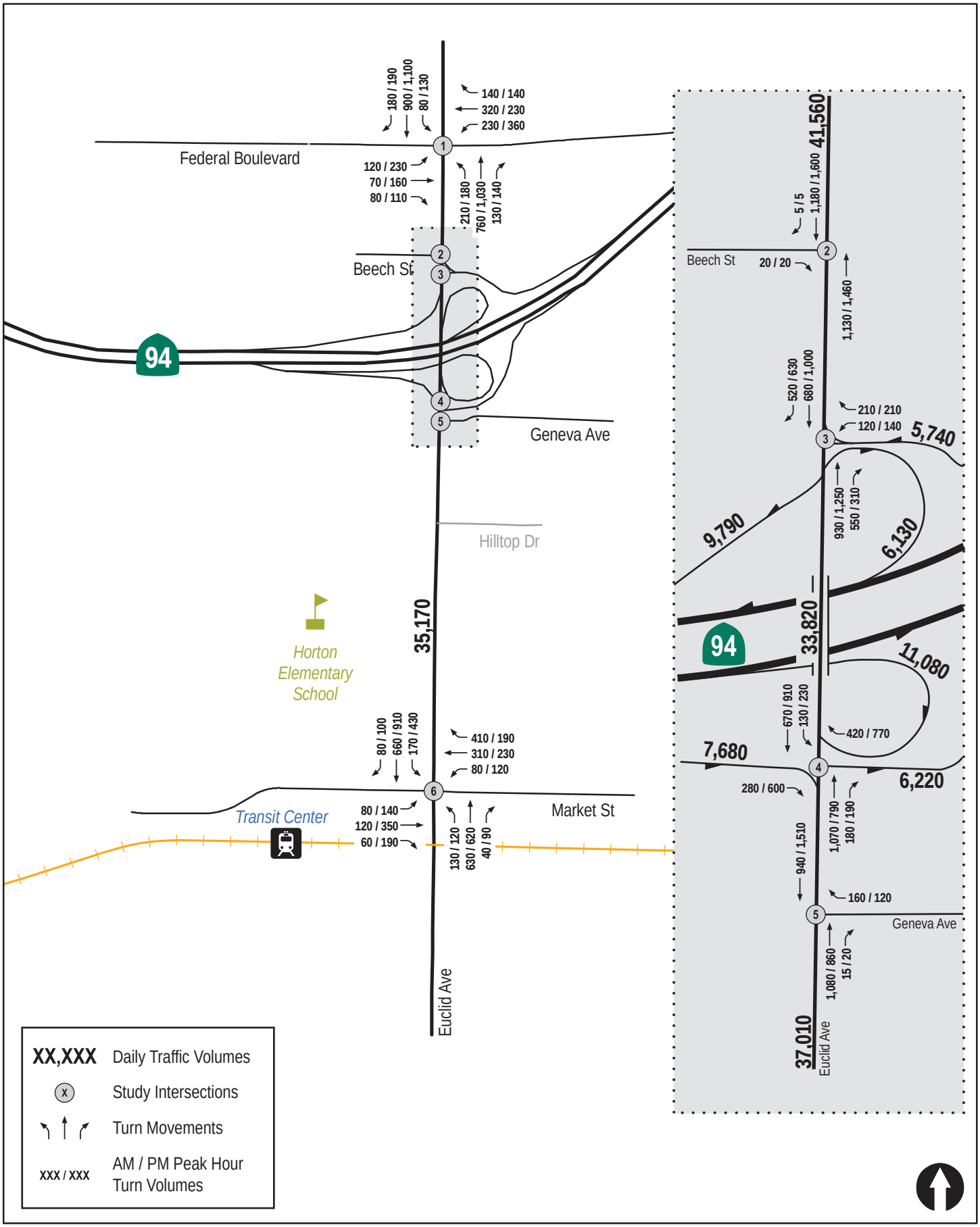

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Figure 8-1

Year 2020 (Opening Day) Traffic Volumes

SR-94 / Euclid Avenue Interchange

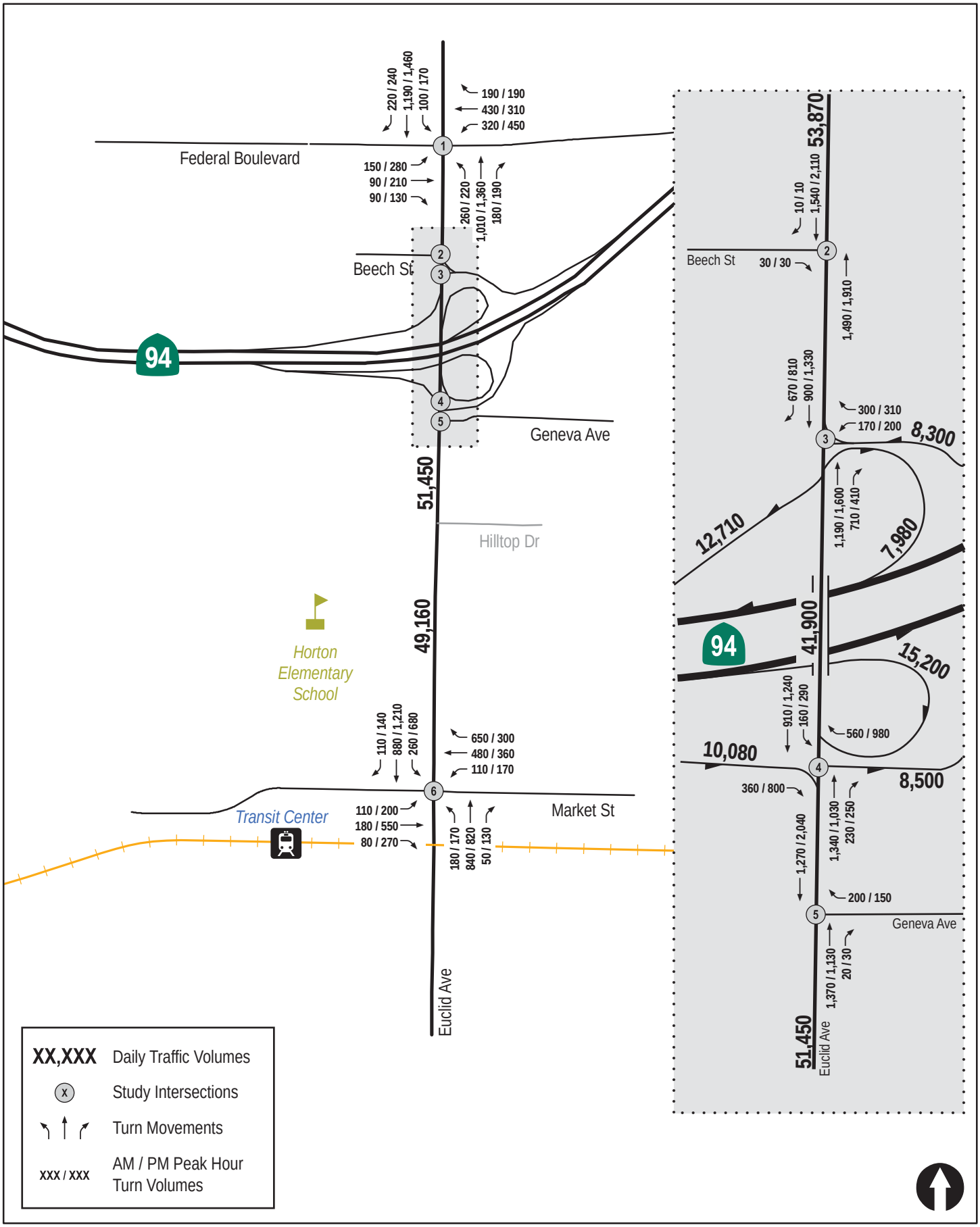

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Figure 8-2

Year 2035 (Horizon Year) Traffic Volumes

SR-94 / Euclid Avenue Interchange

9.0 OPERATIONAL ANALYSIS

The following section presents the operational analysis for the opening day (Year 2020) and horizon year (Year 2035) scenarios.

9.1 Year 2020 (Opening Day)

9.1.1 *Intersection Analysis*

Table 9–1 summarizes the opening day (Year 2020) peak hour intersection operations. As seen in *Table 9–1*, majority of the study area intersections are calculated to continue to operate at LOS D or better with the exception of the following.

- Euclid Ave / SR 94 WB Ramps—LOS F, AM and PM peak hours
- Euclid Ave / SR 94 EB Ramps —LOS F, PM peak hour

The above intersections are calculated to continue to operate at failing levels of service because of increased traffic demand between existing and opening day and the inability of the unsignalized traffic control to handle such demand. The operations also reveal the significant delays at the critical movements due to their inability to find a suitable gap in oncoming traffic.

Appendix G contains the calculation sheets.

9.1.2 *Segment Operations*

Table 9–2 summarizes the opening day (Year 2020) segment operations. As seen in *Table 9–2*, the following segments are calculated to continue to operate at failing levels of service:

- Euclid Avenue, Federal Boulevard to Beech Street — LOS F
- Euclid Avenue, Geneva Avenue to Market Street — LOS F

9.1.3 *Intersection Queuing Analysis*

Queuing analyses were conducted at the two unsignalized intersections at the SR 94/ Euclid Avenue interchange. ***Table 9–3*** summarizes the results of this analysis.

The critical movements at the ramp intersections were analyzed. As shown in *Table 9–3*, the 95th percentile queue lengths were calculated to be exceed the available storage at the following critical movements:

- Euclid Ave / SR 94 WB Ramps — WB left-turn movement, PM peak hour
- Euclid Ave / SR 94 EB Ramps — EB right-turn movement, PM peak hour

The queuing at the above intersections exceeds the storage provided due to the unsignalized control as they need to wait for a gap in the oncoming traffic, which increases delay and queuing. However, no queue spillback to the freeway mainlines was calculated in the Year 2020 scenario. *Appendix G* contains the calculation sheets.

9.2 Year 2035 (Horizon Year)

9.2.1 *Intersection Analysis*

Table 9–1 summarizes the horizon year (Year 2035) peak hour intersection operations. As seen in *Table 9–1***,** majority of the study area intersections are calculated to operate at LOS E as shown below:

- Euclid Ave / Federal Boulevard—LOS E, PM peak hour
- Euclid Ave / SR 94 WB Ramps—LOS F, AM and PM peak hours
- Euclid Ave / SR 94 EB Ramps —LOS F, PM peak hour
- Euclid Ave / Market Street—LOS E, AM peak hour and LOS F, PM peak hour

The above intersections are calculated to continue to operate at failing levels of service due to increased traffic volumes between existing and horizon year and lack of improvements proposed at these intersections.

Appendix H contains the calculation sheets.

9.2.2 *Segment Operations*

Table 9–2 summarizes the horizon year (Year 2035) segment operations. As seen in *Table 9–2***,** the following segments are calculated to continue to operate at failing levels of service:

- Euclid Avenue, Federal Boulevard to Beech Street — LOS F
- Euclid Avenue, SR 94 WB ramps to SR 94 EB ramps — LOS F
- Euclid Avenue, Geneva Avenue to Market Street — LOS F

The above segments are calculated to continue to operate at failing levels of service due to increased traffic volumes between existing and horizon year and lack of improvements such as additional lanes along these segments. Further the failing segment operations are also validated by the failing intersection operations as shown in *Table 9–1* as intersection operations directly influence segment capacity.

9.2.3 *Intersection Queuing Analysis*

Queuing analyses were conducted at the two unsignalized intersections at the SR 94/ Euclid Avenue interchange. *Table 9–3* summarizes the results of this analysis.

The critical movements at the ramp intersections were analyzed. As shown in *Table 9–3*, the 95th percentile queue lengths were calculated to be exceed the available storage at the following critical movements:

- Euclid Ave / SR 94 WB Ramps — WB left-turn movement, AM and PM peak hours
- Euclid Ave / SR 94 EB Ramps — EB right-turn movement, PM peak hour

The queuing at the above critical movements exceeds the storage provided due to the unsignalized control as they need to wait for a gap in the oncoming traffic, which increases delay and queuing. Further, the 95th percentile queue lengths at the WB left-turn and EB right-turn at the SR 94 WB ramps and EB ramp intersections respectively are projected to spillback onto the freeway mainlines, which may compromise safety for the off-ramp and mainline traffic.

TABLE 9–1
INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing		Year 2020 (Opening Day)		Year 2035 (Horizon Year)	
			Delay[a]	LOS[b]	Delay	LOS	Delay	LOS
1. Euclid Ave/Federal Blvd	Signal	AM	25.4	C	29.5	C	43.5	D
		PM	31.5	C	41.2	D	**72.9**	**E**
2. Euclid Ave/Beech St	OWSC[c]	AM	9.2	A	9.5	A	10.3	B
		PM	9.5	A	10.1	B	10.9	B
3. Euclid Ave/SR 94 WB Ramps	OWSC[c]	AM	26.5	D	**69.6**	**F**	**>100.0**	**F**
		PM	**>100.0**	**F**	**>100.0**	**F**	**>100.0**	**F**
4. Euclid Ave/SR 94 EB Ramps	Yield	AM	12.8	B	15.9	C	30.0	D
		PM	**39.9**	**E**	**>100.0**	**F**	**>100.0**	**F**
5. Euclid Ave/Geneva Ave	OWSC[c]	AM	14.7	B	18.1	C	30.6	D
		PM	12.2	B	13.9	B	18.7	C
6. Euclid Ave/Market St	Signal	AM	21.8	C	32.2	C	**62.9**	**E**
		PM	27.3	C	39.2	D	**82.9**	**F**

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. OWSC – One-Way Stop Controlled intersection. Minor street right-turn delay is reported for Beech Street and Geneva Avenue intersections. Minor street left-turn delay is reported for SR 94 WB ramps intersection.

General Notes

1. **Bold** indicates LOS E or F operations.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

TABLE 9–2
STREET SEGMENT OPERATIONS

Street Segment	Existing Capacity (LOS E)[a]	Existing			Year 2020 (Opening Day)			Year 2035 (Horizon Year)		
		ADT[b]	V/C[c]	LOS[d]	ADT	V/C	LOS	ADT	V/C	LOS
Euclid Avenue										
Federal Boulevard to Beech Street	35,000	33,760	**0.965**	**E**	41,560	**1.187**	**F**	53,870	**1.539**	**F**
SR 94 WB Ramps to SR 94 EB Ramps	40,000	28,950	0.724	C	33,820	0.846	D	41,900	**1.048**	**F**
Geneva Avenue to Market Street	30,000	27,410	**0.914**	**E**	37,010	**1.234**	**F**	51,450	**1.715**	**F**

Footnotes:

a. Capacities based on the *City of San Diego Roadway Classification & LOS table* (See *Appendix C*).

b. Average Daily Traffic

c. Volume to Capacity ratio

d. Level of Service

General Notes:

1. **Bold** indicates LOS E or F operations.

TABLE 9–3
QUEUING ANALYSIS

SR 94/ Euclid Avenue Interchange	Movement	Available Storage Length	Total Peak Hour Queue (Feet/Lane) [b]					
			Existing		Year 2020 (Opening Day)		Year 2035 (Horizon Year)	
			AM	PM	AM	PM	AM	PM
3. Euclid Ave/SR 94 WB Ramps	WB L	470' [a]	60'	210'	170'	**510'**	**590'**	mainline spillback*
4. Euclid Ave/SR 94 EB Ramps	EB R	575' [a]	40'	260'	70'	**650'**	160'	mainline spillback *
	SB L	375' [a]	20'	30'	30'	50'	60'	110'

Footnotes:

a. Available storage for ramps that do not have a storage bay assumed to be 50% of the distance from intersection to ramp gore or intersection.

b. 95th percentile queue lengths from Synchro software reported. 95th percentile queues are defined as the queue length that has only a 5% probability of being exceeded. All queues rounded to the nearest 10.

General Notes:

1. **Bold** indicates queuing exceeds available storage.

* Queue exceeds length of ramp and may spillback onto mainline.

10.0 ALTERNATIVES DEVELOPMENT

10.1 Study Objectives

The preceding sections discussed and identified traffic operational deficiencies in existing, opening day (Year 2020) and horizon year (Year 2035) scenarios along the Euclid Avenue corridor especially at the SR-94/ Euclid Avenue interchange. This section presents four (4) design alternatives (2 near-term and 2 long-term) that recommend improvements to improve traffic flow and operations and enhance overall safety at the interchange and along Euclid Avenue.

To achieve the overall objective of improving traffic operations and providing a safe corridor for all roadway users, the following six (6) key design parameters (in order of priority) were considered to help develop the alternatives.

1. Safety
2. Pedestrian and Bicycle Mobility
3. Regional Traffic Operations
4. Local Traffic Operations
5. Community Plan Conformance
6. Street Design Manual Conformance

The next step involved analyzing existing constraints in the area relating to each of these design parameters. For example: In terms of safety, existing constraints include uncontrolled ramp intersections, the weaving section on northbound Euclid Avenue between the EB loop off-ramp and WB loop on-ramp and the unsafe high ramp speeds.

The final step included proposing alternatives containing improvements addressing one or more of these existing constraints. Four alternatives were developed – Alternative 1 through 4. Alternative 1 and 2 are proposed for opening day (Year 2020) improvements and Alternatives 3 and 4 are proposed for horizon year (Year 2035). ***Table 10–1*** lists the existing constraints and proposed improvements.

10.2 Conceptual Striping Plans

The study also conducted conceptual striping plans for the four (4) alternatives to verify the feasibility of constructing the proposed improvements. The conceptual drawings were developed based on information collected during site visits, as-built drawings and aerial photos. The conceptual drawings were conducted based on regional standards outlined in *the Manual of Uniform for Traffic Control Devices (MUTCD)* and local City of San Diego standards such as the *Street Design Manual.*

Figure 10–1 through ***Figure 10–4*** shows the conceptual striping plan for Alternatives 1, 2, 3 and 4 respectively.

TABLE 10–1
EXISTING CONSTRAINTS AND PROPOSED IMPROVEMENTS

Alternatives	Safety 	Pedestrian and Bicycle Mobility	Regional Traffic Operations 	Local Traffic Operations 	Community Plan Conformance 	Street Design Manual Conformance 	Notes
Existing Constraints	A1. Uncontrolled ramps A2. Northbound Euclid Avenue weave A3. Unsafe on- and off-ramp speeds	B1. Missing crosswalks and ADA compliant curb ramps B2. Lack of dedicated bicycle facilities (bike lane or route per City of San Diego Bicycle Master Plan or area Community Plans) B3. Unfriendly and unsafe pedestrian crossings at high speed uncontrolled locations	C1. Congested ramp operations C2. Off-ramp queuing due to unsignalized control C3. No HOV access to encourage carpooling	D1. Congested Euclid Avenue corridor D2. Failing intersection and street segment operations	E1. Widen Euclid Avenue between Federal Boulevard and SR 94 to 6-lanes E2. Bike facilities (Class II or Class III) along Euclid Avenue between Federal Boulevard and SR 94	F1. Euclid Avenue as a 4-lane Major is inconsistent with City's street design standards	None
Near–Term							
Alternative 1 *(Near-Term)*	A1. Signalize ramps A2. Reconfigure EB loop off-ramp A3. Signalize EB diamond off-ramp to reduce speeds. Reconfigure WB off-ramp to eliminate free right-turn and reduce speeds	B1. Install crosswalks and ADA compliant curb ramps as appropriate B2. Install Class II bicycle lanes on bridge deck. Designate Class III bicycle route and "sharrows" as appropriate B3. Provide green pavement within Class II bicycle lanes and at "sharrow" pavement legends. B4. Reconfigure EB loop off-ramp and WB off-ramp to ensure shorter pedestrian crossing distances.	C1. Signalize ramps C2. Signalize ramps and provide SB left-turn pocket at EB ramps to alleviate queuing	*No improvements proposed*	E2. Install Class II bicycle lanes on bridge deck. Designate Class III bicycle route and "sharrows" as appropriate	F1. Meets lane width standards. Deviations include 2 foot median nose and 5 foot bike lanes	– Safety concerns addressed – Does not meet long term demand or address local traffic – Does not promote HOV access – Minor deviations from City of San Diego Street Design standards – Most cost effective alternative
Alternative 2 *(Near-Term)*	A1. Signalize ramps A2. Reconfigure EB loop off-ramp and WB on-ramp A3. Signalize EB ramps. Eliminate EB diamond off-ramp and reconfigure loop off-ramp to include SR 94 EB to SB Euclid Avenue traffic. Reconfigure WB off-ramp to eliminate free right-turn and reduce speeds	B1. Install crosswalks B2. Install Class II bicycle lanes on bridge deck. Designate Class III bicycle route and "sharrows" as appropriate. B3. Provide green pavement within Class II bicycle lanes and at "sharrow" pavement legends. B4. Reconfigure EB and WB ramps to ensure shorter pedestrian crossing distances.	C1. Signalize ramps C2. Signalize ramps and provide SB left-turn pocket at EB ramps	D1. Provide a raised median on Euclid Avenue to enhance segment capacity	E2. Install Class II bicycle lanes on bridge deck. Designate Class III bicycle route and "sharrows" as appropriate	F1. Meets lane width standards. Deviations include 2 foot median nose and 5 foot bike lanes	– Safety concerns addressed – Reconfigures EB and WB ramps – Does not meet long term demand – Does not promote HOV access – Enhances segment capacity on by providing a raised median – Minor deviations from City of San Diego Street Design standards

TABLE 10–1 *continued*

EXISTING CONSTRAINTS AND PROPOSED IMPROVEMENTS

Alternatives	Safety 	Pedestrian and Bicycle Mobility	Regional Traffic Operations 	Local Traffic Operations 	Community Plan Conformance 	Street Design Manual Conformance 	Notes
Long–Term							
Alternative 3 *(Long-Term)*	A1. Signalize ramps A2. Reconfigure EB loop off-ramp and WB on-ramp A3. Signalize EB ramps. Eliminate EB diamond off-ramp and reconfigure loop off-ramp to include SR 94 EB to SB Euclid Avenue traffic. Reconfigure WB off-ramp to eliminate free right-turn and reduce speeds. Reconfigure WB diamond on-ramp to reduce speeds by including a right-turn pocket	B1. Install crosswalks B2. Install Class II bicycle lanes on bridge deck. Designate Class III bicycle route and "sharrows" as appropriate. B3. Provide green pavement within Class II bicycle lanes and at "sharrow" pavement legends. B4. Reconfigure EB and WB ramps to ensure shorter pedestrian crossing distances.	C1. Signalize ramps C2. Signalize ramps and provide SB left-turn pocket at EB ramps C3. Provide dedicated HOV lane at the on-ramps to encourage carpooling	D1. Provide a raised median on Euclid Avenue to enhance segment capacity D2. Improve operations on Euclid Avenue by "cul-de-sacing" Beech Street D3. Implement improvements at Federal Boulevard and Market Street intersections on Euclid Avenue to achieve acceptable LOS	E2. Install Class II bicycle lanes on bridge deck. Designate Class III bicycle route and "sharrows" as appropriate	F1. Meets lane width standards. Deviations include 2 foot median nose and 5 foot bike lanes	– Safety concerns addressed – Meets long term demand – Reconfigures WB diamond on-ramp – Promotes HOV access – Improves intersection operations at Federal Boulevard and Market Street intersections on Euclid Avenue – Enhances segment capacity on by providing a raised median – Minor deviations from City of San Diego Street Design standards
Alternative 4 *(Long-Term)*	A1. Signalize ramps A2. Reconfigure EB loop off-ramp and WB on-ramp A3. Signalize EB ramps. Eliminate EB diamond off-ramp and reconfigure loop off-ramp to include SR 94 EB to SB Euclid Avenue traffic. Eliminate WB diamond on-ramp and include SB Euclid Avenue traffic in WB loop on-ramp	B1. Install crosswalks B2. Install Class II bicycle lanes on bridge deck. Designate Class III bicycle route and "sharrows" as appropriate. B3. Provide green pavement within Class II bicycle lanes. B4. Reconfigure EB and WB ramps. Tee-up WB ramps to slow down speeds. .	C1. Signalize ramps C2. Signalize ramps and provide SB left-turn pocket at EB and WB ramps C3. Provide dedicated HOV lane at the on-ramps to encourage carpooling	D1. Provide a raised median on Euclid Avenue to enhance segment capacity D2. Improve operations on Euclid Avenue by "cul-de-sacing" Beech Street D3. Implement improvements at Federal Boulevard and Market Street intersections at Euclid Avenue to achieve acceptable LOS D4. Widen Euclid Avenue to 6-lanes to alleviate congestion	E1. Widen Euclid Avenue to 6-lanes per Community Plan E2. Install Class II bicycle lanes on bridge deck. Designate Class III bicycle route and "sharrows" as appropriate	F1. Meets City of San Diego Street Design standards. No deviations required. However, significant widening and property acquisition may be required.	– Safety concerns addressed – Meets long term demand – Promotes HOV access – 6-lanes on Euclid Avenue would improve intersection and segment operations – 6-lanes on Euclid Avenue would meet Community Plan classification – 6-lane Euclid Avenue would require new bridge deck and significant widening. May not be a cost effective alternative or feasible

General Notes:

1. Grayscale indicates no change in improvements over the previous alternative.

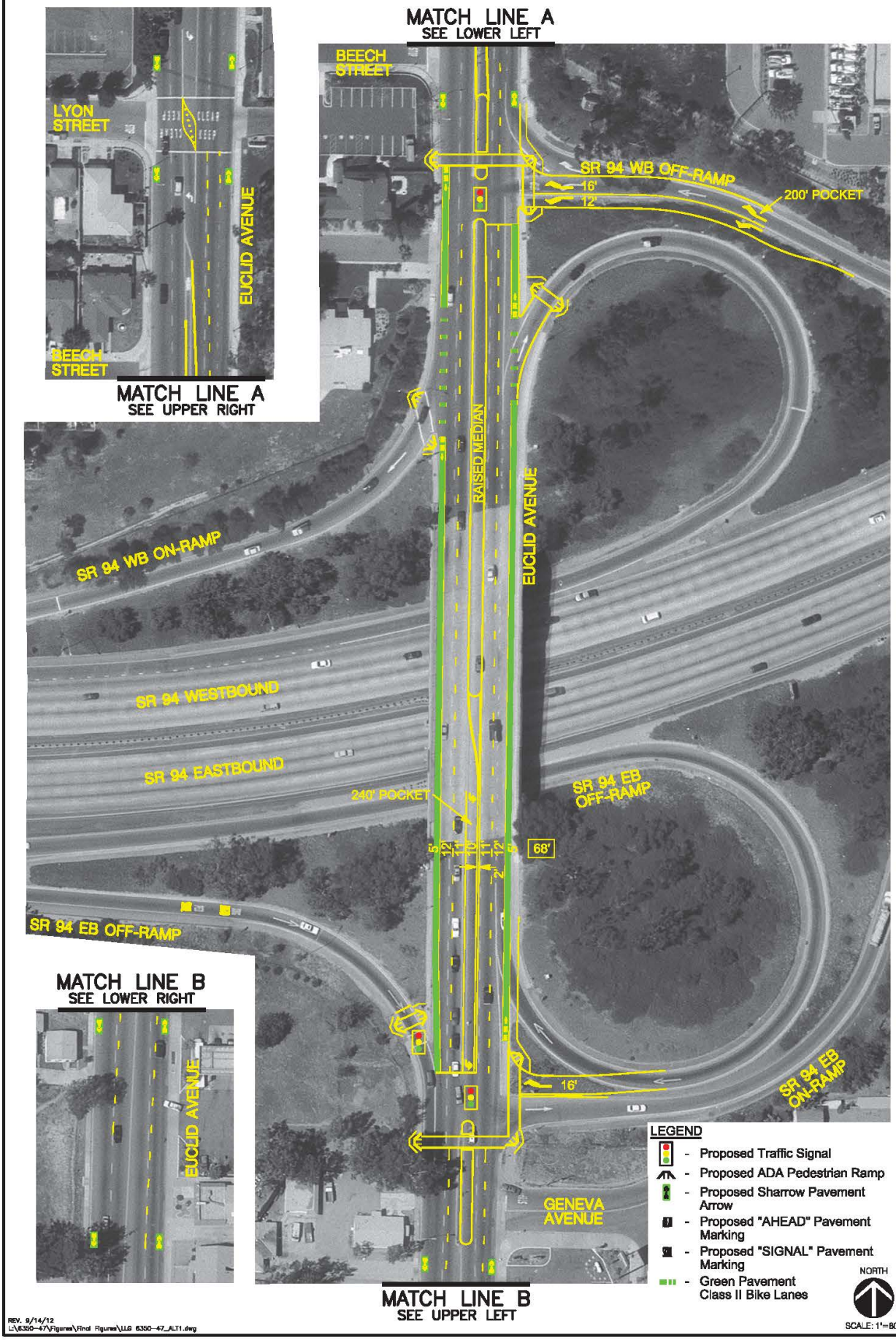

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Figure 10-1

Alternative 1 Conceptual Plan (Near-Term)

SR 94/Euclid Avenue Interchange

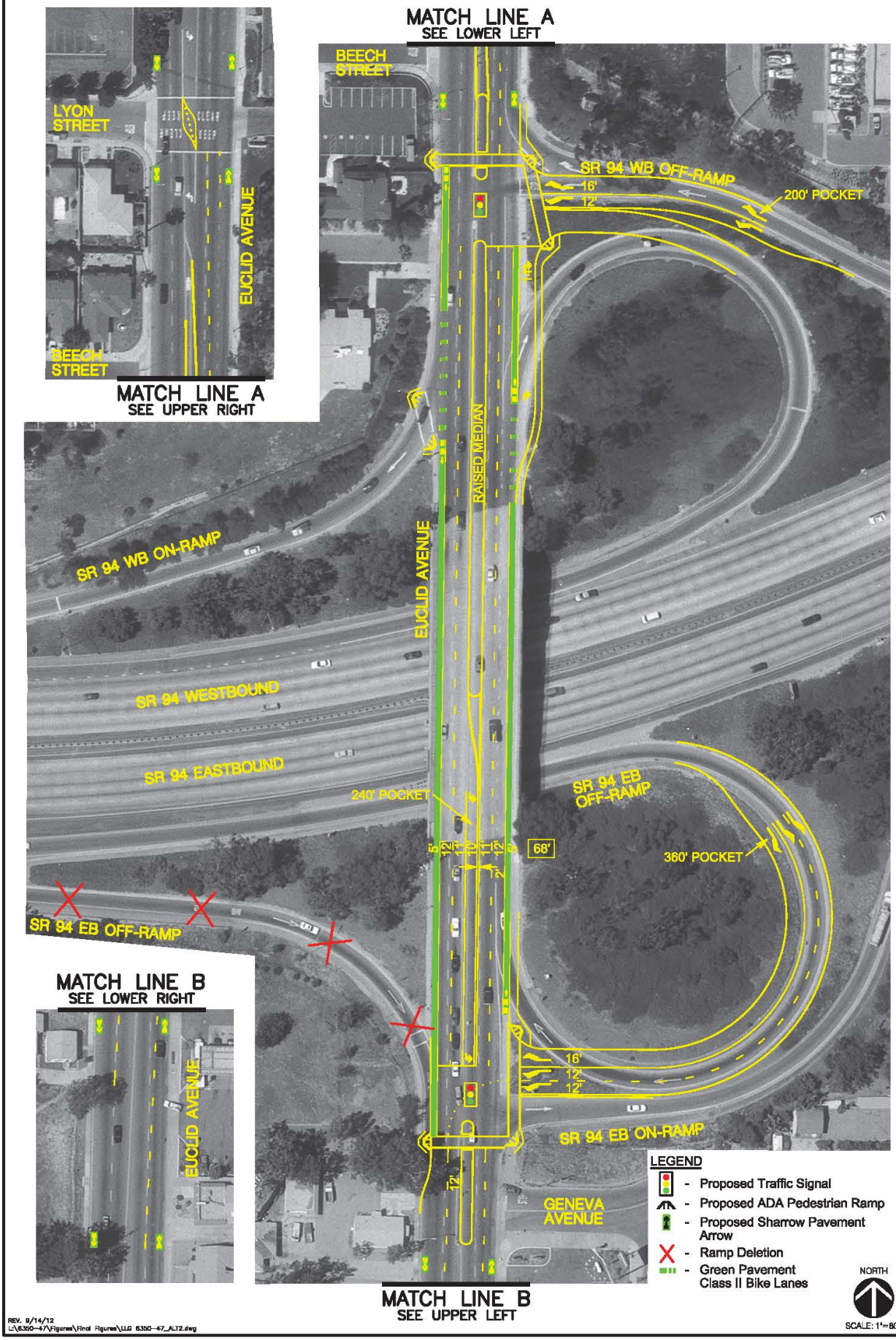

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Figure 10-2

Alternative 2 Conceptual Plan (Near-Term)

SR 94/Euclid Avenue Interchange

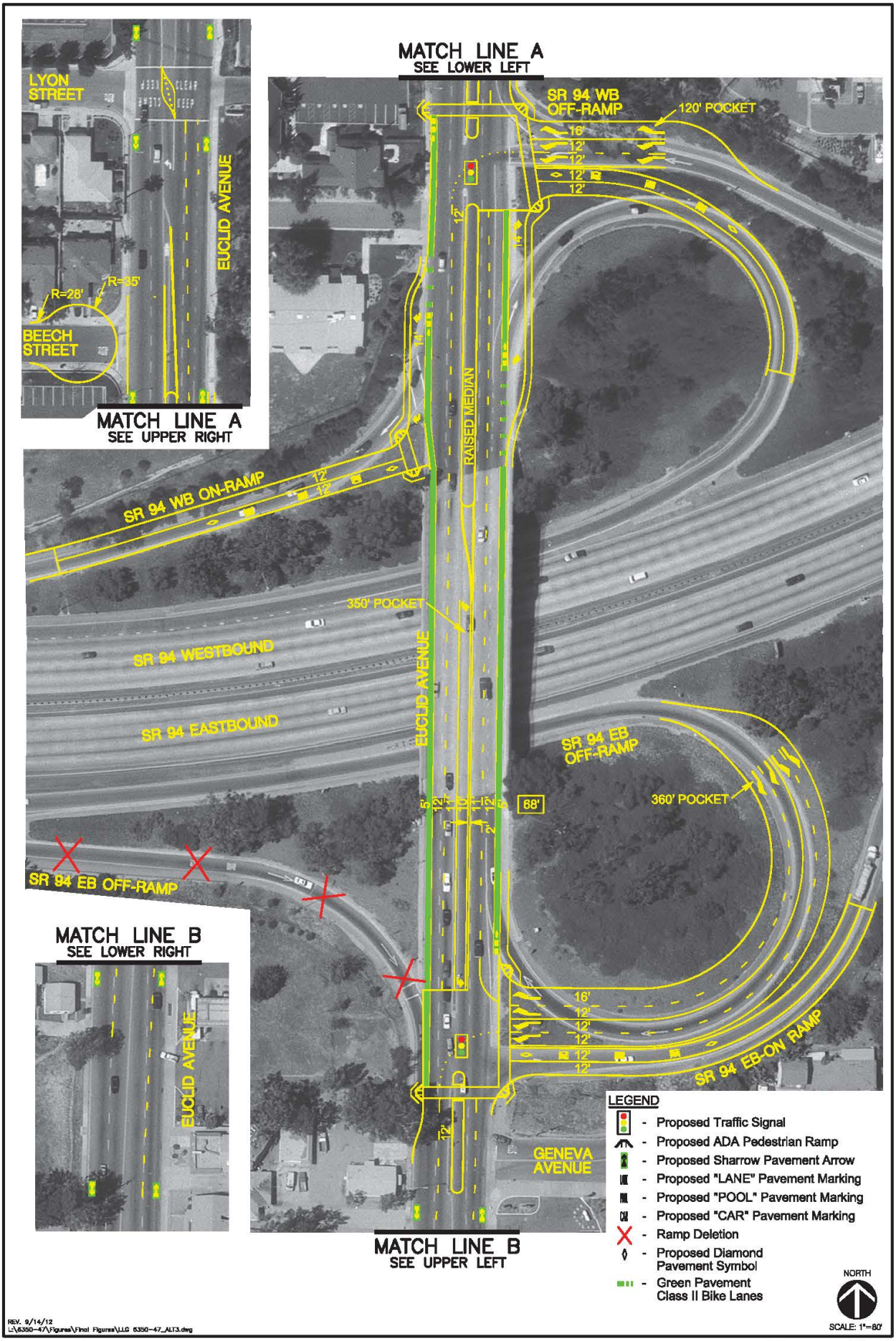

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Figure 10-3

Alternative 3 Conceptual Plan (Long-Term)

SR 94/Euclid Avenue Interchange

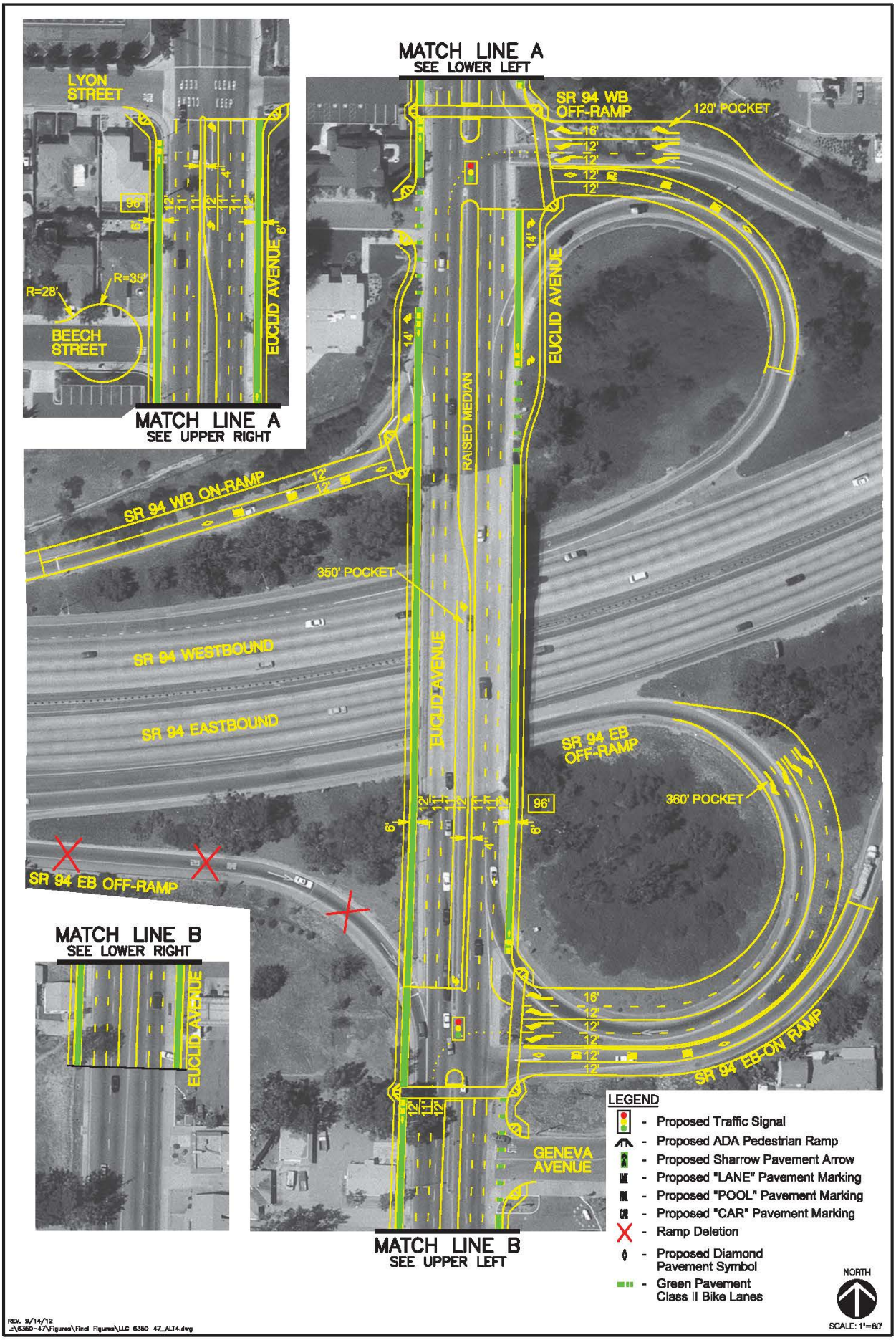

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Figure 10-4

Alternative 4 Conceptual Plan (Long-Term)

SR 94/Euclid Avenue Interchange

11.0 ALTERNATIVES EVALUATION

The following section presents the operational analysis for the Alternatives 1–4 discussed previously. Alternative 1 and 2 are proposed for opening day (Year 2020) and alternatives 3 and 4 are proposed for the horizon year (Year 2035) scenario. ***Figures 11–1*** and ***11–2*** show an improvement diagram for Alternatives 1 and 2.

11.1 Alternatives 1 and 2 – Opening Day (Year 2020)

11.1.1 *Intersection Analysis*

Table 11–1 summarizes the intersection operations for opening day (Year 2020) for Alternative 1. As seen in *Table 11–1*, both the ramp intersections are calculated to operate at LOS D or better. This is primarily due to the installation of a traffic signal at the ramp intersections and the installation of a SB left-turn pocket at the EB ramps. ***Appendix I*** contains the calculation sheets.

Table 11–1 also summarizes the intersection operations for opening day (Year 2020) for Alternative 2. As seen in *Table 11–1,* both the ramp intersections are calculated to operate at LOS D or better. The SR 94/ WB ramps intersection performs better with the "squaring-up" of the WB loop off-ramp, which helps eliminate the weaving section on the bridge and also facilitates better pedestrian mobility. ***Appendix J*** contains the calculation sheets.

The SR 94 / EB ramp intersection also shows an improvement in delay and level of service with the revised configuration of the loop off-ramp accommodating the northbound and southbound Euclid Avenue traffic. The improvement is largely due to the dual WB left-turns to southbound Euclid Avenue, which was originally a single right-turn lane in Alternative 1.

11.1.2 *Segment Operations*

Table 10–3 summarizes the street segment operations for opening day (Year 2020) for Alternative 1. As seen in *Table 10–3***,** the following segments are calculated to continue to operate at failing levels of service as no segment improvements are proposed in Alternative 1:

- Euclid Avenue, Federal Boulevard to Beech Street — LOS F
- Euclid Avenue, Geneva Avenue to Market Street — LOS F

Table 10–3 also summarizes the street segment operations for opening day (Year 2020) for Alternative 2. As seen in *Table 10–3***,** the following segment show an improvement in street segment operations (decreased volume to capacity ratio's and LOS) with the addition of a raised median along Euclid Avenue:

- Euclid Avenue, Federal Boulevard to Beech Street — LOS F remains the same; however, volume to capacity ratio decreases.
- Euclid Avenue, Geneva Avenue to Market Street — LOS F to LOS E

Even though the street segment operations show failing levels of service with the addition of a raised median, the intersections along Euclid Avenue show LOS D or better operations for both Alternatives 1 and 2. Since intersection operations directly influence segment capacity, the segment operations are also anticipated to perform better than calculated.

11.1.3 *Intersection Queuing Analysis*

Queuing analyses were conducted at the two unsignalized intersections at the SR 94/ Euclid Avenue interchange for Alternatives 1 and 2. ***Table 11–3*** summarizes the results of the queuing analysis.

The critical movements at the ramp intersections were analyzed and calculated to be contained within the turn pockets designed for Alternatives 1 and 2. No significant queuing issues were identified for Alternatives 1 or 2. *Appendix I and J* contains the queuing calculation sheets for Alternatives 1 and 2 respectively.

11.1.4 *Non-Motorized Travel*

Alternatives 1 and 2 include the installation of Class II bike lanes on the bridge deck and "sharrow" pavement arrows along the corridor. As part of these Alternatives, it is also proposed to provide skid/slip resistant green pavement markings within Class II bicycle lanes, through intersections / ramps, and at "sharrow" legends.

The Federal Highway Administration (FHWA) and Caltrans has granted interim approval of green pavement markings for bike lanes along roadway, through intersections, and at conflict points. Despite this type of traffic control not included in the current California Manual on Uniform Traffic Control Devices (MUTCD), local jurisdictions may test such markings given this interim approval.

The "sharrow" pavement arrows may be subject to removal based on volumes on Euclid Avenue or future City policy. The City does not currently have an adopted policy regarding the installation of "sharrow" pavement arrows; however it is currently under review. Furthermore, FHWA and Caltrans have not granted interim approval of green pavement markings for "sharrows". Therefore, this treatment would require review and approval by governing agencies before implementation.

TABLE 11–1
YEAR 2020 ALTERNATIVES INTERSECTION OPERATIONS

Intersection	Peak Hour	Existing Traffic Control	2020 without Improvements		Proposed Traffic Control	Alternative 1		Alternative 2	
			Delay [a]	LOS [b]		Delay	LOS	Delay	LOS
1. Euclid Ave / Federal Boulevard	AM	Signal	29.5	C	*No improvement proposed*	29.5	C	29.5	C
	PM		41.2	D		41.2	D	41.2	D
4. Euclid Ave / Beech Street	AM	OWSC[c]	9.5	A	*No improvement proposed*	9.5	B	9.5	A
	PM		10.1	B		10.1	C	10.1	B
3. Euclid Ave / SR 94 WB Ramps	AM	OWSC[c]	**69.6**	**F**	Signal	7.9	A	7.0	A
	PM		**>100.0**	**F**		9.7	A	9.1	A
4. Euclid Ave / SR 94 EB Ramps	AM	Yield	15.9	C	Signal	19.1	B	19.5	B
	PM		**>100.0**	**F**		25.9	C	32.4	C
5. Euclid Ave / Geneva Avenue	AM	OWSC[c]	18.1	C	*No improvement proposed*	18.1	C	18.1	C
	PM		13.9	B		13.9	B	13.9	B
4. Euclid Ave / Market Street	AM	Signal	32.2	C	*No improvement proposed*	32.2	C	32.2	C
	PM		39.2	D		39.2	D	39.2	D

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. OWSC – One-way stop controlled intersection

General Notes:
1. **Bold** indicates LOS E or F operations.
2. Gray scale indicates no improvements proposed Alternatives 1 or 2.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

TABLE 11–2
YEAR 2020 ALTERNATIVES STREET SEGMENT OPERATIONS

Street Segment	Existing Capacity (LOS E) [a]	2020 without Improvements			Alternative 1					Alternative 2				
		ADT [b]	V/C	LOS [d]	Proposed Classification	Proposed Capacity (LOS E)	ADT	V/C	LOS	Proposed Classification	Proposed Capacity (LOS E)	ADT	V/C	LOS
Euclid Avenue														
Federal Blvd. to Beech St.	35,000	41,560	**1.187**	**F**	5-lane Collector	35,000	41,560	**1.187**	**F**	4-lane Major	40,000	41,560	**1.039**	**F**
SR 94 WB to EB Ramps	40,000	33,820	0.846	D	4-lane Major	40,000	33,820	0.846	D	4-lane Major	40,000	33,820	0.846	D
Geneva Ave. to Market St.	30,000	37,010	**1.234**	**F**	4-lane Collector	30,000	37,010	**1.234**	**F**	4-lane Major	40,000	37,010	**0.925**	**E**

Footnotes:

a. Capacity based on *City of San Diego's* roadway classification operating at LOS E.
b. Average Daily Traffic.
c. Level of Service.
d. Volume to Capacity.

General Notes:

1. **Bold** indicates LOS E or F operations.
2. Gray scale indicates no proposed improvements.

TABLE 11–3
YEAR 2020 ALTERNATIVES QUEUING ANALYSIS

SR 94/ Euclid Avenue Interchange	Movement	Total Peak Hour Queue (Feet/Lane)[b]								
		2020 without Improvements			Alternative 1			Alternative 2		
		Available Storage Length	AM	PM	Design Storage Length	AM	PM	Design Storage Length	AM	PM
3. Euclid Ave/SR 94 WB Ramps	WB L	470' [a]	170'	**510'**	200'	90'	170'	200'	90'	140'
4. Euclid Ave/SR 94 EB Ramps	EB R	575' [a]	70'	**650'**	575'	80'	360'	*DNE*	–	–
	SB L	375' [a]	30'	50'	240'	160'	230'	240'	160'	230'
	WB L[c]	*DNE*	–	–	*DNE*	–	–	360'	150'	360'

Footnotes:

a. Available storage for ramps that do not have a storage bay assumed to be 50% of the distance from intersection to ramp gore or adjacent intersection.

b. 95th percentile queue lengths from Synchro software reported. 95th percentile queues are defined as the queue length that has only a 5% probability of being exceeded. All queues rounded to the nearest 10.

c. Westbound left-turn movement in Alternative II replaces the eastbound right-turn movement from the existing condition and Alternative 1.

General Notes:

1. Bold indicates queuing exceeds available storage.

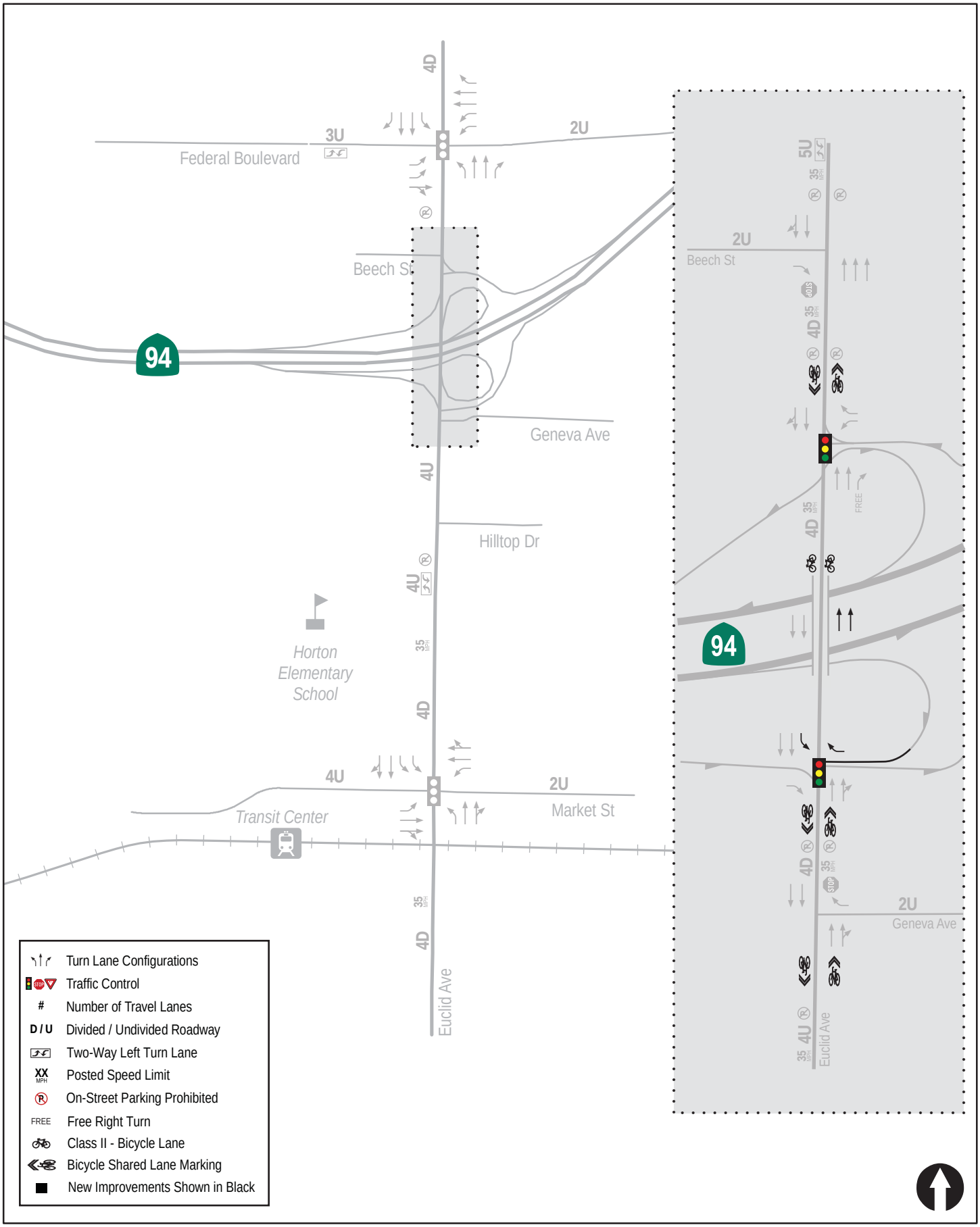

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Figure 11-1

Alternative 1 Improvement Plan

SR-94 / Euclid Avenue Interchange

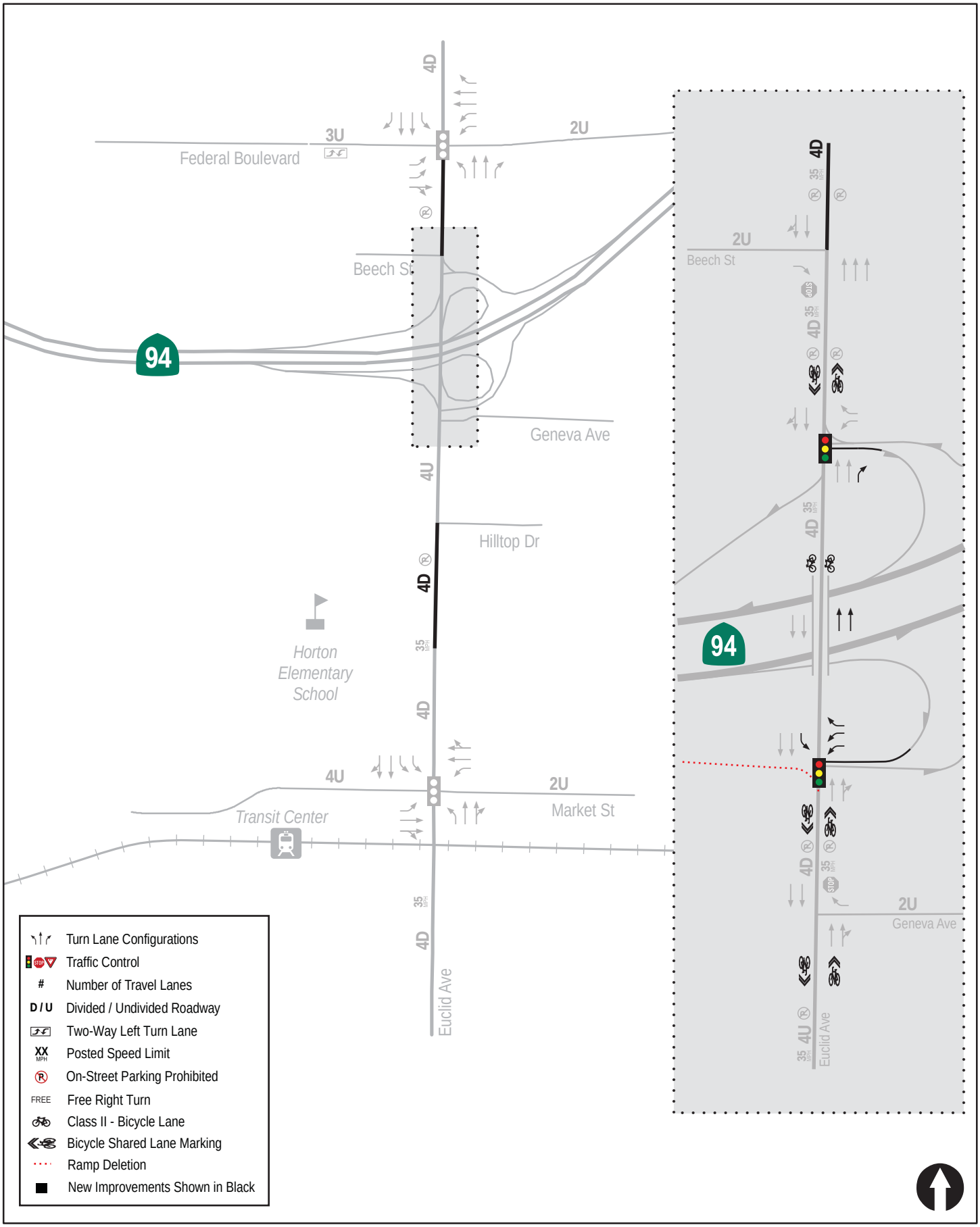

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Figure 11-2

Alternative 2 Improvement Plan

SR-94 / Euclid Avenue Interchange

11.2 Alternatives 3 and 4 – Horizon Year (Year 2035)

The following section presents the intersection, street segment and queuing analysis for Alternatives 3 and 4 for the horizon Year (Year 2035) scenario. ***Figures 11–3*** and ***11–4*** show an improvement diagram for Alternatives 3 and 4.

11.2.1 *Intersection Analysis*

Table 11–4 summarizes the intersection operations for horizon year (Year 2035) for Alternative 3. As seen in *Table 11–4*, all the intersections along are calculated to operate at LOS D or better. This is primarily due to the installation of a traffic signal at the ramp intersection and the installation of additional lanes such as dual left-turn lanes and right-turn lanes at the WB and EB ramps respectively. This was warranted to handle the additional demand in Year 2035. ***Appendix K*** contains the calculation sheets.

In addition to the interchange improvements, Alternative 3 also proposes improvements to the local street intersections at Federal Boulevard and Market Street. With the proposed improvements shown in *Figure 11–3* at these intersections, the intersection of Federal Boulevard and Market Street along Euclid Avenue are also calculated to operate at LOS D or better.

Table 11–1 also summarizes the intersection operations for horizon year (Year 2035) for Alternative 4. Alternative 4 in essence, is considered as a "community plan alternative", which includes a 6-lane cross section (three lanes in each direction) on Euclid Avenue. Identical improvements at Federal Boulevard and Market Street were assumed between Alternative 3 and 4.

As seen in *Table 11–1*, Alternative 4 shows acceptable LOS D operations or better at all the intersections along Euclid Avenue. With the wider cross-section and an additional through lane in the southbound and northbound direction, Alternative 4 shows an improvement in delay and level of service over Alternative 3. ***Appendix L*** contains the calculation sheets.

11.2.2 *Segment Operations*

Table 11–5 summarizes the street segment operations for horizon year (Year 2035) for Alternative 3. As seen in *Table 11–5***,** the analysis show an improvement in street segment operations (volume to capacity ratio's and LOS) with the addition of a raised median along Euclid Avenue when compared to the Year 2035 No build scenario:

- Euclid Avenue, Federal Boulevard to Beech Street — LOS F remains the same; however, volume to capacity ratio decreases.
- Euclid Avenue, Geneva Avenue to Market Street — LOS F remains the same; however, volume to capacity ratio decreases.

Table 11–5 also summarizes the street segment operations for horizon year (Year 2035) for Alternative 4. As seen in *Table 11–5,* with the proposed improvement of widening Euclid Avenue to 6-lanes, the analysis shows an improvement in street segment operations. The segment between the WB and EB ramps improves from LOS F to LOS D between Alternative 3 and 4 respectively. The

TABLE 11–6
YEAR 2035 ALTERNATIVES QUEUING ANALYSIS

SR 94/ Euclid Avenue Interchange	Movement	Total Peak Hour Queue (Feet/Lane) [b]								
		2035 without Improvements			Alternative 3			Alternative 4		
		Available Storage Length [a]	AM	PM	Design Storage Length	AM	PM	Design Storage Length	AM	PM
3. Euclid Ave/SR 94 WB Ramps	WB L	470’	**590’**	*mainline spillback**	120’	80’	120’	120’	70’	50’
4. Euclid Ave/SR 94 EB Ramps	SB L	575’	160’	*mainline spillback**	350’	250’	**450’** [d]	350’	210’	**390’** [d]
	WB L	375’	60’	110	360’	250’	**450’** [d]	360’	220’	**470’** [d]

Footnotes:

a. Available storage for ramps that do not have a storage bay assumed to be 50% of the distance from intersection to ramp gore.

b. 95th percentile queue lengths from Synchro software reported. 95th percentile queues are defined as the queue length that has only a 5% probability of being exceeded. All queues rounded to the nearest 10.

c. WB right-turn movement in existing and 2035 without improvements is a free movement.

d. 95th percentile queues shown represent the worst-case and have a 5% probability of being exceeded. 50th percentile queues represent queue lengths on a typical cycle and have a probability of 50% being exceeded. 50th percentile queues for these movements are contained within the designed storage lengths.

General Notes:

1. **Bold** indicates queuing exceeds available storage.

***** Queue exceeds length of ramp and may spillback onto mainline.

remaining segments on Euclid Avenue show an improvement with reduced volume to capacity ratio's with the additional capacity of a through lane in each direction.

Even though the street segment operations show failing levels of service with the widening to 6-lanes on Euclid Avenue, the intersections along Euclid Avenue show LOS D or better operations for both Alternatives 3 and 4. Since intersection operations directly influence segment capacity, the segment operations are also anticipated to perform better than calculated.

11.2.3 *Intersection Queuing Analysis*

Queuing analyses were conducted at the two unsignalized intersections at the SR 94/ Euclid Avenue interchange for Alternative 3 and 4. ***Table 11–6*** summarizes the results of the queuing analysis.

The critical movements at the ramp intersections were analyzed and calculated to be contained within the turn pockets designed for Alternatives 3 and 4. No significant queuing issues were identified for Alternatives 3 or 4. ***Appendix K*** and ***L*** contain the calculation sheets for Alternatives 3 and 4 respectively.

11.2.4 *Non-Motorized Travel*

Alternative 3 includes the installation of Class II bike lanes on the bridge deck and "sharrow" pavement arrows along the corridor. As part of these Alternatives, it is also proposed to provide skid/slip resistant green pavement markings within Class II bicycle lanes, through intersections / ramps, and at "sharrow" legends.

The Federal Highway Administration (FHWA) and Caltrans has granted interim approval of green pavement markings for bike lanes along roadway, through intersections, and at conflict points. Despite this type of traffic control not included in the current California Manual on Uniform Traffic Control Devices (MUTCD), local jurisdictions may test such markings given this interim approval.

The "sharrow" pavement arrows may be subject to removal based on volumes on Euclid Avenue or future City policy. The City does not currently have an adopted policy regarding the installation of "sharrow" pavement arrows; however it is currently under review. Furthermore, FHWA and Caltrans have not granted interim approval of green pavement markings for "sharrows". Therefore, this treatment would require review and approval by governing agencies before implementation.

Alternative 4 includes the installation of Class II bike lanes along the Euclid Avenue corridor. No "sharrows" are proposed. As part of this Alternative, it is also proposed to provide skid/slip resistant green pavement markings within Class II bicycle lanes and through intersections / ramps.

11.2.5 *Other Considerations*

Alternatives 3 and 4 involve the "cul-de-sacing" of Beech Street at Euclid Avenue. This closure of access will most likely redirect traffic to Lyon Street. The intersection of Lyon Street and Euclid Avenue may be subject to further review to determine the impacts of the redirected traffic and planned improvements considered. The City's Transportation Engineering Division has identified the installation of a raised median (in lieu of existing pylons) as an unfunded need for this location.

TABLE 11–4
YEAR 2035 ALTERNATIVES INTERSECTION OPERATIONS

Intersection	Peak Hour	Existing Traffic Control	2035 without Improvements		Proposed Traffic Control	Alternative 3		Alternative 4	
			Delay [a]	LOS [b]		Delay	LOS	Delay	LOS
1. Euclid Ave / Federal Boulevard	AM	Signal	43.5	D	Signal	37.3	D	47.0	D
	PM		**72.9**	**E**		53.5	D	54.4	D
2. Euclid Ave / Beech Street	AM	OWSC[c]	10.3	B	cul-de-sac	–[d]	–	–	–
	PM		10.9	B		–	–	–	–
3. Euclid Ave / SR 94 WB Ramps	AM	OWSC	**>100.0**	**F**	Signal	10.2	B	8.7	A
	PM		**>100.0**	**F**		15.2	B	9.7	A
4. Euclid Ave / SR 94 EB Ramps	AM	Yield	30.0	D	Signal	25.8	C	17.8	B
	PM		**>100.0**	**F**		40.8	D	27.3	C
5. Euclid Ave / Geneva Avenue	AM	OWSC	30.6	D	OWSC	30.6	D	17.2	C
	PM		18.7	C		18.7	C	13.7	B
6. Euclid Ave / Market Street	AM	Signal	**62.9**	**E**	Signal	47.0	D	47.0	D
	PM		**82.9**	**F**		54.4	D	54.4	D

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. OWSC – One-way Stop controlled intersection.
d. Alts3 and 4 proposes to cul-de-sac Beech Street. Hence no intersection and delay at Euclid Avenue / Beech Street.

General Notes
1. **Bold** indicates LOS E or F operations.
2. Gray scale indicates no improvements proposed.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

TABLE 11–5
YEAR 2035 ALTERNATIVES STREET SEGMENT OPERATIONS

Street Segment	Existing Capacity (LOS E) [a]	2035 without Improvements			Alternative 3					Alternative 4				
		ADT [b]	V/C	LOS [d]	Proposed Classification	Proposed Capacity (LOS E)	ADT	V/C	LOS	Proposed Classification	Proposed Capacity (LOS E)	ADT	V/C	LOS
Euclid Avenue														
Federal Blvd. to Beech St.	35,000	53,870	**1.539**	**F**	4-lane Major	40,000	53,870	**1.346**	**F**	6-lane Major	50,000	53,870	**1.074**	**F**
SR 94 WB to EB Ramps	40,000	41,900	**1.048**	**F**	4-lane Major	40,000	41,900	**1.048**	**F**	6-lane Major	50,000	41,900	0.838	D
Geneva Ave. to Market St.	30,000	51,450	**1.715**	**F**	4-lane Major	40,000	51,450	**1.286**	**F**	6-lane Major	50,000	51,450	**1.029**	**F**

Footnotes:

a. Capacity based on *City of San Diego's* roadway classification operating at LOS E.

b. Average Daily Traffic.

c. Level of Service.

d. Volume to Capacity.

General Notes:

1. **Bold** indicates LOS E or F operations.
2. Gray indicates no proposed improvement.

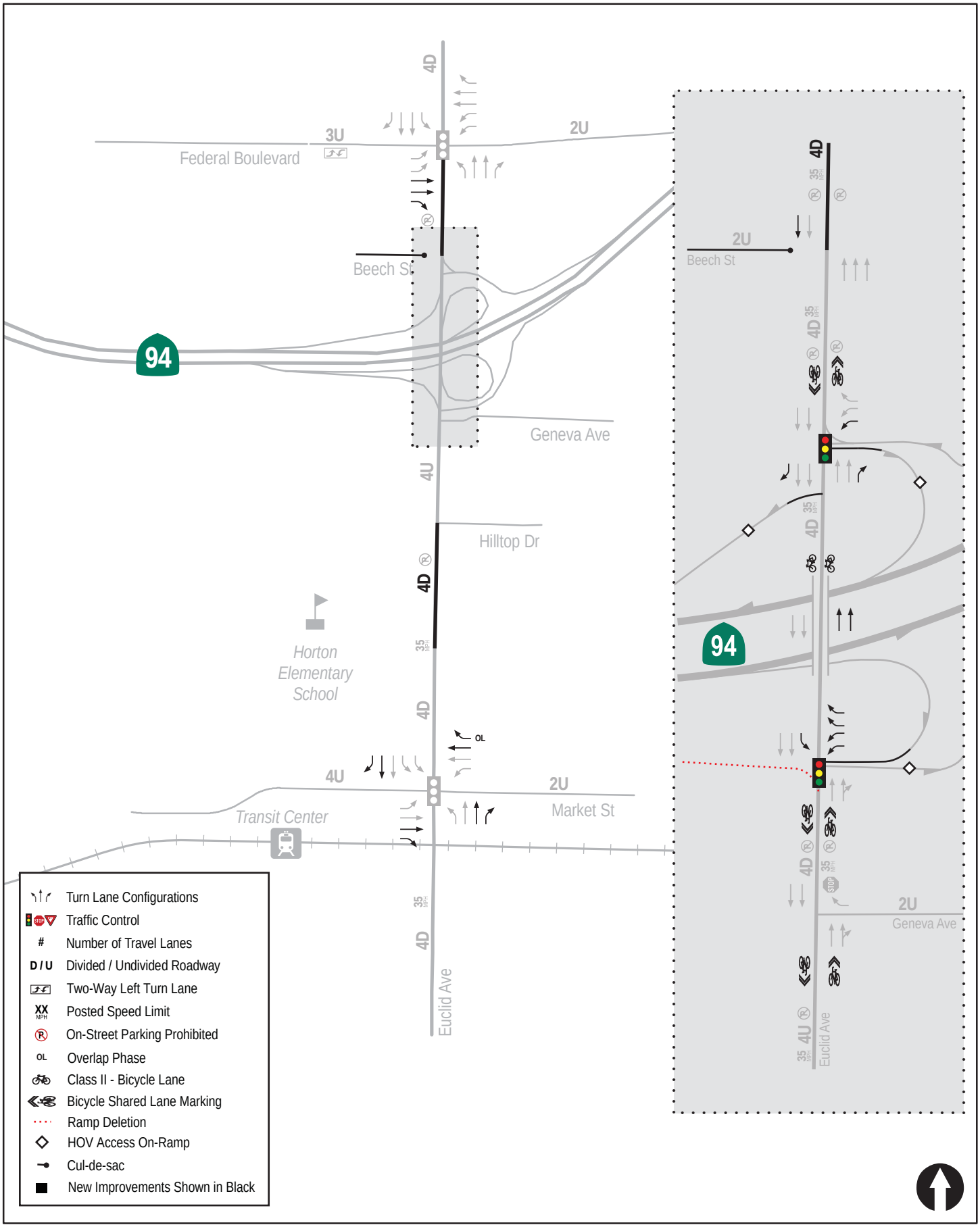

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Figure 11-3

Alternative 3 Improvement Plan

SR-94 / Euclid Avenue Interchange

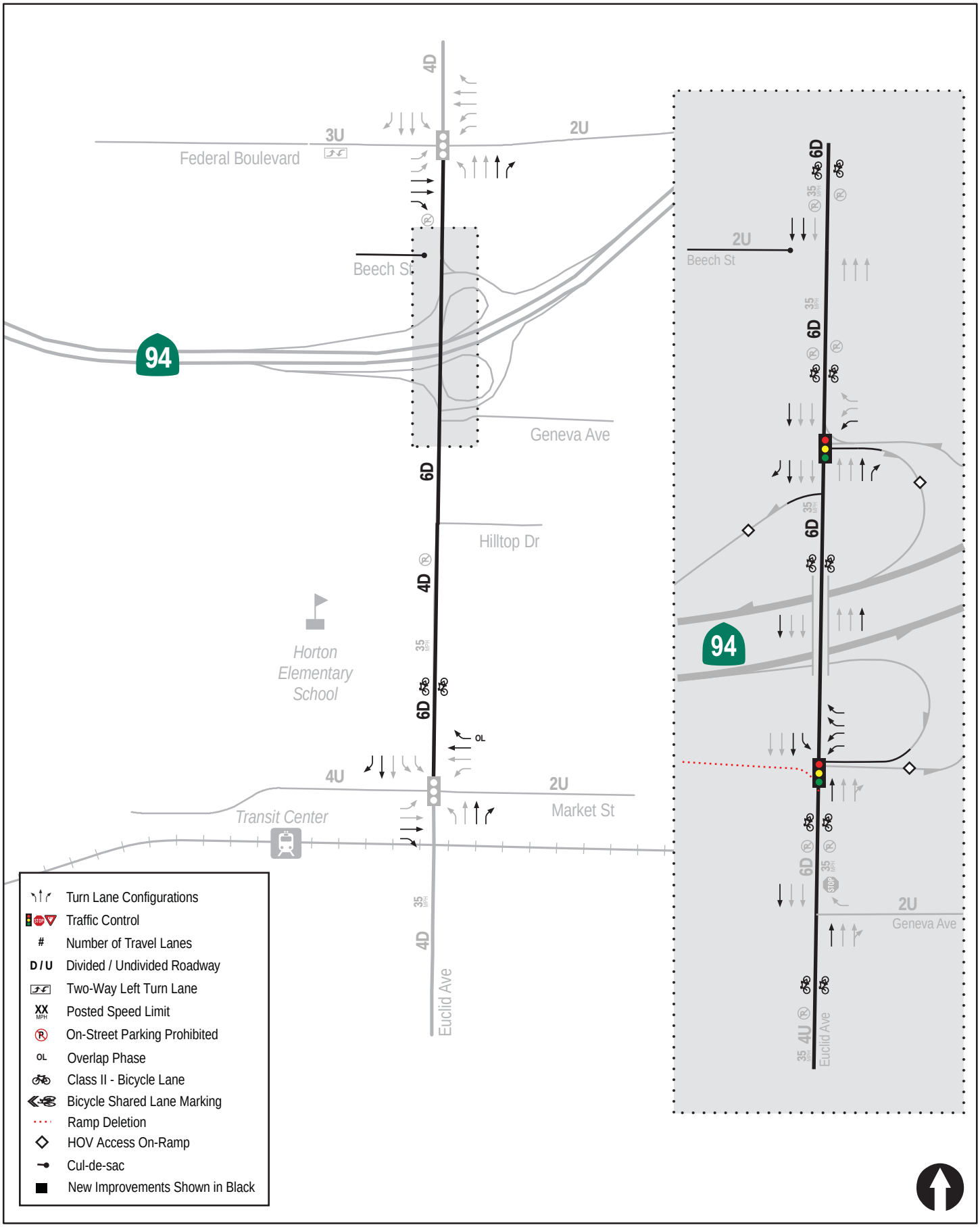

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Figure 11-4

Alternative 4 Improvement Plan

SR-94 / Euclid Avenue Interchange

Appendix B Signal Timing Plans and Existing Traffic Counts

INTERSECTION: 47th Street and Hilltop Drive

223 Program

Group Assignment:
Field Master Assignment:

N/S Street Name: **47th Street**
E/W Street Name: **Hilltop Drive**

Last Database Change:
System Ref. Number:

N

Row	Phase # ---->	1	2	3	4	5	6	7	8
	Column # ---->	Phase							
			47th Street		Hilltop Drive				
0	Ped Walk		7		7				
1	Ped FDW		9		16				
2	Min Green		10		4				
3	Type 3 Limit								
4	Add/Veh								
5	Veh Extn		4.2		2.0				
6	Max Gap		4.2		2.0				
7	Min Gap		0.2		2.0				
8	Max Limit		60		40				
9	Max Limit 2								
A	Bus Adv								
B	Call to Phs								
C	Reduce By		0.1						
D	Every		0.7						
E	Yellow		3.9		3.9				
F	Red Clear		1.0		1.0				

Phase Timing - Bank 1 <F Page>
F + Phase + Row

Row		E
	RR-1 Delay	
	RR-1 Clear	
	EV-A Delay	0
	EV-A Clear	0
	EV-B Delay	0
	EV-B Clear	0
	EV-C Delay	
	EV-C Clear	
	EV-D Delay	
	EV-D Clear	
	RR-2 Delay	
	RR-2 Clear	
	View EV Delay	---
	View EV Clear	---
	View RR Delay	---
	View RR Clear	---

Preempt Timing
F + E + Row

Row		F
0	Permit	_2_4___
1	Red Lock	
2	Yellow Lock	
3	Min Recall	_2_____
4	Ped Recall	_2_____
5	Peds (View)	_2_4___
6	Rest In Walk	
7	Red Rest	
8	Dbl Entry	
9	Max Recall	
A	Soft Recall	
B	Max 2	
C	Cond Serv	
D	Ped Lock	12345678
E	Yellow Start	_2_____
F	1st Phases	___4___

Phase Functions <F Page>
F + F + Row

Max Initial	0	F + 0 + E
Red Revert	5.0	F + 0 + F
All Red Start	0.0	F + C + O

Start / Revert Times

Drop Number		C + 0 + 0
Zone Number		C + 0 + 1
Area Number		C + 0 + 2
Area Address		C + 0 + 3
QuicNet Channel		(QuicNet)

Communication Addresses

Overlap Timing

	Row	9 Green Clear	C Yellow Change	D Red Clear	0 Load-Switch #
Overlap A	A				
Overlap B	B				
Overlap C	C				
Overlap D	D				

<F Page>
F + COLOR +

<D Page>
D + 0 + OVERLAP

Manual Plan	14	C + A + 1
Manual Offset	0	C + B + 1

Manual Selection

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

C + F + O	F	Row
Free Lag	_2_4___	0

Lag Phases <C Page>

Downtime Flash	255	(minutes)

Downtime Before Auto Manual Flash
F + 0 +8

Disable Ports	234

Disable Communication Ports
D + D + 9

Timing Sheet By: eml
Approved By: EFF
Drawing Number: 12883-1
Timing Implemented On: 12-16-13

Row	Time		Function	Day of Week	Column F Phases/Bits
0		:			
1		:			
2		:			
3		:			
4		:			
5		:			
6		:			
7		:			
8		:			
9		:			
A		:			
B		:			
C		:			
D		:			
E		:			
F		:			

TOD Function

7 + ROW

<D Page>

D + F + ROW

T.O.D. Functions
0 = Permitted Phases
1 = Red Lock
2 = Yellow Lock
3 = Veh Min Recall
4 = Ped Recall
5 =
6 = Rest In Walk
7 = Red Rest
8 = Double Entry
9 = Veh Max Recall
A = Veh Soft Recall
B = Maximum 2
C = Conditional Service
D = Free Lag Phases
E = Bit 1 - Local Override
Bit 2 - Phase Bank 2
Bit 3 - Phase Bank 3
Bit 4 - Disable Detector OFF Monitor
Bit 7 - Detector Count Monitor
Bit 8 - Real Time Split Monitor
F = Output Bits 1 thru 4

Row		F
0		
1	RR Overlap A - Phases	
2	RR Overlap B - Phases	
3	RR Overlap C - Phases	
4	RR Overlap D - Phases	
5	Ped 2P	2
6	Ped 6P	
7	Ped 4P	4
8	Ped 8P	
9	Yellow Flash Phases	
A	Overlap A - Phases	
B	Overlap B - Phases	
C	Overlap C - Phases	
D	Overlap D - Phases	
E	Restricted Phases	
F	Assign 5 Outputs	<E Page>

Configuration

E + F + ROW

Row		E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	
5	Overlap A - Green Omit	
6	Overlap B - Green Omit	
7	Overlap C - Green Omit	
8	Overlap D - Green Omit	
9	Overlap Yellow Flash	
A	EV-A Phases	2
B	EV-B Phases	4
C	EV-C Phases	
D	EV-D Phases	
E	Extra 1 Config. Bits	1_34
F	IC Select (Interconnect)	2

Configuration

For access, set F + 9 + E = 1

E + E + ROW

Extra 1 Flags
1 = TBC Type 1
2 = NEMA Ext. Coord
3 = Auto Daylight Savings
4 = EV Advance
5 = Remote Download
6 = Special Event
7 = Pretimed Operation
8 = Split Ring Operation

IC Select Flags
1 =
2 = Modem
3 = 7-Wire Slave
4 = Flash / Free
5 =
6 = Simplex Master
7 = 7-Wire Master
8 = Offset Interrupter

Day of Week

1 = Sunday
2 = Monday
3 = Tuesday
4 = Wednesday
5 = Thursday
6 = Friday
7 = Saturday

Assign 5 Outputs
1 = Right Turn Overlap
2 = TOD Outputs
3 = EV Beacon - Steady
4 = EV Beacon - Flashing
5 = Special Event Outputs
6 = Phase 3 & 7 Ped
7 = Advanced Warning Sign
8 =

Time and Date

8-0 Hour, Minute, Day-of-Week
8-1 Day-of-Month, Year, Month
8-F Seconds

	0
Disable Parity	D+B+0

Dial-Up Telephone Communications

(If set to a non-zero value, parity will be disabled)

Program Information

C + C + 0 = program
C + C + F = version

Remote Download

C + 0 + 4 = 1-255
w/ E + E + E bit 5 on

Row	1 Delay	3 Carry-over
0		
1		1.8
2		
3		1.8
4		
5		
6		
7		
8		
9		
A		
B		
C		
D		
E		
F	---	---

Detector Name	332 Input File	Detector Number
	1I1	14
	2I2U	1
	2I2L	5
	2I3U	21
	2I3L	25
	2I4	9
	3I5	16
	4I6U	3
	4I6L	7
	4I7U	23
	4I7L	27
	4I8	11
	1I9U	18
	3I9L	20
---	---	---
---	---	---

Row	2 Delay	4 Carry-over
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
A		
B		
C		
D		
E	---	---
F	---	---

Detector Name	332 Input File	Detector Number
	5J1	13
	6J2U	2
	6J2L	6
	6J3U	22
	6J3L	26
	6J4	10
	7J5	15
	8J6U	4
	8J6L	8
	8J7U	24
	8J7L	28
	8J8	12
	5J9U	17
	7J9L	19
---	---	---
---	---	---

Detector Delay & Carryover <D Page>

D + X (across) + ROW

Row	Detector Numbers	E
A	1 2 3 4 5 6 7 8	12345678
B	9 10 11 12 -- -- -- --	1234____
C	13 14 15 16 17 18 19 20	12345678
D	-- -- -- -- 21 22 23 24	____5678
E	-- -- -- -- -- -- -- --	1234____
F	-- 25 26 27 28 -- -- --	_2345___

Active Detectors <D Page>

Row		0 Detector #
0		
1	System Det. # 1	
2	System Det. # 2	
3	System Det. # 3	
4	System Det. # 4	
5	System Det. # 5	
6	System Det. # 6	
7	System Det. # 7	
8	System Det. # 8	

System Detectors <D Page>

Max ON (min)		D+A+E
Max OFF (min)		D+A+F

Detector Failure Monitor

Phase Number		F+C+1
Time Before Yellow		F+C+3

Advance Warning Beacon - Sign 1

Phase Number		F+D+1
Time Before Yellow		F+D+3

Advance Warning Beacon - Sign 2

Long Failure		F+0+6
Short Failure		F+0+7

Power Cycle Correction (Default = 0.5)

INTERSECTION: Euclid Av @ Hilltop Dr

...oup Assignment:	
Fi... ...ster Assignment:	
N/S Street Nam...	...EUCLID AV
E/W Street Nam...	...ILLTOP DR
Last Change:	
Timing Sheet By:	BJU
Approved By:	
Drawing Number:	30224-1-...
Sys. Ref. Number:	
Timing implemented on:	9/6/00 (1:30)

Row	Column # ---> / Phase # --->	1	2 (EUCLID)	3	4	5	6 (EUCLID)	7	8 (HILLTOP)
	N ►	↓	→				←		↑
0	Ped Walk		7				7		7
1	Ped FDW		9				10		16
2	Min Green	4	10				10		4
3	Type 3 Limit								
4	Add/Veh								
5	Veh Extn	2.0	4.1				4.0		2.0
6	Max Gap	2.0	4.1				4.0		2.0
7	Min Gap	2.0	0.2				0.2		2.0
8	Max Limit	30	60				60		40
9	Max Limit 2								
A	Bus Adv								
B	Call to Phs	6	6						
C	Reduce By		0.1				0.1		
D	Every	DOC 3/14/03	0.8				0.8		DOC 3/14/03
E	Yellow	~~3.0~~ 3.4	4.4				4.4		~~3.0~~ 3.9
F	Red Clear	1.0	1.0				1.0		1.0

Phase Timing - Bank 1
F + Phase + Row
<F Page>

	E
RR-1 Delay	
RR-1 Clear	
EV-A Delay	
EV-A Clear	0
EV-B Delay	
EV-B Clear	0
EV-C Delay	
EV-C Clear	0
EV-D Delay	
EV-D Clear	0
RR-2 Delay	
RR-2 Clear	
View EV Delay	---
View EV Clear	---
View RR Delay	---
View RR Clear	---

Preempt Timing
F + E + Row

Row		F
0	Permit	12___6_8
1	Red Lock	
2	Yellow Lock	
3	Min Recall	
4	Ped Recall	
5	Peds (View)	
6	Rest In Walk	
7	Red Rest	
8	Dbl Entry	
9	Max Recall	
A	Soft Recall	_2___6__
B	Max 2	
C	Cond Serv	
D	Ped Lock	12345678
E	Yellow Start	_2___6__
F	1st Phases	_______8

Phase Functions <F Page>
F + F + Row

Max Initial	0	F + 0 + E
Red Revert	5.0	F + 0 + F
All Red Start	0.0	F + C + O

Start / Revert Times

Drop Number	0 7	C + 0 + 0
Zone Number	0 7	C + 0 + 1
Area Number	0 0	C + 0 + 2
Area Address	0 205	C + 0 + 3
QuicNet Channel	0 DIGI	(QuicNet)

VAC #401 98

Communication Addresses

C + F + O	F	Row
Free Lag	_2___6_8	0

Lag Phases <C Page>

Row		9 Green Clear	C Yellow Change	D Red Clear	0 Load-Switch #
A	Overlap A				
B	Overlap B				
C	Overlap C				
D	Overlap D				

Overlap Timing <F Page> <D Page>
F + COLOR + D + 0 + OVERLAP

Downtime Flash	60	(minutes)

Downtime Before Auto Manual Flash
F + 0 + 8

Manual Plan	~~14~~ → 0 DOC 3/14/03	C + A + 1
Manual Offset	0	C + B + 1

Manual Selection

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

Manual Offset 0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

Disable Ports	234

Disable Communications Ports
D + D + 9

INTERSECTION: Euclid Av @ Hilltop Dr **223 Program**

Row	Time	Function	Day of Week	Column F Phases/Bits
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
A				
B				
C				
D				
E				
F				

TOD Function <D Page>

7 + ROW D + F + ROW

T.O.D. Functions
0 = Permitted Phases
1 = Red Lock
2 = Yellow Lock
3 = Veh Min Recall
4 = Ped Recall
5 =
6 = Rest In Walk
7 = Red Rest
8 = Double Entry
9 = Veh Max Recall
A = Veh Soft Recall
B = Maximum 2
C = Conditional Service
D = Free Lag Phases
E = Bit 1 - Local Override
Bit 2 - Phase Bank 2
Bit 3 - Phase Bank 3
Bit 4 - Disable Detector OFF Monitor
Bit 7 - Detector Count Monitor
Bit 8 - Real Time Split Monitor
F = Output Bits 1 thru 4

Row		F
0		
1	RR Overlap A - Phases	
2	RR Overlap B - Phases	
3	RR Overlap C - Phases	
4	RR Overlap D - Phases	
5	Ped 2P	_2_____
6	Ped 6P	_____6__
7	Ped 4P	
8	Ped 8P	_____8
9	Yellow Flash Phases	
A	Overlap A - Phases	
B	Overlap B - Phases	
C	Overlap C - Phases	
D	Overlap D - Phases	
E	**Restricted Phases**	
F	Assign 5 Outputs	

Configuration <E Page>

E + F + ROW

Day of Week

1 = Sunday
2 = Monday
3 = Tuesday
4 = Wednesday
5 = Thursday
6 = Friday
7 = Saturday

Assign 5 Outputs
1 = Right Turn Overlap
2 = TOD Outputs
3 = EV Beacon - Steady
4 = EV Beacon - Flashing
5 = Special Event Outputs
6 = Phase 3 & 7 Ped
7 = Advanced Warning Sign
8 =

Row		E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	
5	Overlap A - Green Omit	
6	Overlap B - Green Omit	
7	Overlap C - Green Omit	
8	Overlap D - Green Omit	
9	Overlap Yellow Flash	
A	EV-A Phases	_2_____
B	EV-B Phases	
C	EV-C Phases	1_____6__
D	EV-D Phases	_____8
E	Extra 1 Config. Bits	1_345___
F	IC Select (Interconnect)	_2_____

Configuration

For access, set F + 9 + E = 1 E + E + ROW

Extra 1 Flags
1 = TBC Type 1
2 = NEMA Ext. Coord
3 = Auto Daylight Savings
4 = EV Advance
5 = Remote Download
6 = Special Event
7 = Pretimed Operation
8 = Split Ring Operation

IC Select Flags
1 =
2 = Modem
3 = 7-Wire Slave
4 = Flash / Free
5 =
6 = Simplex Master
7 = 7-Wire Master
8 = Offset Interrupter

Time and Date

8-0 Hour, Minute, Day-of-Week
8-1 Day-of-Month, Year, Month
8-F Seconds

Disable Parity	0	D+B+0

Dial-Up Telephone Communications
(If set to a non-zero value, parity will be disabled)
(This parameter is NOT downloaded)

Program Information
C + C + 0 = program
C + C + F = version

Remote Download
C + 0 + 4 = 1 -255
w/ E + E + E bit 5 on

Row	1 Delay	3 Carry-over
0		
1		1.8
2		1.8
3		
4		
5		
6		
7		
8		
9		
A		
B		
C		
D		
E		---
F	---	---

Detector Name	332 Input File	Detector Number
	1I1	14
	2I2U	1
	2I2L	5
	2I3U	21
	2I3L	25
	2I4	9
	3I5	16
	4I6U	3
	4I6L	7
	4I7U	23
	4I7L	27
	4I8	11
	1I9U	18
	3I9L	20
---	---	---
---	---	---

Row	2 Delay	4 Carry-over
0		
1		1.8
2		1.8
3		
4		
5		
6		
7	10.0	
8		
9		
A		
B		
C		
D		
E	---	---
F	---	---

Detector Name	332 Input File	Detector Number
	5J1	13
	6J2U	2
	6J2L	6
	6J3U	22
	6J3L	26
	6J4	10
	7J5	15
	8J6U	4
	8J6L	8
	8J7U	24
	8J7L	28
	8J8	12
	5J9U	17
	7J9L	19
---	---	---
---	---	---

Detector Delay & Carryover <D Page>

D + X (across) + ROW

Row	Detector Numbers	E
A	1 2 3 4 5 6 7 8	12345678
B	9 10 11 12 -- -- -- --	1234
C	13 14 15 16 17 18 19 20	12345678
D	-- -- -- -- 21 22 23 24	5678
E	-- -- -- -- -- -- -- --	1234
F	-- 25 26 27 28 -- -- --	2345

Active Detectors <D Page>

Row		0 Detector #
0		
1	System Det. # 1	0
2	System Det. # 2	0
3	System Det. # 3	0
4	System Det. # 4	0
5	System Det. # 5	0
6	System Det. # 6	0
7	System Det. # 7	0
8	System Det. # 8	0

System Detectors <D Page>

Max ON (min)	5	D+A+E
Max OFF (min)	60	D+A+F

Detector Failure Monitor

Phase Number	0	F+C+1
Time Before Yellow	0.0	F+C+3

Advance Warning Beacon - Sign 1

Phase Number	0	F+D+1
Time Before Yellow	0.0	F+D+3

Advance Warning Beacon - Sign 2

Long Failure	0.5	F+0+6
Short Failure	0.5	F+0+7

Power Cycle Correction (Default = 0.5)

(These parameters are NOT downloaded.)

INTERSECTION: EUCLID AND MARKET

233 Program

Group Assignment: 4019
Field Master Assignment: NONE
System Reference Number: 494

N/S Street: EUCLID
E/W Street: MARKET

Last Database Change:

Timing sheets by: LEM
Approved by:
Timing implemented on: EFF

Row	Phase Numbers---->	1	2	3	4	5	6	7	8
0	Ped Walk		7		7		7		7
1	Ped FDW		22		25		20		20
2	Min Green	4	10	4	7	4	10	4	7
3	Type 3 Disconnect								
4	Added per Vehicle								
5	Veh Extension	2.0	3.5	2.0	3.1	2.0	2.8	2.0	2.7
6	Max Gap	2.0	3.5	2.0	3.1	2.0	2.8	2.0	2.7
7	Min Gap	2.0	0.2	2.0	0.2	2.0	0.2	2.0	0.2
8	Max Limit	30	60	30	40	30	60	30	40
9	Max Limit 2								
A	Adv. / Delay Walk								
B	PE Min Ped FDW								
C	Cond Serv Check								
D	Reduce Every		0.9		1.0		1.1		1.2
E	Yellow Change	3.4	3.9	3.4	3.9	3.4	4.3	3.4	4.9
F	Red Clear	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Phase Timing - Bank 1 <F/1+Phase+Row>

Row		E
0	RR-1 Delay	
1	RR-1 Clear	
2	EV-A Delay	0
3	EV-A Clear	0
4	EV-B Delay	0
5	EV-B Clear	0
6	EV-C Delay	0
7	EV-C Clear	0
8	EV-D Delay	0
9	EV-D Clear	0
A	RR-2 Delay	0
B	RR-2 Clear	20
C	*View EV Delay*	- - -
D	*View EV Clear*	- - -
E	*View RR Delay*	- - -
F	*View RR Clear*	- - -

Preempt Timing <F/1+E+Row>

Row		F
0	Permit	12345678
1	Red Lock	
2	Yellow Lock	
3	Min Recall	
4	Ped Recall	
5	*View Set Peds*	_2_4_6_8
6	Rest In Walk	
7	Red Rest	
8	Double Entry	
9	Max Recall	
A	Soft Recall	_2___6__
B	Max 2	
C	Cond. Service	
D	Man Cntrl Calls	12345678
E	Yellow Start	___4___8
F	First Phases	_2___6__

Phase Functions <F/1+F+Row>

Current Calculated Cycle Length: C/0 + B + F

	9	A	B	C	D
	---	---	---	---	---
Phase 1					
Phase 2					
Phase 3					
Phase 4					
Phase 5					
Phase 6					
Phase 7					
Phase 8					
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

Alternate Timing <F/1+Column+Phase>

Drop Number	5	<C/0+0+0>
Zone Number	5	<C/0+0+1>
Area Number	0	<C/0+0+2>
Area Address	152	<C/0+0+3>
QuicNet Channel	COM102:	(QuicNet)

Communication Addresses

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

(Outputs specified in Assignable Outputs at E/127+A+E & F)

Exclusive Walk	0	<F/1+0+0>
Exclusive FDW	0	<F/1+0+1>
All Red Clear	0.0	<F/1+0+2>

Exclusive Ped Phase

Flash Start	0	<F/1+0+E>
Red Revert	5.0	<F/1+0+F>
All Red Start	0.0	<F/1+C+0>

Start / Revert Times

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

Manual Plan	14	<C/0+A+1>
Manual Offset	0	<C/0+B+1>

Manual Selection

Free Lag	_2_4_6_8	<C/1+F+0>

How to Set Page Access Code:
F/1 -- C + 0 + F = 1

Notes: *DWG: 27994*

INTERSECTION: EUCLID AND MARKET

233 Program

Row		Overlap 1	2	3	4	5	6	7	8
0	Load Switch Number								
1	Veh Set 1 - Phases								
2	Veh Set 2 - Phases								
3	Veh Set 3 - Phases								
4	Neg Veh Phases								
5	Neg Ped Phases								
6	Green Omit Phases								
7	Green Clear Omit Phs.								
8									
9									
A									
B									
C									
D	Green Clear								
E	Yellow Change								
F	Red Clear								

Overlap Assignments <E/29+Column+Row>

	F
Fast Green Flash Phase	
Green Flash Phases	
Flashing Walk Phases	
Guaranteed Passage	
Simultaneous Gap Term	12345678
Sequential Timing	
Advance Walk Phases	
Delay Walk Phases	
External Recall	
Start-up Overlap Green	
Max Extension	
Inhibit Ped Reservice	
Semi-Actuated	
Start-up Overlap Yellow	
Start-up Vehicle Calls	12345678
Start-up Ped Calls	12345678

Specials <F/2+F+Row>

Row		E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	_2__5___
3	RR-2 Limited Service	1__45_78
4	Prot / Perm Phases	
5	Flash to PE Circuits	
6	Flash Entry Phases	
7	Disable Yellow Range	
8	Disable Ovp Yel Range	
9	Overlap Yellow Flash	
A	EV-A Phases	_2__5___
B	EV-B Phases	___4__7_
C	EV-C Phases	1____6__
D	EV-D Phases	__3____8
E	Extra 1 Config. Bits	1_345___
F	IC Select (Interconnect)	_2_____

Configuration <E/125+E+Row>

	F
Ext. Permit 1 Phases	
Ext. Permit 2 Phases	
Exclusive Ped Assign	
Preempt Non-Lock	12345678
Ped for 2P Output	_2_____
Ped for 6P Output	_____6__
Ped for 4P Output	___4____
Ped for 8P Output	_____8
Yellow Flash Phases	
Low Priority A Phases	
Low Priority B Phases	
Low Priority C Phases	
Low Priority D Phases	
Restricted Phases	
Extra 2 Config. Bits	

Configuration <E/125+F+Row>

	C
EV-A	
EV-B	
EV-C	
EV-D	
RR-1 *	- - -
RR-2 *	- - -
SE-1	0
SE-2	0

<E/125+C+Row>

Preemption Priority

(* RR-1 is always Highest, and RR-2 is always Second Highest)

	2
Phase 1	0
Phase 2	0
Phase 3	0
Phase 4	0
Phase 5	0
Phase 6	0
Phase 7	0
Phase 8	0

<C/5+2+Row>

Coordination Transition Minimums

Extra 1 Flags
1 = TBC Type 1
2 = NEMA Ext. Coord
3 = Auto Daylight Savings
4 = EV Advance
5 = Extended Status
6 = International Ped
7 = Flash - Clear Outputs
8 = Split Ring

IC Select Flags
1 =
2 = Modem
3 = 7-Wire Slave
4 = Flash / Free
5 =
6 = Simplex Master
7 = 7-Wire Master
8 = Offset Interrupter

Extra 2 Flags
1 = AWB During Initial
2 = LMU Installed
3 = Disable Min Walk
4 = QuicNet/4 System
5 = Ignore P/P on EV
6 =
7 = Reserved
8 =

Flash to PE & PE Non-Lock
1 = EV A 5 = RR 1
2 = EV B 6 = RR 2
3 = EV C 7 = SE 1
4 = EV D 8 = SE 2

8-0 Hour, Minute, Day-of-Week
8-1 Day-of-Month, Year, Month
8-F Seconds

Time and Date

Begin Month	0	<C/5+2+A>
Begin Week	0	<C/5+2+B>
End Month	0	<C/5+2+C>
End Week	0	<C/5+2+D>

Daylight Savings Time

Daylight Savings Date:
If set to all zeros, standard dates will be used.

Row	Detector Name	0 C1 Pin Number	1 Attributes	2 Phase(s)	3 Assign	1 Delay	3 Carry-Over
0	2I2U	39	45_7	2	123 8		1.8
1	6J2U	40	45_7	6	123 8		1.8
2	4I6U	41	45_7	4	123 8		1.8
3	8J6U	42	45_7	8	123 8		1.8
4		43	45_7	2	123 8		
5		44	45_7	6	123 8		
6		45	45_7	4	123 8		
7		46	45_7	8	123 8		
8		47	67	2	123 8		
9		48	67	6	123 8		
A		49	67	4	123 8		
B		50	67	8	123 8		
C		55	45_7	5	123 8		
D		56	45_7	1 7	123 8		
E		57	45_7	7	123 8		
F		58	45_7	3	123 8		

Program Type:

Row	Detector Name	4 C1 Pin Number	5 Attributes	6 Phase(s)	7 Assign	2 Delay	4 Carry-Over
0		59	45_7	5	123 8		
1		60	45_7	1 7	123 8		
2		61	45_7	7	123 8		
3		62	45_7	3	123 8		
4		63	45_7	2	123 8		
5		64	45_7	6	123 8		
6		65	45_7	4	123 8		
7		66	45_7	8	123 8		
8		67	2	2	123 8		
9		68	2	6	123 8		
A		69	2	4	123 8		
B		70	2	8	123 8		
C		76	45_7	2	123 8		
D		77	45_7	6	123 8		
E		78	45_7	4	123 8		
F		79	45_7	8	123 8		

Detector Assignments <E/126+Column+Row> <D/0+Column+Row>

Detector Attributes
1 = Full Time Delay
2 = Ped Call
3 =
4 = Count
5 = Extension
6 = Type 3
7 = Calling
8 = Alternate

Det. Assignments
1 = Det. Set 1
2 = Det. Set 2
3 = Det. Set 3
4 =
5 =
6 = Failure - Min Recall
7 = Failure - Max Recall
8 = Report on Failure

Row	Ped / Phase / Overlap 1	2	3	4	5	6	7	8
Walk								
Don't Walk								
Phase Green								
Phase Yellow								
Phase Red								
Overlap Green								
Overlap Yellow								
Overlap Red								

Redirect Phase Outputs <E/127+Column+Row>

Cabinet Type	0

<E/125+D+0>

Enable Redirection
(Enable Redirection = 30)

Max OFF (minutes)	5	<D/0+0+1>
Max ON (minutes)	60	<D/0+0+2>

Detector Failure Monitor

Row		D
0		
1	Output Port 1	
2	Output Port 2	
3	Output Port 3	
4	Output Port 4	
5	Output Port 5	
6	Output Port 6	
7	Output Port 7	

Dimming <E/125+D+Row>

	D
Number of Digits	
1 st Digit	
2 ed Digit	
3 ed Digit	
4 th Digit	
5 th Digit	
6 th Digit	
7 th Digit	
8 th Digit	
9 th Digit	
10 th Digit	
11 th Digit	
12 th Digit	
13 th Digit	
14 th Digit	
15 th Digit	

<C/5+D+Row>

Dial-Back Telephone Number

Disable Alarms
1 = Stop Time
2 = Flash Sense
3 = Keyboard Entry
4 = Manual Plan
5 = Police Control
6 = External Alarm
7 = Detector Failure
8 =

Row		B
A	DELAY-A	1
B	DELAY-B	1
C	DELAY-C	0
D	DELAY-D	0
E	DELAY-E	0
F	DELAY-F	0

<D/0+B+Row> (seconds)

Delay Logic Times

Omit Alarm	#NAME?

<C/5+F+0>

Disable Alarm Reporting

Time	0	<C/5+C+0>

Redial Time (minutes)
(View Redial Timer at E/2+D+6)

Row	Time	Plan	Offset	Day of Week
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
A				
B				
C				
D				
E				
F				

TOD Coordination <9/0.1+Row>
(Bank 1)

Time	Funct.	Day of Week

TOD Function <7/0.1+Row>

Column 4 Phases/Bits

<E/27+4+Row>

Row
0
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F

Day	Year	Month	Holiday Type

Holiday Dates <8/1.1+Row>
(Bank 1)

Time	Plan	Offset	Holiday Type

Holiday Events <9/1.1+Row>
(Bank 1)

Row
0
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F

T.O.D. Functions:
0 =
1 = Red Lock
2 = Yellow Lock
3 = Veh Min Recall
4 = Ped Recall
5 =
6 = Rest In Walk
7 = Red Rest
8 = Double Entry
9 = Veh Max Recall
A = Veh Soft Recall
B = Maximum 2
C = Conditional Service
D = Free Lag Phases
E = Bit 1 - Local Override
Bit 4 - Disable Detector OFF Monitor
Bit 7 - Detector Count Monitor
Bit 8 - Real Time Split Monitor
F = Output Bits 1 thru 8

Plan Select:
1 thru 9 = Coordination Plan 1 thru 9
14 or E = Free
15 or F = Flash

Month Select:
1 = January
2 = February
3 = March
4 = April
5 = May
6 = June
7 = July
8 = August
9 = September
A = October
B = November
C = December

Cycle Timer:
Master: C/0 + A + 0
Ring A: C/0 + B + 0
Ring B: C/0 + D + 0

Interval Timer:
Ring A: F/0 + A + Interval Row
Ring B: F/0 + B + Interval Row

Master Plan: C/0 + A + 2
Current Plan: C/0 + A + 3
TOD Plan: C/0 + A + 5

Row	Time	Plan	Offset	Day of Week
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
A				
B				
C				
D				
E				
F				

TOD Coordination <9/0.2+Row>
(Bank 2)

Time	Funct.	Holiday Type

Holiday TOD Function <7/0.2+Row>

Column 4 Phases/Bits

<E/28+Row>

Row
0
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F

Day	Year	Month	Holiday Type

Holiday Dates <8/1.2+Row>
(Bank 2)

Time	Plan	Offset	Holiday Type

Holiday Events <9/1.2+Row>
(Bank 2)

Row
0
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F

Row	Column 9		Column A		Column B		Column C		Column D		Column E		Column F		Row
0	Spec. Funct. 1		NOT-3		Max 2		Pretimed		Set Monday		Dial 2 (7-Wire)		Sim Term		0
1	Spec. Funct. 2		NOT-4		System Det 1		Plan 1		Ext. Perm 1		Dial 3 (7-Wire)		EV-A	71	1
2	Spec. Funct. 3		OR-4 (a)		System Det 2		Plan 2		Ext. Perm 2		Offset 1 (7-Wire)		EV-B	72	2
3	Spec. Funct. 4		OR-4 (b)		System Det 3		Plan 3		Dimming		Offset 2 (7-Wire)		EV-C	73	3
4	NAND-3 (a)		OR-5 (a)		System Det 4		Plan 4		Set Clock		Offset 3 (7-Wire)		EV-D	74	4
5	NAND-3 (b)		OR-5 (b)		System Det 5		Plan 5		Stop Time		Free (7-Wire)		RR-1	203	5
6	NAND-4 (a)		OR-6 (a)		System Det 6		Plan 6		Flash Sense	81	Flash (7-Wire)		RR-2	205	6
7	NAND-4 (b)		OR-6 (b)		System Det 7		Plan 7		Manual Enable		Excl. Ped Omit		Spec. Event 1		7
8	OR-7 (a)		Fig 3 Diamond		System Det 8		Plan 8		Man. Advance		NOT-1	52	Spec. Event 2		8
9	OR-7 (b)		Fig 4 Diamond		Max Inhibit (nema)		Plan 9		External Alarm		NOT-2		External Lag		9
A	OR-7 (c)		AND-4 (a)		Force A (nema)		DELAY-A	202	Phase Bank 2		OR-1 (a)	51	AND-1 (a)		A
B	OR-7 (d)		AND-4 (b)		Force B (nema)		DELAY-B	204	Phase Bank 3		OR-1 (b)	52	AND-1 (b)		B
C	OR-8 (a)		NAND-1 (a)	51	C.N.A. (nema)		DELAY-C		Overlap Set 2		OR-2 (a)		AND-2 (a)		C
D	OR-8 (b)		NAND-1 (b)	52	Hold (nema)		DELAY-D		Overlap Set 3		OR-2 (b)		AND-2 (b)		D
E	OR-8 (c)		NAND-2 (a)	200	Max Recall		DELAY-E		Detector Set 2		OR-3 (a)		AND-3 (a)		E
F	OR-8 (d)		NAND-2 (b)	201	Min Recall		DELAY-F		Detector Set 3		OR-3 (b)		AND-3 (b)		F

Assignable Inputs **<E/126+Column+Row>**

Row	Column 9		Column A		Column B		Column C		Column D		Column E		Column F		Row
0	Phase ON - 1		Preempt Fail		Flasher 0		Free		NOT-1	204	TOD Out 1		Dial 2 (7-Wire)		0
1	Phase ON - 2		Sp Evnt Out 1		Flasher 1		Plan 1		OR-1	200	TOD Out 2		Dial 3 (7-Wire)		1
2	Phase ON - 3		Sp Evnt Out 2		Fast Flasher		Plan 2		OR-2		TOD Out 3		Offset 1 (7-Wire)		2
3	Phase ON - 4		Sp Evnt Out 3		Fig 3 Diamond		Plan 3		OR-3		TOD Out 4		Offset 2 (7-Wire)		3
4	Phase ON - 5		Sp Evnt Out 4		Fig 4 Diamond		Plan 4		AND-1		TOD Out 5		Offset 3 (7-Wire)		4
5	Phase ON - 6		Sp Evnt Out 5				Plan 5		AND-2		TOD Out 6		Free (7-Wire)		5
6	Phase ON - 7		Sp Evnt Out 6				Plan 6		AND-3		TOD Out 7		Flash (7-Wire)		6
7	Phase ON - 8		Sp Evnt Out 7				Plan 7		NOT-2		TOD Out 8		Preempt		7
8	Ph. Check - 1		Sp Evnt Out 8		NOT-3		Plan 8		EV-A		Adv. Warn - 1		Low Priority A		8
9	Ph. Check - 2				NOT-4		Plan 9		EV-B		Adv. Warn - 2		Low Priority B		9
A	Ph. Check - 3		Detector Fail		OR-4		Spec. Funct. 3		EV-C		DELAY-A	203	Low Priority C		A
B	Ph. Check - 4		Spec. Funct. 1		OR-5		Spec. Funct. 4		EV-D		DELAY-B	205	Low Priority D		B
C	Ph. Check - 5		Spec. Funct. 2		OR-6		NAND-3		RR-1		DELAY-C				C
D	Ph. Check - 6		Central Control		AND-4		NAND-4		RR-2		DELAY-D				D
E	Ph. Check - 7		Excl. Ped DW		NAND-1	201	OR-7		Spec. Event 1		DELAY-E				E
F	Ph. Check - 8		Excl. Ped WK		NAND-2	202	OR-8		Spec. Event 2		DELAY-F				F

Assignable Outputs **<E/127+Column+Row>**

INPUT ASSIGNMENTS

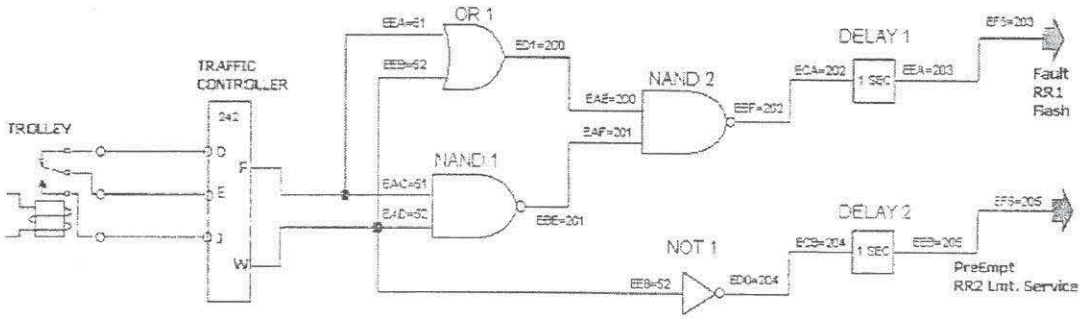
C+0+E=126
EEA=51
EEB=52
EAC=51
EAD=52
EAE=200
EAF=201
ECA=202
EF5=203
EE8=52
ECB=204
EF6=205

OUTPUT ASSIGNMENTS

C+0+E=127
ED1=200
EBE=201
EBF=202
ED0=204
EEA=203
EEB=205

DELAY TIMERS

C+0+D=0
DBA=1
DBB=1



Prepared by NDS/ATD

VOLUME

47th St Bet. SR-94 EB Ramps & Hilltop Dr

Day: Tuesday
Date: 2/14/2017

City: San Diego
Project #: CA17_4038_001

DAILY TOTALS	NB	SB	EB	WB	Total
	9,787	7,478	0	0	17,265

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
0:00	12		8				20		12:00	152		91				243	
0:15	9		11				20		12:15	132		95				227	
0:30	9		7				16		12:30	111		88				199	
0:45	8	38	5	31			13	69	12:45	110	505	101	375			211	880
1:00	8		4				12		13:00	99		95				194	
1:15	8		4				12		13:15	133		102				235	
1:30	8		5				13		13:30	150		104				254	
1:45	10	34	4	17			14	51	13:45	146	528	102	403			248	931
2:00	3		3				6		14:00	124		109				233	
2:15	6		6				12		14:15	126		130				256	
2:30	6		2				8		14:30	157		140				297	
2:45	5	20	3	14			8	34	14:45	187	594	158	537			345	1131
3:00	6		2				8		15:00	178		181				359	
3:15	5		1				6		15:15	186		142				328	
3:30	18		3				21		15:30	190		186				376	
3:45	14	43	2	8			16	51	15:45	177	731	186	695			363	1426
4:00	6		1				7		16:00	199		172				371	
4:15	10		6				16		16:15	196		179				375	
4:30	21		7				28		16:30	189		173				362	
4:45	29	66	10	24			39	90	16:45	206	790	184	708			390	1498
5:00	25		9				34		17:00	180		218				398	
5:15	47		10				57		17:15	173		193				366	
5:30	70		19				89		17:30	189		209				398	
5:45	95	237	23	61			118	298	17:45	183	725	185	805			368	1530
6:00	106		36				142		18:00	148		172				320	
6:15	128		50				178		18:15	120		127				247	
6:30	188		62				250		18:30	121		127				248	
6:45	239	661	101	249			340	910	18:45	111	500	94	520			205	1020
7:00	254		139				393		19:00	98		91				189	
7:15	333		178				511		19:15	99		86				185	
7:30	320		176				496		19:30	84		67				151	
7:45	272	1179	150	643			422	1822	19:45	107	388	64	308			171	696
8:00	231		155				386		20:00	60		58				118	
8:15	180		122				302		20:15	65		55				120	
8:30	173		127				300		20:30	61		45				106	
8:45	166	750	117	521			283	1271	20:45	68	254	45	203			113	457
9:00	108		74				182		21:00	58		55				113	
9:15	114		79				193		21:15	58		57				115	
9:30	116		66				182		21:30	38		33				71	
9:45	106	444	79	298			185	742	21:45	38	192	34	179			72	371
10:00	113		89				202		22:00	32		34				66	
10:15	108		72				180		22:15	42		36				78	
10:30	114		100				214		22:30	29		34				63	
10:45	112	447	65	326			177	773	22:45	33	136	15	119			48	255
11:00	92		96				188		23:00	18		28				46	
11:15	108		85				193		23:15	24		14				38	
11:30	115		89				204		23:30	16		20				36	
11:45	129	444	92	362			221	806	23:45	23	81	10	72			33	153
TOTALS		4363		2554				6917	TOTALS		5424		4924				10348
SPLIT %		63.1%		36.9%				40.1%	SPLIT %		52.4%		47.6%				59.9%

DAILY TOTALS	NB	SB	EB	WB	Total
	9,787	7,478	0	0	17,265

AM Peak Hour	7:00	7:15			7:00	PM Peak Hour	16:00	17:00			16:45
AM Pk Volume	1179	659			1822	PM Pk Volume	790	805			1552
Pk Hr Factor	0.885	0.926			0.891	Pk Hr Factor	0.959	0.923			0.975
7 - 9 Volume	1929	1164	0	0	3093	4 - 6 Volume	1515	1513	0	0	3028
7 - 9 Peak Hour	7:00	7:15			7:00	4 - 6 Peak Hour	16:00	17:00			16:45
7 - 9 Pk Volume	1179	659	0	0	1822	4 - 6 Pk Volume	790	805	0	0	1552
Pk Hr Factor	0.885	0.926	0.000	0.000	0.891	Pk Hr Factor	0.959	0.923	0.000	0.000	0.975

Prepared by NDS/ATD

Project #: CA17_4038_001 **City:** San Diego

Location: 47th St Bet. SR-94 EB Ramps & Hilltop Dr **Date:** 2/14/2017

Prepared by NDS/ATD

VOLUME

47th St Bet. Hilltop Dr & Market St

Day: Tuesday
Date: 2/14/2017

City: San Diego
Project #: CA17_4038_002

DAILY TOTALS	NB	SB	EB	WB	Total
	7,633	5,989	0	0	13,622

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
0:00	8		8				16		12:00	119		62				181	
0:15	9		8				17		12:15	112		78				190	
0:30	5		4				9		12:30	85		60				145	
0:45	7	29	3	23			10	52	12:45	88	404	86	286			174	690
1:00	4		4				8		13:00	85		79				164	
1:15	7		2				9		13:15	103		77				180	
1:30	5		5				10		13:30	111		91				202	
1:45	5	21	2	13			7	34	13:45	109	408	80	327			189	735
2:00	3		5				8		14:00	94		76				170	
2:15	5		4				9		14:15	116		96				212	
2:30	4		1				5		14:30	128		135				263	
2:45	7	19	4	14			11	33	14:45	153	491	127	434			280	925
3:00	4		2				6		15:00	158		151				309	
3:15	3		2				5		15:15	140		117				257	
3:30	11		4				15		15:30	142		156				298	
3:45	14	32	2	10			16	42	15:45	124	564	150	574			274	1138
4:00	4		2				6		16:00	147		137				284	
4:15	8		4				12		16:15	145		151				296	
4:30	12		12				24		16:30	164		143				307	
4:45	22	46	11	29			33	75	16:45	151	607	149	580			300	1187
5:00	16		10				26		17:00	141		181				322	
5:15	30		11				41		17:15	136		179				315	
5:30	40		17				57		17:30	143		180				323	
5:45	70	156	20	58			90	214	17:45	133	553	132	672			265	1225
6:00	76		31				107		18:00	103		137				240	
6:15	111		44				155		18:15	83		101				184	
6:30	144		59				203		18:30	92		103				195	
6:45	202	533	83	217			285	750	18:45	72	350	76	417			148	767
7:00	240		125				365		19:00	74		62				136	
7:15	229		162				391		19:15	70		66				136	
7:30	248		143				391		19:30	73		58				131	
7:45	252	969	104	534			356	1503	19:45	85	302	52	238			137	540
8:00	216		104				320		20:00	51		44				95	
8:15	160		98				258		20:15	51		40				91	
8:30	130		88				218		20:30	44		33				77	
8:45	115	621	90	380			205	1001	20:45	54	200	38	155			92	355
9:00	80		64				144		21:00	50		42				92	
9:15	84		61				145		21:15	48		45				93	
9:30	87		57				144		21:30	30		25				55	
9:45	81	332	56	238			137	570	21:45	32	160	20	132			52	292
10:00	81		72				153		22:00	29		29				58	
10:15	65		51				116		22:15	33		21				54	
10:30	84		74				158		22:30	30		22				52	
10:45	79	309	49	246			128	555	22:45	20	112	8	80			28	192
11:00	77		68				145		23:00	16		19				35	
11:15	79		70				149		23:15	20		10				30	
11:30	91		72				163		23:30	12		14				26	
11:45	102	349	66	276			168	625	23:45	18	66	13	56			31	122
TOTALS		3416		2038				5454	TOTALS		4217		3951				8168
SPLIT %		62.6%		37.4%				40.0%	SPLIT %		51.6%		48.4%				60.0%

DAILY TOTALS	NB	SB	EB	WB	Total
	7,633	5,989	0	0	13,622

AM Peak Hour	7:00	7:00			7:00	PM Peak Hour	16:00	16:45			16:45
AM Pk Volume	969	534			1503	PM Pk Volume	607	689			1260
Pk Hr Factor	0.961	0.824			0.961	Pk Hr Factor	0.925	0.952			0.975
7 - 9 Volume	1590	914	0	0	2504	4 - 6 Volume	1160	1252	0	0	2412
7 - 9 Peak Hour	7:00	7:00			7:00	4 - 6 Peak Hour	16:00	16:45			16:45
7 - 9 Pk Volume	969	534	0	0	1503	4 - 6 Pk Volume	607	689	0	0	1260
Pk Hr Factor	0.961	0.824	0.000	0.000	0.961	Pk Hr Factor	0.925	0.952	0.000	0.000	0.975

Prepared by NDS/ATD

Project #: CA17_4038_002 **City:** San Diego

Location: 47th St Bet. Hilltop Dr & Market St **Date:** 2/14/2017

Prepared by NDS/ATD

VOLUME

Euclid Ave Bet. Federal Blvd & SR-94 WB Ramps

Day: Tuesday
Date: 2/14/2017

City: San Diego
Project #: CA17_4038_003

DAILY TOTALS	NB	SB	EB	WB	Total
	17,503	18,559	0	0	36,062

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
0:00	48		48				96		12:00	242		252				494	
0:15	57		41				98		12:15	262		246				508	
0:30	36		36				72		12:30	246		308				554	
0:45	19	160	26	151			45	311	12:45	276	1026	311	1117			587	2143
1:00	30		20				50		13:00	281		287				568	
1:15	26		23				49		13:15	278		284				562	
1:30	22		16				38		13:30	281		276				557	
1:45	17	95	18	77			35	172	13:45	253	1093	279	1126			532	2219
2:00	21		27				48		14:00	263		270				533	
2:15	15		10				25		14:15	291		303				594	
2:30	16		12				28		14:30	295		318				613	
2:45	21	73	13	62			34	135	14:45	346	1195	298	1189			644	2384
3:00	16		15				31		15:00	309		314				623	
3:15	15		14				29		15:15	310		317				627	
3:30	15		22				37		15:30	296		375				671	
3:45	29	75	16	67			45	142	15:45	289	1204	340	1346			629	2550
4:00	18		23				41		16:00	270		330				600	
4:15	25		37				62		16:15	277		319				596	
4:30	25		64				89		16:30	314		343				657	
4:45	53	121	69	193			122	314	16:45	296	1157	363	1355			659	2512
5:00	54		81				135		17:00	287		399				686	
5:15	61		102				163		17:15	340		383				723	
5:30	105		147				252		17:30	287		347				634	
5:45	166	386	127	457			293	843	17:45	291	1205	327	1456			618	2661
6:00	124		140				264		18:00	272		312				584	
6:15	181		182				363		18:15	291		308				599	
6:30	214		188				402		18:30	267		277				544	
6:45	266	785	273	783			539	1568	18:45	266	1096	320	1217			586	2313
7:00	278		270				548		19:00	215		249				464	
7:15	266		322				588		19:15	225		234				459	
7:30	295		327				622		19:30	227		220				447	
7:45	340	1179	280	1199			620	2378	19:45	195	862	177	880			372	1742
8:00	344		234				578		20:00	192		188				380	
8:15	307		249				556		20:15	188		172				360	
8:30	264		252				516		20:30	196		189				385	
8:45	285	1200	249	984			534	2184	20:45	147	723	178	727			325	1450
9:00	220		272				492		21:00	148		152				300	
9:15	198		254				452		21:15	155		136				291	
9:30	205		258				463		21:30	147		135				282	
9:45	199	822	262	1046			461	1868	21:45	117	567	107	530			224	1097
10:00	220		241				461		22:00	124		110				234	
10:15	213		232				445		22:15	127		102				229	
10:30	231		233				464		22:30	87		92				179	
10:45	208	872	250	956			458	1828	22:45	69	407	77	381			146	788
11:00	231		277				508		23:00	78		67				145	
11:15	208		218				426		23:15	64		48				112	
11:30	233		262				495		23:30	58		60				118	
11:45	272	944	268	1025			540	1969	23:45	56	256	60	235			116	491
TOTALS		6712		7000				13712	TOTALS		10791		11559				22350
SPLIT %		48.9%		51.1%				38.0%	SPLIT %		48.3%		51.7%				62.0%

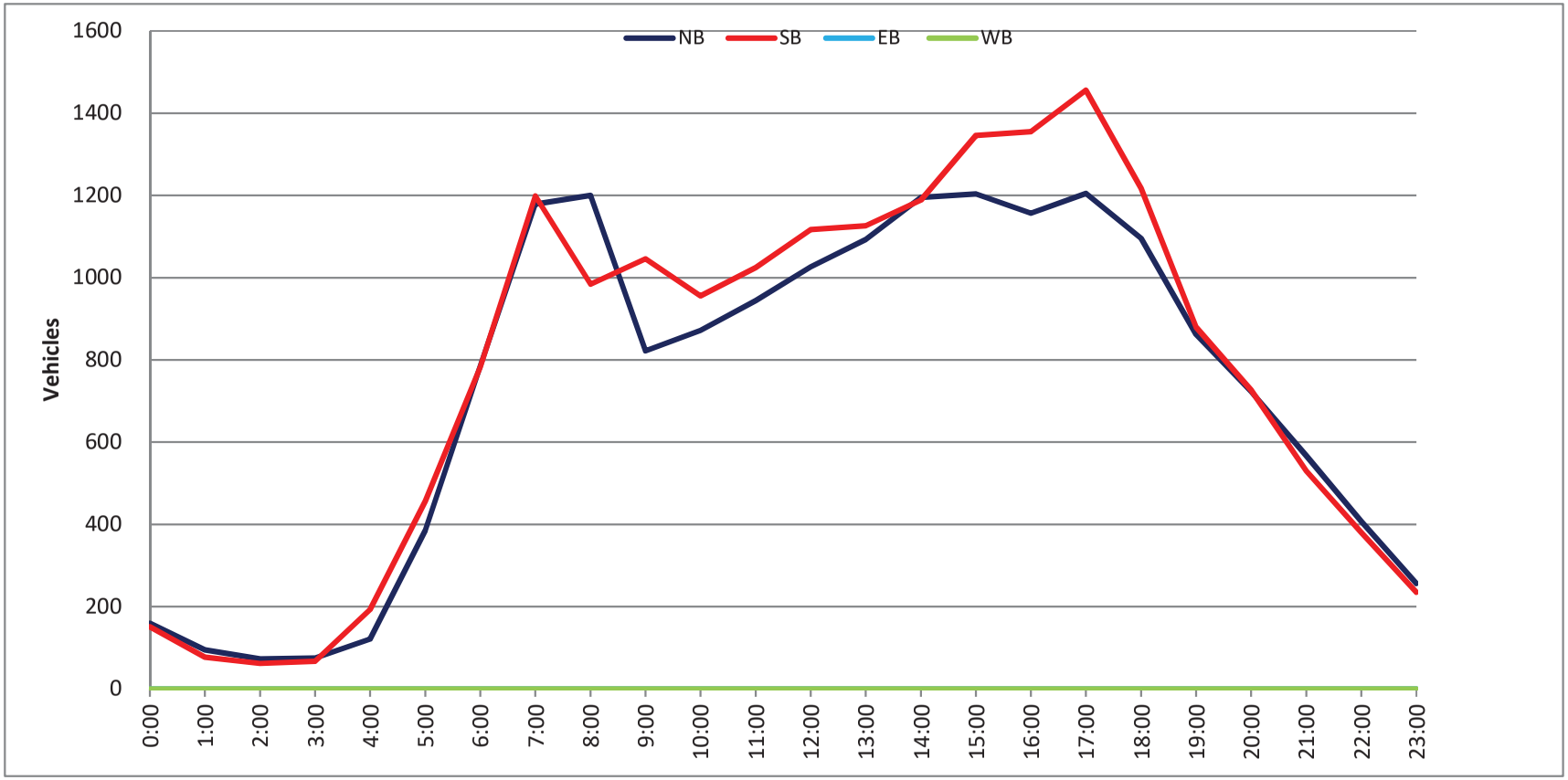
DAILY TOTALS	NB	SB	EB	WB	Total
	17,503	18,559	0	0	36,062

AM Peak Hour	7:30	7:00				7:15	PM Peak Hour	14:45	16:45				16:30
AM Pk Volume	1286	1199				2408	PM Pk Volume	1261	1492				2725
Pk Hr Factor	0.935	0.917				0.968	Pk Hr Factor	0.911	0.935				0.942
7 - 9 Volume	2379	2183	0	0		4562	4 - 6 Volume	2362	2811	0	0		5173
7 - 9 Peak Hour	7:30	7:00				7:15	4 - 6 Peak Hour	16:30	16:45				16:30
7 - 9 Pk Volume	1286	1199	0	0		2408	4 - 6 Pk Volume	1237	1492	0	0		2725
Pk Hr Factor	0.935	0.917	0.000	0.000		0.968	Pk Hr Factor	0.910	0.935	0.000	0.000		0.942

Prepared by NDS/ATD

Project #: CA17_4038_003 **City:** San Diego

Location: Euclid Ave Bet. Federal Blvd & SR-94 WB **Date:** 2/14/2017



Prepared by NDS/ATD

VOLUME

Euclid Ave Bet. SR-94 WB Ramps & SR-94 EB Ramps

Day: Tuesday
Date: 2/14/2017

City: San Diego
Project #: CA17_4038_004

DAILY TOTALS	NB	SB	EB	WB	Total
	22,043	12,472	0	0	34,515

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
0:00	52		27				79		12:00	318		160				478	
0:15	62		24				86		12:15	337		163				500	
0:30	37		23				60		12:30	328		192				520	
0:45	23	174	20	94			43	268	12:45	322	1305	210	725			532	2030
1:00	26		21				47		13:00	347		203				550	
1:15	29		19				48		13:15	307		197				504	
1:30	28		17				45		13:30	333		182				515	
1:45	18	101	21	78			39	179	13:45	363	1350	186	768			549	2118
2:00	20		18				38		14:00	347		199				546	
2:15	16		12				28		14:15	322		209				531	
2:30	18		9				27		14:30	381		215				596	
2:45	19	73	8	47			27	120	14:45	413	1463	211	834			624	2297
3:00	25		14				39		15:00	391		226				617	
3:15	17		10				27		15:15	425		226				651	
3:30	34		12				46		15:30	343		245				588	
3:45	38	114	11	47			49	161	15:45	331	1490	239	936			570	2426
4:00	33		14				47		16:00	339		253				592	
4:15	55		17				72		16:15	346		222				568	
4:30	63		24				87		16:30	332		213				545	
4:45	89	240	27	82			116	322	16:45	343	1360	251	939			594	2299
5:00	105		27				132		17:00	372		283				655	
5:15	156		39				195		17:15	358		271				629	
5:30	203		46				249		17:30	345		245				590	
5:45	239	703	63	175			302	878	17:45	353	1428	246	1045			599	2473
6:00	251		71				322		18:00	341		249				590	
6:15	296		93				389		18:15	363		214				577	
6:30	358		88				446		18:30	313		198				511	
6:45	397	1302	151	403			548	1705	18:45	333	1350	191	852			524	2202
7:00	425		146				571		19:00	292		194				486	
7:15	391		195				586		19:15	273		176				449	
7:30	421		189				610		19:30	225		163				388	
7:45	443	1680	197	727			640	2407	19:45	204	994	139	672			343	1666
8:00	414		154				568		20:00	218		145				363	
8:15	328		155				483		20:15	212		129				341	
8:30	312		180				492		20:30	182		126				308	
8:45	311	1365	187	676			498	2041	20:45	188	800	123	523			311	1323
9:00	266		160				426		21:00	177		112				289	
9:15	255		159				414		21:15	167		109				276	
9:30	263		155				418		21:30	174		113				287	
9:45	252	1036	162	636			414	1672	21:45	157	675	84	418			241	1093
10:00	272		146				418		22:00	135		102				237	
10:15	268		130				398		22:15	112		89				201	
10:30	298		147				445		22:30	112		65				177	
10:45	281	1119	151	574			432	1693	22:45	109	468	63	319			172	787
11:00	248		179				427		23:00	83		53				136	
11:15	273		156				429		23:15	97		44				141	
11:30	277		178				455		23:30	75		54				129	
11:45	329	1127	193	706			522	1833	23:45	71	326	45	196			116	522
TOTALS		9034		4245				**13279**	**TOTALS**		13009		8227				**21236**
SPLIT %		68.0%		32.0%				**38.5%**	**SPLIT %**		61.3%		38.7%				**61.5%**

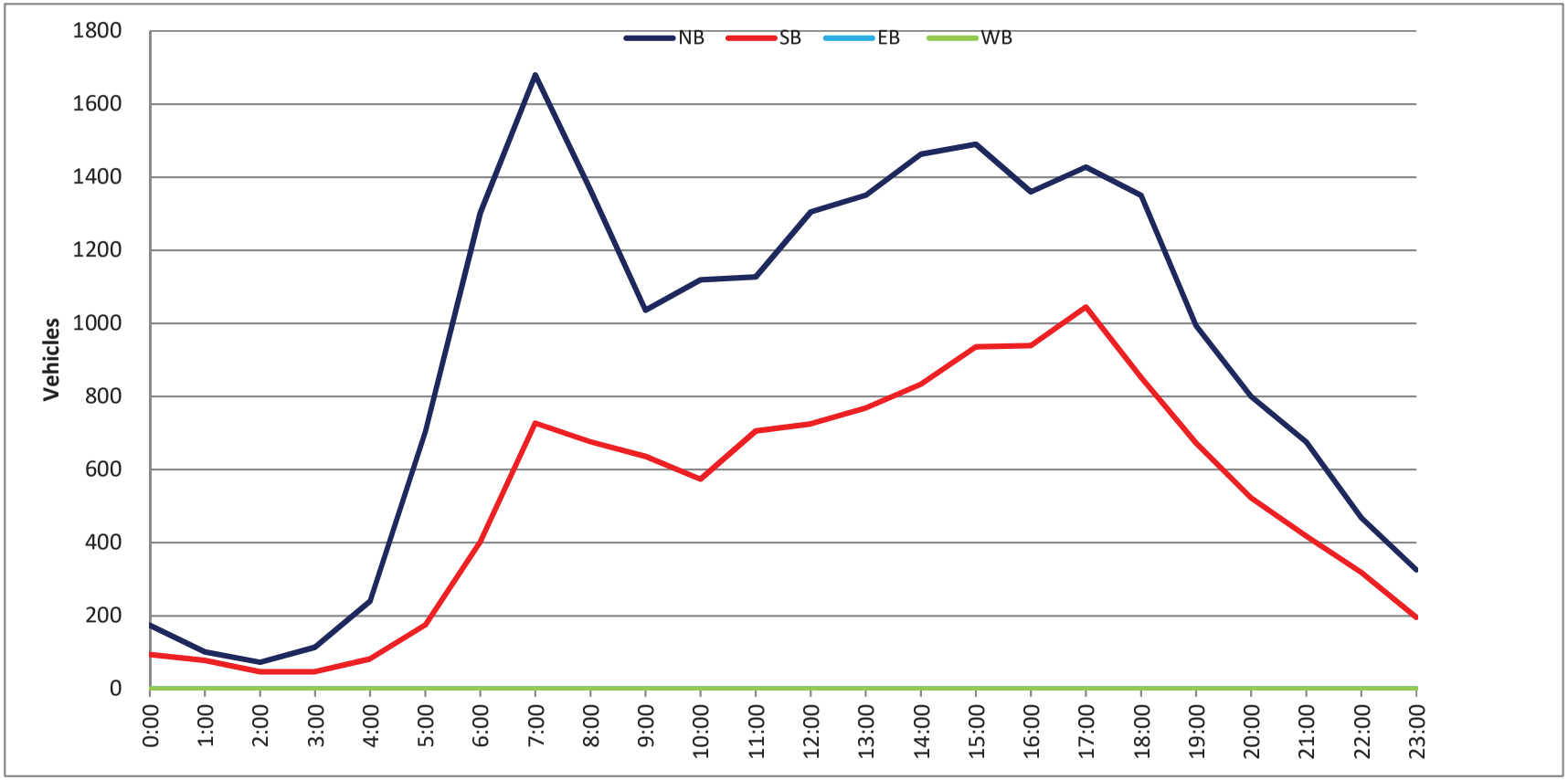
DAILY TOTALS	NB	SB	EB	WB	Total
	22,043	12,472	0	0	34,515

AM Peak Hour	7:00	7:15				**7:00**	**PM Peak Hour**	14:30	16:45				**14:30**
AM Pk Volume	1680	735				**2407**	**PM Pk Volume**	1610	1050				**2488**
Pk Hr Factor	0.948	0.933				**0.940**	**Pk Hr Factor**	0.947	0.928				**0.955**
7 - 9 Volume	3045	1403	0	0		**4448**	**4 - 6 Volume**	2788	1984	0	0		**4772**
7 - 9 Peak Hour	7:00	7:15				**7:00**	**4 - 6 Peak Hour**	17:00	16:45				**17:00**
7 - 9 Pk Volume	1680	735	0	0		**2407**	**4 - 6 Pk Volume**	1428	1050	0	0		**2473**
Pk Hr Factor	0.948	0.933	0.000	0.000		**0.940**	**Pk Hr Factor**	0.960	0.928	0.000	0.000		**0.944**

Prepared by NDS/ATD

Project #: CA17_4038_004 **City:** San Diego

Location: Euclid Ave Bet. SR-94 WB Ramps & SR-94 EB **Date:** 2/14/2017



Prepared by NDS/ATD

VOLUME

Euclid Ave Bet. Hilltop Dr & Market St

Day: Tuesday
Date: 2/14/2017

City: San Diego
Project #: CA17_4038_005

DAILY TOTALS	NB	SB	EB	WB	Total
	13,956	13,297	0	0	27,253

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
0:00	23		39				62		12:00	216		202				418	
0:15	26		34				60		12:15	181		195				376	
0:30	17		32				49		12:30	175		195				370	
0:45	15	81	22	127			37	208	12:45	171	743	210	802			381	1545
1:00	10		20				30		13:00	197		198				395	
1:15	13		30				43		13:15	186		222				408	
1:30	15		16				31		13:30	200		189				389	
1:45	7	45	24	90			31	135	13:45	199	782	180	789			379	1571
2:00	10		21				31		14:00	214		203				417	
2:15	11		14				25		14:15	216		246				462	
2:30	8		9				17		14:30	225		235				460	
2:45	10	39	11	55			21	94	14:45	229	884	226	910			455	1794
3:00	10		15				25		15:00	241		270				511	
3:15	13		11				24		15:15	253		268				521	
3:30	22		12				34		15:30	236		238				474	
3:45	24	69	7	45			31	114	15:45	202	932	249	1025			451	1957
4:00	16		12				28		16:00	233		291				524	
4:15	38		18				56		16:15	223		243				466	
4:30	48		15				63		16:30	195		284				479	
4:45	51	153	30	75			81	228	16:45	247	898	246	1064			493	1962
5:00	66		28				94		17:00	262		258				520	
5:15	114		34				148		17:15	239		256				495	
5:30	127		45				172		17:30	241		281				522	
5:45	154	461	70	177			224	638	17:45	209	951	245	1040			454	1991
6:00	186		73				259		18:00	174		263				437	
6:15	230		95				325		18:15	214		225				439	
6:30	304		95				399		18:30	193		212				405	
6:45	297	1017	140	403			437	1420	18:45	184	765	243	943			427	1708
7:00	386		131				517		19:00	157		198				355	
7:15	376		184				560		19:15	162		193				355	
7:30	359		182				541		19:30	126		168				294	
7:45	345	1466	222	719			567	2185	19:45	108	553	140	699			248	1252
8:00	294		189				483		20:00	116		142				258	
8:15	224		159				383		20:15	114		147				261	
8:30	191		187				378		20:30	85		120				205	
8:45	199	908	178	713			377	1621	20:45	105	420	137	546			242	966
9:00	183		157				340		21:00	93		131				224	
9:15	174		167				341		21:15	81		124				205	
9:30	178		149				327		21:30	99		129				228	
9:45	159	694	165	638			324	1332	21:45	69	342	111	495			180	837
10:00	162		152				314		22:00	63		112				175	
10:15	163		160				323		22:15	51		96				147	
10:30	177		135				312		22:30	56		73				129	
10:45	192	694	168	615			360	1309	22:45	52	222	80	361			132	583
11:00	147		165				312		23:00	34		67				101	
11:15	182		158				340		23:15	32		65				97	
11:30	178		181				359		23:30	43		65				108	
11:45	190	697	202	706			392	1403	23:45	31	140	63	260			94	400
TOTALS		6324		4363				10687	TOTALS		7632		8934				16566
SPLIT %		59.2%		40.8%				39.2%	SPLIT %		46.1%		53.9%				60.8%

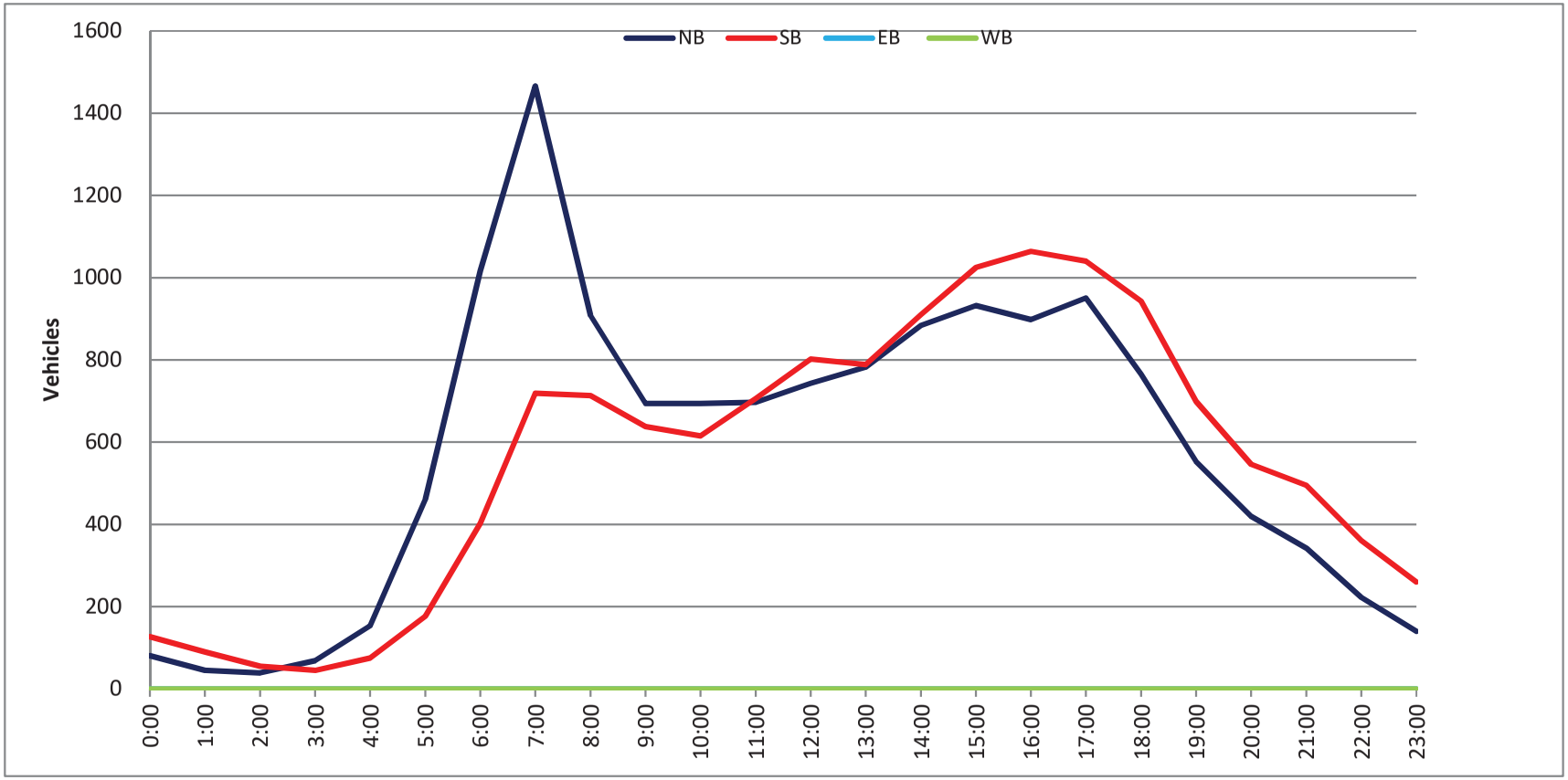
DAILY TOTALS	NB	SB	EB	WB	Total
	13,956	13,297	0	0	27,253

AM Peak Hour	7:00	11:45			7:00	PM Peak Hour	16:45	15:45			16:45
AM Pk Volume	1466	794			2185	PM Pk Volume	989	1067			2030
Pk Hr Factor	0.949	0.983			0.963	Pk Hr Factor	0.944	0.917			0.972
7 - 9 Volume	2374	1432	0	0	3806	4 - 6 Volume	1849	2104	0	0	3953
7 - 9 Peak Hour	7:00	7:15			7:00	4 - 6 Peak Hour	16:45	16:00			16:45
7 - 9 Pk Volume	1466	777	0	0	2185	4 - 6 Pk Volume	989	1064	0	0	2030
Pk Hr Factor	0.949	0.875	0.000	0.000	0.963	Pk Hr Factor	0.944	0.914	0.000	0.000	0.972

Prepared by NDS/ATD

Project #: CA17_4038_005 **City:** San Diego

Location: Euclid Ave Bet. Hilltop Dr & Market St **Date:** 2/14/2017



Prepared by NDS/ATD

VOLUME

Euclid Ave Bet. Market St & Naranja St

Day: Tuesday
Date: 2/14/2017

City: San Diego
Project #: CA17_4038_006

DAILY TOTALS	NB	SB	EB	WB	Total
	11,786	11,716	0	0	23,502

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
0:00	20		28				48		12:00	170		194				364	
0:15	25		29				54		12:15	157		208				365	
0:30	21		25				46		12:30	152		158				310	
0:45	14	80	13	95			27	175	12:45	147	626	167	727			314	1353
1:00	11		9				20		13:00	183		176				359	
1:15	7		16				23		13:15	154		176				330	
1:30	16		14				30		13:30	150		157				307	
1:45	8	42	15	54			23	96	13:45	158	645	168	677			326	1322
2:00	7		18				25		14:00	159		168				327	
2:15	8		11				19		14:15	172		207				379	
2:30	6		7				13		14:30	172		187				359	
2:45	10	31	10	46			20	77	14:45	203	706	192	754			395	1460
3:00	6		8				14		15:00	200		229				429	
3:15	8		5				13		15:15	203		242				445	
3:30	9		7				16		15:30	168		206				374	
3:45	14	37	8	28			22	65	15:45	177	748	262	939			439	1687
4:00	12		8				20		16:00	175		248				423	
4:15	13		10				23		16:15	170		261				431	
4:30	30		9				39		16:30	173		288				461	
4:45	38	93	17	44			55	137	16:45	210	728	259	1056			469	1784
5:00	47		29				76		17:00	202		276				478	
5:15	63		25				88		17:15	201		313				514	
5:30	80		44				124		17:30	176		282				458	
5:45	103	293	54	152			157	445	17:45	162	741	248	1119			410	1860
6:00	157		61				218		18:00	161		259				420	
6:15	203		68				271		18:15	175		218				393	
6:30	286		64				350		18:30	153		194				347	
6:45	303	949	97	290			400	1239	18:45	149	638	196	867			345	1505
7:00	368		122				490		19:00	127		177				304	
7:15	381		154				535		19:15	140		159				299	
7:30	297		152				449		19:30	102		139				241	
7:45	351	1397	194	622			545	2019	19:45	86	455	133	608			219	1063
8:00	275		162				437		20:00	94		115				209	
8:15	213		136				349		20:15	76		113				189	
8:30	171		162				333		20:30	79		105				184	
8:45	193	852	134	594			327	1446	20:45	80	329	113	446			193	775
9:00	154		147				301		21:00	87		111				198	
9:15	160		154				314		21:15	81		106				187	
9:30	146		127				273		21:30	75		92				167	
9:45	142	602	140	568			282	1170	21:45	52	295	92	401			144	696
10:00	135		132				267		22:00	55		76				131	
10:15	146		129				275		22:15	48		74				122	
10:30	139		125				264		22:30	36		56				92	
10:45	155	575	136	522			291	1097	22:45	41	180	68	274			109	454
11:00	124		125				249		23:00	35		53				88	
11:15	163		173				336		23:15	30		42				72	
11:30	165		159				324		23:30	40		54				94	
11:45	162	614	184	641			346	1255	23:45	25	130	43	192			68	322
TOTALS		5565		3656				9221	TOTALS		6221		8060				14281
SPLIT %		60.4%		39.6%				39.2%	SPLIT %		43.6%		56.4%				60.8%

DAILY TOTALS	NB	SB	EB	WB	Total
	11,786	11,716	0	0	23,502

AM Peak Hour	7:00	11:30				7:00	PM Peak Hour	16:45	16:30				16:30
AM Pk Volume	1397	745				2019	PM Pk Volume	789	1136				1922
Pk Hr Factor	0.917	0.895				0.926	Pk Hr Factor	0.939	0.907				0.935
7 - 9 Volume	2249	1216	0	0		3465	4 - 6 Volume	1469	2175	0	0		3644
7 - 9 Peak Hour	7:00	7:15				7:00	4 - 6 Peak Hour	16:45	16:30				16:30
7 - 9 Pk Volume	1397	662	0	0		2019	4 - 6 Pk Volume	789	1136	0	0		1922
Pk Hr Factor	0.917	0.853	0.000	0.000		0.926	Pk Hr Factor	0.939	0.907	0.000	0.000		0.935

Prepared by NDS/ATD

Project #: CA17_4038_006 **City:** San Diego

Location: Euclid Ave Bet. Market St & Naranja St **Date:** 2/14/2017

Prepared by NDS/ATD

VOLUME

Hilltop Dr Bet. 47th St & Escuela St

Day: Tuesday
Date: 2/14/2017

City: San Diego
Project #: CA17_4038_007

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,566	2,303	3,869

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
0:00			3		4		7		12:00			26		17		43	
0:15			2		2		4		12:15			21		24		45	
0:30			0		0		0		12:30			16		35		51	
0:45			1	6	0	6	1	12	12:45			16	79	34	110	50	189
1:00			0		1		1		13:00			19		23		42	
1:15			1		1		2		13:15			19		79		98	
1:30			0		1		1		13:30			13		29		42	
1:45			1	2	4	7	5	9	13:45			38	89	30	161	68	250
2:00			3		2		5		14:00			17		23		40	
2:15			1		2		3		14:15			36		41		77	
2:30			0		2		2		14:30			37		36		73	
2:45			1	5	2	8	3	13	14:45			29	119	29	129	58	248
3:00			2		3		5		15:00			32		85		117	
3:15			1		7		8		15:15			38		58		96	
3:30			0		6		6		15:30			33		44		77	
3:45			1	4	1	17	2	21	15:45			40	143	34	221	74	364
4:00			1		2		3		16:00			47		49		96	
4:15			1		4		5		16:15			36		38		74	
4:30			1		11		12		16:30			41		33		74	
4:45			6	9	7	24	13	33	16:45			48	172	41	161	89	333
5:00			4		13		17		17:00			49		45		94	
5:15			2		15		17		17:15			52		67		119	
5:30			5		19		24		17:30			51		43		94	
5:45			3	14	26	73	29	87	17:45			34	186	26	181	60	367
6:00			12		23		35		18:00			20		36		56	
6:15			11		27		38		18:15			15		31		46	
6:30			15		39		54		18:30			20		32		52	
6:45			26	64	50	139	76	203	18:45			11	66	20	119	31	185
7:00			72		106		178		19:00			13		23		36	
7:15			95		99		194		19:15			11		16		27	
7:30			63		116		179		19:30			4		15		19	
7:45			17	247	53	374	70	621	19:45			8	36	19	73	27	109
8:00			8		32		40		20:00			14		10		24	
8:15			16		37		53		20:15			7		10		17	
8:30			15		23		38		20:30			9		16		25	
8:45			16	55	20	112	36	167	20:45			7	37	10	46	17	83
9:00			16		28		44		21:00			10		9		19	
9:15			11		20		31		21:15			10		11		21	
9:30			13		30		43		21:30			8		6		14	
9:45			18	58	22	100	40	158	21:45			9	37	10	36	19	73
10:00			14		25		39		22:00			5		5		10	
10:15			10		21		31		22:15			7		8		15	
10:30			15		15		30		22:30			8		8		16	
10:45			12	51	18	79	30	130	22:45			6	26	5	26	11	52
11:00			12		19		31		23:00			1		7		8	
11:15			12		15		27		23:15			4		5		9	
11:30			14		17		31		23:30			3		7		10	
11:45			13	51	21	72	34	123	23:45			2	10	10	29	12	39
TOTALS				566		1011		**1577**	**TOTALS**				1000		1292		**2292**
SPLIT %				35.9%		64.1%		**40.8%**	**SPLIT %**				43.6%		56.4%		**59.2%**

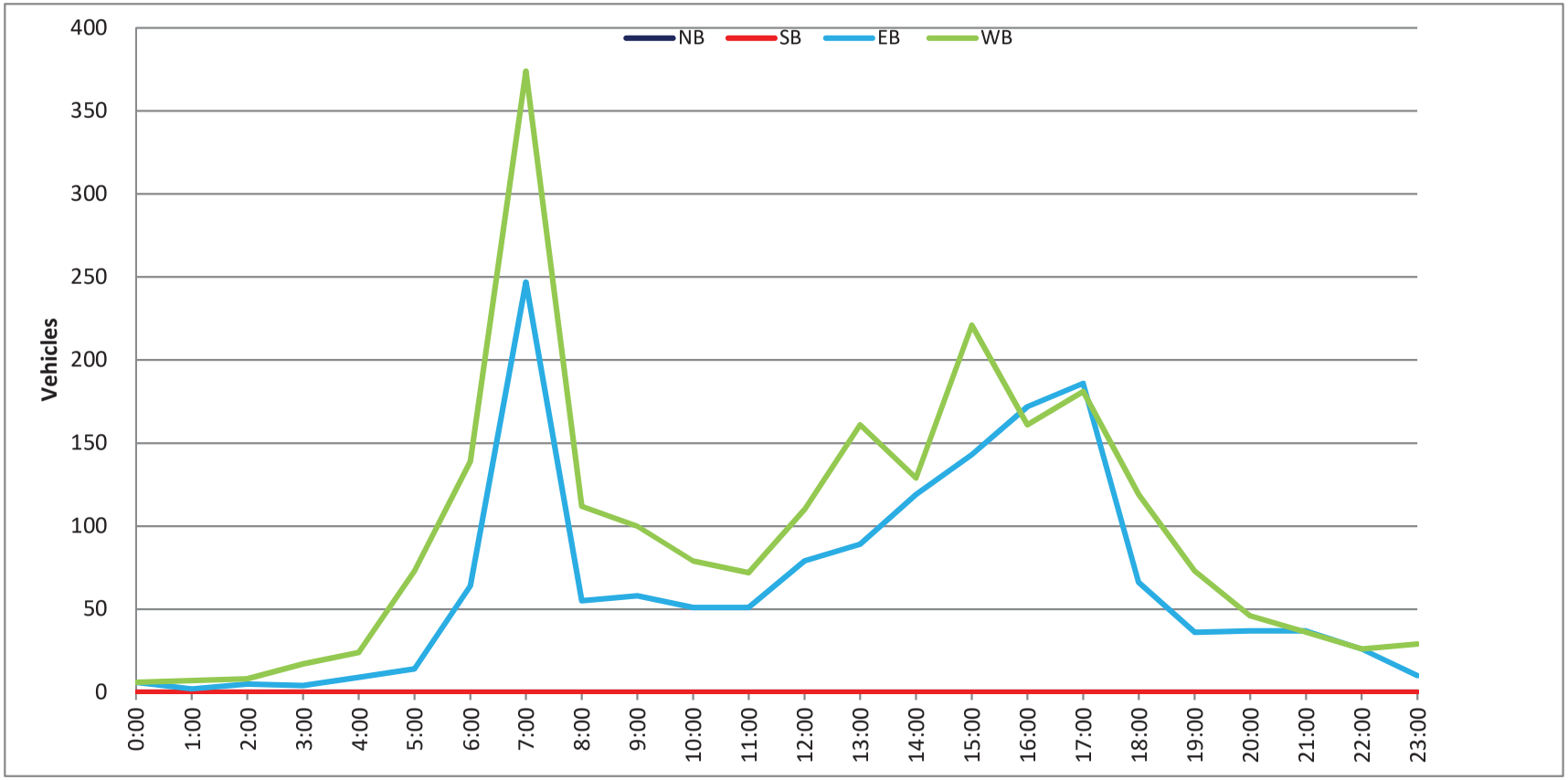
DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,566	2,303	3,869

AM Peak Hour			6:45	7:00	**6:45**	**PM Peak Hour**			16:45	15:00	**16:45**
AM Pk Volume			256	374	**627**	**PM Pk Volume**			200	221	**396**
Pk Hr Factor			0.674	0.806	**0.808**	**Pk Hr Factor**			0.962	0.650	**0.832**
7 - 9 Volume	0	0	302	486	**788**	**4 - 6 Volume**	0	0	358	342	**700**
7 - 9 Peak Hour			7:00	7:00	**7:00**	**4 - 6 Peak Hour**			16:45	16:45	**16:45**
7 - 9 Pk Volume	0	0	247	374	**621**	**4 - 6 Pk Volume**	0	0	200	196	**396**
Pk Hr Factor	0.000	0.000	0.650	0.806	**0.800**	**Pk Hr Factor**	0.000	0.000	0.962	0.731	**0.832**

Prepared by NDS/ATD

Project #: CA17_4038_007 **City:** San Diego

Location: Hilltop Dr Bet. 47th St & Escuela St **Date:** 2/14/2017



Prepared by NDS/ATD

VOLUME

Market St Bet. Cotton St & 47th St

Day: Tuesday
Date: 2/14/2017

City: San Diego
Project #: CA17_4038_008

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	8,643	7,713	16,356

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
0:00			14		5		19		12:00			123		88		211	
0:15			20		7		27		12:15			131		98		229	
0:30			18		9		27		12:30			95		105		200	
0:45			17	69	5	26	22	95	12:45			104	453	107	398	211	851
1:00			5		5		10		13:00			148		110		258	
1:15			12		6		18		13:15			141		121		262	
1:30			6		8		14		13:30			143		111		254	
1:45			13	36	5	24	18	60	13:45			161	593	96	438	257	1031
2:00			6		5		11		14:00			122		98		220	
2:15			8		5		13		14:15			167		97		264	
2:30			12		2		14		14:30			168		120		288	
2:45			13	39	6	18	19	57	14:45			214	671	104	419	318	1090
3:00			9		5		14		15:00			199		128		327	
3:15			10		7		17		15:15			191		101		292	
3:30			13		9		22		15:30			214		145		359	
3:45			18	50	6	27	24	77	15:45			209	813	119	493	328	1306
4:00			11		14		25		16:00			214		93		307	
4:15			15		17		32		16:15			243		109		352	
4:30			29		35		64		16:30			225		105		330	
4:45			21	76	28	94	49	170	16:45			207	889	122	429	329	1318
5:00			14		32		46		17:00			216		112		328	
5:15			28		57		85		17:15			227		132		359	
5:30			32		70		102		17:30			223		119		342	
5:45			50	124	101	260	151	384	17:45			200	866	104	467	304	1333
6:00			54		128		182		18:00			149		102		251	
6:15			60		177		237		18:15			159		85		244	
6:30			60		230		290		18:30			142		90		232	
6:45			65	239	228	763	293	1002	18:45			105	555	87	364	192	919
7:00			105		249		354		19:00			127		62		189	
7:15			89		253		342		19:15			111		57		168	
7:30			80		265		345		19:30			81		58		139	
7:45			80	354	268	1035	348	1389	19:45			106	425	55	232	161	657
8:00			126		201		327		20:00			69		48		117	
8:15			100		179		279		20:15			66		42		108	
8:30			136		172		308		20:30			50		30		80	
8:45			127	489	139	691	266	1180	20:45			75	260	39	159	114	419
9:00			81		113		194		21:00			60		39		99	
9:15			105		111		216		21:15			62		38		100	
9:30			93		86		179		21:30			53		32		85	
9:45			93	372	84	394	177	766	21:45			42	217	20	129	62	346
10:00			85		92		177		22:00			37		17		54	
10:15			82		96		178		22:15			41		27		68	
10:30			96		90		186		22:30			51		19		70	
10:45			91	354	76	354	167	708	22:45			36	165	18	81	54	246
11:00			99		86		185		23:00			20		19		39	
11:15			97		86		183		23:15			27		16		43	
11:30			118		86		204		23:30			26		20		46	
11:45			121	435	94	352	215	787	23:45			26	99	11	66	37	165
TOTALS				2637		4038		**6675**	**TOTALS**				6006		3675		**9681**
SPLIT %				39.5%		60.5%		**40.8%**	**SPLIT %**				62.0%		38.0%		**59.2%**

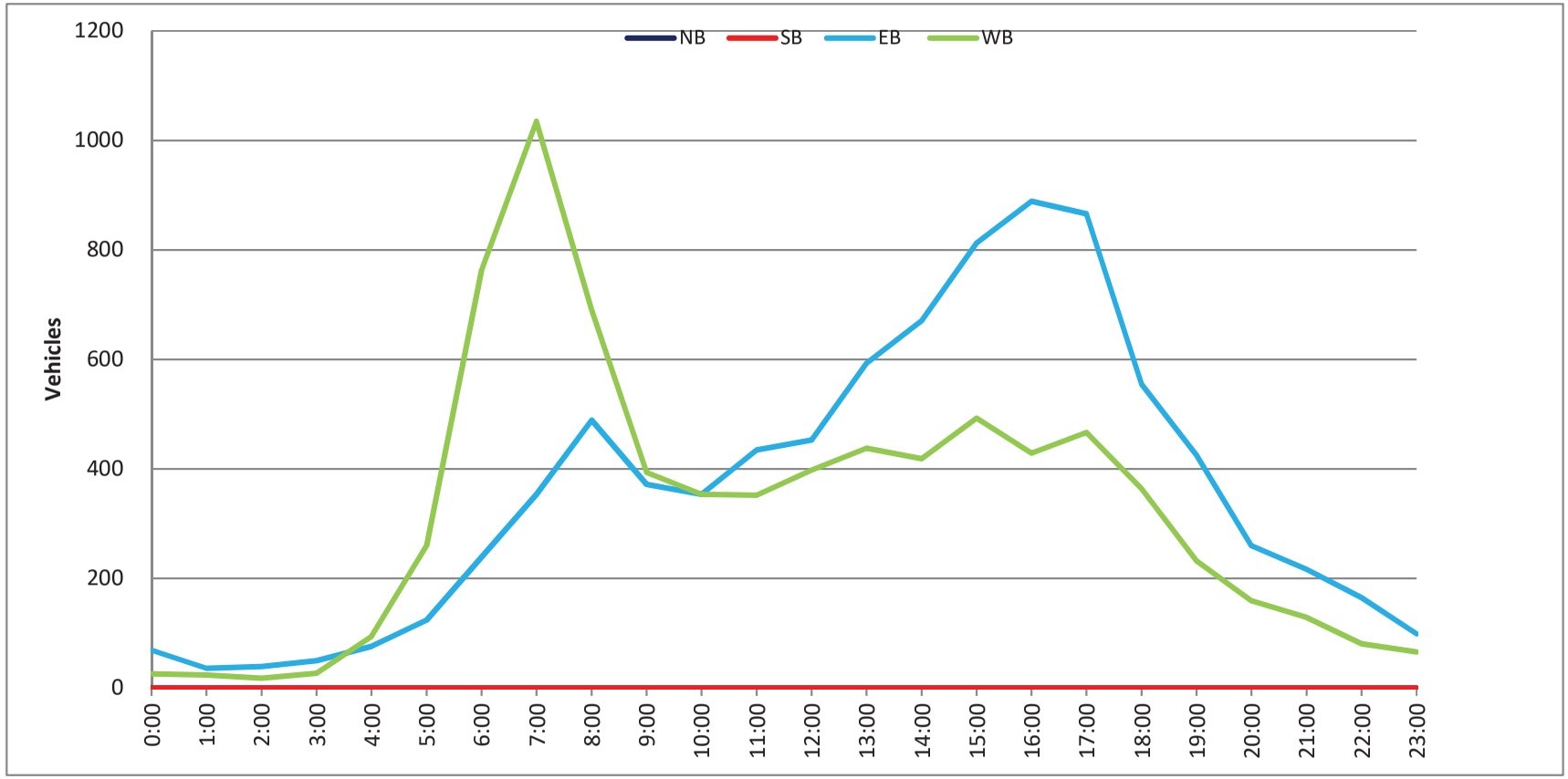
DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	8,643	7,713	16,356

AM Peak Hour			11:30	7:00	**7:00**	**PM Peak Hour**			15:45	15:00	**16:45**
AM Pk Volume			493	1035	**1389**	**PM Pk Volume**			891	493	**1358**
Pk Hr Factor			0.941	0.965	**0.981**	**Pk Hr Factor**			0.917	0.850	**0.946**
7 - 9 Volume	0	0	843	1726	**2569**	**4 - 6 Volume**	0	0	1755	896	**2651**
7 - 9 Peak Hour			8:00	7:00	**7:00**	**4 - 6 Peak Hour**			16:15	16:45	**16:45**
7 - 9 Pk Volume	0	0	489	1035	**1389**	**4 - 6 Pk Volume**	0	0	891	485	**1358**
Pk Hr Factor	0.000	0.000	0.899	0.965	**0.981**	**Pk Hr Factor**	0.000	0.000	0.917	0.919	**0.946**

Prepared by NDS/ATD

Project #: CA17_4038_008 **City:** San Diego

Location: Market St Bet. Cotton St & 47th St **Date:** 2/14/2017



Prepared by NDS/ATD

VOLUME

Market St Bet. Euclid Ave & 54th St

Day: Tuesday
Date: 2/14/2017

City: San Diego
Project #: CA17_4038_009

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	5,239	5,698	10,937

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
0:00			22		8		30		12:00			72		68		140	
0:15			13		2		15		12:15			71		65		136	
0:30			16		3		19		12:30			79		73		152	
0:45			13	64	2	15	15	79	12:45			75	297	54	260	129	557
1:00			12		2		14		13:00			71		63		134	
1:15			11		3		14		13:15			95		63		158	
1:30			5		3		8		13:30			70		80		150	
1:45			11	39	5	13	16	52	13:45			78	314	80	286	158	600
2:00			5		3		8		14:00			93		82		175	
2:15			6		4		10		14:15			113		77		190	
2:30			3		3		6		14:30			111		94		205	
2:45			5	19	2	12	7	31	14:45			108	425	88	341	196	766
3:00			5		5		10		15:00			117		81		198	
3:15			7		7		14		15:15			115		77		192	
3:30			5		16		21		15:30			103		93		196	
3:45			5	22	11	39	16	61	15:45			100	435	81	332	181	767
4:00			4		10		14		16:00			121		95		216	
4:15			9		30		39		16:15			124		85		209	
4:30			8		25		33		16:30			140		75		215	
4:45			13	34	26	91	39	125	16:45			98	483	95	350	193	833
5:00			8		51		59		17:00			126		112		238	
5:15			12		69		81		17:15			101		86		187	
5:30			11		89		100		17:30			119		87		206	
5:45			20	51	92	301	112	352	17:45			120	466	101	386	221	852
6:00			14		125		139		18:00			107		74		181	
6:15			36		147		183		18:15			86		73		159	
6:30			37		152		189		18:30			99		75		174	
6:45			54	141	156	580	210	721	18:45			98	390	64	286	162	676
7:00			45		159		204		19:00			89		62		151	
7:15			39		171		210		19:15			84		40		124	
7:30			46		179		225		19:30			76		50		126	
7:45			48	178	171	680	219	858	19:45			68	317	42	194	110	511
8:00			46		123		169		20:00			58		55		113	
8:15			38		131		169		20:15			68		42		110	
8:30			48		92		140		20:30			38		26		64	
8:45			65	197	86	432	151	629	20:45			72	236	39	162	111	398
9:00			49		75		124		21:00			50		28		78	
9:15			47		63		110		21:15			50		21		71	
9:30			53		69		122		21:30			55		21		76	
9:45			51	200	57	264	108	464	21:45			48	203	27	97	75	300
10:00			54		59		113		22:00			50		18		68	
10:15			55		50		105		22:15			34		17		51	
10:30			43		62		105		22:30			39		17		56	
10:45			53	205	60	231	113	436	22:45			39	162	15	67	54	229
11:00			68		49		117		23:00			24		11		35	
11:15			54		62		116		23:15			26		8		34	
11:30			71		65		136		23:30			31		12		43	
11:45			67	260	66	242	133	502	23:45			20	101	6	37	26	138
TOTALS				1410		2900		**4310**	**TOTALS**				3829		2798		**6627**
SPLIT %				32.7%		67.3%		**39.4%**	**SPLIT %**				57.8%		42.2%		**60.6%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	5,239	5,698	10,937

AM Peak Hour			11:45	7:00	**7:00**	**PM Peak Hour**			16:15	17:00	**16:15**
AM Pk Volume			289	680	**858**	**PM Pk Volume**			488	386	**855**
Pk Hr Factor			0.915	0.950	**0.953**	**Pk Hr Factor**			0.871	0.862	**0.898**
7 - 9 Volume	0	0	375	1112	**1487**	**4 - 6 Volume**	0	0	949	736	**1685**
7 - 9 Peak Hour			8:00	7:00	**7:00**	**4 - 6 Peak Hour**			16:15	17:00	**16:15**
7 - 9 Pk Volume	0	0	197	680	**858**	**4 - 6 Pk Volume**	0	0	488	386	**855**
Pk Hr Factor	0.000	0.000	0.758	0.950	**0.953**	**Pk Hr Factor**	0.000	0.000	0.871	0.862	**0.898**

Prepared by NDS/ATD

Project #: CA17_4038_009 **City:** San Diego

Location: Market St Bet. Euclid Ave & 54th St **Date:** 2/14/2017

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4037-001 **Day:** Tuesday

City: San Diego **Date:** 2/14/2017

AM

NS/EW Streets:	47th St			47th St			Hilltop Dr			Hilltop Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	0	1	0	0	1	0	
7:00 AM	7	192	44	16	62	37	41	21	11	47	17	50	545
7:15 AM	9	218	50	18	87	28	41	35	18	30	27	49	610
7:30 AM	15	220	24	18	87	54	40	23	8	28	37	51	605
7:45 AM	32	216	8	6	76	50	23	4	6	9	14	26	470
8:00 AM	12	100	3	2	67	30	19	0	4	7	6	16	266
8:15 AM	15	156	4	11	96	37	34	3	4	15	8	19	402
8:30 AM	6	114	6	9	73	42	41	3	8	4	5	16	327
8:45 AM	5	123	3	6	75	34	42	6	7	8	3	10	322
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	101	1339	142	86	623	312	281	95	66	148	117	237	3547
APPROACH %'s :	6.38%	84.64%	8.98%	8.42%	61.02%	30.56%	63.57%	21.49%	14.93%	29.48%	23.31%	47.21%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	63	846	126	58	312	169	145	83	43	114	95	176	2230
PEAK HR FACTOR :		0.934			0.847			0.721			0.830		0.914

UTURNS

NB	SB	EB	WB

NB	SB	EB	WB
0	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4037-001 **Day:** Tuesday

City: San Diego **Date:** 2/14/2017

PM

NS/EW Streets:	47th St			47th St			Hilltop Dr			Hilltop Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	0	1	0	0	1	0	
4:00 PM	5	126	12	25	113	38	47	14	5	21	6	25	437
4:15 PM	5	118	10	18	113	33	51	6	4	15	4	18	395
4:30 PM	6	133	19	13	118	31	40	6	5	18	2	18	409
4:45 PM	7	102	17	24	121	30	38	5	4	17	3	16	384
5:00 PM	2	121	14	22	152	30	26	14	7	14	10	21	433
5:15 PM	1	123	20	22	142	27	39	8	3	39	9	24	457
5:30 PM	6	126	20	18	155	30	48	10	7	14	16	12	462
5:45 PM	5	98	7	21	111	30	56	2	3	5	8	8	354
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	37	947	119	163	1025	249	345	65	38	143	58	142	3331
APPROACH %'s :	3.35%	85.86%	10.79%	11.34%	71.33%	17.33%	77.01%	14.51%	8.48%	41.69%	16.91%	41.40%	
PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	16	472	71	86	570	117	151	37	21	84	38	73	1736
PEAK HR FACTOR :	0.919			0.947			0.804			0.677			0.939

UTURNS			
NB	SB	EB	WB
0	0	0	0

CONTROL : Signalized

ITM Peak Hour Summary

Prepared by:

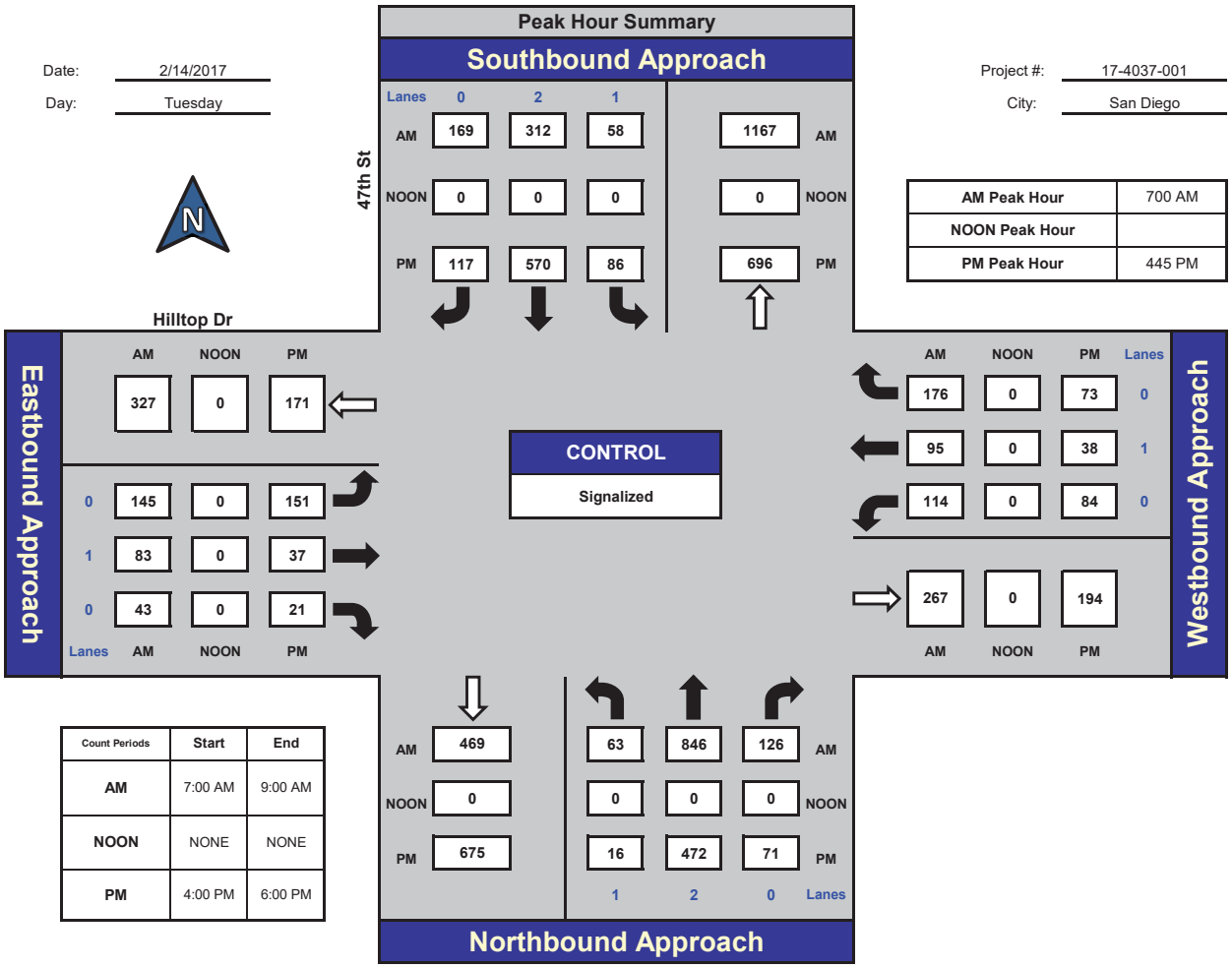
National Data & Surveying Services

47th St and Hilltop Dr , San Diego

Date: 2/14/2017
Day: Tuesday

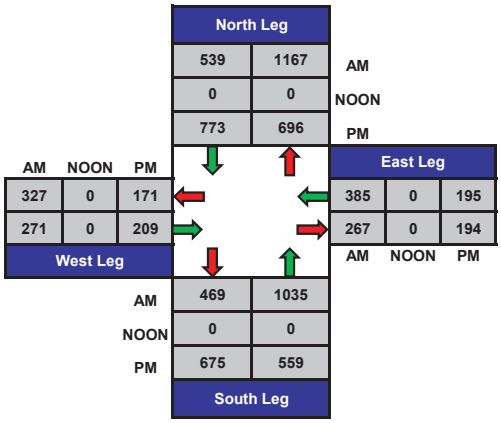
Project #: 17-4037-001
City: San Diego

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	445 PM

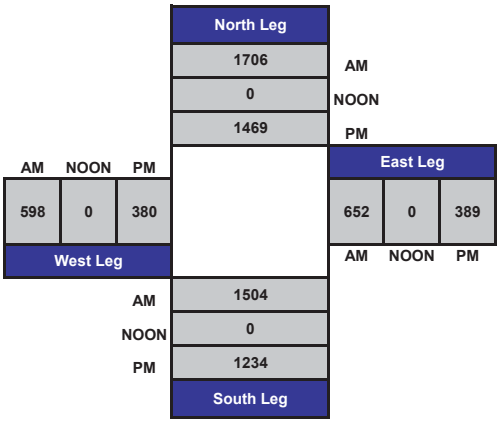


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4037-002 **Day:** Tuesday

City: San Diego **Date:** 2/14/2017

AM

NS/EW Streets:	Euclid Ave			Euclid Ave			SR-94 WB Ramps			SR-94 WB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2.5	0.5	0	2	0	0	1	0	1	0	1	
7:00 AM	1	292	135	0	116	8	0	0	2	12	1	32	599
7:15 AM	0	270	134	0	156	4	0	0	2	24	0	30	620
7:30 AM	0	282	147	0	166	3	0	0	1	23	1	36	659
7:45 AM	0	358	109	0	184	1	0	0	1	22	0	63	738
8:00 AM	0	319	103	0	137	5	0	0	3	26	0	88	681
8:15 AM	0	278	73	0	122	4	0	0	1	27	0	69	574
8:30 AM	0	254	59	0	159	1	0	0	1	33	0	64	571
8:45 AM	0	252	75	0	149	3	0	0	0	32	0	59	570
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	1	2305	835	0	1189	29	0	0	11	199	2	441	5012
APPROACH %'s :	0.03%	73.38%	26.58%	0.00%	97.62%	2.38%	0.00%	0.00%	100.00%	31.00%	0.31%	68.69%	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	0	1229	493	0	643	13	0	0	7	95	1	217	2698
PEAK HR FACTOR :		0.922			0.886			0.583			0.686		0.914

UTURNS	NB	SB	EB	WB
	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	0	0
	NB	SB	EB	WB
	0	0	0	0

CONTROL : 1-Way Stop(WB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4037-002 **Day:** Tuesday

City: San Diego **Date:** 2/14/2017

PM

NS/EW Streets:	Euclid Ave			Euclid Ave			SR-94 WB Ramps			SR-94 WB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2.5	0.5	0	2	0	0	1	0	1	0	1	
4:00 PM	0	272	79	0	215	1	0	0	2	30	0	67	666
4:15 PM	0	274	78	0	219	2	0	0	0	21	1	55	650
4:30 PM	0	283	70	0	179	4	0	0	1	26	0	54	617
4:45 PM	0	257	90	0	220	0	0	0	1	25	1	65	659
5:00 PM	0	261	107	0	249	3	0	0	4	26	0	45	695
5:15 PM	2	289	84	0	258	1	0	0	1	23	0	76	734
5:30 PM	0	271	86	0	228	1	0	0	1	29	0	65	681
5:45 PM	0	279	76	0	232	1	0	0	0	24	0	57	669
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	2	2186	670	0	1800	13	0	0	10	204	2	484	5371
APPROACH %'s :	0.07%	76.49%	23.44%	0.00%	99.28%	0.72%	0.00%	0.00%	100.00%	29.57%	0.29%	70.14%	
PEAK HR START TIME :	500 PM												TOTAL
PEAK HR VOL :	2	1100	353	0	967	6	0	0	6	102	0	243	2779
PEAK HR FACTOR :		0.970			0.939			0.375			0.871		0.947

UTURNS

	NB	SB	EB	WB
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	1	0	0	0
	0	0	0	0
	0	0	0	0
TOTAL VOLUMES :	1	0	0	0

CONTROL : 1-Way Stop(WB)

ITM Peak Hour Summary

Prepared by:

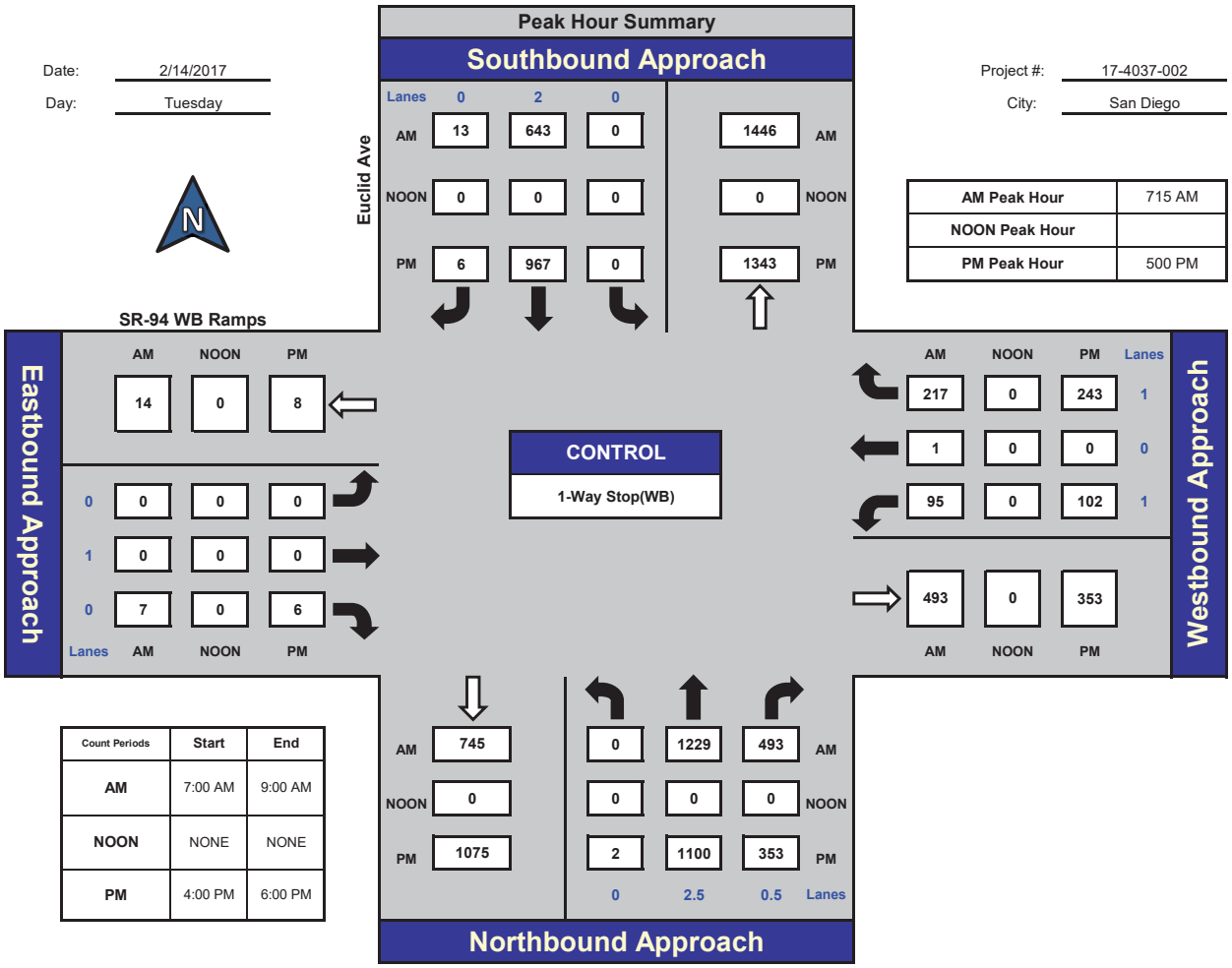
National Data & Surveying Services

Euclid Ave and SR-94 WB Ramps , San Diego

Date: 2/14/2017
Day: Tuesday

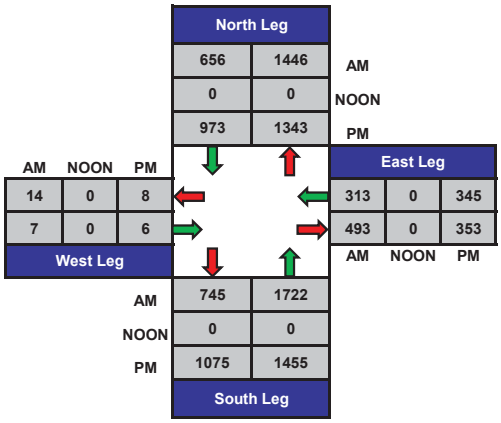
Project #: 17-4037-002
City: San Diego

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	500 PM

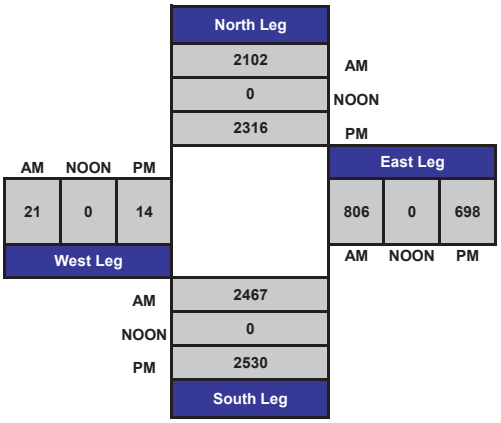


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4037-003 **Day:** Tuesday

City: San Diego **Date:** 2/14/2017

AM

NS/EW Streets:	Euclid Ave			Euclid Ave			SR-94 EB Ramps			SR-94 EB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL 0	NT 2	NR 0	SL 0	ST 2	SR 0	EL 0	ET 0	ER 1	WL 0	WT 0	WR 1	TOTAL
7:00 AM	0	321	63	37	111	0	0	0	55	0	0	99	686
7:15 AM	0	302	73	34	153	0	0	0	69	0	0	95	726
7:30 AM	0	330	72	50	132	0	0	0	56	0	0	122	762
7:45 AM	0	312	80	44	154	0	0	0	64	0	0	138	792
8:00 AM	0	272	72	39	130	0	0	0	81	0	0	146	740
8:15 AM	0	197	58	26	123	0	0	0	58	0	0	143	605
8:30 AM	0	185	46	50	135	0	0	0	78	0	0	137	631
8:45 AM	0	183	62	43	146	0	0	0	68	0	0	139	641
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	2102	526	323	1084	0	0	0	529	0	0	1019	5583
APPROACH %'s :	0.00%	79.98%	20.02%	22.96%	77.04%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	0	1216	297	167	569	0	0	0	270	0	0	501	3020
PEAK HR FACTOR :		0.941			0.929			0.833			0.858		0.953

UTURNS

	NB	SB	EB	WB
	0	0	0	0
	0	1	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	2	0	0
	NB	SB	EB	WB
	0	3	0	0

CONTROL : 1-Way Yield(EB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4037-003 **Day:** Tuesday

City: San Diego **Date:** 2/14/2017

PM

NS/EW Streets:	Euclid Ave			Euclid Ave			SR-94 EB Ramps			SR-94 EB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	0	2	0	0	0	1	0	0	1	
4:00 PM	0	181	52	53	196	0	0	0	146	0	0	159	787
4:15 PM	0	194	67	43	181	0	0	0	128	0	0	162	775
4:30 PM	0	176	48	45	172	0	0	0	153	0	0	164	758
4:45 PM	0	205	58	56	185	0	0	0	142	0	0	146	792
5:00 PM	0	221	77	85	221	0	0	0	148	0	0	143	895
5:15 PM	0	214	64	66	205	0	0	0	112	0	0	159	820
5:30 PM	0	208	53	69	199	0	0	0	137	0	0	150	816
5:45 PM	0	182	65	56	196	0	0	0	111	0	0	168	778
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	1581	484	473	1555	0	0	0	1077	0	0	1251	6421
APPROACH %'s :	0.00%	76.56%	23.44%	23.32%	76.68%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	
PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	0	848	252	276	810	0	0	0	539	0	0	598	3323
PEAK HR FACTOR :		0.923			0.887			0.910			0.940		0.928

UTURNS	NB	SB	EB	WB
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	1	0	0
	0	1	0	0
	0	0	0	0
	NB	SB	EB	WB
	0	2	0	0

CONTROL : 1-Way Yield(EB)

ITM Peak Hour Summary

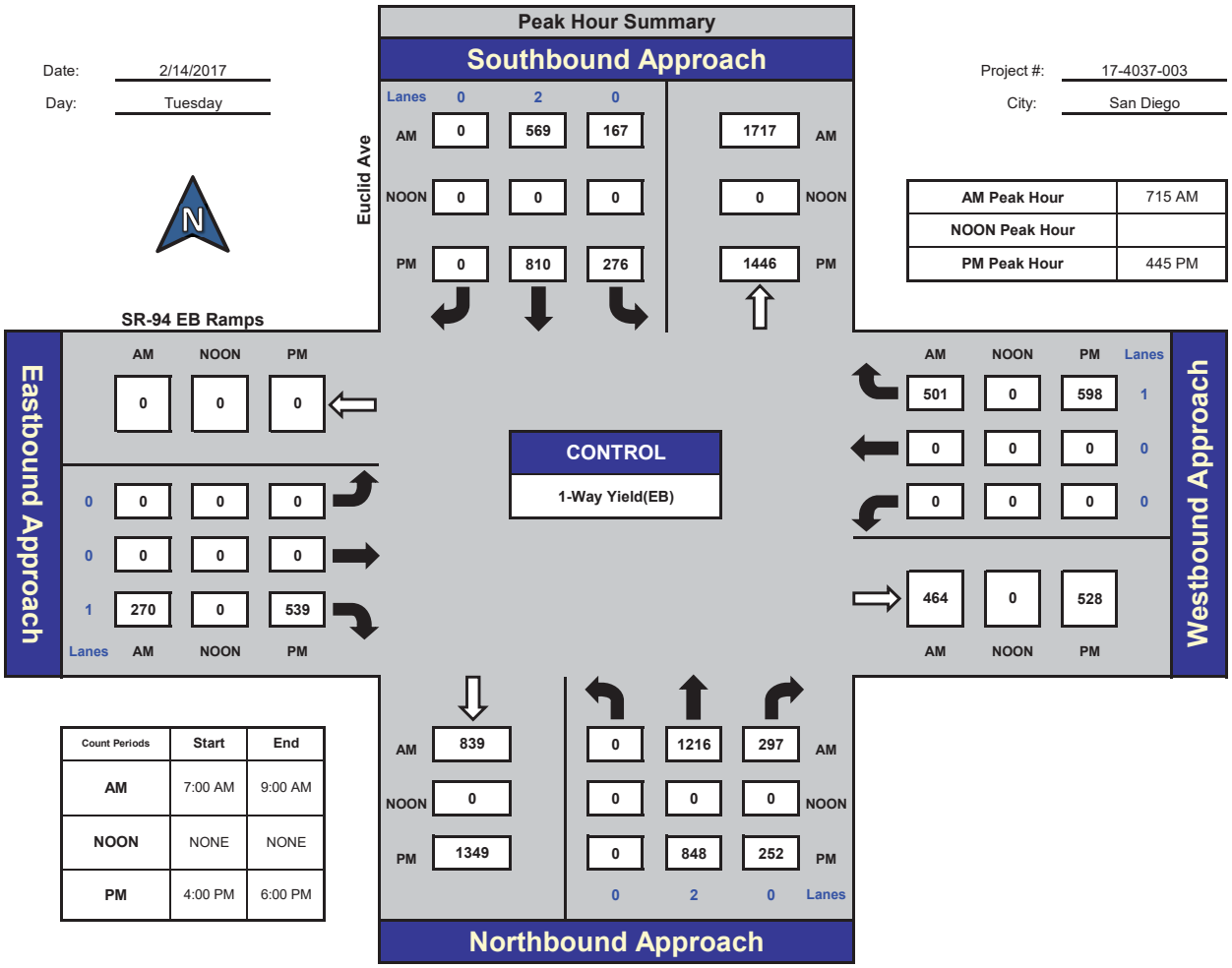
Prepared by:

National Data & Surveying Services

Euclid Ave and SR-94 EB Ramps , San Diego

Date: 2/14/2017
Day: Tuesday

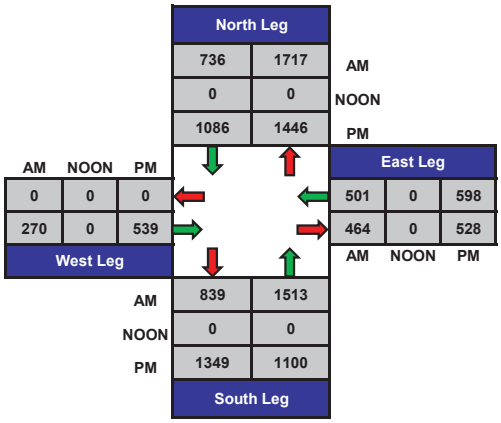
Project #: 17-4037-003
City: San Diego



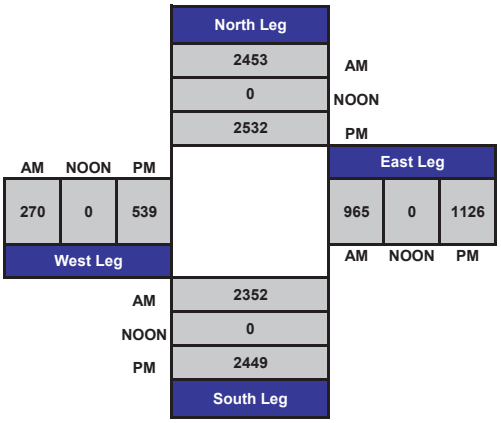
AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	445 PM

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: 17-4037-004 **Day:** Tuesday

City: San Diego **Date:** 2/14/2017

AM

NS/EW Streets:	Euclid Ave			Euclid Ave			Hilltop Dr			Hilltop Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	1	2	0	0	0	0	0	1	0	
7:00 AM	0	359	4	4	162	0	0	0	0	13	0	4	546
7:15 AM	0	339	9	6	219	0	0	0	0	25	0	4	602
7:30 AM	0	346	7	8	178	0	0	0	0	21	0	2	562
7:45 AM	0	348	10	11	207	0	0	0	0	13	0	5	594
8:00 AM	0	306	4	10	190	0	0	0	0	3	0	5	518
8:15 AM	0	219	0	14	159	0	0	0	0	3	0	4	399
8:30 AM	0	200	3	7	197	0	0	0	0	6	0	6	419
8:45 AM	0	220	2	13	195	0	0	0	0	3	0	8	441
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	2337	39	73	1507	0	0	0	0	87	0	38	4081
APPROACH %'s :	0.00%	98.36%	1.64%	4.62%	95.38%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	69.60%	0.00%	30.40%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	0	1392	30	29	766	0	0	0	0	72	0	15	2304
PEAK HR FACTOR :		0.979			0.883			0.000			0.750		0.957

UTURNS	NB	SB	EB	WB
TOTAL VOLUMES :	0	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4037-004 **Day:** Tuesday

City: San Diego **Date:** 2/14/2017

PM

NS/EW Streets:	Euclid Ave			Euclid Ave			Hilltop Dr			Hilltop Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	1	2	0	0	0	0	0	1	0	
4:00 PM	0	223	5	23	318	0	0	0	0	6	0	1	576
4:15 PM	0	242	8	26	270	0	0	0	0	4	0	3	553
4:30 PM	0	200	5	22	296	0	0	0	0	8	0	2	533
4:45 PM	0	235	5	30	281	0	0	0	0	6	0	8	565
5:00 PM	0	285	5	38	325	0	0	0	0	8	0	4	665
5:15 PM	0	245	8	19	286	0	0	0	0	6	0	6	570
5:30 PM	0	228	3	30	293	0	0	0	0	14	0	3	571
5:45 PM	0	227	4	30	256	0	0	0	0	7	0	5	529
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	1885	43	218	2325	0	0	0	0	59	0	32	4562
APPROACH %'s :	0.00%	97.77%	2.23%	8.57%	91.43%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	64.84%	0.00%	35.16%	
PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	0	993	21	117	1185	0	0	0	0	34	0	21	2371
PEAK HR FACTOR :		0.874			0.897			0.000			0.809		0.891

UTURNS	NB	SB	EB	WB
TOTAL VOLUMES :	0	0	0	0

CONTROL : Signalized

ITM Peak Hour Summary

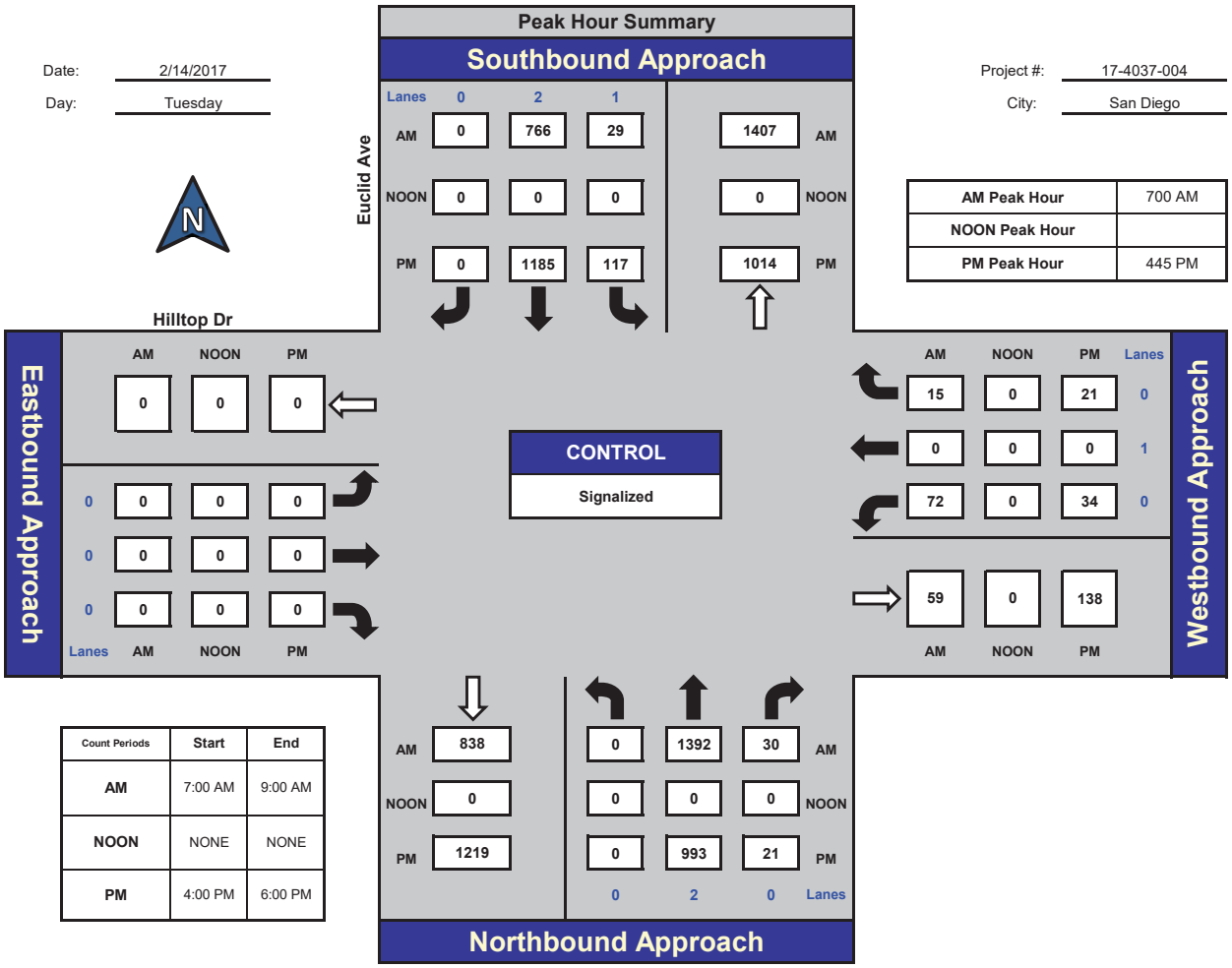
Prepared by:

National Data & Surveying Services

Euclid Ave and Hilltop Dr , San Diego

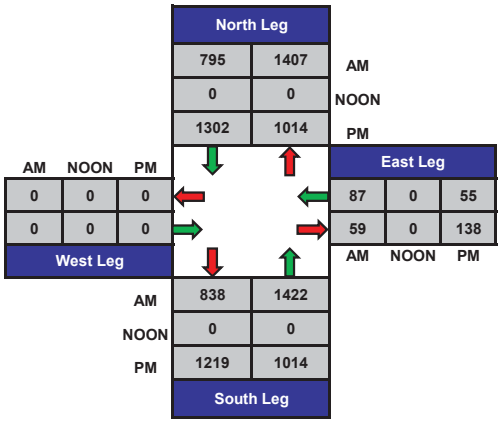
Date: 2/14/2017
Day: Tuesday
Project #: 17-4037-004
City: San Diego

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	445 PM

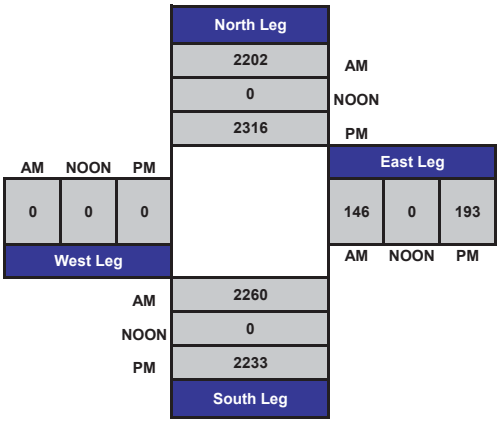


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4037-005 **Day:** Tuesday

City: San Diego **Date:** 2/14/2017

AM

NS/EW Streets:	Euclid Ave			Euclid Ave			Market St			Market St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL 1	NT 2	NR 0	SL 2	ST 2	SR 0	EL 1	ET 2	ER 0	WL 1	WT 2	WR 0	TOTAL
7:00 AM	66	309	13	32	84	28	12	14	14	16	100	79	767
7:15 AM	68	319	27	31	126	15	19	16	15	18	110	76	840
7:30 AM	52	270	12	37	133	16	29	21	17	24	116	77	804
7:45 AM	74	275	15	30	150	27	20	19	20	14	123	73	840
8:00 AM	63	215	8	31	137	27	20	22	14	13	74	71	695
8:15 AM	42	164	5	21	119	24	15	18	21	12	80	56	577
8:30 AM	35	128	8	28	129	30	20	23	22	14	60	57	554
8:45 AM	34	155	3	39	115	29	21	21	19	10	40	42	528
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	434	1835	91	249	993	196	156	154	142	121	703	531	5605
APPROACH %'s :	18.39%	77.75%	3.86%	17.32%	69.05%	13.63%	34.51%	34.07%	31.42%	8.93%	51.88%	39.19%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	260	1173	67	130	493	86	80	70	66	72	449	305	3251
PEAK HR FACTOR :		0.906			0.856			0.806			0.952		0.968

UTURNS	NB	SB	EB	WB
	3	1	0	0
	2	0	0	0
	0	1	0	1
	0	0	1	0
	1	1	1	0
	1	2	1	0
	1	2	0	0
	2	1	0	0
	NB	SB	EB	WB
	10	8	3	1

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 17-4037-005 **Day:** Tuesday

City: San Diego **Date:** 2/14/2017

PM

NS/EW Streets:	Euclid Ave			Euclid Ave			Market St			Market St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL 1	NT 2	NR 0	SL 2	ST 2	SR 0	EL 1	ET 2	ER 0	WL 1	WT 2	WR 0	TOTAL
4:00 PM	20	123	21	69	190	18	42	58	32	19	33	51	676
4:15 PM	22	154	20	63	194	11	37	78	61	21	34	53	748
4:30 PM	21	139	14	68	227	11	31	59	54	20	40	38	722
4:45 PM	24	154	17	43	184	12	33	54	54	20	35	60	690
5:00 PM	26	167	21	60	202	12	35	69	60	19	40	79	790
5:15 PM	32	150	20	44	225	9	38	60	73	23	51	52	777
5:30 PM	26	143	15	56	224	12	43	73	54	19	28	59	752
5:45 PM	29	142	18	58	198	9	33	73	53	24	35	49	721
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	200	1172	146	461	1644	94	292	524	441	165	296	441	5876
APPROACH %'s :	13.18%	77.21%	9.62%	20.96%	74.76%	4.27%	23.23%	41.69%	35.08%	18.29%	32.82%	48.89%	
PEAK HR START TIME :	500 PM												TOTAL
PEAK HR VOL :	113	602	74	218	849	42	149	275	240	85	154	239	3040
PEAK HR FACTOR :		0.922			0.949			0.971			0.866		0.962

UTURNS	NB	SB	EB	WB
	0	3	1	1
	0	1	3	0
	0	3	2	0
	0	1	2	0
	0	4	1	0
	1	1	2	0
	1	1	1	0
	2	4	4	1
	NB	SB	EB	WB
	4	18	16	2

CONTROL : Signalized

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

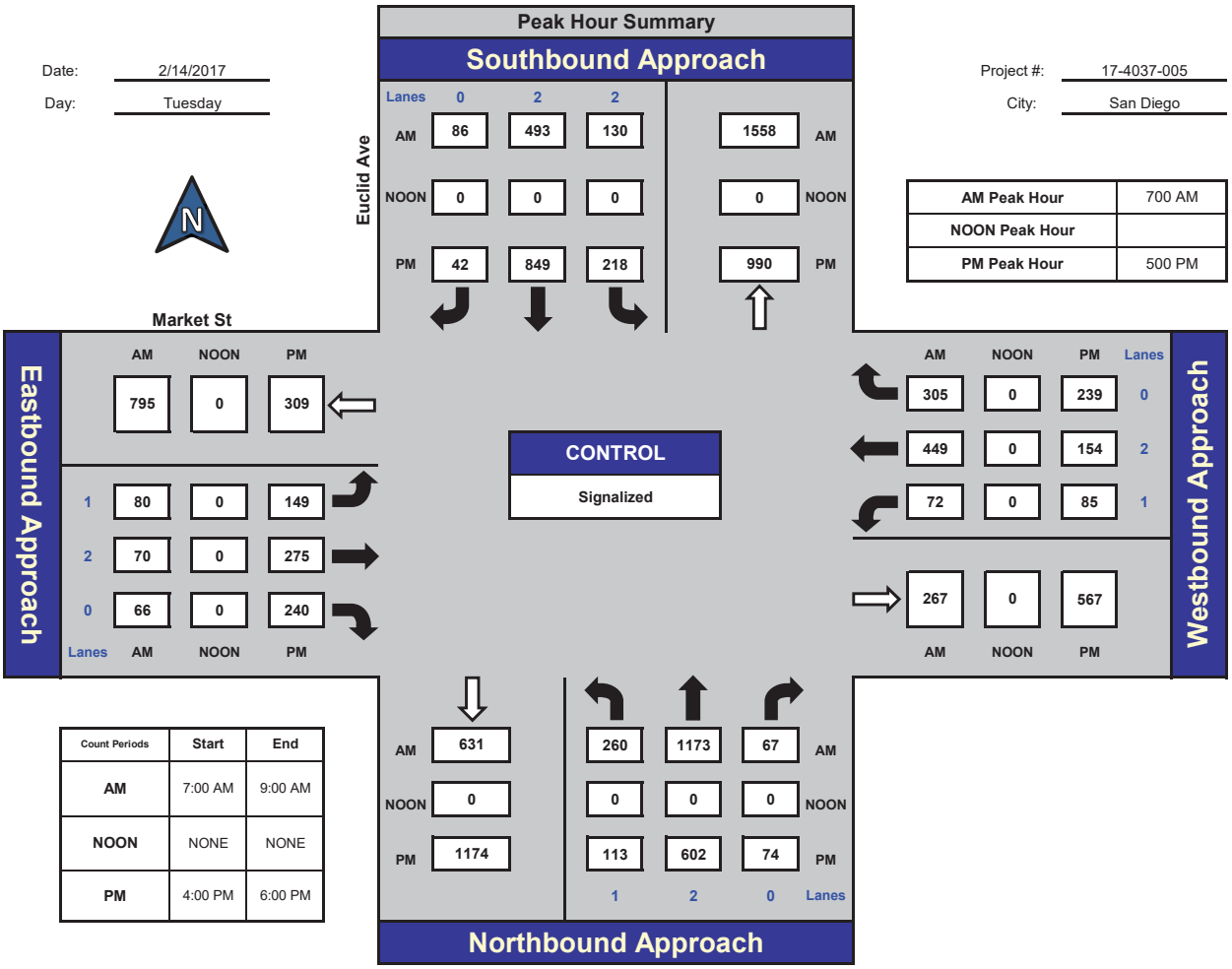
Euclid Ave and Market St , San Diego

Date: 2/14/2017

Day: Tuesday

Project #: 17-4037-005

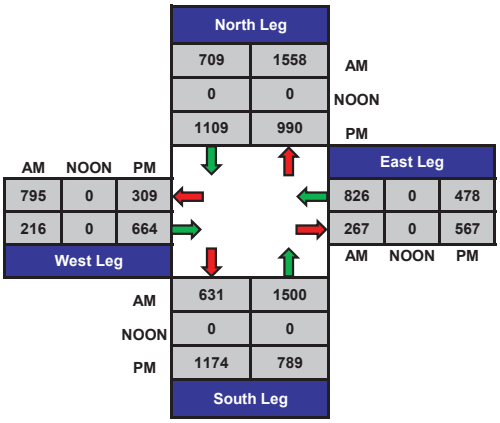
City: San Diego



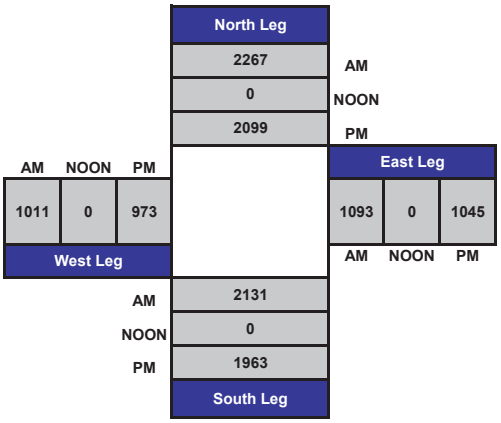
AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	500 PM

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



Appendix C Peak Hour Intersection LOS work Sheets – Existing Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	83	43	114	95	176	63	846	126	58	312	169
Future Volume (veh/h)	145	83	43	114	95	176	63	846	126	58	312	169
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	201	115	60	137	114	212	68	910	135	68	367	199
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.72	0.72	0.72	0.83	0.83	0.83	0.93	0.93	0.93	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	309	166	72	225	176	271	408	1386	206	241	1000	534
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.45	0.45	0.45	0.45	0.45	0.45
Sat Flow, veh/h	559	434	188	379	458	707	842	3093	459	538	2231	1191
Grp Volume(v), veh/h	376	0	0	463	0	0	68	521	524	68	290	276
Grp Sat Flow(s),veh/h/ln	1181	0	0	1543	0	0	842	1770	1782	538	1770	1653
Q Serve(g_s), s	2.3	0.0	0.0	0.0	0.0	0.0	3.4	13.4	13.4	6.6	6.3	6.4
Cycle Q Clear(g_c), s	17.4	0.0	0.0	15.1	0.0	0.0	9.8	13.4	13.4	20.0	6.3	6.4
Prop In Lane	0.53		0.16	0.30		0.46	1.00		0.26	1.00		0.72
Lane Grp Cap(c), veh/h	548	0	0	672	0	0	408	793	799	241	793	741
V/C Ratio(X)	0.69	0.00	0.00	0.69	0.00	0.00	0.17	0.66	0.66	0.28	0.37	0.37
Avail Cap(c_a), veh/h	687	0	0	834	0	0	415	809	814	246	809	755
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.2	0.0	0.0	15.6	0.0	0.0	13.9	12.6	12.6	20.4	10.6	10.6
Incr Delay (d2), s/veh	1.2	0.0	0.0	1.1	0.0	0.0	0.3	2.2	2.2	1.0	0.4	0.5
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	5.6	0.0	0.0	6.6	0.0	0.0	0.8	7.0	7.0	1.0	3.2	3.0
LnGrp Delay(d),s/veh	17.4	0.0	0.0	16.7	0.0	0.0	14.2	14.8	14.8	21.3	11.0	11.1
LnGrp LOS	B			B			B	B	B	C	B	B
Approach Vol, veh/h		376			463			1113			634	
Approach Delay, s/veh		17.4			16.7			14.7			12.2	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		31.0		27.2		31.0		27.2
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		26.6		28.6		26.6		28.6
Max Q Clear Time (g_c+I1), s		15.4		19.4		22.0		17.1
Green Ext Time (p_c), s		9.3		2.9		4.1		3.3

Intersection Summary	
HCM 2010 Ctrl Delay	14.8
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	29

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	96	0	217	0	1229	493	0	643	13
Future Vol, veh/h	0	0	0	96	0	217	0	1229	493	0	643	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	Free	-	-	Yield
Storage Length	-	-	-	0	-	0	-	-	520	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	58	69	69	69	92	92	92	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	139	0	314	0	1336	536	0	722	15

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1697	-	668	-	0	-	-	-	0
Stage 1	1336	-	-	-	-	-	-	-	-
Stage 2	361	-	-	-	-	-	-	-	-
Critical Hdwy	6.84	-	6.94	-	-	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	-	3.32	-	-	-	-	-	-
Pot Cap-1 Maneuver	~ 83	0	401	0	-	0	0	-	-
Stage 1	210	0	-	0	-	0	0	-	-
Stage 2	676	0	-	0	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	~ 83	0	401	-	-	-	-	-	-
Mov Cap-2 Maneuver	~ 83	0	-	-	-	-	-	-	-
Stage 1	210	0	-	-	-	-	-	-	-
Stage 2	676	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	161.6	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	-	83	401	-	-
HCM Lane V/C Ratio	-	1.676	0.784	-	-
HCM Control Delay (s)	-	$ 436.9	39.8	-	-
HCM Lane LOS	-	F	E	-	-
HCM 95th %tile Q(veh)	-	11.5	6.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	270	0	0	501	0	1216	297	167	569	0
Future Volume (Veh/h)	0	0	270	0	0	501	0	1216	297	167	569	0
Sign Control		Yield			Yield			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.86	0.86	0.86	0.94	0.94	0.94	0.93	0.93	0.93
Hourly flow rate (vph)	0	0	325	0	0	583	0	1294	316	180	612	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								705				
pX, platoon unblocked	0.68	0.68		0.68	0.68	0.68				0.68		
vC, conflicting volume	1619	2582	306	2118	2424	805	612			1610		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	978	2388	306	1709	2157	0	612			965		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	53	100	100	21	100			63		
cM capacity (veh/h)	21	14	690	15	20	741	963			485		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	325	583	863	747	384	408
Volume Left	0	0	0	0	180	0
Volume Right	325	583	0	316	0	0
cSH	690	741	1700	1700	485	1700
Volume to Capacity	0.47	0.79	0.51	0.44	0.37	0.24
Queue Length 95th (ft)	63	198	0	0	42	0
Control Delay (s)	14.8	25.3	0.0	0.0	11.6	0.0
Lane LOS	B	D			B	
Approach Delay (s)	14.8	25.3	0.0		5.6	
Approach LOS	B	D				

Intersection Summary				
Average Delay	7.3			
Intersection Capacity Utilization	80.8%	ICU Level of Service	D	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	72	15	1392	30	29	766
Future Volume (veh/h)	72	15	1392	30	29	766
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	96	20	1420	31	33	870
Adj No. of Lanes	0	0	2	0	1	2
Peak Hour Factor	0.75	0.75	0.98	0.98	0.88	0.88
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	124	26	2137	47	52	2545
Arrive On Green	0.09	0.09	0.60	0.60	0.03	0.72
Sat Flow, veh/h	1427	297	3635	77	1774	3632
Grp Volume(v), veh/h	117	0	709	742	33	870
Grp Sat Flow(s),veh/h/ln	1739	0	1770	1849	1774	1770
Q Serve(g_s), s	3.4	0.0	13.5	13.6	0.9	4.7
Cycle Q Clear(g_c), s	3.4	0.0	13.5	13.6	0.9	4.7
Prop In Lane	0.82	0.17		0.04	1.00	
Lane Grp Cap(c), veh/h	152	0	1068	1116	52	2545
V/C Ratio(X)	0.77	0.00	0.66	0.66	0.64	0.34
Avail Cap(c_a), veh/h	787	0	1123	1173	181	2911
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.8	0.0	6.7	6.7	24.5	2.7
Incr Delay (d2), s/veh	3.1	0.0	1.6	1.6	4.7	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	1.7	0.0	7.0	7.3	0.5	2.2
LnGrp Delay(d),s/veh	25.9	0.0	8.3	8.3	29.2	2.8
LnGrp LOS	C		A	A	C	A
Approach Vol, veh/h	117		1451			903
Approach Delay, s/veh	25.9		8.3			3.8
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.9	36.2				42.1		8.9
Change Period (Y+Rc), s	4.4	5.4				5.4		4.5
Max Green Setting (Gmax), s	5.3	32.4				42.0		23.1
Max Q Clear Time (g_c+I1), s	2.9	15.6				6.7		5.4
Green Ext Time (p_c), s	0.0	15.2				29.5		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	7.5
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	70	66	72	449	305	260	1173	67	130	493	86
Future Volume (veh/h)	80	70	66	72	449	305	260	1173	67	130	493	86
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	99	86	56	76	473	237	286	1289	52	151	573	65
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	2	0
Peak Hour Factor	0.81	0.81	0.81	0.95	0.95	0.95	0.91	0.91	0.91	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	124	552	333	97	561	279	317	1524	61	210	1033	117
Arrive On Green	0.07	0.26	0.26	0.05	0.24	0.24	0.18	0.44	0.44	0.06	0.32	0.32
Sat Flow, veh/h	1774	2125	1281	1774	2290	1141	1774	3468	140	3442	3206	363
Grp Volume(v), veh/h	99	70	72	76	365	345	286	657	684	151	316	322
Grp Sat Flow(s),veh/h/ln	1774	1770	1637	1774	1770	1661	1774	1770	1838	1721	1770	1799
Q Serve(g_s), s	6.0	3.3	3.7	4.6	21.2	21.5	17.1	35.9	36.0	4.7	15.9	16.0
Cycle Q Clear(g_c), s	6.0	3.3	3.7	4.6	21.2	21.5	17.1	35.9	36.0	4.7	15.9	16.0
Prop In Lane	1.00		0.78	1.00		0.69	1.00		0.08	1.00		0.20
Lane Grp Cap(c), veh/h	124	460	425	97	433	407	317	778	808	210	570	580
V/C Ratio(X)	0.80	0.15	0.17	0.78	0.84	0.85	0.90	0.84	0.85	0.72	0.55	0.56
Avail Cap(c_a), veh/h	162	534	494	138	503	473	403	842	874	248	583	593
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	49.6	30.9	31.0	50.6	38.9	39.0	43.6	27.1	27.1	49.9	30.3	30.3
Incr Delay (d2), s/veh	14.1	0.2	0.2	10.7	10.7	12.0	17.6	7.3	7.2	5.8	1.1	1.1
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	3.4	1.6	1.7	2.5	11.6	11.1	9.9	18.9	19.8	2.4	8.0	8.1
LnGrp Delay(d),s/veh	63.7	31.1	31.2	61.2	49.6	51.0	61.2	34.4	34.3	55.7	31.4	31.4
LnGrp LOS	E	C	C	E	D	D	E	C	C	E	C	C
Approach Vol, veh/h		241			786			1627			789	
Approach Delay, s/veh		44.5			51.3			39.1			36.1	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.3	33.4	23.7	40.8	12.0	31.8	11.0	53.5
Change Period (Y+Rc), s	4.4	* 5.3	4.4	* 5.9	4.4	5.3	4.4	5.9
Max Green Setting (Gmax), s	8.4	* 33	24.6	* 36	9.9	30.8	7.8	51.5
Max Q Clear Time (g_c+I1), s	10.6	5.7	19.1	18.0	8.0	23.5	6.7	38.0
Green Ext Time (p_c), s	0.0	5.8	0.2	11.7	0.0	3.1	0.0	9.6

Intersection Summary	
HCM 2010 Ctrl Delay	41.6
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	151	37	21	84	38	73	16	472	71	86	570	117
Future Volume (veh/h)	151	37	21	84	38	73	16	472	71	86	570	117
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	189	46	26	124	56	107	17	513	77	91	600	123
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.80	0.80	0.80	0.68	0.68	0.68	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	424	82	37	294	108	154	454	1491	223	512	1413	289
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.48	0.48	0.48	0.48	0.48	0.48
Sat Flow, veh/h	1025	333	150	613	439	625	727	3089	462	823	2928	599
Grp Volume(v), veh/h	261	0	0	287	0	0	17	293	297	91	362	361
Grp Sat Flow(s),veh/h/ln	1508	0	0	1677	0	0	727	1770	1781	823	1770	1757
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.6	3.7	3.7	2.8	4.8	4.8
Cycle Q Clear(g_c), s	5.2	0.0	0.0	5.1	0.0	0.0	5.4	3.7	3.7	6.5	4.8	4.8
Prop In Lane	0.72		0.10	0.43		0.37	1.00		0.26	1.00		0.34
Lane Grp Cap(c), veh/h	542	0	0	555	0	0	454	854	860	512	854	848
V/C Ratio(X)	0.48	0.00	0.00	0.52	0.00	0.00	0.04	0.34	0.35	0.18	0.42	0.43
Avail Cap(c_a), veh/h	1104	0	0	1189	0	0	528	1035	1042	596	1035	1028
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.2	0.0	0.0	12.2	0.0	0.0	7.8	5.8	5.8	7.8	6.1	6.1
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.3	0.0	0.0	0.1	0.4	0.4	0.3	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	0.0	2.6	0.0	0.0	0.1	1.9	1.9	0.7	2.4	2.4
LnGrp Delay(d),s/veh	12.4	0.0	0.0	12.5	0.0	0.0	7.9	6.1	6.2	8.1	6.6	6.6
LnGrp LOS	B			B			A	A	A	A	A	A
Approach Vol, veh/h		261			287			607			814	
Approach Delay, s/veh		12.4			12.5			6.2			6.7	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		22.3		13.8		22.3		13.8
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		21.1		24.1		21.1		24.1
Max Q Clear Time (g_c+I1), s		7.4		7.2		8.5		7.1
Green Ext Time (p_c), s		9.5		2.2		8.9		2.2

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	102	0	243	0	1100	353	0	967	6
Future Volume (Veh/h)	0	0	0	102	0	243	0	1100	353	0	967	6
Sign Control		Yield			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.38	0.38	0.38	0.87	0.87	0.87	0.97	0.97	0.97	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	0	117	0	279	0	1134	364	0	1029	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1599	2166	518	1648	2163	567	1029			1134		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1599	2166	518	1648	2163	567	1029			1134		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	40	100			100		
cM capacity (veh/h)	29	46	503	65	47	467	671			612		

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	117	279	567	567	364	686	349
Volume Left	117	0	0	0	0	0	0
Volume Right	0	279	0	0	364	0	6
cSH	65	467	1700	1700	1700	1700	1700
Volume to Capacity	1.79	0.60	0.33	0.33	0.21	0.40	0.21
Queue Length 95th (ft)	265	96	0	0	0	0	0
Control Delay (s)	515.6	23.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	C					
Approach Delay (s)	168.9		0.0			0.0	
Approach LOS	F						

Intersection Summary				
Average Delay	22.8			
Intersection Capacity Utilization	52.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	539	0	0	598	0	848	252	276	810	0
Future Volume (Veh/h)	0	0	539	0	0	598	0	848	252	276	810	0
Sign Control		Yield			Yield			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.94	0.94	0.94	0.92	0.92	0.92	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	592	0	0	636	0	922	274	310	910	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								705				
pX, platoon unblocked	0.75	0.75		0.75	0.75	0.75				0.75		
vC, conflicting volume	1991	2726	455	2134	2589	598	910			1196		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1646	2632	455	1838	2448	0	910			579		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	0	0	100	21	100			58		
cM capacity (veh/h)	7	10	552	0	13	808	744			738		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	592	636	615	581	613	607
Volume Left	0	0	0	0	310	0
Volume Right	592	636	0	274	0	0
cSH	552	808	1700	1700	738	1700
Volume to Capacity	1.07	0.79	0.36	0.34	0.42	0.36
Queue Length 95th (ft)	440	202	0	0	52	0
Control Delay (s)	86.1	23.8	0.0	0.0	10.1	0.0
Lane LOS	F	C			B	
Approach Delay (s)	86.1	23.8	0.0		5.1	
Approach LOS	F	C				

Intersection Summary				
Average Delay	19.8			
Intersection Capacity Utilization	75.2%	ICU Level of Service	D	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	34	21	993	21	117	1185
Future Volume (veh/h)	34	21	993	21	117	1185
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	42	26	1141	24	130	1317
Adj No. of Lanes	0	0	2	0	1	2
Peak Hour Factor	0.81	0.81	0.87	0.87	0.90	0.90
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	53	33	1935	41	166	2601
Arrive On Green	0.05	0.05	0.55	0.55	0.09	0.73
Sat Flow, veh/h	1034	640	3638	75	1774	3632
Grp Volume(v), veh/h	69	0	570	595	130	1317
Grp Sat Flow(s),veh/h/ln	1698	0	1770	1850	1774	1770
Q Serve(g_s), s	1.9	0.0	10.0	10.0	3.3	7.3
Cycle Q Clear(g_c), s	1.9	0.0	10.0	10.0	3.3	7.3
Prop In Lane	0.61	0.38		0.04	1.00	
Lane Grp Cap(c), veh/h	86	0	966	1010	166	2601
V/C Ratio(X)	0.80	0.00	0.59	0.59	0.78	0.51
Avail Cap(c_a), veh/h	845	0	1000	1045	253	2842
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.7	0.0	7.0	7.0	20.5	2.6
Incr Delay (d2), s/veh	6.2	0.0	1.1	1.1	3.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	5.0	5.3	1.8	3.4
LnGrp Delay(d),s/veh	27.9	0.0	8.1	8.1	24.4	2.8
LnGrp LOS	C		A	A	C	A
Approach Vol, veh/h	69		1165			1447
Approach Delay, s/veh	27.9		8.1			4.7
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	8.7	30.6				39.4		6.9
Change Period (Y+Rc), s	4.4	5.4				5.4		4.5
Max Green Setting (Gmax), s	6.6	26.1				37.1		23.0
Max Q Clear Time (g_c+I1), s	5.3	12.0				9.3		3.9
Green Ext Time (p_c), s	0.0	13.2				24.7		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	6.8
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	275	240	85	154	239	113	602	74	218	849	42
Future Volume (veh/h)	149	275	240	85	154	239	113	602	74	218	849	42
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	154	284	185	98	177	206	123	654	58	229	894	22
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	2	0
Peak Hour Factor	0.97	0.97	0.97	0.87	0.87	0.87	0.92	0.92	0.92	0.95	0.95	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	190	507	321	126	367	328	155	1176	104	313	1274	31
Arrive On Green	0.11	0.24	0.24	0.07	0.21	0.21	0.09	0.36	0.36	0.09	0.36	0.36
Sat Flow, veh/h	1774	2082	1318	1774	1770	1583	1774	3290	291	3442	3530	87
Grp Volume(v), veh/h	154	240	229	98	177	206	123	351	361	229	448	468
Grp Sat Flow(s),veh/h/ln	1774	1770	1630	1774	1770	1583	1774	1770	1811	1721	1770	1847
Q Serve(g_s), s	7.1	10.0	10.4	4.6	7.4	10.0	5.7	13.4	13.4	5.5	18.3	18.3
Cycle Q Clear(g_c), s	7.1	10.0	10.4	4.6	7.4	10.0	5.7	13.4	13.4	5.5	18.3	18.3
Prop In Lane	1.00		0.81	1.00		1.00	1.00		0.16	1.00		0.05
Lane Grp Cap(c), veh/h	190	431	397	126	367	328	155	632	647	313	638	666
V/C Ratio(X)	0.81	0.56	0.58	0.78	0.48	0.63	0.79	0.56	0.56	0.73	0.70	0.70
Avail Cap(c_a), veh/h	371	723	666	280	624	558	308	818	837	564	822	858
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	36.8	27.9	28.0	38.5	29.4	30.4	37.7	21.7	21.7	37.3	23.0	23.0
Incr Delay (d2), s/veh	3.1	1.4	1.6	3.9	0.9	1.8	3.4	0.7	0.6	1.3	1.9	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	5.0	4.9	2.4	3.7	4.5	2.9	6.7	6.8	2.6	9.2	9.6
LnGrp Delay(d),s/veh	39.9	29.2	29.6	42.4	30.3	32.2	41.1	22.4	22.4	38.5	25.0	24.9
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		623			481			835			1145	
Approach Delay, s/veh		32.0			33.6			25.1			27.7	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.4	25.8	11.8	36.3	13.4	22.7	12.0	36.0
Change Period (Y+Rc), s	4.4	* 5.3	4.4	* 5.9	4.4	5.3	4.4	5.9
Max Green Setting (Gmax), s	13.3	* 34	14.6	* 39	17.6	29.7	13.8	38.9
Max Q Clear Time (g_c+I1), s	6.6	12.4	7.7	20.3	9.1	12.0	7.5	15.4
Green Ext Time (p_c), s	0.1	5.9	0.1	10.1	0.1	5.5	0.2	11.4

Intersection Summary	
HCM 2010 Ctrl Delay	28.8
HCM 2010 LOS	C

Notes

Appendix D Peak Hour Intersection LOS work Sheets – Existing Plus Project Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	83	43	39	95	57	63	846	39	24	312	169
Future Volume (veh/h)	145	83	43	39	95	57	63	846	39	24	312	169
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	201	115	60	47	114	69	68	910	42	28	367	199
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.72	0.72	0.72	0.83	0.83	0.83	0.93	0.93	0.93	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	349	165	75	157	307	160	474	1670	77	329	1082	577
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.48	0.48	0.48	0.48	0.48	0.48
Sat Flow, veh/h	756	536	245	212	1000	519	842	3445	159	587	2231	1191
Grp Volume(v), veh/h	376	0	0	230	0	0	68	467	485	28	290	276
Grp Sat Flow(s),veh/h/ln	1536	0	0	1731	0	0	842	1770	1835	587	1770	1653
Q Serve(g_s), s	5.2	0.0	0.0	0.0	0.0	0.0	2.6	8.7	8.7	1.7	4.8	4.9
Cycle Q Clear(g_c), s	10.1	0.0	0.0	4.9	0.0	0.0	7.4	8.7	8.7	10.4	4.8	4.9
Prop In Lane	0.53		0.16	0.20		0.30	1.00		0.09	1.00		0.72
Lane Grp Cap(c), veh/h	590	0	0	624	0	0	474	858	889	329	858	801
V/C Ratio(X)	0.64	0.00	0.00	0.37	0.00	0.00	0.14	0.54	0.54	0.09	0.34	0.34
Avail Cap(c_a), veh/h	1024	0	0	1118	0	0	531	979	1015	369	979	914
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.5	0.0	0.0	13.0	0.0	0.0	9.8	8.5	8.5	12.1	7.5	7.5
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.1	0.0	0.0	0.2	0.8	0.8	0.2	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.0	0.0	2.4	0.0	0.0	0.6	4.4	4.5	0.3	2.3	2.3
LnGrp Delay(d),s/veh	15.0	0.0	0.0	13.1	0.0	0.0	10.0	9.3	9.3	12.3	7.8	7.9
LnGrp LOS	B			B			B	A	A	B	A	A
Approach Vol, veh/h		376			230			1020			594	
Approach Delay, s/veh		15.0			13.1			9.4			8.1	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		27.8		19.4		27.8		19.4
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		26.1		29.1		26.1		29.1
Max Q Clear Time (g_c+I1), s		10.7		12.1		12.4		6.9
Green Ext Time (p_c), s		11.5		2.5		10.5		2.7

Intersection Summary	
HCM 2010 Ctrl Delay	10.4
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	78.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	105	0	217	0	1369	525	0	686	13
Future Vol, veh/h	0	0	0	105	0	217	0	1369	525	0	686	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	Free	-	-	Yield
Storage Length	-	-	-	0	-	0	-	-	520	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	58	69	69	69	92	92	92	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	152	0	314	0	1488	571	0	771	15

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1873	-	744	-	0	-	-	-	0
Stage 1	1488	-	-	-	-	-	-	-	-
Stage 2	385	-	-	-	-	-	-	-	-
Critical Hdwy	7.54	-	6.94	-	-	-	-	-	-
Critical Hdwy Stg 1	6.54	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	-	3.32	-	-	-	-	-	-
Pot Cap-1 Maneuver	~ 44	0	357	0	-	0	0	-	-
Stage 1	~ 130	0	-	0	-	0	0	-	-
Stage 2	610	0	-	0	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	~ 44	-	357	-	-	-	-	-	-
Mov Cap-2 Maneuver	~ 44	-	-	-	-	-	-	-	-
Stage 1	~ 130	-	-	-	-	-	-	-	-
Stage 2	610	-	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 461.8	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	-	44	357	-	-
HCM Lane V/C Ratio	-	3.458	0.881	-	-
HCM Control Delay (s)	-	$ 1298.3	57	-	-
HCM Lane LOS	-	F	F	-	-
HCM 95th %tile Q(veh)	-	16.9	8.5	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	188	5	96	72	5	15	108	1392	30	29	782	50
Future Volume (veh/h)	188	5	96	72	5	15	108	1392	30	29	782	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	204	5	104	96	5	20	117	1420	31	33	889	54
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.75	0.92	0.75	0.92	0.98	0.98	0.88	0.88	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	333	10	124	351	25	54	150	1784	39	49	1510	92
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.08	0.50	0.50	0.03	0.45	0.45
Sat Flow, veh/h	992	42	515	1033	106	225	1774	3541	77	1774	3390	206
Grp Volume(v), veh/h	313	0	0	121	0	0	117	709	742	33	464	479
Grp Sat Flow(s),veh/h/ln	1549	0	0	1364	0	0	1774	1770	1849	1774	1770	1826
Q Serve(g_s), s	7.3	0.0	0.0	0.0	0.0	0.0	4.0	20.8	20.8	1.2	12.3	12.3
Cycle Q Clear(g_c), s	11.8	0.0	0.0	4.5	0.0	0.0	4.0	20.8	20.8	1.2	12.3	12.3
Prop In Lane	0.65		0.33	0.79		0.17	1.00		0.04	1.00		0.11
Lane Grp Cap(c), veh/h	467	0	0	431	0	0	150	891	931	49	788	813
V/C Ratio(X)	0.67	0.00	0.00	0.28	0.00	0.00	0.78	0.80	0.80	0.67	0.59	0.59
Avail Cap(c_a), veh/h	662	0	0	612	0	0	227	904	945	147	822	849
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.3	0.0	0.0	19.7	0.0	0.0	28.1	12.9	12.9	30.2	13.1	13.1
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.1	0.0	0.0	9.4	5.2	5.1	5.6	1.3	1.2
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	5.2	0.0	0.0	1.7	0.0	0.0	2.4	11.3	11.8	0.6	6.2	6.4
LnGrp Delay(d),s/veh	22.9	0.0	0.0	19.9	0.0	0.0	37.5	18.1	18.0	35.8	14.3	14.3
LnGrp LOS	C			B			D	B	B	D	B	B
Approach Vol, veh/h		313			121			1568			976	
Approach Delay, s/veh		22.9			19.9			19.5			15.1	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.1	36.9		19.5	9.8	33.3		19.5
Change Period (Y+Rc), s	4.4	5.4		4.5	4.5	5.4		4.5
Max Green Setting (Gmax), s	5.3	32.0		23.5	8.0	29.1		23.5
Max Q Clear Time (g_c+I1), s	13.8	22.8		13.8	6.0	14.3		6.5
Green Ext Time (p_c), s	0.0	8.6		1.3	0.0	13.5		1.7

Intersection Summary		
HCM 2010 Ctrl Delay	18.4	
HCM 2010 LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	70	66	72	449	308	260	1269	67	135	584	102
Future Volume (veh/h)	89	70	66	72	449	308	260	1269	67	135	584	102
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	110	86	69	76	473	261	286	1395	52	157	679	96
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	2	0
Peak Hour Factor	0.81	0.81	0.81	0.95	0.95	0.95	0.91	0.91	0.91	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	135	528	387	97	549	301	315	1535	57	200	1002	142
Arrive On Green	0.08	0.27	0.27	0.05	0.25	0.25	0.18	0.44	0.44	0.06	0.32	0.32
Sat Flow, veh/h	1774	1951	1429	1774	2207	1211	1774	3480	130	3442	3115	440
Grp Volume(v), veh/h	110	77	78	76	379	355	286	708	739	157	385	390
Grp Sat Flow(s),veh/h/ln	1774	1770	1611	1774	1770	1649	1774	1770	1840	1721	1770	1785
Q Serve(g_s), s	6.9	3.8	4.2	4.8	23.3	23.5	18.0	42.4	42.6	5.1	21.5	21.5
Cycle Q Clear(g_c), s	6.9	3.8	4.2	4.8	23.3	23.5	18.0	42.4	42.6	5.1	21.5	21.5
Prop In Lane	1.00		0.89	1.00		0.73	1.00		0.07	1.00		0.25
Lane Grp Cap(c), veh/h	135	479	436	97	440	410	315	781	812	200	569	574
V/C Ratio(X)	0.81	0.16	0.18	0.79	0.86	0.87	0.91	0.91	0.91	0.79	0.68	0.68
Avail Cap(c_a), veh/h	150	521	474	128	493	459	384	810	842	200	569	574
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	51.8	31.7	31.8	53.1	40.8	40.9	45.9	29.6	29.7	52.9	33.5	33.5
Incr Delay (d2), s/veh	23.2	0.2	0.2	15.0	13.1	14.5	20.3	13.5	13.4	17.1	3.2	3.2
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	4.3	1.9	1.9	2.8	13.0	12.3	10.6	23.6	24.6	2.9	11.0	11.1
LnGrp Delay(d),s/veh	75.0	31.8	32.0	68.1	53.9	55.5	66.2	43.2	43.1	70.0	36.7	36.7
LnGrp LOS	E	C	C	E	D	E	E	D	D	E	D	D
Approach Vol, veh/h		265			810			1733			932	
Approach Delay, s/veh		49.8			55.9			46.9			42.3	
Approach LOS		D			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.6	36.1	24.6	42.5	13.1	33.6	11.0	56.1
Change Period (Y+Rc), s	4.4	* 5.3	4.4	* 5.9	4.4	5.3	4.4	5.9
Max Green Setting (Gmax), s	8.3	* 34	24.6	* 35	9.6	31.7	6.6	52.1
Max Q Clear Time (g_c+I1), s	10.8	6.2	20.0	23.5	8.9	25.5	7.1	44.6
Green Ext Time (p_c), s	0.0	6.1	0.2	9.2	0.0	2.8	0.0	5.6

Intersection Summary	
HCM 2010 Ctrl Delay	47.9
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	16	0	1595	845	23
Future Vol, veh/h	0	16	0	1595	845	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	17	0	1734	918	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	472	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	461	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	461	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	461	-	-
HCM Lane V/C Ratio	-	0.038	-	-
HCM Control Delay (s)	-	13.1	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	211	0	0	145	14	10	0	10	32	0	6
Future Vol, veh/h	3	211	0	0	145	14	10	0	10	32	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	229	0	0	158	15	11	0	11	35	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	173	0	-	-	-	0	404	409	229	406	401	165
Stage 1	-	-	-	-	-	-	236	236	-	165	165	-
Stage 2	-	-	-	-	-	-	168	173	-	241	236	-
Critical Hdwy	4.12	-	-	-	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1404	-	0	0	-	-	557	532	810	555	538	879
Stage 1	-	-	0	0	-	-	767	710	-	837	762	-
Stage 2	-	-	0	0	-	-	834	756	-	762	710	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1404	-	-	-	-	-	552	531	810	547	537	879
Mov Cap-2 Maneuver	-	-	-	-	-	-	552	531	-	547	537	-
Stage 1	-	-	-	-	-	-	765	709	-	835	762	-
Stage 2	-	-	-	-	-	-	828	756	-	750	709	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	10.7	11.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	657	1404	-	-	-	547	879
HCM Lane V/C Ratio	0.033	0.002	-	-	-	0.064	0.007
HCM Control Delay (s)	10.7	7.6	0	-	-	12	9.1
HCM Lane LOS	B	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	0	-	-	-	0.2	0

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	247	149	14	42	10
Future Vol, veh/h	6	247	149	14	42	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	268	162	15	46	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	177	0	-	0	452	170
Stage 1	-	-	-	-	170	-
Stage 2	-	-	-	-	282	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1399	-	-	-	565	874
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	766	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1399	-	-	-	562	874
Mov Cap-2 Maneuver	-	-	-	-	562	-
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	761	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1399	-	-	-	603
HCM Lane V/C Ratio	0.005	-	-	-	0.094
HCM Control Delay (s)	7.6	0	-	-	11.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	151	37	21	28	38	29	16	472	26	38	570	117
Future Volume (veh/h)	151	37	21	28	38	29	16	472	26	38	570	117
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	189	46	26	41	56	43	17	513	28	40	600	123
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	0	2	0
Peak Hour Factor	0.80	0.80	0.80	0.68	0.68	0.68	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	399	72	35	191	203	122	460	1775	97	143	1426	284
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.52	0.52	0.52	0.52	0.52	0.52
Sat Flow, veh/h	1045	314	150	312	885	531	727	3414	186	80	2742	546
Grp Volume(v), veh/h	261	0	0	140	0	0	17	265	276	403	0	360
Grp Sat Flow(s),veh/h/ln	1510	0	0	1728	0	0	727	1770	1830	1770	0	1599
Q Serve(g_s), s	3.4	0.0	0.0	0.0	0.0	0.0	0.6	3.3	3.3	0.0	0.0	5.5
Cycle Q Clear(g_c), s	6.0	0.0	0.0	2.6	0.0	0.0	6.1	3.3	3.3	5.2	0.0	5.5
Prop In Lane	0.72		0.10	0.29		0.31	1.00		0.10	0.10		0.34
Lane Grp Cap(c), veh/h	506	0	0	516	0	0	460	920	951	1021	0	831
V/C Ratio(X)	0.52	0.00	0.00	0.27	0.00	0.00	0.04	0.29	0.29	0.39	0.00	0.43
Avail Cap(c_a), veh/h	1113	0	0	1208	0	0	623	1314	1359	1393	0	1188
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.8	0.0	0.0	12.6	0.0	0.0	7.7	5.3	5.3	5.8	0.0	5.8
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.3	0.4	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	0.0	1.3	0.0	0.0	0.1	1.7	1.8	2.7	0.0	2.5
LnGrp Delay(d),s/veh	14.1	0.0	0.0	12.7	0.0	0.0	7.8	5.6	5.6	6.1	0.0	6.4
LnGrp LOS	B			B			A	A	A	A		A
Approach Vol, veh/h		261			140			558			763	
Approach Delay, s/veh		14.1			12.7			5.6			6.3	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		25.3		13.9		25.3		13.9
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		29.1		26.1		29.1		26.1
Max Q Clear Time (g_c+I1), s		8.1		8.0		7.5		4.6
Green Ext Time (p_c), s		12.3		1.5		12.5		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	7.8
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	44.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	120	0	243	0	1156	373	0	1033	6
Future Vol, veh/h	0	0	0	120	0	243	0	1156	373	0	1033	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	Free	-	-	Yield
Storage Length	-	-	-	0	-	0	-	-	520	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	87	87	87	97	97	97	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	138	0	279	0	1192	385	0	1099	6

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1741	-	596	-	0	-	-	-	0
Stage 1	1192	-	-	-	-	-	-	-	-
Stage 2	549	-	-	-	-	-	-	-	-
Critical Hdwy	7.54	-	6.94	-	-	-	-	-	-
Critical Hdwy Stg 1	6.54	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	-	3.32	-	-	-	-	-	-
Pot Cap-1 Maneuver	~ 56	0	447	0	-	0	0	-	-
Stage 1	199	0	-	0	-	0	0	-	-
Stage 2	488	0	-	0	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	~ 56	-	447	-	-	-	-	-	-
Mov Cap-2 Maneuver	~ 56	-	-	-	-	-	-	-	-
Stage 1	199	-	-	-	-	-	-	-	-
Stage 2	488	-	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	288.9	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	-	56	447	-	-
HCM Lane V/C Ratio	-	2.463	0.625	-	-
HCM Control Delay (s)	-	$ 822.3	25.5	-	-
HCM Lane LOS	-	F	D	-	-
HCM 95th %tile Q(veh)	-	13.9	4.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	0	69	34	0	21	85	993	21	117	1194	84
Future Volume (veh/h)	85	0	69	34	0	21	85	993	21	117	1194	84
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1900	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	92	0	75	42	0	26	92	1141	24	130	1327	91
Adj No. of Lanes	0	1	0	0	1	0	0	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.81	0.92	0.81	0.92	0.87	0.87	0.90	0.90	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	179	10	94	185	18	77	144	1612	34	160	2471	169
Arrive On Green	0.13	0.00	0.13	0.13	0.00	0.13	0.59	0.59	0.59	0.09	0.73	0.73
Sat Flow, veh/h	787	71	699	803	131	578	150	2748	57	1774	3362	230
Grp Volume(v), veh/h	167	0	0	68	0	0	551	0	706	130	697	721
Grp Sat Flow(s),veh/h/ln	1557	0	0	1511	0	0	1270	0	1685	1774	1770	1822
Q Serve(g_s), s	4.8	0.0	0.0	0.0	0.0	0.0	10.0	0.0	22.5	5.4	13.0	13.1
Cycle Q Clear(g_c), s	7.7	0.0	0.0	2.9	0.0	0.0	18.7	0.0	22.5	5.4	13.0	13.1
Prop In Lane	0.55		0.45	0.62		0.38	0.17		0.03	1.00		0.13
Lane Grp Cap(c), veh/h	283	0	0	280	0	0	801	0	988	160	1300	1339
V/C Ratio(X)	0.59	0.00	0.00	0.24	0.00	0.00	0.69	0.00	0.71	0.81	0.54	0.54
Avail Cap(c_a), veh/h	540	0	0	527	0	0	819	0	1015	160	1328	1368
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.5	0.0	0.0	29.5	0.0	0.0	9.6	0.0	11.1	33.7	4.4	4.4
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.2	0.0	0.0	2.7	0.0	2.6	25.0	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	0.0	0.0	1.3	0.0	0.0	8.1	0.0	11.1	3.8	6.4	6.6
LnGrp Delay(d),s/veh	32.2	0.0	0.0	29.7	0.0	0.0	12.3	0.0	13.7	58.7	4.9	4.9
LnGrp LOS	C			C			B		B	E	A	A
Approach Vol, veh/h		167			68			1257			1548	
Approach Delay, s/veh		32.2			29.7			13.1			9.4	
Approach LOS		C			C			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	11.2	49.7		14.6		60.9		14.6
Change Period (Y+Rc), s	4.4	5.4		4.5		5.4		4.5
Max Green Setting (Gmax), s	6.8	45.5		23.4		56.7		23.4
Max Q Clear Time (g_c+I1), s	7.4	24.5		9.7		15.1		4.9
Green Ext Time (p_c), s	0.0	19.8		0.7		37.4		0.8

Intersection Summary		
HCM 2010 Ctrl Delay	12.6	
HCM 2010 LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	167	275	240	85	154	244	113	664	74	221	915	51
Future Volume (veh/h)	167	275	240	85	154	244	113	664	74	221	915	51
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	172	284	185	98	177	211	123	722	58	233	963	31
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	2	0
Peak Hour Factor	0.97	0.97	0.97	0.87	0.87	0.87	0.92	0.92	0.92	0.95	0.95	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	207	522	330	125	362	324	154	1223	98	311	1302	42
Arrive On Green	0.12	0.25	0.25	0.07	0.20	0.20	0.09	0.37	0.37	0.09	0.37	0.37
Sat Flow, veh/h	1774	2082	1318	1774	1770	1583	1774	3319	266	3442	3500	113
Grp Volume(v), veh/h	172	240	229	98	177	211	123	385	395	233	487	507
Grp Sat Flow(s),veh/h/ln	1774	1770	1630	1774	1770	1583	1774	1770	1816	1721	1770	1843
Q Serve(g_s), s	8.6	10.7	11.1	4.9	8.0	11.1	6.2	15.9	16.0	6.0	21.7	21.7
Cycle Q Clear(g_c), s	8.6	10.7	11.1	4.9	8.0	11.1	6.2	15.9	16.0	6.0	21.7	21.7
Prop In Lane	1.00		0.81	1.00		1.00	1.00		0.15	1.00		0.06
Lane Grp Cap(c), veh/h	207	444	409	125	362	324	154	652	669	311	658	686
V/C Ratio(X)	0.83	0.54	0.56	0.78	0.49	0.65	0.80	0.59	0.59	0.75	0.74	0.74
Avail Cap(c_a), veh/h	324	670	617	260	598	535	266	758	777	523	781	813
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	39.3	29.5	29.7	41.5	31.9	33.2	40.7	23.2	23.2	40.3	24.7	24.7
Incr Delay (d2), s/veh	5.5	1.2	1.5	4.0	0.9	2.0	3.6	0.8	0.8	1.4	3.2	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	5.4	5.2	2.6	4.0	5.0	3.2	7.9	8.2	2.9	11.1	11.6
LnGrp Delay(d),s/veh	44.7	30.7	31.1	45.6	32.9	35.2	44.3	23.9	23.9	41.7	27.9	27.7
LnGrp LOS	D	C	C	D	C	D	D	C	C	D	C	C
Approach Vol, veh/h		641			486			903			1227	
Approach Delay, s/veh		34.6			36.4			26.7			30.4	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	28.1	12.3	39.7	15.0	23.9	12.6	39.4
Change Period (Y+Rc), s	4.4	* 5.3	4.4	* 5.9	4.4	5.3	4.4	5.9
Max Green Setting (Gmax), s	13.3	* 34	13.6	* 40	16.6	30.7	13.8	38.9
Max Q Clear Time (g_c+I1), s	10.9	13.1	8.2	23.7	10.6	13.1	8.0	18.0
Green Ext Time (p_c), s	0.1	5.9	0.1	10.1	0.1	5.5	0.2	11.8

Intersection Summary	
HCM 2010 Ctrl Delay	31.1
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	9	0	1099	1386	41
Future Vol, veh/h	0	9	0	1099	1386	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	10	0	1195	1507	45

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	776	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	292	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	292	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	292	-	-
HCM Lane V/C Ratio	-	0.034	-	-
HCM Control Delay (s)	-	17.8	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	111	0	0	117	35	10	0	10	14	0	3
Future Vol, veh/h	6	111	0	0	117	35	10	0	10	14	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	121	0	0	127	38	11	0	11	15	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	165	0	-	-	-	0	282	299	121	285	280	146
Stage 1	-	-	-	-	-	-	134	134	-	146	146	-
Stage 2	-	-	-	-	-	-	148	165	-	139	134	-
Critical Hdwy	4.12	-	-	-	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1413	-	0	0	-	-	670	613	930	667	628	901
Stage 1	-	-	0	0	-	-	869	785	-	857	776	-
Stage 2	-	-	0	0	-	-	855	762	-	864	785	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1413	-	-	-	-	-	665	610	930	657	625	901
Mov Cap-2 Maneuver	-	-	-	-	-	-	665	610	-	657	625	-
Stage 1	-	-	-	-	-	-	865	781	-	853	776	-
Stage 2	-	-	-	-	-	-	852	762	-	850	781	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	9.8	10.3
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	775	1413	-	-	-	657	901
HCM Lane V/C Ratio	0.028	0.005	-	-	-	0.023	0.004
HCM Control Delay (s)	9.8	7.6	0	-	-	10.6	9
HCM Lane LOS	A	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	0	-	-	-	0.1	0

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	124	145	24	30	7
Future Vol, veh/h	11	124	145	24	30	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	135	158	26	33	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	184	0	-	0	330	171
Stage 1	-	-	-	-	171	-
Stage 2	-	-	-	-	159	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1391	-	-	-	665	873
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	870	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1391	-	-	-	659	873
Mov Cap-2 Maneuver	-	-	-	-	659	-
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	862	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1391	-	-	-	691
HCM Lane V/C Ratio	0.009	-	-	-	0.058
HCM Control Delay (s)	7.6	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	100	300	0	0	200	1386	0	0	286	0
Future Volume (veh/h)	0	0	100	300	0	0	200	1386	0	0	286	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	0	109	326	0	0	217	1507	0	0	311	0
Adj No. of Lanes	2	2	0	2	2	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	5	158	141	424	986	441	268	2085	933	3	1316	589
Arrive On Green	0.00	0.00	0.09	0.12	0.00	0.00	0.15	0.59	0.00	0.00	0.37	0.00
Sat Flow, veh/h	3442	1770	1583	3442	3539	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	0	0	109	326	0	0	217	1507	0	0	311	0
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	4.6	6.2	0.0	0.0	8.0	20.7	0.0	0.0	4.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	4.6	6.2	0.0	0.0	8.0	20.7	0.0	0.0	4.1	0.0
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	5	158	141	424	986	441	268	2085	933	3	1316	589
V/C Ratio(X)	0.00	0.00	0.77	0.77	0.00	0.00	0.81	0.72	0.00	0.00	0.24	0.00
Avail Cap(c_a), veh/h	253	468	419	481	1171	524	501	2085	933	130	1316	589
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	30.3	28.9	0.0	0.0	27.9	10.0	0.0	0.0	14.7	0.0
Incr Delay (d2), s/veh	0.0	0.0	8.6	6.6	0.0	0.0	5.8	2.2	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	2.3	3.3	0.0	0.0	4.3	10.7	0.0	0.0	2.1	0.0
LnGrp Delay(d),s/veh	0.0	0.0	38.9	35.4	0.0	0.0	33.7	12.2	0.0	0.0	15.1	0.0
LnGrp LOS			D	D			C	B			B	
Approach Vol, veh/h		109			326			1724			311	
Approach Delay, s/veh		38.9			35.4			14.9			15.1	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	0.0	44.6	12.9	10.6	14.8	29.8	0.0	23.5
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	39.5	9.5	18.0	19.2	25.3	5.0	22.5
Max Q Clear Time (g_c+I1), s	0.0	22.7	8.2	6.6	10.0	6.1	0.0	0.0
Green Ext Time (p_c), s	0.0	11.6	0.2	0.4	0.4	12.8	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	18.7
HCM 2010 LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	105	217	1369	525	0	686
Future Volume (veh/h)	105	217	1369	525	0	686
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	0	1863
Adj Flow Rate, veh/h	152	314	1488	571	0	771
Adj No. of Lanes	1	1	2	1	0	2
Peak Hour Factor	0.69	0.69	0.92	0.92	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	0	2
Cap, veh/h	426	380	2123	950	0	2123
Arrive On Green	0.24	0.24	0.60	0.60	0.00	0.60
Sat Flow, veh/h	1774	1583	3632	1583	0	3725
Grp Volume(v), veh/h	152	314	1488	571	0	771
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	0	1770
Q Serve(g_s), s	4.0	10.6	16.3	12.7	0.0	6.3
Cycle Q Clear(g_c), s	4.0	10.6	16.3	12.7	0.0	6.3
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	426	380	2123	950	0	2123
V/C Ratio(X)	0.36	0.83	0.70	0.60	0.00	0.36
Avail Cap(c_a), veh/h	614	548	2293	1026	0	2293
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.8	20.3	7.8	7.1	0.0	5.8
Incr Delay (d2), s/veh	0.5	6.8	0.9	0.9	0.0	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	2.0	5.3	8.1	5.6	0.0	3.0
LnGrp Delay(d),s/veh	18.3	27.1	8.7	7.9	0.0	5.9
LnGrp LOS	B	C	A	A		A
Approach Vol, veh/h	466		2059			771
Approach Delay, s/veh	24.2		8.5			5.9
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		38.3				38.3		18.0
Change Period (Y+Rc), s		4.5				4.5		4.5
Max Green Setting (Gmax), s		36.5				36.5		19.5
Max Q Clear Time (g_c+I1), s		18.3				8.3		12.6
Green Ext Time (p_c), s		15.4				22.4		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	10.1
HCM 2010 LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	291	501	1388	313	167	621
Future Volume (veh/h)	291	501	1388	313	167	621
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	338	583	1477	333	180	668
Adj No. of Lanes	2	1	2	0	1	2
Peak Hour Factor	0.86	0.86	0.94	0.94	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	623	479	1624	356	216	2581
Arrive On Green	0.18	0.18	0.56	0.56	0.12	0.73
Sat Flow, veh/h	3442	1583	2980	633	1774	3632
Grp Volume(v), veh/h	338	583	889	921	180	668
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1751	1774	1770
Q Serve(g_s), s	8.9	18.1	44.2	48.5	9.9	6.3
Cycle Q Clear(g_c), s	8.9	18.1	44.2	48.5	9.9	6.3
Prop In Lane	1.00	1.00		0.36	1.00	
Lane Grp Cap(c), veh/h	623	479	996	985	216	2581
V/C Ratio(X)	0.54	1.22	0.89	0.93	0.83	0.26
Avail Cap(c_a), veh/h	623	479	1005	994	383	2933
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	37.2	34.9	19.2	20.2	43.0	4.5
Incr Delay (d2), s/veh	1.0	115.7	10.2	15.2	8.2	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	4.3	28.5	24.3	27.4	5.3	3.1
LnGrp Delay(d),s/veh	38.2	150.5	29.5	35.4	51.2	4.6
LnGrp LOS	D	F	C	D	D	A
Approach Vol, veh/h	921		1810			848
Approach Delay, s/veh	109.3		32.5			14.5
Approach LOS	F		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	16.7	60.8				77.4		22.6
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	21.6	56.8				82.9		18.1
Max Q Clear Time (g_c+I1), s	11.9	50.5				8.3		20.1
Green Ext Time (p_c), s	0.3	5.8				41.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	48.0
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	188	5	96	72	5	15	108	1392	30	29	782	50
Future Volume (veh/h)	188	5	96	72	5	15	108	1392	30	29	782	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	204	5	104	96	5	20	117	1420	31	33	889	54
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.75	0.92	0.75	0.92	0.98	0.98	0.88	0.88	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	333	10	124	351	26	54	150	1781	39	50	1507	92
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.08	0.50	0.50	0.03	0.44	0.44
Sat Flow, veh/h	992	43	515	1033	106	226	1774	3541	77	1774	3390	206
Grp Volume(v), veh/h	313	0	0	121	0	0	117	709	742	33	464	479
Grp Sat Flow(s),veh/h/ln	1549	0	0	1364	0	0	1774	1770	1849	1774	1770	1826
Q Serve(g_s), s	7.3	0.0	0.0	0.0	0.0	0.0	4.0	20.7	20.8	1.2	12.3	12.3
Cycle Q Clear(g_c), s	11.8	0.0	0.0	4.5	0.0	0.0	4.0	20.7	20.8	1.2	12.3	12.3
Prop In Lane	0.65		0.33	0.79		0.17	1.00		0.04	1.00		0.11
Lane Grp Cap(c), veh/h	467	0	0	431	0	0	150	890	930	50	787	812
V/C Ratio(X)	0.67	0.00	0.00	0.28	0.00	0.00	0.78	0.80	0.80	0.67	0.59	0.59
Avail Cap(c_a), veh/h	664	0	0	613	0	0	227	907	947	148	825	851
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.2	0.0	0.0	19.7	0.0	0.0	28.0	12.9	12.9	30.1	13.1	13.1
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.1	0.0	0.0	9.3	5.3	5.1	5.6	1.3	1.2
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	5.1	0.0	0.0	1.7	0.0	0.0	2.4	11.3	11.8	0.6	6.2	6.4
LnGrp Delay(d),s/veh	22.8	0.0	0.0	19.8	0.0	0.0	37.3	18.1	18.0	35.7	14.3	14.3
LnGrp LOS	C			B			D	B	B	D	B	B
Approach Vol, veh/h		313			121			1568			976	
Approach Delay, s/veh		22.8			19.8			19.5			15.0	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.1	36.8		19.5	9.8	33.2		19.5
Change Period (Y+Rc), s	4.4	5.4		4.5	4.5	5.4		4.5
Max Green Setting (Gmax), s	5.2	32.0		23.5	8.0	29.1		23.5
Max Q Clear Time (g_c+I1), s	3.2	22.8		13.8	6.0	14.3		6.5
Green Ext Time (p_c), s	0.0	8.6		1.3	0.0	13.4		1.7

Intersection Summary		
HCM 2010 Ctrl Delay		18.4
HCM 2010 LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	70	66	72	449	308	260	1269	67	135	584	102
Future Volume (veh/h)	89	70	66	72	449	308	260	1269	67	135	584	102
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	110	86	69	76	473	261	286	1395	52	157	679	96
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	2	0
Peak Hour Factor	0.81	0.81	0.81	0.95	0.95	0.95	0.91	0.91	0.91	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	135	528	387	97	549	301	315	1534	57	200	1002	141
Arrive On Green	0.08	0.27	0.27	0.05	0.25	0.25	0.18	0.44	0.44	0.06	0.32	0.32
Sat Flow, veh/h	1774	1951	1429	1774	2207	1211	1774	3480	130	3442	3115	440
Grp Volume(v), veh/h	110	77	78	76	379	355	286	708	739	157	385	390
Grp Sat Flow(s),veh/h/ln	1774	1770	1611	1774	1770	1649	1774	1770	1840	1721	1770	1785
Q Serve(g_s), s	6.9	3.8	4.2	4.8	23.2	23.5	18.0	42.4	42.6	5.1	21.5	21.5
Cycle Q Clear(g_c), s	6.9	3.8	4.2	4.8	23.2	23.5	18.0	42.4	42.6	5.1	21.5	21.5
Prop In Lane	1.00		0.89	1.00		0.73	1.00		0.07	1.00		0.25
Lane Grp Cap(c), veh/h	135	479	436	97	440	410	315	780	811	200	569	574
V/C Ratio(X)	0.81	0.16	0.18	0.79	0.86	0.87	0.91	0.91	0.91	0.79	0.68	0.68
Avail Cap(c_a), veh/h	150	521	475	128	493	460	384	811	843	200	569	574
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	51.7	31.6	31.8	53.1	40.8	40.9	45.9	29.6	29.7	52.8	33.4	33.5
Incr Delay (d2), s/veh	23.2	0.2	0.2	14.9	13.0	14.5	20.3	13.6	13.5	17.0	3.3	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	1.9	1.9	2.8	13.0	12.3	10.6	23.6	24.6	2.9	11.0	11.1
LnGrp Delay(d),s/veh	74.9	31.8	32.0	68.0	53.8	55.4	66.1	43.2	43.2	69.9	36.7	36.7
LnGrp LOS	E	C	C	E	D	E	E	D	D	E	D	D
Approach Vol, veh/h		265			810			1733			932	
Approach Delay, s/veh		49.7			55.8			47.0			42.3	
Approach LOS		D			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.6	36.1	24.6	42.5	13.1	33.6	11.0	56.0
Change Period (Y+Rc), s	4.4	* 5.3	4.4	* 5.9	4.4	5.3	4.4	5.9
Max Green Setting (Gmax), s	8.2	* 34	24.6	* 35	9.6	31.7	6.6	52.1
Max Q Clear Time (g_c+I1), s	6.8	6.2	20.0	23.5	8.9	25.5	7.1	44.6
Green Ext Time (p_c), s	0.0	6.1	0.2	9.0	0.0	2.8	0.0	5.5

Intersection Summary	
HCM 2010 Ctrl Delay	47.9
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	100	433	0	0	200	1199	0	0	500	0
Future Volume (veh/h)	0	0	100	433	0	0	200	1199	0	0	500	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	0	109	471	0	0	217	1303	0	0	543	0
Adj No. of Lanes	2	2	0	2	2	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	5	157	141	567	1116	499	261	1988	889	2	1249	559
Arrive On Green	0.00	0.00	0.09	0.16	0.00	0.00	0.15	0.56	0.00	0.00	0.35	0.00
Sat Flow, veh/h	3442	1770	1583	3442	3539	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	0	0	109	471	0	0	217	1303	0	0	543	0
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	4.9	9.7	0.0	0.0	8.7	18.7	0.0	0.0	8.6	0.0
Cycle Q Clear(g_c), s	0.0	0.0	4.9	9.7	0.0	0.0	8.7	18.7	0.0	0.0	8.6	0.0
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	5	157	141	567	1116	499	261	1988	889	2	1249	559
V/C Ratio(X)	0.00	0.00	0.77	0.83	0.00	0.00	0.83	0.66	0.00	0.00	0.43	0.00
Avail Cap(c_a), veh/h	235	436	390	635	1283	574	357	1988	889	121	1249	559
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	32.6	29.5	0.0	0.0	30.3	11.1	0.0	0.0	18.1	0.0
Incr Delay (d2), s/veh	0.0	0.0	8.7	8.3	0.0	0.0	11.3	1.7	0.0	0.0	1.1	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	0.0	0.0	2.5	5.2	0.0	0.0	5.0	9.5	0.0	0.0	4.3	0.0
LnGrp Delay(d),s/veh	0.0	0.0	41.3	37.9	0.0	0.0	41.6	12.8	0.0	0.0	19.2	0.0
LnGrp LOS			D	D			D	B			B	
Approach Vol, veh/h		109			471			1520			543	
Approach Delay, s/veh		41.3			37.9			16.9			19.2	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	0.0	45.6	16.6	11.0	15.3	30.3	0.0	27.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	35.5	13.5	18.0	14.7	25.8	5.0	26.5
Max Q Clear Time (g_c+I1), s	0.0	20.7	11.7	6.9	10.7	10.6	0.0	0.0
Green Ext Time (p_c), s	0.0	10.4	0.4	0.4	0.2	10.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	22.1
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	120	243	1156	373	0	1033
Future Volume (veh/h)	120	243	1156	373	0	1033
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	0	1863
Adj Flow Rate, veh/h	138	279	1192	385	0	1099
Adj No. of Lanes	1	1	2	1	0	2
Peak Hour Factor	0.87	0.87	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	0	2
Cap, veh/h	398	355	2124	950	0	2124
Arrive On Green	0.22	0.22	0.60	0.60	0.00	0.60
Sat Flow, veh/h	1774	1583	3632	1583	0	3725
Grp Volume(v), veh/h	138	279	1192	385	0	1099
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	0	1770
Q Serve(g_s), s	3.4	8.5	10.4	6.6	0.0	9.2
Cycle Q Clear(g_c), s	3.4	8.5	10.4	6.6	0.0	9.2
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	398	355	2124	950	0	2124
V/C Ratio(X)	0.35	0.79	0.56	0.41	0.00	0.52
Avail Cap(c_a), veh/h	709	633	2449	1096	0	2449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.7	18.7	6.2	5.4	0.0	5.9
Incr Delay (d2), s/veh	0.5	3.9	0.2	0.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	4.1	5.0	2.9	0.0	4.5
LnGrp Delay(d),s/veh	17.3	22.6	6.4	5.7	0.0	6.1
LnGrp LOS	B	C	A	A		A
Approach Vol, veh/h	417		1577			1099
Approach Delay, s/veh	20.8		6.2			6.1
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		35.3				35.3		16.0
Change Period (Y+Rc), s		4.5				4.5		4.5
Max Green Setting (Gmax), s		35.5				35.5		20.5
Max Q Clear Time (g_c+I1), s		12.4				11.2		10.5
Green Ext Time (p_c), s		18.4				19.1		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	580	598	924	261	276	894
Future Volume (veh/h)	580	598	924	261	276	894
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	617	636	1004	284	310	1004
Adj No. of Lanes	2	1	2	0	1	2
Peak Hour Factor	0.94	0.94	0.92	0.92	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	790	675	1098	309	349	2323
Arrive On Green	0.23	0.23	0.40	0.40	0.20	0.66
Sat Flow, veh/h	3442	1583	2822	768	1774	3632
Grp Volume(v), veh/h	617	636	649	639	310	1004
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1727	1774	1770
Q Serve(g_s), s	13.3	18.1	27.3	27.6	13.4	10.7
Cycle Q Clear(g_c), s	13.3	18.1	27.3	27.6	13.4	10.7
Prop In Lane	1.00	1.00		0.44	1.00	
Lane Grp Cap(c), veh/h	790	675	712	695	349	2323
V/C Ratio(X)	0.78	0.94	0.91	0.92	0.89	0.43
Avail Cap(c_a), veh/h	790	675	716	699	371	2375
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	28.5	21.7	22.2	22.3	30.8	6.5
Incr Delay (d2), s/veh	5.1	21.6	15.9	17.2	21.3	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	6.8	17.2	16.3	16.5	8.6	5.2
LnGrp Delay(d),s/veh	33.6	43.3	38.2	39.6	52.2	6.6
LnGrp LOS	C	D	D	D	D	A
Approach Vol, veh/h	1253		1288			1314
Approach Delay, s/veh	38.5		38.9			17.4
Approach LOS	D		D			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	20.0	36.2				56.2		22.6
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	16.5	31.9				52.9		18.1
Max Q Clear Time (g_c+I1), s	15.4	29.6				12.7		20.1
Green Ext Time (p_c), s	0.1	2.1				24.6		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	31.4
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	0	69	34	0	21	85	993	21	117	1194	84
Future Volume (veh/h)	85	0	69	34	0	21	85	993	21	117	1194	84
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1900	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	92	0	75	42	0	26	92	1141	24	130	1327	91
Adj No. of Lanes	0	1	0	0	1	0	0	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.81	0.92	0.81	0.92	0.87	0.87	0.90	0.90	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	180	10	94	185	18	78	144	1610	34	160	2470	169
Arrive On Green	0.13	0.00	0.13	0.13	0.00	0.13	0.59	0.59	0.59	0.09	0.73	0.73
Sat Flow, veh/h	786	71	699	803	131	578	150	2748	57	1774	3362	230
Grp Volume(v), veh/h	167	0	0	68	0	0	552	0	705	130	697	721
Grp Sat Flow(s),veh/h/ln	1557	0	0	1512	0	0	1271	0	1685	1774	1770	1822
Q Serve(g_s), s	4.8	0.0	0.0	0.0	0.0	0.0	10.0	0.0	22.5	5.4	13.0	13.1
Cycle Q Clear(g_c), s	7.7	0.0	0.0	2.9	0.0	0.0	18.7	0.0	22.5	5.4	13.0	13.1
Prop In Lane	0.55		0.45	0.62		0.38	0.17		0.03	1.00		0.13
Lane Grp Cap(c), veh/h	283	0	0	280	0	0	800	0	987	160	1300	1339
V/C Ratio(X)	0.59	0.00	0.00	0.24	0.00	0.00	0.69	0.00	0.71	0.81	0.54	0.54
Avail Cap(c_a), veh/h	541	0	0	529	0	0	820	0	1017	160	1331	1371
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.4	0.0	0.0	29.5	0.0	0.0	9.6	0.0	11.1	33.7	4.4	4.4
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.2	0.0	0.0	2.7	0.0	2.6	24.7	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	0.0	0.0	1.3	0.0	0.0	8.1	0.0	11.1	3.7	6.4	6.6
LnGrp Delay(d),s/veh	32.1	0.0	0.0	29.6	0.0	0.0	12.3	0.0	13.7	58.3	4.9	4.9
LnGrp LOS	C			C			B		B	E	A	A
Approach Vol, veh/h		167			68			1257			1548	
Approach Delay, s/veh		32.1			29.6			13.1			9.4	
Approach LOS		C			C			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	11.2	49.6		14.6		60.8		14.6
Change Period (Y+Rc), s	4.4	5.4		4.5		5.4		4.5
Max Green Setting (Gmax), s	6.8	45.5		23.4		56.7		23.4
Max Q Clear Time (g_c+I1), s	7.4	24.5		9.7		15.1		4.9
Green Ext Time (p_c), s	0.0	19.7		0.7		37.0		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	12.6
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	167	275	240	85	154	244	113	664	74	221	915	51
Future Volume (veh/h)	167	275	240	85	154	244	113	664	74	221	915	51
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	172	284	185	98	177	211	123	722	58	233	963	31
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	2	0
Peak Hour Factor	0.97	0.97	0.97	0.87	0.87	0.87	0.92	0.92	0.92	0.95	0.95	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	207	523	331	125	363	325	154	1216	98	311	1295	42
Arrive On Green	0.12	0.25	0.25	0.07	0.21	0.21	0.09	0.37	0.37	0.09	0.37	0.37
Sat Flow, veh/h	1774	2082	1318	1774	1770	1583	1774	3319	266	3442	3500	113
Grp Volume(v), veh/h	172	240	229	98	177	211	123	385	395	233	487	507
Grp Sat Flow(s),veh/h/ln	1774	1770	1630	1774	1770	1583	1774	1770	1816	1721	1770	1843
Q Serve(g_s), s	8.6	10.6	11.0	4.9	8.0	11.0	6.1	15.9	15.9	6.0	21.6	21.6
Cycle Q Clear(g_c), s	8.6	10.6	11.0	4.9	8.0	11.0	6.1	15.9	15.9	6.0	21.6	21.6
Prop In Lane	1.00		0.81	1.00		1.00	1.00		0.15	1.00		0.06
Lane Grp Cap(c), veh/h	207	445	410	125	363	325	154	648	665	311	655	682
V/C Ratio(X)	0.83	0.54	0.56	0.78	0.49	0.65	0.80	0.59	0.59	0.75	0.74	0.74
Avail Cap(c_a), veh/h	326	674	621	261	602	538	267	762	782	526	786	818
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	39.0	29.3	29.4	41.3	31.7	32.9	40.5	23.2	23.2	40.1	24.7	24.7
Incr Delay (d2), s/veh	5.2	1.2	1.4	4.0	0.9	2.0	3.6	0.8	0.8	1.4	3.2	3.1
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	4.5	5.4	5.1	2.5	4.0	5.0	3.2	7.8	8.0	2.9	11.1	11.6
LnGrp Delay(d),s/veh	44.2	30.5	30.9	45.3	32.6	34.9	44.1	23.9	23.9	41.5	27.9	27.8
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		641			486			903			1227	
Approach Delay, s/veh		34.3			36.2			26.7			30.4	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	28.0	12.2	39.3	14.9	23.8	12.6	39.0
Change Period (Y+Rc), s	4.4	* 5.3	4.4	* 5.9	4.4	5.3	4.4	5.9
Max Green Setting (Gmax), s	13.3	* 34	13.6	* 40	16.6	30.7	13.8	38.9
Max Q Clear Time (g_c+I1), s	6.9	13.0	8.1	23.6	10.6	13.0	8.0	17.9
Green Ext Time (p_c), s	0.1	5.9	0.1	9.8	0.1	5.5	0.2	11.4

Intersection Summary	
HCM 2010 Ctrl Delay	31.0
HCM 2010 LOS	C

Notes

Arterial Level of Service: NB Euclid Avenue

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Market Street	III	35	16.7	44.5	61.2	0.12	7.3	F
Hilltop Drive	III	35	37.4	21.0	58.4	0.31	19.2	C
SR-94 EB Ramps	III	35	17.1	42.6	59.7	0.13	8.1	F
SR-94 WB Ramps	III	35	18.2	11.7	29.9	0.14	17.1	D
Federal Blvd	III	35	19.0	11.0	30.0	0.15	17.8	D
Total	III		108.4	130.8	239.2	0.86	12.9	E

Arterial Level of Service: SB Euclid Avenue

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Federal Blvd	III	35	12.9	17.7	30.6	0.10	11.2	E
SR-94 WB Ramps	III	35	19.0	7.5	26.5	0.15	20.2	C
SR-94 EB Ramps	III	35	18.2	3.8	22.0	0.14	23.3	C
Hilltop Drive	III	35	17.1	19.7	36.8	0.13	13.1	E
Market Street	III	35	37.4	38.8	76.2	0.31	14.7	D
Total	III		104.6	87.5	192.1	0.83	15.6	D

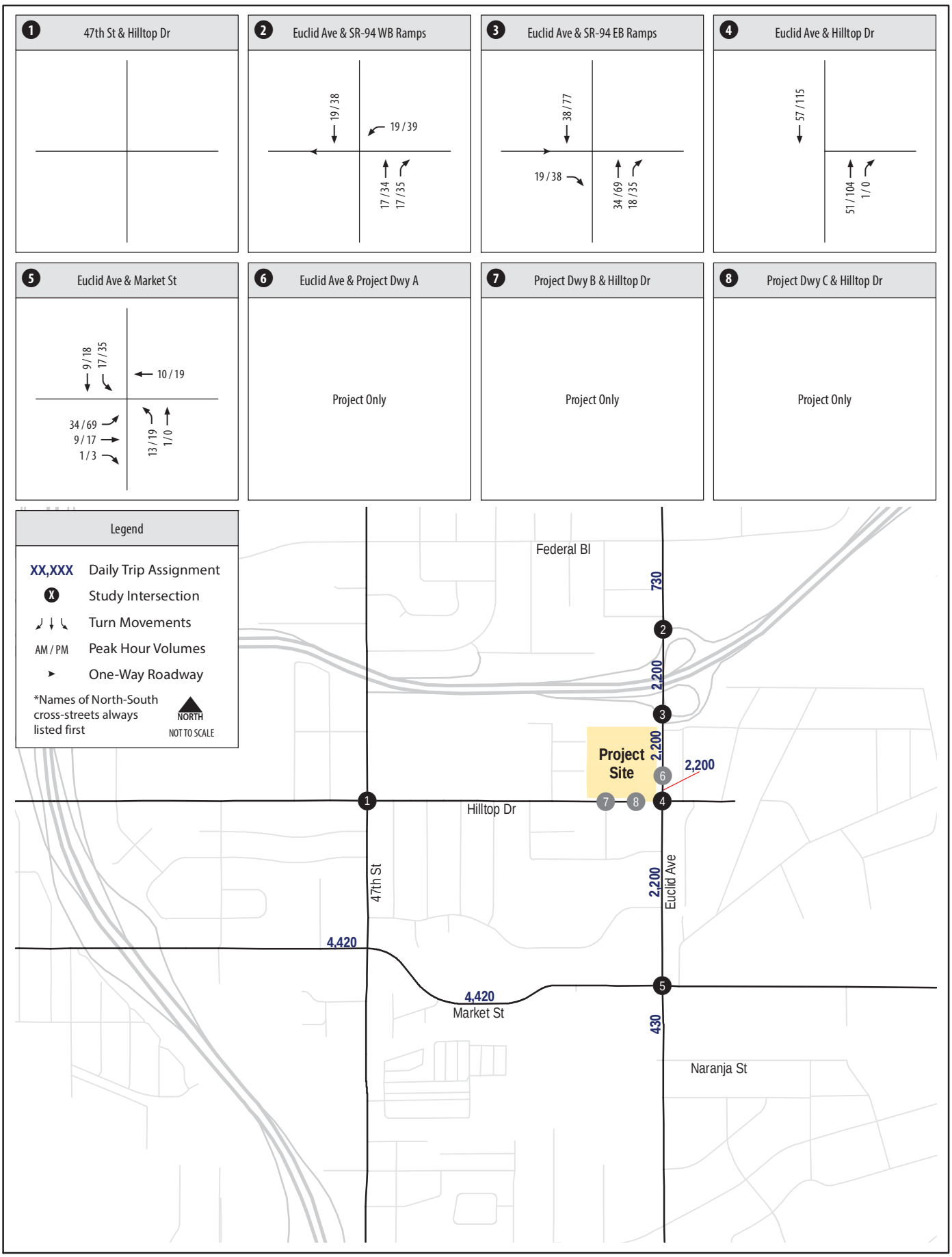
Arterial Level of Service: NB Euclid Avenue

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Market Street	III	35	16.7	29.4	46.1	0.12	9.7	F
Hilltop Drive	III	35	37.3	22.8	60.1	0.31	18.6	C
SR-94 EB Ramps	III	35	17.2	33.2	50.4	0.13	9.6	F
SR-94 WB Ramps	III	35	18.2	9.3	27.5	0.14	18.6	C
Federal Blvd	III	35	18.3	11.8	30.1	0.14	17.1	D
Total	III		107.7	106.5	214.2	0.85	14.4	D

Arterial Level of Service: SB Euclid Avenue

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Federal Blvd	III	35	9.9	20.7	30.6	0.07	8.0	F
SR-94 WB Ramps	III	35	18.3	8.8	27.1	0.14	19.0	C
SR-94 EB Ramps	III	35	18.2	6.9	25.1	0.14	20.4	C
Hilltop Drive	III	35	17.2	6.5	23.7	0.13	20.5	C
Market Street	III	35	37.3	34.2	71.5	0.31	15.6	D
Total	III		100.9	77.1	178.0	0.80	16.1	D

Appendix E Cumulative Projects Information



The TOP
Transportation Impact Study

CHEN RYAN

Cumulative Projects Trip Assignment

Northwest Villages Project

be developed on the project site.

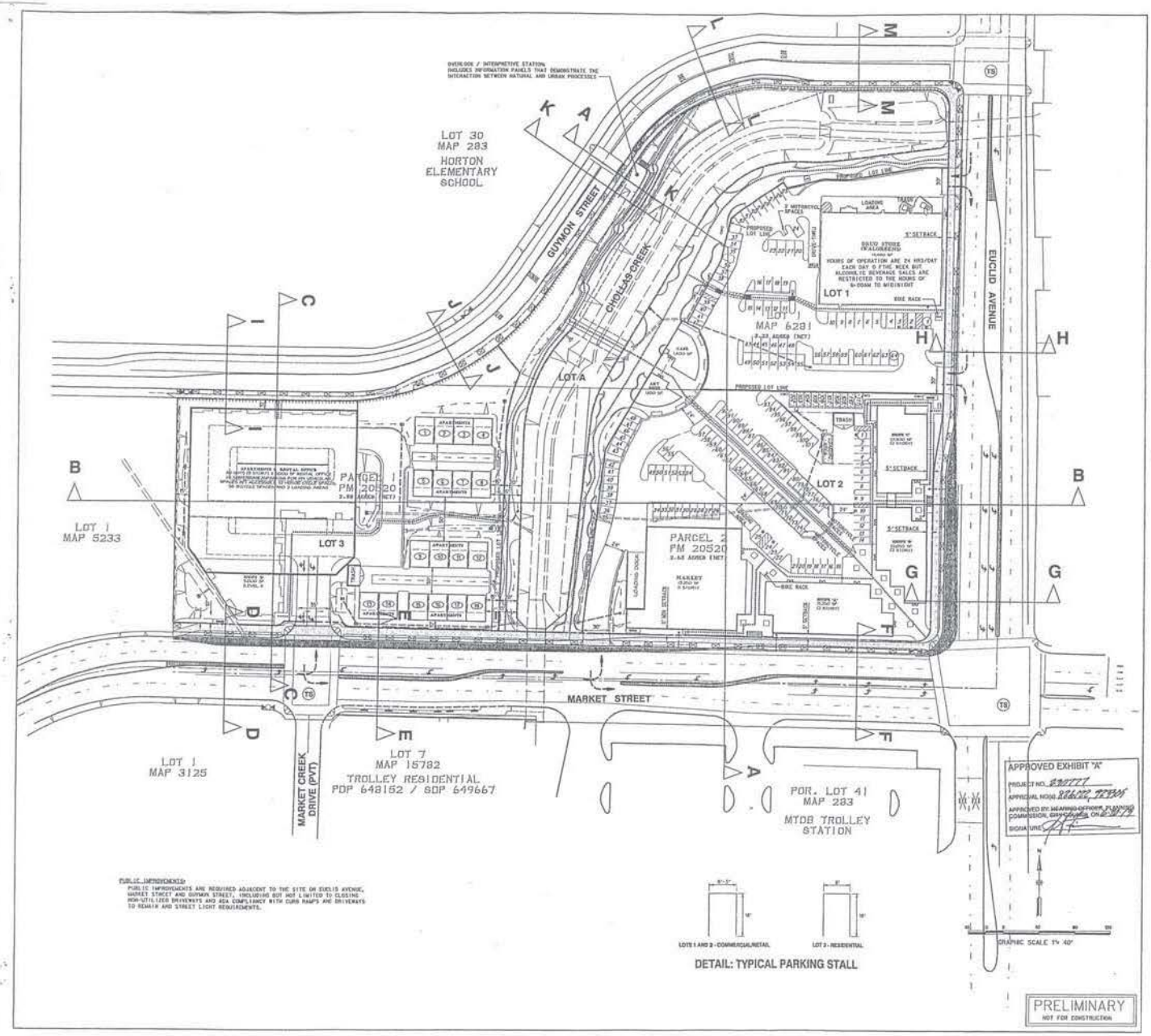
Trip Generation Estimates

The trip generation estimates for the proposed uses were derived using data contained in the City's Trip Generation Manual (May 2003). The various land use categories were reviewed to determine the most appropriate rates for each project component. The applicable trip generation rates and total project trip generation estimates are displayed in Table 3. It should be noted that the estimates presented in Table 3 reflect the total project trip generation associated with the proposed uses (including by-pass trips, diverted-link trips, transit trips, etc).

Table 3 - Driveway Trip Generation Rates and Total Project Trip Generation Estimates

Proposed Use (Size)	Trip Rate	ADT	AM Peak Hour			PM Peak Hour		
			%	Volume		%	Volume	
				In	Out		In	Out
NW Village Residential Site:								
Townhouses (18 Units)	6	108	0.08	2	7	0.09	7	3
Apartments (82 Units)	6	492	0.08	8	31	0.09	31	13
Commercial Office (5,000 SF),(a)	35	175	0.13	21	2	0.14	5	20
Specialty Retail Ct. (5,000 SF)	40	200	0.03	4	2	0.09	9	9
NW Village Commercial Site:								
Drug Store/Pharmacy (14,480 SF)	90	1,303	0.04	31	21	0.10	65	65
Supermarket (13,250 SF)	150	1,988	0.04	56	24	0.10	99	99
Neigh. Retail Ct. (21,250 SF)	120	2,550	0.04	61	73	0.11	140	140
Specialty Retail Ct. (16,420 SF)	40	657	0.03	12	8	0.09	30	30
High Turn Over Rest. (4,825 SF)	130	627	0.08	25	25	0.08	30	20
Quality Restaurants (4,825 SF)	100	483	0.01	3	2	0.08	27	12
Total Project Trip Generation:		8,583	-	223	195	-	443	411

(a) Trip rate for commercial office based on natural logarithmic formula.



PUBLIC IMPROVEMENTS:
PUBLIC IMPROVEMENTS ARE REQUIRED ADJACENT TO THE SITE ON EUCLID AVENUE, MARKET STREET AND GUYMON STREET, INCLUDING BUT NOT LIMITED TO CLOSING NON-UTILIZED DRIVEWAYS AND ADA COMPLIANCE WITH CURB RAMPS AND DRIVEWAYS TO REMAIN AND STREET LIGHT REQUIREMENTS.

DETAIL: TYPICAL PARKING STALL

RICK ENGINEERING COMPANY
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
(FAX)619.291.4165

LEGEND

- PROPERTY LINE
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- ABUTTER'S RIGHTS RELINQUISHED
- EASEMENT LINE
- ACCESSIBLE ROUTE
- EXISTING FIRE HYDRANT
- SITE SECTIONS PER SHEET S2.1 AND S2.2
- EXISTING TRAFFIC SIGNAL
- APARTMENT UNIT (W/2 CAR GARAGE)
- PARKING SPACE COUNT

PARKING DEVIATION REQUEST

DEVIATION FROM SDMC TO ALLOW THE TRANSIT OVERLAY ZONE PARKING RATES

PARKING SUMMARY

LOT 1

REQUIRED PARKING
WALGREENS (RETAIL + PHARMACY) 14,480 SF X (2.1/1000SF)= 31 SPACES(C)

AUTOMOBILE= 31 SPACES W/2 ACCESSIBLE (SDMC TABLE 142-05D)
MOTORCYCLE= 2 SPACES (SDMC 142-0530(D))
BICYCLE= 2 SPACES (SDMC TABLE 142-05D & 142-0530(C))
LOADING AREA= 1 SPACE (SDMC TABLE 142-10B & 142-1010(A))

PROVIDED PARKING
AUTOMOBILE= 64 SPACES W/4 ACCESSIBLE
MOTORCYCLE= 2 SPACES
BICYCLE= 2 SPACES
LOADING AREA= 1 SPACE

LOT 2

REQUIRED PARKING
RETAIL 49,950 SF X (2.1/1000SF) = 105 SPACES(C)
EATING / DRINKING EST 1,400 SF X (4.3/1000SF) = 6 SPACES(C)

AUTOMOBILE= 111 SPACES W/3 ACCESSIBLE (SDMC TABLE 142-05D)
MOTORCYCLE= 2 SPACES (SDMC 142-0530(D))
BICYCLE= 5 SPACES (SDMC TABLE 142-05D & 142-0530(C))
LOADING AREA= 3 SPACES (SDMC TABLE 142-10B & 142-1010(A))

PROVIDED PARKING
AUTOMOBILE= 111 SPACES W/5 ACCESSIBLE (SEE NOTE 2 BELOW)
MOTORCYCLE= 2 SPACES
BICYCLE= 6 SPACES
LOADING AREA= 3 SPACES

LOT 3

REQUIRED PARKING
APARTMENTS
1 BEDROOM = 3 UNITS @ 1.25/UNIT =10 VEH SPACES(B) (3 BIKE @ 0.4/UNIT)
2 BEDROOM = 37 UNITS @ 1.75/UNIT =65 VEH SPACES(B) (33 BIKE @ 0.5/UNIT)
3+4 BEDROOM = 37 UNITS @ 2.00/UNIT =74 VEH SPACES(B) (22 BIKE @ 0.6/UNIT)
3 BEDROOM W/GARAGE (18 UNITS @ 2.00/UNIT) =36 SPACES(B)
RETAIL 5,000 SF X (2.1/1000SF) = 11 SPACES(C)
COMMON AREA PARKING .195 TOTAL SPACES X 0.20 = 39 SPACES(CA)

AUTOMOBILE= 235 SPACES W/7 ACCESSIBLE (SPACES = 185(B), 11(C) & 39(CA))
MOTORCYCLE= 10 SPACES (100 UNITS @ 0.1/UNIT) (SDMC TABLE 142-05D)
BICYCLE= 58 SPACES (SDMC TABLE 142-05C)
LOADING AREA= 2 SPACES (SDMC TABLE 142-10B & 142-1010(A))

PROVIDED PARKING
AUTOMOBILE= 235 SPACES W/7 ACCESSIBLE (SPACES = 185(B), 11(C) & 39(CA))
MOTORCYCLE= 10 SPACES
BICYCLE= 58 SPACES
LOADING AREA= 2 SPACES

PROJECT TOTALS

REQUIRED AUTOMOBILE SPACES:	PROVIDED AUTOMOBILE SPACES:
11 COMMERCIAL (C)	11 COMMERCIAL (C)
185 RESIDENTIAL (B)	185 RESIDENTIAL (B)
39 COMMON AREA (CA)	39 COMMON AREA (CA)
=235 TOTAL SPACES	=235 TOTAL SPACES

NOTES:
1) PARKING RATES ARE BASED ON SDMC SECTION 142.05 FOR TRANSIT AREA
2) LOTS 1 AND 2 SHALL MAINTAIN A "SHARED ACCESS AGREEMENT"
3) LOTS 1 AND 2 SHALL MAINTAIN A "SHARED PARKING AGREEMENT"
4) ABBREVIATIONS= (B) RESIDENTIAL, (C) COMMERCIAL AND (CA) COMMON AREA

BUILDING FLOOR AREA

LOT 1
LOT AREA = 62,431 SF (1.43 AC)
BUILDING SQUARE FOOTAGE = 14,480 SF
F.A.R. = 0.23 < 2.0 (MAX. PER ZONE CC-3-5)

LOT 2
LOT AREA = 106,327 SF (2.45 AC)
BUILDING SQUARE FOOTAGE = 51,350 SF
F.A.R. = 0.47 < 2.0 (MAX. PER ZONE CC-3-5)

LOT 3
LOT AREA = 89,317 SF (2.28 AC)
BUILDING SQUARE FOOTAGE = 268,156 SF (MAX.)
F.A.R. = 2.7 (MAX. PER ZONE RM-3-9)

BARRY J. COWAN — RCE 46568 — DATE

PROJECT
NORTHWEST VILLAGE CREEK

DRAWING TITLE
SITE PLAN / ACCESSIBILITY PLAN

NO.	DATE	ISSUE
1	OCTOBER 8, 2011	2ND SUBMITTAL
2	FEBRUARY 15, 2012	3RD SUBMITTAL
3	MAY 4, 2012	4TH SUBMITTAL
4	JUNE 27, 2012	5TH SUBMITTAL

PROJECT NO.
FIRST SUBMITTAL DATE: JANUARY 27, 2011
DRAWING NO.
S1.0
SHEET 3 OF 34

RICK ENGINEERING COMPANY
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
(FAX)619.291.4165

LEGEND

———————	PROPERTY LINE
— — — —	EXISTING RIGHT-OF-WAY
— — — —	PROPOSED RIGHT-OF-WAY
⊤⊤⊤⊤⊤⊤⊤⊤⊤	ABUTTER'S RIGHTS RELINQUISHED
— — — — —	EASEMENT LINE
.....	ACCESSIBLE ROUTE
⋈	EXISTING FIRE HYDRANT
B △ ———	SITE SECTIONS PER SHEET S2.1 AND S2.2
(TS)	EXISTING TRAFFIC SIGNAL
(4)	APARTMENT UNIT (W/2 CAR GARAGE)
63 (64)	PARKING SPACE COUNT

PARKING DEVIATION REQUEST

DEVIATION FROM SDMC TO ALLOW THE TRANSIT OVERLAY ZONE PARKING RATES

PARKING SUMMARY

LOT 1

REQUIRED PARKING
WALGREENS (RETAIL - PHARMACY) 14,480 SF X (2.1/1000SF) = 31 SPACES(C)

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BICYCLE: 2 SPACES (SDMC TABLE 142-05D & 142-0530(E))
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PROVIDED PARKING
AUTOMOBILE: 64 SPACES W/4 ACCESSIBLE
MOTORCYCLE: 2 SPACES
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LOT 2

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MOTORCYCLE: 2 SPACES
BICYCLE: 6 SPACES
LOADING AREAS: 3 SPACES

LOT 3

REQUIRED PARKING
APARTMENTS
1 BEDROOM - 8 UNITS @ 1.25/UNIT =10 VEH SPACES(R) (3 BIKE @ 0.4/UNIT)
2 BEDROOM - 37 UNITS @ 1.75/UNIT =65 VEH SPACES(R) (33 BIKE @ 0.5/UNIT)
3-4 BEDROOM - 37 UNITS @ 2.00/UNIT =74 VEH SPACES(R) (22 BIKE @ 0.6/UNIT)
3 BEDROOM W/GARAGE (18 UNITS @ 2.00/UNIT) =36 SPACES(R)
RETAIL 5,000 SF X (2.1/1000SF) = 11 SPACES(C)
COMMON AREA PARKING 196 TOTAL SPACES X 0.20 = 39 SPACES(CA)

AUTOMOBILE: 235 SPACES W/7 ACCESSIBLE (SDMC TABLE 142-05C)
MOTORCYCLE: 10 SPACES (100 UNITS @ 0.1/UNIT) (SDMC TABLE 142-05C)
BICYCLE: 58 SPACES (SDMC TABLE 142-05C)
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PROVIDED PARKING
AUTOMOBILE: 235 SPACES W/7 ACCESSIBLE (SPACES = 185(R), 11(C) & 39(CA))
MOTORCYCLE: 10 SPACES
BICYCLE: 58 SPACES
LOADING AREAS: 2 SPACES

PROJECT TOTALS

Creekside Pointe Project

THE CITY OF SAN DIEGO

Report to the Planning Commission

DATE ISSUED: June 16, 2016 REPORT NO. PC-16-046

HEARING DATE: June 23, 2016

SUBJECT: CREEKSIDE POINTE, Process Four Decision.

PROJECT NUMBER: 424931

OWNER/APPLICANT: JACK MC GRORY/LJMJM Naranja LLC.

SUMMARY:

Issue: Should the Planning Commission approve the development of 24 townhomes, located at 5282 Naranja Street, in the RM-2-5 Zone within the Encanto Community Plan area?

Staff Recommendations:

1. **Certify** the Addendum to the Southeastern San Diego Community Plan 2015 Environmental Impact Report No. 386029 that was prepared for this project, and Adopt the Mitigation Monitoring and Reporting Program;

2. **Approve** Tentative Map No. 149351;

3. **Approve** Site Development Permit No. 1494353; and

4. **Approve** Planned Development Permit No. 1494352.

Community Planning Group Recommendation: On July 20, 2015, the Encanto Neighborhood Community Planning Group voted (9-0-1) to recommend approval of the project as proposed (Attachment 10).

Environmental Review: An Addendum to the Southeastern San Diego Community Plan 2015 Environmental Impact Report No. 424931 has been prepared for the project in accordance with State of California Environmental Quality Act (CEQA) Guidelines.

Fiscal Impact Statement: None with this action. All cost associated with the processing of this project are paid by the applicant through a deposit account.

Housing Impact Statement: The 1.55-acre site is designated by the Encanto Community Plan for residential development at 15-29 dwelling units per acre (du/ac). Based on the gross acreage, the subject site could accommodate between 23-45 dwelling units. However, the site is constrained by sloping topography and the Chollas Creek tributary along the north side of the site, therefore only 24 units are proposed in order to respect the natural terrain and sensitive habitat associated with the creek system. The applicant is restricting ten percent of the for-sale units to households earning 100% or less of Area Median Income (Attachment 8). Accordingly, the project provides two affordable for sale housing units on site, in compliance with the Inclusionary Housing Ordinance.

BACKGROUND

The 1.55-acre site is located at 5282 Naranja Street in the RM-2-5 Zone within the Encanto Community Plan area in the neighborhood of Valencia Park (Attachment 2). The project site is bounded on the east and west by developed residential property, on the south by Naranja Street, and on the north by a San Diego Metropolitan Transit System (MTS) railway easement, which contains an active trolley line, and the Encanto Branch of the South Las Chollas Creek Floodway. The project site is not within the Multiple Habitat Planning Area and has been previously disturbed. The Encanto Community Plan designates the site for medium density multi-family residential development at a rate of 15-29 du/ac. Therefore, the site could potentially accommodate 23 - 45 dwelling units, and the proposed 24 dwelling units are within the allowed density range (Attachment 1).

The undeveloped site contains gently sloping terrain that descends toward Chollas Creek to the north (Attachment 3) and is constrained to the north by a railway easement and the Encanto Branch of the South Las Chollas Creek Floodway. The high point of the site is approximately 140 feet Above Mean Sea Level (AMSL) with a low point of approximately 120 feet AMSL or 20 vertical feet across the site. Approximately 0.22-acre of the northern portion of the site is located within the Federal Emergency Management Agency (FEMA) 100-year floodway.

The project site is well served by public transportation choices. A major multi modal transit hub is within a five minute walk of the project. The nearest bus stop (Imperial Avenue and 54th Street) is approximately two blocks north. A second bus stop (located at the intersection of Euclid Avenue and Naranja Street) is approximately three blocks east of the project, and the Euclid Avenue trolley stop is four blocks to the east of the site. From this transportation hub, transit connections can easily be made to the downtown employment center and other transit served areas of San Diego.

DISCUSSION

Project Description:

The project proposes the construction of 24-townhomes, consisting of six two-story buildings with four units each, totaling 32,346 square feet. The RM-2-5 Zone allows for multi-family residential development; the allowed density of the RM-2-5 Zone is one dwelling unit per 1,500 square feet of lot area for a maximum of 45 units allowed onsite. The three-bedroom units are two stories over enclosed garages.

Site access will be provided by two City standard driveways with curb ramps with truncated domes on Naranja Street. The project is required to provide 54 parking spaces.

Project plans show the provision of 48 garage parking spaces (24 two-car garages) and six uncovered spaces for a total of 54 spaces. In addition, the project will provide a central landscaped corridor through the middle of the project. Outdoor use areas are provided on the project site in the form of private patios, balconies, a common play and picnic area with prominent views to Chollas Creek.

Approximately 78 percent of the site would be graded and is limited to the amount necessary to construct the project. Grading would result in 1,800 cubic yards of cut and 9,700 cubic yards of fill, which requires the import of 7,900 cubic yards of soil. The project would improve the site by providing new housing on a vacant site that has been under used as an illegal dumping site in previous years.

All required permitting actions are being consolidated under this application and processed concurrently, pursuant to the Consolidation of Processing regulations contained in SDMC Section 112.0103. As proposed, the project requires a Process Four decision, with appeal rights to the City Council.

Site Development Permit (SDP):
The project requires the following Site Development Permits; (1) Process Three is required for consolidated lots where more than 11 dwelling units are proposed in the RM-2-5 Zone, SDMC Section 126.0502; (2) Process Three is required for multiple unit development on a premises containing Environmentally Sensitive Lands (ESL) SDMC Section 143.0110; (3) Process Three is required for development of a Small Lot Subdivision (SLS) SDMC Section 143.0365; (4) Process Four is required for subdivision of a premise that contains ESL 143.0110.

The project is subdividing a 1.55-acre site in the RM-2-5 Zone of the Encanto Community Planning Area into 26 lots, 24-townhomes and two undevelopable lots. The 24-townhomes are consistent with the density of the RM-2-5 Zone, which allows for the construction of single dwelling units. The intent of the SLS ordinance is to encourage development of single dwelling units on small lots in order to provide a space-efficient and economical alternative to traditional single dwelling unit development. The two non-buildable lots within the subdivision will become homeowner association lots which will include all the common use areas governed by a Mutual Maintenance and Access Agreement per SDMC Section 143.0365(f). The SDP contains conditions requiring the Mutual Maintenance and Access Agreement.

The proposed project would provide market rate and affordable home ownership opportunities for low to moderate income families in the Valencia Park neighborhood. The proposed development is consistent with the design standards of the Encanto Community Plan, including a comparative analysis of the surrounding development, open space requirements and conformance to the community plan. As proposed, staff believes the required findings can be made to support approval of the Site Development Permit required for project construction (Attachment 7).

Planned Development Permit (PDP):
A Process Four PDP is required per SDMC Section 126.0604 to allow one deviation from the development regulations of the RM-2-5 Zone. The deviation would allow two small portions of the side-yard retaining walls to exceed the six-foot height limit.

The eastern retaining wall is proposed to exceed the maximum allowed height of six feet with a height of seven feet, ten inches for approximately 20 feet near Naranja Street where the abutting development pad is higher than the existing and proposed grade. The proposed development includes grade breaks in the pad elevation from south to north to accommodate the change in elevation; however, the slope of the topography causes short portions of the retaining walls to exceed the maximum height of six feet.

The western retaining wall exceeds the maximum allowed height of six feet for approximately 45 feet where the abutting property slopes steeply down to the site. In order to grade the project, implement the Encanto Community Plan, and respect the Encanto branch of Chollas Creek, a retaining wall is included to protect the abutting development. The western retaining wall, which is oriented toward the abutting property, will have a maximum height of eight feet.

The proposed development is consistent with the design standards of the Planned Development Permit Ordinance which requires a comparative analysis of the surrounding development, open space requirements and conformance to the community plan. The natural topographic conditions are unique due to a topographical change in elevation of 20 feet across the project site. Additionally, current residential development on the east and west of the existing lot present challenges to the project design for meeting the required development regulations.

When considered as a whole, the proposed project deviations are supported by staff based upon the overall design of the project.

Tentative Map (TM):
A Tentative Map is required to subdivide the site into 26 lots to accommodate the construction of the 24 townhomes. Conditions of the TM include requiring onsite utilities to be undergrounded and the provision of a street light on Naranja Street. The Encanto Community Plan contains a section on General Plan conformance and identifies goals for residential development. One goal emphasizes the maintenance and enhancement of existing stable residential neighborhoods, which is consistent with the General Plan objectives for older communities which stress the preservation of established communities, the conservation of the social-environmental characteristics of the community and the rehabilitation of deteriorating neighborhoods. The infill development project would implement this guideline through a design that respects the character of the surrounding community. The proposed subdivision complies with the applicable zoning and development regulations of the Land Development Code, including any allowable deviations pursuant to the land development code. As proposed, staff believes the required findings can be made to support approval of the requested TM.

Community Plan Analysis:
The project is site is located in the Valencia Park neighborhood of the Encanto Community Plan. The City of San Diego General Plan and the Encanto Community Plan designate the site for multi-family development at a medium density (15-29 du/ac). The 1.55-acre property could accommodate up to 45 dwelling units on the site and the proposed 24 dwelling units is within the allowed density range. The project is compatible with the appearance of the existing neighborhood and will incorporate façade, articulation and architectural details similar in scale, color and appearance of the existing neighborhood.

The General Plan contains a chapter on Balanced Communities and Equitable Development that includes a policy (LU-H.2) to provide affordable housing throughout the City so that no single area experiences a disproportionate concentration. The applicant would comply with the Inclusionary Housing Ordinance by restricting ten percent of the for-sale units (total of two) to households earning 100% or less of Area Median Income. Overall the project implements the goals and policies of the document by creating a multi-family residential development that accommodates a portion of the community's residential needs, while minimizing the environmental impacts of the development. The project design is consistent with the community's land use plan with the creation of a 24 residential units, as envisioned in the Encanto Community Plan. The proposed development is consistent with the City's General Plan and implements the goals and policies through the provision of residential development for the region.

The Encanto Community Plan contains a section on General Plan conformance and identifies goals for residential development. One goal emphasizes the maintenance and enhancement of existing stable residential neighborhoods, which is consistent with the General Plan objectives for older communities which stress the preservation of established communities, the conservation of the social-environmental characteristics of the community and the rehabilitation of deteriorating neighborhoods. The proposal would implement these objectives through a design that respects the existing two-story, pitched-roof character of the surrounding community. The project will not be in conflict with the General Plan and will be developed in accordance with the policies of the Encanto Community Plan.

Environmental Analysis:
An Addendum to the Southeastern San Diego Community Plan 2015 Environmental Impact Report No. 386029 was prepared for this project in accordance with the State of California Environmentally Quality Act (CEQA) Guidelines. The site is not within or adjacent to the City's MHPA. Mitigation for impacts to sensitive biological resources shall be provided pursuant to the City's Biology Guidelines. The proposed project includes mitigation measures to offset impacts to the environments in the area of Biological, Historical Resources (Archeology) and Paleontological Resources. Implementation of the Mitigation, Monitoring and Reporting Program as well as permit conditions would reduce impacts to below a level of significance.

The proposed development would result in impacts on approximately 1.35-acres of land, including 0. 32-acres of lands identified as sensitive uplands (Tier I –IIIB) in the City of San Diego's Biology Guidelines. Pursuant to the City of San Diego's CEQA Significance Determination Thresholds and Biology Guidelines Total upland impacts (Tier 1-III) greater than 0.1 acre are considered significant and require mitigation.

Thus, impacts to 0.26-acre of Diegan coastal sage scrub habitats (including 0.13-acre of Diegan coastal sage scrub dominated by *Ambrosia monogyra*) and 0.05-acre of non-native grassland are considered significant. The applicant has elected to pay into the Habitat Acquisition Fund at a rate of $35,000 per acre for impacts to approximately 0.32–acres of habitat. Impacts on Tier IV habitats are not considered significant and do not require mitigation.

Conclusion:
Staff has reviewed the proposed project and believes it to be in conformance with adopted City Council policies and regulations of the Land Development Code.

Staff has provided draft findings to support approval of the project (Attachments 6 and 7) and draft conditions of approval (Attachment 8). Staff recommends the Planning Commission approve the project as proposed.

ALTERNATIVES

1. Approve Site Development Permit No. 1494353, Planned Development Permit No. 149352 and Tentative Map No. 149351 with modifications.

2. Deny Site Development Permit No. 1494353, Planned Development Permit No. 149352 and Tentative Map No. 149351, if the findings required to approve the project cannot be affirmed.

Respectfully submitted,

Elyse W. Lowe
Deputy Director
Development Services Department

Derrick Johnson
Development Project Manager
Development Services Department

Attachments:

1. Project Location Map
2. Community Plan Land Use Map
3. Aerial Photograph
4. Project Site Plan
5. Site Topography, Sheet C-3 & C-4
6. Environmental Resolution with MMRP
7. Draft Permit Resolution with Findings
8. Draft Permit with Conditions
9. Draft Map Resolution with Findings
10. Draft Map Conditions
11. Remaining Project Plans
12. Community Planning Group Recommendation
13. Ownership Disclosure Statement

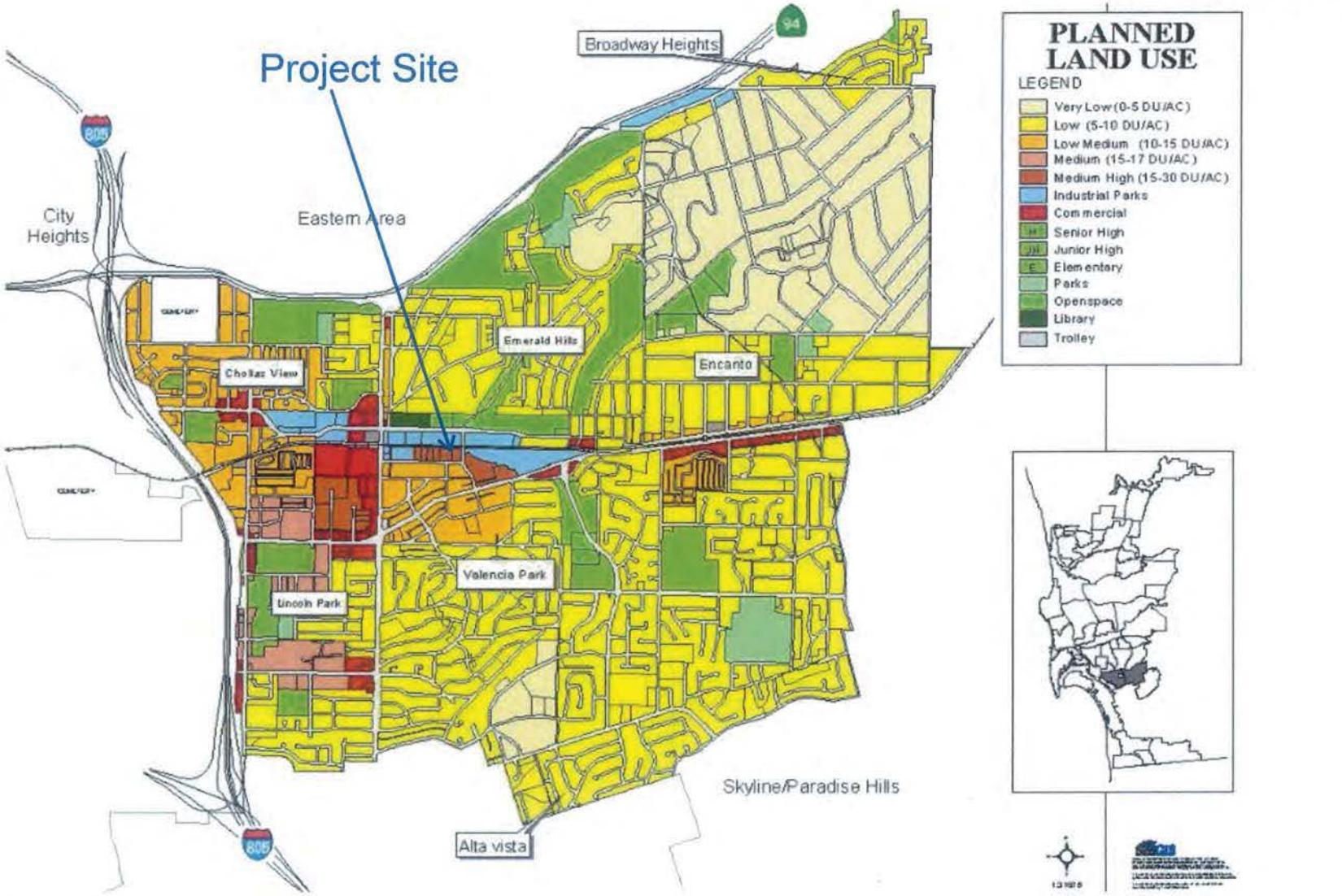
ATTACHMENT 1

Project Location Map

CREEKSIDE POINTE TENTATIVE MAP –
416-440 54TH STREET AND 5282 NARANJA STREET
PROJECT NO. 424931

North

ATTACHMENT 2



Land Use Map

CREEKSIDE POINTE TENTATIVE MAP –
416-440 54TH STREET AND 5282 NARANJA STREET
PROJECT NO. 424931

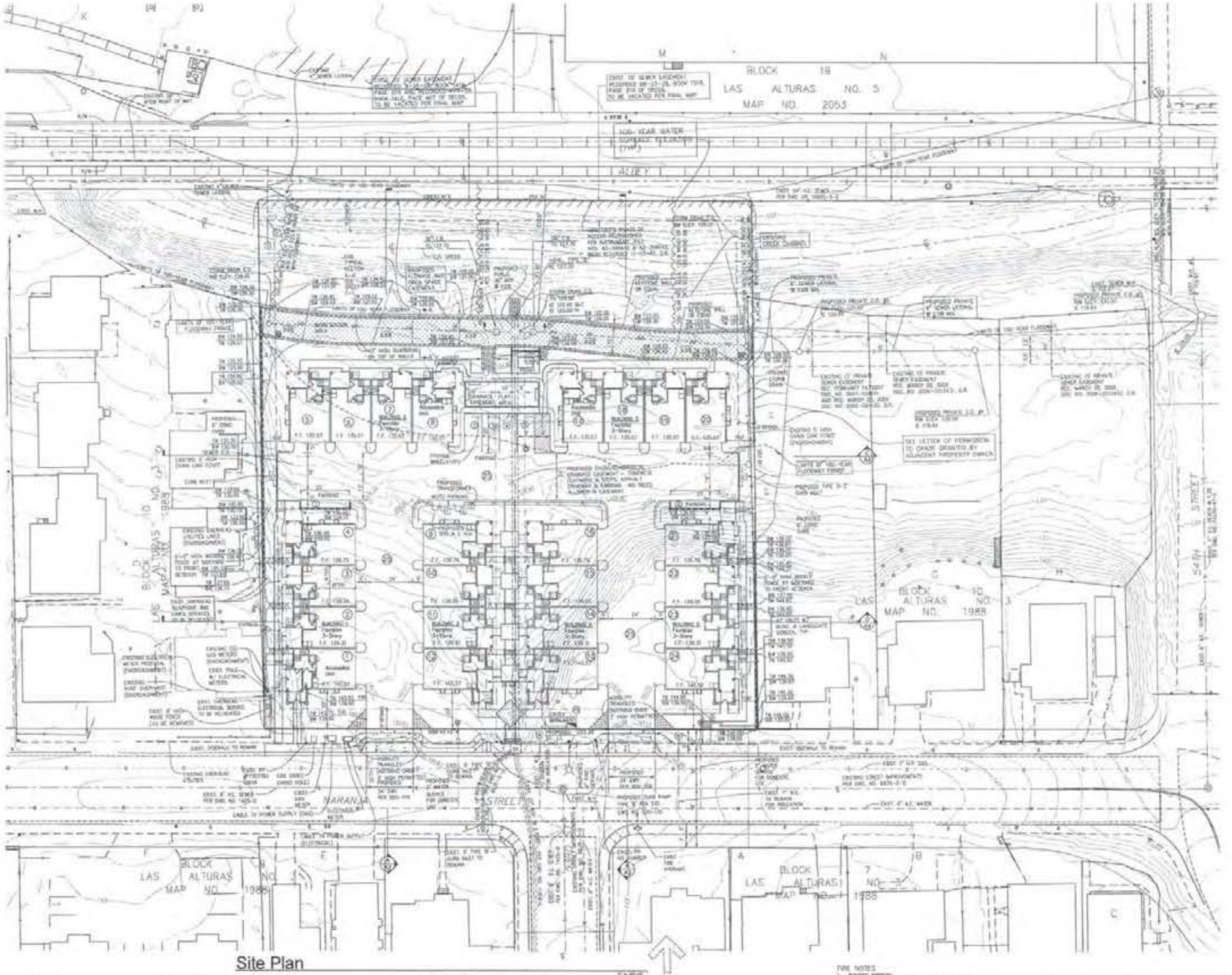
ATTACHMENT 3

Location Aerial Photo

CREEKSIDE POINTE TENTATIVE MAP –
416-440 54TH STREET AND 5282 NARANJA STREET
PROJECT NO. 424931

North

ATTACHMENT 4



Site Plan

Architect
HunLand Design
Troy Weiland
twdesigns@mindspring.com
4532 Judson Way
La Mesa, CA 91942
Phone: (619) 303-9782
Fax: (619) 303-9782

Civil Engineer
JP Engineering, Inc.
Jorge H. Palacios, RCE
jp@jpeng.com
4849 Ronson Court, Suite 105
San Diego, CA 92111
Phone: (858) 569-7377
Fax: (858) 569-0830

Landscape Architect
Weiland & Associates, Inc.
Kim Longo
klongo@wai-inc.com
40463 Charlesburg Drive
Temecula, CA 92591
Phone: (619) 675-3426
Fax: (619) 793-6356

Owner
LJMJM Naranja LLC
7979 Ivanhoe Ave Suite 555
La Jolla, CA 92037
Phone: (858) 551-2504
Fax: (888) 543-6007

SCOPE OF WORK

NEW CONSTRUCTION OF SIX 3-STORY BUILDINGS WITH FOUR TOWNHOMES IN EACH BUILDING FOR A TOTAL OF 24 UNITS. EACH UNIT IS 2-STORIES OVER A 2-CAR GARAGE. (21) 3 BEDROOM/ 3 BATH UNITS, (3) 3 BEDROOM/ 3½ BATH UNITS (ACCESSIBLE UNITS)

PROJECT ADDRESS

5262 NARANJA STREET
SAN DIEGO, CA
92114

LEGAL

LOTS E AND F IN BLOCK 10 OF LAS ALTURAS, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 1988, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAID SAN DIEGO JANUARY 18, 1927

APN: 548-051-12-00 & 13-00

CONSTRUCTION TYPE

TYPE V-B, SPRINKLERED

OCCUPANCY

R3/ U

ZONE

RM 2-5

PROPERTY AREA

67,568 SF

PROPERTY COVERAGE

17,379 SF (INC. COVERED PATIOS)/ 67,568 SF = 26%

FLOOR AREA RATIO

BUILDING 1-6 GFA

FLOOR	
1	2,581 SF
2	2,542 SF
3	2,525 SF
ATTIC	94 SF
TOTAL	7,742 SF x 6 BUILDINGS = 46,452 SF

46,452 SF GFA/ 67,568 SF = 69%

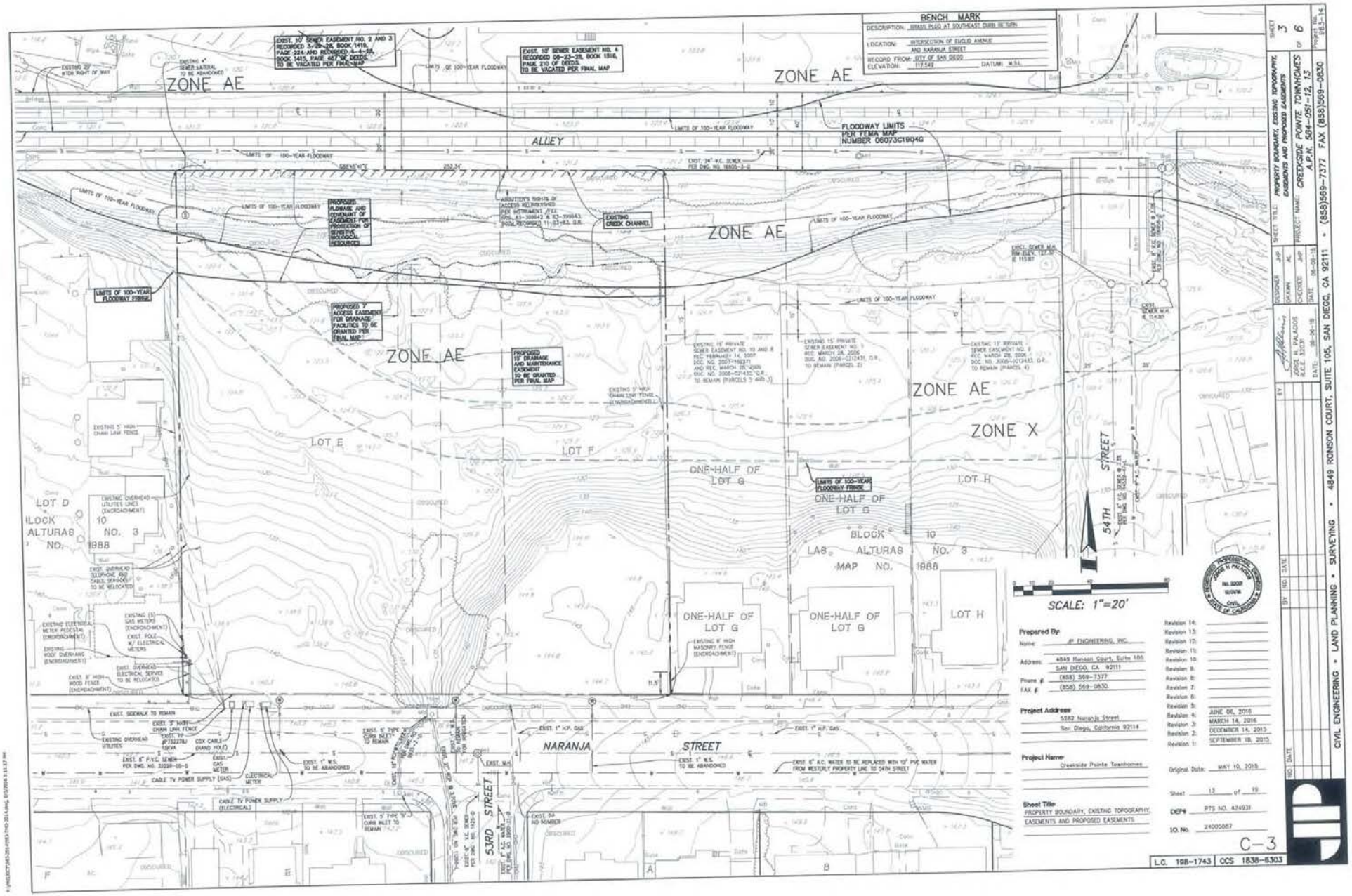
SHEET INDEX

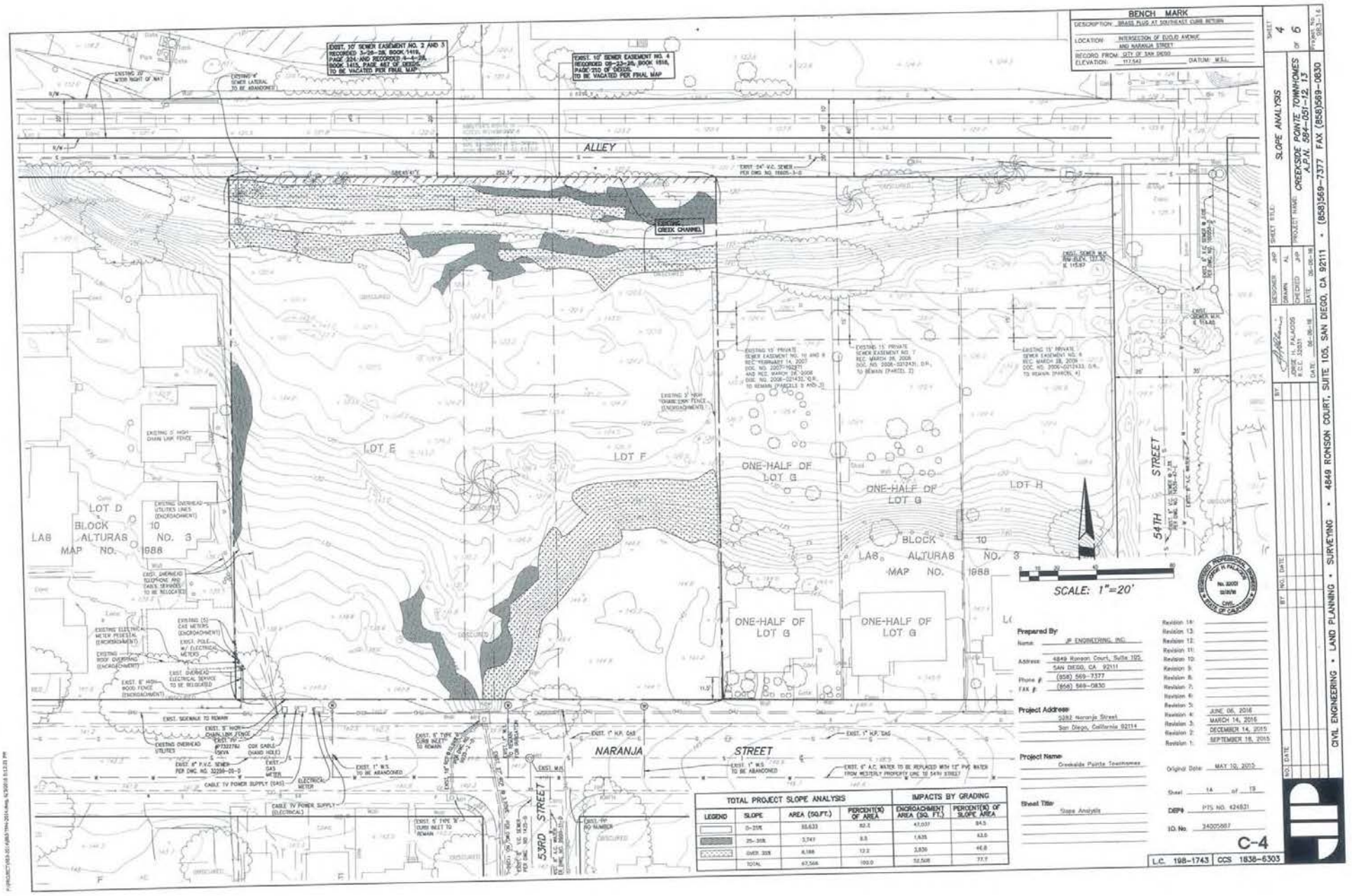
A1	SITE PLAN
A2	PRESENTATION ELEVATIONS
A3	SITE SECTIONS A & B
A4	SITE SECTIONS C & D
A5	BUILDING 1 PLANS, ELEVATIONS, SECTIONS, & ROOF
A6	BUILDING 2 PLANS, ELEVATIONS, SECTIONS, & ROOF
A7	BUILDING 3 PLANS, ELEVATIONS, SECTIONS, & ROOF
A8	BUILDING 4 PLANS, ELEVATIONS, SECTIONS, & ROOF
A9	BUILDING 5 PLANS, ELEVATIONS, SECTIONS, & ROOF
A10	BUILDING 6 PLANS, ELEVATIONS, SECTIONS, & ROOF
C1	TENTATIVE MAP NOTES & DETAILS
C2	PRELIMINARY GRADING PLAN
C3	EXISTING TOPOGRAPHY & EASEMENTS
C4	SLOPE ANALYSIS
C5	BOUNDARY & EASEMENTS
C6	FIRE ACCESS, CIRCULATION, & LOT SIZES
LC-01	LANDSCAPE CONCEPT PLAN
LC-02	LANDSCAPE CALCULATIONS PLAN
LC-03	LANDSCAPE ENLARGEMENT CONCEPT PLAN

HunLand design

Creekside Pointe Townhomes
5262 Naranja Street
San Diego, California
92114

A1


BENCH MARK
DESCRIPTION: BRASS PLUG AT SOUTHEAST CURB RETURN
LOCATION: INTERSECTION OF EUCLID AVENUE AND NARANJA STREET
RECORD FROM: CITY OF SAN DIEGO
ELEVATION: 117.542 DATUM: M.S.L.
EXIST. 10' SEWER EASEMENT NO. 2 AND 3 RECORDED 3-28-28, BOOK 1418, PAGE 324 AND RECORDED 4-4-28, BOOK 1415, PAGE 467 TO BE DEEDED TO BE VACATED PER FINAL MAP
EXIST. 10' SEWER EASEMENT NO. 4 RECORDED 06-23-28, BOOK 1516, PAGE 270 OF DEEDS TO BE VACATED PER FINAL MAP
ZONE AE
ZONE X
ALLEY
FLOODWAY LIMITS PER FEMA MAP NUMBER 06073C1904G
LIMITS OF 100-YEAR FLOODWAY
LIMITS OF 100-YEAR FLOODWAY FRINGE
PROPOSED FLOWAGE AND COVENANT OF EASEMENT FOR PROTECTION OF SENSITIVE BIOLOGICAL RESOURCES
EXISTING CREEK CHANNEL
PROPOSED 7' ACCESS EASEMENT FOR DRAINAGE FACILITIES TO BE GRANTED PER FINAL MAP
PROPOSED 15' DRAINAGE AND MAINTENANCE EASEMENT TO BE GRANTED PER FINAL MAP
LOT D BLOCK 10 ALTURAS NO. 3 1888
LOT E
LOT F
ONE-HALF OF LOT G
LOT H
BLOCK 10 LAS ALTURAS NO. 3 MAP NO. 1888
NARANJA STREET
53RD STREET
54TH STREET
SCALE: 1"=20'
Prepared By:
Name: JP ENGINEERING, INC.
Address: 4849 Ronson Court, Suite 105 SAN DIEGO, CA 92111
Phone #: (858) 569-7377
FAX #: (858) 569-0830
Project Address: 5382 Naranja Street San Diego, California 92114
Project Name: Creekside Pointe Townhomes
Sheet Title: PROPERTY BOUNDARY, EXISTING TOPOGRAPHY, EASEMENTS AND PROPOSED EASEMENTS
Revision 14:
Revision 13:
Revision 12:
Revision 11:
Revision 10:
Revision 9:
Revision 8:
Revision 7:
Revision 6:
Revision 5: JUNE 06, 2016
Revision 4: MARCH 14, 2016
Revision 3: DECEMBER 14, 2015
Revision 2: SEPTEMBER 18, 2015
Revision 1:
Original Date: MAY 10, 2015
Sheet 13 of 19
DEP# PTS NO. 424931
I.O. No. 24005887
C-3
L.G. 198-1743 OCS 1838-8303
PROPERTY BOUNDARY, EXISTING TOPOGRAPHY, EASEMENTS AND PROPOSED EASEMENTS
PROJECT NAME: CREEKSIDE POINTE TOWNHOMES A.P.N. 564-051-12, 13
SHEET TITLE:
DESIGNER JMP
DRAWN AC
CHECKED JMP
DATE 06-06-16
JORGE H. PALADOS R.C.E. 33031
DATE: 06-06-16
SHEET 3 OF 6
Project No. 918.1-14
CIVIL ENGINEERING • LAND PLANNING • SURVEYING • 4849 RONSON COURT, SUITE 105, SAN DIEGO, CA 92111 • (858)569-7377 FAX (858)569-0830


BENCH MARK
DESCRIPTION: BRASS PLUG AT SOUTHEAST CURB RETURN
LOCATION: INTERSECTION OF EUCLID AVENUE AND NARANJA STREET
RECORD FROM: CITY OF SAN DIEGO
ELEVATION: 117.542 DATUM: M.S.L.
EXIST. 10' SEWER EASEMENT NO. 3 AND 5 RECORDED 3-26-28, BOOK 1418, PAGE 224 AND RECORDED 4-4-28, BOOK 1415, PAGE 467 OF DEEDS. TO BE VACATED PER FINAL MAP.
EXIST. 10' SEWER EASEMENT NO. 4 RECORDED 09-23-26, BOOK 1516, PAGE 210 OF DEEDS. TO BE VACATED PER FINAL MAP
ALLEY
EXIST. 24" V.C. SEWER PER DWG. NO. 16605-3-D
CREEK CHANNEL
EXIST. SEWER M.H. RIM ELEV. 127.30 IE 115.67
EXIST. 6" V.C. SEWER PER DWG. NO. 16605-3-D
EXISTING 15' PRIVATE SEWER EASEMENT NO. 10 AND 9 REC. FEBRUARY 14, 2007 DOC. NO. 2007-092271 AND REC. MARCH 26, 2008 DOC. NO. 2008-021431, O.R. TO REMAIN (PARCELS 3 AND 2)
EXISTING 15' PRIVATE SEWER EASEMENT NO. 7 REC. MARCH 26, 2008 DOC. NO. 2008-021431, O.R. TO REMAIN (PARCEL 2)
EXISTING 15' PRIVATE SEWER EASEMENT NO. 6 REC. MARCH 26, 2008 DOC. NO. 2008-021431, O.R. TO REMAIN (PARCEL 4)
EXISTING 3' HIGH CHAIN LINK FENCE (ENCROACHMENT)
EXISTING 5' HIGH CHAIN LINK FENCE
LOT E
LOT F
LOT H
ONE-HALF OF LOT G
ONE-HALF OF LOT G
ONE-HALF OF LOT G
ONE-HALF OF LOT G
LOT D
BLOCK 10
LAS ALTURAS NO. 3
MAP NO. 1888
EXISTING OVERHEAD UTILITIES LINES (ENCROACHMENT)
EXIST. OVERHEAD TELEPHONE AND CABLE SERVICES TO BE RELOCATED
EXISTING ELECTRIC METER PEDESTAL (ENCROACHMENT)
EXISTING ROOF OVERHANG (ENCROACHMENT)
EXIST. (5) GAS METERS (ENCROACHMENT)
EXIST. POLE W/ ELECTRICAL METERS
EXIST. OVERHEAD ELECTRICAL SERVICE TO BE RELOCATED
EXIST. 6' HIGH WOOD FENCE (ENCROACHMENT)
EXIST. SIDEWALK TO REMAIN
EXIST. 5' HIGH CHAIN LINK FENCE
EXISTING OVERHEAD UTILITIES
EXIST. TV PT332784 COX
COX CABLE (HAND HOLE)
EXIST. 6" P.V.C. SEWER PER DWG. NO. 32286-00-D
EXIST. GAS METER
EXIST. W.S. TO BE ABANDONED
CABLE TV POWER SUPPLY (GAS)
ELECTRICAL METER
CABLE TV POWER SUPPLY (ELECTRICAL)
EXIST. 6" TYPE 'G' CURB INLET TO REMAIN
EXIST. 6" TYPE 'G' CURB INLET TO REMAIN
EXIST. 10" V.C. SEWER PER DWG. NO. 1425-D
EXIST. M.H. NO. 1425-3
EXIST. PP NO. NUMBER
EXIST. M.H.
EXIST. 1" H.P. GAS
EXIST. 1" W.S. TO BE ABANDONED
EXIST. 6" A.C. WATER TO BE REPLACED WITH 12" PVC WATER FROM WESTERLY PROPERTY LINE TO 54TH STREET
NARANJA STREET
53RD STREET
54TH STREET
SCALE: 1"=20'
TOTAL PROJECT SLOPE ANALYSIS
IMPACTS BY GRADING
LEGEND | SLOPE | AREA (SQ.FT.) | PERCENT(%) OF AREA | ENCROACHMENT AREA (SQ. FT.) | PERCENT(%) OF SLOPE AREA
0-25% | 55,633 | 82.4 | 47,037 | 84.5
25-35% | 3,741 | 5.5 | 1,635 | 43.0
OVER 35% | 8,188 | 12.2 | 3,836 | 46.8
TOTAL | 67,564 | 100.0 | 52,508 | 77.7
SLOPE ANALYSIS
CREEKSIDE POINTE TOWNHOMES
A.P.N. 564-051-12, 13
SHEET 4 OF 6
PROJECT NO. 98-3-16
DESIGNER JHP
DRAWN AL
CHECKED JHP
DATE 06-06-16
PROJECT NAME
SHEET TITLE
BY
JOHN H. PALADINI R.C.E. 32631 DATE 04-06-16
CIVIL ENGINEERING • LAND PLANNING • SURVEYING • 4849 RONSON COURT, SUITE 105, SAN DIEGO, CA 92111 • (858)569-7377 FAX (858)569-0830
Prepared By:
Name: JP ENGINEERING, INC.
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Phone #: (858) 569-7377
FAX #: (858) 569-0830
Project Address:
5282 Naranja Street
San Diego, California 92114
Project Name:
Creekside Pointe Townhomes
Sheet Title:
Slope Analysis
Revision 14:
Revision 13:
Revision 12:
Revision 11:
Revision 10:
Revision 9:
Revision 8:
Revision 7:
Revision 6:
Revision 5:
Revision 4: JUNE 06, 2016
Revision 3: MARCH 14, 2016
Revision 2: DECEMBER 14, 2015
Revision 1: SEPTEMBER 18, 2015
Original Date: MAY 10, 2013
Sheet 14 of 19
DEP# PTS NO. 424831
I.O. No. 34005667
C-4
L.C. 198-1743 CCS 1838-6303

RESOLUTION NUMBER R-

ADOPTED ON

WHEREAS, on November 16, 2016, the City Council of the City of San Diego considered an amendment to the Encanto Community Plan; and

WHEREAS, on November 16, 2016, as part of that consideration, the City of San Diego City Council adopted Resolution No.310077, certifying Environmental Impact Report No. 386029, a copy of which is on file in the Development Services Department in accordance with the California Environmental Quality Act of 1970 (CEQA) (Public Resources Code Section 21000 et seq.), as amended, and the State CEQA Guidelines thereto (California Code of Regulations, Title 14, Chapter 3, Section 15000 et seq.); and

WHEREAS, on June 8, 2016, LJMJM Naranja LLC submitted an application to the Development Services Department for approval of minor technical changes or additions to the Project; and

WHEREAS, State CEQA Guidelines section 15164(a) allows a lead agency to prepare an Addendum to a final Environmental Impact Report if such Addendum meets the requirements of CEQA;

NOW, THEREFORE,

BE IT RESOLVED, by the Planning Commission of the City of San Diego as follows:

1. That the information contained in the final Addendum to Environmental Impact Report No. 386029 along with the Addendum thereto, has been reviewed and considered by this Planning Commission prior to making a decision on the Project.

2. That there are no substantial changes proposed to the Project and no substantial changes with respect to the circumstances under which the Project is to be undertaken that would require major revisions in the Addendum to Environmental Impact Report for the Project.

3. That no new information of substantial importance has become available showing that the Project would have any significant effects not discussed previously in the Addendum to Environmental Impact Report or that any significant effects previously examined will be substantially more severe than shown in the Addendum to Environmental Impact Report.

4. That no new information of substantial importance has become available showing that mitigation measures or alternatives previously found not to be feasible are in fact feasible which would substantially reduce any significant effects, but that the Project proponents decline to adopt, or that there are any considerably different mitigation measures or alternatives not previously considered which would substantially reduce any significant effects, but that the Project proponents decline to adopt.

5. That pursuant to State CEQA Guidelines Section 15164, only minor technical changes or additions are necessary, and therefore, the Planning Commission adopts Addendum to

Environmental Impact Report No. 386029 with respect to the Project, a copy of which is on file in the office of the Development Services Department.

6. That pursuant to CEQA Section 21081.6, the Planning Commission adopts the Mitigation Monitoring and Reporting Program, or alterations to implement the changes to the project as required by this Planning Commission in order to mitigate or avoid significant effects on the environment, which is attached hereto as Exhibit A.

7. That Development Services Staff is directed to file a Notice of Determination with the Clerk of the Board of Supervisors for the County of San Diego regarding the Project.

APPROVED: DEVELOPMENT PROJECT MANAGER

By: _____

Derrick Johnson, Development Project Manager

EXHIBIT A

MITIGATION MONITORING AND REPORTING PROGRAM

Tentative Map (TM), Planned Development Permit (PDP) and Site Development Permit (SDP) for Environmentally Sensitive Lands (ESL)
PROJECT NO. 424931

This Mitigation Monitoring and Reporting Program is designed to ensure compliance with Public Resources Code Section 21081.6 during implementation of mitigation measures. This program identifies at a minimum: the department responsible for the monitoring, what is to be monitored, how the monitoring shall be accomplished, the monitoring and reporting schedule, and completion requirements. A record of the Mitigation Monitoring and Reporting Program will be maintained at the offices of the Entitlements Division, 1222 First Avenue, Fifth Floor, San Diego, CA, 92101. All mitigation measures contained in the Addendum to Environmental Impact Report No. 386029 shall be made conditions of TM, PDP, and SDP for ESL as may be further described below.

VI. MITIGATION, MONITORING AND REPORTING PROGRAM INCORPORATED INTO THE PROJECT:

A. GENERAL REQUIREMENTS – PART I
Plan Check Phase (prior to permit issuance)

1. Prior to the issuance of a Notice To Proceed (NTP) for a subdivision, or any construction permits, such as Demolition, Grading or Building, or beginning any construction related activity on-site, the Development Services Department (DSD) Director's Environmental Designee (ED) shall review and approve all Construction Documents (CD), (plans, specification, details, etc.) to ensure the MMRP requirements are incorporated into the design.

2. In addition, the ED shall verify that the MMRP Conditions/Notes that apply ONLY to the construction phases of this project are included VERBATIM, under the heading, "**ENVIRONMENTAL/MITIGATION REQUIREMENTS**."

3. These notes must be shown within the first three (3) sheets of the construction documents in the format specified for engineering construction document templates as shown on the City website:

http://www.sandiego.gov/development-services/industry/standtemp.shtml

4. The **TITLE INDEX SHEET** must also show on which pages the "Environmental/Mitigation Requirements" notes are provided.

5. **SURETY AND COST RECOVERY –** The Development Services Director or City Manager may require appropriate surety instruments or bonds from private Permit Holders to ensure the long term performance or implementation of required mitigation measures or programs. The City is authorized to recover its cost to offset the salary, overhead, and expenses for City personnel and programs to monitor qualifying projects.

B. GENERAL REQUIREMENTS – PART II
Post Plan Check (After permit issuance/Prior to start of construction)

1. PRE CONSTRUCTION MEETING IS REQUIRED TEN (10) WORKING DAYS PRIOR TO BEGINNING ANY WORK ON THIS PROJECT. The PERMIT HOLDER/OWNER is responsible to arrange and perform

this meeting by contacting the CITY RESIDENT ENGINEER (RE) of the Field Engineering Division and City staff from MITIGATION MONITORING COORDINATION (MMC). Attendees must also include the Permit holder's Representative(s), Job Site Superintendent and the following consultants:

Qualified Biologist
Qualified Archaeologist
Native American Monitor
Qualified Paleontologist

Note:
Failure of all responsible Permit Holder's representatives and consultants to attend shall require an additional meeting with all parties present.

CONTACT INFORMATION:

a) The PRIMARY POINT OF CONTACT is the **RE** at the **Field Engineering Division – 858-627-3200**

b) For Clarification of ENVIRONMENTAL REQUIREMENTS, it is also required to call **RE and MMC at 858-627-3360**

2. MMRP COMPLIANCE: This Project, Project Tracking System (PTS) # 424931 and /or Environmental Document # 424931, shall conform to the mitigation requirements contained in the associated Environmental Document and implemented to the satisfaction of the DSD's Environmental Designee (MMC) and the City Engineer (RE). The requirements may not be reduced or changed but may be annotated (i.e. to explain when and how compliance is being met and location of verifying proof, etc.). Additional clarifying information may also be added to other relevant plan sheets and/or specifications as appropriate (i.e., specific locations, times of monitoring, methodology, etc.

Note:
Permit Holder's Representatives must alert RE and MMC if there are any discrepancies in the plans or notes, or any changes due to field conditions. All conflicts must be approved by RE and MMC BEFORE the work is performed.

3. OTHER AGENCY REQUIREMENTS: Evidence of compliance with all other agency requirements or permits shall be submitted to the RE and MMC for review and acceptance prior to the beginning of work or within one week of the Permit Holder obtaining documentation of those permits or requirements. Evidence shall include copies of permits, letters of resolution or other documentation issued by the responsible agency.

NONE REQUIRED

4. MONITORING EXHIBITS

All consultants are required to submit , to RE and MMC, a monitoring exhibit on a 11x17 reduction of the appropriate construction plan, such as site plan, grading, landscape, etc., marked to clearly show the specific areas including the **LIMIT OF WORK**, scope of that discipline's work, and notes indicating when in the construction schedule that work will be performed. When necessary for clarification, a detailed methodology of how the work will be performed shall be included.

NOTE:
Surety and Cost Recovery – When deemed necessary by the Development Services Director or City Manager, additional surety instruments or bonds from the private Permit Holder may be required to ensure the long term performance or implementation of required mitigation measures or programs. The City is authorized to recover its cost to offset the salary, overhead, and expenses for City personnel and programs to monitor qualifying projects.

5. OTHER SUBMITTALS AND INSPECTIONS:

The Permit Holder/Owner's representative shall submit all required documentation, verification letters, and requests for all associated inspections to the RE and MMC for approval per the following schedule:

DOCUMENT SUBMITTAL/INSPECTION CHECKLIST		
Issue Area	Document Submittal	Associated Inspection/Approvals/Notes
General	Consultant Qualification Letters	Prior to Preconstruction Meeting
General	Consultant Construction Monitoring Exhibits	Prior to or at Preconstruction Meeting
Biology	Biologist Limit of Work Verification	Limit of Work Inspection
Archaeology	Archaeology Reports	Archaeology/Historic Site Observation
Paleontology	Paleontology Reports	Paleontology Site Observation
Bond Release	Request for Bond Release Letter	Final MMRP Inspections Prior to Bond Release Letter

C. SPECIFIC MMRP ISSUE AREA CONDITIONS/REQUIREMENTS

BIO-1: BIOLOGICAL RESOURCE PROTECTION DURING CONSTRUCTION with AVIAN PROTECTION MITIGATION

I. Prior to Construction

A. **Biologist Verification -** The owner/permittee shall provide a letter to the City's Mitigation Monitoring Coordination (MMC) section stating that a Project Biologist (Qualified Biologist) as defined in the City of San Diego's Biological Guidelines (2012), has been retained to implement the project's biological monitoring program. The letter shall include the names and contact information of all persons involved in the biological monitoring of the project.

B. **Preconstruction Meeting -** The Qualified Biologist shall attend the preconstruction meeting, discuss the project's biological monitoring program, and arrange to perform any follow up mitigation measures and reporting including site-specific monitoring, restoration or revegetation, and additional fauna/flora surveys/salvage.

C. **Biological Documents -** The Qualified Biologist shall submit all required documentation to MMC verifying that any special mitigation reports including but not limited to, maps, plans, surveys, survey timelines, or buffers are completed or scheduled per City Biology Guidelines, Multiple Species Conservation Program (MSCP), Environmentally Sensitive Lands Ordinance (ESL), project permit conditions; California Environmental Quality Act (CEQA); endangered species acts (ESAs); and/or other local, state or federal requirements.

D. **BCME -**The Qualified Biologist shall present a Biological Construction Mitigation/Monitoring Exhibit (BCME) which includes the biological documents in C above. In addition, include: restoration/revegetation plans, plant salvage/relocation requirements (e.g., coastal cactus wren plant salvage, burrowing owl exclusions, etc.), avian or other wildlife surveys/survey schedules (including general avian nesting and USFWS protocol), timing of surveys, wetland

buffers, avian construction avoidance areas/noise buffers/ barriers, other impact avoidance areas, and any subsequent requirements determined by the Qualified Biologist and the City ADD/MMC. The BCME shall include a site plan, written and graphic depiction of the project's biological mitigation/monitoring program, and a schedule. The BCME shall be approved by MMC and referenced in the construction documents.

E. **Avian Protection Requirements -** To avoid any direct impacts to raptors and/or any native/migratory birds, removal of habitat that supports active nests in the proposed area of disturbance should occur outside of the breeding season for these species (February 1 to September 15). If removal of habitat in the proposed area of disturbance must occur during the breeding season, the Qualified Biologist shall conduct a pre-construction survey to determine the presence or absence of nesting birds on the proposed area of disturbance. The pre-construction survey shall be conducted within 10 calendar days prior to the start of construction activities (including removal of vegetation). The applicant shall submit the results of the pre-construction survey to City DSD for review and approval prior to initiating any construction activities. If nesting birds are detected, a letter report or mitigation plan in conformance with the City's Biology Guidelines and applicable State and Federal Law (i.e. appropriate follow up surveys, monitoring schedules, construction and noise barriers/buffers, etc.) shall be prepared and include proposed measures to be implemented to ensure that take of birds or eggs or disturbance of breeding activities is avoided. The report or mitigation plan shall be submitted to the City for review and approval and implemented to the satisfaction of the City. The City's MMC Section and Biologist shall verify and approve that all measures identified in the report or mitigation plan are in place prior to and/or during construction.

F. **Resource Delineation -** Prior to construction activities, the Qualified Biologist shall supervise the placement of orange construction fencing or equivalent along the limits of disturbance adjacent to sensitive biological habitats and verify compliance with any other project conditions as shown on the BCME. This phase shall include flagging plant specimens and delimiting buffers to protect sensitive biological resources (e.g., habitats/flora & fauna species, including nesting birds) during construction. Appropriate steps/care should be taken to minimize attraction of nest predators to the site.

G. **Education –** Prior to commencement of construction activities, the Qualified Biologist shall meet with the owner/permittee or designee and the construction crew and conduct an on-site educational session regarding the need to avoid impacts outside of the approved construction area and to protect sensitive flora and fauna (e.g., explain the avian and wetland buffers, flag system for removal of invasive species or retention of sensitive plants, and clarify acceptable access routes/methods and staging areas, etc.).

II. During Construction

A. **Monitoring** - All construction (including access/staging areas) shall be restricted to areas previously identified, proposed for development/staging, or previously disturbed as shown on "Exhibit A" and/or the BCME. The Qualified Biologist shall monitor construction activities as needed to ensure that construction activities do not encroach into biologically sensitive areas, or cause other similar damage, and that the work plan has been amended to accommodate any sensitive species located during the pre-construction surveys. In addition, the Qualified Biologist shall document field activity via the Consultant Site Visit Record (CSVR). The CSVR shall be e-mailed to MMC on the 1st day of monitoring, the 1st week of each month, the last day of monitoring, and immediately in the case of any undocumented condition or discovery.

B. **Subsequent Resource Identification -** The Qualified Biologist shall note/act to prevent any new disturbances to habitat, flora, and/or fauna onsite (e.g., flag plant specimens for avoidance during access, etc). If active nests or other previously unknown sensitive resources are detected, all project activities that directly impact the resource shall be delayed until species specific local, state or federal regulations have been determined and applied by the Qualified Biologist.

III. Post Construction Measures

A. In the event that impacts exceed previously allowed amounts, additional impacts shall be mitigated in accordance with City Biology Guidelines, ESL and MSCP, State CEQA, and other applicable local, state and federal law. The Qualified Biologist shall submit a final BCME/report to the satisfaction of the City ADD/MMC within 30 days of construction completion.

BIO-2: Habitat Acquisition Fund:

Prior to Notice to Proceed (NTP) for any construction permits, including but not limited to, the first Grading Permit, Demolition Plans/Permits and Building Plans/Permits, the owner/permittee shall contribute to the City of San Diego Habitat Acquisition Fund (HAF) to mitigate for the loss of 0.320 acre of Diegan coastal sage scrub (Tier II) and Non-native Grasslands (Tier IIIB). This fee is based on mitigation ratios, per the City of San Diego Biology Guidelines, of 1:1 for Diegan coastal sage scrub and 0.5:1 for Non-native Grassland preserved within the MHPA. Therefore, the resulting total mitigation required for direct project impacts for a total of 0.291 acres equivalent contribution to the City's Habitat Acquisition Fund (HAF) plus a ten percent (10%) administrative fee.

D. HISTORICAL RESOURCES (ARCHAEOLOGY)

I. Prior to Permit Issuance

A. Entitlements Plan Check

1. Prior to issuance of any construction permits, including but not limited to, the first Grading Permit, Demolition Plans/Permits and Building Plans/Permits or a Notice to Proceed for Subdivisions, but prior to the first preconstruction meeting, whichever is applicable, the Assistant Deputy Director (ADD) Environmental designee shall verify that the requirements for Archaeological Monitoring and Native American monitoring have been noted on the applicable construction documents through the plan check process.

B. Letters of Qualification have been submitted to ADD

1. The applicant shall submit a letter of verification to Mitigation Monitoring Coordination (MMC) identifying the Principal Investigator (PI) for the project and the names of all persons involved in the archaeological monitoring program, as defined in the City of San Diego Historical Resources Guidelines (HRG). If applicable, individuals involved in the archaeological monitoring program must have completed the 40-hour HAZWOPER training with certification documentation.

2. MMC will provide a letter to the applicant confirming the qualifications of the PI and all persons involved in the archaeological monitoring of the project meet the qualifications established in the HRG.

3. Prior to the start of work, the applicant must obtain written approval from MMC for any personnel changes associated with the monitoring program.

II. Prior to Start of Construction

A. Verification of Records Search

1. The PI shall provide verification to MMC that a site specific records search (¼ mile radius) has been completed. Verification includes, but is not limited to a copy of a confirmation letter from South Coastal Information Center, or, if the search was in-house, a letter of verification from the PI stating that the search was completed.

2. The letter shall introduce any pertinent information concerning expectations and probabilities of discovery during trenching and/or grading activities.

3. The PI may submit a detailed letter to MMC requesting a reduction to the ¼ mile radius.

B. PI Shall Attend Precon Meetings

1. Prior to beginning any work that requires monitoring; the Applicant shall arrange a Precon Meeting that shall include the PI, Native American consultant/monitor (where Native American resources may be impacted), Construction Manager (CM) and/or Grading Contractor, Resident Engineer (RE), Building Inspector (BI), if appropriate, and MMC. The qualified Archaeologist and Native American Monitor shall attend any grading/excavation related Precon Meetings to make comments and/or suggestions concerning the Archaeological Monitoring program with the Construction Manager and/or Grading Contractor.

   a. If the PI is unable to attend the Precon Meeting, the Applicant shall schedule a focused Precon Meeting with MMC, the PI, RE, CM or BI, if appropriate, prior to the start of any work that requires monitoring.

2. Identify Areas to be Monitored

   a. Prior to the start of any work that requires monitoring, the PI shall submit an Archaeological Monitoring Exhibit (AME) (with verification that the AME has been reviewed and approved by the Native American consultant/monitor when Native American resources may be impacted) based on the appropriate construction documents (reduced to 11x17) to MMC identifying the areas to be monitored including the delineation of grading/excavation limits.

   b. The AME shall be based on the results of a site specific records search as well as information regarding existing known soil conditions (native or formation).

3. When Monitoring Will Occur

   c. a. Prior to the start of any work, the PI shall also submit a construction schedule to MMC through the RE indicating when and where monitoring will occur.

   b. The PI may submit a detailed letter to MMC prior to the start of work or during construction requesting a modification to the monitoring program. This request shall be based on relevant information such as review of final construction

documents which indicate site conditions such as depth of excavation and/or site graded to bedrock, etc., which may reduce or increase the potential for resources to be present.

III. During Construction

A. Monitor(s) Shall be Present During Grading/Excavation/Trenching

1. The Archaeological Monitor shall be present full-time during all soil disturbing and grading/excavation/trenching activities which could result in impacts to archaeological resources as identified on the AME. **The Construction Manager is responsible for notifying the RE, PI, and MMC of changes to any construction activities such as in the case of a potential safety concern within the area being monitored. In certain circumstances OSHA safety requirements may necessitate modification of the AME.**

2. The Native American consultant/monitor shall determine the extent of their presence during soil disturbing and grading/excavation/trenching activities based on the AME and provide that information to the PI and MMC. If prehistoric resources are encountered during the Native American consultant/monitor's absence, work shall stop and the Discovery Notification Process detailed in Section III.B-C and IV.A-D shall commence.

3. The PI may submit a detailed letter to MMC during construction requesting a modification to the monitoring program when a field condition such as modern disturbance post-dating the previous grading/trenching activities, presence of fossil formations, or when native soils are encountered that may reduce or increase the potential for resources to be present.

4. The archaeological and Native American consultant/monitor shall document field activity via the Consultant Site Visit Record (CSVR). The CSVR's shall be faxed by the CM to the RE the first day of monitoring, the last day of monitoring, monthly (**Notification of Monitoring Completion**), and in the case of ANY discoveries. The RE shall forward copies to MMC.

B. Discovery Notification Process

1. In the event of a discovery, the Archaeological Monitor shall direct the contractor to temporarily divert all soil disturbing activities, including but not limited to digging, trenching, excavating or grading activities in the area of discovery and in the area reasonably suspected to overlay adjacent resources and immediately notify the RE or BI, as appropriate.

2. The Monitor shall immediately notify the PI (unless Monitor is the PI) of the discovery.

3. The PI shall immediately notify MMC by phone of the discovery, and shall also submit written documentation to MMC within 24 hours by fax or email with photos of the resource in context, if possible.

4. No soil shall be exported off-site until a determination can be made regarding the significance of the resource specifically if Native American resources are encountered.

C. Determination of Significance

1. The PI and Native American consultant/monitor, where Native American resources are discovered shall evaluate the significance of the resource. If Human Remains are involved, follow protocol in Section IV below.

   a. The PI shall immediately notify MMC by phone to discuss significance determination and shall also submit a letter to MMC indicating whether additional mitigation is required.

   b. If the resource is significant, the PI shall submit an Archaeological Data Recovery Program (ADRP) which has been reviewed by the Native American consultant/monitor, and obtain written approval from MMC. Impacts to significant resources must be mitigated before ground disturbing activities in the area of discovery will be allowed to resume. **Note: If a unique archaeological site is also an historical resource as defined in CEQA, then the limits on the amount(s) that a project applicant may be required to pay to cover mitigation costs as indicated in CEQA Section 21083.2 shall not apply.**

   c. If the resource is not significant, the PI shall submit a letter to MMC indicating that artifacts will be collected, curated, and documented in the Final Monitoring Report. The letter shall also indicate that that no further work is required.

IV. Discovery of Human Remains

If human remains are discovered, work shall halt in that area and no soil shall be exported off-site until a determination can be made regarding the provenance of the human remains; and the following procedures as set forth in CEQA Section 15064.5(e), the California Public Resources Code (Sec. 5097.98) and State Health and Safety Code (Sec. 7050.5) shall be undertaken:

A. Notification

1. Archaeological Monitor shall notify the RE or BI as appropriate, MMC, and the PI, if the Monitor is not qualified as a PI. MMC will notify the appropriate Senior Planner in the Environmental Analysis Section (EAS) of the Development Services Department to assist with the discovery notification process.

2. The PI shall notify the Medical Examiner after consultation with the RE, either in person or via telephone.

B. Isolate discovery site

1. Work shall be directed away from the location of the discovery and any nearby area reasonably suspected to overlay adjacent human remains until a determination can be made by the Medical Examiner in consultation with the PI concerning the provenance of the remains.

2. The Medical Examiner, in consultation with the PI, will determine the need for a field examination to determine the provenance.

3. If a field examination is not warranted, the Medical Examiner will determine with input from the PI, if the remains are or are most likely to be of Native American origin.

C. If Human Remains ARE determined to be Native American

1. The Medical Examiner will notify the Native American Heritage Commission (NAHC) within 24 hours. By law, **ONLY** the Medical Examiner can make this call.

2. NAHC will immediately identify the person or persons determined to be the Most Likely Descendent (MLD) and provide contact information.

3. The MLD will contact the PI within 24 hours or sooner after the Medical Examiner has completed coordination, to begin the consultation process in accordance with CEQA Section 15064.5(e), the California Public Resources and Health & Safety Codes.
4. The MLD will have 48 hours to make recommendations to the property owner or representative, for the treatment or disposition with proper dignity, of the human remains and associated grave goods.

5. Disposition of Native American Human Remains will be determined between the MLD and the PI, and, if:

   a. The NAHC is unable to identify the MLD, OR the MLD failed to make a recommendation within 48 hours after being notified by the Commission; OR;

   b. The landowner or authorized representative rejects the recommendation of the MLD and mediation in accordance with PRC 5097.94 (k) by the NAHC fails to provide measures acceptable to the landowner, THEN,

   c. In order to protect these sites, the Landowner shall do one or more of the following:
      (1) Record the site with the NAHC;

      (2) Record an open space or conservation easement on the site;

      (3) Record a document with the County.

   d. Upon the discovery of multiple Native American human remains during a ground disturbing land development activity, the landowner may agree that additional conferral with descendants is necessary to consider culturally appropriate treatment of multiple Native American human remains. Culturally appropriate treatment of such a discovery may be ascertained from review of the site utilizing cultural and archaeological standards. Where the parties are unable to agree on the appropriate treatment measures the human remains and items associated and buried with Native American human remains shall be reinterred with appropriate dignity, pursuant to Section 5.c., above.

D. If Human Remains are **NOT** Native American

1. The PI shall contact the Medical Examiner and notify them of the historic era context of the burial.

2. The Medical Examiner will determine the appropriate course of action with the PI and City staff (PRC 5097.98).

3. If the remains are of historic origin, they shall be appropriately removed and conveyed to the San Diego Museum of Man for analysis. The decision for internment

of the human remains shall be made in consultation with MMC, EAS, the applicant/landowner, any known descendant group, and the San Diego Museum of Man.

V. Night and/or Weekend Work

A. If night and/or weekend work is included in the contract

1. When night and/or weekend work is included in the contract package, the extent and timing shall be presented and discussed at the precon meeting.

2. The following procedures shall be followed.
   a. No Discoveries

      In the event that no discoveries were encountered during night and/or weekend work, the PI shall record the information on the CSVR and submit to MMC via fax by 8AM of the next business day.

   b. Discoveries

      All discoveries shall be processed and documented using the existing procedures detailed in Sections III - During Construction, and IV – Discovery of Human Remains. Discovery of human remains shall always be treated as a significant discovery.

   c. Potentially Significant Discoveries

      If the PI determines that a potentially significant discovery has been made, the procedures detailed under Section III - During Construction and IV-Discovery of Human Remains shall be followed.

   d. The PI shall immediately contact MMC, or by 8AM of the next business day to report and discuss the findings as indicated in Section III-B, unless other specific arrangements have been made.

B. If night and/or weekend work becomes necessary during the course of construction

1. The Construction Manager shall notify the RE, or BI, as appropriate, a minimum of 24 hours before the work is to begin.

2. The RE, or BI, as appropriate, shall notify MMC immediately.

C. All other procedures described above shall apply, as appropriate.

VI. Post Construction

A. Preparation and Submittal of Draft Monitoring Report

1. The PI shall submit two copies of the Draft Monitoring Report (even if negative), prepared in accordance with the Historical Resources Guidelines (Appendix C/D) which describes the results, analysis, and conclusions of all phases of the Archaeological Monitoring Program (with appropriate graphics) to MMC for review and approval within 90 days following the completion of monitoring. **It should be noted that if the PI is unable to submit the Draft Monitoring Report within the**

allotted 90-day timeframe resulting from delays with analysis, special study results or other complex issues, a schedule shall be submitted to MMC establishing agreed due dates and the provision for submittal of monthly status reports until this measure can be met.

a. For significant archaeological resources encountered during monitoring, the Archaeological Data Recovery Program shall be included in the Draft Monitoring Report.

b. Recording Sites with State of California Department of Parks and Recreation

The PI shall be responsible for recording (on the appropriate State of California Department of Park and Recreation forms-DPR 523 A/B) any significant or potentially significant resources encountered during the Archaeological Monitoring Program in accordance with the City's Historical Resources Guidelines, and submittal of such forms to the South Coastal Information Center with the Final Monitoring Report.

2. MMC shall return the Draft Monitoring Report to the PI for revision or, for preparation of the Final Report.

3. The PI shall submit revised Draft Monitoring Report to MMC for approval.

4. MMC shall provide written verification to the PI of the approved report.

5. MMC shall notify the RE or BI, as appropriate, of receipt of all Draft Monitoring Report submittals and approvals.

B. Handling of Artifacts

1. The PI shall be responsible for ensuring that all cultural remains collected are cleaned and catalogued.

2. The PI shall be responsible for ensuring that all artifacts are analyzed to identify function and chronology as they relate to the history of the area; that faunal material is identified as to species; and that specialty studies are completed, as appropriate.

3. The cost for curation is the responsibility of the property owner.

C. Curation of artifacts: Accession Agreement and Acceptance Verification

1. The PI shall be responsible for ensuring that all artifacts associated with the survey, testing and/or data recovery for this project are permanently curated with an appropriate institution. This shall be completed in consultation with MMC and the Native American representative, as applicable.

2. The PI shall include the Acceptance Verification from the curation institution in the Final Monitoring Report submitted to the RE or BI and MMC.

3. When applicable to the situation, the PI shall include written verification from the Native American consultant/monitor indicating that Native American resources were treated in accordance with state law and/or applicable agreements. If the resources were reinterred, verification shall be provided to show what protective measures

were taken to ensure no further disturbance occurs in accordance with Section IV – Discovery of Human Remains, Subsection 5.

D. Final Monitoring Report(s)

1. The PI shall submit one copy of the approved Final Monitoring Report to the RE or BI as appropriate, and one copy to MMC (even if negative), within 90 days after notification from MMC that the draft report has been approved.

2. The RE shall, in no case, issue the Notice of Completion and/or release of the Performance Bond for grading until receiving a copy of the approved Final Monitoring Report from MMC which includes the Acceptance Verification from the curation institution.

E. PALEONTOLOGICAL RESOURCES

I. Prior to Permit Issuance

A. Entitlements Plan Check

1. Prior to issuance of any construction permits, including but not limited to, the first Grading Permit, Demolition Plans/Permits and Building Plans/Permits or a Notice to Proceed for Subdivisions, but prior to the first preconstruction meeting, whichever is applicable, the Assistant Deputy Director (ADD) Environmental designee shall verify that the requirements for Paleontological Monitoring have been noted on the appropriate construction documents.

B. Letters of Qualification have been submitted to ADD

1. The applicant shall submit a letter of verification to Mitigation Monitoring Coordination (MMC) identifying the Principal Investigator (PI) for the project and the names of all persons involved in the paleontological monitoring program, as defined in the City of San Diego Paleontology Guidelines.

2. MMC will provide a letter to the applicant confirming the qualifications of the PI and all persons involved in the paleontological monitoring of the project.

3. Prior to the start of work, the applicant shall obtain approval from MMC for any personnel changes associated with the monitoring program.

II. Prior to Start of Construction

A. Verification of Records Search

1. The PI shall provide verification to MMC that a site specific records search has been completed. Verification includes, but is not limited to a copy of a confirmation letter from San Diego Natural History Museum, other institution or, if the search was in-house, a letter of verification from the PI stating that the search was completed.

2. The letter shall introduce any pertinent information concerning expectations and probabilities of discovery during trenching and/or grading activities.

B. PI Shall Attend Precon Meetings

1. Prior to beginning any work that requires monitoring; the Applicant shall arrange a Precon Meeting that shall include the PI, Construction Manager (CM) and/or Grading Contractor, Resident Engineer (RE), Building Inspector (BI), if appropriate, and MMC. The qualified paleontologist shall attend any grading/excavation related Precon Meetings to make comments and/or suggestions concerning the Paleontological Monitoring program with the Construction Manager and/or Grading Contractor.

    a. If the PI is unable to attend the Precon Meeting, the Applicant shall schedule a focused Precon Meeting with MMC, the PI, RE, CM or BI, if appropriate, prior to the start of any work that requires monitoring.

2. Identify Areas to be Monitored

    Prior to the start of any work that requires monitoring, the PI shall submit a Paleontological Monitoring Exhibit (PME) based on the appropriate construction documents (reduced to 11x17) to MMC identifying the areas to be monitored including the delineation of grading/excavation limits. The PME shall be based on the results of a site specific records search as well as information regarding existing known soil conditions (native or formation).

3. When Monitoring Will Occur

    a. Prior to the start of any work, the PI shall also submit a construction schedule to MMC through the RE indicating when and where monitoring will occur.

    b. The PI may submit a detailed letter to MMC prior to the start of work or during construction requesting a modification to the monitoring program. This request shall be based on relevant information such as review of final construction documents which indicate conditions such as depth of excavation and/or site graded to bedrock, presence or absence of fossil resources, etc., which may reduce or increase the potential for resources to be present.

III. During Construction

A. Monitor Shall be Present During Grading/Excavation/Trenching

1. The monitor shall be present full-time during grading/excavation/trenching activities as identified on the PME that could result in impacts to formations with high and moderate resource sensitivity. **The Construction Manager is responsible for notifying the RE, PI, and MMC of changes to any construction activities such as in the case of a potential safety concern within the area being monitored. In certain circumstances OSHA safety requirements may necessitate modification of the PME.**

2. The PI may submit a detailed letter to MMC during construction requesting a modification to the monitoring program when a field condition such as trenching activities that do not encounter formational soils as previously assumed, and/or when unique/unusual fossils are encountered, which may reduce or increase the potential for resources to be present.

3. The monitor shall document field activity via the Consultant Site Visit Record (CSVR). The CSVR's shall be faxed by the CM to the RE the first day of monitoring, the last day of monitoring, monthly (**Notification of Monitoring Completion**), and in the case of ANY discoveries. The RE shall forward copies to MMC.

B. Discovery Notification Process

1. In the event of a discovery, the Paleontological Monitor shall direct the contractor to temporarily divert trenching activities in the area of discovery and immediately notify the RE or BI, as appropriate.

2. The Monitor shall immediately notify the PI (unless Monitor is the PI) of the discovery.

3. The PI shall immediately notify MMC by phone of the discovery, and shall also submit written documentation to MMC within 24 hours by fax or email with photos of the resource in context, if possible.

C. Determination of Significance

1. The PI shall evaluate the significance of the resource.

   a. The PI shall immediately notify MMC by phone to discuss significance determination and shall also submit a letter to MMC indicating whether additional mitigation is required. The determination of significance for fossil discoveries shall be at the discretion of the PI.

   b. If the resource is significant, the PI shall submit a Paleontological Recovery Program (PRP) and obtain written approval from MMC. Impacts to significant resources must be mitigated before ground disturbing activities in the area of discovery will be allowed to resume.

   c. If resource is not significant (e.g., small pieces of broken common shell fragments or other scattered common fossils) the PI shall notify the RE, or BI as appropriate, that a non-significant discovery has been made. The Paleontologist shall continue to monitor the area without notification to MMC unless a significant resource is encountered.

   d. The PI shall submit a letter to MMC indicating that fossil resources will be collected, curated, and documented in the Final Monitoring Report. The letter shall also indicate that no further work is required.

IV. Night and/or Weekend Work

A. If night and/or weekend work is included in the contract

1. When night and/or weekend work is included in the contract package, the extent and timing shall be presented and discussed at the precon meeting.

2. The following procedures shall be followed.

   a. No Discoveries

      In the event that no discoveries were encountered during night and/or weekend work, The PI shall record the information on the CSVR and submit to MMC via fax by 8AM on the next business day.

   b. Discoveries

All discoveries shall be processed and documented using the existing procedures detailed in Sections III - During Construction.

c. Potentially Significant Discoveries

If the PI determines that a potentially significant discovery has been made, the procedures detailed under Section III - During Construction shall be followed.

d. The PI shall immediately contact MMC, or by 8AM on the next business day to report and discuss the findings as indicated in Section III-B, unless other specific arrangements have been made.

B. If night work becomes necessary during the course of construction

1. The Construction Manager shall notify the RE, or BI, as appropriate, a minimum of 24 hours before the work is to begin.

2. The RE, or BI, as appropriate, shall notify MMC immediately.

C. All other procedures described above shall apply, as appropriate.

V. Post Construction

A. Preparation and Submittal of Draft Monitoring Report

1. The PI shall submit two copies of the Draft Monitoring Report (even if negative), prepared in accordance with the Paleontological Guidelines which describes the results, analysis, and conclusions of all phases of the Paleontological Monitoring Program (with appropriate graphics) to MMC for review and approval within 90 days following the completion of monitoring,

a. For significant paleontological resources encountered during monitoring, the Paleontological Recovery Program shall be included in the Draft Monitoring Report.

b. Recording Sites with the San Diego Natural History Museum

The PI shall be responsible for recording (on the appropriate forms) any significant or potentially significant fossil resources encountered during the Paleontological Monitoring Program in accordance with the City's Paleontological Guidelines, and submittal of such forms to the San Diego Natural History Museum with the Final Monitoring Report.

2. MMC shall return the Draft Monitoring Report to the PI for revision or, for preparation of the Final Report.

3. The PI shall submit revised Draft Monitoring Report to MMC for approval.

4. MMC shall provide written verification to the PI of the approved report.

5. MMC shall notify the RE or BI, as appropriate, of receipt of all Draft Monitoring Report submittals and approvals.

B. Handling of Fossil Remains

1. The PI shall be responsible for ensuring that all fossil remains collected are cleaned and catalogued.

2. The PI shall be responsible for ensuring that all fossil remains are analyzed to identify function and chronology as they relate to the geologic history of the area; that faunal material is identified as to species; and that specialty studies are completed, as appropriate.

C. Curation of fossil remains: Deed of Gift and Acceptance Verification

1. The PI shall be responsible for ensuring that all fossil remains associated with the monitoring for this project are permanently curated with an appropriate institution.

2. The PI shall include the Acceptance Verification from the curation institution in the Final Monitoring Report submitted to the RE or BI and MMC.

D. Final Monitoring Report(s)

1. The PI shall submit two copies of the Final Monitoring Report to MMC (even if negative), within 90 days after notification from MMC that the draft report has been approved.

2. The RE shall, in no case, issue the Notice of Completion until receiving a copy of the approved Final Monitoring Report from MMC which includes the Acceptance Verification from the curation institution.

The above mitigation monitoring and reporting program will require additional fees and/or deposits to be collected prior to the issuance of building permits, certificates of occupancy and/or final maps to ensure the successful completion of the monitoring program.

PLANNING COMMISSION
SITE DEVELOPMENT PERMIT NO. 1494353
PLANNED DEVELOPMENT PERMIT NO. 1494352
CREEKSIDE POINTE TM PROJECT NO. 424931
[MMRP]

LJMJM NARANJA LLC, Owner/Permittee, filed an application with the City of San Diego for a permit to allow the development of 24 townhomes, consisting of six, two-story buildings with four units each, totaling 32,346 square feet (as described in and by reference to the approved Exhibits "A" and corresponding conditions of approval for the associated Site Development Permit No. 149353 and Planned Development Permit No. 1494352) on portions of a 1.55-acre site;

WHEREAS, the project site is located at 5282 Naranja Street in the RM-2-5 Zone, within the Encanto Community Plan area;

WHEREAS, the project site is legally described as Lots E and F in Block 10 of La Alturas, Map No. 1988, San Diego County;

WHEREAS, on June 23, 2016, the Planning Commission of the City of San Diego considered Site Development Permit No. 149353 and Planned Development Permit No. 1494352 pursuant to the Land Development Code of the City of San Diego;

BE IT RESOLVED by the Planning Commission of the City of San Diego as follows:

That the Planning Commission adopts the following written Findings, dated June 23, 2016.

FINDINGS:

Site Development Permit Findings, SDMC 126.0504

1. **The proposed development will not adversely affect the applicable land use plan.**

   The project proposes the construction of 24 residential townhomes on a vacant 1.55-acre site located in the Valencia Park neighborhood of the Encanto Community Plan, which designates the site for medium density residential development at a rate of 15-29 dwelling units per acre (du/ac) or 23 to 47 dwelling units allowed onsite. Therefore, the proposed 24 residential units complies with the land use designation of the Encanto Community Plan.

   The Encanto Community Plan contains a section on General Plan conformance and identifies goals for residential development. One goal emphasizes the maintenance and enhancement of existing stable residential neighborhoods, which is consistent with the General Plan objectives for the preservation of established communities, the conservation of the community's social-environmental characteristics and the rehabilitation of deteriorating neighborhoods.

This infill development project would implement these objectives through a design that respects the character of the surrounding community. Both multi-family and single-family residential are the primary existing land uses of the immediate neighborhood and the proposed multi-family development maintains that character. The project will be compatible with the appearance of the existing neighborhood and will incorporate façade, articulation and architectural details similar in scale, color and appearance of the existing development. Therefore, the proposed development will not adversely affect the applicable land use plan.

2. **The proposed development will not be detrimental to the public health, safety, and welfare.**

Adequate levels of essential public services are available to serve the project, including police, fire, and emergency medical services. The project is located in a developed residential neighborhood and the addition of 24 dwelling units is consistent with the existing use and intensity of the area. The site is served by developed streets and public utility facilities with access to be provided from two City standard driveways on Naranja Street. In addition, any existing non-standard and/or damaged public improvements, including curb, gutter and sidewalk would be replaced.

The project will not be detrimental to public health, safety and welfare in that the permit controlling the development and continued use of this site contain specific conditions addressing compliance with the City's codes, policies, regulations and other regional, state, and federal regulations. Also, conditions of approval require the review and approval of all construction plans by professional staff to ensure the project will comply with all building code regulations. The project will be inspected by certified building and engineering inspectors to assure construction is in accordance with the approved plans and all applicable regulations.

Approximately 0.22-acres of the northern portion of the site is located within the 100-year floodway and the applicant is required to obtain a Conditional Letter of Map Revision (CLOMR) from the Federal Emergency Management Agency (FEMA) prior to issuance of any grading, engineering, or building permits. No work is allowed within the regulatory floodway and all residential structures built within the flood fringe of the Special Flood Hazard Area (SFHA) must be constructed with the lowest floor elevated a minimum of two feet above the base flood elevation at that location.

The project was reviewed by the Airport Land Use Commission (ALUC) of the San Diego County Regional Airport for a consistency determination. The ALUC determined that the project was consistent and meets their requirements. An Addendum to the Southeastern San Diego Community Plan 2015 Environmental Impact Report was prepared for this project in accordance with the State of California Environmentally Quality Act (CEQA) Guidelines. The proposed project includes mitigation measures to offset environmental impacts to Biological, Historical Resources (Archeology) and Paleontological Resources. Implementation of the Mitigation, Monitoring and Reporting Program (MMRP) as well as permit conditions would reduce impacts to below a level of significance. Therefore, the project will not be detrimental to the public health, safety, and welfare.

3. **The proposed development will comply with the regulations of the Land Development Code including any allowable deviations pursuant to the Land Development Code.**

The proposed use of the 1.55-acre site for the development of 24 residential townhomes is consistent with the RM-2-5 Zoning designation. The RM-2-5 Zone allows for multi-family residential development at a density of one dwelling unit per 1,500 square feet of lot area for a maximum of 45 units allowed onsite. As designed, the project meets all applicable development regulations of the Land Development Code, including height, setbacks, parking and landscaping.

The applicant is requesting one deviations from the RM-2-5 Zone, which is allowed with the approval of a Planned Development Permit (PDP). The deviation would allow two small portions of the side-yard retaining walls to exceed the six-foot height limit. The eastern retaining wall exceeds the maximum height of six feet for approximately 20 feet near Naranja Street where the abutting development pad is higher than the existing and proposed grade. This wall would be oriented internal to the project with a maximum height of seven feet, ten inches. The western retaining wall exceeds the maximum height of six feet. This wall would be oriented toward the abutting property with a maximum height of eight feet, for approximately 45 feet where the abutting property slopes steeply down to the site.

The proposed development includes grade breaks in the pad elevation from south to north to accommodate the change in elevation; however, the slope of the topography causes short portions of the retaining walls to exceed the maximum height of six-feet. In order to grade the project, implement the Encanto Community Plan, and respect the Encanto branch of Chollas Creek and protect the abutting development, the retaining wall deviations are appropriate and the minimum necessary to implement the project.

The use of the Small Lot Subdivision (SLS) ordinance is required for development of single dwelling units in a small lot subdivision. The project is subdividing a small lot in the RM-2-5 Zone of the Encanto Community Planning Area. The 24- townhomes are consistent with the density of the RM-2-5 Zone, which allows for the construction of single dwelling units. The intent of the SLS is to encourage development of single dwelling units on small lots in order to provide a space-efficient and economical alternative to traditional single dwelling unit development. The SLS will be designed as a 26 lot subdivision with a Mutual Maintenance and Access Agreement for all facilities used in common. The proposed development is consistent with the design standards of the Encanto Community Plan.

The natural topographic conditions are unique and current residential development east and west of the existing lot presents challenges to design a project that meets the required development regulations. The property is also constrained due to a topographical change in elevation of 20 feet across the project site.

When considered as a whole, the proposed deviation is supported by staff based upon the overall design of the project. The project would provide home ownership opportunities for low to moderate income families in quality housing that includes all required public improvements and services. Therefore, the proposed development will comply with the

regulations of the Land Development Code including any allowable deviations pursuant to the Land Development Code.

(b) Supplemental Findings--Environmentally Sensitive Lands.

1. **The site is physically suitable for the design and siting of the proposed development and the development will result in minimum disturbance to environmentally sensitive lands.**

   The vacant 1.55-acre site is located in a developed residential neighborhood and is served by existing streets and public utility facilities, with site access to be provided by two driveways on Naranja Street. The Encanto Community Plan designates the site for medium density residential development at a rate of 15-29 dwelling units per acre (du/ac) or 23 to 45 dwelling units allowed onsite. Therefore the proposed 24 dwelling units are suitable for the proposed project.

   The project site is located outside the Multiple Habitat Planning Area (MHPA) and was previously disturbed. The proposed development respects the Encanto branch of the Chollas Creek which is located on the northern portion of the site. The development has been clustered towards the southern portion of the site closest to Naraja Street, on the least sensitive areas of the site, away from Chollas Creek. The project is required to conserve 0.346 acres of the northern portion of the property adjacent to Chollas Creek with a Covenant of Easement in favor of the City of San Diego.

   Approximately 78 percent of the site would be graded and is limited to the amount necessary for project construction. The proposed 24-townhome are on a location and scale consistent with the Community Plan, and is consistent in type and intensity of use with surrounding residential developments.

   An Addendum to the Southeastern San Diego Community Plan 2015 Environmental Impact Report was prepared for this project in accordance with the State of California Environmentally Quality Act (CEQA) Guidelines. The proposed project includes mitigation measures to offset impacts to the environments in the area of Biological, Historical Resources (Archeology) and Paleontological Resources. Implementation of the Mitigation, Monitoring and Reporting Program as well as permit conditions would reduce impacts to below a level of significance. The applicants have elected to pay into the Habitat Acquisition Fund at a rate of $35,000 per acre for impacts to approximately 0.32–acres of upland habitat. Therefore, the site is physically suitable for the design and siting of the proposed development and the development will result in minimum disturbance to environmentally sensitive lands.

2. **The proposed development will minimize the alteration of natural land forms and will not result in undue risk from geologic and erosional forces, flood hazards, or fire hazards.**

The vacant 1.55-acre site is located in an urbanized area with existing residential development adjacent to the west and east. Approximately 78 percent of the site would be graded and is limited to the amount necessary to construct the project. The site slopes from south to north towards Chollas Creek and that general orientation would remain with project implementation. The project proposes to construct two retaining walls up to eight feet in height with new landscaping on the east and west sides of the site. These walls would direct site drainage, limit erosion and protect the adjacent properties and Chollas Creek. The project is required to conserve 0.346-acres of the northern portion of the property adjacent to Chollas Creek with a Covenant of Easement in favor of the City of San Diego.

Geotechnical Update, Creekside Pointe, 53rd Street and Naranja Street, San Diego, California, dated April 6, 2015, was prepared for the project which determined the site is suitable for development. The new retaining walls will be constructed on fill soils so there will be minimal risk from geologic and erosional forces.

Approximately 0.22-acres of the northern portion of the site is located within the 100-year floodway and the applicant was required to obtain a Conditional Letter of Map Revision (CLOMR) from the Federal Emergency Management Agency (FEMA). No work is allowed within the regulatory floodway and all residential structures built within the flood fringe of the Special Flood Hazard Area (SFHA) must be constructed with the lowest floor elevated a minimum of two feet above the base flood elevation at that location.

The construction materials are comprised of primarily non-combustible materials as required by the California State Fire Marshall, and will not increase any fire hazards for the site. Therefore, the proposed development will minimize the alteration of natural land forms and will not result in undue risk from geologic and erosional forces, flood hazards, or fire hazards.

3. **The proposed development will be sited and designed to prevent adverse impacts on any adjacent environmentally sensitive lands.**

The project is located in an urbanized area and the adjacent properties to the east and west are devoid of any environmentally sensitive lands as they are fully developed with residential uses. The development has been located on the least sensitive areas towards the southern end of the property away from Chollas Creek to the north. The project is required to conserve 0.346 acres of the northern portion of the property adjacent to Chollas Creek with a Covenant of Easement in favor of the City of San Diego.

Approximately 0.22-acres of the northern portion of the site is located within the 100-year floodway and the applicant was required to obtain a Conditional Letter of Map Revision (CLOMR) from the Federal Emergency Management Agency (FEMA). No work is allowed within the regulatory floodway and all residential structures built within the flood fringe of the Special Flood Hazard Area (SFHA) must be constructed with the lowest floor elevated a minimum of two feet above the base flood elevation at that location.

Grading would include 78 percent of the project site and is limited to that necessary to construct the project. The proposed 24 dwelling residential development is on a location

and scale consistent with the Encanto Community Plan, and is consistent in type and intensity of use with surrounding residential developments. Further, the proposed project will comply with the provisions of the Chollas Creek Enhancement Program (CCEP). Therefore, the development will result in minimum disturbance to adjacent Environmentally Sensitive Lands (ESL).

4. **The proposed development will be consistent with the City of San Diego's Multiple Species Conservation Program (MSCP) Subarea Plan.**

   The project site is not within or adjacent to the Multiple Species Conservation Program (MSCP) Multiple Habitat Planning Area (MHPA). Therefore, the project is not inconsistent with the City's MSCP.

5. **The proposed development will not contribute to the erosion of public beaches or adversely impact local shoreline sand supply.**

   The proposed development is located more than six miles inland from public beaches and more than three miles from local shoreline (San Diego Harbor) and therefore it is unlikely that on-site development will contribute to erosion of public beaches or adversely affect shoreline sand supply. The development will comply with the CCEP and will include water quality Best Management Practices (BMPs) in compliance with local and state regulations to ensure downstream water quality is not significantly affected. Specifically, detention/desiltation basins will be provided on-site to reduce surface water runoff and reduce water runoff velocities to the extent water runoff might increase downstream siltation and contribute to the erosion of public beaches or adversely affect local shoreline sand supply.

6. **The nature and extent of mitigation required as a condition of the permit is reasonably related to, and calculated to alleviate, negative impacts created by the proposed development.**

   An Addendum to the Southeastern San Diego Community Plan 2015 Environmental Impact Report was prepared for this project in accordance with the State of California Environmentally Quality Act (CEQA) Guidelines. The site is not within or adjacent to the City's MHPA. Mitigation for impacts to sensitive biological resources shall be provided pursuant to the City's Biology Guidelines. The proposed project includes mitigation measures to offset impacts to the environments in the area of Biological, Historical Resources (Archeology) and Paleontological Resources. Implementation of the Mitigation, Monitoring and Reporting Program as well as permit conditions would reduce impacts to below a level of significance. The applicants have elected to pay into the Habitat Acquisition Fund at a rate of $35,000 per acre for impacts to approximately 0.32–acres of habitat. As described in the administrative record, the permit conditions, and mitigation measures alleviate the negative impact of this development. All feasible mitigation reasonably related to and calculated to alleviate negative impacts created by the proposed development are incorporated into the conditions of approval.

Planned Development Permit, SDMC 126.0604

1. **The proposed development will not adversely affect the applicable land use plan.**

   The project proposes the construction of 24-townhomes on a vacant 1.55-acre site located in the Valencia Park neighborhood of the Encanto Community Plan, which designates the site for medium density residential development at a rate of 15-29 dwelling units per acre (du/ac) or 23 to 45 dwelling units allowed onsite. Therefore, the proposed 24-townhomes comply with the land use designation of the Encanto Community Plan.

   The Encanto Community Plan contains a section on General Plan conformance and identifies goals for residential development. One goal emphasizes the maintenance and enhancement of existing stable residential neighborhoods, which is consistent with the General Plan objectives for the preservation of established communities, the conservation of the community's social-environmental characteristics and the rehabilitation of deteriorating neighborhoods.

   This infill development project would implement these objectives through a design that respects the character of the surrounding community. Both multi-family and single-family residential are the primary existing land uses of the immediate neighborhood and the proposed multi-family development maintains that character. The project will be compatible with the appearance of the existing neighborhood and will incorporate façade, articulation and architectural details similar in scale, color and appearance of the existing development. Therefore, the proposed development will not adversely affect the applicable land use plan.

2. **The proposed development will not be detrimental to the public health, safety, and welfare.**

   Adequate levels of essential public services are available to serve the project, including police, fire, and emergency medical services. The project is located in a developed residential neighborhood and the addition of 24 dwelling units is consistent with the existing use and intensity of the area. The site is served by developed streets and public utility facilities with access to be provided from two City standard driveways on Naranja Street. In addition, any existing non-standard and/or damaged public improvements, including curb, gutter and sidewalk would be replaced. The project will not be detrimental to public health, safety and welfare in that the permit controlling the development and continued use of this site contain specific conditions addressing compliance with the City's codes, policies, regulations and other regional, state, and federal regulations. Also, conditions of approval require the review and approval of all construction plans by professional staff to ensure the project will comply with all building code regulations. The project will be inspected by certified building and engineering inspectors to assure construction is in accordance with the approved plans and all applicable regulations.

   Approximately 0.22-acres of the northern portion of the site is located within the 100-year floodway and the applicant was required to obtain a Conditional Letter of Map Revision (CLOMR) from the Federal Emergency Management Agency (FEMA). No work is allowed within the regulatory floodway and all residential structures built within the flood fringe of

the Special Flood Hazard Area (SFHA) must be constructed with the lowest floor elevated a minimum of two feet above the base flood elevation at that location.

The project was reviewed by the Airport Land Use Commission (ALUC) of the San Diego County Regional Airport for a consistency determination. The ALUC determined that the project was consistent and meets their requirements. An Addendum to the Southeastern San Diego Community Plan 2015 Environmental Impact Report was prepared for this project in accordance with the State of California Environmentally Quality Act (CEQA) Guidelines. The proposed project includes mitigation measures to offset environmental impacts to Biological, Historical Resources (Archeology) and Paleontological Resources. Implementation of the Mitigation, Monitoring and Reporting Program (MMRP) as well as permit conditions would reduce impacts to below a level of significance. Therefore, the project will not be detrimental to the public health, safety, and welfare.

3. **The proposed development will comply with the regulations of the Land Development Code including any proposed deviations pursuant to Section 126.0602(b)(1) that are appropriate for this location and will result in a more desirable project than would be achieved if designed in strict conformance with the development regulations of the applicable zone, and any allowable deviations that are otherwise authorized pursuant to the Land Development Code.**

The proposed use of the 1.55-acre site for the construction of 24 townhomes is consistent with the RM-2-5 Zoning designation. The RM-2-5 Zone allows for multi-family residential development at a density of one dwelling unit per 1,500 square feet of lot area for a maximum of 45 units allowed onsite. As designed the project meets all applicable development regulations of the Land Development Code, including height, setbacks, parking and landscaping.

The applicant is requesting one deviation from the RM-2-5 Zone, which is allowed with the approval of a Planned Development Permit (PDP). The deviation would allow two small portions of the side-yard retaining walls to exceed the six-foot height limit. The eastern retaining wall is proposed to exceed the maximum allowed height of six feet with a height of seven feet, ten inches for approximately 20 feet near Naranja Street where the abutting development pad is higher than the existing and proposed grade. The proposed development includes grade breaks in the pad elevation from south to north to accommodate the change in elevation; however, the slope of the topography causes short portions of the retaining walls to exceed the maximum height of six feet.

The western retaining wall exceeds the maximum allowed height of six feet for approximately 45 feet where the abutting property slopes steeply down to the site. In order to grade the project, implement the Encanto Community Plan, and respect the Encanto branch of Chollas Creek, a retaining wall is included to protect the abutting development. The western retaining wall, which is oriented toward the abutting property will have a maximum height of eight feet.

The proposed development is consistent with the design standards of the Planned Development Permit Ordinance which requires a comparative analysis of the surrounding development, open space requirements and conformance to the community plan. The natural topographic conditions are unique due to a topographical change in elevation of 20 feet across the project site. Additionally, the current residential development on the east and west of the existing lot present challenges to project design for meeting the required development regulations.

When considered as a whole, the proposed project deviations are supported by staff based upon the overall design of the project. If approved, the project would provide new housing along with all necessary public improvements. Two housing units will provide opportunities for home ownership to low to moderate income families. The project would improve the site by providing new housing on a vacant site that has been under used as an illegal dumping site in previous years. Therefore, the proposed development will comply with the regulations of the Land Development Code including any allowable deviations pursuant to the Land Development Code and results in a more desirable project than would be achieved if designed in strict conformance with the development regulations of the applicable zone, and any allowable deviations.

BE IT FURTHER RESOLVED that, based on the findings hereinbefore adopted by the Planning Commission, Development Permit No. 149353 and Planned Development Permit No. 1494352, is hereby GRANTED by the Planning Commission to the referenced Owner/Permittee, in the form, exhibits, terms and conditions as set forth in Site Development Permit No. 149353 and Planned Development Permit No. 1494352, a copy of which is attached hereto and made a part hereof.

Derrick Johnson (DJ)
Development Project Manager
Development Services

Adopted on: June 23, 2016

SAP or WBS Number: 24005887

RECORDING REQUESTED BY
CITY OF SAN DIEGO
DEVELOPMENT SERVICES
PERMIT INTAKE, MAIL STATION 501

PROJECT MANAGEMENT
PERMIT CLERK
MAIL STATION 501

SPACE ABOVE THIS LINE FOR RECORDER'S USE

INTERNAL ORDER NUMBER: 24005887

SITE DEVELOPMENT PERMIT NO. 1494351
PLANNED DEVELOPMENT PERMIT NO. 1494352
CREEKSIDE POINTE - PROJECT NO. 424931 MMRP
PLANNING COMMISSION

This Site Development Permit No. 149435 and Planned Development Permit No. 149352 is granted by the Planning Commission of the City of San Diego to LJMJM NARANJA LLC, Owner/Permittee, pursuant to San Diego Municipal Code [SDMC] sections 126.0504 and 126.0604. The 1.55-acre site is located at 5282 Naranja Street in the RM-2-5 Zone within the Encanto Community Plan area. The project site is legally described as Lot E and F in Block 10 of La Alturas, Map No. 1988, San Diego County.

Subject to the terms and conditions set forth in this Permit, permission is granted to Owner/Permittee to allow the construction of 24 townhomes, consisting of six two-story buildings with four units each, described and identified by size, dimension, quantity, type, and location on the approved exhibits [Exhibit "A"] dated June 23, 2016, on file in the Development Services Department.

The project shall include:

a. Construction of six buildings totaling 32,346-square-feet, containing four three-bedroom units, per building, (a total of 24 townhomes). Each townhome is two-stories over a two -car garage;

b. Deviation for retaining walls that exceed six feet in height;

c. Landscaping (planting, irrigation and landscape related improvements);

d. 54 off-street parking spaces;

e. Retaining walls, fences, signs, lighting and recreational facilities; and

f. Public and private accessory improvements determined by the Development Services Department to be consistent with the land use and development standards for this site in accordance with the adopted community plan, the California Environmental Quality Act [CEQA] and the CEQA Guidelines, the City Engineer's requirements, zoning regulations, conditions of this Permit, and any other applicable regulations of the SDMC.

STANDARD REQUIREMENTS:

1. This permit must be utilized within thirty-six (36) months after the date on which all rights of appeal have expired. If this permit is not utilized in accordance with Chapter 12, Article 6, Division 1 of the SDMC within the 36 month period, this permit shall be void unless an Extension of Time has been granted. Any such Extension of Time must meet all SDMC requirements and applicable guidelines in effect at the time the extension is considered by the appropriate decision maker. This permit must be utilized by June 10, 2019.

2. No permit for the construction, occupancy, or operation of any facility or improvement described herein shall be granted, nor shall any activity authorized by this Permit be conducted on the premises until:

a. The Owner/Permittee signs and returns the Permit to the Development Services Department; and

b. The Permit is recorded in the Office of the San Diego County Recorder.

3. While this Permit is in effect, the subject property shall be used only for the purposes and under the terms and conditions set forth in this Permit unless otherwise authorized by the appropriate City decision maker.

4. This Permit is a covenant running with the subject property and all of the requirements and conditions of this Permit and related documents shall be binding upon the Owner/Permittee and any successor(s) in interest.

5. The continued use of this Permit shall be subject to the regulations of this and any other applicable governmental agency.

6. Issuance of this Permit by the City of San Diego does not authorize the Owner/Permittee for this Permit to violate any Federal, State or City laws, ordinances, regulations or policies including, but not limited to, the Endangered Species Act of 1973 [ESA] and any amendments thereto (16 U.S.C. § 1531 et seq.).

7. The Owner/Permittee shall secure all necessary building permits. The Owner/Permittee is informed that to secure these permits, substantial building modifications and site improvements may be required to comply with applicable building, fire, mechanical, and plumbing codes, and State and Federal disability access laws.

8. Construction plans shall be in substantial conformity to Exhibit "A." Changes, modifications, or alterations to the construction plans are prohibited unless appropriate application(s) or amendment(s) to this Permit have been granted.

9. All of the conditions contained in this Permit have been considered and were determined-necessary to make the findings required for approval of this Permit. The Permit holder is required to comply with each and every condition in order to maintain the entitlements that are granted by this Permit.

If any condition of this Permit, on a legal challenge by the Owner/Permittee of this Permit, is found or held by a court of competent jurisdiction to be invalid, unenforceable, or unreasonable, this Permit shall be void. However, in such an event, the Owner/Permittee shall have the right, by paying applicable processing fees, to bring a request for a new permit without the "invalid" conditions(s) back to the discretionary body which approved the Permit for a determination by that body as to whether all of the findings necessary for the issuance of the proposed permit can still be made in the absence of the "invalid" condition(s). Such hearing shall be a hearing de novo, and the discretionary body shall have the absolute right to approve, disapprove, or modify the proposed permit and the condition(s) contained therein.

10. The Owner/Permittee shall defend, indemnify, and hold harmless the City, its agents, officers, and employees from any and all claims, actions, proceedings, damages, judgments, or costs, including attorney's fees, against the City or its agents, officers, or employees, relating to the issuance of this permit including, but not limited to, any action to attack, set aside, void, challenge, or annul this development approval and any environmental document or decision. The City will promptly notify Owner/Permittee of any claim, action, or proceeding and, if the City should fail to cooperate fully in the defense, the Owner/Permittee shall not thereafter be responsible to defend, indemnify, and hold harmless the City or its agents, officers, and employees. The City may elect to conduct its own defense, participate in its own defense, or obtain independent legal counsel in defense of any claim related to this indemnification. In the event of such election, Owner/Permittee shall pay all of the costs related thereto, including without limitation reasonable attorney's fees and costs. In the event of a disagreement between the City and Owner/Permittee regarding litigation issues, the City shall have the authority to control the litigation and make litigation related decisions, including, but not limited to, settlement or other disposition of the matter. However, the Owner/Permittee shall not be required to pay or perform any settlement unless such settlement is approved by Owner/Permittee.

ENVIRONMENTAL/MITIGATION REQUIREMENTS:

11. Mitigation requirements in the Mitigation, Monitoring, and Reporting Program [MMRP] shall apply to this Permit. These MMRP conditions are hereby incorporated into this Permit by reference.

12. The mitigation measures specified in the MMRP and outlined in Addendum to the Southeastern San Diego Community Plan 2015 Environmental Impact Report No. 424931, shall be noted on the construction plans and specifications under the heading ENVIRONMENTAL MITIGATION REQUIREMENTS.

13. The northern portion of the property adjacent to Chollas Creek, approximately 0.346 acres, shall be conserved in and placed into a Covenant of Easement in favor of the City of San Diego.

AFFORDABLE HOUSING REQUIREMENTS

14. Prior to receiving the first residential building permit or recordation of the final map, whichever shall first occur, Owner/Permittee shall comply with the provisions of Chapter 14, Article 2, Division 13 of the San Diego Municipal Code ("Inclusionary Affordable Housing Regulations") by entering into an agreement with the San Diego Housing Commission, secured by a performance deed of trust, to provide at least 10 percent of the total units at the project as affordable to households earning at or below 100 percent of area median income in compliance with the Inclusionary Affordable Housing Regulations. The agreement shall provide that the affordable units must be offered for sale within 12 months from issuance of the first residential building permit and that the Owner/Permittee shall diligently pursue the sale of such affordable units until all affordable units have been sold. If the affordable units are not offered for sale and/or sale is not diligently pursued by the Owner/Permittee, Owner/Permittee shall pay the Inclusionary Affordable Housing Fee for the entire project to the San Diego Housing Commission, upon notice, based upon the rate in effect at the time the first building permit was issued, plus interest at the legal rate to the date of payment. The agreement, secured by a performance deed of trust, shall be executed before the issuance of the first residential building permit or the recordation of the final map, whichever shall first occur, in a form as approved by the San Diego Housing Commission and its General Counsel, and the Agreement shall provide that time is of the essence in marketing the affordable units.

AIRPORT REQUIREMENTS:

15. Prior to issuance of a grading permit the Owner/Permittee shall provide a valid "Determination of No Hazard to Air Navigation" issued by the Federal Aviation Administration [FAA].

ENGINEERING REQUIREMENTS:

16. The Site Development and Planned Development Permit shall comply with all Conditions of the Final Map for the Tentative Map No. 1494351.

17. The project proposes to import material to project site. All excavated material listed to be exported, shall be exported to a legal disposal site in accordance with the Standard Specifications for Public Works Construction (the "Green Book"), 2009 edition and Regional Supplement Amendments adopted by Regional Standards Committee.

18. The drainage system proposed for this development, as shown on the site plan, is public and private and subject to approval by the City Engineer.

19. Prior to the issuance of any building permits, the Owner/Permittee shall obtain a bonded grading permit for the grading proposed for this project. All grading shall conform to the requirements of the City of San Diego Municipal Code in a manner satisfactory to the City Engineer.

20. Prior to the issuance of any building permits, the Owner/Permittee shall obtain an Encroachment Maintenance Removal Agreement, from the City Engineer, for the enhanced paving, landscaping and steps in the Public storm drain easement.

21. Prior to the issuance of any building permits, the Owner/Permittee shall assure, by permit and bond, to construct a curb ramp the north curb of Naranja Street at 53rd Street, with current City Standard curb ramp Standard Drawing SDG-130 and SDG-132 with truncated domes, satisfactory to the City Engineer.

22. Prior to the issuance of any building permits, the Owner/Permittee shall assure, by permit and bond, the construction of two current City Standard 24 foot wide concrete driveways, adjacent to the site on Naranja Street, satisfactory to the City Engineer.

23. Prior to the issuance of any building permits, the Owner/Permittee shall assure, by permit and bond, to reconstruct the damaged portions of the curb, gutter and sidewalk with current City Standards curb, gutter and sidewalk, adjacent to the site on Naranja Street, satisfactory to the City Engineer.

24. Prior to the issuance of any building permits, the Owner/Permittee shall dedicate a 15-foot wide Public Storm Drain Easement, satisfactory to the City Engineer.

25. Whenever Public easements are required to be dedicated, it is the responsibility of the Owner/Permittee to provide the easements free and clear of all encumbrances and prior easements. The Applicant must secure "subordination agreements" for minor distribution facilities and/or "joint-use agreements" for major transmission facilities.

26. Prior to the issuance of any building permits, the Owner/Permittee shall assure, by permit and bond, to construct a current City Standard 36 inch Reinforced Concrete Pipe (RCP) Public Storm Drain system, per approved Exhibit 'A', satisfactory to the City Engineer.

27. Prior to the issuance of any construction permit, the Owner/Permittee shall enter into a Maintenance Agreement for the ongoing permanent water quality Best Management Practice (BMP) device maintenance, satisfactory to the City Engineer.

28. Prior to the issuance of any construction permit, the Owner/Permittee shall incorporate any construction BMPs necessary to comply with Chapter 14, Article 2, Division 1 (Grading Regulations) of the SDMC, into the construction plans or specifications.

29. Prior to the issuance of any construction permit, the Owner/Permittee shall submit a Technical Report that will be subject to final review and approval by the City Engineer, based on the Storm Water Standards in effect at the time of the construction permit issuance.

30. Development of this project shall comply with all storm water construction requirements of the State Construction General Permit, Order No. 2009-00090DWQ, or subsequent order, and the Municipal Storm Water Permit, Order No. R9-2013-0001, or subsequent order. In accordance with Order No. 2009-0009DWQ, or subsequent order, a Risk Level Determination shall be calculated for

the site and a Storm Water Pollution Prevention Plan (SWPPP) shall be implemented concurrently with the commencement of grading activities.

31. Prior to issuance of a grading or a construction permit, a copy of the Notice of Intent (NOI) with a valid Waste Discharge ID number (WDID#) shall be submitted to the City of San Diego as a proof of enrollment under the Construction General Permit. When ownership of the entire site or portions of the site changes prior to filing of the Notice of Termination (NOT), a revised NOI shall be submitted electronically to the State Water Resources Board in accordance with the provisions as set forth in Section II.C of Order No. 2009-0009-DWQ and a copy shall be submitted to the City.

32. The storm drain outfall structure of this project has been identified as being within the floodway of a Special Flood Hazard Area (SFHA). No increases to base flood elevations are allowed. Prior to issuance of a grading or a construction permit, a Registered Professional Engineer shall submit a no rise certification along with a detailed engineering analysis to substantiate the certification. The analysis is subject to the approval of the City Engineer.

33. No certificates of occupancy will be granted or bonds released for development associated with this project until a Letter of Map Revision (LOMR) is obtained from FEMA. The LOMR is issued based upon as-built site conditions, therefore, the Owner/Permittee must allow time to complete this process. The developer must provide all documentation, engineering calculations, and fees which are required by FEMA.

34. Fill placed in the SFHA for the purpose of creating a building pad must be compacted to 95% of the maximum density obtainable with the Standard Proctor Test Fill method issued by the American Society for Testing and Materials (ASTM Standard D-698). Granular fill slopes must have adequate protection for a minimum flood water velocity of five feet per second.

35. The Owner/Permittee shall denote on the final map and the improvement plans "Subject to Inundation" all areas lower than the base flood elevation plus two feet.

36. The Owner/Permittee shall enter into an agreement with the City waiving the right to oppose a special assessment initiated for the construction of flood control facilities and their perpetual maintenance.

37. The Owner/Permittee shall grant a flowage easement, satisfactory to the City Engineer, over property within the floodway.

38. This project proposes to construct structures within the flood fringe of a Special Flood Hazard Area (SFHA). No work is allowed within the regulatory floodway. All residential structures built within the SFHA must be constructed with the lowest floor elevated a minimum of two feet above the base flood elevation (BFE) at that location.

39. The Owner/Permittee shall floodproof all structures subject to inundation. The floodproofed structures must be constructed to meet the requirements of the Federal Insurance Administration's Technical Bulletin 3-93. Additionally, a registered civil engineer or architect must certify prior to occupancy that those requirements have been met.

40. The Owner/Permittee shall enter into an agreement to indemnify, protect and hold harmless the City, its officials and employees from any and al claims, demands, causes or action, liability or loss because of, or arising out of flood waters.

LANDSCAPE REQUIREMENTS:

41. Prior to issuance of any engineering permits for grading, the Owner/Permittee shall submit complete construction documents for the revegetation and hydroseeding of all disturbed land in accordance with the Landscape Standards and to the satisfaction of the Development Services Department. All plans shall be in substantial conformance to this permit (including Environmental conditions) and Exhibit 'A,' on file in the Office of the Development Services Department.

42. Prior to issuance of any engineering permits for right-of-way improvements, the Owner/Permittee shall submit complete landscape construction documents for right-of-way improvements to the Development Services Department for approval. Improvement plans shall show, label, and dimension a 40 sq-ft area around each tree which is unencumbered by utilities. Driveways, utilities, drains, water and sewer laterals shall be designed so as not to prohibit the placement of street trees.

43. In the event that a foundation only permit is requested, the Owner/Permittee shall submit a site plan or staking layout plan identifying all landscape areas consistent with Exhibit 'A,' Landscape Development Plan, on file in the Office of the Development Services Department. These landscape areas shall be clearly identified with a distinct symbol, noted with dimensions and labeled as 'landscaping area.

44. Prior to issuance of any construction permits for structures, the Owner/Permittee shall submit complete landscape and irrigation construction documents consistent with the Landscape Standards to the Development Services Department for approval. The construction documents shall be in substantial conformance with Exhibit 'A,' Landscape Development Plan, on file in the Development Services Department. Construction plans shall show, label, and dimension a 40 square feet area around each tree which is unencumbered by hardscape and utilities as set forth under LDC 142.0403(b)(5).

45. Prior to issuance of any construction permits for structures, the Owner/Permittee shall submit a water budget in accordance with the Water Conservation Requirements per SDMC 142.0413, Table 142-04I, to be included with the construction documents. An irrigation audit shall be submitted consistent with Section 2.7 of the Landscape Standards of the Land Development Manual at final inspection. The irrigation audit shall certify that all irrigation systems have been installed and operate as approved by the Development Services Department.

46. The Owner/Permittee shall be responsible for the maintenance of all landscape improvements shown on the approved plans, including in the right-of-way, consistent with the Landscape Standards unless long-term maintenance of said landscaping will be the responsibility of a Landscape Maintenance District or other approved entity. All required landscape shall be

maintained in a disease, weed and litter free condition at all times. Severe pruning or "topping" of trees is not permitted unless specifically noted in this Permit.

If any required landscape (including existing or new plantings, hardscape, landscape features, etc.) indicated on the approved construction document plans is damaged or removed during demolition or construction, the Owner/Permittee shall repair and/or replace it in kind and equivalent size per the approved documents to the satisfaction of the Development Services Department within 30 days of damage.

PLANNING/DESIGN REQUIREMENTS:

47. Owner/Permittee shall maintain a minimum of 54 off-street parking spaces on the property at all times in the approximate locations shown on the approved Exhibit "A." Parking spaces shall comply at all times with the SDMC and shall not be converted for any other use unless otherwise authorized by the appropriate City decision maker in accordance with the SDMC.

48. A topographical survey conforming to the provisions of the SDMC may be required if it is determined, during construction, that there may be a conflict between the building(s) under construction and a condition of this Permit or a regulation of the underlying zone. The cost of any such survey shall be borne by the Owner/Permittee.

49. There shall be compliance with the regulations of the underlying zone(s) unless a deviation or variance to a specific regulation(s) is approved or granted as condition of approval of this permit. Where there is a conflict between a condition (including exhibits) of this permit and a regulation of the underlying zone, the regulation shall prevail unless the condition provides for a deviation or variance from the regulations.

50. The height(s) of the building(s) or structure(s) shall not exceed those heights set forth in the conditions and the exhibits (including, but not limited to, elevations and cross sections) or the maximum permitted building height of the underlying zone, whichever is lower, unless a deviation or variance to the height limit has been granted as a specific condition of this permit.

51. Any future requested amendment to this permit shall be reviewed for compliance with the regulations of the underlying zone(s) which are in effect on the date of the submittal of the requested amendment.

52. All signs shall comply with the San Diego Municipal Code Chapter 14, Article 2, Division 12, Sign Regulations.

53. Fences and retaining walls shall comply with the San Diego Municipal Code Section 142.0301, unless deviations to the regulations are approved with this permit.

54. Environmentally sensitive lands that are outside of the allowable development area of the premises shall be left in a natural state and used only for those passive activities allowed as a condition of permit approval. Prior to the issuance of any construction permits, the passive activities allowed on the undeveloped remainder of the premises and any other conditions of the

permit shall be incorporated into a covenant of easement that shall be recorded against title to the property, in accordance with procedures set forth in section 143.0152.

55. The U.S. Fish and Wildlife Service and the California Department of Fish and Game will be named as third party beneficiaries to any covenant of easement recorded pursuant to this condition.

56. The Owner/Permittee shall post a copy of each approved discretionary Permit or Tentative Map in its sales office for consideration by each prospective buyer.

57. All private outdoor lighting shall be shaded and adjusted to fall on the same premises where such lights are located and in accordance with the applicable regulations in the SDMC.

58. A Mutual Maintenance and Access Agreement for all facilities used in common will be entered into to the satisfaction of the City Engineer and shall be recorded against the applicable properties in the office of the San Diego County Recorder prior to issuance of a certificate of occupancy.

59. The Mutual Maintenance and Access Agreement shall, at a minimum, include and provide for the following:(1) Easements for: (A) Shared driveways, (B) Utilities (C) Drainage and runoff, (D) Encroachments, (E) Maintenance, repair, and reconstruction, (2) Maintenance for: (A) Shared driveways, (B) Sewer lines, (C) Cable and electrical lines, (D) Exterior lighting, (E) Perimeter fences as shown on Exhibit "A", satisfactory to the City Engineer.

TRANSPORTATION REQUIREMENTS

60. No fewer than 54 parking spaces (two spaces per unit), including 1 van accessible space, and 2 motorcycle spaces shall be maintained on the property at all times in the approximate locations shown on Exhibit "A". All on-site parking stalls and aisle widths shall be in compliance with requirements of the City's land Development Code and shall not be converted and/or utilized for any other purpose, unless otherwise authorized in writing by the Development Services Department.

61. Within three months from the issuance of occupancy permit, applicant shall request an evaluation for a stop control installation (sign, limit line and pavement legend) at the north leg of the intersection of 53rd Street and Naranja Street from City's Transportation and Storm Water Department-Traffic Engineering Operations Division.

62. Red curb markings shall be installed between the two proposed project driveways on the north side of Naranja Street, and 50 feet east of easterly driveway and 50 feet west of the westerly driveway. No objects higher than 36 inches shall be located within the visibility triangles.

PUBLIC UTILITIES DEPARTMENT REQUIREMENTS:

63. Prior to issuance of any engineering permits, the Owner/Permittee shall obtain Encroachment and Maintenance Removal Agreement (EMRA) for proposed improvements of any kind, including

utilities, landscaping, enriched paving, and electrical conduits to be installed within the public- right-of-way or public easement.

64. Prior to the issuance of any building permits, the Owner/Permittee shall assure, by permit and bond, the design and construction of any new water and sewer service(s) outside of any driveway, and the disconnection at the water main of the existing unused water service adjacent to the project site, in a manner satisfactory to the Public Utilities Director and the City Engineer.

65. Prior to the issuance of any building permits, the Owner/Permittee shall apply for a plumbing permit for the installation of appropriate above ground private back flow prevention device(s), on each water service (domestic, fire and irrigation), in a manner satisfactory to the Public Utilities Director and the City Engineer. BFPD's are typically located on private property, in line with the service and immediately adjacent to the right-of-way. The Public Utilities Department will not permit the required BFPDs to be located below grade or within the structure.

66. Prior to the issuance of any certificate of occupancy, the Owner/Permittee shall construct all water and sewer facilities required by the Public Utilities Department necessary to serve this development and assure them by permit and bond.

67. The Owner/Permittee shall install fire hydrants at locations satisfactory to the Fire Marshal, the Public Utilities Director and the City Engineer. If more than two (2) fire hydrants or thirty (30) dwelling units are located on a dead-end water main then the Owner/Permittee shall install a redundant water system, in a manner satisfactory to the Public Utilities Director and the City Engineer.

68. Prior to the issuance of any building permits, the Owner/Permittee shall assure, by permit and bond, the replacement of the existing 6-inch water main with 12-inch water facilities and a 12" X 6" reducer in Naranja Street from 54th Street to the project westerly lot boundary, in a manner satisfactory to the Public Utilities Department Director and the City Engineer.

69. In addition, prior to the issuance of any building permits, the Owner/Permittee shall assure, by permit and bond, the replacement of the existing connections with one 6" X 8" X 12" Tee-connection at the intersection of 54th Street and Naranja Street and one 12" X 12" X 8" Tee-connection of the intersection of 53rd Street and Naranja Street, in a manner satisfactory to the Public Utilities Department Director and the City Engineer.

70. All on-site water and sewer facilities shall be private.

71. All proposed private sewer facilities located within a single lot are to be designed to meet the requirements of the California Plumbing Code and will be reviewed as part of the building permit plan check.

72. All proposed public water and sewer facilities, must be designed and constructed in accordance with established criteria in the most current edition of the City of San Diego Water and Sewer Facility Design Guidelines and City regulations, standards and practices pertaining thereto.

73. No trees or shrubs exceeding three feet in height at maturity shall be installed within ten feet of any sewer and five feet of any water facilities.

INFORMATION ONLY:

- The issuance of this discretionary use permit alone does not allow the immediate commencement or continued operation of the proposed use on site. The operation allowed by this discretionary use permit may only begin or recommence after all conditions listed on this permit are fully completed and all required ministerial permits have been issued and received final inspection.

- Any party on whom fees, dedications, reservations, or other exactions have been imposed as conditions of approval of this Permit, may protest the imposition within ninety days of the approval of this development permit by filing a written protest with the City Clerk pursuant to California Government Code-section 66020.

- This development may be subject to impact fees at the time of construction permit issuance.

APPROVED by the Planning Commission of the City of San Diego on June 23, 2016 and PC-Reso NO_____ .

Permit Type/PTS Approval No.: Site Development Permit No. 149353/Planned Development Permit No. 1494352
Date of Approval: June 23, 2016

AUTHENTICATED BY THE CITY OF SAN DIEGO DEVELOPMENT SERVICES DEPARTMENT

_____
Derrick Johnson (DJ)
Development Project Manager

NOTE: Notary acknowledgment must be attached per Civil Code section 1189 et seq.

The undersigned Owner/Permittee, by execution hereof, agrees to each and every condition of this Permit and promises to perform each and every obligation of Owner/Permittee hereunder.

LJMJM NARANJA LLC
Owner/Permittee

By _____
Jack McGory
President

NOTE: Notary acknowledgments must be attached per Civil Code section 1189 et seq.

PLANNING COMMISSION RESOLUTION NUMBER R-_____

TENTATIVE MAP NO. 1494351
CREEKSIDE POINTE TM-PROJECT NO. 424931 [MMRP]

WHEREAS, LJMJM NARANJA LLC, Subdivider, and Engineer, JP ENGINEERING, INC, submitted an application to the City of San Diego for Tentative Map No. 1494351 for the construction of six two-story buildings with four units each, totaling 24 townhomes. The project site is located at 5282 Naranja Street in the RM-2-5 Zone, within the Encanto Community Plan Area. The property is legally described as Lots E and F in Block 10 of La Alturas, Map No. 1988, San Diego County; and

WHEREAS, the Map proposes the Subdivision of a 1.55-site from two lots into 26 lots to accommodate the construction of 24-townhomes; and

WHEREAS, on April 6, 2016, the City of San Diego, as Lead Agency, through the Development Services Department, made and issued an Environmental Determination that an Addendum to the Southeastern San Diego Community Plan 2015 Environmental Impact Report No. 386029 is required for the project in accordance with State of California Environmental Quality Act (CEQA) Guidelines; and

WHEREAS, the project complies with the requirements of a preliminary soils and/or geological reconnaissance report pursuant to Subdivision Map Act sections 66490 and 66491(b)-(f) and San Diego Municipal Code section 144.0220; and

WHEREAS, on June 23, 2016, the Planning Commission of the City of San Diego considered Tentative Map No. 1494351 and pursuant to San Diego Municipal Code section(s) 125.0440, 125.1040 and Subdivision Map Act section 66428, received for its consideration written and oral presentations, evidence having been submitted, and testimony having been heard from all

interested parties at the public hearing, and the Planning Commission having fully considered the matter and being fully advised concerning the same; NOW THEREFORE,

BE IT RESOLVED by the Planning Commission of the City of San Diego, that it adopts the following findings with respect to Tentative Map No. 1494351:

1. **The proposed subdivision and its design or improvement are consistent with the policies, goals, and objectives of the applicable land use plan.**

   The City of San Diego General Plan and the Encanto Community Plan designate the site for multi-family development at a medium density of 15-29 dwelling units per acre, with minimum lot size and dimensional criteria. The project proposes the subdivision of a vacant 1.55-acre site, to create 26 lots for the construction of 24 townhomes. The 25th & 26th lots within the subdivision will include all the common use areas and the Mutual Maintenance and Access Agreement. Both multi-family and single-family residential are the primary existing land uses of the surrounding neighborhood. The project will be compatible with the appearance of the existing neighborhood and will incorporate façade, articulation and architectural details similar in scale, color and appearance of the existing neighborhood.

   The Encanto Community Plan contains a section on General Plan conformance and identifies goals for residential development. One goal emphasizes the maintenance and enhancement of existing stable residential neighborhoods, which is consistent with the General Plan objectives for older communities which stress the preservation of established communities, the conservation of the social-environmental characteristics of the community and the rehabilitation of deteriorating neighborhoods. The infill development project would implement this guideline through a design that respects the character of the surrounding community. The project will not be in conflict with the General Plan and will be developed in accordance with the policies of the Encanto Community Plan.

2. **The proposed subdivision complies with the applicable zoning and development regulations of the Land Development Code, including any allowable deviations pursuant to the land development code.**

   The project proposes the subdivision of a vacant 1.55-acre site, to create 26 lots for the construction of 24 townhomes and is consistent with the RM-2-5 Zoning designation. The RM-2-5 Zone allows for multi-family residential development. The allowed density of the RM-2-5 Zone is one dwelling unit per 1,500 square feet of lot area for a maximum of 45 units allowed onsite. As designed the project meets all applicable development regulations of the Land Development Code, including lot size, lot dimensions and right-of-way accessibility.

   The applicant is requesting one deviation from the RM-2-5 Zone, which is allowed with the approval of a Planned Development Permit (PDP). The deviation would allow two small portions of the side-yard retaining walls to exceed the six-foot height limit. The eastern retaining wall exceeds the maximum height of six feet for approximately 20 feet near Naranja Street where the abutting development pad is higher than the existing and

proposed grade. This wall would be oriented internal to the project with a maximum height of seven feet, ten inches. The western retaining wall exceeds the maximum height of six feet for approximately 45 feet where the abutting property slopes steeply down to the site. This wall would be oriented toward the abutting property with a maximum height of eight feet.

The proposed development is consistent with the design standards of the PDP Ordinance which requires a comparative analysis of the surrounding development, open space requirements and conformance to the community plan.

The natural topographic conditions are unique and current residential development east and west of the existing lot presents challenges to design a project that meets the required development regulations. The property is also constrained due to a topographical change in elevation of 20 feet across the project site.

When considered as a whole, the proposed deviation is supported by staff based upon the overall design of the project. The project would provide home ownership opportunities for low to moderate income families in quality housing that includes all required public improvements and services. Therefore, the proposed subdivision complies with the applicable zoning and development regulations of the Land Development Code, including any allowable deviations pursuant to the land development code.

3. **The site is physically suitable for the type and density of development. (San Diego Municipal Code § 125.0440(c) and Subdivision Map Act §§ 66474(c) and 66474(d)).**

The site is physically suitable for the type and density of development. The Encanto Community Plan identifies the project site as an area designated for single-family residential development at a low density of (15-29 du/ac). The 1.55 acre site could accommodate 45 dwelling units on the site, so, at 24 dwelling units, the proposal is within the allowed density range and the site is suitable for the proposed project.

4. **The design of the subdivision or the proposed improvements are not likely to cause substantial environmental damage or substantially and avoidably injure fish or wildlife or their habitat.**

The City of San Diego, as Lead Agency, through the Development Services Department, conducted an environmental review of this site in accordance with the State of California Environmental Quality Act (CEQA) Guidelines. An Addendum to the Southeastern San Diego Community Plan 2015 Environmental Impact Report was prepared for this project in accordance with the State of California Environmentally Quality Act (CEQA) Guidelines. The proposed project includes mitigation measures to offset impacts to the environments in the area of Biological, Historical Resources (Archeology) and Paleontological Resources. Implementation of the Mitigation, Monitoring and Reporting Program as well as permit conditions would reduce impacts to below a level of significance. In addition, a Stormwater Quality Management Plan and a Drainage Study were prepared for the proposed project and Best Management Practices (BMPs) necessary to minimize the impacts of surface water runoff are included in the project design.

5. **The design of the subdivision or the type of improvement will not be detrimental to the public health, safety, and welfare.**

The approval for this subdivision includes various conditions and referenced exhibits of approval relevant to achieving project compliance with the applicable regulations of the San Diego Municipal Code in effect for this subdivision and improvements. Such conditions have been determined by the decision maker as necessary to avoid adverse impacts upon the public health, safety and welfare. Further, the applicant is required to abide by all relevant Federal, State and Local regulations, including building regulations.

Approximately 0.22-acres of the northern portion of the site is located within the 100-year floodway and the applicant was required to obtain a Conditional Letter of Map Revision (CLOMR) from the Federal Emergency Management Agency (FEMA). No work is allowed within the regulatory floodway and all residential structures built within the flood fringe of the Special Flood Hazard Area (SFHA) must be constructed with the lowest floor elevated a minimum of two feet above the base flood elevation at that location.

An Addendum to the Southeastern San Diego Community Plan 2015 Environmental Impact Report was prepared for this project in accordance with the State of California Environmentally Quality Act (CEQA) Guidelines. The proposed project includes mitigation measures to offset environmental impacts to Biological, Historical Resources (Archeology) and Paleontological Resources. Implementation of the Mitigation, Monitoring and Reporting Program (MMRP) as well as permit conditions would reduce impacts to below a level of significance. Therefore, the project will not be detrimental to the public health, safety, and welfare.

Therefore, the design of the subdivision and the type of improvements will not be detrimental to the public health, safety, and welfare.

6. **The design of the subdivision or the type of improvements will not conflict with easements acquired by the public at large for access through or use of property within the proposed subdivision.**

The project site does not contain public access easements within the project boundaries as shown on Tentative Map No. 1494351. Access to the site will be provided via two new driveways on Naranja Street and the site does not provide access to any other parcels. As such, no conflict will occur with the recording of the subdivision and therefore no conflict would negatively affect any easements acquired by the public at large. The design of the subdivision and the type of improvements are such that they will not conflict with any easements, acquired by the public at large, for access through or use of property within the proposed subdivision.

7. **The design of the proposed subdivision provides, to the extent feasible, for future passive or natural heating and cooling opportunities. The proposed project will not impede or inhibit any future passive or natural heating and cooling opportunities**.

The proposed project will not impede or inhibit any future passive or natural heating and cooling opportunities. During the construction of the proposed multi-family dwelling units

caution will be taken to ensure the best use of the land, by minimized grading and by providing for natural light to permeate through the windows of the residences. In addition, the potential and opportunity exists to incorporate sustainable building techniques that utilize photovoltaic systems (solar panels) to generate a portion of the project energy needs. The units will have the opportunity to perform remodels through the building permit process, which would include building materials, placement and selection of plant materials to provide, to the extent feasible, for future passive or natural heating and cooling opportunities.

8. **The decision maker has considered the effects of the proposed subdivision on the housing needs of the region and that those needs are balanced against the needs for public services and the available fiscal and environmental resources**.

The site is located in the RM-2-5 Zone of the Valencia Park neighborhood of the Encanto Community Plan area. The vacant 1.55-acre site is identified in the Encanto Community Plan as an area designated for multi-family residential development at a medium density (15-29 du/ac). The site is served by developed streets and public utility facilities with access to be provided from two City standard driveways on Naranja Street. In addition, any existing non-standard and/or damaged public improvements, including curb, gutter and sidewalk would be replaced.

The San Diego Housing Commission has reviewed the project and the project is conditioned to comply with the Inclusionary Housing Ordinance at the time of building permit issuance or prior to the filing of the final map. The need for public facilities was taken into consideration with the development of the Encanto Community Plan and the project is consistent with the density in the community plan. Therefore, approval of the tentative map will not negatively impact the housing needs within the region, and those needs are balanced against the needs for public services and available fiscal and environmental resources. The above findings are supported by the minutes, maps, and exhibits, all of which are herein incorporated by reference.

BE IT FURTHER RESOLVED, that based on the Findings hereinbefore adopted by the Planning Commission, Tentative Map No. 149351, is hereby granted to LJMJM NARANJA LLC, subject to the attached conditions which are made a part of this resolution by this reference.

By _____

Derrick Johnson (DJ)

Development Project Manager

Development Services Department

Attachment 9

ATTACHMENT: Tentative Map Conditions

Internal Order No. 24005887

PLANNING COMMISSION
CONDITIONS FOR TENTATIVE MAP NO. 1494351
CREEKSIDE POINT - PROJECT NO. 424931 [MMRP]
ADOPTED BY RESOLUTION NO. R-_____ ON _____

GENERAL

1. This Tentative Map will expire on July 8, 2019.

2. Compliance with all of the following conditions shall be completed and/or assured, to the satisfaction of the City Engineer, prior to the recordation of the Final Map, unless otherwise noted.

3. Prior to the expiration of the Tentative Map, if approved, a Final Map subdividing the properties into 26 lots shall be recorded in the office of the County Recorder.

4. Prior to the recordation of the Final Map taxes must be paid or bonded for this property pursuant to section 66492 of the Subdivision Map Act. A current original tax certificate, recorded in the office of the San Diego County Recorder must be provided to satisfy this condition.

5. The Tentative Map No. 1494351 shall conform to the provisions of Site Development Permit No. 149353 and Planned Development Permit No. 1494352.

6. The Subdivider shall defend, indemnify, and hold the City (including its agents, officers, and employees [together, "Indemnified Parties"]) harmless from any claim, action, or proceeding, against the City and/or any Indemnified Parties to attack, set aside, void, or annul City's approval of this project, which action is brought within the time period provided for in Government Code section 66499.37. City shall promptly notify Subdivider of any claim, action, or proceeding and shall cooperate fully in the defense. If City fails to promptly notify Subdivider of any claim, action, or proceeding, or if City fails to cooperate fully in the defense, Subdivider shall not thereafter be responsible to defend, indemnify, or hold City and/or any Indemnified Parties harmless. City may participate in the defense of any claim, action, or proceeding if City both bears its own attorney's fees and costs, City defends the action in good faith, and Subdivider is not required to pay or perform any settlement unless such settlement is approved by the Subdivider.

AIRPORT

7. Prior to recordation of the Final Map, the Subdivider shall provide a valid "Determination of No Hazard to Air Navigation" issued by the Federal Aviation Administration [FAA].

AFFORDABLE HOUSING

8. Prior to receiving the first residential building permit or recordation of the final map, whichever shall first occur, Subdivider shall comply with the provisions of Chapter 14, Article 2, Division 13 of the San Diego Municipal Code ("Inclusionary Affordable Housing Regulations") by entering into an agreement with the San Diego Housing Commission, secured by a performance deed of trust, to provide at least 10% of the total units at the project as affordable to households earning at or below 100% of area median income in compliance with the Inclusionary Affordable Housing Regulations. The agreement shall provide that the affordable units must be offered for sale within 12 months from issuance of the first residential building permit and that the Sudivider shall diligently pursue the sale of such affordable units until all affordable units have been sold. If the affordable units are not offered for sale and/or sale is not diligently pursued by the Sudivider, Sudivider shall pay the Inclusionary Affordable Housing Fee for the entire project to the San Diego Housing Commission, upon notice, based upon the rate in effect at the time the first building permit was issued, plus interest at the legal rate to the date of payment. The agreement, secured by a performance deed of trust, shall be executed before the issuance of the first residential building permit or the recordation of the final map, whichever shall first occur, in a form as approved by the San Diego Housing Commission and its General Counsel, and the Agreement shall provide that time is of the essence in marketing the affordable units.

ENGINEERING

9. Per the City of San Diego Street Design Manual-Street Light Standards, and Council Policy 200-18, the Subdivider will be required to install a new street light adjacent to the site on Naranja Street.

10. The Subdivider shall vacate the undeveloped 10-foot wide public utility sewer easement located at the northern portion of the site prior to approval of the Final Map.

11. The Subdivider shall underground any new service runs to any new or proposed structures within the subdivision.

12. The Subdivider shall ensure that all existing onsite utilities serving the subdivision shall be undergrounded with the appropriate permits. The Subdivider shall provide written confirmation from applicable utilities that the conversion has taken place, or provide other means to assure the undergrounding, satisfactory to the City Engineer.

13. Conformance with the "General Conditions for Tentative Subdivision Maps," filed in the Office of the City Clerk under Document No. 767688 on May 7, 1980, is required. Only those exceptions to the General Conditions which are shown on the Tentative

Map and covered in these special conditions will be authorized. All public improvements and incidental facilities shall be designed in accordance with criteria established in the Street Design Manual, filed with the City Clerk as Document No. RR-297376.

MAPPING

14. "Basis of Bearings" means the source of uniform orientation of all measured bearings shown on the map. Unless otherwise approved, this source shall be the California Coordinate System, Zone 6, North American Datum of 1983 [NAD 83].

15. All subdivision maps in the City of San Diego are required to be tied to the California Coordinate System of 1983 (CCS83), Zone 6 pursuant to section 8801 through 8819 of the California Public Resources Code.

16. The easements shown on the Tentative Map exhibit will be vacated pursuant to section 66434(g) of the Subdivision Map Act.

17. The Final Map shall:

    a. Use the California Coordinate System for its "Basis of Bearing" and express all measured and calculated bearing values in terms of said system. The angle of grid divergence from a true median (theta or mapping angle) and the north point of said map shall appear on each sheet thereof. Establishment of said Basis of Bearings may be by use of existing Horizontal Control stations or astronomic observations.

    b. Show two measured ties from the boundary of the map to existing Horizontal Control stations having California Coordinate values of First Order accuracy. These tie lines to the existing control shall be shown in relation to the California Coordinate System (i.e., grid bearings and grid distances). All other distances shown on the map are to be shown as ground distances. A combined factor for conversion of grid-to-ground distances shall be shown on the map.

PUBLIC UTILITIES DEPARTMENT

18. Prior to recordation of the Final Map, the Subdivider shall sign and provide to the City a letter acknowledging their obligation and intent to create, via CC&Rs on each Unit's title, provisions for the continuous future operation and maintenance of the development's private sewer main.

19. All on-site water and sewer facilities shall be private.

20. All proposed private sewer facilities located within a single lot are to be designed to meet the requirements of the California Plumbing Code and will be reviewed as part of the building permit plan check.

21. All proposed public water and sewer facilities, must be designed and constructed in accordance with established criteria in the most current edition of the City of San Diego Water and Sewer Facility Design Guidelines and City regulations, standards and practices pertaining thereto.

22. No trees or shrubs exceeding three feet in height at maturity shall be installed within ten feet of any sewer and five feet of any water facilities.

PLANNING

23. Prior to receiving the first residential building permit or recordation of the final map, the project shall comply with the Affordable Housing requirements listed in Site Development Permit No. 1494351 and Planned Development No. 149432.

INFORMATION:

- The approval of this Tentative Map by the Planning Commission of the City of San Diego does not authorize the subdivider to violate any Federal, State, or City laws, ordinances, regulations, or policies including but not limited to, the Federal Endangered Species Act of 1973 and any amendments thereto (16 USC § 1531 et seq.).

- If the Subdivider makes any request for new water and sewer facilities (including services, fire hydrants, and laterals), the Subdivider shall design and construct such facilities in accordance with established criteria in the most current editions of the City of San Diego water and sewer design guides and City regulations, standards and practices pertaining thereto. Off-site improvements may be required to provide adequate and acceptable levels of service and will be determined at final engineering.

- Subsequent applications related to this Tentative Map will be subject to fees and charges based on the rate and calculation method in effect at the time of payment.

- Any party on whom fees, dedications, reservations, or other exactions have been imposed as conditions of approval of the Tentative Map, may protest the imposition within ninety days of the approval of this Tentative Map by filing a written protest with the San Diego City Clerk pursuant to Government Code sections 66020 and/or 66021.

- Where in the course of development of private property, public facilities are damaged or removed, the Subdivider shall at no cost to the City, obtain the required permits for work in the public right-of-way, and repair or replace the public facility to the satisfaction of the City Engineer (San Diego Municipal Code § 142.0607.

Internal Order No. 24005887

Attachment 11

South Property Line Elevation along Naranja Street

West Property Line Elevation
East Property Line

North Property Line Elevation at Chollas Creek

HunLand

Creekside Pointe Townhomes
8282 Naranja Street
San Diego, California
92154

A2

Attachment 11

SCALE - 1" = 20'-0"

PROPOSED PLANT PALETTE

SYMBOL BOTANICAL NAME / COMMON NAME

STREET TREES (24" BOX)
JACARANDA MIMOSIFOLIA / JACARANDA
MAGNOLIA GRANDIFLORA / MAGNOLIA VAR
RHUS LANCEA / AFRICAN SUMAC
TRISTANIA LAURINA / WATER GUM TREE

THEME TREES (15 GAL - 24" BOX)
CUPANIOPSIS ANACARDIOIDES / CARROTWOOD
PINUS ELDARICA / AFGHAN PINE
PLATANUS SPP. / SYCAMORE VAR
RHUS LANCEA / AFRICAN SUMAC

BIOSWALE TREES (24" - 36" BOX)
ALNUS RHOMBIFOLIA / WHITE ALDER
PLATANUS RACEMOSA / CALIFORNIA SYCAMORE
QUERCUS AGRIFOLIA / COAST LIVE OAK

ACCENT TREES (24" - 36" BOX)
ARBUTUS UNEDO / STRAWBERRY TREE
ERIOBOTRYA DEFLEXA / BRONZE LOQUAT
LAGERSTROEMIA INDICA / CRAPE MYRTLE VAR
PRUNUS CERASIFERA / PURPLE LEAF PLUM

PALM ACCENT TREES (MIN. 10' BTH)
SYAGRUS ROMANZOFFIANUM / QUEEN PALM
WASHINGTONIA ROBUSTA / MEXICAN FAN PALM

DRIVELANE VERTICAL ACCENT SHRUB (100% - 15 GAL)
ARBUTUS 'MARINA' / STRAWBERRY TREE VAR. (STD)
LIGUSTRUM J. 'TEXANUM' / TEXAS PRIVET (STD)
RHAPHIOLEPIS I. 'MAJESTIC BEAUTY' / INDIAN HAWTHORN VAR. (STD)

BIOSWALE HYDROSEED

COMMON H.O.A. AREA SHRUBS / VINES / GROUNDCOVER
(40% 5 gal. 60% 1 gal. etc. with flatted groundcover) such as:

AGAPANTHUS AFRICANUS / LILY OF THE NILE
ANIGOZANTHOS SPP. / KANGAROO PAW
ARBUTUS UNEDO 'COMPACTA' / DWARF STRAWBERRY TREE
BOUGAINVILLEA SPP. / BOUGAINVILLEA - N.C.N
BUXUS SPP. / BOXWOOD SPP.
CALLISTEMON 'LITTLE JOHN' / BOTTLE BRUSH SPP.
DIANELLA SPP. / FLAX LILY VAR.
DIETES SPP. / FORTNIGHT LILY
DODONEA V. 'PURPUREA' / HOPSEED BUSH
ELAEAGNUS P. VARIEGATA / SILVERBERRY VAR.
ESCALLONIA SPP. / ESCALLONIA - N.C.N
FESTUCA SPP. / BLUE FESCUE VAR.
GAZANIA SPP. / GAZANIA - N.C.N
GELSEMIUM SEMPERVIRENS / CAROLINA JESSAMINE
GREVILLEA LANIGERA / GREVILLEA - N.C.N
GREWIA OCCIDENTALIS / LAVENDER STARFLOWER
HEMEROCALLIS SPP. / DAYLILY SPP.
JUNIPERUS SPP. / JUNIPERUS SPP.
KNIPHOFIA UVARIA / RED HOT POKER
LIGUSTRUM J. 'TEXANUM' / JAPANESE PRIVET
MYRTUS COMMUNIS / MYRTLE VAR.
MUHLENBERGIA SPP. / DEER GRASS VAR.
NANDINA SPP. / HEAVENLY BAMBOO
PHORMIUM SPP. / NEW ZEALAND FLAX SPP.
PITTOSPORUM SPP. / PITTOSPORUM SPP.
RHAPHIOLEPIS SPP. / INDIAN HAWTHORN VAR.
ROSMARINUS SPP. / ROSEMARY SPP.
TRACHELOSPERMUM JASMINOIDES / STAR JASMINE

MAINTENANCE NOTE:

1. ALL REQUIRED LANDSCAPE AS SHOWN ON THESE PLANS SHALL BE MAINTAINED BY THE OWNER UNTIL TURNED OVER TO THE COMMUNITY HOMEOWNER'S ASSOCIATION IN A DISEASE, WEED, AND LITTER FREE CONDITION AT ALL TIMES CONSISTENT WITH THE CITY OF SAN DIEGO'S LANDSCAPE REGULATIONS AND STANDARDS.

VEHICULAR USE AREA NOTES:

1. ALL REQUIRED PARKING FOR RESIDENTIAL UNITS IS ENCLOSED WITHIN GROUND LEVEL GARAGES. ON-STREET PARKING PROVIDES FOR (1) CANOPY TREE WITHIN 30 FT OF EACH PARKING STALL. TYP.

SITE PLAN LEGEND

SYMBOL | DESCRIPTION

EXISTING CHAINLINK GREEN TO REMAIN - NOT A PART
6 FT. WOOD FENCE AT PROJECT BOUNDARY - TYP. SWM

LANDSCAPE NOTES:

1. IMPROVEMENTS SUCH AS DRIVEWAYS, UTILITIES, DRAINS, WATER AND SEWER LATERALS SHALL BE DESIGNED SO AS NOT TO PROHIBIT THE PLACEMENT OF STREET TREES. ALL TO THE SATISFACTION OF THE CITY MANAGER.
2. TREE PLANTING AREAS SHALL ALLOW FOR A MINIMUM PLANTING AREA OF 40SF WITH A 5' MINIMUM INSIDE DIMENSION.

PLANTING NOTES:

1. PLANT MATERIAL SHALL BE MAINTAINED IN A HEALTHY, DISEASE FREE GROWING CONDITION AT ALL TIMES.
2. TREES SHALL BE MAINTAINED SO THAT ALL BRANCHES OVER PEDESTRIAN WALKWAYS ARE 8 FEET ABOVE THE WALKWAY GRADE AND SO ALL BRANCHES OVER VEHICULAR TRAVEL WAYS ARE 14 FEET ABOVE THE TRAVEL WAY.
3. ROOT BARRIERS SHALL BE INSTALLED WHERE TREES ARE PLACED WITHIN 5 FEET OF ANY HARDSCAPE MATERIAL INCLUDING WALKS, CURBS AND PATIOS.
4. THE PLANTING PLAN SHOWN IS DIAGRAMMATIC IN NATURE AND BASED ON THE INFORMATION KNOWN TO DATE. FINAL TREE AND SHRUB LOCATIONS WILL BE ADJUSTED TO REMAIN IN ACCORDANCE WITH THE CITY OF SAN DIEGO REQUIREMENTS. TREES WILL NOT BE ALLOWED WITHIN 10 FEET OF ANY PUBLIC SEWER MAIN OR LATERALS. REQUIRED TREES WILL HAVE A MINIMUM PLANTING AREA OF 40SF WITH A MINIMUM DIMENSION OF 5 FEET.

GENERAL NOTES:

1. ALL LANDSCAPE AND IRRIGATION SHALL CONFORM TO THE STANDARDS OF THE CITY-WIDE LANDSCAPE REGULATIONS AND THE CITY OF SAN DIEGO LAND DEVELOPMENT MANUAL LANDSCAPE STANDARDS AND ALL OTHER LANDSCAPE RELATED CITY AND REGIONAL STANDARDS.
2. ALL GRADED, DISTURBED OR ERODED AREAS THAT WILL NOT BE PERMANENTLY PAVED OR COVERED BY STRUCTURES SHALL BE PERMANENTLY REVEGETATED AND IRRIGATED AS SHOWN IN TABLE 142-04F AND IN ACCORDANCE WITH THE STANDARDS IN THE LAND DEVELOPMENT MANUAL.
3. GRADED PAD AREAS SHALL BE HYDROSEEDED TO PREVENT EROSION IN THE EVENT THAT CONSTRUCTION OF BUILDING(S) DOES NOT OCCUR WITHIN 30 DAYS OF FOLLOWING GRADING. HYDROSEED SHALL BE RE-APPLIED OR IRRIGATED AS NECESSARY TO ESTABLISH GROWTH.

Prepared By:
Project Address:
Project Name:
Sheet Title:

LC-01

WEILAND & ASSOCIATES, INC.

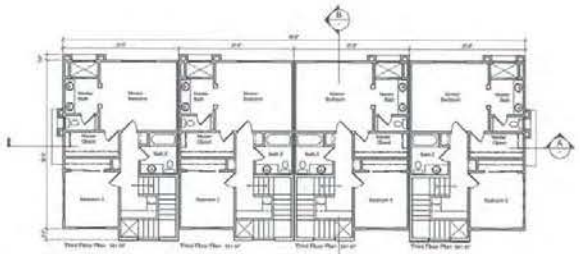
UMLIM NARANJA, LLC
CITY OF SAN DIEGO, CA
CREEKSIDE POINTE - TM
(24 UNIT SF DEVELOPMENT)

OVERALL LANDSCAPE CONCEPT PLAN

DATE

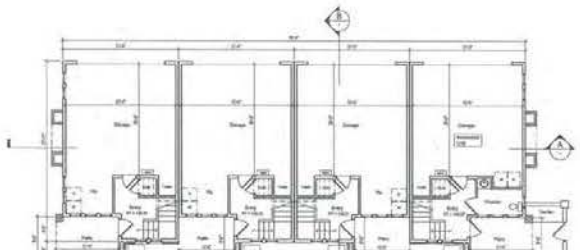
REVISIONS

DATE: 05/10/15
SCALE: SEE SHEET
JOB #: 14-051
DRAWN: BW / KTL
SHEET: LC-01
16 OF 18

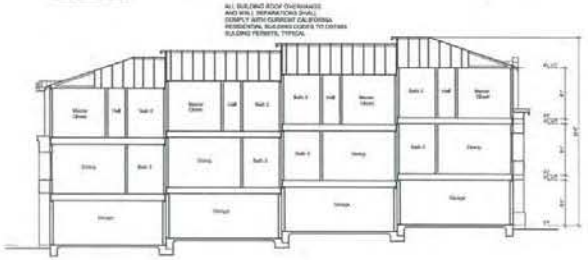


Third Floor Plan

Second Floor Plan



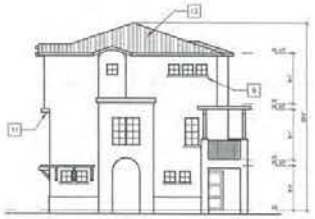
First Floor Plan



Building Section 'A'

West Elevation

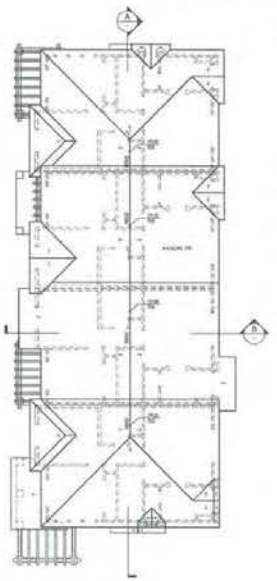
East Elevation



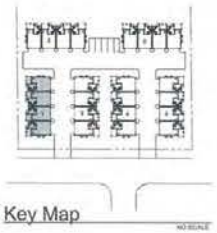
North Elevation

South Elevation

Building Section 'B'



Roof Plan



Key Map

LEGEND

1. CONCRETE 'S' TILE
2. DECORATIVE WOOD BRACES
3. SMOOTH WOOD FASCIA
4. EXTERIOR PLASTER IN MULTIPLE COLORS
5. VINYL WINDOWS
6. OVERHEAD GARAGE DOOR
7. PLASTER WAINSCOT OVER SOLID WOOD
8. PLASTER CORBELS
9. FOAM TRIM WITH PLASTER OVER
10. WROUGHT IRON GUARDRAIL
11. DECORATIVE WOOD BEAMS
12. WOOD TRELLIS
13. 'O'HAGINS' CONCEALED ROOF VENTS
14. FABRIC AWNING WITH WROUGHT IRON SUPPORTS
15. CMU WALL WITH PLASTER OVER
16. WOOD GATE, PAINTED

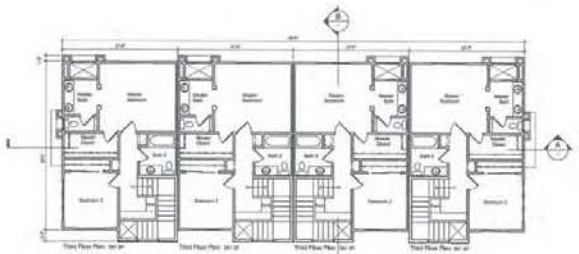
HunLand design

Creekside Pointe Townhomes
5282 Naranja Street
San Diego, California
92154

5/10/13

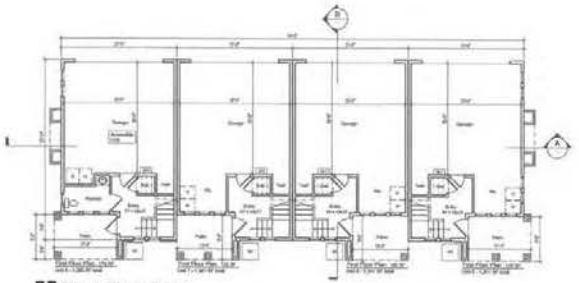
1/8" = 1'-0"

A5

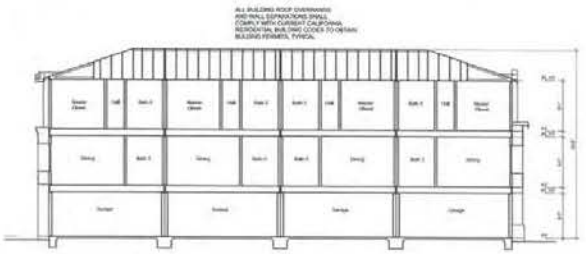


Third Floor Plan

Second Floor Plan



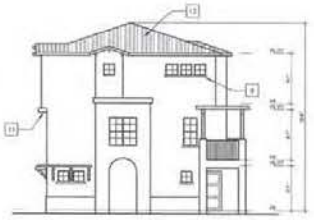
First Floor Plan



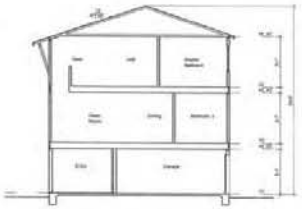
Building Section 'A'

North Elevation

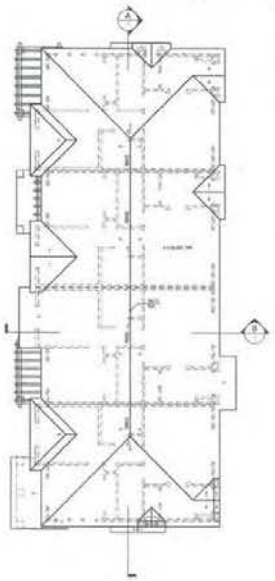
South Elevation



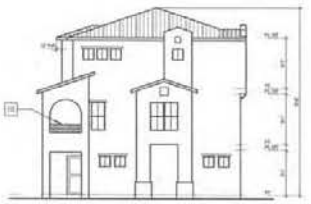
East Elevation



Building Section 'B'



Roof Plan



West Elevation

LEGEND

1. CONCRETE 'S' TILE
2. DECORATIVE WOOD BRACES
3. SMOOTH WOOD FASCIA
4. EXTERIOR PLASTER IN MULTIPLE COLORS
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11. DECORATIVE WOOD BEAMS
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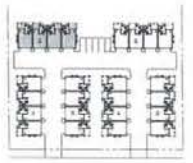


Key Map

HunLand design

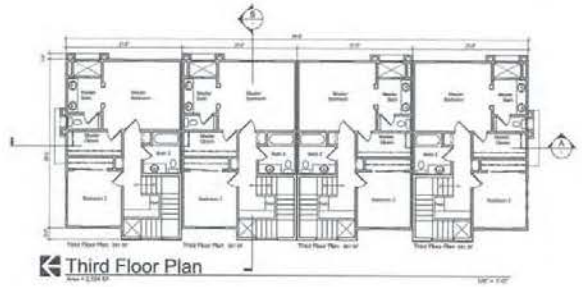
Creekside Pointe Townhomes

5282 Naranja Street
San Diego, California
92114

5/10/15

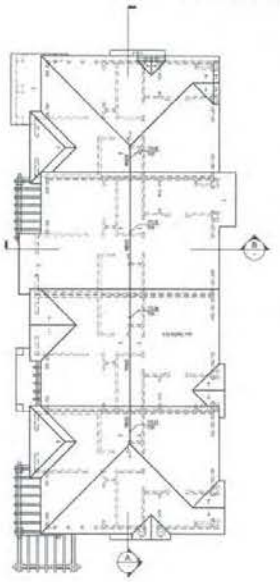
1/8" = 1'-0"

A6



Third Floor Plan

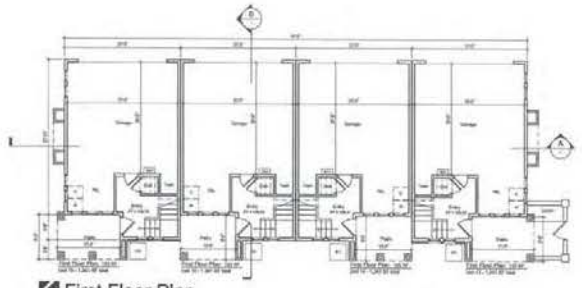
West Elevation



Roof Plan

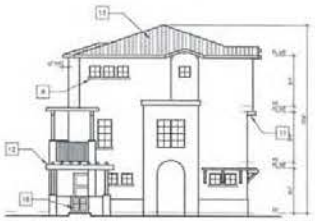
Second Floor Plan

East Elevation



First Floor Plan

North Elevation



South Elevation

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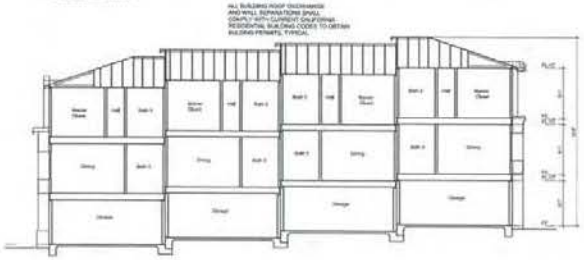
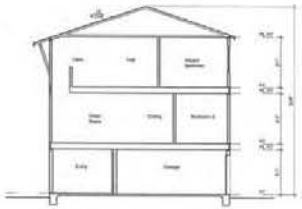


Building Section 'A'



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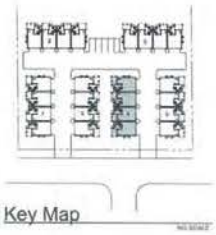

Key Map

HunLand design

Creekside Pointe Townhomes

5282 Naranja Street
San Diego, California
92114

5/10/18

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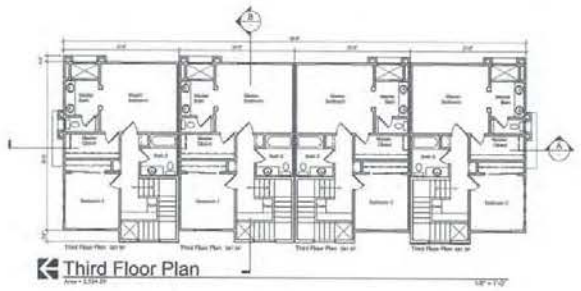
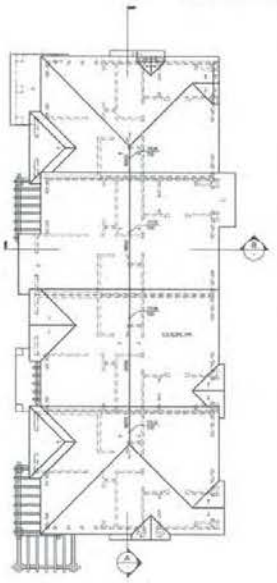
A8



Third Floor Plan

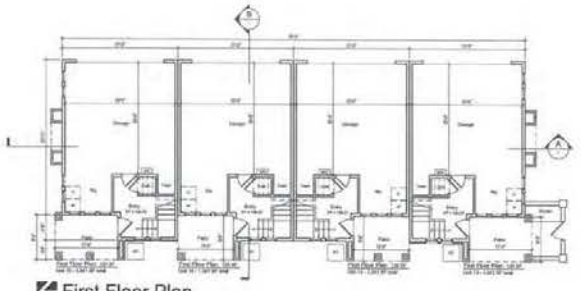
West Elevation



Roof Plan

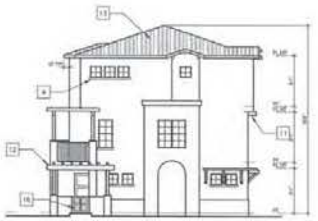
Second Floor Plan

East Elevation



First Floor Plan

North Elevation



South Elevation

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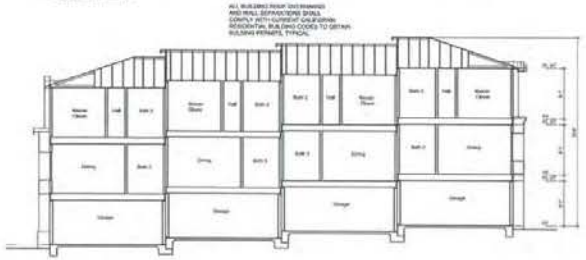
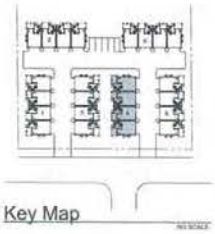
11. DECORATIVE WOOD BEAMS
12. WOOD TRELLIS
13. 'OTHERS': CONCEALED ROOF VENTS
14. FABRIC AWNING WITH WROUGHT IRON SUPPORTS
15. CMU WALL WITH PLASTER OVER
16. WOOD GATE, PAINTED



Building Section 'A'

Building Section 'B'



Key Map

HunLand design

Creekside Pointe Townhomes

5282 Naranja Street
San Diego, California
92114

5/10/18

1/8" = 1'-0"

A8

Attachment 11

Third Floor Plan
Second Floor Plan
First Floor Plan
North Elevation
South Elevation
East Elevation
West Elevation
Roof Plan
Building Section 'A'
Building Section 'B'
Key Map
LEGEND
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HunLand design

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San Diego, California
92114

5/10/15
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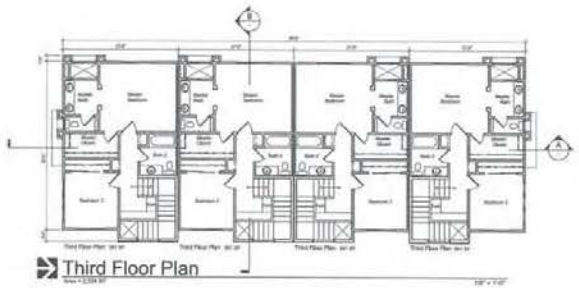
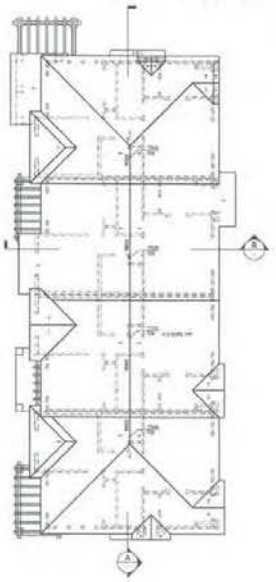
A9



Third Floor Plan

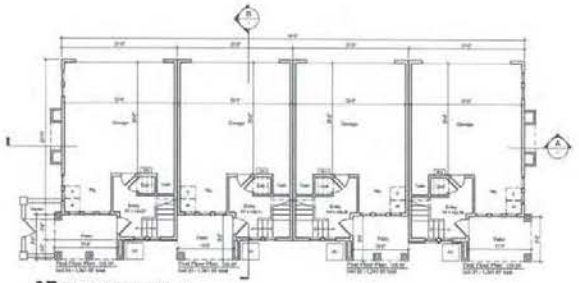
East Elevation



Roof Plan

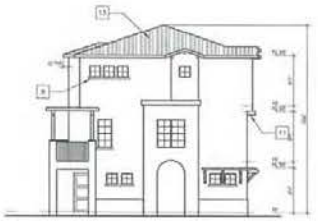
Second Floor Plan

West Elevation



First Floor Plan

South Elevation



North Elevation

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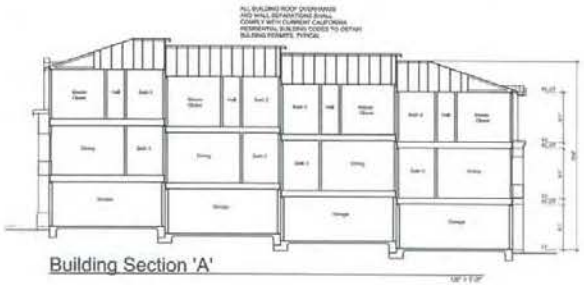
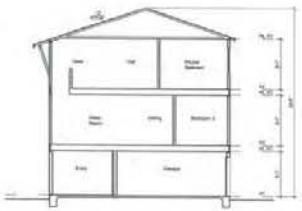


Building Section 'A'



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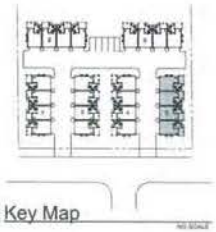


Key Map

HunLand design

Creekside Pointe Townhomes

5282 Naranja Street
San Diego, California
92114

A10

Encanto Neighborhood Community Planning Group

ATTACHMENT 12

ENCANTO NEIGHBORHOODS COMMUNITY PLANNING GROUP

Jacobs Center's Community Room: 404 Euclid Avenue, San Diego CA 92114

MINUTES

Date: July 20, 2015

Seat	Member	Here?	Seat	Member	Here?
Alta Vista	Marry Young	N	At-Large	Alfredo Ybarra	Y
Broadway Heights	Maxine Sherard	Y	At-Large	Edward Howell	Y
Chollas View	Ardelle Matthews	N	At-Large	Steve Ward	Y
Emerald Hills	Gayle Reid	Y	At-Large	Khalada Salaam-Al	Y
Encanto-North	Ricky Valdez	Y	At-Large	Brian Pollard	Y
Encanto-South	Kenneth Malbrough	Y	At-Large	Kwame Oates	N
Lincoln Park	Leslie Dudley	Y	At-Large	Vacant	N/A
Valencia Park	Monte Jones	Y			
City Dept.	**Name**	**Here?**	**Dept.**	**Name**	**Here?**
Planning	Laura Gates	N	Mayor	Darnisha Hunter	Y
Planning	Karen Bucey	Y	4th District	Mathew Gordon	N

Number of Visitors: (See Attendance Sheet) **Sign-in sheet on file: No**

1. **CALL TO ORDER:**
   The meeting was called to order by the Chair at 6:34PM.

2. **INTRODUCTIONS: ENCPG BOARD**

3. **COMMUNICATIONS FROM THE PUBLIC:**
   Barry Pollard, Urban Collective gave a brief announcement: October 17, Better Block event at Euclid and Imperial the SW corner; they have asked for valet parking space.

4. **ADOPTION OF THE AGENDA:**
   Board Chair Ken Malborough requested that Info item# B, Randy Slabbers be given an agenda-order preference/quick presentation. Motion made by Steve Ward to accept the agenda change; seconded by Gayle Reid; motion approved by consensus.

   Info Item B: Trolley Residential Brownfield Remediation Grant
   Presenter: Randy Slabbers, Chelsea Investment Corporation:
   Trolley Residential, herein referenced as Trolley Park Terrace received a grant from EPA to remove 3800 cu yds of contaminated soil from the site containing pesticides to Otay land field for processing. Leslie Dudley inquired as to the list of pesticides. The list will be emailed to Mr. Malborough for distribution.

5. REVIEW/APPROVAL OF MINUTES:

Motion to approve June 15, 2015 minutes: Motion by Barry Pollard; seconded by Steve Ward; passed 9-0-1; with one (1) abstention from Ricky Valdez who was absent.

6. CHAIR'S REPORT:

(1)Karen Bucey has received the EIR report. The 600 page document allows review up through September 8, 2015. Barry Pollard inquired about the availability of an Executive Summary Report. The answer was yes, "it is found at the beginning of the report."

(2)Chair Ken Malborough received a letter from Groundwork stating that they have terminated their Right of Entry at Chollas Creek Crossing located at 47th Street and Castana. He noted that there had been several violations, such as grading, etc.

(3)Upon discussion of the long involvement of developing the Community Plan, it was decided that ENCPG will go "dark" in August. Chair Malborough indicated that there were 23 meetings held during 2014. Motion to go dark by Gayle Reid; seconded by Alfredo Ybarra; motion passed unanimously.

(4) Pushing public safety bonds: Councilwoman Marty Emerald, chair of Public Safety Committee chose Community Planning groups for outreach in pushing the safety bonds.

7. STAFF REPORTS:

A. City Council Report: None

B. Assemblywoman Weber Report: LaShae Collins- District Director for Weber.

Discussed various bills and upcoming activities/events:
(1) Senior Advisory Council, July 29th at George Stevens Sr. Center, (2) 50th Anniversary of Voting Rights Act 1965, Bayview Baptist Church, August 5, 2015, (3) Community Recognition Ceremony, August 14th (4) Health Fair coordinated by the Blk Nurses Association, August 22nd, Jacob's Center and various bills such as AB713 Kindergarten Mandate, 953 Racial Profiling, 1328 W/Holding evidence before jury decision and AB562 Attendance Challenge. More than 550 attended the Attendance Challenge event at Sea World.

C. Civic San Diego Report

Sherry Brooks reported: (1) Board of Directors will reconvene to advise on funding for the Jackie Robinson Y $20M project- from new market tax credits (2) Food land Project at Federal and Euclid- more tenants and jobs for the community (3) Invitation to attend meeting on July 28, 2015 to discuss the Hilltop and Euclid project- 9-acre site. Meeting to be held at Lincoln High School to solicit from the community what type of developments to place at the site.

D. JCNI

Robert Robinson discussed the following: (1) Shopping Center- some color, construction and other improvements (2) Moving of the trailer to rehab (3) groundbreaking at Chollas Creek, $8M project to restore creek; will use help [for pay] from the community (4) Last week of job hiring- a good turnout.
Questions: (1) Darnisha Hunter concerning bids and contracts: Where are the contracts awarded? Answer: See website. (2) Barry Pollard inquired about (a) the takedown of pictures on the Food-For-Less building. Answer: Yes; and (b) about employment at Walgreen's: Answer: about 15 with 95% local hire; and (c) about who Mr. Robinson

worked for, i.e., Civic San Diego vs. JCNI? Answer: an agreement to be on Civic SD Board but works for JCNI

E. Current Sub-Committees

1. Facilities Finance Plan

Chair Barry Pollard reported that the sub-committee meets on Wednesdays with Vicki Burgess, City Finance Department. Mr. Malborough reminded the FFP Chair of the 72 hour notice needed for meetings. The next FFP meeting was then scheduled for the following Thursday. Also, the chair requested that a list of CIP (new) projects be sent to him.

2. Bylaws

Ken Malborough stated that he had replaced Patrick Ambrosia as Chair. The sub-committee will meet July 30th at 6pm and will reschedule in September after the next Board meeting.

8. ACTION ITEMS:

A. Urban Greening Grant Groundwork San Diego (Cancelled)

Presenter: Patrice Baker, Groundwork San Diego

B. Homeland Petroleum CUP (Gas Station/Convenience Store, 4704 Imperial Avenue)

Presenter: Allen Sipe, Barghausen Consulting Engineers, Inc.

Mr. Sipe engaged in a rather lengthy discussion concerning a new CUP application for the gas station zoned CSR-1: commercial with rear parking. Mr. Sipe wanted to convert the station into a 24-hour operation, with a car wash and other operational changes. A motion for continuance was made by Steve Ward and seconded by Maxine Sherard. A friendly motion was accepted for additional background and seconded by Gayle Reed but failed by a vote: (6-4-0).

A new motion was made by Barry Pollard to disapprove the CUP for Homeland Petroleum Gas Station, seconded by Edward Howell; motion failed (2-8-0) in favor of support for the CUP Application for Homeland Petroleum Gas Station.

C. Creekside Pointe Town homes

Presenters: Robert Ito, Jack McGory and David Weiland

Creekside is a homeownership project located at Naranja Street across from Market Street Plaza. It features 24 units to be sold at market rate, 54 parking spaces. Units are, with 21/2 baths, approximately 1400 sq ft per unit. Not gated- some fencing. HOA cap-on, application by HOA with Board of Directors.

Motion to approve by Gayle Reid; seconded by Alfredo Ybarra; motion passed 9-0-1. Leslie Dudley: No vote.

9. INFO ITEMS: (Omitted unintentionally)

A. City of San Diego FY16 Budget Overview

Presenter: Darnisha Hunter, Community Representative, Mayor's Office

10. CONTINUING BUSINESS: ENCPG Board Elections

Board Election (At-Large Seat) Candidate: Emilia Castillo.

Emilia spoke of her involvement in the community and her commitment to improve the community via her service on the board. She lived in Ventura City for 3 years and served at the Jacob's Center. **Vote: Unanimous.**

11. NEW BUSINESS:

Secretary Position (Open)

Mr. Malborough shared the organization he had given the files upon receiving them from the secretary. He then opened the position for nominations. No one volunteered or received a nomination. The chair expressed his disappointment!

Info Item A: Darnisha Hunter called to the attention of the Chair that **Info Item A** had been overlooked. The Chair apologized for the omission and allotted a few minutes for Darnisha Hunter to present an abbreviated discussion of the Mayor's budget, referring to slides, Budget FY16.

12. ADJOURNMENT: Unanimous at 6:34PM.

THE CITY OF SAN DIEGO
City of San Diego
Development Services
1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

Ownership Disclosure Statement

Approval Type: Check appropriate box for type of approval (s) requested: ☐ Neighborhood Use Permit ☐ Coastal Development Permit
☐ Neighborhood Development Permit ☒ Site Development Permit ☒ Planned Development Permit ☐ Conditional Use Permit
☐ Variance ☒ Tentative Map ☐ Vesting Tentative Map ☐ Map Waiver ☐ Land Use Plan Amendment • ☐ **Other** ____________

Project Title — **Project No.** *For City Use Only*

Creekside Pointe

Project Address:

5282 Naranja Street, San Diego 92113

Part I - To be completed when property is held by Individual(s)

By signing the Ownership Disclosure Statement, the owner(s) acknowledge that an application for a permit, map or other matter, as identified above, will be filed with the City of San Diego on the subject property, with the intent to record an encumbrance against the property. Please list below the owner(s) and tenant(s) (if applicable) of the above referenced property. The list must include the names and addresses of **all** persons who have an interest in the property, recorded or otherwise, and state the type of property interest (e.g., tenants who will benefit from the permit, all individuals who own the property). A signature is required of at least one of the property owners. Attach additional pages if needed. A signature from the Assistant Executive Director of the San Diego Redevelopment Agency shall be required for all project parcels for which a Disposition and Development Agreement (DDA) has been approved / executed by the City Council. Note: The applicant is responsible for notifying the Project Manager of any changes in ownership during the time the application is being processed or considered. Changes in ownership are to be given to the Project Manager at least thirty days prior to any public hearing on the subject property. Failure to provide accurate and current ownership information could result in a delay in the hearing process.

Additional pages attached ☒ **Yes** ☐ **No**

Name of Individual (type or print):	Name of Individual (type or print):
☐ Owner ☐ Tenant/Lessee ☐ Redevelopment Agency	☐ Owner ☐ Tenant/Lessee ☐ Redevelopment Agency
Street Address:	Street Address:
City/State/Zip:	City/State/Zip:
Phone No: Fax No:	Phone No: Fax No:
Signature : Date:	Signature : Date:
Name of Individual (type or print):	Name of Individual (type or print):
☐ Owner ☐ Tenant/Lessee ☐ Redevelopment Agency	☐ Owner ☐ Tenant/Lessee ☐ Redevelopment Agency
Street Address:	Street Address:
City/State/Zip:	City/State/Zip:
Phone No: Fax No:	Phone No: Fax No:
Signature : Date:	Signature : Date:

ATTACHMENT 13

Project Title: Creekside Pointe	Project No. *(For City Use Only)*

Part II - To be completed when property is held by a corporation or partnership

Legal Status (please check):

☐ Corporation ☒ Limited Liability -or- ☐ General) What State? CA Corporate Identification No. 27-4131151
☐ Partnership

By signing the Ownership Disclosure Statement, the owner(s) acknowledge that an application for a permit, map or other matter, as identified above, will be filed with the City of San Diego on the subject property with the intent to record an encumbrance against the property.. Please list below the names, titles and addresses of **all** persons who have an interest in the property, recorded or otherwise, and state the type of property interest (e.g., tenants who will benefit from the permit, all corporate officers, and all partners in a partnership who own the property). A signature is required of at least one of the corporate officers or partners who own the property. Attach additional pages if needed. **Note:** The applicant is responsible for notifying the Project Manager of any changes in ownership during the time the application is being processed or considered. Changes in ownership are to be given to the Project Manager at least thirty days prior to any public hearing on the subject property. Failure to provide accurate and current ownership information could result in a delay in the hearing process. **Additional pages attached** ☐ **Yes** ☐ **No**

Corporate/Partnership Name (type or print): LJMJM Naranja LLC	Corporate/Partnership Name (type or print):
☒ Owner ☐ Tenant/Lessee	☐ Owner ☐ Tenant/Lessee
Street Address: 7979 Ivanhoe Suite 555	Street Address:
City/State/Zip: La Jolla CA 92037	City/State/Zip:
Phone No: 619-954-7017 Fax No: 619-741-9731	Phone No: Fax No:
Name of Corporate Officer/Partner (type or print): Jack McGrory	Name of Corporate Officer/Partner (type or print):
Title (type or print): Managing Partner	Title (type or print):
Signature : [signature] Date: 5-12-15	Signature : Date:

Corporate/Partnership Name (type or print):	Corporate/Partnership Name (type or print):
☐ Owner ☐ Tenant/Lessee	☐ Owner ☐ Tenant/Lessee
Street Address:	Street Address:
City/State/Zip:	City/State/Zip:
Phone No: Fax No:	Phone No: Fax No:
Name of Corporate Officer/Partner (type or print):	Name of Corporate Officer/Partner (type or print):
Title (type or print):	Title (type or print):
Signature : Date:	Signature : Date:

Corporate/Partnership Name (type or print):	Corporate/Partnership Name (type or print):
☐ Owner ☐ Tenant/Lessee	☐ Owner ☐ Tenant/Lessee
Street Address:	Street Address:
City/State/Zip:	City/State/Zip:
Phone No: Fax No:	Phone No: Fax No:
Name of Corporate Officer/Partner (type or print):	Name of Corporate Officer/Partner (type or print):
Title (type or print):	Title (type or print):
Signature : Date:	Signature : Date:

Appendix F Peak Hour Intersection LOS Worksheets – Near-Term Year 2020 Base Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	90	50	120	100	180	60	850	130	60	320	170
Future Volume (veh/h)	150	90	50	120	100	180	60	850	130	60	320	170
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	208	125	69	145	120	217	65	914	140	71	376	200
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.72	0.72	0.72	0.83	0.83	0.83	0.93	0.93	0.93	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	309	174	81	233	182	276	384	1331	204	223	972	509
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.43	0.43	0.43	0.43	0.43	0.43
Sat Flow, veh/h	540	430	201	383	451	683	834	3078	471	533	2247	1178
Grp Volume(v), veh/h	402	0	0	482	0	0	65	525	529	71	295	281
Grp Sat Flow(s),veh/h/ln	1171	0	0	1517	0	0	834	1770	1780	533	1770	1655
Q Serve(g_s), s	3.0	0.0	0.0	0.0	0.0	0.0	3.5	14.4	14.4	7.4	6.8	7.0
Cycle Q Clear(g_c), s	19.4	0.0	0.0	16.4	0.0	0.0	10.4	14.4	14.4	21.8	6.8	7.0
Prop In Lane	0.52		0.17	0.30		0.45	1.00		0.26	1.00		0.71
Lane Grp Cap(c), veh/h	564	0	0	691	0	0	384	765	770	223	765	716
V/C Ratio(X)	0.71	0.00	0.00	0.70	0.00	0.00	0.17	0.69	0.69	0.32	0.39	0.39
Avail Cap(c_a), veh/h	670	0	0	813	0	0	387	771	776	225	771	721
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.2	0.0	0.0	15.3	0.0	0.0	15.2	13.7	13.7	22.5	11.6	11.6
Incr Delay (d2), s/veh	2.1	0.0	0.0	1.5	0.0	0.0	0.3	2.9	2.9	1.2	0.5	0.5
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	6.4	0.0	0.0	7.1	0.0	0.0	0.8	7.5	7.5	1.2	3.4	3.2
LnGrp Delay(d),s/veh	18.3	0.0	0.0	16.8	0.0	0.0	15.5	16.6	16.6	23.7	12.1	12.1
LnGrp LOS	B			B			B	B	B	C	B	B
Approach Vol, veh/h		402			482			1119			647	
Approach Delay, s/veh		18.3			16.8			16.5			13.4	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		30.8		29.1		30.8		29.1
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		26.1		29.1		26.1		29.1
Max Q Clear Time (g_c+I1), s		16.4		21.4		23.8		18.4
Green Ext Time (p_c), s		8.3		2.8		2.1		3.4

Intersection Summary	
HCM 2010 Ctrl Delay	16.1
HCM 2010 LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	120	220	1250	510	0	690
Future Volume (veh/h)	120	220	1250	510	0	690
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	0	1863
Adj Flow Rate, veh/h	174	319	1359	554	0	775
Adj No. of Lanes	1	1	2	1	0	2
Peak Hour Factor	0.69	0.69	0.92	0.92	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	0	2
Cap, veh/h	435	388	2097	938	0	2097
Arrive On Green	0.24	0.24	0.59	0.59	0.00	0.59
Sat Flow, veh/h	1774	1583	3632	1583	0	3725
Grp Volume(v), veh/h	174	319	1359	554	0	775
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	0	1770
Q Serve(g_s), s	4.6	10.6	14.1	12.2	0.0	6.3
Cycle Q Clear(g_c), s	4.6	10.6	14.1	12.2	0.0	6.3
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	435	388	2097	938	0	2097
V/C Ratio(X)	0.40	0.82	0.65	0.59	0.00	0.37
Avail Cap(c_a), veh/h	624	557	2331	1043	0	2331
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.5	19.8	7.5	7.1	0.0	5.9
Incr Delay (d2), s/veh	0.6	6.6	0.5	0.7	0.0	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	2.3	5.3	7.0	5.4	0.0	3.0
LnGrp Delay(d),s/veh	18.1	26.3	8.0	7.8	0.0	6.0
LnGrp LOS	B	C	A	A		A
Approach Vol, veh/h	493		1913			775
Approach Delay, s/veh	23.4		7.9			6.0
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		37.3				37.3		18.1
Change Period (Y+Rc), s		4.5				4.5		4.5
Max Green Setting (Gmax), s		36.5				36.5		19.5
Max Q Clear Time (g_c+I1), s		16.1				8.3		12.6
Green Ext Time (p_c), s		16.8				21.8		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.9
HCM 2010 LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	290	510	1340	320	170	640
Future Volume (veh/h)	290	510	1340	320	170	640
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	337	477	1426	276	183	688
Adj No. of Lanes	2	1	2	0	1	2
Peak Hour Factor	0.86	0.86	0.94	0.94	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	617	482	1618	308	222	2550
Arrive On Green	0.18	0.18	0.55	0.55	0.13	0.72
Sat Flow, veh/h	3442	1583	3062	564	1774	3632
Grp Volume(v), veh/h	337	477	840	862	183	688
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1763	1774	1770
Q Serve(g_s), s	8.0	16.1	36.9	39.1	9.0	6.1
Cycle Q Clear(g_c), s	8.0	16.1	36.9	39.1	9.0	6.1
Prop In Lane	1.00	1.00		0.32	1.00	
Lane Grp Cap(c), veh/h	617	482	965	961	222	2550
V/C Ratio(X)	0.55	0.99	0.87	0.90	0.82	0.27
Avail Cap(c_a), veh/h	617	482	983	980	405	2952
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	33.5	31.1	17.7	18.2	38.3	4.4
Incr Delay (d2), s/veh	1.0	38.1	8.4	10.8	7.5	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	3.9	16.8	20.0	21.8	4.9	2.9
LnGrp Delay(d),s/veh	34.5	69.2	26.1	28.9	45.8	4.4
LnGrp LOS	C	E	C	C	D	A
Approach Vol, veh/h	814		1702			871
Approach Delay, s/veh	54.9		27.5			13.1
Approach LOS	D		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	15.7	53.5				69.2		20.6
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	20.5	49.9				74.9		16.1
Max Q Clear Time (g_c+I1), s	11.0	41.1				8.1		18.1
Green Ext Time (p_c), s	0.3	7.9				38.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.4
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	80	20	1450	40	30	830
Future Volume (veh/h)	80	20	1450	40	30	830
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	107	27	1480	41	34	943
Adj No. of Lanes	0	0	2	0	1	2
Peak Hour Factor	0.75	0.75	0.98	0.98	0.88	0.88
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	138	35	2188	61	52	2575
Arrive On Green	0.10	0.10	0.62	0.62	0.03	0.73
Sat Flow, veh/h	1373	347	3611	97	1774	3632
Grp Volume(v), veh/h	135	0	743	778	34	943
Grp Sat Flow(s),veh/h/ln	1733	0	1770	1846	1774	1770
Q Serve(g_s), s	4.4	0.0	15.8	15.8	1.1	5.7
Cycle Q Clear(g_c), s	4.4	0.0	15.8	15.8	1.1	5.7
Prop In Lane	0.79	0.20		0.05	1.00	
Lane Grp Cap(c), veh/h	174	0	1101	1148	52	2575
V/C Ratio(X)	0.78	0.00	0.68	0.68	0.66	0.37
Avail Cap(c_a), veh/h	696	0	1150	1200	160	2891
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.2	0.0	7.1	7.1	27.6	2.9
Incr Delay (d2), s/veh	2.8	0.0	1.7	1.7	5.2	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	2.2	0.0	8.0	8.3	0.6	2.8
LnGrp Delay(d),s/veh	28.1	0.0	8.8	8.8	32.8	3.0
LnGrp LOS	C		A	A	C	A
Approach Vol, veh/h	135		1521			977
Approach Delay, s/veh	28.1		8.8			4.1
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.1	41.2				47.3		10.3
Change Period (Y+Rc), s	4.4	5.4				5.4		4.5
Max Green Setting (Gmax), s	5.2	37.4				47.0		23.1
Max Q Clear Time (g_c+I1), s	3.1	17.8				7.7		6.4
Green Ext Time (p_c), s	0.0	17.9				33.6		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	8.0
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	80	70	80	460	310	280	1240	70	150	560	90
Future Volume (veh/h)	120	80	70	80	460	310	280	1240	70	150	560	90
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	148	99	61	84	484	221	308	1363	66	174	651	93
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	2	0
Peak Hour Factor	0.81	0.81	0.81	0.95	0.95	0.95	0.91	0.91	0.91	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	175	599	344	106	563	256	336	1456	70	227	934	133
Arrive On Green	0.10	0.28	0.28	0.06	0.24	0.24	0.19	0.42	0.42	0.07	0.30	0.30
Sat Flow, veh/h	1774	2167	1245	1774	2368	1075	1774	3437	166	3442	3110	444
Grp Volume(v), veh/h	148	80	80	84	361	344	308	701	728	174	370	374
Grp Sat Flow(s),veh/h/ln	1774	1770	1643	1774	1770	1673	1774	1770	1833	1721	1770	1784
Q Serve(g_s), s	9.4	3.9	4.3	5.4	22.5	22.7	19.6	43.5	43.7	5.7	21.3	21.3
Cycle Q Clear(g_c), s	9.4	3.9	4.3	5.4	22.5	22.7	19.6	43.5	43.7	5.7	21.3	21.3
Prop In Lane	1.00		0.76	1.00		0.64	1.00		0.09	1.00		0.25
Lane Grp Cap(c), veh/h	175	489	454	106	421	398	336	750	777	227	531	536
V/C Ratio(X)	0.85	0.16	0.18	0.79	0.86	0.86	0.92	0.93	0.94	0.77	0.70	0.70
Avail Cap(c_a), veh/h	179	518	481	139	472	446	398	770	798	227	531	536
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	51.0	31.5	31.7	53.4	42.0	42.1	45.7	31.6	31.7	52.9	35.6	35.6
Incr Delay (d2), s/veh	27.6	0.2	0.2	15.2	13.3	14.7	21.7	18.1	18.1	13.1	4.0	4.0
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	6.0	1.9	2.0	3.1	12.5	12.1	11.6	25.0	26.0	3.1	11.0	11.1
LnGrp Delay(d),s/veh	78.6	31.7	31.9	68.6	55.3	56.7	67.5	49.7	49.8	65.9	39.6	39.6
LnGrp LOS	E	C	C	E	E	E	E	D	D	E	D	D
Approach Vol, veh/h		308			789			1737			918	
Approach Delay, s/veh		54.3			57.3			52.9			44.6	
Approach LOS		D			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.3	37.1	26.2	40.5	15.7	32.7	12.0	54.7
Change Period (Y+Rc), s	4.4	* 5.3	4.4	* 5.9	4.4	5.3	4.4	5.9
Max Green Setting (Gmax), s	9.0	* 34	25.8	* 33	11.6	30.7	7.6	50.1
Max Q Clear Time (g_c+I1), s	7.4	6.3	21.6	23.3	11.4	24.7	7.7	45.7
Green Ext Time (p_c), s	0.0	5.9	0.2	7.7	0.0	2.7	0.0	3.0

Intersection Summary	
HCM 2010 Ctrl Delay	51.9
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	40	30	90	40	80	20	480	80	90	570	120
Future Volume (veh/h)	160	40	30	90	40	80	20	480	80	90	570	120
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	200	50	38	132	59	118	22	522	87	95	600	126
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.80	0.80	0.80	0.68	0.68	0.68	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	415	89	52	295	116	171	432	1433	238	482	1374	288
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.47	0.47	0.47	0.47	0.47	0.47
Sat Flow, veh/h	940	327	193	592	429	631	725	3039	504	809	2914	611
Grp Volume(v), veh/h	288	0	0	309	0	0	22	303	306	95	364	362
Grp Sat Flow(s),veh/h/ln	1459	0	0	1652	0	0	725	1770	1774	809	1770	1755
Q Serve(g_s), s	0.4	0.0	0.0	0.0	0.0	0.0	0.8	4.2	4.2	3.2	5.2	5.2
Cycle Q Clear(g_c), s	6.4	0.0	0.0	5.9	0.0	0.0	6.0	4.2	4.2	7.4	5.2	5.2
Prop In Lane	0.69		0.13	0.43		0.38	1.00		0.28	1.00		0.35
Lane Grp Cap(c), veh/h	555	0	0	582	0	0	432	834	836	482	834	828
V/C Ratio(X)	0.52	0.00	0.00	0.53	0.00	0.00	0.05	0.36	0.37	0.20	0.44	0.44
Avail Cap(c_a), veh/h	1037	0	0	1123	0	0	492	982	984	549	982	974
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.4	0.0	0.0	12.3	0.0	0.0	8.7	6.4	6.4	8.8	6.7	6.7
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.3	0.0	0.0	0.1	0.4	0.4	0.3	0.5	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	0.0	2.9	0.0	0.0	0.2	2.1	2.1	0.8	2.7	2.6
LnGrp Delay(d),s/veh	12.6	0.0	0.0	12.6	0.0	0.0	8.8	6.8	6.8	9.1	7.2	7.2
LnGrp LOS	B			B			A	A	A	A	A	A
Approach Vol, veh/h		288			309			631			821	
Approach Delay, s/veh		12.6			12.6			6.9			7.5	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		22.8		15.2		22.8		15.2
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		21.1		24.1		21.1		24.1
Max Q Clear Time (g_c+I1), s		8.0		8.4		9.4		7.9
Green Ext Time (p_c), s		9.3		2.4		8.5		2.5

Intersection Summary	
HCM 2010 Ctrl Delay	8.8
HCM 2010 LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	150	250	1180	390	0	1070
Future Volume (veh/h)	150	250	1180	390	0	1070
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	0	1863
Adj Flow Rate, veh/h	172	287	1216	402	0	1138
Adj No. of Lanes	1	1	2	1	0	2
Peak Hour Factor	0.87	0.87	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	0	2
Cap, veh/h	407	363	2125	951	0	2125
Arrive On Green	0.23	0.23	0.60	0.60	0.00	0.60
Sat Flow, veh/h	1774	1583	3632	1583	0	3725
Grp Volume(v), veh/h	172	287	1216	402	0	1138
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	0	1770
Q Serve(g_s), s	4.4	9.0	11.1	7.2	0.0	10.0
Cycle Q Clear(g_c), s	4.4	9.0	11.1	7.2	0.0	10.0
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	407	363	2125	951	0	2125
V/C Ratio(X)	0.42	0.79	0.57	0.42	0.00	0.54
Avail Cap(c_a), veh/h	688	614	2378	1064	0	2378
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.4	19.2	6.4	5.7	0.0	6.2
Incr Delay (d2), s/veh	0.7	3.9	0.3	0.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	4.3	5.3	3.2	0.0	4.8
LnGrp Delay(d),s/veh	18.1	23.0	6.7	6.0	0.0	6.4
LnGrp LOS	B	C	A	A		A
Approach Vol, veh/h	459		1618			1138
Approach Delay, s/veh	21.2		6.5			6.4
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		36.2				36.2		16.6
Change Period (Y+Rc), s		4.5				4.5		4.5
Max Green Setting (Gmax), s		35.5				35.5		20.5
Max Q Clear Time (g_c+I1), s		13.1				12.0		11.0
Green Ext Time (p_c), s		18.7				19.4		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	8.6
HCM 2010 LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	580	600	960	290	280	930
Future Volume (veh/h)	580	600	960	290	280	930
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	617	372	1043	315	315	1045
Adj No. of Lanes	2	1	2	0	1	2
Peak Hour Factor	0.94	0.94	0.92	0.92	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	729	653	1106	332	356	2383
Arrive On Green	0.21	0.21	0.41	0.41	0.20	0.67
Sat Flow, veh/h	3442	1583	2779	805	1774	3632
Grp Volume(v), veh/h	617	372	684	674	315	1045
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1721	1774	1770
Q Serve(g_s), s	12.7	13.4	27.4	28.0	12.8	10.1
Cycle Q Clear(g_c), s	12.7	13.4	27.4	28.0	12.8	10.1
Prop In Lane	1.00	1.00		0.47	1.00	
Lane Grp Cap(c), veh/h	729	653	729	709	356	2383
V/C Ratio(X)	0.85	0.57	0.94	0.95	0.89	0.44
Avail Cap(c_a), veh/h	744	660	730	710	372	2416
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	28.0	16.7	20.9	21.0	28.7	5.6
Incr Delay (d2), s/veh	8.8	1.1	19.9	22.3	21.1	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	6.9	6.0	17.3	17.5	8.3	4.8
LnGrp Delay(d),s/veh	36.8	17.8	40.7	43.3	49.9	5.7
LnGrp LOS	D	B	D	D	D	A
Approach Vol, veh/h	989		1358			1360
Approach Delay, s/veh	29.7		42.0			16.0
Approach LOS	C		D			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	19.3	35.0				54.3		19.7
Change Period (Y+Rc), s	4.5	4.5				4.5		4.0
Max Green Setting (Gmax), s	15.5	30.5				50.5		16.0
Max Q Clear Time (g_c+I1), s	14.8	30.0				12.1		15.4
Green Ext Time (p_c), s	0.1	0.5				26.4		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	29.2
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	40	30	1100	30	120	1300
Future Volume (veh/h)	40	30	1100	30	120	1300
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	49	37	1264	34	133	1444
Adj No. of Lanes	0	0	2	0	1	2
Peak Hour Factor	0.81	0.81	0.87	0.87	0.90	0.90
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	62	47	2003	54	170	2647
Arrive On Green	0.07	0.07	0.57	0.57	0.10	0.75
Sat Flow, veh/h	951	718	3614	95	1774	3632
Grp Volume(v), veh/h	87	0	635	663	133	1444
Grp Sat Flow(s),veh/h/ln	1688	0	1770	1846	1774	1770
Q Serve(g_s), s	2.7	0.0	12.8	12.8	3.9	9.2
Cycle Q Clear(g_c), s	2.7	0.0	12.8	12.8	3.9	9.2
Prop In Lane	0.56	0.43		0.05	1.00	
Lane Grp Cap(c), veh/h	110	0	1007	1050	170	2647
V/C Ratio(X)	0.79	0.00	0.63	0.63	0.78	0.55
Avail Cap(c_a), veh/h	733	0	1007	1050	255	2813
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.4	0.0	7.7	7.7	23.4	2.8
Incr Delay (d2), s/veh	4.7	0.0	1.5	1.4	4.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	6.6	6.9	2.1	4.3
LnGrp Delay(d),s/veh	29.1	0.0	9.2	9.1	27.8	3.1
LnGrp LOS	C		A	A	C	A
Approach Vol, veh/h	87		1298			1577
Approach Delay, s/veh	29.1		9.1			5.2
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.5	35.5				45.0		8.0
Change Period (Y+Rc), s	4.4	5.4				5.4		4.5
Max Green Setting (Gmax), s	7.6	30.1				42.1		23.0
Max Q Clear Time (g_c+I1), s	5.9	14.8				11.2		4.7
Green Ext Time (p_c), s	0.0	14.6				28.4		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	7.6
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	300	250	90	180	240	140	640	80	260	910	50
Future Volume (veh/h)	220	300	250	90	180	240	140	640	80	260	910	50
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	227	309	196	103	207	207	152	696	65	274	958	30
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	2	0
Peak Hour Factor	0.97	0.97	0.97	0.87	0.87	0.87	0.92	0.92	0.92	0.95	0.95	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	566	351	130	346	310	184	1152	108	348	1225	38
Arrive On Green	0.15	0.27	0.27	0.07	0.20	0.20	0.10	0.35	0.35	0.10	0.35	0.35
Sat Flow, veh/h	1774	2102	1301	1774	1770	1583	1774	3273	305	3442	3503	110
Grp Volume(v), veh/h	227	259	246	103	207	207	152	376	385	274	484	504
Grp Sat Flow(s),veh/h/ln	1774	1770	1633	1774	1770	1583	1774	1770	1809	1721	1770	1843
Q Serve(g_s), s	12.3	12.3	12.7	5.6	10.4	11.8	8.2	17.1	17.2	7.6	24.0	24.0
Cycle Q Clear(g_c), s	12.3	12.3	12.7	5.6	10.4	11.8	8.2	17.1	17.2	7.6	24.0	24.0
Prop In Lane	1.00		0.80	1.00		1.00	1.00		0.17	1.00		0.06
Lane Grp Cap(c), veh/h	261	477	440	130	346	310	184	623	637	348	619	644
V/C Ratio(X)	0.87	0.54	0.56	0.79	0.60	0.67	0.83	0.60	0.60	0.79	0.78	0.78
Avail Cap(c_a), veh/h	362	634	585	245	509	456	259	654	668	548	696	725
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	40.9	30.6	30.8	44.6	35.9	36.4	43.1	26.1	26.1	43.0	28.5	28.5
Incr Delay (d2), s/veh	12.0	1.2	1.3	4.0	1.5	2.3	10.0	1.3	1.3	1.5	5.2	5.0
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	6.9	6.1	5.9	2.9	5.3	5.4	4.6	8.6	8.8	3.7	12.6	13.1
LnGrp Delay(d),s/veh	52.9	31.8	32.1	48.7	37.4	38.7	53.1	27.5	27.4	44.5	33.8	33.6
LnGrp LOS	D	C	C	D	D	D	D	C	C	D	C	C
Approach Vol, veh/h		732			517			913			1262	
Approach Delay, s/veh		38.4			40.2			31.7			36.0	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.6	31.7	14.5	40.1	18.8	24.5	14.3	40.4
Change Period (Y+Rc), s	4.4	* 5.3	4.4	* 5.9	4.4	5.3	4.4	5.9
Max Green Setting (Gmax), s	13.5	* 35	14.3	* 39	20.0	28.2	15.6	36.2
Max Q Clear Time (g_c+I1), s	7.6	14.7	10.2	26.0	14.3	13.8	9.6	19.2
Green Ext Time (p_c), s	0.1	6.3	0.1	8.3	0.2	5.3	0.3	10.3

Intersection Summary	
HCM 2010 Ctrl Delay	36.0
HCM 2010 LOS	D

Notes

Appendix G Peak Hour Intersection LOS Worksheets– Near-Term Year 2020 Base Plus Project Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	90	50	45	100	61	60	850	43	26	320	170
Future Volume (veh/h)	150	90	50	45	100	61	60	850	43	26	320	170
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	208	125	69	54	120	73	65	914	46	31	376	200
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.72	0.72	0.72	0.83	0.83	0.83	0.93	0.93	0.93	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	347	174	85	165	318	165	451	1624	82	310	1064	558
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.33	0.47	0.47	0.47	0.47	0.47	0.47
Sat Flow, veh/h	721	533	260	231	972	505	834	3429	173	583	2247	1178
Grp Volume(v), veh/h	402	0	0	247	0	0	65	472	488	31	295	281
Grp Sat Flow(s),veh/h/ln	1514	0	0	1708	0	0	834	1770	1832	583	1770	1655
Q Serve(g_s), s	6.2	0.0	0.0	0.0	0.0	0.0	2.6	9.4	9.4	2.0	5.2	5.3
Cycle Q Clear(g_c), s	11.5	0.0	0.0	5.4	0.0	0.0	7.9	9.4	9.4	11.4	5.2	5.3
Prop In Lane	0.52		0.17	0.22		0.30	1.00		0.09	1.00		0.71
Lane Grp Cap(c), veh/h	607	0	0	649	0	0	451	838	867	310	838	783
V/C Ratio(X)	0.66	0.00	0.00	0.38	0.00	0.00	0.14	0.56	0.56	0.10	0.35	0.36
Avail Cap(c_a), veh/h	976	0	0	1065	0	0	498	937	971	343	937	877
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.7	0.0	0.0	12.9	0.0	0.0	10.7	9.3	9.3	13.4	8.2	8.2
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.1	0.0	0.0	0.2	0.9	0.9	0.2	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.0	0.0	2.6	0.0	0.0	0.6	4.8	5.0	0.3	2.6	2.5
LnGrp Delay(d),s/veh	15.2	0.0	0.0	13.1	0.0	0.0	11.0	10.2	10.2	13.6	8.6	8.7
LnGrp LOS	B			B			B	B	B	B	A	A
Approach Vol, veh/h		402			247			1025			607	
Approach Delay, s/veh		15.2			13.1			10.3			8.9	
Approach LOS		B			B			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		28.2		21.0		28.2		21.0
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		26.1		29.1		26.1		29.1
Max Q Clear Time (g_c+I1), s		11.4		13.5		13.4		7.4
Green Ext Time (p_c), s		11.2		2.7		9.9		3.0

Intersection Summary		
HCM 2010 Ctrl Delay		11.1
HCM 2010 LOS		B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	129	220	1480	542	0	733
Future Volume (veh/h)	129	220	1480	542	0	733
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	0	1863
Adj Flow Rate, veh/h	187	319	1609	589	0	824
Adj No. of Lanes	1	1	2	1	0	2
Peak Hour Factor	0.69	0.69	0.92	0.92	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	0	2
Cap, veh/h	421	376	2168	970	0	2168
Arrive On Green	0.24	0.24	0.61	0.61	0.00	0.61
Sat Flow, veh/h	1774	1583	3632	1583	0	3725
Grp Volume(v), veh/h	187	319	1609	589	0	824
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	0	1770
Q Serve(g_s), s	5.4	11.5	19.4	13.8	0.0	7.1
Cycle Q Clear(g_c), s	5.4	11.5	19.4	13.8	0.0	7.1
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	421	376	2168	970	0	2168
V/C Ratio(X)	0.44	0.85	0.74	0.61	0.00	0.38
Avail Cap(c_a), veh/h	517	462	2270	1016	0	2270
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.5	21.8	8.3	7.2	0.0	5.9
Incr Delay (d2), s/veh	0.7	11.8	1.3	1.0	0.0	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	2.7	6.3	9.5	6.2	0.0	3.5
LnGrp Delay(d),s/veh	20.2	33.6	9.5	8.2	0.0	6.0
LnGrp LOS	C	C	A	A		A
Approach Vol, veh/h	506		2198			824
Approach Delay, s/veh	28.7		9.2			6.0
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		41.3				41.3		18.8
Change Period (Y+Rc), s		4.5				4.5		4.5
Max Green Setting (Gmax), s		38.5				38.5		17.5
Max Q Clear Time (g_c+I1), s		21.4				9.1		13.5
Green Ext Time (p_c), s		15.4				24.9		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	11.2
HCM 2010 LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	311	510	1512	336	170	662
Future Volume (veh/h)	311	510	1512	336	170	662
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	362	419	1609	357	183	712
Adj No. of Lanes	2	1	2	0	1	2
Peak Hour Factor	0.86	0.86	0.94	0.94	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	467	406	1835	393	215	2797
Arrive On Green	0.14	0.14	0.63	0.63	0.12	0.79
Sat Flow, veh/h	3442	1583	2995	621	1774	3632
Grp Volume(v), veh/h	362	419	958	1008	183	712
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1753	1774	1770
Q Serve(g_s), s	12.4	16.5	52.8	60.5	12.3	6.4
Cycle Q Clear(g_c), s	12.4	16.5	52.8	60.5	12.3	6.4
Prop In Lane	1.00	1.00		0.35	1.00	
Lane Grp Cap(c), veh/h	467	406	1119	1109	215	2797
V/C Ratio(X)	0.78	1.03	0.86	0.91	0.85	0.25
Avail Cap(c_a), veh/h	467	406	1142	1131	459	3331
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	50.8	45.2	17.9	19.3	52.4	3.3
Incr Delay (d2), s/veh	8.0	53.0	6.5	10.7	9.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	19.6	27.6	32.4	6.6	3.1
LnGrp Delay(d),s/veh	58.8	98.2	24.4	30.0	61.6	3.4
LnGrp LOS	E	F	C	C	E	A
Approach Vol, veh/h	781		1966			895
Approach Delay, s/veh	79.9		27.3			15.3
Approach LOS	E		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	19.2	81.4				100.7		21.0
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	31.5	78.5				114.5		16.5
Max Q Clear Time (g_c+I1), s	14.3	62.5				8.4		18.5
Green Ext Time (p_c), s	0.4	14.4				63.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	35.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	188	0	96	80	0	20	108	1450	40	30	846	50
Future Volume (veh/h)	188	0	96	80	0	20	108	1450	40	30	846	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	204	0	104	107	0	27	117	1480	41	34	961	54
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.75	0.92	0.75	0.92	0.98	0.98	0.88	0.88	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	323	2	122	340	11	65	150	1861	51	49	1604	90
Arrive On Green	0.24	0.00	0.24	0.24	0.00	0.24	0.08	0.53	0.53	0.03	0.47	0.47
Sat Flow, veh/h	1004	10	517	1042	45	274	1774	3518	97	1774	3407	191
Grp Volume(v), veh/h	308	0	0	134	0	0	117	743	778	34	499	516
Grp Sat Flow(s),veh/h/ln	1532	0	0	1362	0	0	1774	1770	1846	1774	1770	1829
Q Serve(g_s), s	7.4	0.0	0.0	0.0	0.0	0.0	4.4	23.5	23.6	1.3	14.3	14.3
Cycle Q Clear(g_c), s	13.0	0.0	0.0	5.6	0.0	0.0	4.4	23.5	23.6	1.3	14.3	14.3
Prop In Lane	0.66		0.34	0.80		0.20	1.00		0.05	1.00		0.10
Lane Grp Cap(c), veh/h	448	0	0	415	0	0	150	936	976	49	833	861
V/C Ratio(X)	0.69	0.00	0.00	0.32	0.00	0.00	0.78	0.79	0.80	0.69	0.60	0.60
Avail Cap(c_a), veh/h	601	0	0	556	0	0	224	952	992	134	859	888
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.8	0.0	0.0	22.2	0.0	0.0	30.9	13.2	13.2	33.2	13.4	13.4
Incr Delay (d2), s/veh	0.9	0.0	0.0	0.2	0.0	0.0	9.8	4.9	4.8	6.2	1.3	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	0.0	0.0	2.2	0.0	0.0	2.6	12.6	13.2	0.7	7.2	7.5
LnGrp Delay(d),s/veh	25.7	0.0	0.0	22.4	0.0	0.0	40.7	18.1	18.0	39.4	14.8	14.7
LnGrp LOS	C			C			D	B	B	D	B	B
Approach Vol, veh/h		308			134			1638			1049	
Approach Delay, s/veh		25.7			22.4			19.7			15.5	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.3	41.8		20.7	10.3	37.8		20.7
Change Period (Y+Rc), s	4.4	5.4		4.5	4.5	5.4		4.5
Max Green Setting (Gmax), s	5.2	37.0		23.5	8.7	33.4		23.5
Max Q Clear Time (g_c+I1), s	3.3	25.6		15.0	6.4	16.3		7.6
Green Ext Time (p_c), s	0.0	10.8		1.2	0.1	15.9		1.7

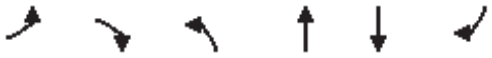
Intersection Summary		
HCM 2010 Ctrl Delay		19.0
HCM 2010 LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	129	80	70	80	460	313	280	1336	70	155	651	106
Future Volume (veh/h)	129	80	70	80	460	313	280	1336	70	155	651	106
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	159	99	49	84	484	171	308	1468	44	180	757	88
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	2	0
Peak Hour Factor	0.81	0.81	0.81	0.95	0.95	0.95	0.91	0.91	0.91	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	183	608	284	106	556	195	336	1563	47	219	1022	119
Arrive On Green	0.10	0.26	0.26	0.06	0.22	0.22	0.19	0.45	0.45	0.06	0.32	0.32
Sat Flow, veh/h	1774	2344	1095	1774	2571	902	1774	3509	105	3442	3195	371
Grp Volume(v), veh/h	159	73	75	84	332	323	308	739	773	180	419	426
Grp Sat Flow(s),veh/h/ln	1774	1770	1670	1774	1770	1703	1774	1770	1844	1721	1770	1797
Q Serve(g_s), s	10.3	3.7	4.0	5.4	21.1	21.3	19.8	46.3	46.6	6.0	24.6	24.6
Cycle Q Clear(g_c), s	10.3	3.7	4.0	5.4	21.1	21.3	19.8	46.3	46.6	6.0	24.6	24.6
Prop In Lane	1.00		0.66	1.00		0.53	1.00		0.06	1.00		0.21
Lane Grp Cap(c), veh/h	183	459	433	106	383	368	336	788	821	219	566	575
V/C Ratio(X)	0.87	0.16	0.17	0.79	0.87	0.88	0.92	0.94	0.94	0.82	0.74	0.74
Avail Cap(c_a), veh/h	183	470	443	137	418	402	393	807	841	219	566	575
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	51.5	33.3	33.4	54.0	44.0	44.1	46.3	30.8	30.8	53.9	35.3	35.3
Incr Delay (d2), s/veh	32.3	0.2	0.2	15.9	16.3	17.8	22.4	18.1	18.0	20.5	5.2	5.1
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	6.7	1.8	1.9	3.1	12.1	11.9	11.8	26.5	27.7	3.5	12.8	13.0
LnGrp Delay(d),s/veh	83.7	33.5	33.6	69.9	60.3	62.0	68.7	48.8	48.9	74.4	40.5	40.5
LnGrp LOS	F	C	C	E	E	E	E	D	D	E	D	D
Approach Vol, veh/h		307			739			1820			1025	
Approach Delay, s/veh		59.5			62.1			52.2			46.4	
Approach LOS		E			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.4	35.5	26.4	43.1	16.4	30.5	11.8	57.8
Change Period (Y+Rc), s	4.4	* 5.3	4.4	* 5.9	4.4	5.3	4.4	5.9
Max Green Setting (Gmax), s	9.0	* 31	25.8	* 36	12.0	27.5	7.4	53.1
Max Q Clear Time (g_c+I1), s	7.4	6.0	21.8	26.6	12.3	23.3	8.0	48.6
Green Ext Time (p_c), s	0.0	5.2	0.2	7.7	0.0	1.9	0.0	3.3

Intersection Summary	
HCM 2010 Ctrl Delay	53.2
HCM 2010 LOS	D

Notes



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	16	0	1658	940	23
Future Volume (Veh/h)	0	16	0	1658	940	23
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	17	0	1802	1022	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				237	468	
pX, platoon unblocked	0.62					
vC, conflicting volume	1936	353	1047			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1281	353	1047			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	97	643	660			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	17	901	901	409	409	229
Volume Left	0	0	0	0	0	0
Volume Right	17	0	0	0	0	25
cSH	643	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.53	0.53	0.24	0.24	0.13
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.7	0.0		0.0		
Approach LOS	B					

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	49.2%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	206	0	0	140	14	10	0	10	32	0	6
Future Volume (Veh/h)	3	206	0	0	140	14	10	0	10	32	0	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	224	0	0	152	15	11	0	11	35	0	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					487							
pX, platoon unblocked												
vC, conflicting volume	167			224			396	397	224	400	390	160
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	167			224			396	397	224	400	390	160
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	100	99	94	100	99
cM capacity (veh/h)	1411			1345			558	539	815	552	544	886

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	227	167	22	35	7
Volume Left	3	0	11	35	0
Volume Right	0	15	11	0	7
cSH	1411	1700	663	552	886
Volume to Capacity	0.00	0.10	0.03	0.06	0.01
Queue Length 95th (ft)	0	0	3	5	1
Control Delay (s)	0.1	0.0	10.6	12.0	9.1
Lane LOS	A		B	B	A
Approach Delay (s)	0.1	0.0	10.6	11.5	
Approach LOS			B	B	

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	27.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	242	144	14	42	10
Future Volume (Veh/h)	6	242	144	14	42	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	263	157	15	46	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			210			
pX, platoon unblocked						
vC, conflicting volume	172				442	164
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	172				442	164
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				92	99
cM capacity (veh/h)	1405				570	880

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	270	172	57
Volume Left	7	0	46
Volume Right	0	15	11
cSH	1405	1700	612
Volume to Capacity	0.00	0.10	0.09
Queue Length 95th (ft)	0	0	8
Control Delay (s)	0.2	0.0	11.5
Lane LOS	A		B
Approach Delay (s)	0.2	0.0	11.5
Approach LOS			B

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	40	30	34	40	36	20	480	35	42	570	120
Future Volume (veh/h)	160	40	30	34	40	36	20	480	35	42	570	120
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	200	50	38	50	59	53	22	522	38	44	600	126
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.80	0.80	0.80	0.68	0.68	0.68	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	409	81	51	207	208	143	448	1651	120	524	1438	301
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	992	319	199	336	818	561	725	3346	243	846	2914	611
Grp Volume(v), veh/h	288	0	0	162	0	0	22	275	285	44	364	362
Grp Sat Flow(s),veh/h/ln	1511	0	0	1716	0	0	725	1770	1820	846	1770	1755
Q Serve(g_s), s	3.5	0.0	0.0	0.0	0.0	0.0	0.8	3.6	3.6	1.3	5.1	5.1
Cycle Q Clear(g_c), s	6.5	0.0	0.0	2.9	0.0	0.0	5.9	3.6	3.6	4.9	5.1	5.1
Prop In Lane	0.69		0.13	0.31		0.33	1.00		0.13	1.00		0.35
Lane Grp Cap(c), veh/h	541	0	0	557	0	0	448	873	898	524	873	866
V/C Ratio(X)	0.53	0.00	0.00	0.29	0.00	0.00	0.05	0.32	0.32	0.08	0.42	0.42
Avail Cap(c_a), veh/h	1228	0	0	1333	0	0	578	1190	1224	675	1190	1180
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.0	0.0	0.0	11.9	0.0	0.0	8.2	5.9	5.9	7.4	6.3	6.3
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.1	0.0	0.0	0.1	0.3	0.3	0.1	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	0.0	1.4	0.0	0.0	0.2	1.8	1.9	0.3	2.5	2.5
LnGrp Delay(d),s/veh	13.3	0.0	0.0	12.0	0.0	0.0	8.2	6.2	6.2	7.5	6.8	6.8
LnGrp LOS	B			B			A	A	A	A	A	A
Approach Vol, veh/h		288			162			582			770	
Approach Delay, s/veh		13.3			12.0			6.3			6.8	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		24.1		14.8		24.1		14.8
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		26.1		29.1		26.1		29.1
Max Q Clear Time (g_c+I1), s		7.9		8.5		7.1		4.9
Green Ext Time (p_c), s		11.3		1.8		11.6		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	8.1
HCM 2010 LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	168	250	1226	410	0	1136
Future Volume (veh/h)	168	250	1226	410	0	1136
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	0	1863
Adj Flow Rate, veh/h	193	287	1264	423	0	1209
Adj No. of Lanes	1	1	2	1	0	2
Peak Hour Factor	0.87	0.87	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	0	2
Cap, veh/h	407	363	2136	956	0	2136
Arrive On Green	0.23	0.23	0.60	0.60	0.00	0.60
Sat Flow, veh/h	1774	1583	3632	1583	0	3725
Grp Volume(v), veh/h	193	287	1264	423	0	1209
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	0	1770
Q Serve(g_s), s	5.1	9.2	11.9	7.8	0.0	11.1
Cycle Q Clear(g_c), s	5.1	9.2	11.9	7.8	0.0	11.1
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	407	363	2136	956	0	2136
V/C Ratio(X)	0.47	0.79	0.59	0.44	0.00	0.57
Avail Cap(c_a), veh/h	676	603	2334	1044	0	2334
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.9	19.5	6.6	5.8	0.0	6.4
Incr Delay (d2), s/veh	0.9	3.9	0.3	0.3	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	4.4	5.7	3.4	0.0	5.3
LnGrp Delay(d),s/veh	18.8	23.4	6.9	6.1	0.0	6.7
LnGrp LOS	B	C	A	A		A
Approach Vol, veh/h	480		1687			1209
Approach Delay, s/veh	21.6		6.7			6.7
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		37.0				37.0		16.8
Change Period (Y+Rc), s		4.5				4.5		4.5
Max Green Setting (Gmax), s		35.5				35.5		20.5
Max Q Clear Time (g_c+I1), s		13.9				13.1		11.2
Green Ext Time (p_c), s		18.6				19.2		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	8.8
HCM 2010 LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	621	600	1036	299	280	1014
Future Volume (veh/h)	621	600	1036	299	280	1014
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	661	425	1126	216	315	1139
Adj No. of Lanes	2	1	2	0	1	2
Peak Hour Factor	0.94	0.94	0.92	0.92	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	680	624	1344	257	349	2480
Arrive On Green	0.20	0.20	0.45	0.45	0.20	0.70
Sat Flow, veh/h	3442	1583	3059	566	1774	3632
Grp Volume(v), veh/h	661	425	670	672	315	1139
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1763	1774	1770
Q Serve(g_s), s	16.9	17.5	29.5	29.8	15.4	12.6
Cycle Q Clear(g_c), s	16.9	17.5	29.5	29.8	15.4	12.6
Prop In Lane	1.00	1.00		0.32	1.00	
Lane Grp Cap(c), veh/h	680	624	802	799	349	2480
V/C Ratio(X)	0.97	0.68	0.84	0.84	0.90	0.46
Avail Cap(c_a), veh/h	680	624	822	819	359	2539
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	35.3	22.2	21.3	21.4	34.7	5.8
Incr Delay (d2), s/veh	27.4	3.0	7.4	7.8	24.8	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	10.6	9.1	16.0	16.1	9.9	6.1
LnGrp Delay(d),s/veh	62.7	25.2	28.6	29.2	59.5	6.0
LnGrp LOS	E	C	C	C	E	A
Approach Vol, veh/h	1086		1342			1454
Approach Delay, s/veh	48.0		28.9			17.6
Approach LOS	D		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	21.9	44.6				66.5		22.0
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	17.9	41.1				63.5		17.5
Max Q Clear Time (g_c+I1), s	17.4	31.8				14.6		19.5
Green Ext Time (p_c), s	0.1	8.3				32.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	0	69	40	0	30	85	1100	30	120	1309	84
Future Volume (veh/h)	85	0	69	40	0	30	85	1100	30	120	1309	84
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	92	0	75	49	0	37	92	1264	34	133	1454	91
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.81	0.92	0.81	0.92	0.87	0.87	0.90	0.90	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	196	11	97	193	23	95	118	1906	51	169	1923	120
Arrive On Green	0.14	0.00	0.14	0.14	0.00	0.14	0.07	0.54	0.54	0.10	0.57	0.57
Sat Flow, veh/h	786	78	704	753	167	695	1774	3521	95	1774	3384	211
Grp Volume(v), veh/h	167	0	0	86	0	0	92	635	663	133	758	787
Grp Sat Flow(s),veh/h/ln	1568	0	0	1616	0	0	1774	1770	1846	1774	1770	1826
Q Serve(g_s), s	3.4	0.0	0.0	0.0	0.0	0.0	3.2	16.2	16.2	4.6	20.4	20.7
Cycle Q Clear(g_c), s	6.3	0.0	0.0	2.9	0.0	0.0	3.2	16.2	16.2	4.6	20.4	20.7
Prop In Lane	0.55		0.45	0.57		0.43	1.00		0.05	1.00		0.12
Lane Grp Cap(c), veh/h	304	0	0	311	0	0	118	958	999	169	1006	1038
V/C Ratio(X)	0.55	0.00	0.00	0.28	0.00	0.00	0.78	0.66	0.66	0.79	0.75	0.76
Avail Cap(c_a), veh/h	645	0	0	645	0	0	160	969	1011	213	1020	1052
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	0.0	0.0	24.7	0.0	0.0	29.0	10.4	10.4	28.0	10.3	10.3
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.2	0.0	0.0	15.7	1.9	1.9	11.0	3.4	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	0.0	1.4	0.0	0.0	2.1	8.3	8.6	2.8	10.6	11.3
LnGrp Delay(d),s/veh	26.7	0.0	0.0	24.9	0.0	0.0	44.7	12.3	12.2	38.9	13.7	13.8
LnGrp LOS	C			C			D	B	B	D	B	B
Approach Vol, veh/h		167			86			1390			1678	
Approach Delay, s/veh		26.7			24.9			14.4			15.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.4	39.6		13.2	8.7	41.3		13.2
Change Period (Y+Rc), s	4.4	5.4		4.5	4.5	5.4		4.5
Max Green Setting (Gmax), s	7.6	34.6		23.5	5.7	36.4		23.5
Max Q Clear Time (g_c+I1), s	6.6	18.2		8.3	5.2	22.7		4.9
Green Ext Time (p_c), s	0.0	15.7		0.9	0.0	13.2		0.9

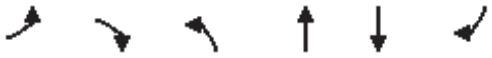
Intersection Summary		
HCM 2010 Ctrl Delay		16.0
HCM 2010 LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	238	300	250	90	180	245	140	702	80	263	976	59
Future Volume (veh/h)	238	300	250	90	180	245	140	702	80	263	976	59
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	245	309	196	103	207	213	152	763	65	277	1027	39
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	2	0
Peak Hour Factor	0.97	0.97	0.97	0.87	0.87	0.87	0.92	0.92	0.92	0.95	0.95	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	276	586	363	129	347	311	182	1179	100	342	1231	47
Arrive On Green	0.16	0.28	0.28	0.07	0.20	0.20	0.10	0.36	0.36	0.10	0.35	0.35
Sat Flow, veh/h	1774	2102	1301	1774	1770	1583	1774	3302	281	3442	3477	132
Grp Volume(v), veh/h	245	259	246	103	207	213	152	409	419	277	523	543
Grp Sat Flow(s),veh/h/ln	1774	1770	1633	1774	1770	1583	1774	1770	1813	1721	1770	1839
Q Serve(g_s), s	14.1	12.9	13.3	6.0	11.1	13.0	8.8	20.1	20.2	8.2	28.2	28.2
Cycle Q Clear(g_c), s	14.1	12.9	13.3	6.0	11.1	13.0	8.8	20.1	20.2	8.2	28.2	28.2
Prop In Lane	1.00		0.80	1.00		1.00	1.00		0.16	1.00		0.07
Lane Grp Cap(c), veh/h	276	493	455	129	347	311	182	632	647	342	627	651
V/C Ratio(X)	0.89	0.52	0.54	0.80	0.60	0.69	0.84	0.65	0.65	0.81	0.83	0.83
Avail Cap(c_a), veh/h	333	614	567	230	504	451	214	647	663	416	664	690
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	43.1	31.8	31.9	47.6	38.1	38.9	45.9	28.0	28.0	46.0	30.9	30.9
Incr Delay (d2), s/veh	19.1	1.0	1.2	4.2	1.5	2.4	18.8	2.1	2.0	7.9	8.7	8.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	6.4	6.2	3.1	5.5	5.9	5.3	10.1	10.4	4.3	15.3	15.9
LnGrp Delay(d),s/veh	62.3	32.8	33.1	51.7	39.6	41.4	64.8	30.1	30.1	53.9	39.6	39.3
LnGrp LOS	E	C	C	D	D	D	E	C	C	D	D	D
Approach Vol, veh/h		750			523			980			1343	
Approach Delay, s/veh		42.5			42.7			35.4			42.4	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	34.4	15.1	42.8	20.6	25.8	14.8	43.1
Change Period (Y+Rc), s	4.4	* 5.3	4.4	* 5.9	4.4	5.3	4.4	5.9
Max Green Setting (Gmax), s	13.5	* 36	12.6	* 39	19.6	29.7	12.6	38.1
Max Q Clear Time (g_c+I1), s	8.0	15.3	10.8	30.2	16.1	15.0	10.2	22.2
Green Ext Time (p_c), s	0.1	6.4	0.0	6.7	0.1	5.4	0.1	10.6

Intersection Summary	
HCM 2010 Ctrl Delay	40.6
HCM 2010 LOS	D

Notes



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	9	0	1215	1504	41
Future Volume (Veh/h)	0	9	0	1215	1504	41
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	10	0	1321	1635	45
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				259	452	
pX, platoon unblocked	0.74	0.94	0.94			
vC, conflicting volume	2318	568	1680			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1582	311	1496			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	74	643	417			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	10	660	660	654	654	372
Volume Left	0	0	0	0	0	0
Volume Right	10	0	0	0	0	45
cSH	643	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.39	0.39	0.38	0.38	0.22
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.7	0.0		0.0		
Approach LOS	B					

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	40.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	111	0	0	117	35	10	0	10	14	0	3
Future Volume (Veh/h)	6	111	0	0	117	35	10	0	10	14	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	121	0	0	127	38	11	0	11	15	0	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					710							
pX, platoon unblocked												
vC, conflicting volume	165			121			284	300	121	292	281	146
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	165			121			284	300	121	292	281	146
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	100	99	98	100	100
cM capacity (veh/h)	1413			1467			664	609	930	650	624	901

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	128	165	22	15	3
Volume Left	7	0	11	15	0
Volume Right	0	38	11	0	3
cSH	1413	1700	775	650	901
Volume to Capacity	0.00	0.10	0.03	0.02	0.00
Queue Length 95th (ft)	0	0	2	2	0
Control Delay (s)	0.5	0.0	9.8	10.7	9.0
Lane LOS	A		A	B	A
Approach Delay (s)	0.5	0.0	9.8	10.4	
Approach LOS			A	B	

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	25.2%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	124	145	24	30	7
Future Volume (Veh/h)	11	124	145	24	30	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	135	158	26	33	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			280			
pX, platoon unblocked						
vC, conflicting volume	184				330	171
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	184				330	171
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				95	99
cM capacity (veh/h)	1391				659	873

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	147	184	41
Volume Left	12	0	33
Volume Right	0	26	8
cSH	1391	1700	692
Volume to Capacity	0.01	0.11	0.06
Queue Length 95th (ft)	1	0	5
Control Delay (s)	0.7	0.0	10.5
Lane LOS	A		B
Approach Delay (s)	0.7	0.0	10.5
Approach LOS			B

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	25.6%	ICU Level of Service	A
Analysis Period (min)	15		

Arterial Level of Service: NB Euclid Avenue

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Market Street	III	35	16.7	45.8	62.5	0.12	7.1	F
Hilltop Drive	III	35	37.4	12.3	49.7	0.31	22.6	C
SR-94 EB Ramps	III	35	17.1	48.8	65.9	0.13	7.3	F
SR-94 WB Ramps	III	35	18.2	11.5	29.7	0.14	17.2	D
Federal Blvd	III	35	18.6	9.6	28.2	0.15	18.6	C
Total	III		108.0	128.0	236.0	0.86	13.1	E

Arterial Level of Service: SB Euclid Avenue

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Federal Blvd	III	35	10.5	16.9	27.4	0.07	9.5	F
SR-94 WB Ramps	III	35	18.6	7.4	26.0	0.15	20.2	C
SR-94 EB Ramps	III	35	18.2	3.6	21.8	0.14	23.5	C
Hilltop Drive	III	35	17.1	7.6	24.7	0.13	19.5	C
Market Street	III	35	37.4	59.5	96.9	0.31	11.6	E
Total	III		101.8	95.0	196.8	0.81	14.7	D

Arterial Level of Service: NB Euclid Avenue

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Market Street	III	35	16.7	31.1	47.8	0.12	9.3	F
Hilltop Drive	III	35	37.3	15.7	53.0	0.31	21.1	C
SR-94 EB Ramps	III	35	17.2	35.6	52.8	0.13	9.2	F
SR-94 WB Ramps	III	35	18.2	9.8	28.0	0.14	18.3	C
Federal Blvd	III	35	18.4	13.1	31.5	0.14	16.5	D
Total	III		107.8	105.3	213.1	0.86	14.5	D

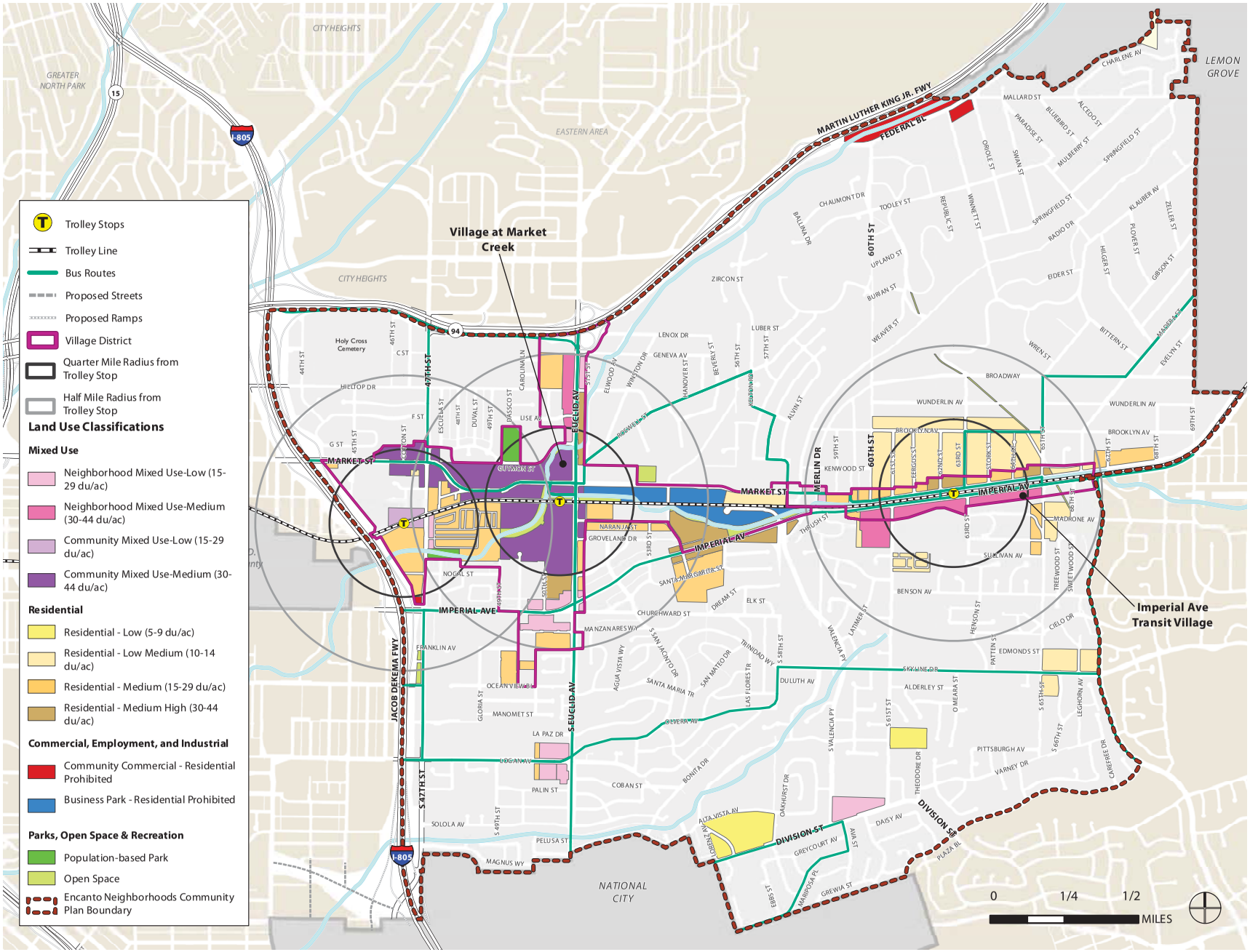
Arterial Level of Service: SB Euclid Avenue

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Federal Blvd	III	35	11.5	22.8	34.3	0.09	8.9	F
SR-94 WB Ramps	III	35	18.4	9.4	27.8	0.14	18.6	C
SR-94 EB Ramps	III	35	18.2	6.6	24.8	0.14	20.6	C
Hilltop Drive	III	35	17.2	12.4	29.6	0.13	16.4	D
Market Street	III	35	37.3	38.1	75.4	0.31	14.8	D
Total	III		102.6	89.3	191.9	0.82	15.3	D

Appendix H Encanto Community Plan EIR and Horizon Year 2030 Base Volume Development Methodology


LEGEND
Land Use Code - # of Dwelling Units Assumed in Preferred Plan / SF of commercial assumed in preferred plan
These number were obtained from City's staff as a part of the modeling process.
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

FIGURE 2-3: Areas of Land Use Change and Village District Boundaries



SOUTHEASTERN SAN DIEGO AND ENCANTO COMMUNITY PLAN UPDATES

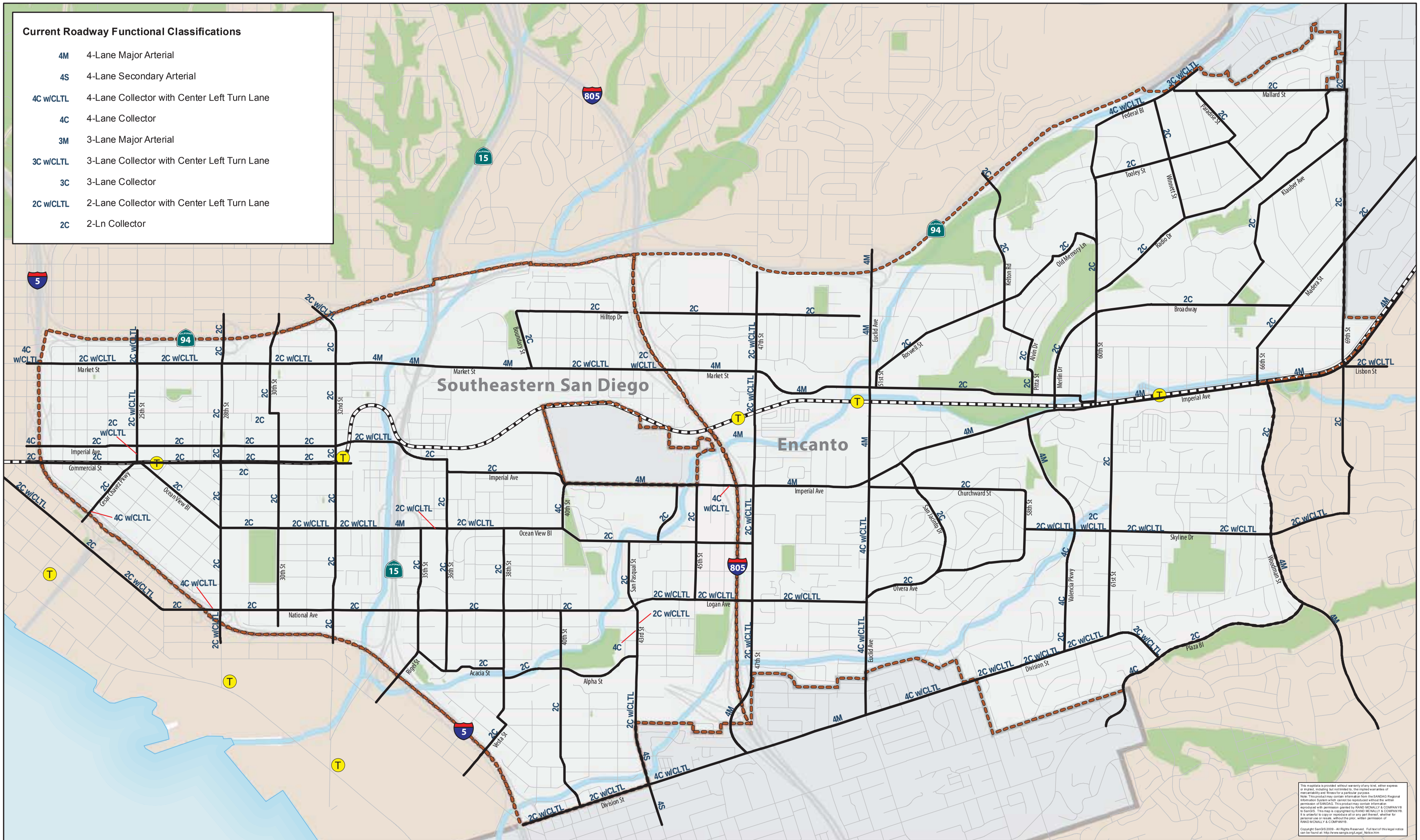


Figure 4-2: Preferred Plan Roadway Network

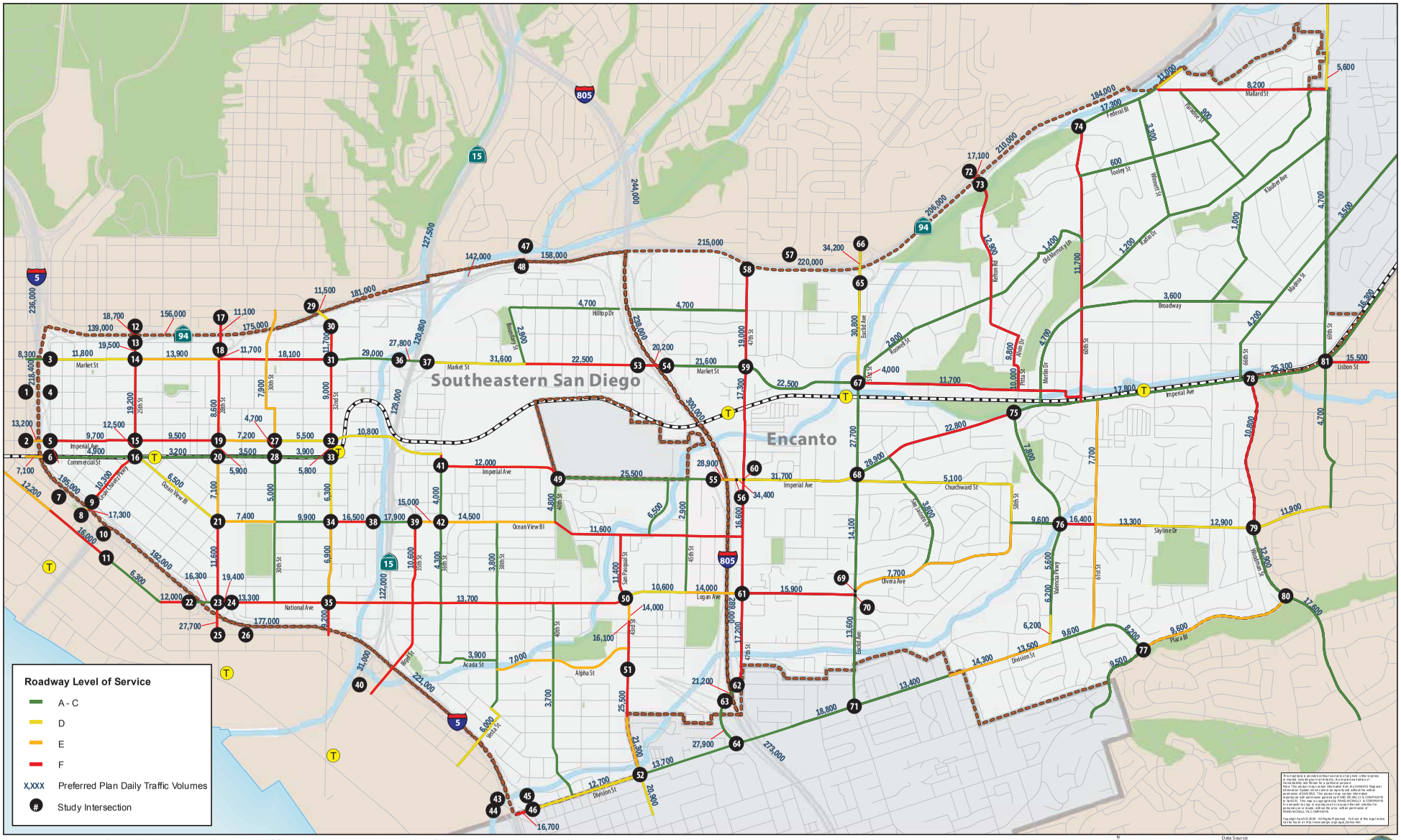
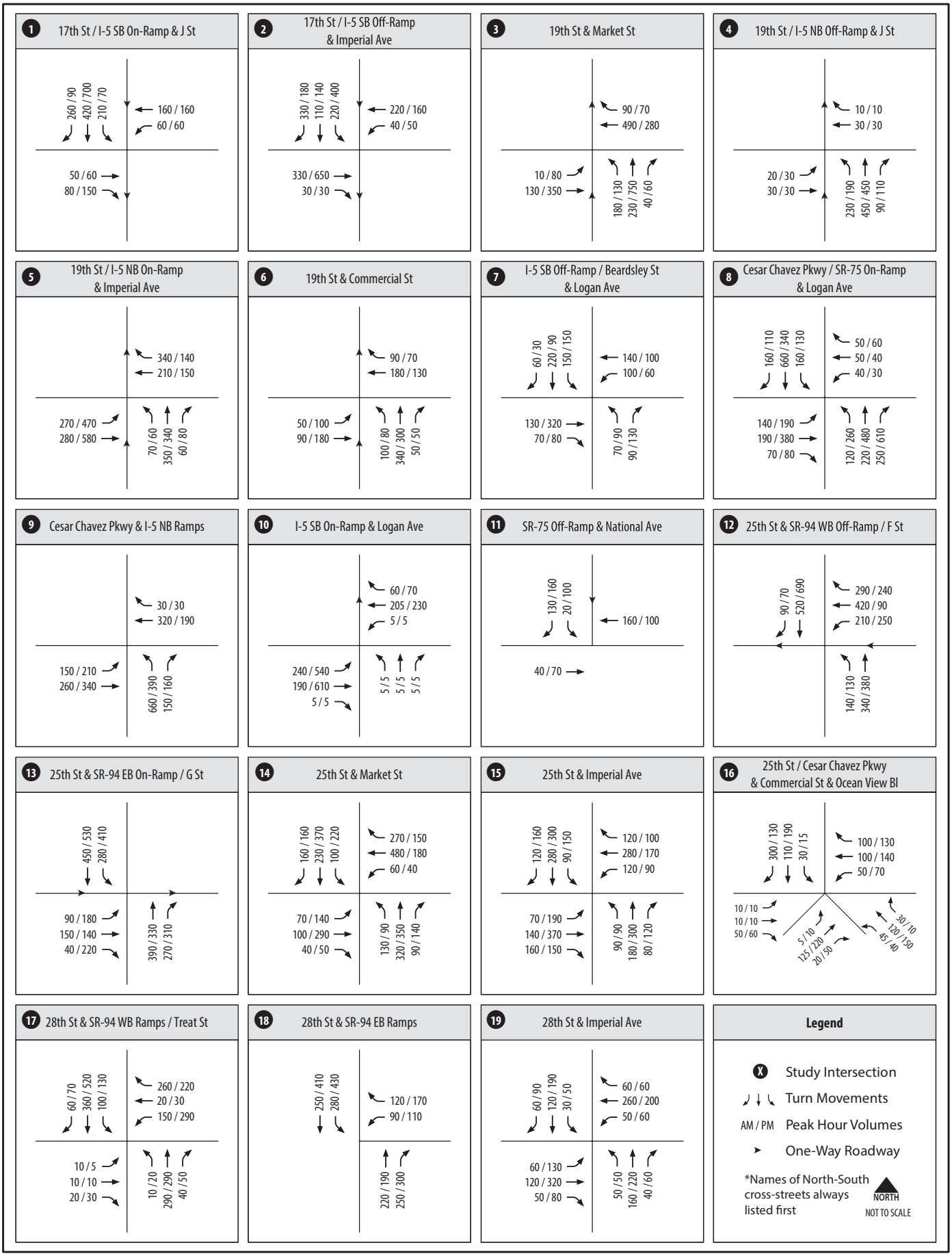


Figure 4-3: Preferred Plan Roadway Traffic Volumes and Level of Service

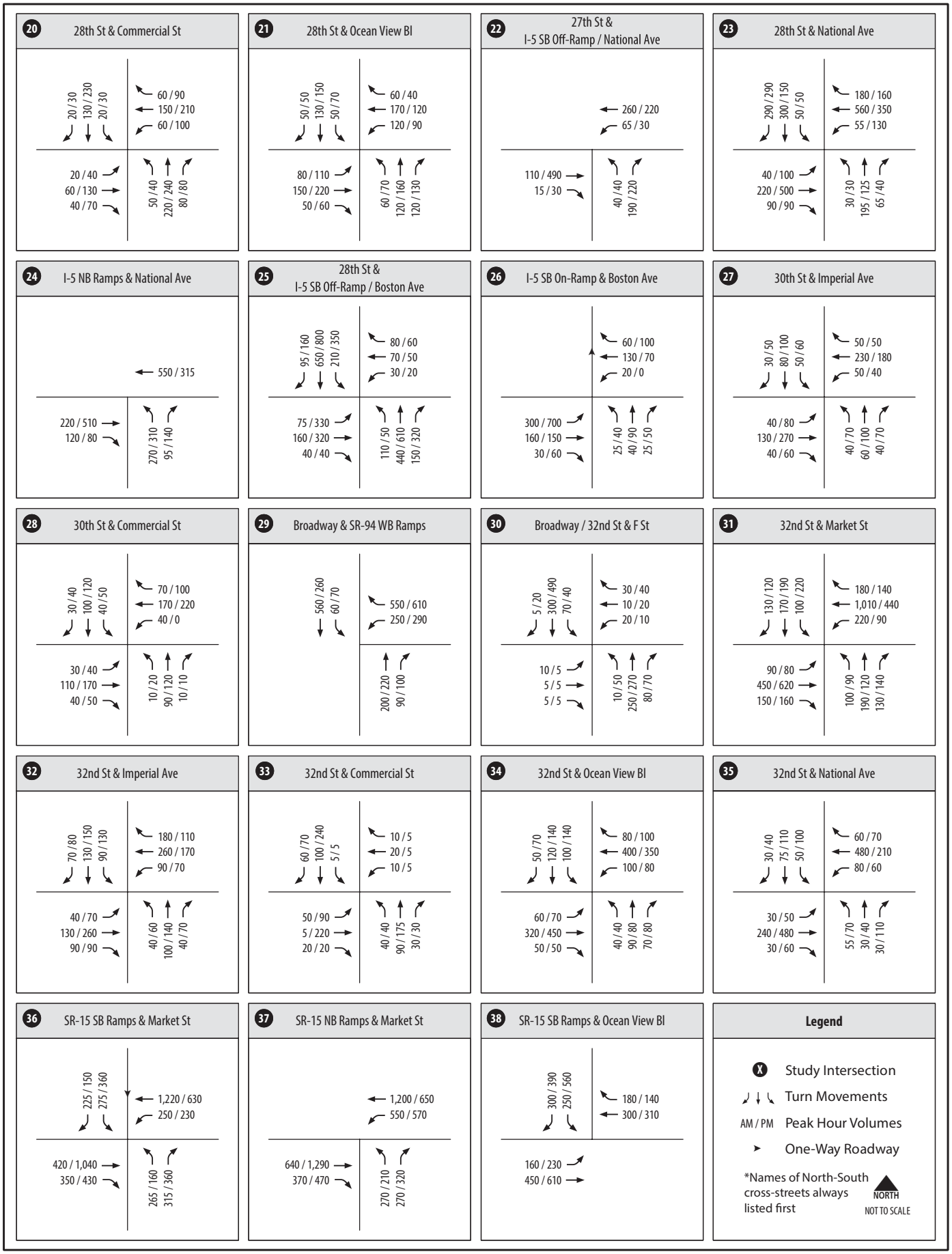


Southeastern San Diego and Encanto Community Plan Updates

CHEN RYAN

Figure 4-5

Preferred Plan AM/PM Peak Hour Intersection Turning Movements
Intersections 1-19 (Page 1 of 5)

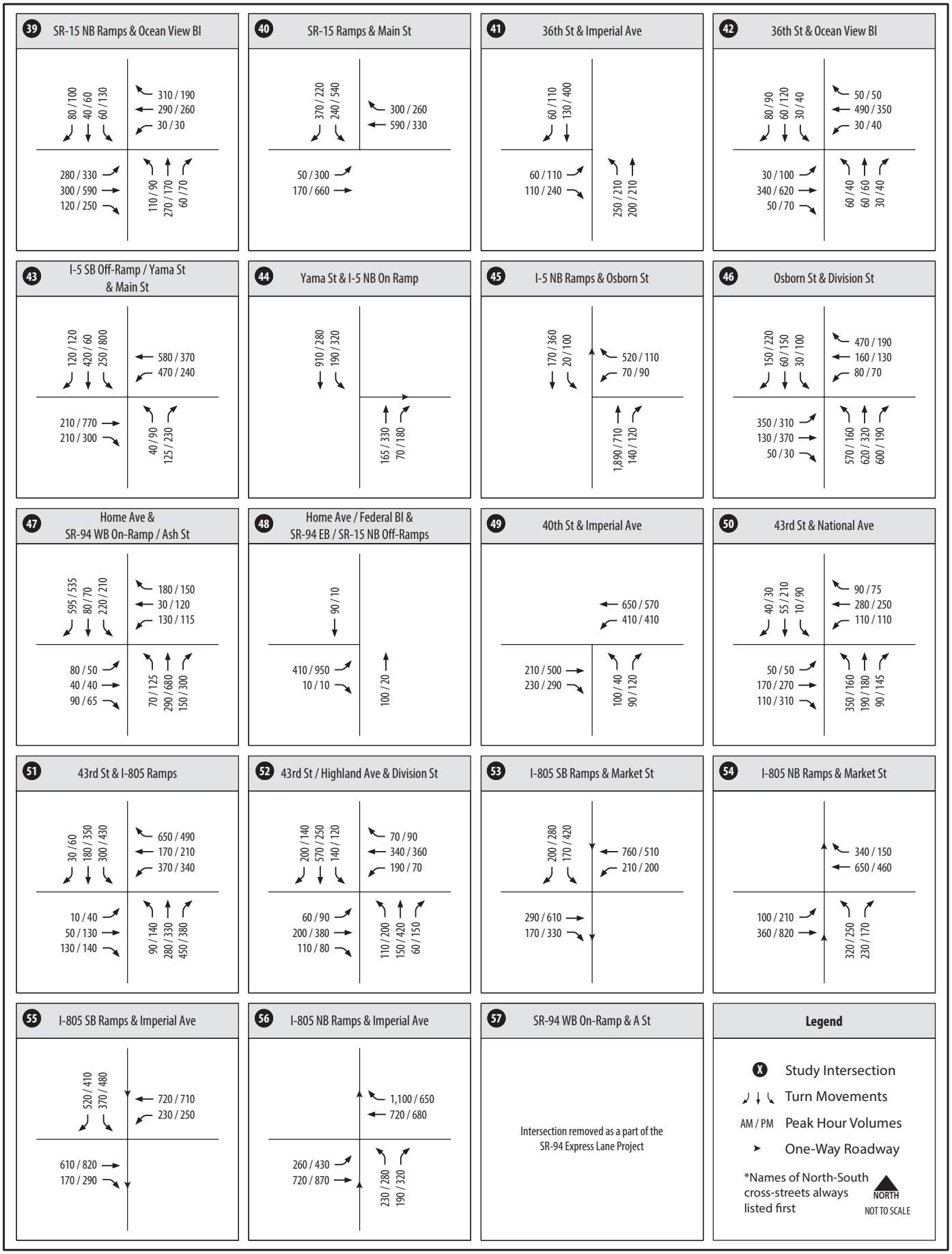


Southeastern San Diego and Encanto Community Plan Updates

CHEN RYAN

Figure 4-5

Preferred Plan AM/PM Peak Hour Intersection Turning Movements
Intersections 20-38 (Page 2 of 5)

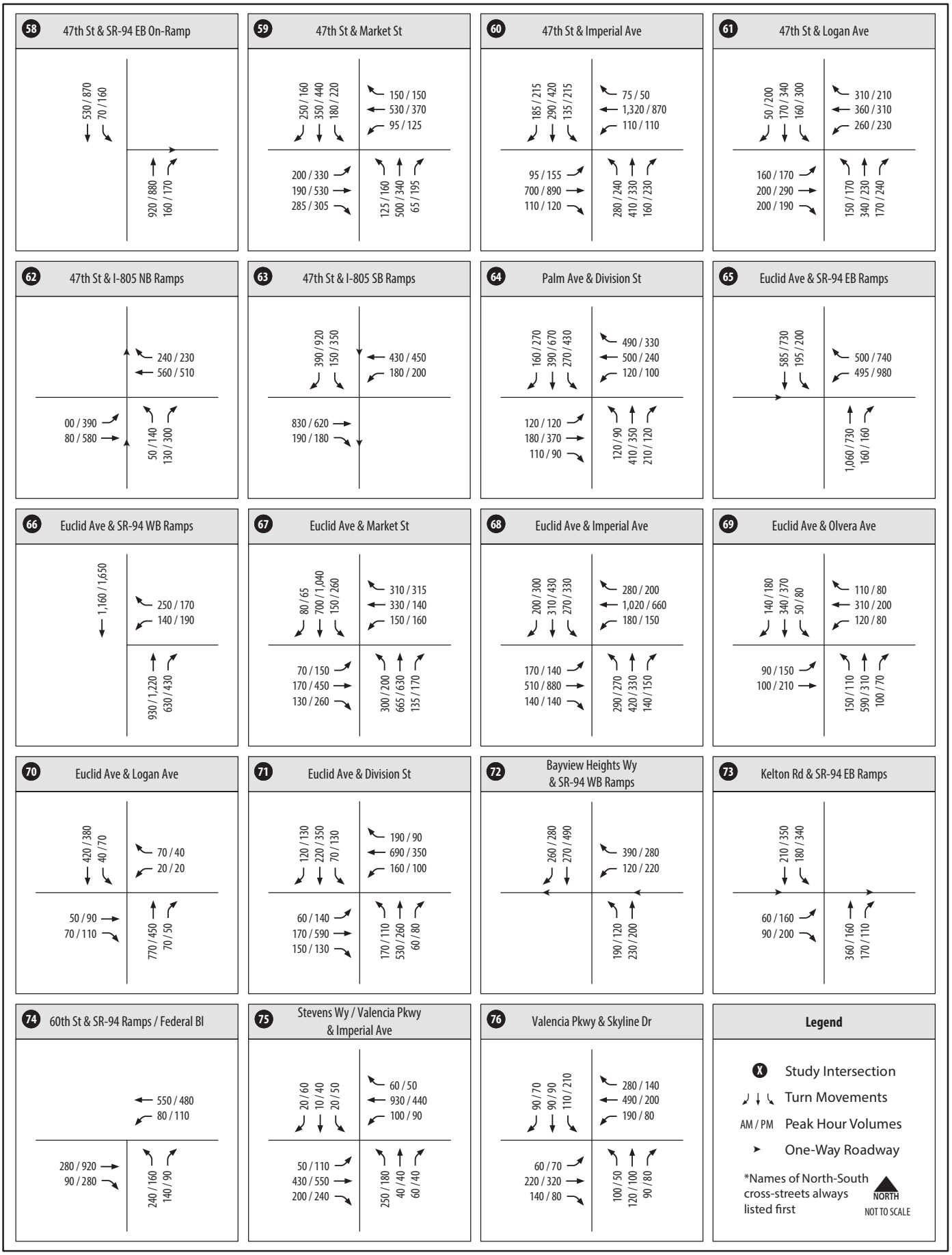


Southeastern San Diego and Encanto Community Plan Updates

CHEN RYAN

Figure 4-5

Preferred Plan AM/PM Peak Hour Intersection Turning Movements
Intersections 39-57 (Page 3 of 5)

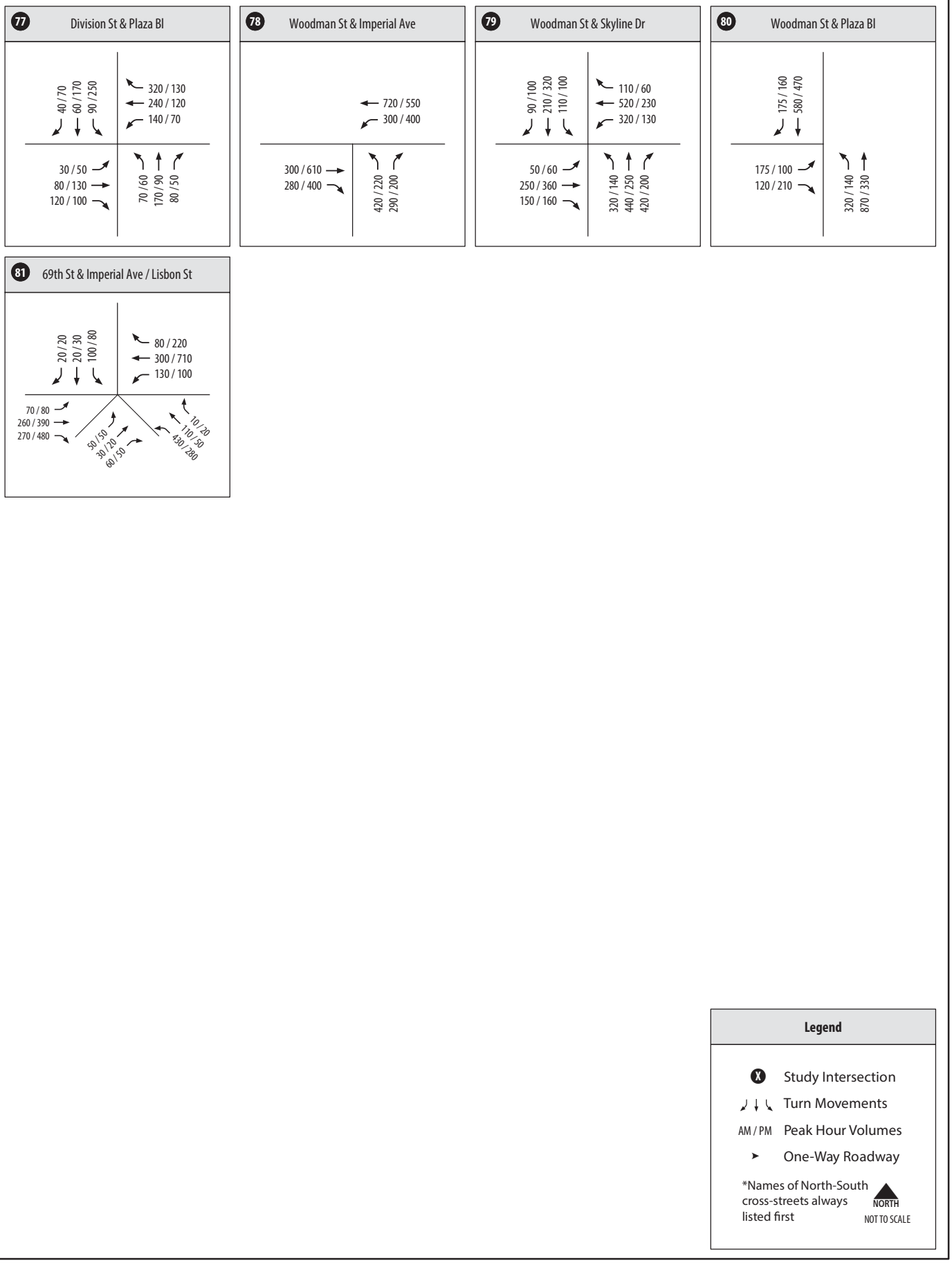


Southeastern San Diego and Encanto Community Plan Updates

CHEN RYAN

Figure 4-5

Preferred Plan AM/PM Peak Hour Intersection Turning Movements
Intersections 58-76 (Page 4 of 5)



Southeastern San Diego and Encanto Community Plan Updates

CHEN RYAN

Figure 4-5

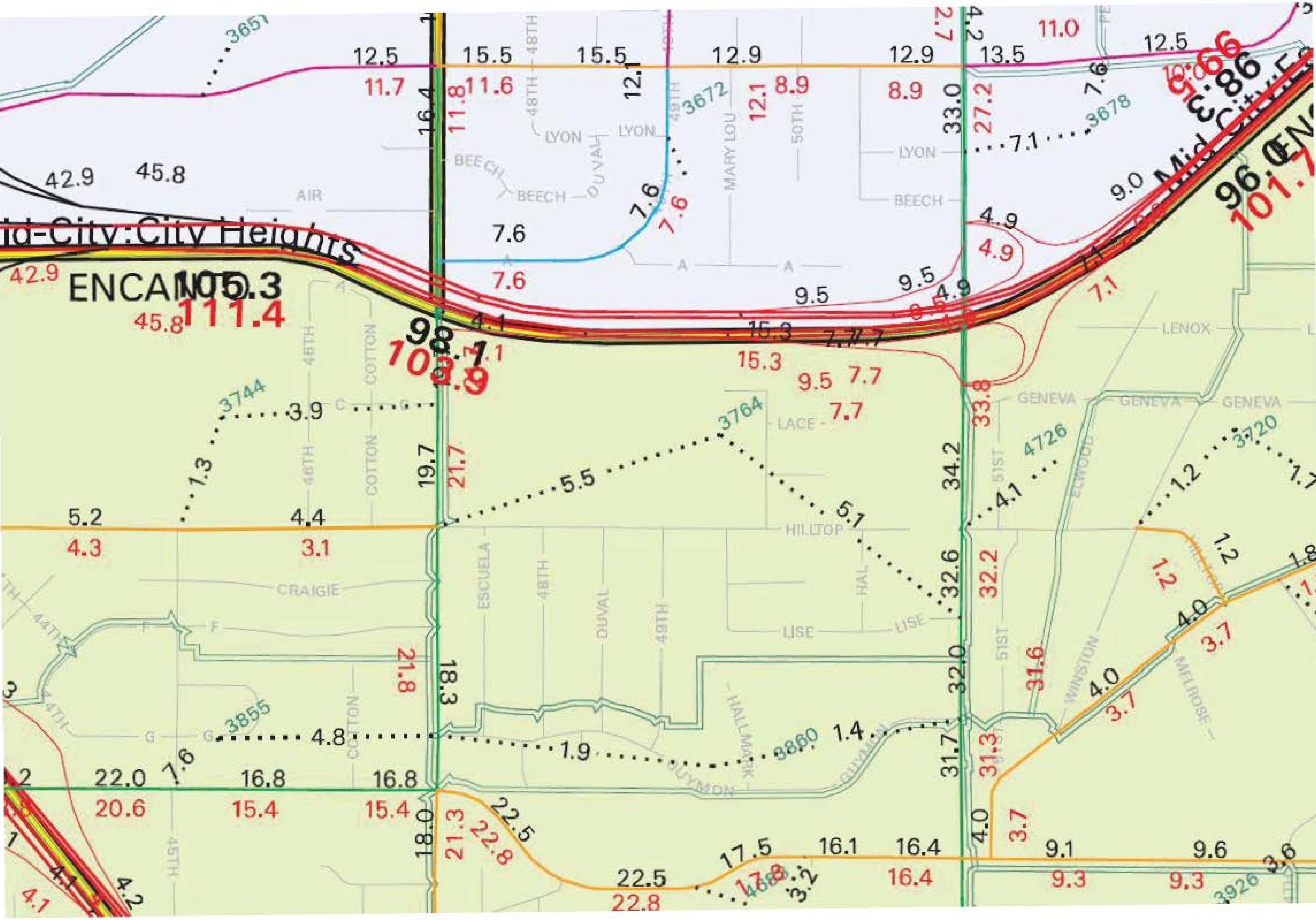
Preferred Plan AM/PM Peak Hour Intersection Turning Movements
Intersections 77-81 (Page 5 of 5)

Excerpt from Encanto CPU TIS -
from Encanto CPU TIS Appendix M
SANDAG Series 12 Model Outputs, Documentation and VMT Analysis

Horizon Year (2035) Land Use Input

Zone	Land Use Code	Name	Type	Amount	Trips Person	Trips Vehicle
3745	112	SINGLE FAMILY	du	315.0	4063.	2836.
3745	121	MULTI-FAMILY	du	228.0	2599.	1825.
3745	122	MULTI-FAMILY	du	65.0	559.	392.
3745	4112	RIGHT-OF-WAY	acre	67.8	0.	0.
3745	6112	RELIGIOUS FACILITY	ksf	4.3	28.	21.
3745		TOTAL			7250.	5075.
3764	112	SINGLE FAMILY	du	349.0	4502.	3142.
3764	121	MULTI-FAMILY	du	142.0	1619.	1136.
3764	122	MULTI-FAMILY	du	302.0	2597.	1823.
3764	4112	RIGHT-OF-WAY	acre	18.2	0.	0.
3764	5137	ARTERIAL COMMERCIAL	ksf	60.8	3346.	2430.
3764	6814	SENIOR HIGH SCHOOL	other	950.0	3800.	1710.
3764	6815	JUNIOR HIGH OR MIDDLE SCHOOL	other	420.0	966.	593.
3764	7613	ACTIVE PARK	acre	4.7	365.	240.
3764		TOTAL			17194.	11075.
3766	112	SINGLE FAMILY	du	13.0	168.	117.
3766	121	MULTI-FAMILY	du	6.0	68.	48.
3766	2113	LIGHT INDUSTRY GENERAL	ksf	511.6	9516.	7869.
3766	2114	WAREHOUSING	ksf	30.3	185.	155.
3766	4112	RIGHT-OF-WAY	acre	39.4	0.	0.
3766	4113	COMMUNICATION OR UTILITY	acre	15.6	50.	39.
3766	6082	LOW RISE OFFICE H	ksf	125.1	3103.	2390.
3766	7611	OPEN SPACE PARK	acre	0.7	6.	4.
3766		TOTAL			13096.	10621.
3767	2113	LIGHT INDUSTRY GENERAL	ksf	596.5	11095.	9174.
3767	4112	RIGHT-OF-WAY	acre	8.0	0.	0.
3767	5133	COMMUNITY SHOP CENTER	ksf	127.6	13768.	9743.
3767	6511	CLINIC	ksf	31.9	2148.	1595.
3767	7611	OPEN SPACE PARK	acre	0.1	1.	1.
3767	7613	ACTIVE PARK	acre	5.6	434.	285.
3767		TOTAL			27446.	20798.
3817	112	SINGLE FAMILY	du	283.0	3651.	2548.
3817	121	MULTI-FAMILY	du	45.0	513.	360.
3817	122	MULTI-FAMILY	du	88.0	757.	531.
3817	4112	RIGHT-OF-WAY	acre	29.2	0.	0.
3817	4113	COMMUNICATION OR UTILITY	acre	0.3	1.	1.
3817	6112	RELIGIOUS FACILITY	ksf	15.0	98.	75.
3817	7611	OPEN SPACE PARK	acre	0.1	1.	0.
3817	7613	ACTIVE PARK	acre	5.8	449.	296.
3817		TOTAL			5469.	3812.
3831	112	SINGLE FAMILY	du	10.0	129.	90.
3831	121	MULTI-FAMILY	du	4.0	46.	32.
3831	122	MULTI-FAMILY	du	46.0	396.	278.
3831	2113	LIGHT INDUSTRY GENERAL	ksf	29.2	543.	449.
3831	4112	RIGHT-OF-WAY	acre	17.0	0.	0.
3831	4113	COMMUNICATION OR UTILITY	acre	2.9	9.	7.
3831	5137	ARTERIAL COMMERCIAL	ksf	63.2	3477.	2525.

Screen shot of Horizon Year (2035) - Preferred Plan Output


Mid-City:City Heights
ENCANTO
LYON
BEECH
AIR
DUVAL
MARY LOU
50TH
48TH
49TH
A
LENOX
GENEVA
LACE
HILLTOP
CRAIGIE
ESCUELA
DUVAL
ELWOOD
51ST
LISE
HAL
F
G
COTTON
46TH
45TH
44TH
HALLMARK
GUYMON
WINSTON
MELROSE
3651
3672
3678
3744
3764
4726
3720
3855
3860
3926

Appendix I Peak Hour Intersection LOS work Sheets – Horizon Year 2035 Base Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	90	50	130	100	180	70	850	140	70	320	170
Future Volume (veh/h)	150	90	50	130	100	180	70	850	140	70	320	170
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	163	98	54	141	109	196	76	924	152	76	348	185
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	278	158	71	223	155	232	464	1484	244	262	1097	573
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	534	462	206	412	451	676	868	3044	501	522	2250	1175
Grp Volume(v), veh/h	315	0	0	446	0	0	76	537	539	76	272	261
Grp Sat Flow(s),veh/h/ln	1202	0	0	1539	0	0	868	1770	1774	522	1770	1655
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	3.4	12.9	12.9	7.3	5.4	5.5
Cycle Q Clear(g_c), s	13.9	0.0	0.0	15.4	0.0	0.0	8.9	12.9	12.9	20.2	5.4	5.5
Prop In Lane	0.52		0.17	0.32		0.44	1.00		0.28	1.00		0.71
Lane Grp Cap(c), veh/h	507	0	0	610	0	0	464	863	865	262	863	807
V/C Ratio(X)	0.62	0.00	0.00	0.73	0.00	0.00	0.16	0.62	0.62	0.29	0.32	0.32
Avail Cap(c_a), veh/h	648	0	0	771	0	0	477	889	892	270	889	832
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	0.0	0.0	17.4	0.0	0.0	11.7	10.9	10.9	18.4	9.0	9.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	1.8	0.0	0.0	0.3	1.6	1.6	0.9	0.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.0	0.0	6.9	0.0	0.0	0.8	6.7	6.7	1.1	2.6	2.6
LnGrp Delay(d),s/veh	17.1	0.0	0.0	19.2	0.0	0.0	12.0	12.5	12.5	19.3	9.3	9.4
LnGrp LOS	B			B			B	B	B	B	A	A
Approach Vol, veh/h		315			446			1152			609	
Approach Delay, s/veh		17.1			19.2			12.5			10.6	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		33.1		24.8		33.1		24.8
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		29.1		26.1		29.1		26.1
Max Q Clear Time (g_c+I1), s		14.9		15.9		22.2		17.4
Green Ext Time (p_c), s		11.5		2.8		6.0		2.5

Intersection Summary	
HCM 2010 Ctrl Delay	13.8
HCM 2010 LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	140	250	930	510	0	1160
Future Volume (veh/h)	140	250	930	510	0	1160
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	0	1863
Adj Flow Rate, veh/h	152	207	1011	554	0	1261
Adj No. of Lanes	1	1	2	1	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	2
Cap, veh/h	314	280	2297	1027	0	2297
Arrive On Green	0.18	0.18	0.65	0.65	0.00	0.65
Sat Flow, veh/h	1774	1583	3632	1583	0	3725
Grp Volume(v), veh/h	152	207	1011	554	0	1261
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	0	1770
Q Serve(g_s), s	4.0	6.4	7.3	9.8	0.0	10.0
Cycle Q Clear(g_c), s	4.0	6.4	7.3	9.8	0.0	10.0
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	314	280	2297	1027	0	2297
V/C Ratio(X)	0.48	0.74	0.44	0.54	0.00	0.55
Avail Cap(c_a), veh/h	601	536	2637	1180	0	2637
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.1	20.1	4.5	4.9	0.0	4.9
Incr Delay (d2), s/veh	1.2	3.8	0.1	0.4	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	3.1	3.6	4.3	0.0	4.8
LnGrp Delay(d),s/veh	20.3	23.9	4.6	5.3	0.0	5.2
LnGrp LOS	C	C	A	A		A
Approach Vol, veh/h	359		1565			1261
Approach Delay, s/veh	22.4		4.9			5.2
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		38.0				38.0		13.6
Change Period (Y+Rc), s		4.5				4.5		4.5
Max Green Setting (Gmax), s		38.5				38.5		17.5
Max Q Clear Time (g_c+I1), s		11.8				12.0		8.4
Green Ext Time (p_c), s		21.7				21.5		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	7.0
HCM 2010 LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	290	510	1340	320	170	670
Future Volume (veh/h)	290	510	1340	320	170	670
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	315	337	1457	239	185	728
Adj No. of Lanes	2	1	2	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	605	477	1683	272	223	2570
Arrive On Green	0.18	0.18	0.55	0.55	0.13	0.73
Sat Flow, veh/h	3442	1583	3145	493	1774	3632
Grp Volume(v), veh/h	315	337	835	861	185	728
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1776	1774	1770
Q Serve(g_s), s	7.6	16.1	36.8	38.6	9.3	6.5
Cycle Q Clear(g_c), s	7.6	16.1	36.8	38.6	9.3	6.5
Prop In Lane	1.00	1.00		0.28	1.00	
Lane Grp Cap(c), veh/h	605	477	976	979	223	2570
V/C Ratio(X)	0.52	0.71	0.86	0.88	0.83	0.28
Avail Cap(c_a), veh/h	605	477	1002	1006	358	2892
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	34.3	28.4	17.5	17.9	39.1	4.3
Incr Delay (d2), s/veh	0.8	4.7	7.3	8.9	8.6	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	3.7	8.2	19.8	21.3	5.1	3.2
LnGrp Delay(d),s/veh	35.1	33.2	24.7	26.7	47.8	4.4
LnGrp LOS	D	C	C	C	D	A
Approach Vol, veh/h	652		1696			913
Approach Delay, s/veh	34.1		25.8			13.2
Approach LOS	C		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	16.0	55.0				71.0		20.6
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	18.5	51.9				74.9		16.1
Max Q Clear Time (g_c+I1), s	11.3	40.6				8.5		18.1
Green Ext Time (p_c), s	0.3	9.9				38.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	23.9
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	90	30	1540	50	30	880
Future Volume (veh/h)	90	30	1540	50	30	880
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	98	33	1674	54	33	957
Adj No. of Lanes	0	0	2	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	125	42	2333	75	48	2682
Arrive On Green	0.10	0.10	0.67	0.67	0.03	0.76
Sat Flow, veh/h	1279	431	3593	113	1774	3632
Grp Volume(v), veh/h	132	0	844	884	33	957
Grp Sat Flow(s),veh/h/ln	1723	0	1770	1843	1774	1770
Q Serve(g_s), s	5.1	0.0	20.8	21.1	1.3	6.1
Cycle Q Clear(g_c), s	5.1	0.0	20.8	21.1	1.3	6.1
Prop In Lane	0.74	0.25		0.06	1.00	
Lane Grp Cap(c), veh/h	168	0	1179	1228	48	2682
V/C Ratio(X)	0.78	0.00	0.72	0.72	0.68	0.36
Avail Cap(c_a), veh/h	581	0	1219	1269	140	2943
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.2	0.0	7.3	7.3	33.0	2.8
Incr Delay (d2), s/veh	3.0	0.0	2.2	2.2	6.2	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	2.6	0.0	10.6	11.3	0.7	3.0
LnGrp Delay(d),s/veh	33.3	0.0	9.5	9.5	39.2	2.9
LnGrp LOS	C		A	A	D	A
Approach Vol, veh/h	132		1728			990
Approach Delay, s/veh	33.3		9.5			4.1
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.3	51.1				57.3		11.2
Change Period (Y+Rc), s	4.4	5.4				5.4		4.5
Max Green Setting (Gmax), s	5.4	47.2				57.0		23.1
Max Q Clear Time (g_c+I1), s	2.3	23.1				8.1		7.1
Green Ext Time (p_c), s	0.0	22.6				43.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	8.7
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	80	70	80	460	310	280	1240	70	150	560	90
Future Volume (veh/h)	120	80	70	80	460	310	280	1240	70	150	560	90
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	130	87	65	87	500	174	304	1348	54	163	609	76
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	157	518	355	110	597	207	333	1531	61	204	991	123
Arrive On Green	0.09	0.26	0.26	0.06	0.23	0.23	0.19	0.44	0.44	0.06	0.31	0.31
Sat Flow, veh/h	1774	2010	1379	1774	2581	893	1774	3469	139	3442	3168	395
Grp Volume(v), veh/h	130	76	76	87	342	332	304	687	715	163	340	345
Grp Sat Flow(s),veh/h/ln	1774	1770	1619	1774	1770	1705	1774	1770	1838	1721	1770	1793
Q Serve(g_s), s	8.0	3.7	4.1	5.4	20.5	20.7	18.7	39.5	39.6	5.2	18.2	18.2
Cycle Q Clear(g_c), s	8.0	3.7	4.1	5.4	20.5	20.7	18.7	39.5	39.6	5.2	18.2	18.2
Prop In Lane	1.00		0.85	1.00		0.52	1.00		0.08	1.00		0.22
Lane Grp Cap(c), veh/h	157	456	417	110	409	394	333	781	811	204	554	561
V/C Ratio(X)	0.83	0.17	0.18	0.79	0.84	0.84	0.91	0.88	0.88	0.80	0.61	0.62
Avail Cap(c_a), veh/h	185	490	448	185	483	466	392	817	849	204	554	561
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	49.9	32.0	32.2	51.5	40.8	40.9	44.3	28.4	28.5	51.7	32.5	32.6
Incr Delay (d2), s/veh	19.8	0.2	0.3	4.7	10.4	11.3	21.5	10.4	10.3	18.4	2.0	2.1
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	4.8	1.8	1.9	2.8	11.2	11.0	11.2	21.5	22.4	3.0	9.2	9.3
LnGrp Delay(d),s/veh	69.7	32.2	32.4	56.2	51.2	52.2	65.9	38.9	38.8	70.1	34.6	34.6
LnGrp LOS	E	C	C	E	D	D	E	D	D	E	C	C
Approach Vol, veh/h		282			761			1706			848	
Approach Delay, s/veh		49.6			52.2			43.6			41.4	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.3	34.0	25.3	40.7	14.3	31.0	11.0	55.0
Change Period (Y+Rc), s	4.4	* 5.3	4.4	* 5.9	4.4	5.3	4.4	5.9
Max Green Setting (Gmax), s	11.6	* 31	24.6	* 34	11.6	30.4	6.6	51.4
Max Q Clear Time (g_c+I1), s	7.4	6.1	20.7	20.2	10.0	22.7	7.2	41.6
Green Ext Time (p_c), s	0.0	5.4	0.2	10.4	0.0	3.0	0.0	7.5

Intersection Summary		
HCM 2010 Ctrl Delay		45.4
HCM 2010 LOS		D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	40	30	100	40	80	20	480	90	100	570	120
Future Volume (veh/h)	160	40	30	100	40	80	20	480	90	100	570	120
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	174	43	33	109	43	87	22	522	98	109	620	130
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	374	73	45	270	95	136	468	1602	299	527	1568	328
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.54	0.54	0.54	0.54	0.54	0.54
Sat Flow, veh/h	1007	326	203	637	424	607	709	2977	557	800	2915	610
Grp Volume(v), veh/h	250	0	0	239	0	0	22	309	311	109	376	374
Grp Sat Flow(s),veh/h/ln	1536	0	0	1669	0	0	709	1770	1765	800	1770	1755
Q Serve(g_s), s	0.8	0.0	0.0	0.0	0.0	0.0	0.8	4.0	4.1	3.6	5.1	5.2
Cycle Q Clear(g_c), s	5.8	0.0	0.0	5.0	0.0	0.0	5.9	4.0	4.1	7.7	5.1	5.2
Prop In Lane	0.70		0.13	0.46		0.36	1.00		0.32	1.00		0.35
Lane Grp Cap(c), veh/h	492	0	0	501	0	0	468	952	949	527	952	944
V/C Ratio(X)	0.51	0.00	0.00	0.48	0.00	0.00	0.05	0.32	0.33	0.21	0.39	0.40
Avail Cap(c_a), veh/h	1087	0	0	1147	0	0	570	1208	1204	642	1208	1198
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.6	0.0	0.0	14.3	0.0	0.0	7.3	5.3	5.3	7.5	5.6	5.6
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.3	0.0	0.0	0.1	0.3	0.3	0.3	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	0.0	2.4	0.0	0.0	0.2	2.0	2.0	0.8	2.5	2.6
LnGrp Delay(d),s/veh	14.9	0.0	0.0	14.6	0.0	0.0	7.4	5.6	5.6	7.8	6.0	6.0
LnGrp LOS	B			B			A	A	A	A	A	A
Approach Vol, veh/h		250			239			642			859	
Approach Delay, s/veh		14.9			14.6			5.7			6.2	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		27.0		14.1		27.0		14.1
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		28.1		27.1		28.1		27.1
Max Q Clear Time (g_c+I1), s		7.9		7.8		9.7		7.0
Green Ext Time (p_c), s		13.3		2.0		12.4		2.0

Intersection Summary		
HCM 2010 Ctrl Delay		8.1
HCM 2010 LOS		A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	190	170	1220	430	0	1650
Future Volume (veh/h)	190	170	1220	430	0	1650
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	0	1863
Adj Flow Rate, veh/h	207	185	1326	467	0	1793
Adj No. of Lanes	1	1	2	1	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	2
Cap, veh/h	283	253	2417	1081	0	2417
Arrive On Green	0.16	0.16	0.68	0.68	0.00	0.68
Sat Flow, veh/h	1774	1583	3632	1583	0	3725
Grp Volume(v), veh/h	207	185	1326	467	0	1793
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	0	1770
Q Serve(g_s), s	6.4	6.4	10.9	7.6	0.0	18.6
Cycle Q Clear(g_c), s	6.4	6.4	10.9	7.6	0.0	18.6
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	283	253	2417	1081	0	2417
V/C Ratio(X)	0.73	0.73	0.55	0.43	0.00	0.74
Avail Cap(c_a), veh/h	496	443	2474	1107	0	2474
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.9	22.9	4.6	4.1	0.0	5.8
Incr Delay (d2), s/veh	3.6	4.1	0.2	0.3	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	3.1	5.2	3.3	0.0	9.1
LnGrp Delay(d),s/veh	26.5	26.9	4.8	4.4	0.0	7.0
LnGrp LOS	C	C	A	A		A
Approach Vol, veh/h	392		1793			1793
Approach Delay, s/veh	26.7		4.7			7.0
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		43.6				43.6		13.6
Change Period (Y+Rc), s		4.5				4.5		4.5
Max Green Setting (Gmax), s		40.0				40.0		16.0
Max Q Clear Time (g_c+I1), s		12.9				20.6		8.4
Green Ext Time (p_c), s		25.4				18.5		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	7.9
HCM 2010 LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	580	600	960	290	280	930
Future Volume (veh/h)	580	600	960	290	280	930
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	630	435	1043	206	304	1011
Adj No. of Lanes	2	1	2	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	730	643	1239	244	344	2379
Arrive On Green	0.21	0.21	0.42	0.42	0.19	0.67
Sat Flow, veh/h	3442	1583	3042	581	1774	3632
Grp Volume(v), veh/h	630	435	625	624	304	1011
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1760	1774	1770
Q Serve(g_s), s	13.7	16.5	24.6	24.8	13.0	10.2
Cycle Q Clear(g_c), s	13.7	16.5	24.6	24.8	13.0	10.2
Prop In Lane	1.00	1.00		0.33	1.00	
Lane Grp Cap(c), veh/h	730	643	744	740	344	2379
V/C Ratio(X)	0.86	0.68	0.84	0.84	0.88	0.42
Avail Cap(c_a), veh/h	730	643	762	758	376	2479
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	29.6	18.9	20.2	20.3	30.5	5.9
Incr Delay (d2), s/veh	10.4	2.8	8.2	8.5	20.0	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	7.5	8.1	13.7	13.7	8.2	5.0
LnGrp Delay(d),s/veh	40.0	21.7	28.4	28.7	50.4	6.0
LnGrp LOS	D	C	C	C	D	A
Approach Vol, veh/h	1065		1249			1315
Approach Delay, s/veh	32.5		28.6			16.3
Approach LOS	C		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	19.6	37.2				56.8		21.0
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	16.5	33.5				54.5		16.5
Max Q Clear Time (g_c+I1), s	15.0	26.8				12.2		18.5
Green Ext Time (p_c), s	0.2	5.9				25.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	25.3
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	50	40	1170	40	140	1360
Future Volume (veh/h)	50	40	1170	40	140	1360
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1900	1863	1863
Adj Flow Rate, veh/h	54	43	1272	43	152	1478
Adj No. of Lanes	0	0	2	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	69	55	2002	68	192	2678
Arrive On Green	0.07	0.07	0.57	0.57	0.11	0.76
Sat Flow, veh/h	929	740	3587	118	1774	3632
Grp Volume(v), veh/h	98	0	644	671	152	1478
Grp Sat Flow(s),veh/h/ln	1686	0	1770	1842	1774	1770
Q Serve(g_s), s	3.3	0.0	14.3	14.3	4.9	10.2
Cycle Q Clear(g_c), s	3.3	0.0	14.3	14.3	4.9	10.2
Prop In Lane	0.55	0.44		0.06	1.00	
Lane Grp Cap(c), veh/h	125	0	1014	1056	192	2678
V/C Ratio(X)	0.78	0.00	0.63	0.64	0.79	0.55
Avail Cap(c_a), veh/h	662	0	1031	1073	261	2848
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	0.0	8.4	8.4	25.5	3.0
Incr Delay (d2), s/veh	4.0	0.0	1.5	1.4	7.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	7.2	7.5	2.8	4.8
LnGrp Delay(d),s/veh	30.6	0.0	9.9	9.8	33.1	3.3
LnGrp LOS	C		A	A	C	A
Approach Vol, veh/h	98		1315			1630
Approach Delay, s/veh	30.6		9.9			6.0
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	10.7	38.9				49.7		8.8
Change Period (Y+Rc), s	4.4	5.4				5.4		4.5
Max Green Setting (Gmax), s	8.6	34.1				47.1		23.0
Max Q Clear Time (g_c+I1), s	16.3	16.3				12.2		5.3
Green Ext Time (p_c), s	0.0	17.0				32.1		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	8.5
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	450	260	160	140	315	200	630	170	260	1040	65
Future Volume (veh/h)	150	450	260	160	140	315	200	630	170	260	1040	65
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	163	489	218	174	152	277	217	685	163	283	1130	49
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	181	631	280	165	452	405	181	1044	248	339	1259	55
Arrive On Green	0.10	0.26	0.26	0.09	0.26	0.26	0.10	0.37	0.37	0.10	0.36	0.36
Sat Flow, veh/h	1774	2387	1058	1774	1770	1583	1774	2838	675	3442	3456	150
Grp Volume(v), veh/h	163	362	345	174	152	277	217	427	421	283	578	601
Grp Sat Flow(s),veh/h/ln	1774	1770	1676	1774	1770	1583	1774	1770	1744	1721	1770	1836
Q Serve(g_s), s	10.3	21.5	21.7	10.6	8.0	17.9	11.6	22.9	22.9	9.2	35.1	35.1
Cycle Q Clear(g_c), s	10.3	21.5	21.7	10.6	8.0	17.9	11.6	22.9	22.9	9.2	35.1	35.1
Prop In Lane	1.00		0.63	1.00		1.00	1.00		0.39	1.00		0.08
Lane Grp Cap(c), veh/h	181	468	443	165	452	405	181	651	641	339	645	669
V/C Ratio(X)	0.90	0.77	0.78	1.05	0.34	0.68	1.20	0.66	0.66	0.83	0.90	0.90
Avail Cap(c_a), veh/h	181	571	541	165	550	492	181	651	641	351	662	687
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	50.5	38.7	38.7	51.5	34.5	38.2	51.0	29.9	30.0	50.3	34.1	34.1
Incr Delay (d2), s/veh	39.2	5.7	6.3	84.4	0.4	2.8	130.5	2.3	2.3	14.4	14.9	14.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	11.2	10.8	9.0	3.9	8.2	12.2	11.6	11.4	5.0	19.7	20.4
LnGrp Delay(d),s/veh	89.6	44.3	45.0	135.9	34.8	41.0	181.5	32.2	32.3	64.7	49.0	48.6
LnGrp LOS	F	D	D	F	C	D	F	C	C	E	D	D
Approach Vol, veh/h		870			603			1065			1462	
Approach Delay, s/veh		53.1			66.8			62.7			51.9	
Approach LOS		D			E			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	35.4	16.0	47.3	16.0	34.4	15.6	47.7
Change Period (Y+Rc), s	4.4	* 5.3	4.4	* 5.9	4.4	5.3	4.4	5.9
Max Green Setting (Gmax), s	10.6	* 37	11.6	* 43	11.6	35.3	11.6	41.5
Max Q Clear Time (g_c+I1), s	12.3	23.7	13.6	37.1	12.3	19.9	11.2	24.9
Green Ext Time (p_c), s	0.0	6.4	0.0	4.3	0.0	7.0	0.0	11.7

Intersection Summary		
HCM 2010 Ctrl Delay	57.3	
HCM 2010 LOS	E	

Notes

Appendix J Peak Hour Intersection LOS Worksheets – Horizon Year 2035 Base Plus Project Condition

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	90	50	55	100	61	70	850	53	36	320	170
Future Volume (veh/h)	150	90	50	55	100	61	70	850	53	36	320	170
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	163	98	54	60	109	66	76	924	58	39	348	185
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	309	150	70	176	247	127	535	1777	112	354	1182	617
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.53	0.53	0.53	0.53	0.53	0.53
Sat Flow, veh/h	728	572	269	296	942	484	868	3383	212	571	2250	1175
Grp Volume(v), veh/h	315	0	0	235	0	0	76	483	499	39	272	261
Grp Sat Flow(s),veh/h/ln	1569	0	0	1722	0	0	868	1770	1825	571	1770	1655
Q Serve(g_s), s	2.9	0.0	0.0	0.0	0.0	0.0	2.5	8.2	8.2	2.2	4.0	4.1
Cycle Q Clear(g_c), s	8.1	0.0	0.0	5.2	0.0	0.0	6.6	8.2	8.2	10.4	4.0	4.1
Prop In Lane	0.52		0.17	0.26		0.28	1.00		0.12	1.00		0.71
Lane Grp Cap(c), veh/h	530	0	0	549	0	0	535	930	959	354	930	870
V/C Ratio(X)	0.59	0.00	0.00	0.43	0.00	0.00	0.14	0.52	0.52	0.11	0.29	0.30
Avail Cap(c_a), veh/h	991	0	0	1062	0	0	608	1078	1112	402	1078	1008
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.3	0.0	0.0	14.5	0.0	0.0	8.0	7.1	7.1	10.6	6.1	6.2
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	0.2	0.7	0.7	0.2	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.0	2.6	0.0	0.0	0.6	4.1	4.2	0.4	2.0	1.9
LnGrp Delay(d),s/veh	15.7	0.0	0.0	14.7	0.0	0.0	8.2	7.8	7.8	10.8	6.4	6.5
LnGrp LOS	B			B			A	A	A	B	A	A
Approach Vol, veh/h		315			235			1058			572	
Approach Delay, s/veh		15.7			14.7			7.9			6.7	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		29.1		17.0		29.1		17.0
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		28.1		27.1		28.1		27.1
Max Q Clear Time (g_c+I1), s		10.2		10.1		12.4		7.2
Green Ext Time (p_c), s		13.1		2.2		11.8		2.3

Intersection Summary	
HCM 2010 Ctrl Delay	9.4
HCM 2010 LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	149	250	1070	542	0	1203
Future Volume (veh/h)	149	250	1070	542	0	1203
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	0	1863
Adj Flow Rate, veh/h	162	272	1163	589	0	1308
Adj No. of Lanes	1	1	2	1	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	2
Cap, veh/h	382	341	2204	986	0	2204
Arrive On Green	0.22	0.22	0.62	0.62	0.00	0.62
Sat Flow, veh/h	1774	1583	3632	1583	0	3725
Grp Volume(v), veh/h	162	272	1163	589	0	1308
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	0	1770
Q Serve(g_s), s	4.4	9.0	10.2	12.4	0.0	12.3
Cycle Q Clear(g_c), s	4.4	9.0	10.2	12.4	0.0	12.3
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	382	341	2204	986	0	2204
V/C Ratio(X)	0.42	0.80	0.53	0.60	0.00	0.59
Avail Cap(c_a), veh/h	592	528	2393	1070	0	2393
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.8	20.6	5.9	6.3	0.0	6.3
Incr Delay (d2), s/veh	0.8	4.8	0.2	0.8	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	4.4	4.9	5.5	0.0	5.9
LnGrp Delay(d),s/veh	19.6	25.4	6.1	7.1	0.0	6.6
LnGrp LOS	B	C	A	A		A
Approach Vol, veh/h	434		1752			1308
Approach Delay, s/veh	23.2		6.4			6.6
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		39.0				39.0		16.4
Change Period (Y+Rc), s		4.5				4.5		4.5
Max Green Setting (Gmax), s		37.5				37.5		18.5
Max Q Clear Time (g_c+I1), s		14.4				14.3		11.0
Green Ext Time (p_c), s		20.1				20.2		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	8.6
HCM 2010 LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	290	510	1512	336	170	722
Future Volume (veh/h)	290	510	1512	336	170	722
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	315	337	1643	256	185	785
Adj No. of Lanes	2	1	2	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	486	418	1908	290	217	2764
Arrive On Green	0.14	0.14	0.62	0.62	0.12	0.78
Sat Flow, veh/h	3442	1583	3174	469	1774	3632
Grp Volume(v), veh/h	315	337	927	972	185	785
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1780	1774	1770
Q Serve(g_s), s	10.0	16.3	48.4	52.8	11.8	7.2
Cycle Q Clear(g_c), s	10.0	16.3	48.4	52.8	11.8	7.2
Prop In Lane	1.00	1.00		0.26	1.00	
Lane Grp Cap(c), veh/h	486	418	1096	1103	217	2764
V/C Ratio(X)	0.65	0.81	0.85	0.88	0.85	0.28
Avail Cap(c_a), veh/h	486	418	1129	1136	407	3209
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	46.9	39.8	17.6	18.4	49.6	3.6
Incr Delay (d2), s/veh	3.0	11.2	6.0	8.1	9.0	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	5.0	11.3	25.3	28.1	6.4	3.5
LnGrp Delay(d),s/veh	49.9	50.9	23.5	26.6	58.6	3.6
LnGrp LOS	D	D	C	C	E	A
Approach Vol, veh/h	652		1899			970
Approach Delay, s/veh	50.4		25.1			14.1
Approach LOS	D		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	18.7	76.0				94.7		20.8
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	26.5	73.7				104.7		16.3
Max Q Clear Time (g_c+I1), s	12.8	54.8				9.2		18.3
Green Ext Time (p_c), s	0.4	16.7				58.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	26.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	188	0	96	90	0	30	108	1540	50	30	896	50
Future Volume (veh/h)	188	0	96	90	0	30	108	1540	50	30	896	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	204	0	104	98	0	33	117	1674	54	33	974	54
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	305	0	118	306	11	81	150	1974	63	46	1720	95
Arrive On Green	0.23	0.00	0.23	0.23	0.00	0.23	0.08	0.56	0.56	0.03	0.50	0.50
Sat Flow, veh/h	993	0	507	980	48	346	1774	3500	113	1774	3410	189
Grp Volume(v), veh/h	308	0	0	131	0	0	117	844	884	33	505	523
Grp Sat Flow(s),veh/h/ln	1500	0	0	1373	0	0	1774	1770	1843	1774	1770	1829
Q Serve(g_s), s	9.5	0.0	0.0	0.0	0.0	0.0	5.2	32.1	32.5	1.5	16.0	16.0
Cycle Q Clear(g_c), s	15.8	0.0	0.0	6.4	0.0	0.0	5.2	32.1	32.5	1.5	16.0	16.0
Prop In Lane	0.66		0.34	0.75		0.25	1.00		0.06	1.00		0.10
Lane Grp Cap(c), veh/h	423	0	0	398	0	0	150	998	1040	46	893	923
V/C Ratio(X)	0.73	0.00	0.00	0.33	0.00	0.00	0.78	0.85	0.85	0.72	0.57	0.57
Avail Cap(c_a), veh/h	511	0	0	480	0	0	279	1026	1068	114	893	923
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.6	0.0	0.0	26.1	0.0	0.0	36.2	14.7	14.7	39.0	13.9	13.9
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.2	0.0	0.0	8.6	6.8	6.8	7.6	1.0	1.0
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	6.9	0.0	0.0	2.5	0.0	0.0	2.9	17.4	18.2	0.8	8.0	8.2
LnGrp Delay(d),s/veh	32.6	0.0	0.0	26.3	0.0	0.0	44.8	21.5	21.6	46.6	14.9	14.9
LnGrp LOS	C			C			D	C	C	D	B	B
Approach Vol, veh/h		308			131			1845			1061	
Approach Delay, s/veh		32.6			26.3			23.0			15.9	
Approach LOS		C			C			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.5	50.9		23.3	11.3	46.1		23.3
Change Period (Y+Rc), s	4.4	5.4		4.5	4.5	5.4		4.5
Max Green Setting (Gmax), s	5.3	46.8		23.7	12.7	39.2		23.7
Max Q Clear Time (g_c+I1), s	11.5	34.5		17.8	7.2	18.0		8.4
Green Ext Time (p_c), s	0.0	11.1		1.0	0.1	20.0		1.6

Intersection Summary		
HCM 2010 Ctrl Delay	21.8	
HCM 2010 LOS	C	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	129	80	70	80	460	313	280	1336	70	155	651	106
Future Volume (veh/h)	129	80	70	80	460	313	280	1336	70	155	651	106
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	140	87	65	87	500	177	304	1452	54	168	708	93
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	163	517	355	110	583	205	332	1550	58	215	1009	132
Arrive On Green	0.09	0.26	0.26	0.06	0.23	0.23	0.19	0.45	0.45	0.06	0.32	0.32
Sat Flow, veh/h	1774	2010	1379	1774	2568	904	1774	3480	129	3442	3146	413
Grp Volume(v), veh/h	140	76	76	87	344	333	304	737	769	168	398	403
Grp Sat Flow(s),veh/h/ln	1774	1770	1619	1774	1770	1703	1774	1770	1840	1721	1770	1790
Q Serve(g_s), s	9.0	3.8	4.2	5.6	21.5	21.7	19.4	45.7	46.0	5.6	22.7	22.8
Cycle Q Clear(g_c), s	9.0	3.8	4.2	5.6	21.5	21.7	19.4	45.7	46.0	5.6	22.7	22.8
Prop In Lane	1.00		0.85	1.00		0.53	1.00		0.07	1.00		0.23
Lane Grp Cap(c), veh/h	163	455	416	110	402	387	332	788	819	215	567	574
V/C Ratio(X)	0.86	0.17	0.18	0.79	0.86	0.86	0.92	0.94	0.94	0.78	0.70	0.70
Avail Cap(c_a), veh/h	163	483	442	138	453	436	394	808	841	215	567	574
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	51.6	33.3	33.4	53.4	42.8	42.9	46.0	30.4	30.5	53.3	34.4	34.4
Incr Delay (d2), s/veh	32.8	0.2	0.3	16.9	13.5	14.7	21.7	17.6	17.7	15.6	3.9	3.9
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	5.9	1.9	1.9	3.2	12.0	11.8	11.5	26.0	27.3	3.1	11.7	11.8
LnGrp Delay(d),s/veh	84.4	33.5	33.7	70.3	56.2	57.5	67.7	48.0	48.1	68.9	38.3	38.2
LnGrp LOS	F	C	C	E	E	E	E	D	D	E	D	D
Approach Vol, veh/h		292			764			1810			969	
Approach Delay, s/veh		58.0			58.4			51.4			43.6	
Approach LOS		E			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	35.0	26.0	42.9	15.0	31.5	11.6	57.3
Change Period (Y+Rc), s	4.4	* 5.3	4.4	* 5.9	4.4	5.3	4.4	5.9
Max Green Setting (Gmax), s	9.6	* 32	25.6	* 35	10.6	29.5	7.2	52.7
Max Q Clear Time (g_c+I1), s	7.6	6.2	21.4	24.8	11.0	23.7	7.6	48.0
Green Ext Time (p_c), s	0.0	5.5	0.2	8.7	0.0	2.5	0.0	3.4

Intersection Summary	
HCM 2010 Ctrl Delay	51.3
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	16	0	1758	989	23
Future Vol, veh/h	0	16	0	1758	989	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	17	0	1911	1075	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	550	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	410	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	410	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	410	-	-
HCM Lane V/C Ratio	-	0.042	-	-
HCM Control Delay (s)	-	14.2	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	206	0	0	140	14	10	0	10	32	0	6
Future Vol, veh/h	3	206	0	0	140	14	10	0	10	32	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	224	0	0	152	15	11	0	11	35	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	167	0	-	-	-	0	393	397	224	396	390	160
Stage 1	-	-	-	-	-	-	230	230	-	160	160	-
Stage 2	-	-	-	-	-	-	163	167	-	236	230	-
Critical Hdwy	4.12	-	-	-	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1411	-	0	0	-	-	566	540	815	564	545	885
Stage 1	-	-	0	0	-	-	773	714	-	842	766	-
Stage 2	-	-	0	0	-	-	839	760	-	767	714	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1411	-	-	-	-	-	561	539	815	556	544	885
Mov Cap-2 Maneuver	-	-	-	-	-	-	561	539	-	556	544	-
Stage 1	-	-	-	-	-	-	771	713	-	840	766	-
Stage 2	-	-	-	-	-	-	833	760	-	755	713	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	10.6	11.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	665	1411	-	-	-	556	885
HCM Lane V/C Ratio	0.033	0.002	-	-	-	0.063	0.007
HCM Control Delay (s)	10.6	7.6	0	-	-	11.9	9.1
HCM Lane LOS	B	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	0	-	-	-	0.2	0

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	242	144	14	42	10
Future Vol, veh/h	6	242	144	14	42	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	263	157	15	46	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	172	0	-	0	440	164
Stage 1	-	-	-	-	164	-
Stage 2	-	-	-	-	276	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1405	-	-	-	574	881
Stage 1	-	-	-	-	865	-
Stage 2	-	-	-	-	771	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1405	-	-	-	571	881
Mov Cap-2 Maneuver	-	-	-	-	571	-
Stage 1	-	-	-	-	865	-
Stage 2	-	-	-	-	766	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1405	-	-	-	612
HCM Lane V/C Ratio	0.005	-	-	-	0.092
HCM Control Delay (s)	7.6	0	-	-	11.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	40	30	44	40	36	20	480	45	52	570	120
Future Volume (veh/h)	160	40	30	44	40	36	20	480	45	52	570	120
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	174	43	33	48	43	39	22	522	49	57	620	130
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	382	71	45	221	174	114	467	1705	160	549	1519	318
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.52	0.52	0.52	0.52	0.52	0.52
Sat Flow, veh/h	1002	320	201	415	784	514	709	3272	306	838	2915	610
Grp Volume(v), veh/h	250	0	0	130	0	0	22	282	289	57	376	374
Grp Sat Flow(s),veh/h/ln	1523	0	0	1713	0	0	709	1770	1809	838	1770	1755
Q Serve(g_s), s	3.2	0.0	0.0	0.0	0.0	0.0	0.7	3.5	3.5	1.6	4.9	4.9
Cycle Q Clear(g_c), s	5.6	0.0	0.0	2.4	0.0	0.0	5.7	3.5	3.5	5.1	4.9	4.9
Prop In Lane	0.70		0.13	0.37		0.30	1.00		0.17	1.00		0.35
Lane Grp Cap(c), veh/h	498	0	0	509	0	0	467	922	943	549	922	915
V/C Ratio(X)	0.50	0.00	0.00	0.26	0.00	0.00	0.05	0.31	0.31	0.10	0.41	0.41
Avail Cap(c_a), veh/h	1229	0	0	1307	0	0	602	1260	1288	709	1260	1249
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.6	0.0	0.0	12.5	0.0	0.0	7.3	5.2	5.2	6.6	5.5	5.5
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.1	0.0	0.0	0.1	0.3	0.3	0.1	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	0.0	1.1	0.0	0.0	0.1	1.7	1.8	0.4	2.4	2.4
LnGrp Delay(d),s/veh	13.8	0.0	0.0	12.6	0.0	0.0	7.3	5.5	5.5	6.8	6.0	6.0
LnGrp LOS	B			B			A	A	A	A	A	A
Approach Vol, veh/h		250			130			593			807	
Approach Delay, s/veh		13.8			12.6			5.5			6.0	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		24.7		13.3		24.7		13.3
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		27.1		28.1		27.1		28.1
Max Q Clear Time (g_c+I1), s		7.7		7.6		7.1		4.4
Green Ext Time (p_c), s		12.2		1.5		12.4		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	7.4
HCM 2010 LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	208	170	1276	450	0	1716
Future Volume (veh/h)	208	170	1276	450	0	1716
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	0	1863
Adj Flow Rate, veh/h	226	185	1387	489	0	1865
Adj No. of Lanes	1	1	2	1	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	2
Cap, veh/h	300	268	2394	1071	0	2394
Arrive On Green	0.17	0.17	0.68	0.68	0.00	0.68
Sat Flow, veh/h	1774	1583	3632	1583	0	3725
Grp Volume(v), veh/h	226	185	1387	489	0	1865
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	0	1770
Q Serve(g_s), s	7.1	6.4	12.1	8.4	0.0	21.0
Cycle Q Clear(g_c), s	7.1	6.4	12.1	8.4	0.0	21.0
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	300	268	2394	1071	0	2394
V/C Ratio(X)	0.75	0.69	0.58	0.46	0.00	0.78
Avail Cap(c_a), veh/h	487	435	2429	1087	0	2429
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.1	22.8	5.0	4.4	0.0	6.4
Incr Delay (d2), s/veh	3.8	3.2	0.3	0.3	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	3.0	5.9	3.6	0.0	10.4
LnGrp Delay(d),s/veh	26.9	26.0	5.4	4.7	0.0	8.1
LnGrp LOS	C	C	A	A		A
Approach Vol, veh/h	411		1876			1865
Approach Delay, s/veh	26.5		5.2			8.1
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		43.9				43.9		14.4
Change Period (Y+Rc), s		4.5				4.5		4.5
Max Green Setting (Gmax), s		40.0				40.0		16.0
Max Q Clear Time (g_c+I1), s		14.1				23.0		9.1
Green Ext Time (p_c), s		24.6				16.4		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	8.6
HCM 2010 LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	580	600	1036	299	280	1014
Future Volume (veh/h)	580	600	1036	299	280	1014
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	630	435	1126	216	304	1102
Adj No. of Lanes	2	1	2	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	705	629	1326	253	342	2448
Arrive On Green	0.20	0.20	0.45	0.45	0.19	0.69
Sat Flow, veh/h	3442	1583	3059	566	1774	3632
Grp Volume(v), veh/h	630	435	670	672	304	1102
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1763	1774	1770
Q Serve(g_s), s	15.5	17.8	29.3	29.6	14.5	12.1
Cycle Q Clear(g_c), s	15.5	17.8	29.3	29.6	14.5	12.1
Prop In Lane	1.00	1.00		0.32	1.00	
Lane Grp Cap(c), veh/h	705	629	791	788	342	2448
V/C Ratio(X)	0.89	0.69	0.85	0.85	0.89	0.45
Avail Cap(c_a), veh/h	705	629	808	805	388	2574
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	33.6	21.7	21.4	21.5	34.2	6.0
Incr Delay (d2), s/veh	13.9	3.2	8.2	8.7	20.0	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	8.7	9.2	15.9	16.3	9.0	5.9
LnGrp Delay(d),s/veh	47.5	25.0	29.6	30.1	54.2	6.1
LnGrp LOS	D	C	C	C	D	A
Approach Vol, veh/h	1065		1342			1406
Approach Delay, s/veh	38.3		29.8			16.5
Approach LOS	D		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	21.2	43.4				64.6		22.3
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	16.6	39.7				63.2		17.8
Max Q Clear Time (g_c+I1), s	16.5	31.6				14.1		19.8
Green Ext Time (p_c), s	0.2	7.2				31.5		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	27.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	0	69	50	0	40	85	1170	40	140	1369	84
Future Volume (veh/h)	85	0	69	50	0	40	85	1170	40	140	1369	84
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	92	0	75	54	0	43	92	1272	43	152	1488	91
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	182	9	95	171	20	92	266	1986	67	188	2488	152
Arrive On Green	0.13	0.00	0.13	0.13	0.00	0.13	0.57	0.57	0.57	0.11	0.73	0.73
Sat Flow, veh/h	808	69	715	721	153	696	323	3494	118	1774	3389	206
Grp Volume(v), veh/h	167	0	0	97	0	0	92	644	671	152	774	805
Grp Sat Flow(s),veh/h/ln	1593	0	0	1570	0	0	323	1770	1842	1774	1770	1826
Q Serve(g_s), s	3.2	0.0	0.0	0.0	0.0	0.0	14.0	18.3	18.3	6.2	15.3	15.5
Cycle Q Clear(g_c), s	7.3	0.0	0.0	4.0	0.0	0.0	17.3	18.3	18.3	6.2	15.3	15.5
Prop In Lane	0.55		0.45	0.56		0.44	1.00		0.06	1.00		0.11
Lane Grp Cap(c), veh/h	286	0	0	284	0	0	266	1006	1047	188	1299	1340
V/C Ratio(X)	0.58	0.00	0.00	0.34	0.00	0.00	0.35	0.64	0.64	0.81	0.60	0.60
Avail Cap(c_a), veh/h	552	0	0	544	0	0	269	1019	1061	230	1353	1397
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.9	0.0	0.0	29.6	0.0	0.0	11.7	10.9	10.9	32.4	4.7	4.7
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.3	0.0	0.0	1.1	1.6	1.5	13.1	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	0.0	1.9	0.0	0.0	1.3	9.2	9.6	3.7	7.6	7.9
LnGrp Delay(d),s/veh	31.6	0.0	0.0	29.9	0.0	0.0	12.9	12.4	12.4	45.5	5.5	5.5
LnGrp LOS	C			C			B	B	B	D	A	A
Approach Vol, veh/h		167			97			1407			1731	
Approach Delay, s/veh		31.6			29.9			12.4			9.0	
Approach LOS		C			C			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	12.3	47.5		14.3		59.8		14.3
Change Period (Y+Rc), s	4.4	5.4		4.5		5.4		4.5
Max Green Setting (Gmax), s	9.6	42.7		23.4		56.7		23.4
Max Q Clear Time (g_c+I1), s	9.3	20.3		9.3		17.5		6.0
Green Ext Time (p_c), s	0.0	21.6		0.9		36.9		0.9

Intersection Summary		
HCM 2010 Ctrl Delay	12.1	
HCM 2010 LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	450	260	160	140	320	200	692	170	263	1106	74
Future Volume (veh/h)	168	450	260	160	140	320	200	692	170	263	1106	74
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	183	489	218	174	152	283	217	752	163	286	1202	58
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	208	535	237	199	387	347	243	1183	256	346	1279	62
Arrive On Green	0.12	0.22	0.22	0.11	0.22	0.22	0.14	0.41	0.41	0.10	0.37	0.37
Sat Flow, veh/h	1774	2387	1058	1774	1770	1583	1774	2894	627	3442	3437	166
Grp Volume(v), veh/h	183	362	345	174	152	283	217	460	455	286	618	642
Grp Sat Flow(s),veh/h/ln	1774	1770	1676	1774	1770	1583	1774	1770	1752	1721	1770	1833
Q Serve(g_s), s	13.1	25.8	26.0	12.5	9.5	22.0	15.6	26.8	26.9	10.6	43.6	43.7
Cycle Q Clear(g_c), s	13.1	25.8	26.0	12.5	9.5	22.0	15.6	26.8	26.9	10.6	43.6	43.7
Prop In Lane	1.00		0.63	1.00		1.00	1.00		0.36	1.00		0.09
Lane Grp Cap(c), veh/h	208	397	376	199	387	347	243	723	716	346	658	682
V/C Ratio(X)	0.88	0.91	0.92	0.88	0.39	0.82	0.89	0.64	0.64	0.83	0.94	0.94
Avail Cap(c_a), veh/h	241	410	389	215	387	347	347	723	716	673	689	714
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	56.2	48.9	49.0	56.6	43.2	48.1	54.9	30.5	30.6	57.1	39.2	39.2
Incr Delay (d2), s/veh	24.2	24.1	26.3	27.6	0.6	13.9	14.6	1.7	1.8	2.0	20.4	20.1
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	7.9	15.2	14.8	7.7	4.7	10.9	8.6	13.4	13.4	5.1	25.0	25.9
LnGrp Delay(d),s/veh	80.4	73.1	75.4	84.2	43.8	62.0	69.5	32.3	32.3	59.1	59.6	59.3
LnGrp LOS	F	E	E	F	D	E	E	C	C	E	E	E
Approach Vol, veh/h		890			609			1132			1546	
Approach Delay, s/veh		75.5			63.8			39.4			59.4	
Approach LOS		E			E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.9	34.3	22.1	54.0	19.6	33.6	17.4	58.8
Change Period (Y+Rc), s	4.4	* 5.3	4.4	* 5.9	4.4	5.3	4.4	5.9
Max Green Setting (Gmax), s	15.7	* 30	25.3	* 50	17.6	27.7	25.3	49.4
Max Q Clear Time (g_c+I1), s	14.5	28.0	17.6	45.7	15.1	24.0	12.6	28.9
Green Ext Time (p_c), s	0.0	1.0	0.2	2.4	0.1	2.4	0.4	14.5

Intersection Summary	
HCM 2010 Ctrl Delay	58.0
HCM 2010 LOS	E

Notes

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	9	0	1295	1584	41
Future Vol, veh/h	0	9	0	1295	1584	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	10	0	1408	1722	45

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	883	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	248	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	248	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	248	-	-
HCM Lane V/C Ratio	-	0.039	-	-
HCM Control Delay (s)	-	20.1	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	111	0	0	117	35	10	0	10	14	0	3
Future Vol, veh/h	6	111	0	0	117	35	10	0	10	14	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	121	0	0	127	38	11	0	11	15	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	165	0	-	-	-	0	282	299	121	285	280	146
Stage 1	-	-	-	-	-	-	134	134	-	146	146	-
Stage 2	-	-	-	-	-	-	148	165	-	139	134	-
Critical Hdwy	4.12	-	-	-	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1413	-	0	0	-	-	670	613	930	667	628	901
Stage 1	-	-	0	0	-	-	869	785	-	857	776	-
Stage 2	-	-	0	0	-	-	855	762	-	864	785	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1413	-	-	-	-	-	665	610	930	657	625	901
Mov Cap-2 Maneuver	-	-	-	-	-	-	665	610	-	657	625	-
Stage 1	-	-	-	-	-	-	865	781	-	853	776	-
Stage 2	-	-	-	-	-	-	852	762	-	850	781	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	9.8	10.3
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	775	1413	-	-	-	657	901
HCM Lane V/C Ratio	0.028	0.005	-	-	-	0.023	0.004
HCM Control Delay (s)	9.8	7.6	0	-	-	10.6	9
HCM Lane LOS	A	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	0	-	-	-	0.1	0

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	124	145	24	30	7
Future Vol, veh/h	11	124	145	24	30	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	135	158	26	33	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	184	0	-	0	330	171
Stage 1	-	-	-	-	171	-
Stage 2	-	-	-	-	159	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1391	-	-	-	665	873
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	870	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1391	-	-	-	659	873
Mov Cap-2 Maneuver	-	-	-	-	659	-
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	862	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1391	-	-	-	691
HCM Lane V/C Ratio	0.009	-	-	-	0.058
HCM Control Delay (s)	7.6	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Arterial Level of Service: NB Euclid Avenue

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Market Street	III	35	16.7	51.5	68.2	0.12	6.5	F
Hilltop Drive	III	35	37.4	21.1	58.5	0.31	19.2	C
SR-94 EB Ramps	III	35	17.1	51.0	68.1	0.13	7.1	F
SR-94 WB Ramps	III	35	18.2	8.2	26.4	0.14	19.4	C
Federal Blvd	III	35	21.1	7.9	29.0	0.16	20.4	C
Total	III		110.5	139.7	250.2	0.88	12.6	E

Arterial Level of Service: SB Euclid Avenue

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Federal Blvd	III	35	6.8	19.9	26.7	0.05	6.3	F
SR-94 WB Ramps	III	35	21.1	9.1	30.2	0.16	19.6	C
SR-94 EB Ramps	III	35	18.2	3.3	21.5	0.14	23.8	C
Hilltop Drive	III	35	17.1	17.9	35.0	0.13	13.7	E
Market Street	III	35	37.4	41.3	78.7	0.31	14.3	D
Total	III		100.6	91.5	192.1	0.80	15.0	D

Arterial Level of Service: EB Hilltop Drive

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
47th Street	IV	30	14.8	19.7	34.5	0.07	6.8	F
Euclid Avenue	IV	25	75.8	0.0	75.8	0.50	23.5	B
Total	IV		90.6	19.7	110.3	0.56	18.3	C

Arterial Level of Service: WB Hilltop Drive

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Euclid Avenue	IV	30	8.2	0.0	8.2	0.04	15.9	C
47th Street	IV	25	75.8	12.6	88.4	0.50	20.2	B
Total	IV		84.0	12.6	96.6	0.53	19.8	B

Arterial Level of Service: NB Euclid Avenue

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Market Street	III	30	17.5	35.3	52.8	0.12	8.4	F
Hilltop Drive	III	30	39.5	17.1	56.6	0.31	19.8	C
SR-94 EB Ramps	III	30	18.0	35.9	53.9	0.13	9.0	F
SR-94 WB Ramps	III	30	19.1	8.1	27.2	0.14	18.8	C
Federal Blvd	III	30	21.5	6.9	28.4	0.16	20.3	C
Total	III		115.6	103.3	218.9	0.87	14.3	D

Arterial Level of Service: SB Euclid Avenue

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Federal Blvd	III	30	11.3	27.5	38.8	0.08	7.5	F
SR-94 WB Ramps	III	30	21.5	12.6	34.1	0.16	16.9	D
SR-94 EB Ramps	III	30	19.1	6.5	25.6	0.14	20.0	C
Hilltop Drive	III	30	18.0	7.8	25.8	0.13	18.8	C
Market Street	III	30	39.5	59.9	99.4	0.31	11.3	E
Total	III		109.4	114.3	223.7	0.83	13.3	E

Arterial Level of Service: EB Hilltop Drive

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
47th Street	III	30	10.1	16.1	26.2	0.07	9.0	F
Euclid Avenue	III	30	63.0	0.0	63.0	0.50	28.3	B
Total	III		73.1	16.1	89.2	0.56	22.6	C

Arterial Level of Service: WB Hilltop Drive

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Euclid Avenue	III	30	5.6	0.0	5.6	0.04	23.3	C
47th Street	III	30	63.0	9.0	72.0	0.50	24.8	B
Total	III		68.6	9.0	77.6	0.53	24.7	B

Appendix K Horizon Year 2035 Condition (47th Street Road Diet)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	90	50	130	100	180	70	850	140	70	320	170
Future Volume (veh/h)	150	90	50	130	100	180	70	850	140	70	320	170
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	163	98	54	141	109	196	76	924	152	76	348	185
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	208	112	52	186	124	196	427	895	147	90	658	350
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.57	0.57	0.57	0.57	0.57	0.57
Sat Flow, veh/h	459	370	172	417	408	647	868	1561	257	522	1146	609
Grp Volume(v), veh/h	315	0	0	446	0	0	76	0	1076	76	0	533
Grp Sat Flow(s),veh/h/ln	1000	0	0	1472	0	0	868	0	1817	522	0	1755
Q Serve(g_s), s	0.1	0.0	0.0	0.0	0.0	0.0	4.7	0.0	45.9	0.0	0.0	14.9
Cycle Q Clear(g_c), s	24.3	0.0	0.0	24.2	0.0	0.0	19.6	0.0	45.9	45.9	0.0	14.9
Prop In Lane	0.52		0.17	0.32		0.44	1.00		0.14	1.00		0.35
Lane Grp Cap(c), veh/h	372	0	0	506	0	0	427	0	1043	90	0	1007
V/C Ratio(X)	0.85	0.00	0.00	0.88	0.00	0.00	0.18	0.00	1.03	0.84	0.00	0.53
Avail Cap(c_a), veh/h	372	0	0	506	0	0	427	0	1043	90	0	1007
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.7	0.0	0.0	27.6	0.0	0.0	16.4	0.0	17.1	40.0	0.0	10.4
Incr Delay (d2), s/veh	15.6	0.0	0.0	15.9	0.0	0.0	0.3	0.0	36.4	50.1	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	0.0	0.0	12.0	0.0	0.0	1.2	0.0	33.1	2.9	0.0	7.3
LnGrp Delay(d),s/veh	43.3	0.0	0.0	43.5	0.0	0.0	16.7	0.0	53.4	90.1	0.0	11.2
LnGrp LOS	D			D			B		F	F		B
Approach Vol, veh/h		315			446			1152			609	
Approach Delay, s/veh		43.3			43.5			51.0			21.0	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		50.8		29.2		50.8		29.2
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		45.9		24.3		45.9		24.3
Max Q Clear Time (g_c+I1), s		47.9		26.3		47.9		26.2
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	41.5
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	40	30	100	40	80	20	480	90	100	570	120
Future Volume (veh/h)	160	40	30	100	40	80	20	480	90	100	570	120
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	174	43	33	109	43	87	22	522	98	109	620	130
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	336	69	43	246	93	134	342	882	166	431	864	181
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.58	0.58	0.58	0.58	0.58	0.58
Sat Flow, veh/h	948	308	191	622	413	593	709	1526	286	800	1494	313
Grp Volume(v), veh/h	250	0	0	239	0	0	22	0	620	109	0	750
Grp Sat Flow(s),veh/h/ln	1446	0	0	1628	0	0	709	0	1812	800	0	1807
Q Serve(g_s), s	1.5	0.0	0.0	0.0	0.0	0.0	1.2	0.0	11.0	5.0	0.0	14.9
Cycle Q Clear(g_c), s	7.9	0.0	0.0	6.4	0.0	0.0	16.1	0.0	11.0	16.0	0.0	14.9
Prop In Lane	0.70		0.13	0.46		0.36	1.00		0.16	1.00		0.17
Lane Grp Cap(c), veh/h	449	0	0	472	0	0	342	0	1047	431	0	1045
V/C Ratio(X)	0.56	0.00	0.00	0.51	0.00	0.00	0.06	0.00	0.59	0.25	0.00	0.72
Avail Cap(c_a), veh/h	773	0	0	825	0	0	388	0	1165	483	0	1162
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.9	0.0	0.0	17.4	0.0	0.0	13.4	0.0	6.8	11.9	0.0	7.6
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.9	0.5	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.0	3.0	0.0	0.0	0.2	0.0	5.6	1.2	0.0	7.9
LnGrp Delay(d),s/veh	18.3	0.0	0.0	17.7	0.0	0.0	13.5	0.0	7.7	12.4	0.0	9.9
LnGrp LOS	B			B			B		A	B		A
Approach Vol, veh/h		250			239			642			859	
Approach Delay, s/veh		18.3			17.7			7.9			10.2	
Approach LOS		B			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		33.7		16.2		33.7		16.2
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		32.1		23.1		32.1		23.1
Max Q Clear Time (g_c+I1), s		18.1		9.9		18.0		8.4
Green Ext Time (p_c), s		10.8		1.8		10.8		1.8

Intersection Summary	
HCM 2010 Ctrl Delay	11.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	90	50	55	100	61	70	850	53	36	320	170
Future Volume (veh/h)	150	90	50	55	100	61	70	850	53	36	320	170
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	163	98	54	60	109	66	76	924	58	39	348	185
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	248	126	62	137	229	119	475	1054	66	188	696	370
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.61	0.61	0.61	0.61	0.61	0.61
Sat Flow, veh/h	668	483	238	293	877	457	868	1735	109	571	1146	609
Grp Volume(v), veh/h	315	0	0	235	0	0	76	0	982	39	0	533
Grp Sat Flow(s),veh/h/ln	1389	0	0	1628	0	0	868	0	1844	571	0	1755
Q Serve(g_s), s	7.4	0.0	0.0	0.0	0.0	0.0	4.0	0.0	33.5	4.6	0.0	12.8
Cycle Q Clear(g_c), s	16.3	0.0	0.0	8.9	0.0	0.0	16.8	0.0	33.5	38.1	0.0	12.8
Prop In Lane	0.52		0.17	0.26		0.28	1.00		0.06	1.00		0.35
Lane Grp Cap(c), veh/h	436	0	0	486	0	0	475	0	1120	188	0	1066
V/C Ratio(X)	0.72	0.00	0.00	0.48	0.00	0.00	0.16	0.00	0.88	0.21	0.00	0.50
Avail Cap(c_a), veh/h	522	0	0	582	0	0	483	0	1136	193	0	1082
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.4	0.0	0.0	23.6	0.0	0.0	13.0	0.0	12.3	28.3	0.0	8.3
Incr Delay (d2), s/veh	2.8	0.0	0.0	0.3	0.0	0.0	0.2	0.0	8.2	0.8	0.0	0.6
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	6.6	0.0	0.0	4.2	0.0	0.0	1.0	0.0	19.2	0.8	0.0	6.2
LnGrp Delay(d),s/veh	29.3	0.0	0.0	23.9	0.0	0.0	13.3	0.0	20.5	29.1	0.0	8.8
LnGrp LOS	C			C			B		C	C		A
Approach Vol, veh/h		315			235			1058			572	
Approach Delay, s/veh		29.3			23.9			20.0			10.2	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		50.3		24.5		50.3		24.5
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		46.1		24.1		46.1		24.1
Max Q Clear Time (g_c+I1), s		35.5		18.3		40.1		10.9
Green Ext Time (p_c), s		9.1		1.3		5.4		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	19.2
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	40	30	44	40	36	20	480	45	52	570	120
Future Volume (veh/h)	160	40	30	44	40	36	20	480	45	52	570	120
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	174	43	33	48	43	39	22	522	49	57	620	130
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	343	64	42	195	162	109	357	981	92	483	874	183
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.58	0.58	0.58	0.58	0.58	0.58
Sat Flow, veh/h	1022	306	202	437	771	518	709	1677	157	838	1494	313
Grp Volume(v), veh/h	250	0	0	130	0	0	22	0	571	57	0	750
Grp Sat Flow(s),veh/h/ln	1531	0	0	1726	0	0	709	0	1835	838	0	1807
Q Serve(g_s), s	4.1	0.0	0.0	0.0	0.0	0.0	1.1	0.0	9.0	2.1	0.0	14.1
Cycle Q Clear(g_c), s	7.1	0.0	0.0	3.0	0.0	0.0	15.2	0.0	9.0	11.1	0.0	14.1
Prop In Lane	0.70		0.13	0.37		0.30	1.00		0.09	1.00		0.17
Lane Grp Cap(c), veh/h	449	0	0	466	0	0	357	0	1073	483	0	1057
V/C Ratio(X)	0.56	0.00	0.00	0.28	0.00	0.00	0.06	0.00	0.53	0.12	0.00	0.71
Avail Cap(c_a), veh/h	836	0	0	888	0	0	418	0	1232	556	0	1213
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.5	0.0	0.0	16.1	0.0	0.0	12.4	0.0	6.0	9.3	0.0	7.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.6	0.2	0.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	0.0	1.5	0.0	0.0	0.2	0.0	4.6	0.5	0.0	7.5
LnGrp Delay(d),s/veh	17.9	0.0	0.0	16.2	0.0	0.0	12.5	0.0	6.6	9.5	0.0	9.0
LnGrp LOS	B			B			B		A	A		A
Approach Vol, veh/h		250			130			593			807	
Approach Delay, s/veh		17.9			16.2			6.8			9.1	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		32.9		14.9		32.9		14.9
Change Period (Y+Rc), s		4.9		4.9		4.9		4.9
Max Green Setting (Gmax), s		32.1		23.1		32.1		23.1
Max Q Clear Time (g_c+I1), s		17.2		9.1		16.1		5.0
Green Ext Time (p_c), s		10.8		1.3		11.4		1.4

Intersection Summary	
HCM 2010 Ctrl Delay	10.1
HCM 2010 LOS	B

Appendix L Parking Calculations

Required Parking

REQUIRED SINGLE FAMILY PARKING

20	Single Family Houses with 2-Car Garage	= 40 spaces
27	Townhouses with 2-Car Garage	= 54 spaces
	Required Motorcycle Parking	= 05 spaces
47	**Total Single Family Residential Parking:**	**94 spaces, 5 motorcycle spaces**

REQUIRED MIXED-USE RESIDENTIAL PARKING:

14	Studio Units x 0.5 Spaces per Unit	= 07 Spaces
23	1-BR Units x 0.5 Spaces per Unit	= 12 Spaces
37	2-BR Units x 0.5 Spaces per Unit	= 19 Spaces
21	3-BR Units x 0.5 Spaces per Unit	= 10 Spaces
18	4-BR Units x 0.5 Spaces per Unit	= 09 Spaces
113	**Total Mixed-Use Residential Parking:**	**57 Spaces (assigned)**

TRANSIT PROXIMITY REQUIREMENTS

The mixed-use portion is 100% low and very-low affordable rental housing and meets the following transit requirements in SDMC TABLE 143-07D for the 0.5 spaces per dwelling unit parking reduction:

The project is located approximately 2,200 ft (0.3 miles) from the Euclid Avenue Trolley Station. The Euclid Trolley Station is currently served by the San Diego Trolley Orange Line, with stops at 47th Street Station and Euclid Trolley Station. The Orange Line runs between downtown San Diego and the Santee Town Center. The Orange Line covers 20.7 miles with 15-minute service Mondays to Saturdays, and 30-minute service during the late-evenings, weekend mornings, and Sundays. It serves a total of 23 stations. The Euclid Trolley Station also provides transfer/stops for the following MTS bus routes:

MTS Bus Route #3 - (UCSD Hospital to Euclid Transit Center);
MTS Bus Route #4 - (12th & Imperial Trolley to Lomita Village);
MTS Bus Route #5 - (Downtown San Diego to Euclid Transit Center);
MTS Bus Route #13 - (Kaiser Hospital to 24th Street Trolley);
MTS Bus Route #60 - (Euclid Trolley Station to UTC via Convoy);
MTS Bus Route #916 & #917 (Oak Park to Emerald Hills Loop CW); and
MTS Bus Route #955 - (National City to San Diego State University).

REQUIRED MIXED-USE RESIDENTIAL ACCESSIBLE PARKING:

1 Standard Accessible Space, 1 Van Accessible Space
(2% of 57 assigned residential spaces per CBC 1109A.4)

REQUIRED MIXED-USE COMMERCIAL PARKING:

2.5 spaces per 1,000 sf @ 8,485 sf = 21 Spaces Required
(SDMC Table 142-05F for Eating Establishments in CN-1-4 zone)
1 Van Accessible Space (per CBC Table 11B-208.2)

REQUIRED MIXED-USE OFF STREET LOADING SPACE

Per SDMC Table 142-10B, (1) one off-street loading space required for multiple unit residential use up to 200,000 sf. Per Building Area Summary, mixed-use portion is approximately 145,000 sf.

REQUIRED MIXED-USE ELECTRIC VEHICLE CHARGING STATIONS:

5 Standard Non-Accessible EVCS for Residents
1 Standard Accessible EVCS, 1 Van Accessible EVCS
No Commercial EVCS

REQUIRED MIXED-USE MOTORCYCLE PARKING:

(14)	Studio Units x 0.1 per Unit =	1.4 Spaces
(23)	1-BR Units x 0.1 per Unit =	2.4 Spaces
(37)	2-BR Units x 0.1 per Unit =	3.7 Spaces
(21)	3-BR Units x 0.1 per Unit =	2 Spaces
(18)	4-BR Units x 0.1 per Unit =	1.8 Spaces

Total Motorcycle Spaces Required: 12 Spaces

REQUIRED MIXED-USE SHORT-TERM & LONG-TERM BICYCLE PARKING:

(14)	Studio Units x 0.4 per Unit =	5.6 Spaces
(23)	1-BR Units x 0.4 per Unit =	9.6 Spaces
(37)	2-BR Units x 0.5 per Unit =	18.5 Spaces
(21)	3-BR Units x 0.6 per Unit =	12 Spaces
(18)	4-BR Units x 0.6 per Unit =	10.8 Spaces

Total Bicycle Spaces Required: 57 Spaces

****

EXISTING / PROPOSED ON-STREET PARKING:

Euclid Ave =	6 Existing Spaces, 0 Proposed
Hilltop Dr. =	0 Existing Spaces, 19 Proposed
NET GAIN:	13 Spaces

PRELIMINARY
DRAINAGE REPORT

HILLTOP AND EUCLID

City of San Diego, CA
November 28, 2017
VTM/SDP: PTS #560527

APN #: 542-480-03, 09, 12, 14, 16, 18 & 20
Project Address: Euclid Avenue & Hilltop Drive, San Diego, 92114

Prepared For:

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Under the supervision of

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Registration Expires 12/31/18

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TABLES

APPENDICES

1. INTRODUCTION

This preliminary drainage report has been prepared in support of the storm drain improvements associated with the proposed Hilltop and Euclid development project (Project). The Hilltop and Euclid Project is a re-development project consisting of a mixed-use development with residential and commercial uses. Total Project area is 8.5 acres that is currently a vacant lot. The project is located south of Highway 94 and east of Interstate 805, and is bounded on the north by a vacant lot, on the east south and west by existing residential homes. The existing site zoning is RM 1-2 on the western half of the site and CN 1-4 on the east. Accordingly, the project proposes 47 for sale homes on the western side of the site and 3-residential buildings with a total of 113 units, and three commercial buildings on the east. Refer to the Vicinity Map below: Figure 1 for the Project location.

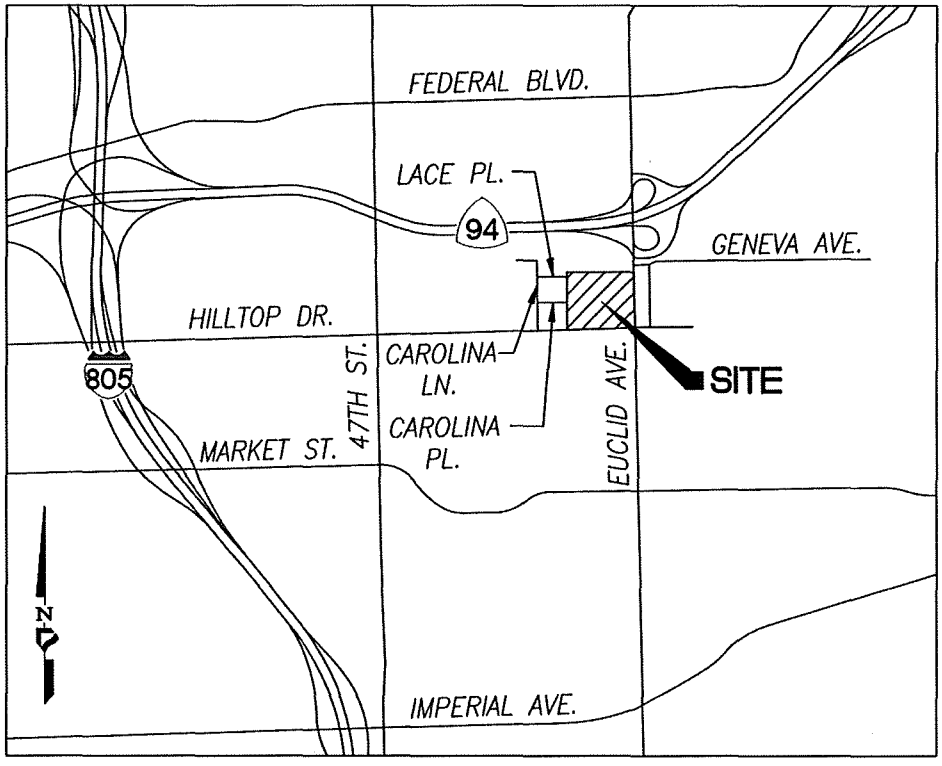

Figure 1: Vicinity Map

At present the site is mostly undeveloped land consisting primarily of natural terrain, with brush and some areas of dense trees around the existing channel going through project site from north to south. There were previously a few sparse houses on the east side of the project site next to Euclid Avenue, which have been demolished.

Presently all runoff flows across the site to the central channel that runs through the site, and then enters into the public storm drain system connecting to the downstream channel. The proposed project will continue to send all runoff to this point with a proposed upgraded storm drain that will be constructed to convey water from the site to downstream. Multiple biofiltration basins and other BMPs will be implemented to manage water quality while also providing some flow attenuation for hydromodification. From a regional drainage perspective, the runoff through the Project site includes 63.9 acres of upstream offsite area immediately north to the project boundary. These offsite upstream areas drain through an existing 42-in RCP across Highway 94 leading to existing channel. As a part of the project, the length of the existing channel within the property boundary will be re-graded to improve the channel and its associated habitat. These proposed changes to the onsite portion of the channel will require a 401 Certification and an Army Corps of Engineers 404 permit, which will be obtained prior to issuance of the grading permit. The storm drain system to which the site discharges outlets into the downstream channel and eventually to South Chollas Creek further downstream, which then flows to the San Diego Bay. For water quality management concerns refer to the Storm Water Quality Management Plan (SWQMP) prepared by Project Design Consultants for the proposed project treatment BMPs.

2. EXISTING AND PROPOSED DRAINAGE PATTERNS AND IMPROVEMENTS

The following sections provide descriptions of the existing and proposed drainage patterns and improvements for the project.

2.1 Existing Drainage Patterns

There are minimal on-site drainage facilities, except for existing culverts near the downstream end of the project limits. At present all site runoff flows off-site through the channel to the south. Upstream of the site, runoff from areas north of Highway 94 are conveyed in an existing 42-in RCP leading to the onsite channel. There is an existing 36-in RCP (per 6893-B) culvert leading

into the downstream channel at the south end of Hilltop Drive. Refer to Exhibit A in Appendix 6 for the existing condition drainage map.

There are about 63.9 acres of upstream offsite areas draining through project site channel, flowing further south to Chollas Creek. Refer to Exhibit B in Appendix 6 for the offsite drainage map. There are also a couple fragments of area outside the project boundary next to the adjacent cul-de-sac to the west and to the south end which drains onto the site, but generally no significant amount of runon from other sides of project site except for north is conveyed through the site.

2.2 Proposed Drainage Improvements

The site will continue to discharge to the downstream channel at the south side of the extension of Hilltop Drive through a public storm drain culvert that will be upgraded to convey runoff to this point from the site. The proposed drainage improvements include private storm drains collecting rooftop and surface drainage, a public storm drain in Hilltop Drive and Euclid Avenue, and a culvert upgrade with a slope-tapered improved culvert inlet structure design. Offsite runoff from two curb cuts at the cul-de-sacs of Carolina Pl and Lace Pl will be collected in a brow ditch and piped into the proposed private storm drain system. Refer to Exhibit C in Appendix 6 for the proposed condition drainage map.

Water quality requirements will be managed with multiple biofiltration basins and other BMPs. Some of the BMPs will provide peak flow detention to mitigate for peak flows, as there is an existing downstream storm drain pipe that is insufficient for existing condition flows. Refer to Exhibit D. From the point of discharge, the existing channel continues south approximately 300 feet before entering an existing culvert. The existing culvert is an undersized 36-inch storm drain system located underneath Lakiba Palmer Avenue (formerly Lise Avenue). Due to the existing capacity issues downstream, the project will propose detention as mitigation for 100-year peak flow impacts.

3. HYDROLOGY CRITERIA, METHODOLOGY, AND RESULTS

Hydrologic modeling was performed per City of San Diego Drainage Design Manual criteria to provide the design flows for storm drain design and improvements.

3.1 Hydrology Criteria

Table 1 summarizes the hydrology assumptions and criteria used for hydrologic modeling.

Table 1: Hydrology Criteria

Existing and Proposed Hydrology:	100-year storm frequency
Soil Type:	Hydrologic Soil Group D
Land Use / Runoff Coefficients:	Based on criteria presented in the 1984 City of San Diego Drainage Design Manual.
Rainfall intensity:	Based on intensity duration frequency relationships presented in the January 2017 City of San Diego Drainage Design Manual, see Appendix 1.

3.2 Hydrologic Methodology

The Rational Method was used to determine the onsite 100-year storm flow for the design of the Project storm drainpipe improvements. The goal of this analysis was to:

- Determine the design flows for the sizing of any proposed storm drain improvements.
- Determine the differences in the drainage conditions between existing and proposed conditions to confirm there are no significant downstream impacts.

The Civil-D Rational Method program was used to calculate onsite and offsite runoff for the 100-year storm event. The runoff coefficient for rural development of 0.45 was used for the existing onsite conditions while higher runoff coefficients for multi-family residential development, single family residential development, and commercial development were used for the proposed onsite condition. Offsite hydrology runoff coefficients were based on land uses apparent from aerial photography, which includes mostly single family residential development.

3.3 Description of Hydrologic Modeling Software

The Civil-D Rational Method Program was used to perform the Rational Method hydrologic calculations. This section provides a brief explanation of the computational procedure used in the computer model.

The Civil-D Modified Rational Method Hydrology Program is a computer-aided design program where the user simulates the hydrology with a link-node model. The sub-watersheds are represented by a pair of nodes and the conduits connecting them are assigned channel properties. The intensity-duration-frequency relationships are applied to each of the drainage areas in the model to yield peak flow rates at each point of interest per the methodology in the *City of San Diego Drainage Design Manual.*

3.4 Hydrology Results

The Rational Method as presented in the City of San Diego Drainage Design Manual was used to calculate the existing and proposed conditions peak storm flows. The Pre and Post project C-values are found in Table 2 below.

EXISTING CONDITIONS				**PROPOSED CONDITIONS**			
C Type	**C Value**	**Total Acres**	**% of Site**	**C Type**	**C Value**	**Total Acres**	**% of Site**
Rural	0.45	9.14	59.1	Rural	0.45	1.77	11.5
Single Family	0.55	4.75	30.7	Single Family	0.55	5.45	35.3
Industrial	0.95	1.58	10.2	Industrial	0.95	2.84	18.4
				Multi Unit	0.70	2.53	16.4
				Commercial	0.85	2.84	18.4

Table 3 below summarizes the Rational Method results for the comparison of the existing and proposed project site.

Table 3: Hydrology Results

LOCATION	EXISTING CONDITIONS		PROPOSED CONDITIONS	
	100-Year Flow Rate (cfs)	Contributing Area (ac)	100-Year Flow Rate (cfs)	Contributing Area (ac)
Upstream offsite System 1000	124.5	63.9	124.5	63.9
Offsite from Carolina Pl & Lace Pl	2.21	1.1	2.21	1.1
Offsite+Onsite* (System 2000 w/ Detention taken into account)	145.7	79.3	154.3 (w/o detention) <=145.7 (w/ detention)	79.3

*Note Q from Carolina Place and Lace Place = 2.21 cfs

The site will detain post-project 100-year flows to less than pre-project 100-year flows. Final detention routing will be provided during final engineering, however, preliminary calculations are provided in Appendix 5.

4. HYDRAULIC CRITERIA, METHODOLOGY, AND RESULTS

Due to the proposed regarding of the channel through the length of the project site, a preliminary hydraulic analysis was performed using the United States Army Corps of Engineers Hydrologic Engineering Center's River Analysis System (HEC-RAS) 5.0.3. HEC-RAS 5.0.3 is computer-aided hydraulic analysis program that is designed to perform one and two-dimensional hydraulic calculations for a full network of natural and constructed channels. Cross sections of the existing and proposed conditions were inputted from the existing and proposed topography into HEC-RAS in order to model an accurate geometric shape of the channel (See HEC-RAS cross section exhibits in Appendix 7).

The existing conditions peak 100-year hydrology results were used for both the existing and proposed channel hydraulic analysis. The most downstream cross section is located at the entrance of the existing 36 inch storm drain per DWG 5568-D and the most upstream cross section is located 160 feet north of the property line. The water surface elevations generated by the existing condition analysis served as a baseline for the project and the proposed water surface elevations (WSELs) were compared against the project baseline. The downstream existing 36 storm drain was modeled using CulvertMaster to obtain the starting downstream water surface elevation.This analysis was performed to determine if there are any adverse effects of the proposed project to the existing channel and if any channel protection is needed for the proposed channel design.

Under the proposed conditions a low roughness coefficient of 0.03 was assumed, which is conservative from a velocity standpoint. The entrance of the new channel near the north property line was analyzed to determine if slope protection or velocity dissipaters were needed. The results indicate that the cross section where the new channel narrows from the existing conditions the velocity increases by 0.9 ft/sec from 4.5 ft/sec to 5.4 ft/sec (See Output file located in Appendix 8). 15" thick No. 2 backing riprap will be placed on the embankment slopes at this section for protection and stabilization as the channel narrows through the project site.

HEC-RAS is unable to model a circular pipe with a slope taper inlet, this was approximated by the flow entering the culvert at the invert of the pipe. The proposed 48" stormdrain culvert was modeled and comparing the existing and proposed conditions 20 feet south of the proposed riprap, the velocities are 6.69 ft/sec and 6.71 ft/sec, respectively (See Appendix 8). This shows that the new channel under proposed conditions mimics the existing conditions almost exactly when exiting the site. The analysis of sizing the riprap energy dissipaters will be completed during final engineering, but the new culvert has been design with a concrete energy dissipater to provide adequate energy dissipation at the new outfall location.

The HEC RAS results, included in Appendix 8, indicate that the proposed channel has sufficient freeboard to convey the upstream flows through the development. In addition, the velocities are relatively low, and therefore riprap is only proposed near the upstream section. The HEC-RAS

hydraulic analysis will be updated during final engineering, but the preliminary results indicate that there are no significant hydraulic impacts from a CEQA perspective.

The existing culvert is insufficient to convey the 100-year flows underneath the berm located just north of the proposed extension of Hilltop Drive. However, the proposed culvert is sufficient to convey the flows underneath Hilltop Drive without overtopping. Appendix 4 includes the slope-tapered inlet control calculations for the proposed public Hilltop Drive culvert.

5. CONCLUSION

This drainage report was prepared for the Hilltop and Euclid project. While there is a small increase of flow rate in the proposed conditions, the project includes basins designed to mitigate 100-year flows to less than pre-project conditions. Therefore, there will be no major impacts on the adjacent properties. The onsite storm drain system will be designed to comply with drainage guidelines and will be adequate to convey the peak design flows.

APPENDIX 1

Supplemental Information (Intensity Duration Frequency Curve, Runoff Coefficients)

TABLE 2

RUNOFF COEFFICIENTS (RATIONAL METHOD)

DEVELOPED AREAS (URBAN)

Land Use	Coefficient, C Soil Type (1)
Residential:	D
Single Family	.55
Multi-Units	.70
Mobile Homes	.65
Rural (lots greater than 1/2 acre)	.45
Commercial (2) 80% Impervious	.85
Industrial (2) 90% Impervious	.95

NOTES:

(1) Type D soil to be used for all areas.

(2) Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in no case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%

Tabulated imperviousness = 80%

Revised C = $\frac{50}{80}$ x 0.85 = 0.53

APPENDIX

RAINFALL INTENSITY-DURATION-FREQUENCY CURVES
for
COUNTY OF SAN DIEGO

ELEV.	FACTOR
0–1500	1.00
1500–3000	1.25
3000–4000	1.42
4000–5000	1.60
5000–6000	1.70
DESERT	1.25

To obtain correct intensity, multiply intensity on chart by factor for design elevation.

APPENDIX 2

Existing Conditions Rational Method Computer Output

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 06/27/17
--------------------------------------------------------------------------
PROJECT HILLTOP
PROPOSED CONDITIONS
1000P100


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1000.000 to Point/Station     1001.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                          ]
Initial subarea flow distance  =  204.000(Ft.)
Highest elevation =  252.000(Ft.)
Lowest elevation =  243.600(Ft.)
Elevation difference =    8.400(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.41 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*( 204.000^.5)/(   4.118^(1/3)]=   2.41
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      1.001(CFS)
Total initial stream area =        0.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1001.000 to Point/Station     1002.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
```



```
Top of street segment elevation =   243.600(Ft.)
End of street segment elevation =   231.000(Ft.)
Length of street segment  =   410.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0170
 Manning's N from gutter to grade break =  0.0170
 Manning's N from grade break to crown =  0.0170
Estimated mean flow rate at midpoint of street =      3.544(CFS)
Depth of flow =   0.318(Ft.), Average velocity =   3.414(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   9.547(Ft.)
Flow velocity =   3.41(Ft/s)
Travel time =    2.00 min.     TC =    7.00  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                       ]
Rainfall intensity =      3.846(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =      2.581(CFS) for    1.220(Ac.)
Total runoff =      3.581(CFS)  Total area =        1.46(Ac.)
Street flow at end of street =      3.581(CFS)
Half street flow at end of street =      3.581(CFS)
Depth of flow =   0.318(Ft.), Average velocity =   3.422(Ft/s)
Flow width (from curb towards crown)=   9.591(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1002.000 to Point/Station     1003.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =   231.000(Ft.)
End of street segment elevation =   222.800(Ft.)
Length of street segment  =   588.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.063
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0170
 Manning's N from gutter to grade break =  0.0170
 Manning's N from grade break to crown =  0.0170
Estimated mean flow rate at midpoint of street =      9.395(CFS)
Depth of flow =   0.463(Ft.), Average velocity =   3.179(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.818(Ft.)
Flow velocity =   3.18(Ft/s)
```

```
Travel time =    3.08 min.     TC =   10.08  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Rainfall intensity =      3.364(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =      8.770(CFS) for    4.740(Ac.)
Total runoff =     12.351(CFS)  Total area =        6.20(Ac.)
Street flow at end of street =     12.351(CFS)
Half street flow at end of street =     12.351(CFS)
Depth of flow =   0.502(Ft.), Average velocity =   3.391(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    0.08(Ft.)
Flow width (from curb towards crown)=  18.749(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1003.000 to Point/Station     1004.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of street segment elevation =   222.800(Ft.)
End of street segment elevation =   220.000(Ft.)
Length of street segment  =   398.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     19.513(CFS)
Depth of flow =   0.498(Ft.), Average velocity =   2.723(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  18.591(Ft.)
Flow velocity =   2.72(Ft/s)
Travel time =    2.44 min.     TC =   12.52  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Rainfall intensity =      3.109(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =     12.296(CFS) for    7.190(Ac.)
Total runoff =     24.647(CFS)  Total area =       13.39(Ac.)
Street flow at end of street =     24.647(CFS)
Half street flow at end of street =     12.323(CFS)
Depth of flow =   0.537(Ft.), Average velocity =   2.826(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    1.48(Ft.)
Flow width (from curb towards crown)=  20.000(Ft.)
```



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1005.000 to Point/Station     1004.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                       ]
Time of concentration =    12.52 min.
Rainfall intensity =      3.109(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =      9.329(CFS) for    3.530(Ac.)
Total runoff =     33.976(CFS)  Total area =       16.92(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1004.000 to Point/Station     1008.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   219.000(Ft.)
Downstream point/station elevation =   218.000(Ft.)
Pipe length  =   450.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    33.976(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    33.976(CFS)
Normal flow depth in pipe =   28.22(In.)
Flow top width inside pipe =   34.88(In.)
Critical Depth =   22.15(In.)
Pipe flow velocity =      5.29(Ft/s)
Travel time through pipe =    1.42 min.
Time of concentration (TC) =    13.94 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1006.000 to Point/Station     1008.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Time of concentration =    13.94 min.
Rainfall intensity =      2.987(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =     18.994(CFS) for   11.560(Ac.)
Total runoff =     52.971(CFS)  Total area =       28.48(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1008.000 to Point/Station     1016.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   218.000(Ft.)
Downstream point/station elevation =   194.000(Ft.)
Pipe length  =  1144.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    52.971(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    52.971(CFS)
Normal flow depth in pipe =   22.08(In.)
Flow top width inside pipe =   26.45(In.)
```

```
Critical Depth =    28.01(In.)
Pipe flow velocity =      13.68(Ft/s)
Travel time through pipe =     1.39 min.
Time of concentration (TC) =     15.33 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      1007.000 to Point/Station      1016.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                    ]
Time of concentration =     15.33 min.
Rainfall intensity =      2.880(In/Hr) for a    100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      25.038(CFS) for     9.150(Ac.)
Total runoff =      78.009(CFS)  Total area =       37.63(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      1011.000 to Point/Station      1016.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                 ]
Time of concentration =     15.33 min.
Rainfall intensity =      2.880(In/Hr) for a    100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =       7.097(CFS) for     4.480(Ac.)
Total runoff =      85.106(CFS)  Total area =       42.11(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      1010.000 to Point/Station      1016.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                 ]
Time of concentration =     15.33 min.
Rainfall intensity =      2.880(In/Hr) for a    100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =      11.090(CFS) for     7.000(Ac.)
Total runoff =      96.195(CFS)  Total area =       49.11(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      1012.000 to Point/Station      1013.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
```



```
Time of concentration =     15.33 min.
Rainfall intensity =      2.880(In/Hr) for a    100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =       3.215(CFS) for     2.480(Ac.)
Total runoff =      99.410(CFS)  Total area =       51.59(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      1013.000 to Point/Station      1016.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                    ]
Time of concentration =     15.33 min.
Rainfall intensity =      2.880(In/Hr) for a    100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =       4.378(CFS) for     1.600(Ac.)
Total runoff =     103.788(CFS)  Total area =       53.19(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      1014.000 to Point/Station      1016.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                    ]
Time of concentration =     15.33 min.
Rainfall intensity =      2.880(In/Hr) for a    100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =       4.358(CFS) for     1.780(Ac.)
Total runoff =     108.146(CFS)  Total area =       54.97(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      1015.000 to Point/Station      1016.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                    ]
Note: user entry of impervious value, Ap = 0.700
Time of concentration =     15.33 min.
Rainfall intensity =      2.880(In/Hr) for a    100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.744
Subarea runoff =       7.584(CFS) for     3.540(Ac.)
Total runoff =     115.730(CFS)  Total area =       58.51(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      1016.000 to Point/Station      1019.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =    176.000(Ft.)
Downstream point/station elevation =    168.000(Ft.)
Pipe length  =    335.00(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =   115.730(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =   115.730(CFS)
Normal flow depth in pipe =   29.11(In.)
Flow top width inside pipe =   33.94(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.42(Ft/s)
Travel time through pipe =    0.32 min.
Time of concentration (TC) =    15.65 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1019.000 to Point/Station     1021.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   168.000(Ft.)
Downstream point elevation =   163.000(Ft.)
Channel length thru subarea  =   209.000(Ft.)
Channel base width       =   20.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =    119.706(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =    119.706(CFS)
Depth of flow =   0.565(Ft.), Average velocity =  10.032(Ft/s)
Channel flow top width =   22.259(Ft.)
Flow Velocity =   10.03(Ft/s)
Travel time  =    0.35 min.
Time of concentration =   16.00 min.
Critical depth =      1.000(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.833(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      5.124(CFS) for    4.020(Ac.)
Total runoff =    120.854(CFS)  Total area =       62.53(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1020.000 to Point/Station     1021.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                       ]
Time of concentration =    16.00 min.
Rainfall intensity =      2.833(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      3.660(CFS) for    1.360(Ac.)
Total runoff =    124.514(CFS)  Total area =       63.89(Ac.)
End of computations, total study area =          63.890 (Ac.)
```

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                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
       Rational Hydrology Study        Date: 10/31/17
--------------------------------------------------------------------------
PROJECT HILLTOP
EXISTING CONDITIONS
S300E100


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1021.000 to Point/Station      303.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
--------------------------------------------------------------------------
User specified 'C' value of 0.690 given for subarea
Rainfall intensity (I) =      2.833(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  16.00 min.  Rain intensity =       2.83(In/Hr)
Total area =       63.890(Ac.)  Total runoff =   124.500(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      303.000 to Point/Station      304.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
Upstream point elevation =   163.000(Ft.)
Downstream point elevation =   160.000(Ft.)
Channel length thru subarea  =   156.000(Ft.)
Channel base width       =   20.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =    125.104(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =    125.104(CFS)
Depth of flow =   0.619(Ft.), Average velocity =   9.522(Ft/s)
Channel flow top width =   22.475(Ft.)
Flow Velocity =    9.52(Ft/s)
```



```
Travel time  =    0.27 min.
Time of concentration =   16.27 min.
Critical depth =      1.031(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.814(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.785(CFS) for    0.620(Ac.)
Total runoff =    125.285(CFS)  Total area =       64.51(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      303.000 to Point/Station      304.000
**** CONFLUENCE OF MINOR STREAMS ****
--------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     64.510(Ac.)
Runoff from this stream =    125.285(CFS)
Time of concentration =   16.27 min.
Rainfall intensity =     2.814(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      302.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =   43.000(Ft.)
Highest elevation =  188.000(Ft.)
Lowest elevation =  186.000(Ft.)
Elevation difference =    2.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     4.60 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  43.000^.5)/(   4.651^(1/3)]=   4.60
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.138(CFS)
Total initial stream area =        0.070(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      304.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
Upstream point elevation =   186.000(Ft.)
Downstream point elevation =   160.000(Ft.)
Channel length thru subarea  =   347.000(Ft.)
Channel base width       =    5.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      1.313(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.000(Ft.)
```

```
Flow(q) thru subarea =      1.313(CFS)
Depth of flow =   0.062(Ft.), Average velocity =   4.185(Ft/s)
Channel flow top width =    5.124(Ft.)
Flow Velocity =    4.19(Ft/s)
Travel time  =    1.38 min.
Time of concentration =    6.38 min.
Critical depth =      0.128(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.984(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      2.134(CFS) for    1.190(Ac.)
Total runoff =      2.272(CFS)  Total area =        1.26(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      304.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.260(Ac.)
Runoff from this stream =      2.272(CFS)
Time of concentration =    6.38 min.
Rainfall intensity =     3.984(In/Hr)
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      125.285     16.27                2.814
2        2.272      6.38                3.984
Qmax(1) =
           1.000 *    1.000 *   125.285) +
           0.706 *    1.000 *     2.272) + =     126.889
Qmax(2) =
           1.000 *    0.392 *   125.285) +
           1.000 *    1.000 *     2.272) + =      51.405

Total of 2 streams to confluence:
Flow rates before confluence point:
     125.285       2.272
Maximum flow rates at confluence using above data:
      126.889       51.405
Area of streams before confluence:
       64.510        1.260
Results of confluence:
Total flow rate =    126.889(CFS)
Time of concentration =    16.273 min.
Effective stream area after confluence =     65.770(Ac.)


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Process from Point/Station      304.000 to Point/Station      305.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   160.000(Ft.)
Downstream point elevation =   146.000(Ft.)
Channel length thru subarea  =   478.000(Ft.)
```



```
Channel base width      =   20.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =    129.407(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =    129.407(CFS)
Depth of flow =   0.557(Ft.), Average velocity =  11.004(Ft/s)
Channel flow top width =   22.228(Ft.)
Flow Velocity =   11.00(Ft/s)
Travel time  =    0.72 min.
Time of concentration =   17.00 min.
Critical depth =      1.047(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.765(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      3.247(CFS) for    2.610(Ac.)
Total runoff =    130.137(CFS)  Total area =       68.38(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      310.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   145.500(Ft.)
Downstream point/station elevation =   144.000(Ft.)
Pipe length  =   137.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   130.137(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   130.137(CFS)
Normal flow depth in pipe =   38.16(In.)
Flow top width inside pipe =   32.32(In.)
Critical Depth =   40.68(In.)
Pipe flow velocity =     13.03(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =    17.17 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      310.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     68.380(Ac.)
Runoff from this stream =    130.137(CFS)
Time of concentration =   17.17 min.
Rainfall intensity =     2.753(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      308.000 to Point/Station      309.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
```

```
Initial subarea flow distance  =  105.000(Ft.)
Highest elevation =  192.000(Ft.)
Lowest elevation =  184.000(Ft.)
Elevation difference =    8.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     6.09 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*( 105.000^.5)/( 7.619^(1/3)]=   6.09
Rainfall intensity (I) =      4.056(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.511(CFS)
Total initial stream area =        0.280(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      320.000 to Point/Station      309.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Time of concentration =     6.09 min.
Rainfall intensity =      4.056(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =      1.963(CFS) for    0.880(Ac.)
Total runoff =      2.474(CFS)  Total area =        1.16(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      321.000 to Point/Station      309.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Time of concentration =     6.09 min.
Rainfall intensity =      4.056(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =      0.558(CFS) for    0.250(Ac.)
Total runoff =      3.032(CFS)  Total area =        1.41(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      309.000 to Point/Station      310.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------
Upstream point elevation =   184.000(Ft.)
Downstream point elevation =   146.000(Ft.)
Channel length thru subarea  =   700.000(Ft.)
Channel base width       =    5.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      6.441(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      6.441(CFS)
Depth of flow =   0.178(Ft.), Average velocity =   7.003(Ft/s)
Channel flow top width =    5.355(Ft.)
Flow Velocity =    7.00(Ft/s)
```



```
Travel time  =    1.67 min.
Time of concentration =    7.76 min.
Critical depth =      0.363(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.701(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      5.280(CFS) for    3.170(Ac.)
Total runoff =      8.312(CFS)  Total area =        4.58(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      309.000 to Point/Station      310.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      4.580(Ac.)
Runoff from this stream =      8.312(CFS)
Time of concentration =    7.76 min.
Rainfall intensity =     3.701(In/Hr)
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      130.137     17.17                 2.753
2        8.312      7.76                 3.701
Qmax(1) =
           1.000 *    1.000 *   130.137) +
           0.744 *    1.000 *     8.312) + =     136.319
Qmax(2) =
           1.000 *    0.452 *   130.137) +
           1.000 *    1.000 *     8.312) + =      67.109

Total of 2 streams to confluence:
Flow rates before confluence point:
     130.137       8.312
Maximum flow rates at confluence using above data:
      136.319       67.109
Area of streams before confluence:
       68.380        4.580
Results of confluence:
Total flow rate =    136.319(CFS)
Time of concentration =    17.172 min.
Effective stream area after confluence =     72.960(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      310.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Time of concentration =    17.17 min.
Rainfall intensity =      2.753(In/Hr) for a   100.0 year storm
```

```
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.487(CFS) for    1.200(Ac.)
Total runoff =    137.806(CFS)  Total area =       74.16(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      313.000 to Point/Station      310.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Time of concentration =    17.17 min.
Rainfall intensity =      2.753(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =      1.454(CFS) for    0.960(Ac.)
Total runoff =    139.260(CFS)  Total area =       75.12(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      300.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------
Upstream point elevation =   146.000(Ft.)
Downstream point elevation =   144.000(Ft.)
Channel length thru subarea  =    58.000(Ft.)
Channel base width       =   20.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =    139.260(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =    139.260(CFS)
Depth of flow =   0.554(Ft.), Average velocity =  11.903(Ft/s)
Channel flow top width =   22.217(Ft.)
Flow Velocity =   11.90(Ft/s)
Travel time  =    0.08 min.
Time of concentration =   17.25 min.
Critical depth =      1.109(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.748(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.000(CFS) for    0.000(Ac.)
Total runoff =    139.260(CFS)  Total area =       75.12(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      300.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Time of concentration =    17.25 min.
```



```
Rainfall intensity =      2.748(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =      4.020(CFS) for    2.660(Ac.)
Total runoff =    143.280(CFS)  Total area =       77.78(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      300.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     77.780(Ac.)
Runoff from this stream =    143.280(CFS)
Time of concentration =   17.25 min.
Rainfall intensity =     2.748(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      311.000 to Point/Station      312.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                       ]
Initial subarea flow distance  =  179.000(Ft.)
Highest elevation =  210.000(Ft.)
Lowest elevation =  200.000(Ft.)
Elevation difference =   10.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.04 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*( 179.000^.5)/(   5.587^(1/3)]=   2.04
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      0.876(CFS)
Total initial stream area =        0.210(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      312.000 to Point/Station      319.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of street segment elevation =   200.000(Ft.)
End of street segment elevation =   164.000(Ft.)
Length of street segment  =  1182.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.063
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0170
 Manning's N from gutter to grade break =  0.0170
 Manning's N from grade break to crown =  0.0170
Estimated mean flow rate at midpoint of street =     3.732(CFS)
Depth of flow =   0.322(Ft.), Average velocity =   3.442(Ft/s)
```

```
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   9.785(Ft.)
Flow velocity =   3.44(Ft/s)
Travel time =    5.72 min.     TC =   10.72  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                    ]
Rainfall intensity =      3.290(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      4.282(CFS) for    1.370(Ac.)
Total runoff =      5.157(CFS)  Total area =        1.58(Ac.)
Street flow at end of street =      5.157(CFS)
Half street flow at end of street =      5.157(CFS)
Depth of flow =   0.352(Ft.), Average velocity =   3.708(Ft/s)
Flow width (from curb towards crown)=  11.243(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      319.000 to Point/Station      300.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.580(Ac.)
Runoff from this stream =      5.157(CFS)
Time of concentration =   10.72 min.
Rainfall intensity =     3.290(In/Hr)
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1      143.280     17.25                2.748
2        5.157     10.72                3.290
Qmax(1) =
           1.000 *    1.000 *   143.280) +
           0.835 *    1.000 *     5.157) + =     147.588
Qmax(2) =
           1.000 *    0.622 *   143.280) +
           1.000 *    1.000 *     5.157) + =      94.210

Total of 2 streams to confluence:
Flow rates before confluence point:
     143.280       5.157
Maximum flow rates at confluence using above data:
      147.588       94.210
Area of streams before confluence:
       77.780        1.580
Results of confluence:
Total flow rate =    147.588(CFS)
Time of concentration =    17.253 min.
Effective stream area after confluence =     79.360(Ac.)
End of computations, total study area =          79.360 (Ac.)
```

APPENDIX 3

Proposed Conditions Rational Method Computer Output

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 11/20/17
--------------------------------------------------------------------------
PROJECT HILLTOP
PROPOSED CONDITIONS
3000P100


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********
--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3011.000 to Point/Station     3012.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                    ]
Initial subarea flow distance  =   70.000(Ft.)
Highest elevation =  170.000(Ft.)
Lowest elevation =  168.000(Ft.)
Elevation difference =    2.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.65 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8500)*(  70.000^.5)/(   2.857^(1/3)]=   2.65
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =      0.672(CFS)
Total initial stream area =       0.180(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3012.000 to Point/Station     3013.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
```



```
Upstream point/station elevation =   168.000(Ft.)
Downstream point/station elevation =   162.000(Ft.)
Pipe length  =    40.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.672(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.672(CFS)
Normal flow depth in pipe =    2.29(In.)
Flow top width inside pipe =    5.83(In.)
Critical Depth =    4.97(In.)
Pipe flow velocity =      9.75(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =     5.07 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3010.000 to Point/Station     3013.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                    ]
Time of concentration =     5.07 min.
Rainfall intensity =      4.365(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =      2.560(CFS) for    0.690(Ac.)
Total runoff =      3.231(CFS)  Total area =       0.87(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3013.000 to Point/Station     3035.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   162.000(Ft.)
Downstream point/station elevation =   158.500(Ft.)
Pipe length  =    63.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.231(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.231(CFS)
Normal flow depth in pipe =    6.25(In.)
Flow top width inside pipe =    8.29(In.)
Critical depth could not be calculated.
Pipe flow velocity =      9.87(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =     5.17 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3013.000 to Point/Station     3035.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      0.870(Ac.)
Runoff from this stream =      3.231(CFS)
Time of concentration =    5.17 min.
Rainfall intensity =     4.328(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3016.000 to Point/Station     3017.000
```

```
**** INITIAL AREA EVALUATION ****
-------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MULTI - UNITS area type                    ]
Initial subarea flow distance  =   24.000(Ft.)
Highest elevation =  190.000(Ft.)
Lowest elevation =  183.000(Ft.)
Elevation difference =    7.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     1.15 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7000)*(  24.000^.5)/(  29.167^(1/3)]=   1.15
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.700
Subarea runoff =      0.061(CFS)
Total initial stream area =        0.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3017.000 to Point/Station     3018.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
-------------------------------------------------------------------------------
Top of street segment elevation =   183.000(Ft.)
End of street segment elevation =   177.500(Ft.)
Length of street segment  =   291.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      0.082(CFS)
Depth of flow =   0.070(Ft.), Average velocity =   1.384(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   2.000(Ft.)
Flow velocity =   1.38(Ft/s)
Travel time =    3.50 min.     TC =    8.50  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MULTI - UNITS area type                    ]
Rainfall intensity =      3.579(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.700
Subarea runoff =      1.703(CFS) for    0.680(Ac.)
Total runoff =      1.765(CFS)  Total area =       0.70(Ac.)
Street flow at end of street =      1.765(CFS)
Half street flow at end of street =      0.882(CFS)
Depth of flow =   0.226(Ft.), Average velocity =   2.354(Ft/s)
Flow width (from curb towards crown)=   4.981(Ft.)
```



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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3036.000 to Point/Station     3018.000
**** SUBAREA FLOW ADDITION ****
-------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Time of concentration =     8.50 min.
Rainfall intensity =      3.579(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =      1.732(CFS) for    0.880(Ac.)
Total runoff =      3.497(CFS)  Total area =       1.58(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3018.000 to Point/Station     3021.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
-------------------------------------------------------------------------------
Upstream point/station elevation =   177.000(Ft.)
Downstream point/station elevation =   174.000(Ft.)
Pipe length  =   100.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.497(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.497(CFS)
Normal flow depth in pipe =     6.47(In.)
Flow top width inside pipe =   11.96(In.)
Critical Depth =    9.59(In.)
Pipe flow velocity =      8.10(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =     8.71 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3018.000 to Point/Station     3021.000
**** SUBAREA FLOW ADDITION ****
-------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                       ]
Time of concentration =     8.71 min.
Rainfall intensity =      3.547(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      0.270(CFS) for    0.080(Ac.)
Total runoff =      3.766(CFS)  Total area =       1.66(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3021.000 to Point/Station     3022.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
-------------------------------------------------------------------------------
Upstream point/station elevation =   174.000(Ft.)
Downstream point/station elevation =   173.500(Ft.)
Pipe length  =    24.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.766(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.766(CFS)
Normal flow depth in pipe =     7.63(In.)
Flow top width inside pipe =   11.55(In.)
```

```
Critical Depth =    9.91(In.)
Pipe flow velocity =      7.15(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =     8.77 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3020.000 to Point/Station     3022.000
**** SUBAREA FLOW ADDITION ****

----------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Time of concentration =     8.77 min.
Rainfall intensity =      3.539(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =      0.584(CFS) for    0.300(Ac.)
Total runoff =      4.350(CFS)  Total area =        1.96(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3022.000 to Point/Station     3038.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

----------------------------------------------------------------------------
Upstream point/station elevation =   173.500(Ft.)
Downstream point/station elevation =   168.140(Ft.)
Pipe length  =   150.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.350(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.350(CFS)
Normal flow depth in pipe =    7.02(In.)
Flow top width inside pipe =   11.83(In.)
Critical Depth =   10.51(In.)
Pipe flow velocity =      9.12(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =     9.04 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3037.000 to Point/Station     3038.000
**** SUBAREA FLOW ADDITION ****

----------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Time of concentration =     9.04 min.
Rainfall intensity =      3.500(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =      0.481(CFS) for    0.250(Ac.)
Total runoff =      4.832(CFS)  Total area =        2.21(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3038.000 to Point/Station     3025.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

----------------------------------------------------------------------------
Upstream point/station elevation =   168.140(Ft.)
Downstream point/station elevation =   165.500(Ft.)
Pipe length  =    57.20(Ft.)   Manning's N = 0.013
```



```
No. of pipes = 1  Required pipe flow  =     4.832(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.832(CFS)
Normal flow depth in pipe =    6.91(In.)
Flow top width inside pipe =   11.86(In.)
Critical Depth =   10.88(In.)
Pipe flow velocity =     10.31(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =     9.13 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3023.000 to Point/Station     3025.000
**** SUBAREA FLOW ADDITION ****

----------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MULTI - UNITS area type                    ]
Time of concentration =     9.13 min.
Rainfall intensity =      3.487(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.700
Subarea runoff =      2.490(CFS) for    1.020(Ac.)
Total runoff =      7.321(CFS)  Total area =        3.23(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3025.000 to Point/Station     3026.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

----------------------------------------------------------------------------
Upstream point/station elevation =   165.500(Ft.)
Downstream point/station elevation =   165.000(Ft.)
Pipe length  =    25.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.321(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     7.321(CFS)
Normal flow depth in pipe =   10.16(In.)
Flow top width inside pipe =   14.02(In.)
Critical Depth =   12.95(In.)
Pipe flow velocity =      8.27(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =     9.18 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3024.000 to Point/Station     3026.000
**** SUBAREA FLOW ADDITION ****

----------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                       ]
Time of concentration =     9.18 min.
Rainfall intensity =      3.480(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      0.529(CFS) for    0.160(Ac.)
Total runoff =      7.850(CFS)  Total area =        3.39(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3026.000 to Point/Station     3030.000
```

```
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   165.000(Ft.)
Downstream point/station elevation =   164.500(Ft.)
Pipe length  =    37.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.850(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     7.850(CFS)
Normal flow depth in pipe =   10.50(In.)
Flow top width inside pipe =   17.75(In.)
Critical Depth =   13.02(In.)
Pipe flow velocity =      7.34(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =     9.27 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3026.000 to Point/Station     3030.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      3.390(Ac.)
Runoff from this stream =      7.850(CFS)
Time of concentration =    9.27 min.
Rainfall intensity =     3.468(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3027.000 to Point/Station     3028.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Initial subarea flow distance  =   30.000(Ft.)
Highest elevation =  182.000(Ft.)
Lowest elevation =  172.000(Ft.)
Elevation difference =   10.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     1.68 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.5500)*(  30.000^.5)/(  33.333^(1/3)]=   1.68
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.550
Subarea runoff =      0.072(CFS)
Total initial stream area =        0.030(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3028.000 to Point/Station     3029.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =   172.000(Ft.)
End of street segment elevation =   164.800(Ft.)
Length of street segment  =   174.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
```



```
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      0.094(CFS)
Depth of flow =   0.064(Ft.), Average velocity =   1.918(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   2.000(Ft.)
Flow velocity =   1.92(Ft/s)
Travel time =    1.51 min.     TC =    6.51  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Rainfall intensity =      3.953(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =      1.283(CFS) for    0.590(Ac.)
Total runoff =      1.355(CFS)  Total area =        0.62(Ac.)
Street flow at end of street =      1.355(CFS)
Half street flow at end of street =      0.678(CFS)
Depth of flow =   0.181(Ft.), Average velocity =   3.393(Ft/s)
Flow width (from curb towards crown)=   2.703(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3029.000 to Point/Station     3030.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   164.800(Ft.)
Downstream point/station elevation =   164.000(Ft.)
Pipe length  =    60.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.355(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.355(CFS)
Normal flow depth in pipe =    5.60(In.)
Flow top width inside pipe =    8.73(In.)
Critical Depth =    6.43(In.)
Pipe flow velocity =      4.69(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =     6.73 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3029.000 to Point/Station     3030.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.620(Ac.)
Runoff from this stream =      1.355(CFS)
Time of concentration =    6.73 min.
Rainfall intensity =     3.905(In/Hr)
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)
```

```
1        7.850      9.27                3.468
2        1.355      6.73                3.905
Qmax(1) =
          1.000 *    1.000 *     7.850) +
          0.888 *    1.000 *     1.355) + =       9.054
Qmax(2) =
          1.000 *    0.726 *     7.850) +
          1.000 *    1.000 *     1.355) + =       7.052

Total of 2 streams to confluence:
Flow rates before confluence point:
      7.850       1.355
Maximum flow rates at confluence using above data:
      9.054       7.052
Area of streams before confluence:
      3.390       0.620
Results of confluence:
Total flow rate =      9.054(CFS)
Time of concentration =     9.267 min.
Effective stream area after confluence =      4.010(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3030.000 to Point/Station     3031.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   164.000(Ft.)
Downstream point/station elevation =   162.500(Ft.)
Pipe length  =   124.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.054(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     9.054(CFS)
Normal flow depth in pipe =   12.00(In.)
Flow top width inside pipe =   16.97(In.)
Critical Depth =   13.96(In.)
Pipe flow velocity =      7.24(Ft/s)
Travel time through pipe =    0.29 min.
Time of concentration (TC) =     9.55 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3030.000 to Point/Station     3031.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MULTI - UNITS area type                    ]
Time of concentration =     9.55 min.
Rainfall intensity =      3.430(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.700
Subarea runoff =      1.033(CFS) for    0.430(Ac.)
Total runoff =     10.086(CFS)  Total area =        4.44(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3031.000 to Point/Station     3035.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   162.500(Ft.)
Downstream point/station elevation =   158.500(Ft.)
Pipe length  =    56.00(Ft.)   Manning's N = 0.013
```



```
No. of pipes = 1  Required pipe flow  =    10.086(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    10.086(CFS)
Normal flow depth in pipe =    8.24(In.)
Flow top width inside pipe =   14.93(In.)
Critical Depth =   14.23(In.)
Pipe flow velocity =     14.61(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =     9.62 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3033.000 to Point/Station     3035.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MULTI - UNITS area type                    ]
Time of concentration =     9.62 min.
Rainfall intensity =      3.422(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.700
Subarea runoff =      0.287(CFS) for    0.120(Ac.)
Total runoff =     10.374(CFS)  Total area =        4.56(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3032.000 to Point/Station     3035.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Time of concentration =     9.62 min.
Rainfall intensity =      3.422(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.170(CFS) for    0.760(Ac.)
Total runoff =     11.544(CFS)  Total area =        5.32(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3032.000 to Point/Station     3035.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.320(Ac.)
Runoff from this stream =     11.544(CFS)
Time of concentration =    9.62 min.
Rainfall intensity =     3.422(In/Hr)
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        3.231      5.17                4.328
2       11.544      9.62                3.422
Qmax(1) =
          1.000 *    1.000 *     3.231) +
```

```
          1.000 *    0.538 *    11.544) + =       9.443
Qmax(2) =
          0.791 *    1.000 *     3.231) +
          1.000 *    1.000 *    11.544) + =      14.099

Total of 2 main streams to confluence:
Flow rates before confluence point:
      3.231      11.544
Maximum flow rates at confluence using above data:
      9.443      14.099
Area of streams before confluence:
      0.870       5.320


Results of confluence:
Total flow rate =     14.099(CFS)
Time of concentration =     9.617 min.
Effective stream area after confluence  =      6.190(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3035.000 to Point/Station     3040.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   158.000(Ft.)
Downstream point/station elevation =   157.000(Ft.)
Pipe length  =    44.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    14.099(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    14.099(CFS)
Normal flow depth in pipe =   13.23(In.)
Flow top width inside pipe =   15.89(In.)
Critical Depth =   16.61(In.)
Pipe flow velocity =     10.13(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =     9.69 min.
End of computations, total study area =          6.190 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/19/17
------------------------------------------------------------------------
PROJECT HILLTOP
PROPOSED CONDITIONS
4000P100


------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

------------------------------------------------------------------------


Program License Serial Number 4049

------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     4004.000 to Point/Station     4005.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                    ]
Initial subarea flow distance  =  113.000(Ft.)
Highest elevation =  188.000(Ft.)
Lowest elevation =  180.000(Ft.)
Elevation difference =    8.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.49 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8500)*( 113.000^.5)/(   7.080^(1/3)]=   2.49
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =       0.560(CFS)
Total initial stream area =        0.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     4005.000 to Point/Station     4006.000
```



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**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =   180.000(Ft.)
End of street segment elevation =   175.500(Ft.)
Length of street segment  =   242.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  26.000(Ft.)
Distance from crown to crossfall grade break  =  10.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      1.399(CFS)
Depth of flow =   0.245(Ft.), Average velocity =   2.200(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   7.515(Ft.)
Flow velocity =   2.20(Ft/s)
Travel time =    1.83 min.     TC =    6.83  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                    ]
Rainfall intensity =      3.882(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =      1.485(CFS) for    0.450(Ac.)
Total runoff =      2.044(CFS)  Total area =        0.60(Ac.)
Street flow at end of street =      2.044(CFS)
Half street flow at end of street =      2.044(CFS)
Depth of flow =   0.272(Ft.), Average velocity =   2.393(Ft/s)
Flow width (from curb towards crown)=   8.849(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     4006.000 to Point/Station     4006.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                    ]
Time of concentration =     6.83 min.
Rainfall intensity =      3.882(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =      2.969(CFS) for    0.900(Ac.)
Total runoff =      5.014(CFS)  Total area =        1.50(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     4006.000 to Point/Station     4007.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   175.200(Ft.)
```

```
Downstream point/station elevation =   173.500(Ft.)
Pipe length  =    83.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.014(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     5.014(CFS)
Normal flow depth in pipe =    9.66(In.)
Flow top width inside pipe =    9.51(In.)
Critical Depth =   11.02(In.)
Pipe flow velocity =      7.40(Ft/s)
Travel time through pipe =    0.19 min.
Time of concentration (TC) =     7.02 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     4007.000 to Point/Station     4007.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                    ]
Time of concentration =     7.02 min.
Rainfall intensity =      3.842(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =      0.849(CFS) for    0.260(Ac.)
Total runoff =      5.863(CFS)  Total area =        1.76(Ac.)
End of computations, total study area =          1.760 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/19/17
--------------------------------------------------------------------------
PROJECT HILLTOP
PROPOSED CONDITIONS
2000P100 WITH USER DEFINED INPUTS FROM OTHER SYSTEMS
WITH DETENTION
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2001.000 to Point/Station     2002.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                        ]
Initial subarea flow distance  =   58.000(Ft.)
Highest elevation =  181.200(Ft.)
Lowest elevation =  179.400(Ft.)
Elevation difference =    1.800(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.35 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8500)*(  58.000^.5)/(   3.103^(1/3)]=   2.35
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =      0.187(CFS)
Total initial stream area =        0.050(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2002.000 to Point/Station     2003.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
```



```
--------------------------------------------------------------------------
Top of street segment elevation =   179.400(Ft.)
End of street segment elevation =   176.500(Ft.)
Length of street segment  =   198.000(Ft.)
Height of curb above gutter flowline  =     6.0(In.)
Width of half street (curb to crown)  =  26.000(Ft.)
Distance from crown to crossfall grade break  =  10.000(Ft.)
Slope from gutter to grade break (v/hz) =    0.020
Slope from grade break to crown (v/hz)  =    0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =    0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      0.226(CFS)
Depth of flow =   0.151(Ft.), Average velocity =   1.501(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   2.812(Ft.)
Flow velocity =   1.50(Ft/s)
Travel time =    2.20 min.     TC =    7.20  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                        ]
Rainfall intensity =      3.806(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.850
Subarea runoff =      1.359(CFS) for    0.420(Ac.)
Total runoff =      1.545(CFS)  Total area =        0.47(Ac.)
Street flow at end of street =      1.545(CFS)
Half street flow at end of street =      1.545(CFS)
Depth of flow =   0.260(Ft.), Average velocity =   2.049(Ft/s)
Flow width (from curb towards crown)=   8.265(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.000 to Point/Station     2000.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
--------------------------------------------------------------------------
Upstream point/station elevation =   176.000(Ft.)
Downstream point/station elevation =   163.000(Ft.)
Pipe length  =    36.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.545(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     1.545(CFS)
Normal flow depth in pipe =    2.85(In.)
Flow top width inside pipe =    5.99(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.80(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     7.23 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.000 to Point/Station     2000.000
**** CONFLUENCE OF MINOR STREAMS ****
--------------------------------------------------------------------------
```

```
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.470(Ac.)
Runoff from this stream =      1.545(CFS)
Time of concentration =    7.23 min.
Rainfall intensity =     3.799(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1019.000 to Point/Station     2000.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------
User specified 'C' value of 0.690 given for subarea
Rainfall intensity (I) =      2.833(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  16.00 min.  Rain intensity =       2.83(In/Hr)
Total area =       63.890(Ac.)  Total runoff =   124.500(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1019.000 to Point/Station     2000.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     63.890(Ac.)
Runoff from this stream =    124.500(CFS)
Time of concentration =   16.00 min.
Rainfall intensity =     2.833(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        1.545      7.23                  3.799
2      124.500     16.00                  2.833
Qmax(1) =
           1.000 *    1.000 *     1.545) +
           1.000 *    0.452 *   124.500) + =      57.832
Qmax(2) =
           0.746 *    1.000 *     1.545) +
           1.000 *    1.000 *   124.500) + =     125.652

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.545     124.500
Maximum flow rates at confluence using above data:
       57.832      125.652
Area of streams before confluence:
       0.470       63.890
Results of confluence:
Total flow rate =     125.652(CFS)
Time of concentration =    16.000 min.
Effective stream area after confluence =     64.360(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2000.000 to Point/Station     4009.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   163.000(Ft.)
Downstream point elevation =   157.900(Ft.)
```



```
Channel length thru subarea  =   506.000(Ft.)
Channel base width       =   20.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =    126.638(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =    126.638(CFS)
Depth of flow =   1.136(Ft.), Average velocity =   5.003(Ft/s)
Channel flow top width =   24.546(Ft.)
Flow Velocity =    5.00(Ft/s)
Travel time  =    1.69 min.
Time of concentration =   17.69 min.
Critical depth =      1.039(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.720(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.236(CFS) for    1.010(Ac.)
Total runoff =    126.888(CFS)  Total area =       65.37(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2000.000 to Point/Station     4009.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     65.370(Ac.)
Runoff from this stream =    126.888(CFS)
Time of concentration =   17.69 min.
Rainfall intensity =     2.720(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     4007.000 to Point/Station     4009.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                  ]
Rainfall intensity (I) =      3.842(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =   7.02 min.  Rain intensity =       3.84(In/Hr)
Total area =       1.760(Ac.)  Total runoff =     1.700(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     4007.000 to Point/Station     4009.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.760(Ac.)
Runoff from this stream =      1.700(CFS)
Time of concentration =    7.02 min.
Rainfall intensity =     3.842(In/Hr)
```

```
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       126.888     17.69                 2.720
2         1.700      7.02                 3.842
Qmax(1) =
           1.000 *    1.000 *   126.888) +
           0.708 *    1.000 *     1.700) + =     128.092
Qmax(2) =
           1.000 *    0.397 *   126.888) +
           1.000 *    1.000 *     1.700) + =      52.066

Total of 2 streams to confluence:
Flow rates before confluence point:
     126.888       1.700
Maximum flow rates at confluence using above data:
      128.092       52.066
Area of streams before confluence:
       65.370        1.760
Results of confluence:
Total flow rate =    128.092(CFS)
Time of concentration =    17.686 min.
Effective stream area after confluence =     67.130(Ac.)


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Process from Point/Station     4009.000 to Point/Station     2046.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   157.900(Ft.)
Downstream point elevation =   155.800(Ft.)
Channel length thru subarea  =   203.000(Ft.)
Channel base width       =   20.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =    128.330(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =    128.330(CFS)
Depth of flow =   1.137(Ft.), Average velocity =   5.069(Ft/s)
Channel flow top width =   24.546(Ft.)
Flow Velocity =    5.07(Ft/s)
Travel time  =    0.67 min.
Time of concentration =   18.35 min.
Critical depth =      1.047(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.678(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.301(CFS) for    0.250(Ac.)
Total runoff =    128.393(CFS)  Total area =       67.38(Ac.)


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Process from Point/Station     2046.000 to Point/Station     2047.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   155.000(Ft.)
Downstream point/station elevation =   146.670(Ft.)
Pipe length  =    74.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   128.393(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =   128.393(CFS)
Normal flow depth in pipe =   22.97(In.)
Flow top width inside pipe =   25.42(In.)
Critical depth could not be calculated.
Pipe flow velocity =     31.86(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    18.39 min.


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Process from Point/Station     2046.000 to Point/Station     2047.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     67.380(Ac.)
Runoff from this stream =    128.393(CFS)
Time of concentration =   18.39 min.
Rainfall intensity =     2.676(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2036.000 to Point/Station     2037.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                ]
Initial subarea flow distance  =   73.000(Ft.)
Highest elevation =  164.700(Ft.)
Lowest elevation =  163.300(Ft.)
Elevation difference =    1.400(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     1.86 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*(  73.000^.5)/(   1.918^(1/3)]=   1.86
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      0.250(CFS)
Total initial stream area =        0.060(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2037.000 to Point/Station     2040.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =   163.300(Ft.)
End of street segment elevation =   156.000(Ft.)
Length of street segment  =   270.000(Ft.)
```

```
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  10.000(Ft.)
Slope from gutter to grade break (v/hz) =    0.020
Slope from grade break to crown (v/hz)  =    0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  14.000(Ft.)
Slope from curb to property line (v/hz) =    0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      0.286(CFS)
Depth of flow =   0.147(Ft.), Average velocity =   2.050(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   2.617(Ft.)
Flow velocity =   2.05(Ft/s)
Travel time =    2.20 min.      TC =    7.20  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                    ]
Rainfall intensity =      3.807(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      1.049(CFS) for    0.290(Ac.)
Total runoff =      1.299(CFS)  Total area =        0.35(Ac.)
Street flow at end of street =      1.299(CFS)
Half street flow at end of street =      1.299(CFS)
Depth of flow =   0.229(Ft.), Average velocity =   2.509(Ft/s)
Flow width (from curb towards crown)=   6.682(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2040.000 to Point/Station     2040.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                    ]
Time of concentration =     7.20 min.
Rainfall intensity =      3.807(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      1.013(CFS) for    0.280(Ac.)
Total runoff =      2.311(CFS)  Total area =        0.63(Ac.)


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Process from Point/Station     2037.000 to Point/Station     2040.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      0.630(Ac.)
Runoff from this stream =      2.311(CFS)
Time of concentration =    7.20 min.
Rainfall intensity =     3.807(In/Hr)
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Process from Point/Station     3035.000 to Point/Station     2040.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                 ]
Rainfall intensity (I) =      3.381(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =   9.94 min.  Rain intensity =       3.38(In/Hr)
Total area =       5.060(Ac.)  Total runoff =      4.700(CFS)


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Process from Point/Station     3035.000 to Point/Station     2040.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      5.060(Ac.)
Runoff from this stream =      4.700(CFS)
Time of concentration =    9.94 min.
Rainfall intensity =     3.381(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        2.311      7.20                  3.807
2        4.700      9.94                  3.381
Qmax(1) =
           1.000 *    1.000 *     2.311) +
           1.000 *    0.724 *     4.700) + =       5.714
Qmax(2) =
           0.888 *    1.000 *     2.311) +
           1.000 *    1.000 *     4.700) + =       6.753

Total of 2 streams to confluence:
Flow rates before confluence point:
       2.311       4.700
Maximum flow rates at confluence using above data:
       5.714       6.753
Area of streams before confluence:
       0.630       5.060
Results of confluence:
Total flow rate =      6.753(CFS)
Time of concentration =     9.940 min.
Effective stream area after confluence =      5.690(Ac.)


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Process from Point/Station     2040.000 to Point/Station     2045.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   157.000(Ft.)
Downstream point/station elevation =   156.000(Ft.)
Pipe length  =    13.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.753(CFS)
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Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     6.753(CFS)
Normal flow depth in pipe =    7.28(In.)
Flow top width inside pipe =   11.72(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.54(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     9.96 min.


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Process from Point/Station     3040.000 to Point/Station     3045.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      5.690(Ac.)
Runoff from this stream =      6.753(CFS)
Time of concentration =    9.96 min.
Rainfall intensity =     3.380(In/Hr)


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Process from Point/Station     2041.000 to Point/Station     2042.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                  ]
Initial subarea flow distance  =   66.000(Ft.)
Highest elevation =  166.000(Ft.)
Lowest elevation =  164.000(Ft.)
Elevation difference =    2.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     1.52 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*(  66.000^.5)/(   3.030^(1/3)]=   1.52
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      0.125(CFS)
Total initial stream area =        0.030(Ac.)


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Process from Point/Station     2042.000 to Point/Station     2044.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of street segment elevation =   164.000(Ft.)
End of street segment elevation =   156.000(Ft.)
Length of street segment  =   198.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  26.000(Ft.)
Distance from crown to crossfall grade break  =  10.000(Ft.)
Slope from gutter to grade break (v/hz) =    0.020
Slope from grade break to crown (v/hz)  =    0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =    0.020
Gutter width =   1.500(Ft.)
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Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      0.138(CFS)
Depth of flow =   0.096(Ft.), Average velocity =   2.488(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   1.500(Ft.)
Flow velocity =   2.49(Ft/s)
Travel time =    1.33 min.     TC =    6.33  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                  ]
Rainfall intensity =      3.998(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      0.760(CFS) for    0.200(Ac.)
Total runoff =      0.885(CFS)  Total area =        0.23(Ac.)
Street flow at end of street =      0.885(CFS)
Half street flow at end of street =      0.885(CFS)
Depth of flow =   0.195(Ft.), Average velocity =   2.737(Ft/s)
Flow width (from curb towards crown)=   5.020(Ft.)


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Process from Point/Station     2043.000 to Point/Station     2044.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                  ]
Time of concentration =     6.33 min.
Rainfall intensity =      3.998(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =      8.903(CFS) for    2.620(Ac.)
Total runoff =      9.787(CFS)  Total area =        2.85(Ac.)


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Process from Point/Station     2044.000 to Point/Station     2045.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   156.000(Ft.)
Downstream point/station elevation =   155.500(Ft.)
Pipe length  =    24.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.787(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     9.787(CFS)
Normal flow depth in pipe =   10.52(In.)
Flow top width inside pipe =   17.74(In.)
Critical Depth =   14.48(In.)
Pipe flow velocity =      9.12(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     6.37 min.


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Process from Point/Station     2044.000 to Point/Station     2045.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =       2.850(Ac.)
Runoff from this stream =       9.787(CFS)
Time of concentration =     6.37 min.
Rainfall intensity =      3.987(In/Hr)


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Process from Point/Station     2038.000 to Point/Station     2039.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Initial subarea flow distance  =  109.000(Ft.)
Highest elevation =  178.000(Ft.)
Lowest elevation =  172.000(Ft.)
Elevation difference =    6.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =      5.85 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.5500)*( 109.000^.5)/( 5.505^(1/3)]=   5.85
Rainfall intensity (I) =       4.120(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.550
Subarea runoff =       0.340(CFS)
Total initial stream area =        0.150(Ac.)


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Process from Point/Station     2039.000 to Point/Station     2004.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =   172.000(Ft.)
End of street segment elevation =   166.000(Ft.)
Length of street segment  =   290.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  10.000(Ft.)
Slope from gutter to grade break (v/hz) =    0.020
Slope from grade break to crown (v/hz)  =    0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  14.000(Ft.)
Slope from curb to property line (v/hz) =    0.020
Gutter width =    1.500(Ft.)
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =       1.054(CFS)
Depth of flow =   0.224(Ft.), Average velocity =   2.161(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   6.453(Ft.)
Flow velocity =   2.16(Ft/s)
Travel time =    2.24 min.     TC =    8.09  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
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Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Rainfall intensity =      3.645(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =      1.263(CFS) for    0.630(Ac.)
Total runoff =      1.603(CFS)  Total area =        0.78(Ac.)
Street flow at end of street =      1.603(CFS)
Half street flow at end of street =      1.603(CFS)
Depth of flow =   0.251(Ft.), Average velocity =   2.363(Ft/s)
Flow width (from curb towards crown)=   7.792(Ft.)


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Process from Point/Station     2004.000 to Point/Station     2045.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 3
Stream flow area =       0.780(Ac.)
Runoff from this stream =       1.603(CFS)
Time of concentration =     8.09 min.
Rainfall intensity =      3.645(In/Hr)
Summary of stream data:

Stream    Flow rate       TC             Rainfall Intensity
 No.        (CFS)        (min)                  (In/Hr)


1         6.753       9.96                  3.380
2         9.787       6.37                  3.987
3         1.603       8.09                  3.645
Qmax(1) =
            1.000 *     1.000 *     6.753) +
            0.848 *     1.000 *     9.787) +
            0.927 *     1.000 *     1.603) + =       16.536
Qmax(2) =
            1.000 *     0.640 *     6.753) +
            1.000 *     1.000 *     9.787) +
            1.000 *     0.787 *     1.603) + =       15.370
Qmax(3) =
            1.000 *     0.813 *     6.753) +
            0.914 *     1.000 *     9.787) +
            1.000 *     1.000 *     1.603) + =       16.037

Total of 3 streams to confluence:
Flow rates before confluence point:
       6.753       9.787       1.603
Maximum flow rates at confluence using above data:
      16.536      15.370      16.037
Area of streams before confluence:
       5.690       2.850       0.780
Results of confluence:
Total flow rate =      16.536(CFS)
Time of concentration =      9.956 min.
Effective stream area after confluence =       9.320(Ac.)


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Process from Point/Station     2045.000 to Point/Station     2047.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =   155.500(Ft.)
Downstream point/station elevation =   155.000(Ft.)
Pipe length  =    24.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.536(CFS)
Nearest computed pipe diameter  =    21.00(In.)
Calculated individual pipe flow  =    16.536(CFS)
Normal flow depth in pipe =   13.23(In.)
Flow top width inside pipe =   20.28(In.)
Critical Depth =   17.93(In.)
Pipe flow velocity =    10.36(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    9.99 min.


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Process from Point/Station     2045.000 to Point/Station     2047.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      9.320(Ac.)
Runoff from this stream =     16.536(CFS)
Time of concentration =    9.99 min.
Rainfall intensity =     3.375(In/Hr)
Program is now starting with Main Stream No. 3


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Process from Point/Station     2048.000 to Point/Station     2049.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                    ]
Initial subarea flow distance  =  179.000(Ft.)
Highest elevation =  210.000(Ft.)
Lowest elevation =  200.000(Ft.)
Elevation difference =   10.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.04 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*( 179.000^.5)/(   5.587^(1/3)]=   2.04
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      0.876(CFS)
Total initial stream area =        0.210(Ac.)


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Process from Point/Station     2049.000 to Point/Station     2050.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of street segment elevation =   200.000(Ft.)
End of street segment elevation =   167.000(Ft.)
Length of street segment  =  1074.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  26.000(Ft.)
```



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Distance from crown to crossfall grade break  =  10.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  14.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      3.669(CFS)
Depth of flow =   0.298(Ft.), Average velocity =   3.320(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.168(Ft.)
Flow velocity =   3.32(Ft/s)
Travel time =    5.39 min.     TC =   10.39  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                    ]
Rainfall intensity =      3.328(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      4.236(CFS) for    1.340(Ac.)
Total runoff =      5.112(CFS)  Total area =        1.55(Ac.)
Street flow at end of street =      5.112(CFS)
Half street flow at end of street =      5.112(CFS)
Depth of flow =   0.328(Ft.), Average velocity =   3.587(Ft/s)
Flow width (from curb towards crown)=  11.635(Ft.)


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Process from Point/Station     2050.000 to Point/Station     2047.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   160.000(Ft.)
Downstream point/station elevation =   155.000(Ft.)
Pipe length  =   226.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.112(CFS)
Nearest computed pipe diameter  =    12.00(In.)
Calculated individual pipe flow  =     5.112(CFS)
Normal flow depth in pipe =    9.47(In.)
Flow top width inside pipe =    9.79(In.)
Critical Depth =   11.07(In.)
Pipe flow velocity =      7.69(Ft/s)
Travel time through pipe =    0.49 min.
Time of concentration (TC) =    10.88 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2050.000 to Point/Station     2047.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      1.550(Ac.)
Runoff from this stream =      5.112(CFS)
Time of concentration =   10.88 min.
Rainfall intensity =     3.273(In/Hr)
```

```
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      128.393     18.39                2.676
2       16.536      9.99                3.375
3        5.112     10.88                3.273
Qmax(1) =
           1.000 *    1.000 *   128.393) +
           0.793 *    1.000 *    16.536) +
           0.818 *    1.000 *     5.112) + =     145.684
Qmax(2) =
           1.000 *    0.543 *   128.393) +
           1.000 *    1.000 *    16.536) +
           1.000 *    0.918 *     5.112) + =      91.003
Qmax(3) =
           1.000 *    0.592 *   128.393) +
           0.970 *    1.000 *    16.536) +
           1.000 *    1.000 *     5.112) + =      97.112

Total of 3 main streams to confluence:
Flow rates before confluence point:
     128.393      16.536       5.112
Maximum flow rates at confluence using above data:
      145.684       91.003       97.112
Area of streams before confluence:
       67.380        9.320        1.550


Results of confluence:
Total flow rate =    145.684(CFS)
Time of concentration =    18.392 min.
Effective stream area after confluence  =     78.250(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2047.000 to Point/Station     2051.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   154.500(Ft.)
Downstream point/station elevation =   146.000(Ft.)
Pipe length  =    47.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   145.684(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =   145.684(CFS)
Normal flow depth in pipe =   20.95(In.)
Flow top width inside pipe =   27.54(In.)
Critical depth could not be calculated.
Pipe flow velocity =     39.77(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    18.41 min.
End of computations, total study area =          78.250 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/19/17
------------------------------------------------------------------------
PROJECT HILLTOP
PROPOSED CONDITIONS
2000P100 WITH USER DEFINED INPUTS FROM OTHER SYSTEMS
WITHOUT DETENTION TAKEN INTO ACCOUNT (FOR COMPARISON)
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

------------------------------------------------------------------------


Program License Serial Number 4049

------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2001.000 to Point/Station     2002.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                    ]
Initial subarea flow distance  =   58.000(Ft.)
Highest elevation =  181.200(Ft.)
Lowest elevation =  179.400(Ft.)
Elevation difference =    1.800(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.35 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8500)*(  58.000^.5)/(   3.103^(1/3)]=   2.35
Setting time of concentration to 5 minutes
Rainfall intensity (I) =     4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =      0.187(CFS)
Total initial stream area =       0.050(Ac.)


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Process from Point/Station     2002.000 to Point/Station     2003.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
```



```
------------------------------------------------------------------------
Top of street segment elevation =   179.400(Ft.)
End of street segment elevation =   176.500(Ft.)
Length of street segment  =   198.000(Ft.)
Height of curb above gutter flowline  =     6.0(In.)
Width of half street (curb to crown)  =  26.000(Ft.)
Distance from crown to crossfall grade break  =  10.000(Ft.)
Slope from gutter to grade break (v/hz) =    0.020
Slope from grade break to crown (v/hz)  =    0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =    0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      0.226(CFS)
Depth of flow =   0.151(Ft.), Average velocity =   1.501(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   2.812(Ft.)
Flow velocity =   1.50(Ft/s)
Travel time =    2.20 min.     TC =    7.20  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                    ]
Rainfall intensity =      3.806(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =      1.359(CFS) for    0.420(Ac.)
Total runoff =      1.545(CFS)  Total area =        0.47(Ac.)
Street flow at end of street =      1.545(CFS)
Half street flow at end of street =      1.545(CFS)
Depth of flow =   0.260(Ft.), Average velocity =   2.049(Ft/s)
Flow width (from curb towards crown)=   8.265(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.000 to Point/Station     2000.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   176.000(Ft.)
Downstream point/station elevation =   163.000(Ft.)
Pipe length  =    36.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.545(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     1.545(CFS)
Normal flow depth in pipe =    2.85(In.)
Flow top width inside pipe =    5.99(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.80(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     7.23 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.000 to Point/Station     2000.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
```

```
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.470(Ac.)
Runoff from this stream =      1.545(CFS)
Time of concentration =    7.23 min.
Rainfall intensity =     3.799(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1019.000 to Point/Station     2000.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------------
User specified 'C' value of 0.690 given for subarea
Rainfall intensity (I) =      2.833(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  16.00 min.  Rain intensity =       2.83(In/Hr)
Total area =       63.890(Ac.)  Total runoff =   124.500(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1019.000 to Point/Station     2000.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     63.890(Ac.)
Runoff from this stream =    124.500(CFS)
Time of concentration =   16.00 min.
Rainfall intensity =     2.833(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        1.545      7.23                3.799
2      124.500     16.00                2.833
Qmax(1) =
           1.000 *    1.000 *     1.545) +
           1.000 *    0.452 *   124.500) + =      57.832
Qmax(2) =
           0.746 *    1.000 *     1.545) +
           1.000 *    1.000 *   124.500) + =     125.652

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.545     124.500
Maximum flow rates at confluence using above data:
      57.832     125.652
Area of streams before confluence:
       0.470      63.890
Results of confluence:
Total flow rate =    125.652(CFS)
Time of concentration =    16.000 min.
Effective stream area after confluence =     64.360(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2000.000 to Point/Station     4009.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   163.000(Ft.)
Downstream point elevation =   157.900(Ft.)
```



```
Channel length thru subarea  =   506.000(Ft.)
Channel base width       =   20.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =    126.638(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =    126.638(CFS)
Depth of flow =   1.136(Ft.), Average velocity =   5.003(Ft/s)
Channel flow top width =   24.546(Ft.)
Flow Velocity =    5.00(Ft/s)
Travel time  =    1.69 min.
Time of concentration =   17.69 min.
Critical depth =      1.039(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.720(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.236(CFS) for    1.010(Ac.)
Total runoff =    126.888(CFS)  Total area =       65.37(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2000.000 to Point/Station     4009.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     65.370(Ac.)
Runoff from this stream =    126.888(CFS)
Time of concentration =   17.69 min.
Rainfall intensity =     2.720(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     4007.000 to Point/Station     4009.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                  ]
Rainfall intensity (I) =      3.842(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =   7.02 min.  Rain intensity =       3.84(In/Hr)
Total area =       1.760(Ac.)  Total runoff =     5.863(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     4007.000 to Point/Station     4009.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.760(Ac.)
Runoff from this stream =      5.863(CFS)
Time of concentration =    7.02 min.
Rainfall intensity =     3.842(In/Hr)
```

```
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.        (CFS)       (min)                (In/Hr)


1       126.888     17.69                2.720
2         5.863      7.02                3.842
Qmax(1) =
           1.000 *    1.000 *   126.888) +
           0.708 *    1.000 *     5.863) + =     131.039
Qmax(2) =
           1.000 *    0.397 *   126.888) +
           1.000 *    1.000 *     5.863) + =      56.229

Total of 2 streams to confluence:
Flow rates before confluence point:
     126.888       5.863
Maximum flow rates at confluence using above data:
      131.039       56.229
Area of streams before confluence:
       65.370       1.760
Results of confluence:
Total flow rate =    131.039(CFS)
Time of concentration =    17.686 min.
Effective stream area after confluence =     67.130(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     4009.000 to Point/Station     2046.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   157.900(Ft.)
Downstream point elevation =   155.800(Ft.)
Channel length thru subarea  =   203.000(Ft.)
Channel base width       =   20.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =    131.283(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =    131.283(CFS)
Depth of flow =   1.152(Ft.), Average velocity =   5.110(Ft/s)
Channel flow top width =   24.608(Ft.)
Flow Velocity =    5.11(Ft/s)
Travel time  =    0.66 min.
Time of concentration =   18.35 min.
Critical depth =      1.063(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.679(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.301(CFS) for    0.250(Ac.)
Total runoff =    131.340(CFS)  Total area =       67.38(Ac.)


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Process from Point/Station     2046.000 to Point/Station     2047.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   155.000(Ft.)
Downstream point/station elevation =   146.670(Ft.)
Pipe length  =    74.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   131.340(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =   131.340(CFS)
Normal flow depth in pipe =   23.44(In.)
Flow top width inside pipe =   24.80(In.)
Critical depth could not be calculated.
Pipe flow velocity =     31.91(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    18.39 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2046.000 to Point/Station     2047.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     67.380(Ac.)
Runoff from this stream =    131.340(CFS)
Time of concentration =   18.39 min.
Rainfall intensity =     2.676(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2036.000 to Point/Station     2037.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                ]
Initial subarea flow distance  =   73.000(Ft.)
Highest elevation =  164.700(Ft.)
Lowest elevation =  163.300(Ft.)
Elevation difference =    1.400(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     1.86 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*(  73.000^.5)/(   1.918^(1/3)]=   1.86
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      0.250(CFS)
Total initial stream area =        0.060(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2037.000 to Point/Station     2040.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =   163.300(Ft.)
End of street segment elevation =   156.000(Ft.)
Length of street segment  =   270.000(Ft.)
```

```
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  10.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  14.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      0.286(CFS)
Depth of flow =   0.147(Ft.), Average velocity =   2.050(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   2.617(Ft.)
Flow velocity =   2.05(Ft/s)
Travel time =    2.20 min.     TC =    7.20  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                    ]
Rainfall intensity =     3.807(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =     1.049(CFS) for    0.290(Ac.)
Total runoff =     1.299(CFS)  Total area =       0.35(Ac.)
Street flow at end of street =     1.299(CFS)
Half street flow at end of street =     1.299(CFS)
Depth of flow =   0.229(Ft.), Average velocity =   2.509(Ft/s)
Flow width (from curb towards crown)=   6.682(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2040.000 to Point/Station     2040.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                    ]
Time of concentration =     7.20 min.
Rainfall intensity =     3.807(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =     1.013(CFS) for    0.280(Ac.)
Total runoff =     2.311(CFS)  Total area =       0.63(Ac.)


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Process from Point/Station     2037.000 to Point/Station     2040.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      0.630(Ac.)
Runoff from this stream =      2.311(CFS)
Time of concentration =    7.20 min.
Rainfall intensity =     3.807(In/Hr)
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Process from Point/Station     3035.000 to Point/Station     2040.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                 ]
Rainfall intensity (I) =     3.381(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =   9.94 min.  Rain intensity =      3.38(In/Hr)
Total area =      5.060(Ac.)  Total runoff =    11.804(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3035.000 to Point/Station     2040.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      5.060(Ac.)
Runoff from this stream =     11.804(CFS)
Time of concentration =    9.94 min.
Rainfall intensity =     3.381(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        2.311      7.20                 3.807
2       11.804      9.94                 3.381
Qmax(1) =
           1.000 *    1.000 *     2.311) +
           1.000 *    0.724 *    11.804) + =      10.856
Qmax(2) =
           0.888 *    1.000 *     2.311) +
           1.000 *    1.000 *    11.804) + =      13.857

Total of 2 streams to confluence:
Flow rates before confluence point:
       2.311      11.804
Maximum flow rates at confluence using above data:
      10.856      13.857
Area of streams before confluence:
       0.630       5.060
Results of confluence:
Total flow rate =     13.857(CFS)
Time of concentration =     9.940 min.
Effective stream area after confluence =      5.690(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2040.000 to Point/Station     2045.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   157.000(Ft.)
Downstream point/station elevation =   156.000(Ft.)
Pipe length  =    13.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.857(CFS)
```

```
Nearest computed pipe diameter =     15.00(In.)
Calculated individual pipe flow =    13.857(CFS)
Normal flow depth in pipe =    9.90(In.)
Flow top width inside pipe =   14.21(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.12(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =     9.95 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3040.000 to Point/Station     3045.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      5.690(Ac.)
Runoff from this stream =     13.857(CFS)
Time of concentration =    9.95 min.
Rainfall intensity =     3.380(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2041.000 to Point/Station     2042.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                    ]
Initial subarea flow distance  =   66.000(Ft.)
Highest elevation =  166.000(Ft.)
Lowest elevation =  164.000(Ft.)
Elevation difference =    2.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     1.52 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*(  66.000^.5)/(   3.030^(1/3)]=   1.52
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      0.125(CFS)
Total initial stream area =        0.030(Ac.)


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Process from Point/Station     2042.000 to Point/Station     2044.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of street segment elevation =   164.000(Ft.)
End of street segment elevation =   156.000(Ft.)
Length of street segment  =   198.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  26.000(Ft.)
Distance from crown to crossfall grade break  =  10.000(Ft.)
Slope from gutter to grade break (v/hz) =    0.020
Slope from grade break to crown (v/hz)  =    0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =    0.020
Gutter width =   1.500(Ft.)
```



```
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      0.138(CFS)
Depth of flow =   0.096(Ft.), Average velocity =   2.488(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   1.500(Ft.)
Flow velocity =   2.49(Ft/s)
Travel time =    1.33 min.     TC =    6.33  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                    ]
Rainfall intensity =     3.998(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      0.760(CFS) for    0.200(Ac.)
Total runoff =      0.885(CFS)  Total area =        0.23(Ac.)
Street flow at end of street =      0.885(CFS)
Half street flow at end of street =      0.885(CFS)
Depth of flow =   0.195(Ft.), Average velocity =   2.737(Ft/s)
Flow width (from curb towards crown)=   5.020(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2043.000 to Point/Station     2044.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                    ]
Time of concentration =     6.33 min.
Rainfall intensity =     3.998(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =      8.903(CFS) for    2.620(Ac.)
Total runoff =      9.787(CFS)  Total area =        2.85(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2044.000 to Point/Station     2045.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   156.000(Ft.)
Downstream point/station elevation =   155.500(Ft.)
Pipe length  =    24.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.787(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     9.787(CFS)
Normal flow depth in pipe =   10.52(In.)
Flow top width inside pipe =   17.74(In.)
Critical Depth =   14.48(In.)
Pipe flow velocity =      9.12(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     6.37 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
Process from Point/Station     2044.000 to Point/Station     2045.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.850(Ac.)
Runoff from this stream =      9.787(CFS)
Time of concentration =    6.37 min.
Rainfall intensity =     3.987(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2038.000 to Point/Station     2039.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Initial subarea flow distance  =  109.000(Ft.)
Highest elevation =  178.000(Ft.)
Lowest elevation =  172.000(Ft.)
Elevation difference =    6.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     5.85 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.5500)*( 109.000^.5)/( 5.505^(1/3)]=   5.85
Rainfall intensity (I) =      4.120(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.550
Subarea runoff =      0.340(CFS)
Total initial stream area =       0.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2039.000 to Point/Station     2004.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation =   172.000(Ft.)
End of street segment elevation =   166.000(Ft.)
Length of street segment  =   290.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  10.000(Ft.)
Slope from gutter to grade break (v/hz) =    0.020
Slope from grade break to crown (v/hz)  =    0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  14.000(Ft.)
Slope from curb to property line (v/hz) =    0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      1.054(CFS)
Depth of flow =   0.224(Ft.), Average velocity =   2.161(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   6.453(Ft.)
Flow velocity =   2.16(Ft/s)
Travel time =    2.24 min.     TC =    8.09  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
```



```
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[SINGLE FAMILY area type                    ]
Rainfall intensity =      3.645(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.550
Subarea runoff =      1.263(CFS) for    0.630(Ac.)
Total runoff =      1.603(CFS)  Total area =       0.78(Ac.)
Street flow at end of street =      1.603(CFS)
Half street flow at end of street =      1.603(CFS)
Depth of flow =   0.251(Ft.), Average velocity =   2.363(Ft/s)
Flow width (from curb towards crown)=   7.792(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2004.000 to Point/Station     2045.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 3
Stream flow area =      0.780(Ac.)
Runoff from this stream =      1.603(CFS)
Time of concentration =    8.09 min.
Rainfall intensity =     3.645(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       13.857      9.95                3.380
2        9.787      6.37                3.987
3        1.603      8.09                3.645
Qmax(1) =
           1.000 *    1.000 *    13.857) +
           0.848 *    1.000 *     9.787) +
           0.927 *    1.000 *     1.603) + =      23.640
Qmax(2) =
           1.000 *    0.640 *    13.857) +
           1.000 *    1.000 *     9.787) +
           1.000 *    0.787 *     1.603) + =      19.918
Qmax(3) =
           1.000 *    0.813 *    13.857) +
           0.914 *    1.000 *     9.787) +
           1.000 *    1.000 *     1.603) + =      21.813

Total of 3 streams to confluence:
Flow rates before confluence point:
     13.857       9.787       1.603
Maximum flow rates at confluence using above data:
      23.640      19.918      21.813
Area of streams before confluence:
       5.690       2.850       0.780
Results of confluence:
Total flow rate =     23.640(CFS)
Time of concentration =     9.953 min.
Effective stream area after confluence =      9.320(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2045.000 to Point/Station     2047.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =   155.500(Ft.)
Downstream point/station elevation =   155.000(Ft.)
Pipe length  =    24.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    23.640(CFS)
Nearest computed pipe diameter  =    21.00(In.)
Calculated individual pipe flow  =    23.640(CFS)
Normal flow depth in pipe =   17.91(In.)
Flow top width inside pipe =   14.89(In.)
Critical depth could not be calculated.
Pipe flow velocity =     10.81(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     9.99 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2045.000 to Point/Station     2047.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      9.320(Ac.)
Runoff from this stream =     23.640(CFS)
Time of concentration =    9.99 min.
Rainfall intensity =     3.375(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2048.000 to Point/Station     2049.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                    ]
Initial subarea flow distance  =  179.000(Ft.)
Highest elevation =  210.000(Ft.)
Lowest elevation =  200.000(Ft.)
Elevation difference =   10.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.04 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*( 179.000^.5)/(   5.587^(1/3)]=   2.04
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      0.876(CFS)
Total initial stream area =        0.210(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2049.000 to Point/Station     2050.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of street segment elevation =   200.000(Ft.)
End of street segment elevation =   167.000(Ft.)
Length of street segment  =  1074.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  26.000(Ft.)
```



```
Distance from crown to crossfall grade break  =  10.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  14.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      3.669(CFS)
Depth of flow =   0.298(Ft.), Average velocity =   3.320(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.168(Ft.)
Flow velocity =   3.32(Ft/s)
Travel time =    5.39 min.     TC =   10.39  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                    ]
Rainfall intensity =      3.328(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      4.236(CFS) for    1.340(Ac.)
Total runoff =      5.112(CFS)  Total area =        1.55(Ac.)
Street flow at end of street =      5.112(CFS)
Half street flow at end of street =      5.112(CFS)
Depth of flow =   0.328(Ft.), Average velocity =   3.587(Ft/s)
Flow width (from curb towards crown)=  11.635(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2050.000 to Point/Station     2047.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   160.000(Ft.)
Downstream point/station elevation =   155.000(Ft.)
Pipe length  =   226.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.112(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     5.112(CFS)
Normal flow depth in pipe =    9.47(In.)
Flow top width inside pipe =    9.79(In.)
Critical Depth =   11.07(In.)
Pipe flow velocity =      7.69(Ft/s)
Travel time through pipe =    0.49 min.
Time of concentration (TC) =    10.88 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2050.000 to Point/Station     2047.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      1.550(Ac.)
Runoff from this stream =      5.112(CFS)
Time of concentration =   10.88 min.
Rainfall intensity =     3.273(In/Hr)
```

```
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.        (CFS)       (min)                (In/Hr)


1       131.340      18.39                 2.676
2        23.640       9.99                 3.375
3         5.112      10.88                 3.273
Qmax(1) =
            1.000 *    1.000 *   131.340) +
            0.793 *    1.000 *    23.640) +
            0.818 *    1.000 *     5.112) + =     154.264
Qmax(2) =
            1.000 *    0.543 *   131.340) +
            1.000 *    1.000 *    23.640) +
            1.000 *    0.918 *     5.112) + =      99.699
Qmax(3) =
            1.000 *    0.592 *   131.340) +
            0.970 *    1.000 *    23.640) +
            1.000 *    1.000 *     5.112) + =     105.765

Total of 3 main streams to confluence:
Flow rates before confluence point:
     131.340      23.640       5.112
Maximum flow rates at confluence using above data:
      154.264       99.699      105.765
Area of streams before confluence:
       67.380        9.320        1.550


Results of confluence:
Total flow rate =    154.264(CFS)
Time of concentration =    18.386 min.
Effective stream area after confluence  =     78.250(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2047.000 to Point/Station     2051.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =   154.500(Ft.)
Downstream point/station elevation =   146.000(Ft.)
Pipe length  =    47.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   154.264(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =   154.264(CFS)
Normal flow depth in pipe =   21.94(In.)
Flow top width inside pipe =   26.60(In.)
Critical depth could not be calculated.
Pipe flow velocity =     40.12(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    18.41 min.
End of computations, total study area =          78.250 (Ac.)
```

APPENDIX 4

Hydraulic Calculations

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 50 cfs

Design Flow: 128.4 cfs

Maximum Flow: 200 cfs

Table 1 - Summary of Culvert Flows at Crossing: Crossing 1

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
158.24	50.00	50.00	0.00	1
158.74	65.00	65.00	0.00	1
159.23	80.00	80.00	0.00	1
159.75	95.00	95.00	0.00	1
160.34	110.00	110.00	0.00	1
161.00	125.00	124.81	0.03	30
161.04	128.40	125.66	2.51	8
161.20	155.00	128.88	25.91	6
161.26	170.00	130.16	39.50	4
161.32	185.00	131.32	53.50	4
161.37	200.00	132.39	67.52	4
161.00	124.76	124.76	0.00	Overtopping

Rating Curve Plot for Crossing: Crossing 1

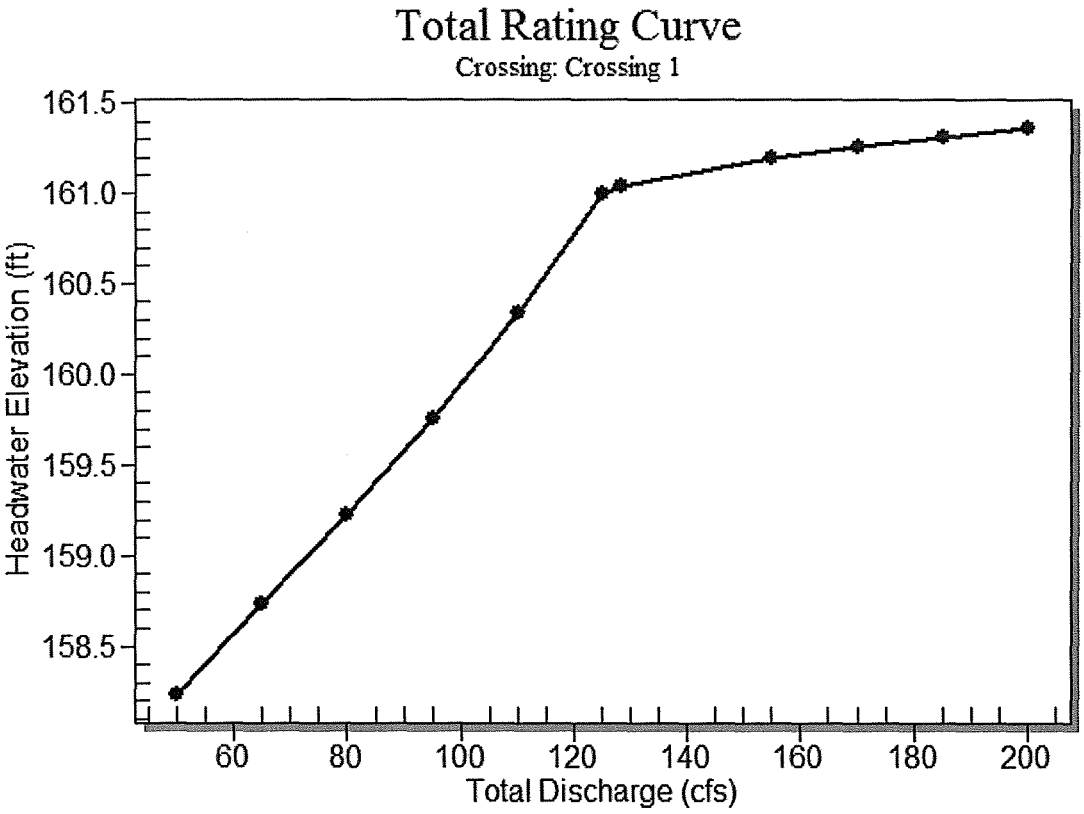


Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
50.00	50.00	158.24	2.741	0.0*	1-S2n	0.792	2.118	0.908	0.707	22.464	6.194
65.00	65.00	158.74	3.236	0.0*	1-S2n	0.903	2.430	1.062	0.824	23.472	6.773
80.00	80.00	159.23	3.726	0.0*	1-S2n	1.003	2.707	1.203	0.929	24.254	7.260
95.00	95.00	159.75	4.253	0.0*	5-S2n	1.094	2.951	1.339	1.026	24.871	7.684
110.00	110.00	160.34	4.843	0.0*	5-S2n	1.180	3.167	1.466	1.116	25.462	8.060
125.00	124.81	161.00	5.502	0.0*	5-S2n	1.260	3.352	1.589	1.200	25.929	8.398
128.40	125.66	161.04	5.542	0.0*	5-S2n	1.265	3.362	1.595	1.219	25.955	8.471
155.00	128.88	161.20	5.697	0.0*	5-S2n	1.282	3.398	1.621	1.356	26.059	8.992
170.00	130.16	161.26	5.759	0.0*	5-S2n	1.288	3.411	1.631	1.428	26.102	9.257
185.00	131.32	161.32	5.816	0.0*	5-S2n	1.294	3.424	1.640	1.498	26.143	9.503
200.00	132.39	161.37	5.870	0.0*	5-S2n	1.300	3.435	1.649	1.565	26.181	9.735

* Full Flow Headwater elevation is below inlet invert.

****

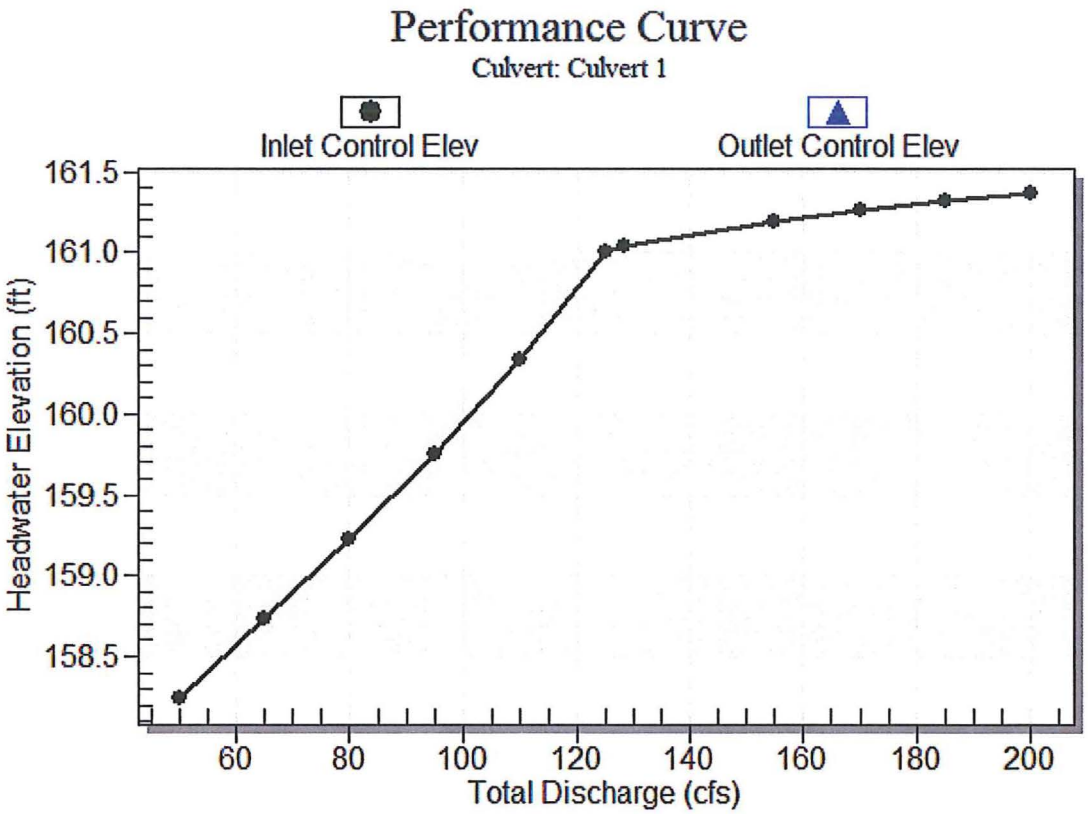
Straight Culvert

Inlet Elevation (invert): 155.50 ft, Outlet Elevation (invert): 145.08 ft

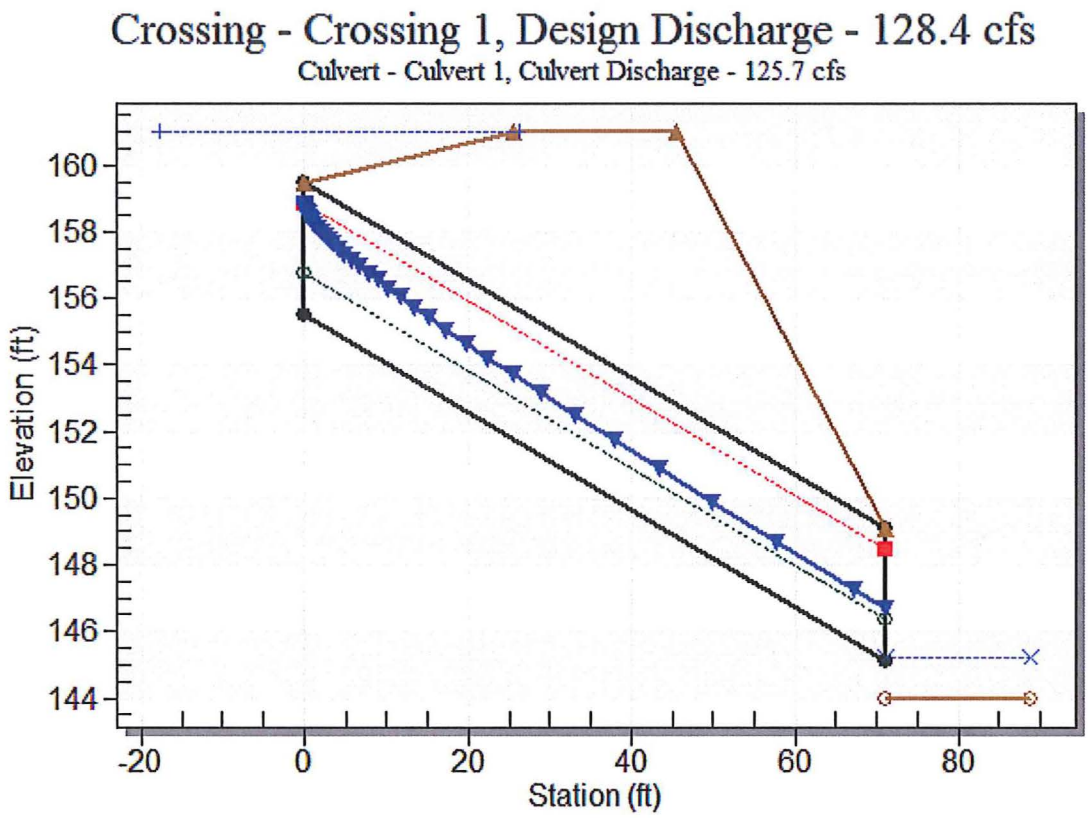
Culvert Length: 71.87 ft, Culvert Slope: 0.1465

****

Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 155.50 ft

Outlet Station: 71.11 ft

Outlet Elevation: 145.08 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0130

Culvert Type: Straight

Inlet Configuration: Grooved End in Headwall

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 1)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
50.00	144.71	0.71	6.19	1.32	1.38
65.00	144.82	0.82	6.77	1.54	1.40
80.00	144.93	0.93	7.26	1.74	1.43
95.00	145.03	1.03	7.68	1.92	1.45
110.00	145.12	1.12	8.06	2.09	1.46
125.00	145.20	1.20	8.40	2.25	1.48
128.40	145.22	1.22	8.47	2.28	1.48
155.00	145.36	1.36	8.99	2.54	1.50
170.00	145.43	1.43	9.26	2.67	1.51
185.00	145.50	1.50	9.50	2.80	1.52
200.00	145.56	1.56	9.74	2.93	1.53

Tailwater Channel Data - Crossing 1

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 10.00 ft

Side Slope (H:V): 2.00 (_:1)

Channel Slope: 0.0300

Channel Manning's n: 0.0300

Channel Invert Elevation: 144.00 ft

Roadway Data for Crossing: Crossing 1

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

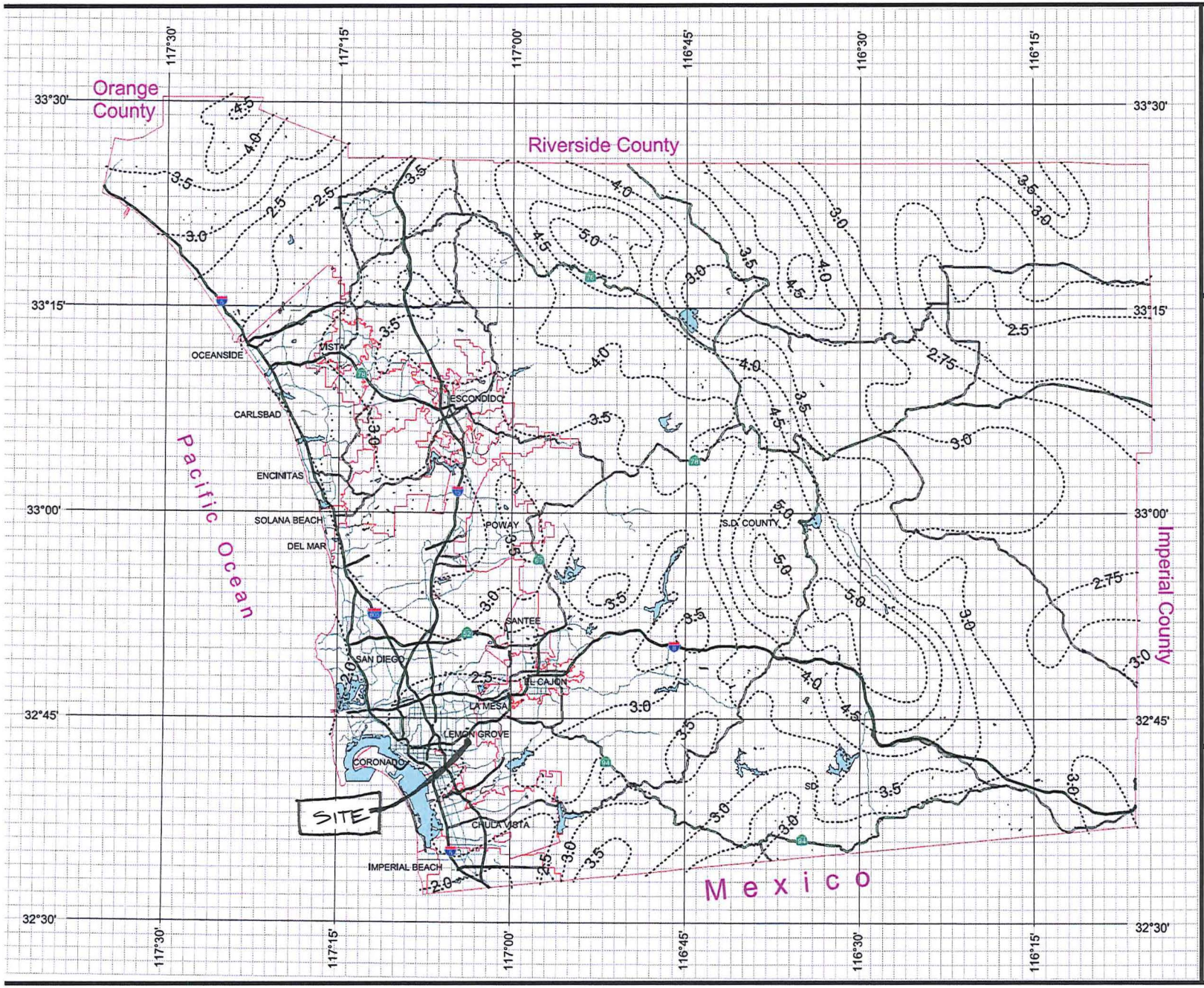
Crest Elevation: 161.00 ft

Roadway Surface: Paved

Roadway Top Width: 20.00 ft

APPENDIX 5

Preliminary Detention Analysis



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS
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PROJECT Hilltop Detention Estim
SUBJECT
PAGE : ____ OF ____ JOB NO.: 4210
DRAWN BY : ____ DATE : 9/19/17
CHECKED BY : ____ DATE : ____

Detention Volume Estimate

100 yr

Approx Volume Reqd $\approx P_6 (C_{post} - C_{pre})(A)$

WEST BASIN

$$\text{Vol Reqd} \approx \frac{2.7}{12}(0.55-0.45)(5.06) = 0.11 \text{ AF}$$

EAST BASIN

$$\text{Vol Reqd} \approx \frac{2.7}{12}(0.85-0.45)(1.76) = 0.16 \text{ AF}$$

Sum = 0.27 AF

APPENDIX 6

Drainage Exhibits

0 25 50 100 150

GRAPHICAL SCALE

Hwy 94

Lace Pl

Carolina Ln

Carolina Pl

Euclid Ave

Hilltop Dr

Dassco Ct

OFFSITE
SYSTEM 1000
TOTAL Q100 = 124.5 CFS
TOTAL AREA = 63.9 AC

0.21 AC

1.37 AC

0.07 AC

0.28 AC

0.88 AC

1.19 AC

0.62 AC

2.61 AC

3.17 AC

0.25 AC

1.20 AC

0.96 AC

2.66 AC

SYSTEM 300
TOTAL Q100 = 147.6 CFS
TOTAL AREA = 79.36 AC

LEGEND

DRAINAGE SUBAREA

HYDROLOGY NODE

AREA FROM UPSTREAM TO DOWNSTREAM NODE — X.XX AC

SCALE: 1"=50'

JOB #: 4210

CREATED: 6/28/17

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

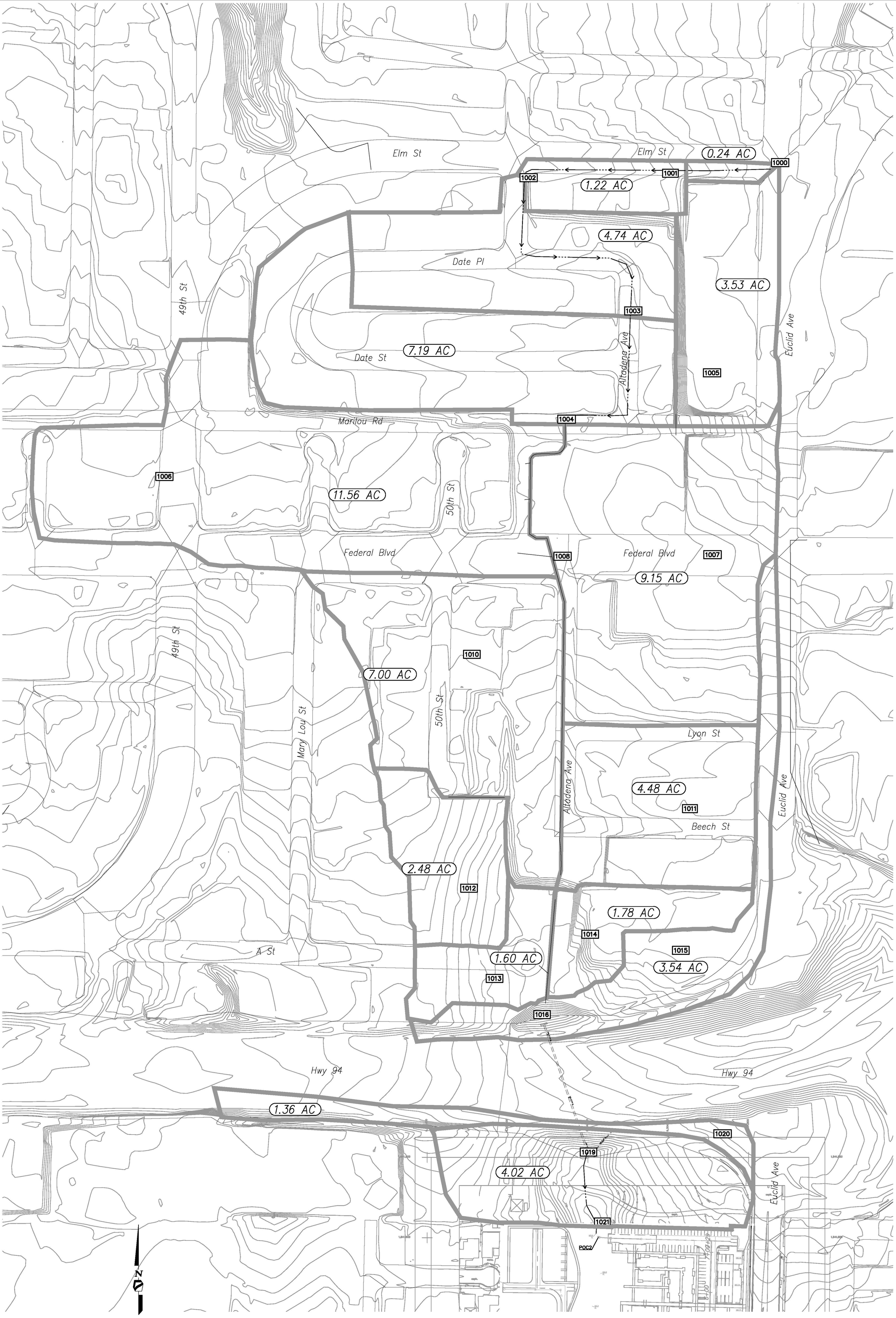
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

CITY OF SAN DIEGO

HILLTOP

DRAINAGE MAP
EXISTING CONDITIONS
EXHIBIT A

P:\4210.00\Engr\Reports\Drainage\EXH\4210 Existing Conditions.dwg 11/2/2017 11:12:57 AM



SCALE: 1"=100'

JOB #: 4210

CREATED: 6/26/17

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

CITY OF SAN DIEGO

HILLTOP

DRAINAGE MAP-OFFSITE PROPOSED CONDITIONS EXHIBIT B

P:\4210.00\Engr\Reports\Drainage\4210 Proposed Conditions Offsite.dwg 6/27/2017 10:46:24 AM

N

0 25 50 100 150

GRAPHICAL SCALE

Hwy 94

Lace Pl

Carolina Pl

Hilltop Dr

Euclid Ave

51st St

OFFSITE
SYSTEM 1000
TOTAL Q100 = 124.5 CFS
TOTAL AREA = 63.9 AC

BMP/DETENTION

SYSTEM 4000 (UNDETAINED)
TOTAL Q100 = 5.9 CFS
TOTAL AREA = 1.76 AC

SYSTEM 3000 (UNDETAINED)
TOTAL Q100 = 14.1 CFS
TOTAL AREA = 6.19 AC

SYSTEM 2000
TOTAL Q100 = 154.3 CFS
W/O DETENTION
TOTAL Q100 <= 145.7 CFS
W/ DETENTION
TOTAL AREA = 78.2 AC

0.21 AC
0.02 AC
0.05 AC
0.42 AC
0.15 AC
0.88 AC
0.68 AC
0.08 AC
1.01 AC
0.90 AC
0.45 AC
1.34 AC
0.30 AC
0.25 AC
1.02 AC
0.16 AC
0.26 AC
0.76 AC
0.12 AC
0.69 AC
0.03 AC
0.25 AC
0.17 AC
0.63 AC
0.59 AC
0.43 AC
0.06 AC
0.18 AC
0.29 AC
0.28 AC
0.03 AC
0.20 AC
2.64 AC

LEGEND

DRAINAGE SUBAREA

HYDROLOGY NODE

AREA FROM UPSTREAM TO DOWNSTREAM NODE (X.XX AC)

SCALE: 1"=50'

JOB #: 4210

CREATED: 6/28/17

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

CITY OF SAN DIEGO

HILLTOP

DRAINAGE MAP
PROPOSED CONDITIONS
EXHIBIT C

Hilltop Dr

Hal St

Euclid Ave

Lakiba Palmer Ave (Formerly Lise Ave)

PROPOSED OUTLET

EXISTING CHANNEL

EXISTING 36-INCH STORM DRAIN PER DWG 5568-D

PAD 165.0

PAD 164.8

PAD 164.6

PAD 164.3

PAD 164.0

2000 SF BOT 158.0

FF 171.0

FF 169.0

asph.

conc.

SCALE:	1"=60'	PREPARED BY: PROJECT DESIGN CONSULTANTS Planning | Landscape Architecture | Engineering | Survey	CITY OF SAN DIEGO
JOB #:	4210	701 B Street, Suite 800 San Diego, CA 92101 619.235.6471 Tel 619.234.0349 Fax	HILLTOP
CREATED:	9/18/17		DOWNSTREAM DRAINAGE MAP EXHIBIT D

P:\4210.00\Engr\Reports\Drainage\EXH\4210 Proposed Conditions-Downstream-ExhD.dwg 11/29/2017 9:08:11 AM

APPENDIX 8

HEC-RAS Existing and Proposed Conditions Computer Output

HEC-RAS Existing Condition Computer Output

HEC-RAS Plan: EX River: Hilltop Reach: Hilltop Profile: 100yr

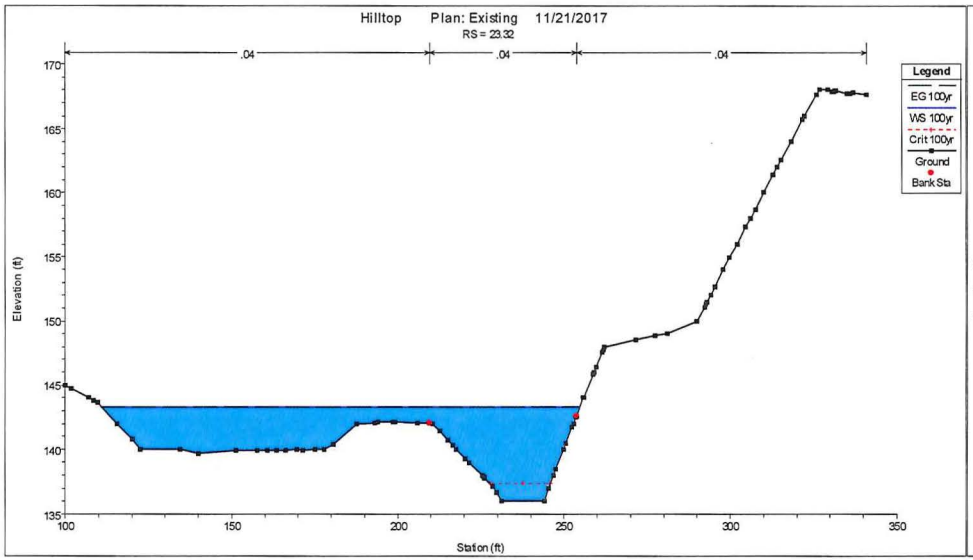
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Hilltop	1395	100yr	124.80	169.18	169.91	169.91	170.16	0.029850	4.02	31.05	62.63	1.01
Hilltop	1300	100yr	124.80	165.58	166.35	166.35	166.59	0.030376	3.91	32.20	70.51	1.01
Hilltop	1240.42	100yr	124.80	163.53	164.99		165.09	0.005226	2.56	48.82	52.45	0.47
Hilltop	1190.01	100yr	124.80	163.35	164.33	164.33	164.64	0.015801	4.49	27.78	45.51	1.01
Hilltop	1047.33	100yr	124.80	158.67	159.90	159.90	160.20	0.028649	4.41	28.32	48.19	1.01
Hilltop	895.36	100yr	124.80	155.04	159.69		159.69	0.000019	0.38	330.88	93.68	0.04
Hilltop	699.41	100yr	124.80	148.99	159.69		159.69	0.000002	0.17	718.87	104.08	0.01
Hilltop	560.40	100yr	124.80	146.74	159.69	148.31	159.69	0.000001	0.16	815.67	88.77	0.01
Hilltop	560.38		Culvert									
Hilltop	420.65	100yr	124.80	143.06	145.47	145.36	145.99	0.019012	5.79	21.54	17.11	0.91
Hilltop	350	100yr	124.80	142.44	145.18		145.33	0.003436	3.09	40.42	23.04	0.41
Hilltop	267.60	100yr	124.80	141.29	143.87	143.87	144.57	0.023893	6.69	18.66	13.55	1.00
Hilltop	200	100yr	124.80	140.98	143.30		143.33	0.000673	1.41	88.44	49.32	0.19
Hilltop	23.32	100yr	124.80	136.00	143.32	137.34	143.32	0.000009	0.32	478.83	143.85	0.02

HEC-RAS River: Hilltop Reach: Hilltop Profile: 100yr

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Hilltop	1395	100yr	Proposed	124.80	169.18	169.91	169.91	170.16	0.016790	4.02	31.05	62.63	1.01
Hilltop	1395	100yr	EX	124.80	169.18	169.91	169.91	170.16	0.029850	4.02	31.05	62.63	1.01
Hilltop	1300	100yr	Proposed	124.80	165.55	166.40	166.67	167.26	0.067139	7.46	16.73	37.72	1.97
Hilltop	1300	100yr	EX	124.80	165.58	166.35	166.35	166.59	0.030376	3.91	32.20	70.51	1.01
Hilltop	1240.42	100yr	Proposed	124.80	163.53	165.00	164.54	165.10	0.002746	2.51	49.75	52.76	0.45
Hilltop	1240.42	100yr	EX	124.80	163.53	164.99		165.09	0.005226	2.56	48.82	52.45	0.47
Hilltop	1221.79	100yr	Proposed	124.80	163.47	164.89		165.03	0.004689	3.03	41.23	48.59	0.58
Hilltop	1190.01	100yr	Proposed	124.80	163.10	164.31	164.31	164.76	0.013902	5.40	23.10	25.65	1.00
Hilltop	1190.01	100yr	EX	124.80	163.35	164.33	164.33	164.64	0.015801	4.49	27.78	45.51	1.01
Hilltop	1112.45	100yr	Proposed	124.80	162.15	163.56	163.37	163.89	0.007940	4.65	26.82	24.26	0.78
Hilltop	1047.33	100yr	EX	124.80	158.67	159.90	159.90	160.20	0.028649	4.41	28.32	48.19	1.01
Hilltop	1035.70	100yr	Proposed	124.80	161.39	162.60	162.60	163.08	0.013971	5.58	22.37	23.63	1.01
Hilltop	969.61	100yr	Proposed	124.80	160.72	162.05	161.80	162.28	0.006069	3.82	32.66	32.79	0.67
Hilltop	904.49	100yr	Proposed	124.80	160.08	161.48	161.30	161.82	0.007995	4.67	26.74	24.20	0.78
Hilltop	895.36	100yr	EX	124.80	155.04	159.69		159.69	0.000019	0.38	330.89	93.68	0.04
Hilltop	809.87	100yr	Proposed	124.80	159.14	160.35	160.35	160.82	0.014159	5.47	22.82	24.99	1.01
Hilltop	715.85	100yr	Proposed	124.80	158.21	159.59	159.32	159.82	0.006017	3.88	32.18	31.42	0.68
Hilltop	699.41	100yr	EX	124.80	148.99	159.69		159.69	0.000002	0.17	718.87	104.08	0.01
Hilltop	601.93	100yr	Proposed	124.80	157.07	159.46		159.54	0.001037	2.36	52.80	28.29	0.31
Hilltop	560.40	100yr	EX	124.80	146.74	159.69	148.29	159.69	0.000001	0.15	815.67	88.77	0.01
Hilltop	469.96	100yr	Proposed	124.80	155.75	159.16	157.57	159.38	0.001211	3.80	32.81	59.20	0.37
Hilltop	469.94			Culvert									
Hilltop	420.65	100yr	EX	124.80	143.06	145.47	145.36	145.99	0.019012	5.79	21.54	17.11	0.91

HEC-RAS River: Hilltop Reach: Hilltop Profile: 100yr (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Hilltop	350	100yr	EX	124.80	142.44	145.18		145.33	0.003436	3.09	40.42	23.04	0.41
Hilltop	323.55	100yr	Proposed	124.80	143.58	145.20	145.20	145.89	0.011774	6.67	18.71	21.86	1.00
Hilltop	267.60	100yr	Proposed	124.80	141.29	143.50	143.87	144.74	0.029336	8.91	14.01	11.78	1.44
Hilltop	267.60	100yr	EX	124.80	141.29	143.87	143.87	144.57	0.023893	6.69	18.66	13.55	1.00
Hilltop	200	100yr	Proposed	124.80	140.98	143.30	141.96	143.33	0.000378	1.41	88.48	49.32	0.19
Hilltop	200	100yr	EX	124.80	140.98	143.30		143.33	0.000673	1.41	88.44	49.32	0.19
Hilltop	23.32	100yr	Proposed	124.80	136.00	143.32	137.34	143.32	0.000005	0.32	478.84	143.85	0.02
Hilltop	23.32	100yr	EX	124.80	136.00	143.32	137.34	143.32	0.000009	0.32	478.83	143.85	0.02


Hilltop Plan: Existing 11/21/2017
RS = 23.32
.04
.04
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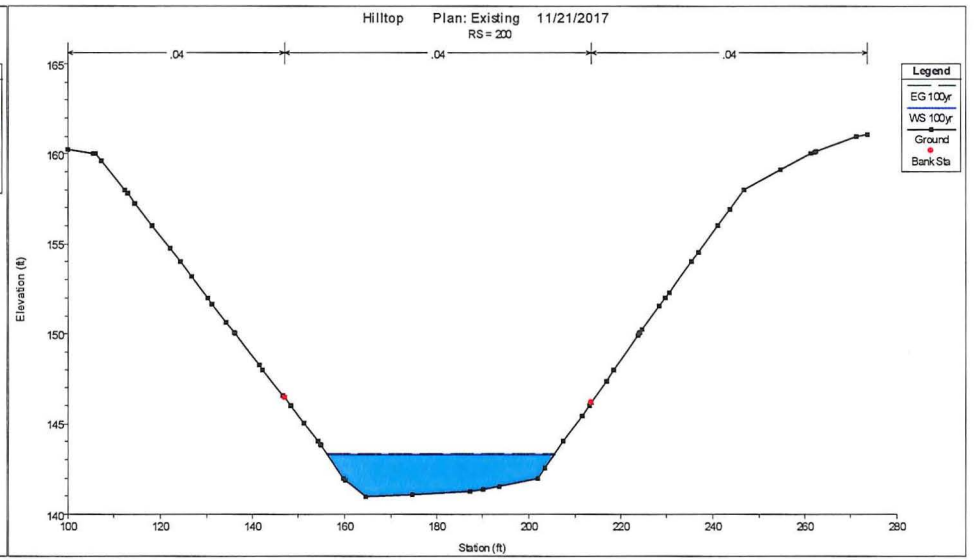
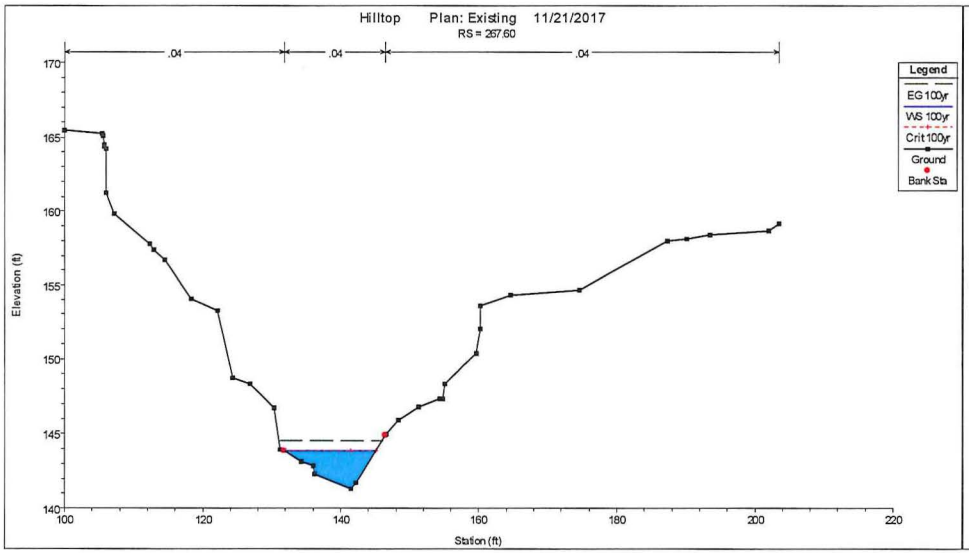
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Existing 11/21/2017
RS = 200
.04
.04
.04
Legend
EG 100yr
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Existing 11/21/2017
RS = 257.60
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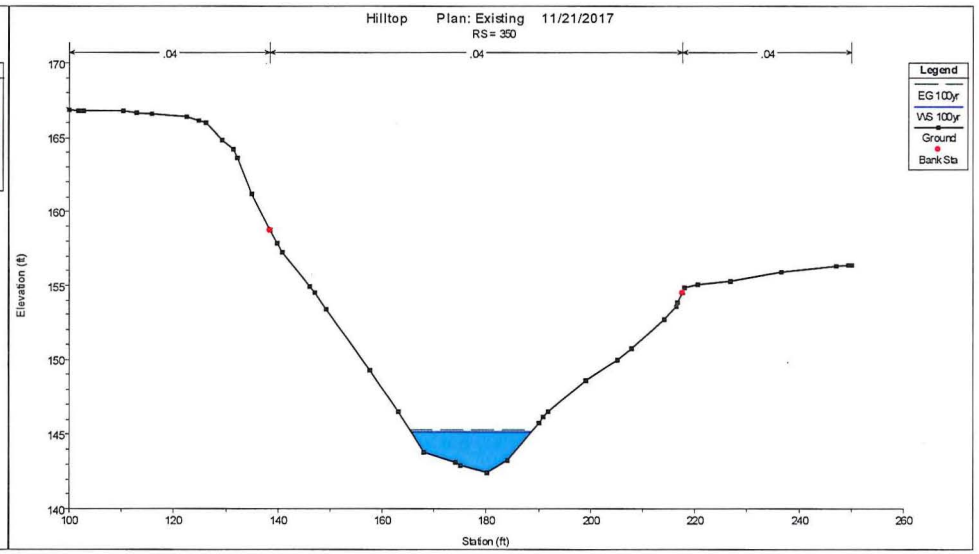
.04
.04
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Existing 11/21/2017
RS = 350
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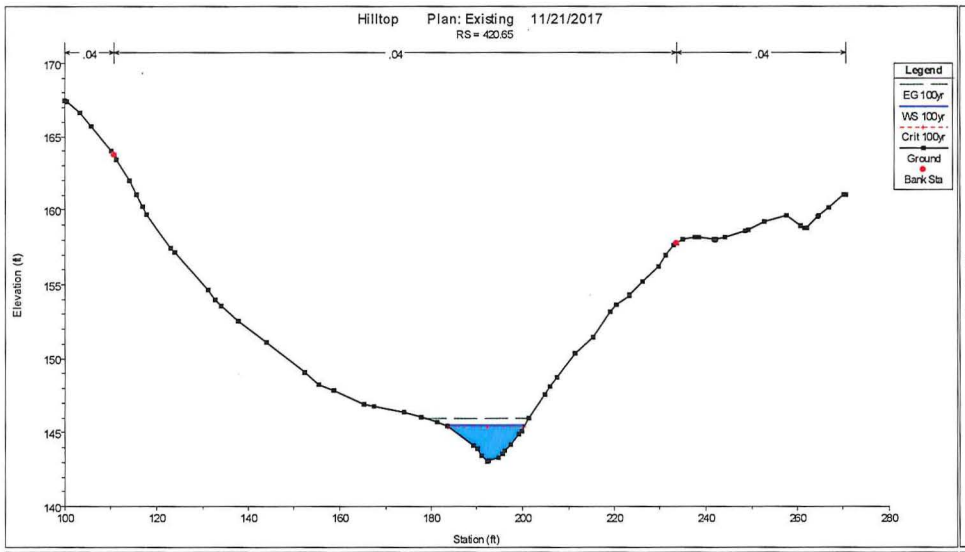
.04
.04
Legend
EG 100yr
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Existing 11/21/2017
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.04
.04
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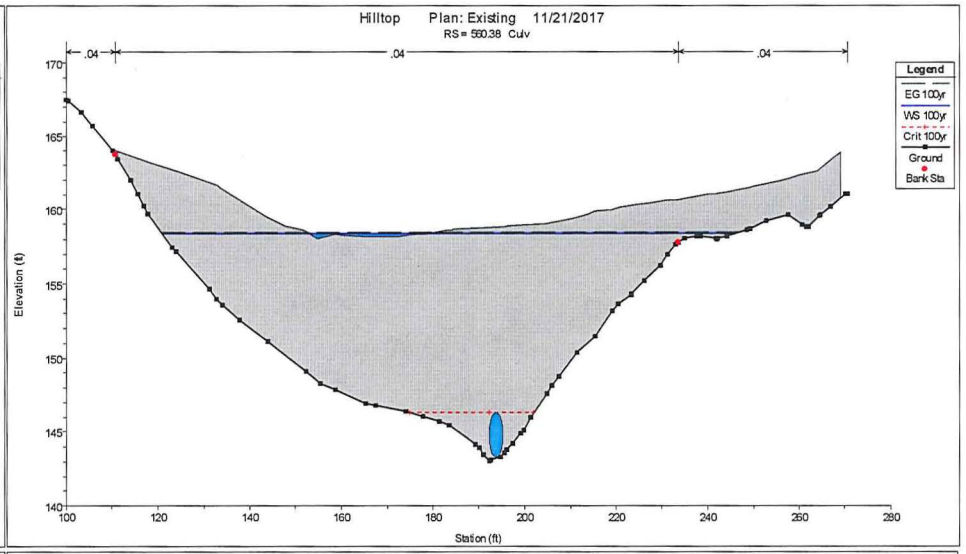
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Existing 11/21/2017
RS = 560.38 Culv
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.04
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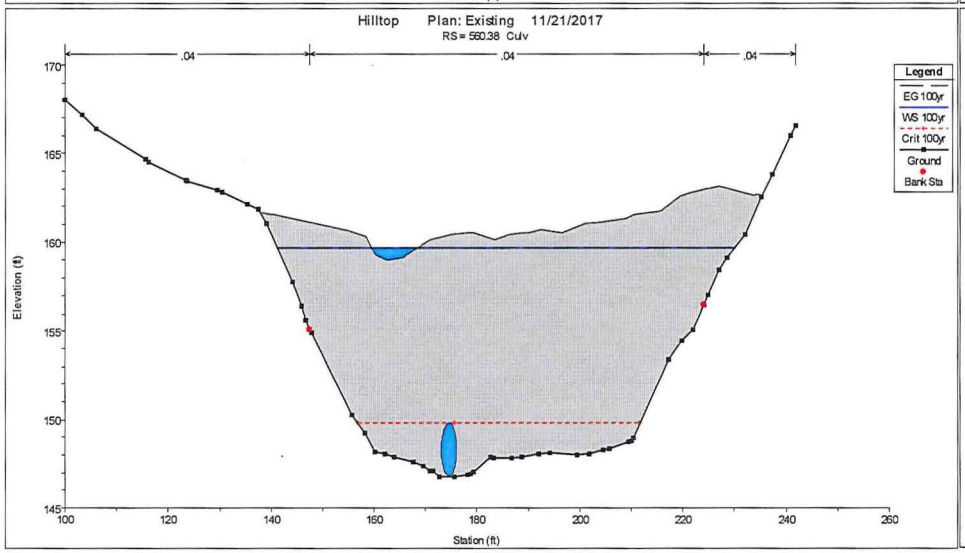
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Existing 11/21/2017
RS = 560.38 Culv
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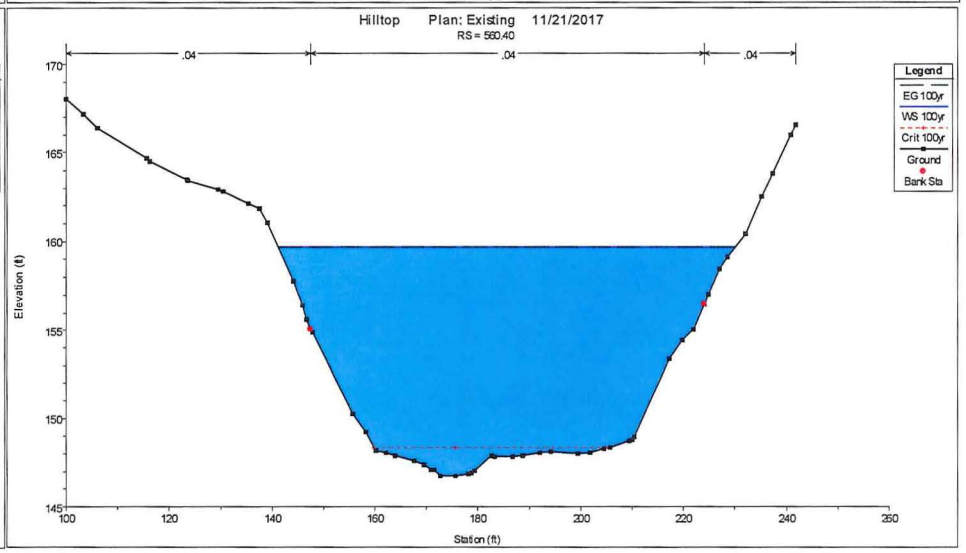
.04
.04
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Existing 11/21/2017
RS = 560.40
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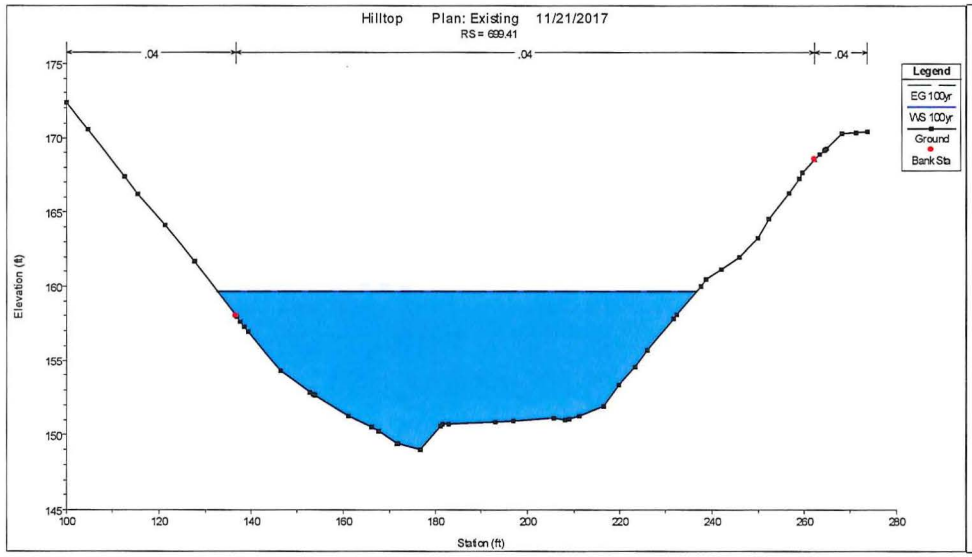
.04
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)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RS = 699.41
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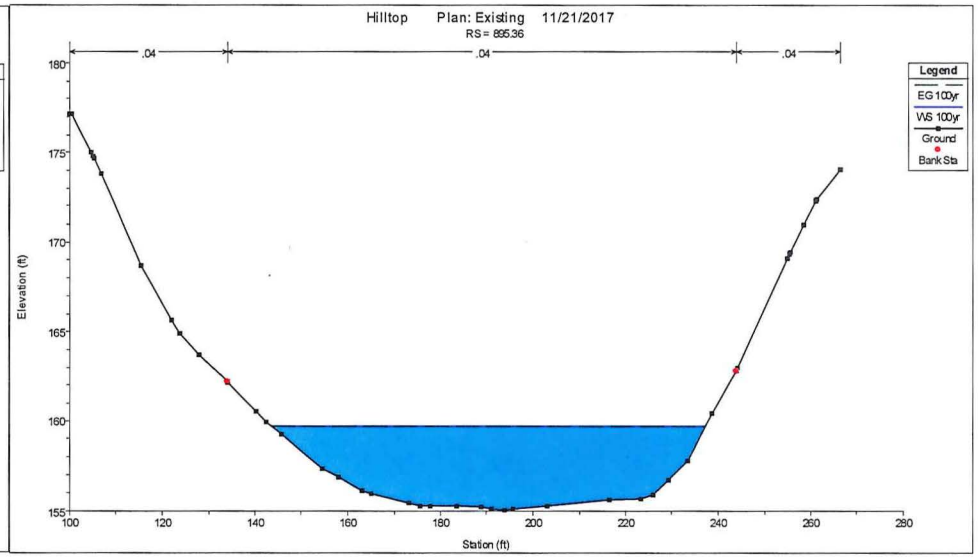
.04
Legend
EG 100yr
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Existing 11/21/2017
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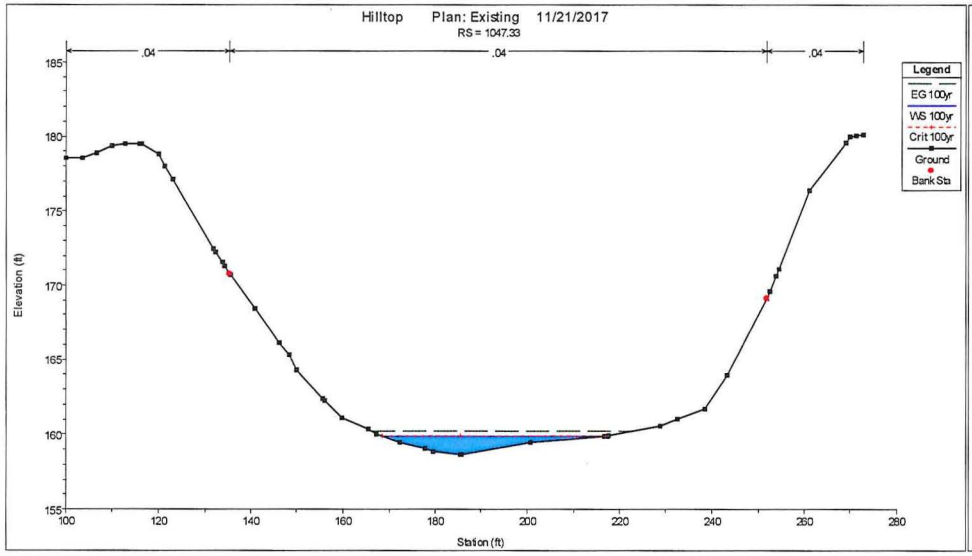
.04
Legend
EG 100yr
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Existing 11/21/2017
RS = 1047.33
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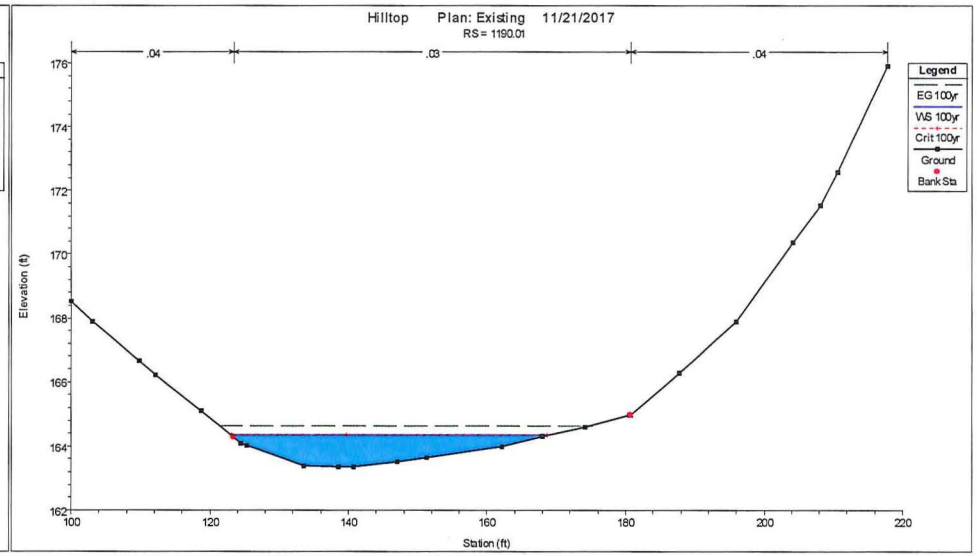
.04
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Existing 11/21/2017
RS = 1190.01
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.03
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Legend
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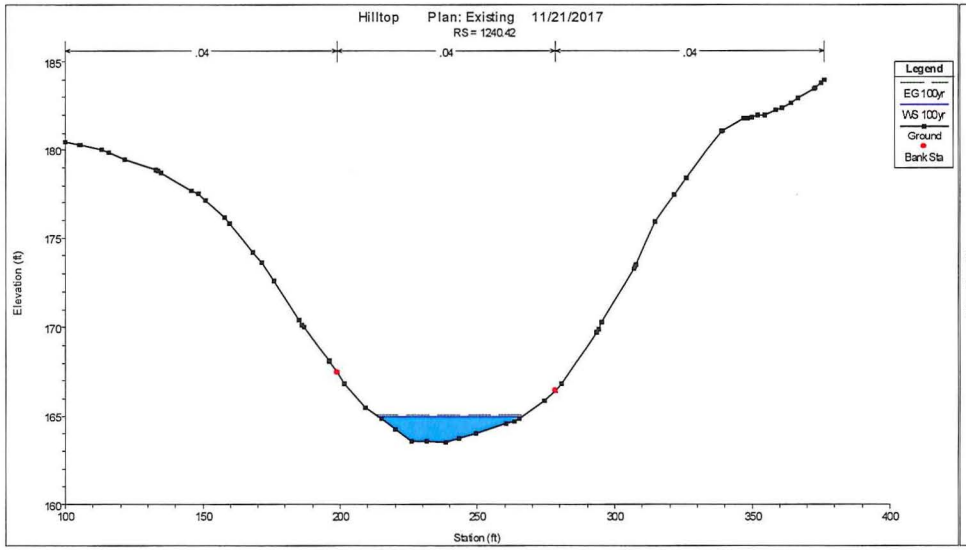
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Existing 11/21/2017
RS = 1240.42
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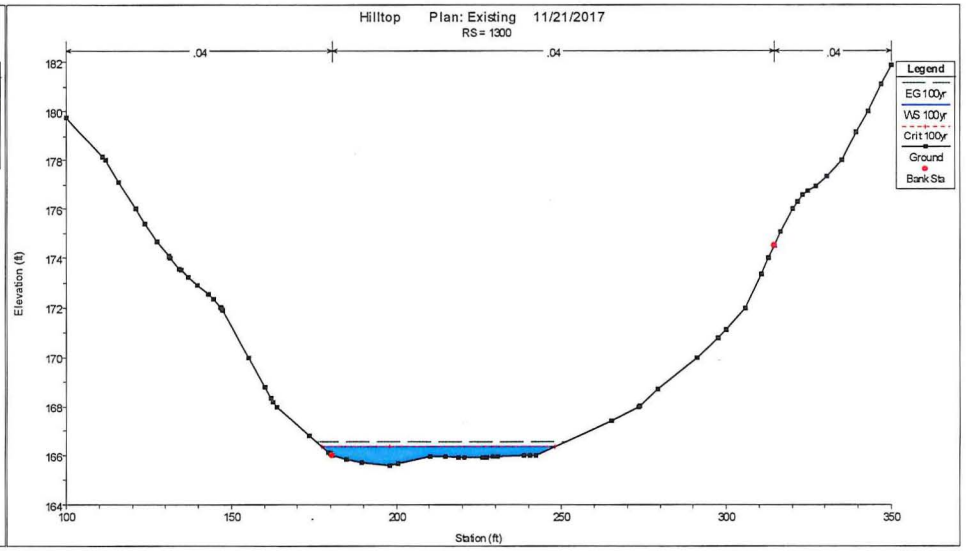
.04
.04
Legend
EG 100yr
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
185
180
175
170
165
160
100
150
200
250
300
350
400


Hilltop Plan: Existing 11/21/2017
RS = 1300
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.04
.04
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
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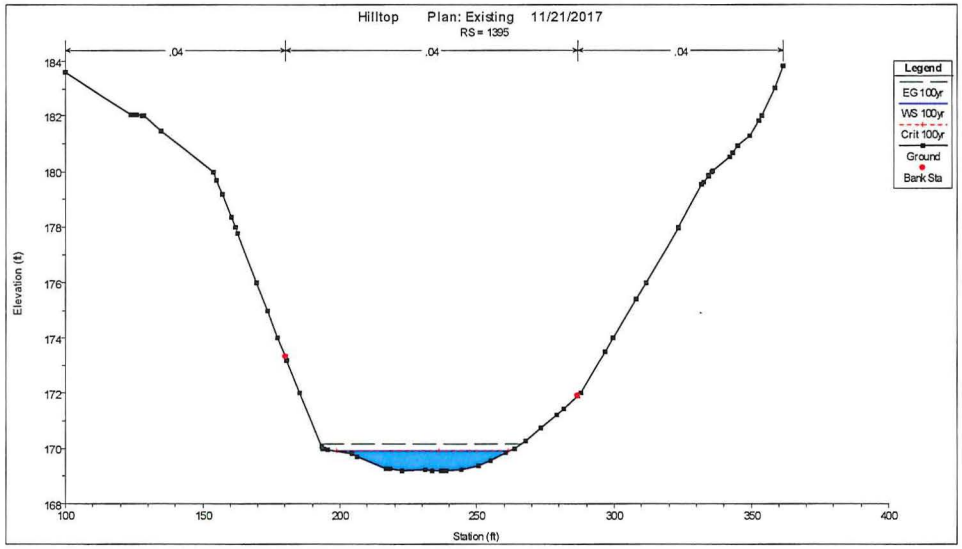
180
178
176
174
172
170
168
166
164
100
150
200
250
300
350


Hilltop Plan: Existing 11/21/2017
RS = 1395
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.04
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Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
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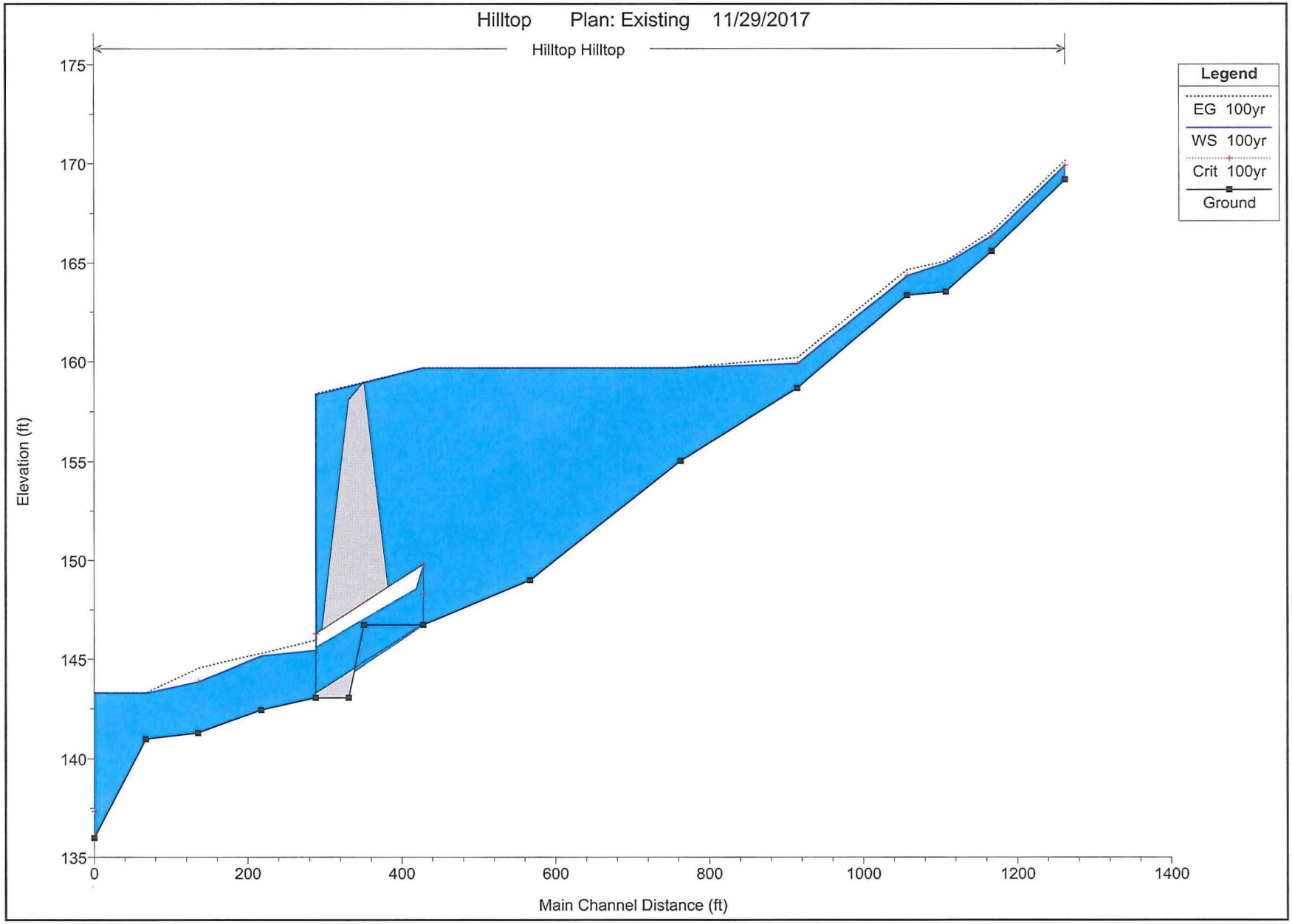
182
180
178
176
174
172
170
168
100
150
200
250
300
350
400


Hilltop Plan: Existing 11/29/2017
Hilltop Hilltop
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Elevation (ft)
175
170
165
160
155
150
145
140
135
0
200
400
600
800
1000
1200
1400
Main Channel Distance (ft)

HEC-RAS HEC-RAS 5.0.3 September 2016
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Hilltop
Project File : Hilltop.prj
Run Date and Time: 11/29/2017 9:01:25 AM

Project in English units

PLAN DATA

Plan Title: Existing
Plan File : p:\4210.00\Engr\Reports\Drainage\HYDRA\HEC-RAS\Hilltop.p03

Geometry Title: Hilltop Existing
Geometry File :
p:\4210.00\Engr\Reports\Drainage\HYDRA\HEC-RAS\Hilltop.g03

Flow Title : Flow
Flow File :
p:\4210.00\Engr\Reports\Drainage\HYDRA\HEC-RAS\Hilltop.f01

Plan Summary Information:
Number of: Cross Sections = 13 Multiple Openings = 0
Culverts = 1 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Flow
Flow File : p:\4210.00\Engr\Reports\Drainage\HYDRA\HEC-RAS\Hilltop.f01

Flow Data (cfs)

River	Reach	RS	100yr
Hilltop	Hilltop	1395	124.8

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Hilltop	Hilltop	100yr	Critical	

Known WS = 143.32

GEOMETRY DATA

Geometry Title: Hilltop Existing
Geometry File : p:\4210.00\Engr\Reports\Drainage\HYDRA\HEC-RAS\Hilltop.g03

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 1395

INPUT
Description:
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	183.59	123.77	182.05	125.19	182.05	126.11	182.03	127.77	182.01
128.05	182.01	128.54	182	134.84	181.48	153.68	180	154.96	179.71
157.03	179.19	160.46	178.35	161.8	178	162.65	177.78	169.55	176
173.53	175	177.47	174	180.1	173.33	180.67	173.19	185.45	172
193.51	170.07	193.84	170	193.99	170	194.2	169.99	195.55	169.97
204.29	169.81	206.13	169.69	216.82	169.26	218.26	169.26	222.53	169.19
231.31	169.22	233.87	169.18	236.88	169.19	238.4	169.18	238.89	169.18
244.27	169.24	250.58	169.38	254.85	169.57	260.58	169.85	263.56	170
267.68	170.27	273.39	170.76	279.22	171.22	281.58	171.43	286.91	171.91
287.92	172	296.72	173.49	299.76	174	308.17	175.42	311.57	176
323.27	177.97	323.45	178	331.94	179.53	332.56	179.61	334.27	179.85
334.5	179.87	335.48	180	335.72	180.03	342.18	180.51	343.27	180.67
344.88	180.94	349.35	181.27	352.66	181.81	353.75	182	358.46	183.02
361.59	183.81								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	180.1	.04	286.91	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
180.1	286.91	93.36	95	83.4	.1	.3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 1300

INPUT
Description:
Station Elevation Data num= 70

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	179.75	111.07	178.13	111.79	178	115.79	177.12	120.93	176
123.8	175.39	127.46	174.66	131	174.08	131.18	174.05	131.52	174
134.28	173.59	134.73	173.53	136.97	173.23	139.78	172.92	143.13	172.55
144.62	172.36	146.63	172.04	146.68	172.04	146.72	172.03	146.86	172
147.18	171.92	155.29	170	160.07	168.81	161.99	168.37	162.68	168.21
163.85	168	173.45	166.82	179.44	166.11	179.85	166.06	180.52	166
180.72	165.99	184.99	165.83	189.55	165.71	198.01	165.58	200.38	165.65
210.12	165.94	214.9	165.94	218.89	165.93	220.6	165.92	226.17	165.93
227.44	165.93	228.99	165.94	230.52	165.94	238.45	165.99	240.37	165.99
242.28	166	265.01	167.41	273.41	168	273.62	168.02	279.04	168.71
291.01	170	297.54	170.82	299.91	171.12	305.79	172	310.65	173.35
312.73	174	314.46	174.49	316.49	175.06	320.14	176	321.65	176.28
323.17	176.6	324.75	176.73	327.23	176.95	330.38	177.36	334.93	178
339.26	179.16	339.45	179.2	343.11	180	347.01	181.1	350	181.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	180.72	.04	314.46	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
180.72	314.46	49.19	59.58	66.35	.1	.3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 1240.42

INPUT
Description:
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	180.48	105.2	180.29	105.26	180.29	105.56	180.28	113.11	180
115.81	179.88	121.77	179.47	132.88	178.87	133.57	178.83	133.77	178.81
134.96	178.71	145.85	177.71	148.17	177.52	150.79	177.14	157.78	176.19
159.66	175.84	167.97	174.22	171.41	173.63	175.78	172.63	184.88	170.4
186.01	170.13	186.72	169.99	195.8	168.15	196.05	168.1	198.8	167.46
201.51	166.84	209.28	165.5	214.84	164.85	220.14	164.27	225.84	163.59
231.62	163.56	238.53	163.53	243.22	163.74	249.37	164.02	260.29	164.56
263.47	164.67	265.06	164.87	274.44	165.9	278.23	166.45	278.31	166.46
280.46	166.87	293.5	169.72	293.98	169.88	295.34	170.32	306.83	173.29
307.29	173.43	307.65	173.54	314.67	175.94	321.64	177.48	326.18	178.44
338.7	181.1	338.89	181.15	339.04	181.17	347.02	181.82	348.45	181.83
349.94	181.9	351.86	181.98	354.54	182.02	358.63	182.3	360.64	182.37
364.14	182.69	366.69	182.98	372.41	183.46	372.97	183.54	374.91	183.81
376.22	183.96								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	198.8	.04	278.31	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
198.8	278.31	49.87	50.41	50.23	.1	.3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 1190.01

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	168.52	103.13	167.9	109.79	166.67	112.14	166.2	118.77	165.11
123.42	164.29	123.45	164.285	124.53	164.09	125.4	164.04	133.6	163.39
138.51	163.35	140.77	163.35	146.99	163.52	151.3	163.64	162.06	164
168.04	164.3	174.19	164.59	180.62	164.97	180.73	164.99	187.77	166.28
196.02	167.88	204.22	170.37	208.07	171.54	210.59	172.58	217.86	175.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	123.45	.03	180.73	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
123.45	180.73	142.34	142.68	143.12	.1	.3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 1047.33

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	178.58	103.53	178.57	106.64	178.86	109.9	179.4	112.81	179.47
115.75	179.52	115.95	179.53	116.22	179.48	120.08	178.84	121.35	178.04
123.01	177.13	131.93	172.46	132.36	172.22	133.78	171.54	134.26	171.26
135.42	170.77	135.69	170.66	140.86	168.42	146.26	166.15	148.34	165.35
150	164.27	155.54	162.42	155.94	162.29	159.71	161.14	165.51	160.35
167.25	160.05	172.41	159.49	177.78	159.04	179.65	158.85	185.5	158.67
185.59	158.68	185.66	158.67	185.75	158.68	200.7	159.5	216.78	159.9
217.44	159.92	217.69	159.93	228.72	160.56	232.56	161.03	238.5	161.72
243.31	163.93	251.81	169.15	252.5	169.57	253.89	170.62	254.49	171.11
261.11	176.39	268.91	179.59	269.84	179.99	271.26	180.06	272.83	180.14

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	135.42	.04	251.81	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
135.42	251.81	170.03	151.97	168.66	.1	.3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 895.36

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	177.18	100.35	177.18	104.65	175.04	105.04	174.82	105.28	174.71
106.81	173.84	115.49	168.66	122.01	165.66	123.71	164.9	127.99	163.72
133.98	162.19	134.17	162.14	140.11	160.57	142.49	159.9	145.72	159.22

154.59	157.31	158	156.85	163.1	156.14	164.95	155.94	173.18	155.43
175.66	155.29	177.89	155.28	183.45	155.28	188.79	155.22	190.94	155.11
193.95	155.04	195.64	155.1	203.11	155.3	216.57	155.64	223.27	155.68
225.85	155.89	229.34	156.71	233.35	157.78	238.64	160.42	243.86	162.81
244.27	163	255.02	169.09	255.41	169.31	255.49	169.36	255.6	169.42
258.52	170.94	261.06	172.27	261.13	172.31	261.34	172.35	266.31	174.06

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	133.98	.04	243.86	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
133.98	243.86	130.09	195.5 182.16	.1	.3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 699.41

INPUT
Description:
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	172.38	104.64	170.58	112.6	167.41	115.37	166.17	121.26	164.15
127.64	161.73	132.98	159.542	136.67	158.03	136.87	157.95	137.69	157.61
138.5	157.27	139.28	156.96	146.46	154.31	152.81	152.85	153.43	152.72
153.91	152.65	159.69	151.531	161.14	151.25	166.06	150.47	167.75	150.26
171.74	149.42	171.8	149.41	171.85	149.4	176.62	148.99	181.1	150.54
181.6	150.69	182.87	150.71	193.01	150.83	196.97	150.92	205.67	151.1
208.08	150.94	209.07	151.01	211.17	151.23	216.39	151.95	219.81	153.32
223.33	154.59	225.93	155.7	231.59	157.81	232.29	158.07	236.18	159.497
237.58	160.01	238.66	160.48	241.94	161.16	245.92	161.99	249.95	163.23
252.33	164.56	256.62	166.27	258.85	167.25	259.63	167.69	262.29	168.53
263.32	168.86	264.29	169.16	264.52	169.22	264.81	169.32	268.19	170.29
271.18	170.38	273.55	170.46						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	132.98	.04	236.18	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
132.98	236.18	214.01	139.01 61.26	.1	.3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 560.40

INPUT
Description:
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	168	103.34	167.16	106.06	166.4	115.56	164.66	116.2	164.53
123.46	163.47	123.72	163.43	123.73	163.43	129.45	162.93	130.44	162.82
135.28	162.15	137.44	161.87	139.13	161.08	141.27	159.687	144.2	157.78
145.85	156.42	146.66	155.66	147.55	155.04	147.8	154.87	155.76	150.27
158.3	149.26	160.1	148.16	162.1	148.06	163.87	147.91	167.62	147.6
169.51	147.36	169.55	147.35	170.96	147.11	171.41	147.11	172.7	146.76
175.66	146.74	178.13	146.89	178.73	146.94	179.32	147.03	182.6	147.86
183.22	147.85	186.81	147.85	188.6	147.87	192.03	148.03	194.16	148.11
199.37	148.01	201.81	148.04	204.5	148.28	205.69	148.36	209.41	148.75

210.02	148.81	210.3	148.95	217.16	153.36	219.75	154.43	221.92	155.08
224.02	156.48	224.88	157.05	227	158.44	228.61	159.14	230.04	159.689
232.02	160.45	235.16	162.56	237.41	163.86	240.91	166.01	241.76	166.57

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	141.27	.04	230.04	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
141.27	230.04	143.12	139.75	141.17	.1	.3

CULVERT

RIVER: Hilltop
REACH: Hilltop RS: 560.38

INPUT
Description:
Distance from Upstream XS = 76.96
Deck/Roadway Width = 20
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 66

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
100	165.47		103.33	164.71		104.44	164.45	
106.01	163.96		108.11	163.55		110.31	163.37	
115.06	162.96		117.82	162.73		120.26	162.5	
123.93	162.29		137.61	161.68		139.84	161.59	
140.47	161.55		141.25	161.52		150.63	160.97	
154.92	160.64		158.36	160.31		159.75	159.52	
160.3	159.31		162.29	159.02		163.18	159.01	
165.28	159.14		165.67	159.12		166.05	159.23	
168.4	159.68		168.87	159.77		169.29	159.86	
170.98	160.18		174.82	160.43		176.04	160.47	
176.38	160.49		178.15	160.53		179.07	160.54	
179.26	160.53		179.87	160.47		183.45	160.16	
186.14	160.43		188.94	160.53		190.05	160.57	
192.37	160.73		196.47	160.57		200.99	161.07	
203.63	161.14		208.78	161.34		210.53	161.57	
215.35	161.77		215.76	161.8		216.02	161.83	
219.4	162.57		221.06	162.75		224.92	163.06	
225.14	163.07		225.85	163.1		226.93	163.14	
227.01	163.13		229.27	162.99		232.07	162.75	
233.86	162.66		234.22	162.68		234.33	162.68	
236.05	162.6		240.56	162.4		241.9	162.46	
247.72	162.79		250.26	163.61		250.95	163.86	

Upstream Bridge Cross Section Data
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	168	103.34	167.16	106.06	166.4	115.56	164.66	116.2	164.53
123.46	163.47	123.72	163.43	123.73	163.43	129.45	162.93	130.44	162.82
135.28	162.15	137.44	161.87	139.13	161.08	141.27	159.687	144.2	157.78
145.85	156.42	146.66	155.66	147.55	155.04	147.8	154.87	155.76	150.27
158.3	149.26	160.1	148.16	162.1	148.06	163.87	147.91	167.62	147.6
169.51	147.36	169.55	147.35	170.96	147.11	171.41	147.11	172.7	146.76
175.66	146.74	178.13	146.89	178.73	146.94	179.32	147.03	182.6	147.86
183.22	147.85	186.81	147.85	188.6	147.87	192.03	148.03	194.16	148.11
199.37	148.01	201.81	148.04	204.5	148.28	205.69	148.36	209.41	148.75
210.02	148.81	210.3	148.95	217.16	153.36	219.75	154.43	221.92	155.08
224.02	156.48	224.88	157.05	227	158.44	228.61	159.14	230.04	159.689
232.02	160.45	235.16	162.56	237.41	163.86	240.91	166.01	241.76	166.57

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	141.27	.04	230.04	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
141.27	230.04	.1	.3

Downstream Deck/Roadway Coordinates num= 60

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
100	165.62		103.39	165.22		106.76	164.75	
108.49	164.32		118.64	163.17		119.29	163.1	
124.93	162.54		133.06	161.62		133.69	161.44	
134.23	161.29		143.83	159.45		147.8	158.87	
151.77	158.63		154.73	158.08		158.77	158.35	
160.04	158.24		165.07	158.18		166.45	158.18	
166.96	158.19		172.24	158.2		176.57	158.3	
178.15	158.33		182.98	158.6		184.09	158.63	
184.34	158.65		195.06	158.81		195.55	158.82	
196.3	158.88		200.1	158.95		203.81	158.98	
204.29	158.98		209.03	159.26		210.91	159.42	
213.85	159.7		214.99	159.82		215.42	159.86	
218.29	159.96		218.8	159.98		220.82	160.13	
222.5	160.25		223.87	160.32		227.49	160.41	
231.26	160.62		232.67	160.66		233.24	160.65	
240.15	161.03		241.81	161.04		242.68	161.08	
244.21	161.17		247.39	161.4		248.71	161.47	
250.03	161.57		255.6	161.94		256.39	162	
258.02	162.11		260.17	162.35		263.94	162.61	
265.05	162.88		267.22	163.5		269.08	163.89	

Downstream Bridge Cross Section Data
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	167.48	100.33	167.44	103.29	166.66	105.66	165.72	110.08	164.02
110.72	163.75	110.75	163.73	111.3	163.44	114.11	161.99	115.62	161.04
116.92	160.25	117.8	159.68	123.17	157.46	123.93	157.2	131.22	154.67
132.68	154.01	134.03	153.55	137.81	152.59	144.01	151.13	152.41	149.11
155.45	148.25	158.72	147.85	165.38	146.95	167.47	146.76	174	146.38
177.83	146.02	181.32	145.72	183.43	145.45	189.22	144.13	190.18	143.96
190.92	143.46	192.27	143.06	192.46	143.12	194.66	143.34	195.56	143.62
196.09	143.83	197.27	144.23	199.21	144.87	199.73	145.1	201.27	145.97
204.91	147.62	205.85	148.13	207.51	148.78	211.4	150.37	215.29	151.44
219.09	153.15	220.4	153.64	223.22	154.27	223.33	154.29	226.17	155.23
229.7	156.19	231.11	156.96	232.91	157.62	233.73	157.79	234.93	158.03
237.68	158.16	238.52	158.16	241.74	158.03	242.08	158.02	242.23	158.03
244.16	158.2	248.68	158.63	249.19	158.68	252.81	159.2	257.64	159.64
260.63	158.96	261.58	158.78	261.96	158.78	264.33	159.52	264.63	159.59
266.84	160.19	270.05	161.01	270.45	161.06				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	110.75	.04	233.73	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
110.75	233.73	.3	.5

Upstream Embankment side slope = 3 horiz. to 1.0 vertical
Downstream Embankment side slope = 3 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Energy head used in spillway design =

Spillway height used in design =
Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #EX	Circular	3	

FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
1	.167	139.5	.013	.013	0	.5	1

Upstream Elevation = 146.8
Centerline Station = 174.59
Downstream Elevation = 143.3
Centerline Station = 193.72

CULVERT OUTPUT Profile #100yr Culv Group: Culvert #EX

Q Culv Group (cfs)	117.07	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	16.56
Q Barrel (cfs)	117.07	Culv Vel DS (ft/s)	19.93
E.G. US. (ft)	159.69	Culv Inv El Up (ft)	146.80
W.S. US. (ft)	159.69	Culv Inv El Dn (ft)	143.30
E.G. DS (ft)	145.99	Culv Frctn Ls (ft)	4.30
W.S. DS (ft)	145.47	Culv Exit Loss (ft)	5.81
Delta EG (ft)	13.70	Culv Entr Loss (ft)	2.13
Delta WS (ft)	14.22	Q Weir (cfs)	7.73
E.G. IC (ft)	159.69	Weir Sta Lft (ft)	159.44
E.G. OC (ft)	157.00	Weir Sta Rgt (ft)	168.48
Culvert Control	Inlet	Weir Submerg	0.00
Culv WS Inlet (ft)	149.80	Weir Max Depth (ft)	0.69
Culv WS Outlet (ft)	145.62	Weir Avg Depth (ft)	0.46
Culv Nml Depth (ft)	3.00	Weir Flow Area (sq ft)	4.13
Culv Crt Depth (ft)	3.00	Min El Weir Flow (ft)	159.02

Warning: During the supercritical analysis, the program could not converge on a supercritical answer in the downstream cross section. The program used the solution with the least error.
Warning: During the culvert outlet control computations, the program could not balance the culvert/weir flow. The reported outlet energy grade answer may not be valid.
Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the height of the culvert.
Note: Culvert critical depth exceeds the height of the culvert.
Note: The flow in the culvert is entirely supercritical.

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 420.65

INPUT
Description:
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	167.48	100.33	167.44	103.29	166.66	105.66	165.72	110.08	164.02
110.72	163.75	110.75	163.73	111.3	163.44	114.11	161.99	115.62	161.04

116.92	160.25	117.8	159.68	123.17	157.46	123.93	157.2	131.22	154.67
132.68	154.01	134.03	153.55	137.81	152.59	144.01	151.13	152.41	149.11
155.45	148.25	158.72	147.85	165.38	146.95	167.47	146.76	174	146.38
177.83	146.02	181.32	145.72	183.43	145.45	189.22	144.13	190.18	143.96
190.92	143.46	192.27	143.06	192.46	143.12	194.66	143.34	195.56	143.62
196.09	143.83	197.27	144.23	199.21	144.87	199.73	145.1	201.27	145.97
204.91	147.62	205.85	148.13	207.51	148.78	211.4	150.37	215.29	151.44
219.09	153.15	220.4	153.64	223.22	154.27	223.33	154.29	226.17	155.23
229.7	156.19	231.11	156.96	232.91	157.62	233.73	157.79	234.93	158.03
237.68	158.16	238.52	158.16	241.74	158.03	242.08	158.02	242.23	158.03
244.16	158.2	248.68	158.63	249.19	158.68	252.81	159.2	257.64	159.64
260.63	158.96	261.58	158.78	261.96	158.78	264.33	159.52	264.63	159.59
266.84	160.19	270.05	161.01	270.45	161.06				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	110.75	.04	233.73	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110.75	233.73	86.49	70.65	54.63	.3	.5

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 350

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	166.86	101.77	166.82	102.72	166.84	110.32	166.8	112.97	166.7
115.88	166.58	122.37	166.43	124.75	166.16	126.26	165.98	129.28	164.82
131.43	164.24	132.14	163.65	134.94	161.16	138.55	158.76	139.95	157.83
140.8	157.26	146.17	154.91	147.02	154.52	149.28	153.36	150.26	152.878
157.56	149.29	163.1	146.51	168.07	143.83	174.02	143.09	174.93	142.93
180.06	142.44	184.03	143.23	190.06	145.79	190.89	146.17	191.91	146.5
199.08	148.61	205.07	149.96	207.85	150.7	214.07	152.72	216.36	153.55
216.56	153.86	217.59	154.52	218.08	154.84	220.52	155.08	226.72	155.24
236.56	155.9	247.01	156.27	249.51	156.38	250	156.39		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	150.26	.04	217.59	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
150.26	217.59	85.46	82.4	83.12	.3	.5

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 267.60

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	165.44	105.48	165.28	105.62	165.08	105.66	164.52	105.67	164.46
105.72	164.36	106.01	164.21	106.01	161.23	107.19	159.81	112.27	157.81
112.91	157.38	114.51	156.7	118.33	154.07	122.17	153.25	124.35	148.76
126.76	148.38	130.28	146.72	131.26	143.97	131.73	143.835	134.26	143.11
136.04	142.83	136.2	142.34	141.47	141.29	142.25	141.7	146.49	144.866

146.63	144.97	148.31	145.93	151.27	146.79	154.36	147.3	154.78	147.34
155.04	148.35	159.68	150.4	160.16	151.99	160.22	153.6	164.62	154.31
174.65	154.64	187.35	157.96	190.1	158.15	193.52	158.39	202.03	158.69
203.42	159.11								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	131.73	.04	146.49	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
131.73	146.49	66.54	67.6	68.45	.1 .3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 200

INPUT
Description:
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	160.25	105.48	160.01	105.62	160	106.01	160	107.19	159.62
112.27	158	112.91	157.8	114.51	157.26	118.33	156	122.17	154.74
124.35	154	126.76	153.2	130.28	152	131.26	151.67	134.26	150.64
136.04	150.05	136.2	150	141.47	148.26	142.25	148	146.63	146.55
147	146.43	148.31	146	151.27	145.02	154.36	144	154.78	143.86
155.04	143.78	159.68	142	160.16	141.88	160.22	141.89	164.62	140.98
174.65	141.05	187.35	141.25	190.1	141.38	193.52	141.55	202.03	142
203.42	142.52	207.56	144	211.57	145.43	213.09	146	213.55	146.17
216.82	147.38	218.56	148	223.78	149.9	224.05	150	224.21	150.06
224.65	150.21	228.34	151.53	229.7	152	230.55	152.3	235.37	154
236.98	154.56	241.11	156	243.64	156.91	246.77	158	254.72	159.13
261.24	160	262.22	160.1	262.4	160.11	271.27	161.01	273.55	161.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	147	.04	213.55	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
147	213.55	65.45	67.6	71.5	.1 .3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 23.32

INPUT
Description:
Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	144.95	101.7	144.72	107.06	144	108.47	143.81	109.86	143.63
115.6	142	120.02	140.75	122.71	140	134.48	140	139.97	139.66
151.24	139.93	157.83	139.93	160.64	139.94	163.47	139.93	166.21	139.93
169.67	139.95	171.49	139.94	175.17	139.97	177.78	140	180.58	140.42
187.53	142	193.19	142.08	194.04	142.09	198.68	142.13	199.34	142.14
205.94	142.05	209.45	142.01	210.42	142	212.58	141.38	215.02	140.68
216.55	140.27	217.56	140	220.18	139.26	221.53	138.94	225.4	138
225.79	137.91	225.94	137.87	226.12	137.81	228.4	137.16	229.69	136.64
231.18	136	243.96	136	245.32	136.97	246.86	138	247.54	138.47
249.85	140	250.57	140.48	252.39	141.71	252.84	142	253.67	142.54
253.8	142.63	255.78	144	255.85	144.04	258.78	145.88	258.95	146

259.57	146.39	261.44	147.56	261.76	147.77	262.08	148	262.2	148
271.7	148.52	277.5	148.84	280.96	149.03	289.98	150	290	150
292.24	151.1	292.67	151.32	292.94	151.45	294.02	152	295.27	152.62
297.93	154	299.78	154.92	301.95	156	304.59	157.31	306	158
307.44	158.71	309.98	160	310.06	160	312.86	161.39	314.1	162
315.28	162.57	318.13	164	321.6	165.75	322.19	166	325.88	167.6
326.79	168	329.28	168	330.53	167.86	330.98	167.9	331.26	167.91
331.69	167.92	334.94	167.73	335.9	167.74	336.79	167.75	340.94	167.63

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	209.45	.04	253.8	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
209.45	253.8	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Hilltop

Reach	River Sta.	n1	n2	n3
Hilltop	1395	.04	.04	.04
Hilltop	1300	.04	.04	.04
Hilltop	1240.42	.04	.04	.04
Hilltop	1190.01	.04	.03	.04
Hilltop	1047.33	.04	.04	.04
Hilltop	895.36	.04	.04	.04
Hilltop	699.41	.04	.04	.04
Hilltop	560.40	.04	.04	.04
Hilltop	560.38	Culvert		
Hilltop	420.65	.04	.04	.04
Hilltop	350	.04	.04	.04
Hilltop	267.60	.04	.04	.04
Hilltop	200	.04	.04	.04
Hilltop	23.32	.04	.04	.04

SUMMARY OF REACH LENGTHS

River: Hilltop

Reach	River Sta.	Left	Channel	Right
Hilltop	1395	93.36	95	83.4
Hilltop	1300	49.19	59.58	66.35
Hilltop	1240.42	49.87	50.41	50.23
Hilltop	1190.01	142.34	142.68	143.12
Hilltop	1047.33	170.03	151.97	168.66
Hilltop	895.36	130.09	195.5	182.16
Hilltop	699.41	214.01	139.01	61.26
Hilltop	560.40	143.12	139.75	141.17
Hilltop	560.38	Culvert		
Hilltop	420.65	86.49	70.65	54.63
Hilltop	350	85.46	82.4	83.12
Hilltop	267.60	66.54	67.6	68.45
Hilltop	200	65.45	67.6	71.5
Hilltop	23.32	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Hilltop

Reach	River Sta.	Contr.	Expan.
Hilltop	1395	.1	.3
Hilltop	1300	.1	.3
Hilltop	1240.42	.1	.3
Hilltop	1190.01	.1	.3
Hilltop	1047.33	.1	.3
Hilltop	895.36	.1	.3
Hilltop	699.41	.1	.3
Hilltop	560.40	.1	.3
Hilltop	560.38	Culvert	
Hilltop	420.65	.3	.5
Hilltop	350	.3	.5
Hilltop	267.60	.1	.3
Hilltop	200	.1	.3
Hilltop	23.32	.1	.3

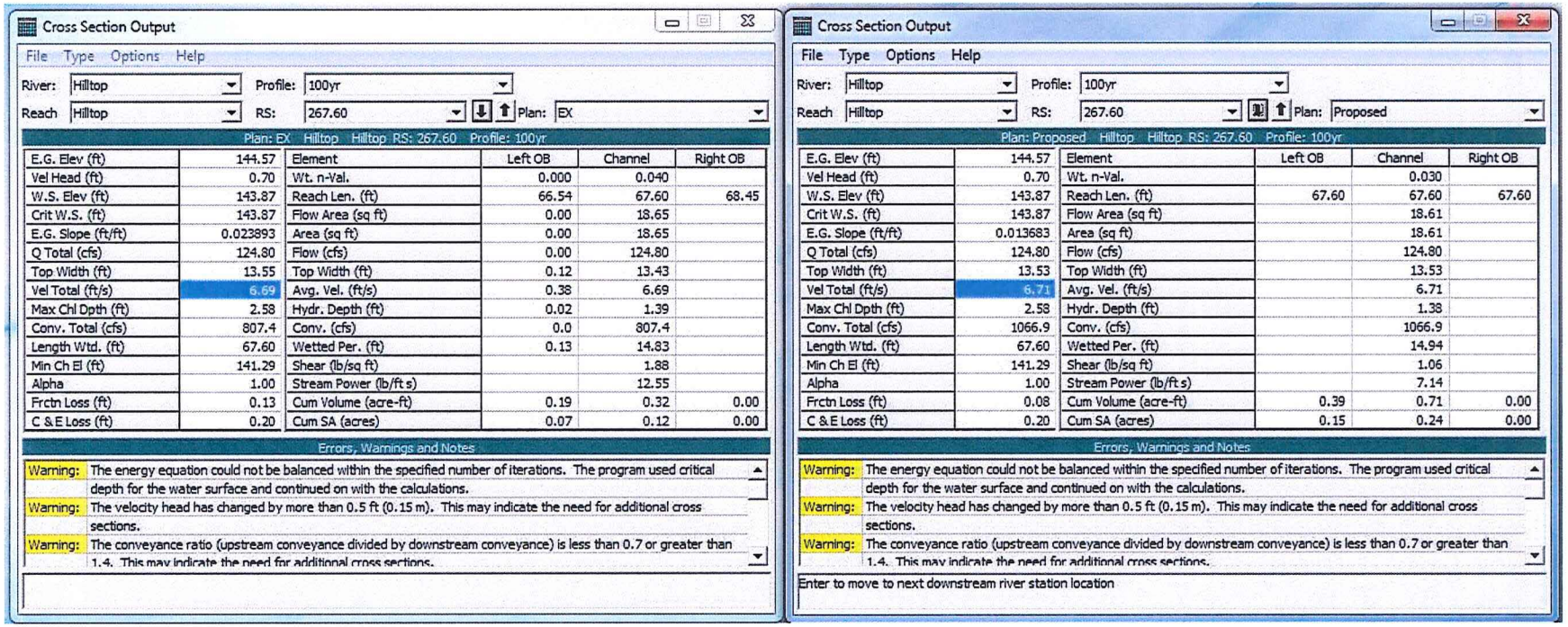
HEC-RAS Proposed Condition Computer Output

HEC-RAS Plan: Proposed River: Hilltop Reach: Hilltop Profile: 100yr

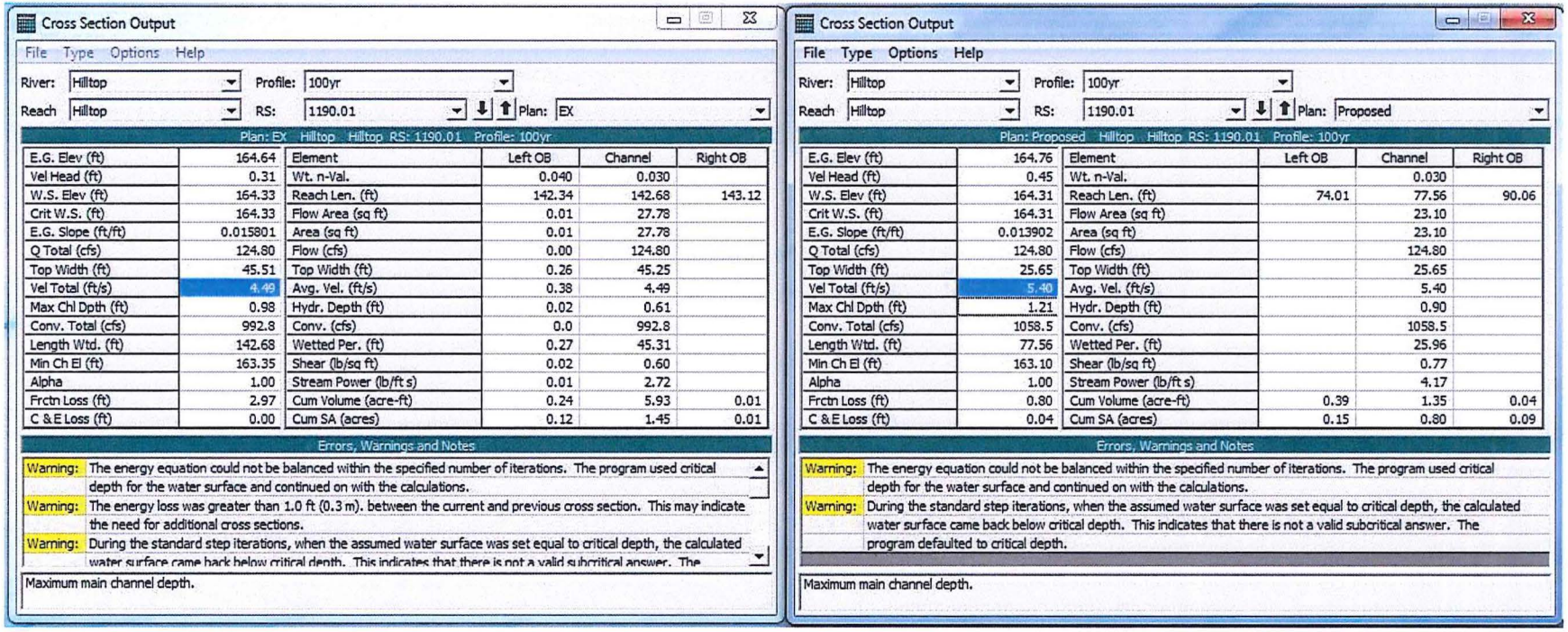
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Hilltop	1395	100yr	124.80	169.18	169.91	169.91	170.16	0.016781	4.02	31.06	62.63	1.01
Hilltop	1300	100yr	124.80	165.55	166.67	166.67	166.96	0.016358	4.35	28.66	50.25	1.02
Hilltop	1240.42	100yr	124.80	163.53	165.00		165.10	0.002746	2.51	49.75	52.76	0.45
Hilltop	1221.79	100yr	124.80	163.47	164.89		165.03	0.004689	3.03	41.23	48.59	0.58
Hilltop	1190.01	100yr	124.80	163.10	164.31	164.31	164.76	0.013902	5.40	23.10	25.65	1.00
Hilltop	1112.45	100yr	124.80	162.15	163.56	163.37	163.89	0.007940	4.65	26.82	24.26	0.78
Hilltop	1035.70	100yr	124.80	161.39	162.60	162.60	163.08	0.013971	5.58	22.37	23.63	1.01
Hilltop	969.61	100yr	124.80	160.72	162.05		162.28	0.006069	3.82	32.66	32.79	0.67
Hilltop	904.49	100yr	124.80	160.08	161.48	161.30	161.82	0.007995	4.67	26.74	24.20	0.78
Hilltop	809.87	100yr	124.80	159.14	160.35	160.35	160.82	0.014159	5.47	22.82	24.99	1.01
Hilltop	715.85	100yr	124.80	158.21	159.59		159.82	0.006017	3.88	32.18	31.42	0.68
Hilltop	601.93	100yr	124.80	157.07	159.46		159.54	0.001037	2.36	52.80	28.29	0.31
Hilltop	469.96	100yr	124.80	155.75	159.16	157.57	159.38	0.001211	3.80	32.81	59.20	0.37
Hilltop	469.94		Culvert									
Hilltop	323.55	100yr	124.80	143.58	145.20	145.20	145.89	0.011774	6.67	18.71	21.86	1.00
Hilltop	267.60	100yr	124.80	141.29	143.87	143.87	144.57	0.013683	6.71	18.61	13.53	1.01
Hilltop	200	100yr	124.80	140.98	143.30		143.33	0.000378	1.41	88.48	49.32	0.19
Hilltop	23.32	100yr	124.80	136.00	143.32	137.34	143.32	0.000005	0.32	478.84	143.85	0.02

Plan: Proposed Hilltop Hilltop RS: 469.94 Culv Group: Culvert #1 Profile: 100yr

Q Culv Group (cfs)	124.80	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	11.09
Q Barrel (cfs)	124.80	Culv Vel DS (ft/s)	22.81
E.G. US. (ft)	159.39	Culv Inv El Up (ft)	153.17
W.S. US. (ft)	159.16	Culv Inv El Dn (ft)	145.08
E.G. DS (ft)	145.89	Culv Frctn Ls (ft)	0.00
W.S. DS (ft)	145.20	Culv Exit Loss (ft)	9.07
Delta EG (ft)	13.50	Culv Entr Loss (ft)	0.96
Delta WS (ft)	13.96	Q Weir (cfs)	
E.G. IC (ft)	158.88	Weir Sta Lft (ft)	
E.G. OC (ft)	159.39	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	156.52	Weir Max Depth (ft)	
Culv WS Outlet (ft)	146.88	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.59	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.35	Min El Weir Flow (ft)	160.91



Existing and Proposed Conditions at Station 2+67.60 twenty feet south of Culvert Exit/Riprip Disspater.



Cross Section Output

File Type Options Help

River: Hilltop Profile: 100yr

Reach Hilltop RS: 1190.01 Plan: EX

Plan: EX Hilltop Hilltop RS: 1190.01 Profile: 100yr

E.G. Elev (ft)	164.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.040	0.030	
W.S. Elev (ft)	164.33	Reach Len. (ft)	142.34	142.68	143.12
Crit W.S. (ft)	164.33	Flow Area (sq ft)	0.01	27.78	
E.G. Slope (ft/ft)	0.015801	Area (sq ft)	0.01	27.78	
Q Total (cfs)	124.80	Flow (cfs)	0.00	124.80	
Top Width (ft)	45.51	Top Width (ft)	0.26	45.25	
Vel Total (ft/s)	4.49	Avg. Vel. (ft/s)	0.38	4.49	
Max Chl Dpth (ft)	0.98	Hydr. Depth (ft)	0.02	0.61	
Conv. Total (cfs)	992.8	Conv. (cfs)	0.0	992.8	
Length Wtd. (ft)	142.68	Wetted Per. (ft)	0.27	45.31	
Min Ch El (ft)	163.35	Shear (lb/sq ft)	0.02	0.60	
Alpha	1.00	Stream Power (lb/ft s)	0.01	2.72	
Frctn Loss (ft)	2.97	Cum Volume (acre-ft)	0.24	5.93	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	1.45	0.01

Errors, Warnings and Notes

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The

Maximum main channel depth.

Cross Section Output

File Type Options Help

River: Hilltop Profile: 100yr

Reach Hilltop RS: 1190.01 Plan: Proposed

Plan: Proposed Hilltop Hilltop RS: 1190.01 Profile: 100yr

E.G. Elev (ft)	164.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.030	
W.S. Elev (ft)	164.31	Reach Len. (ft)	74.01	77.56	90.06
Crit W.S. (ft)	164.31	Flow Area (sq ft)		23.10	
E.G. Slope (ft/ft)	0.013902	Area (sq ft)		23.10	
Q Total (cfs)	124.80	Flow (cfs)		124.80	
Top Width (ft)	25.65	Top Width (ft)		25.65	
Vel Total (ft/s)	5.40	Avg. Vel. (ft/s)		5.40	
Max Chl Dpth (ft)	1.21	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	1058.5	Conv. (cfs)		1058.5	
Length Wtd. (ft)	77.56	Wetted Per. (ft)		25.96	
Min Ch El (ft)	163.10	Shear (lb/sq ft)		0.77	
Alpha	1.00	Stream Power (lb/ft s)		4.17	
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)	0.39	1.35	0.04
C & E Loss (ft)	0.04	Cum SA (acres)	0.15	0.80	0.09

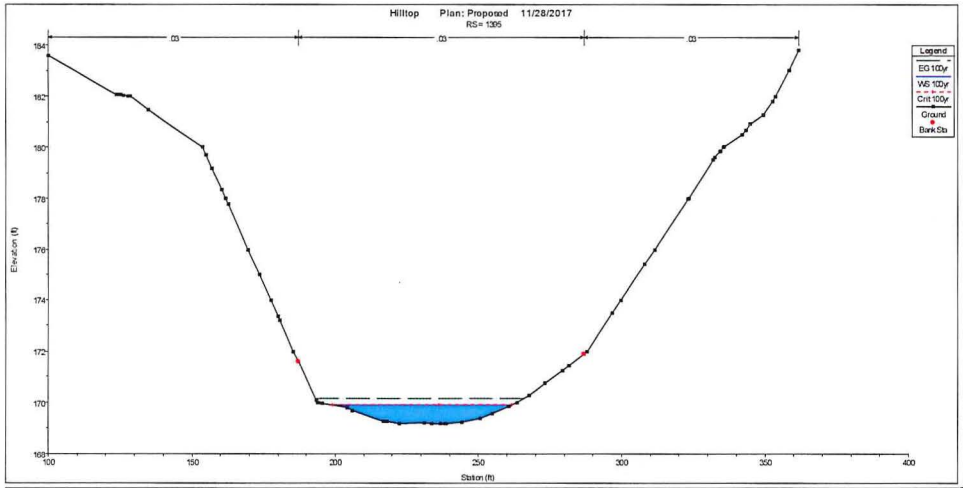
Errors, Warnings and Notes

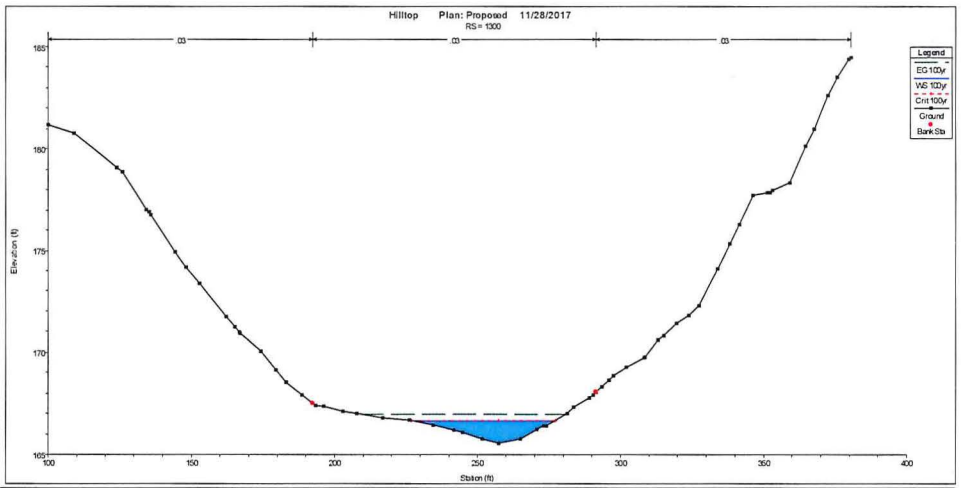
Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

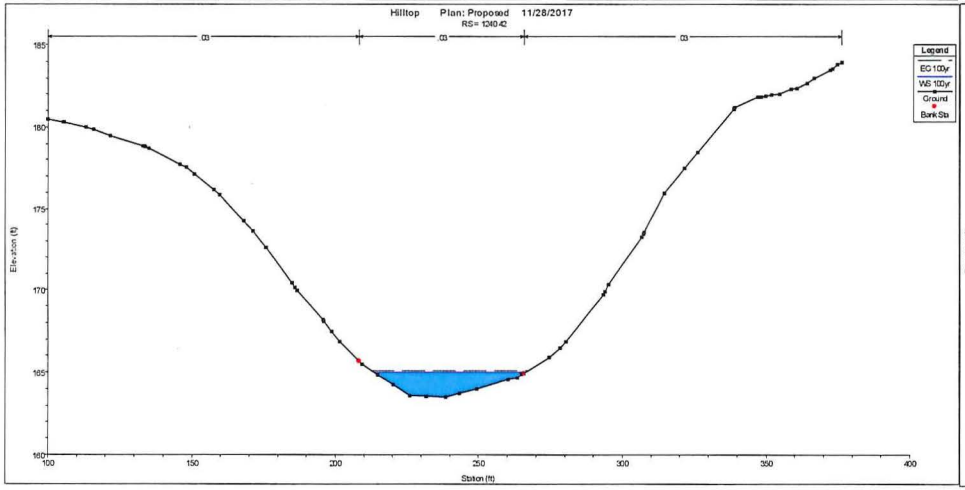
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

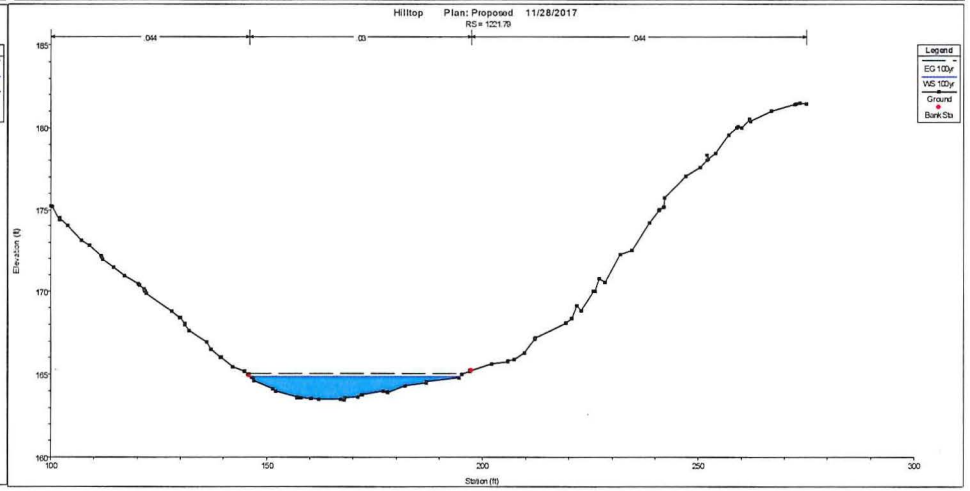
Maximum main channel depth.

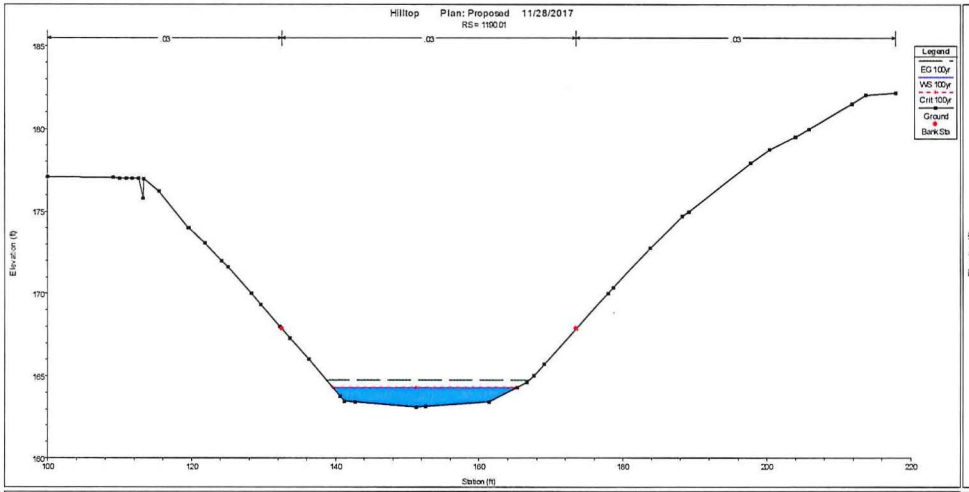
Existing and Proposed Conditions at Station 11+90.01 near North Property Line.

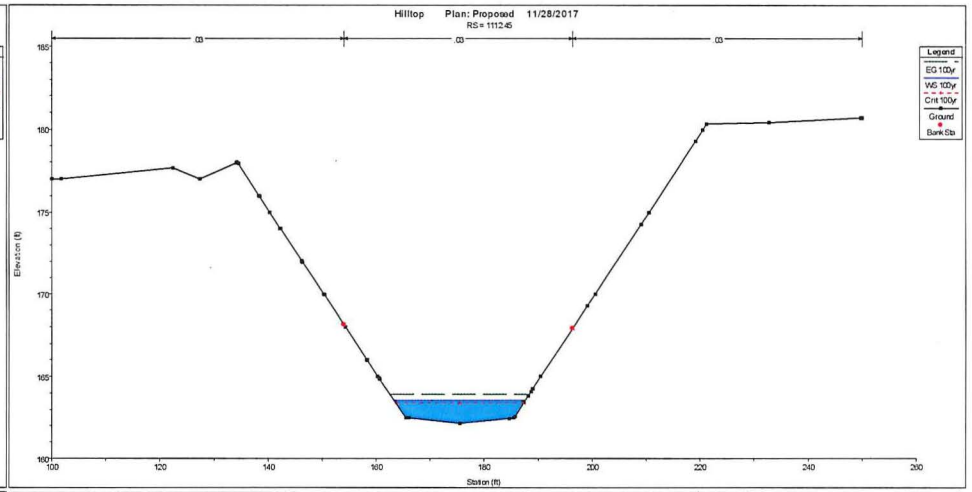

Hilltop Plan: Proposed 11/28/2017
RS = 1395
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

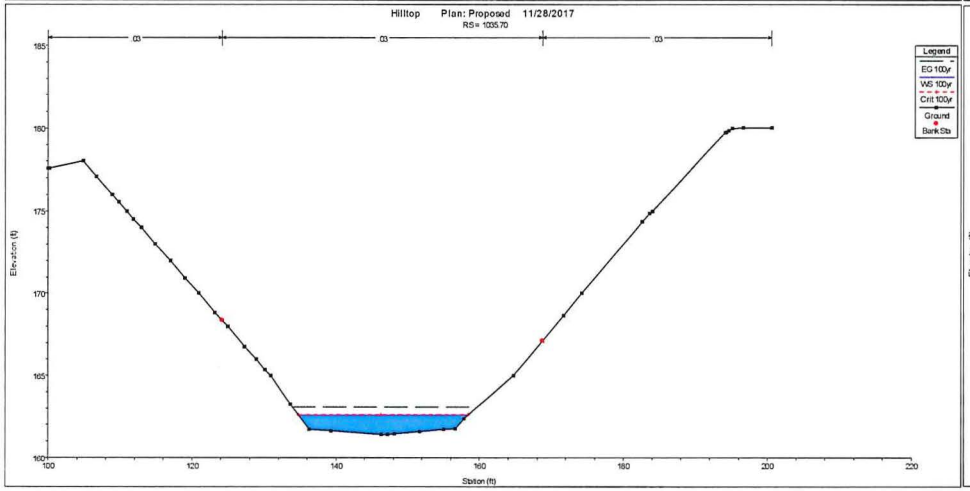

Hilltop Plan: Proposed 11/28/2017
RS = 1300
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

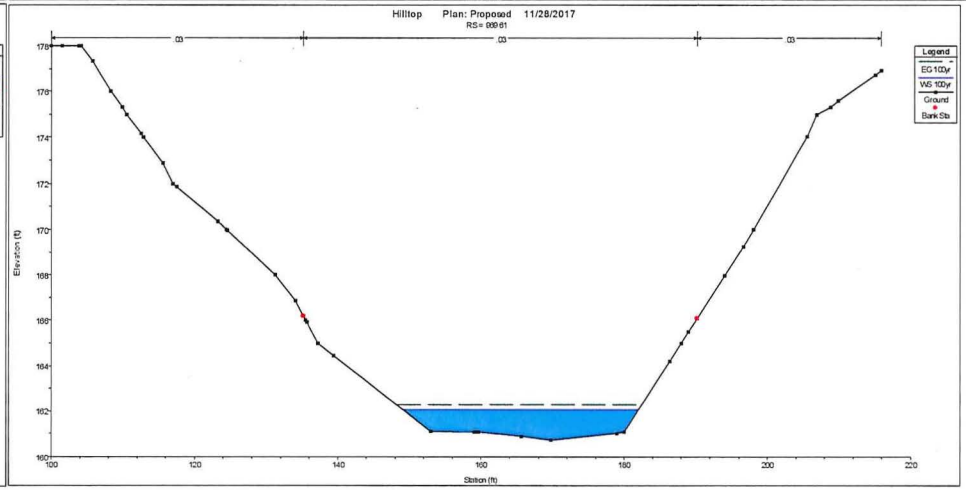

Hilltop Plan: Proposed 11/28/2017
RS = 1240.42
Legend
EG 100yr
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

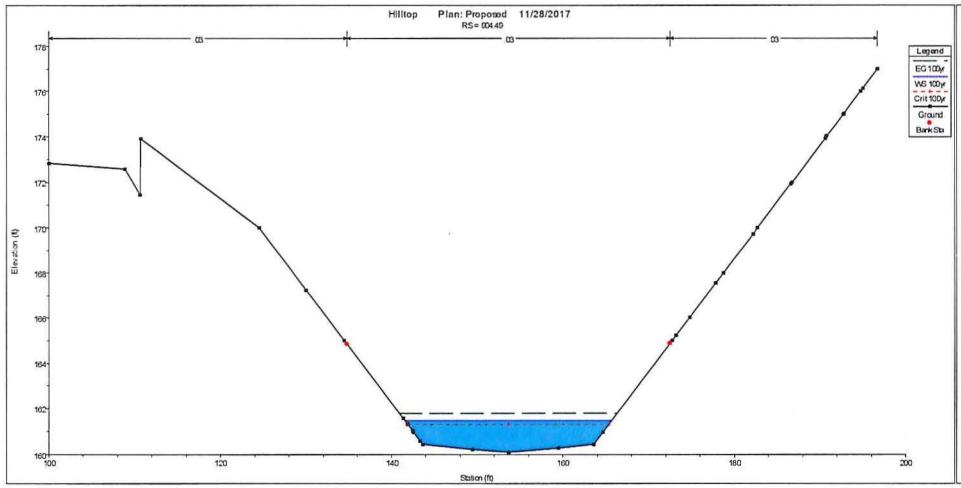

Hilltop Plan: Proposed 11/28/2017
RS = 1221.79
Legend
EG 100yr
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

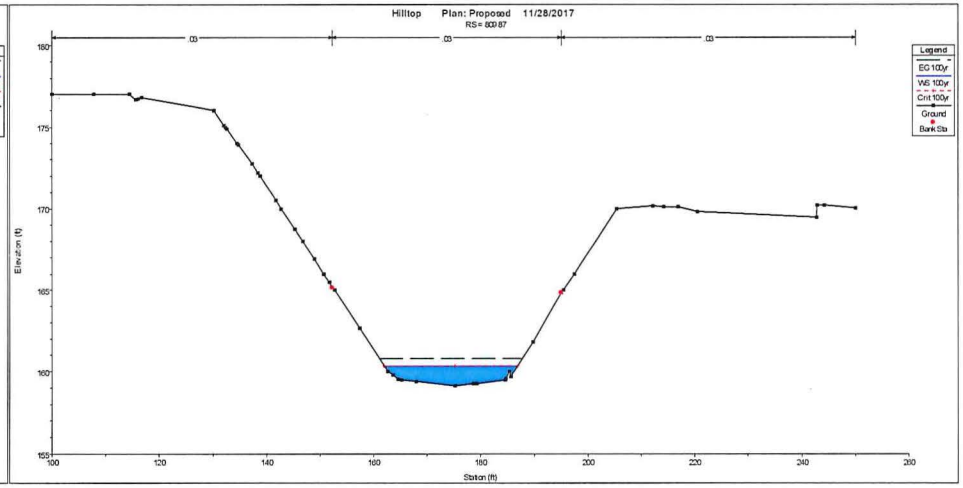

Hilltop Plan: Proposed 11/28/2017
RS = 1190.01
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

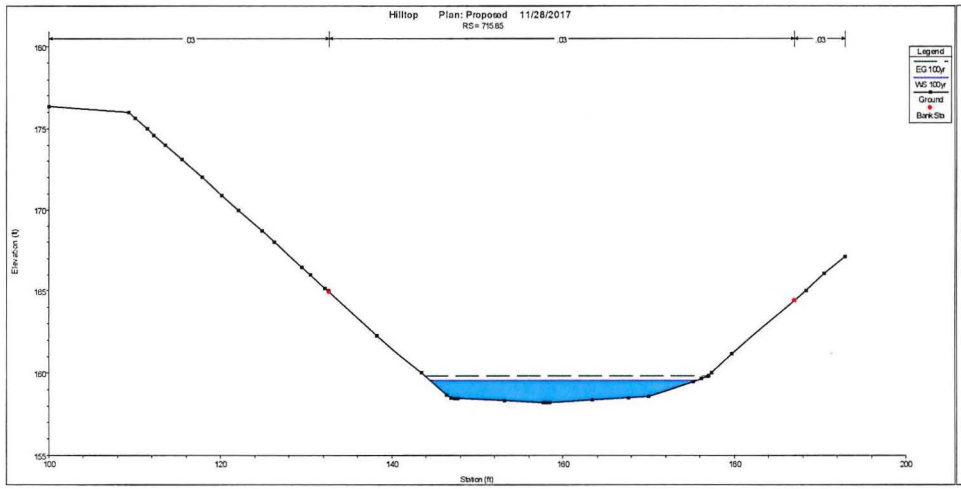

Hilltop Plan: Proposed 11/28/2017
RS = 1112.45
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

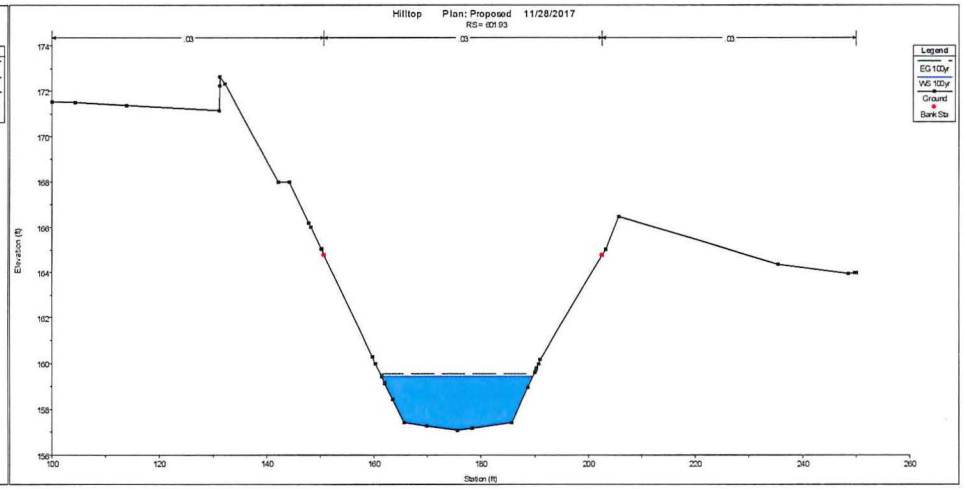

Hilltop Plan: Proposed 11/28/2017
RS = 1035.70
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

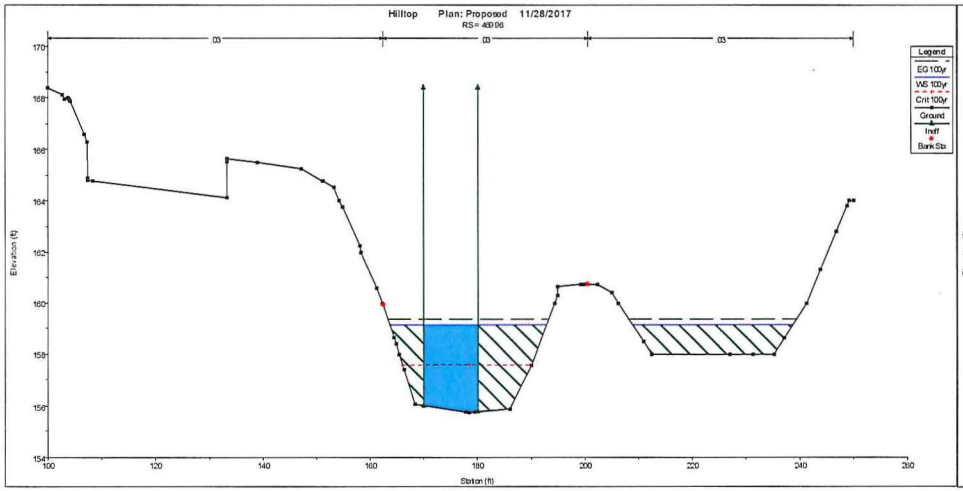

Hilltop Plan: Proposed 11/28/2017
RS = 999.61
Legend
EG 100yr
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

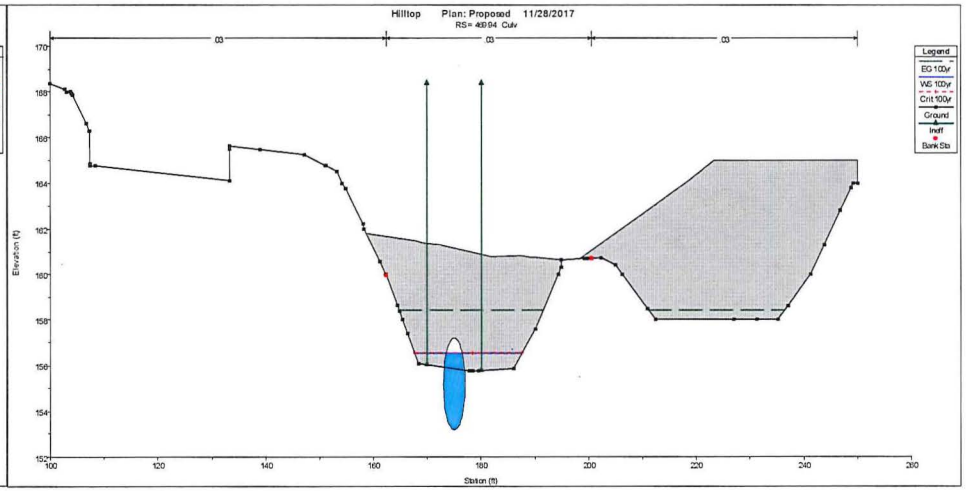

Hilltop Plan: Proposed 11/28/2017
RS= 00149
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

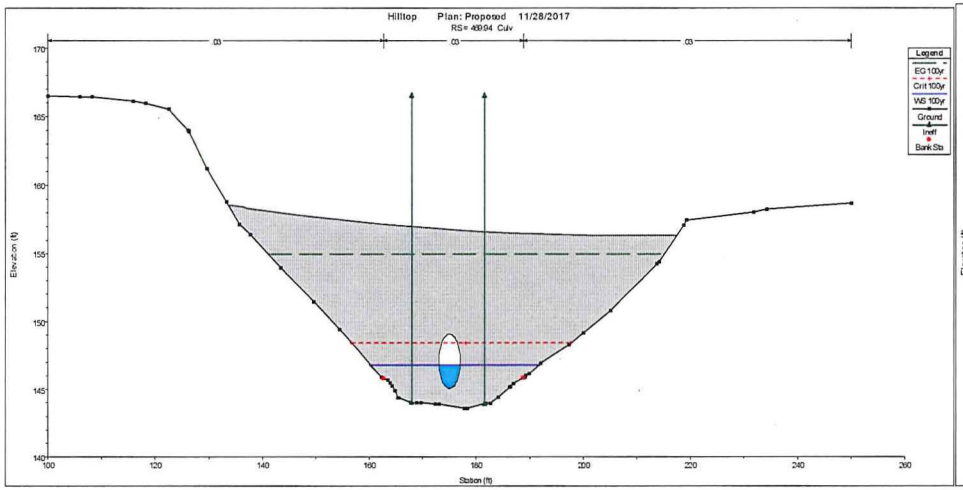

Hilltop Plan: Proposed 11/28/2017
RS= 800 87
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

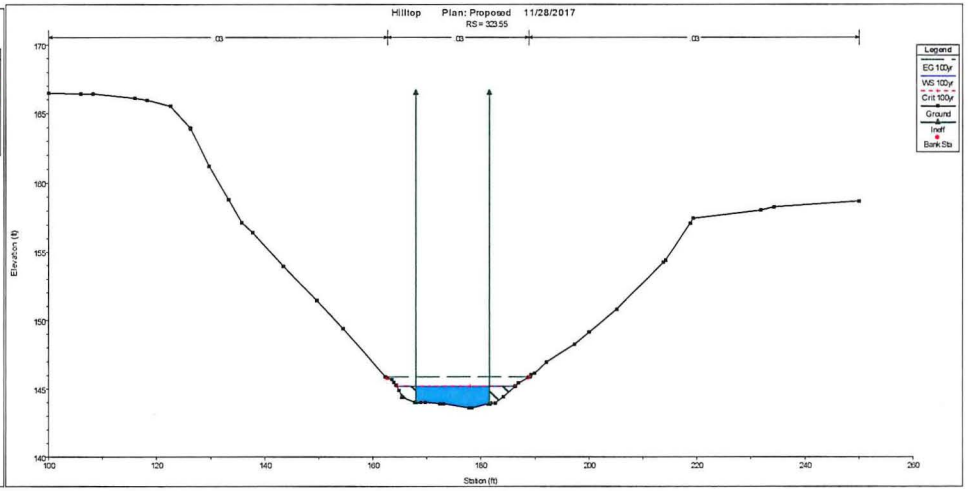

Hilltop Plan: Proposed 11/28/2017
RS= 715 85
Legend
EG 100yr
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

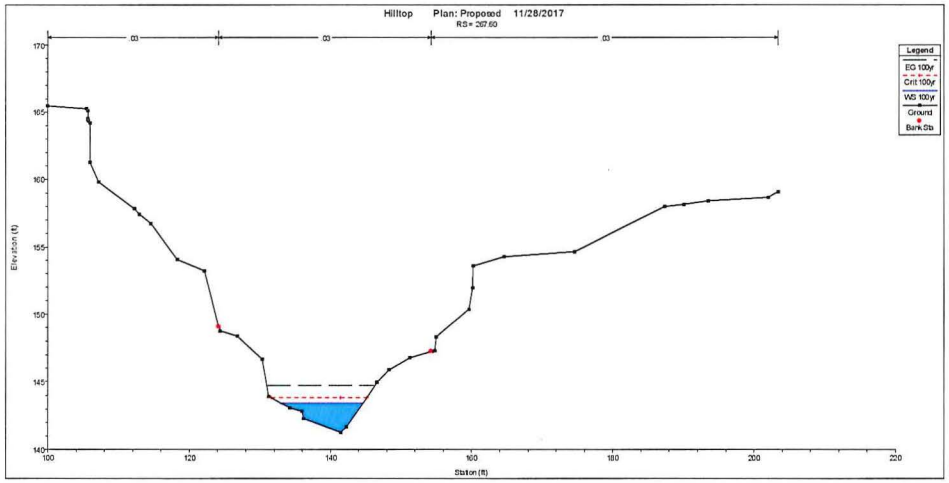

Hilltop Plan: Proposed 11/28/2017
RS= 601 93
Legend
EG 100yr
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

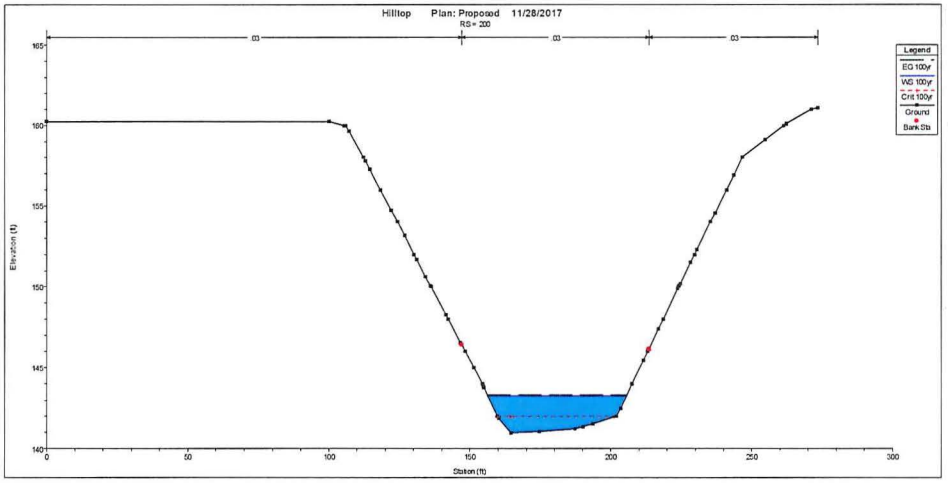

Hilltop Plan: Proposed 11/28/2017
RS = 49996
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

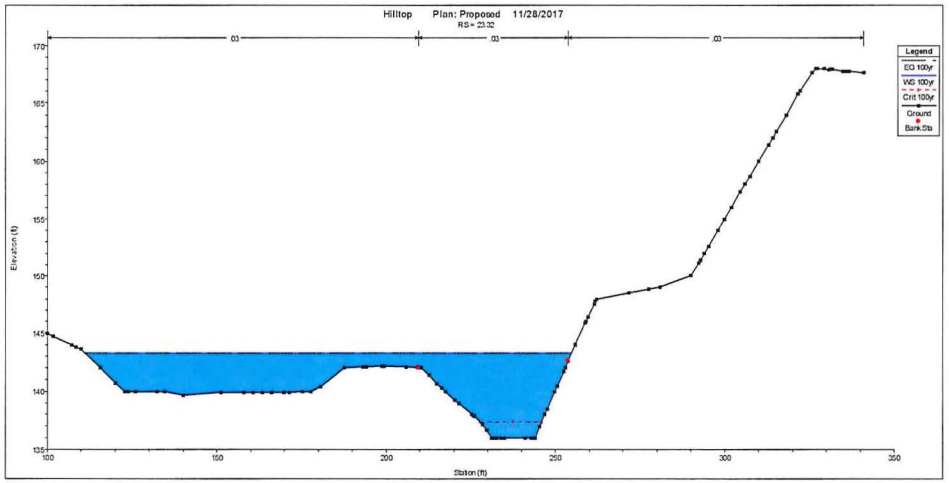

Hilltop Plan: Proposed 11/28/2017
RS = 49994 Culv
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

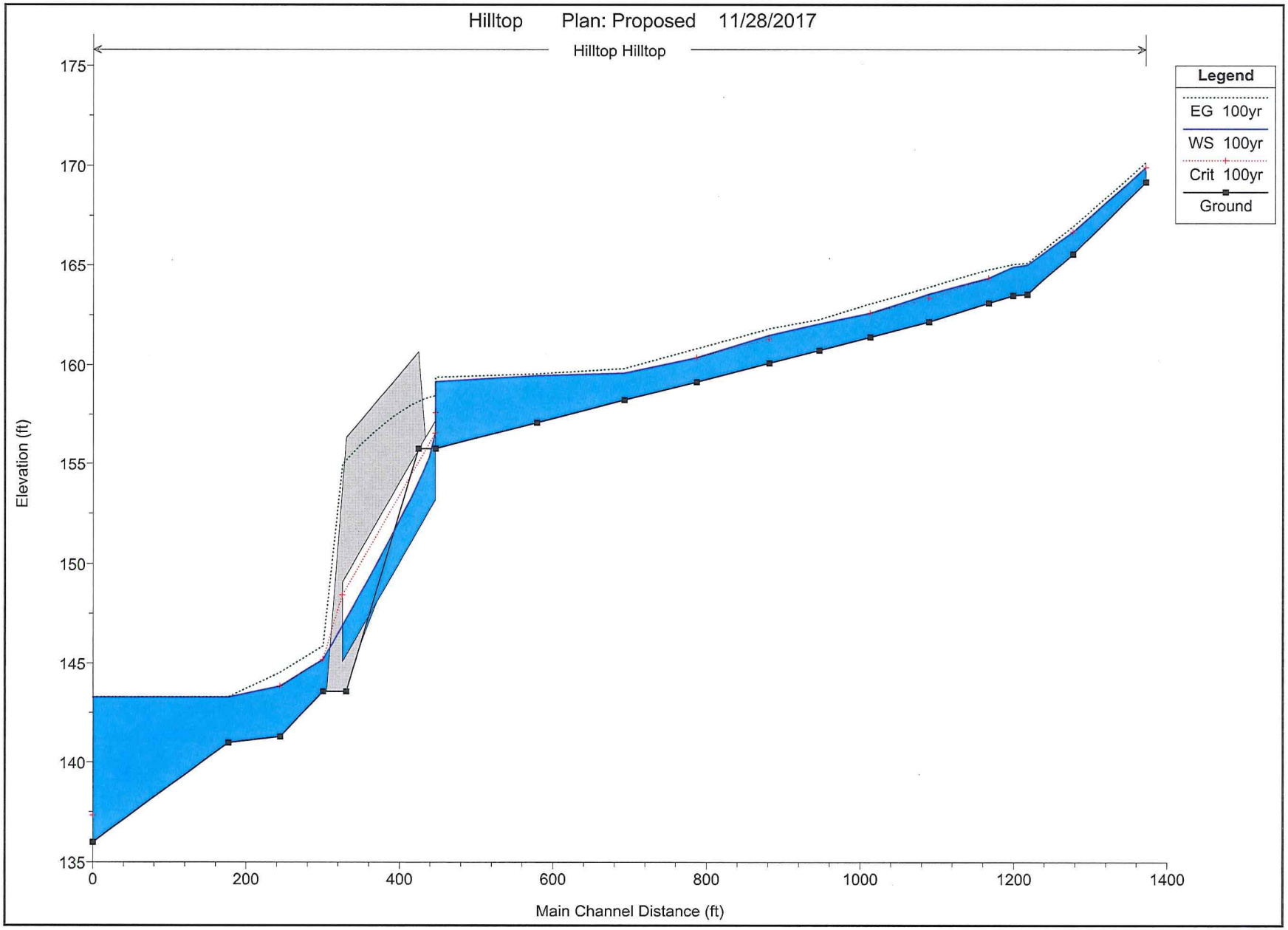

Hilltop Plan: Proposed 11/28/2017
RS = 49994 Culv
Legend
EG 100yr
Crit 100yr
WS 100yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Proposed 11/28/2017
RS = 32355
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Proposed 11/28/2017
RS = 267.60
Legend
EG 100yr
Crit 100yr
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Proposed 11/28/2017
RS = 200
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Proposed 11/28/2017
RS = 23.32
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Hilltop Plan: Proposed 11/28/2017
Hilltop Hilltop
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Elevation (ft)
175
170
165
160
155
150
145
140
135
0
200
400
600
800
1000
1200
1400
Main Channel Distance (ft)

HEC-RAS HEC-RAS 5.0.3 September 2016
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Hilltop
Project File : Hilltop.prj
Run Date and Time: 11/28/2017 2:33:02 PM

Project in English units

PLAN DATA

Plan Title: Proposed
Plan File : p:\4210.00\Engr\Reports\Drainage\HYDRA\HEC-RAS\Hilltop.p01

Geometry Title: Hilltop Prop
Geometry File :
p:\4210.00\Engr\Reports\Drainage\HYDRA\HEC-RAS\Hilltop.g02

Flow Title : Flow
Flow File :
p:\4210.00\Engr\Reports\Drainage\HYDRA\HEC-RAS\Hilltop.f01

Plan Summary Information:

Number of:	Cross Sections	= 17	Multiple Openings	=	0
	Culverts	= 1	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	= 0.01
Critical depth calculation tolerance	= 0.01
Maximum number of iterations	= 20
Maximum difference tolerance	= 0.3
Flow tolerance factor	= 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Flow
Flow File : p:\4210.00\Engr\Reports\Drainage\HYDRA\HEC-RAS\Hilltop.f01

Flow Data (cfs)

River	Reach	RS	100yr
Hilltop	Hilltop	1395	124.8

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Hilltop	Hilltop	100yr	Critical	

Known WS = 143.32

GEOMETRY DATA

Geometry Title: Hilltop Prop
Geometry File : p:\4210.00\Engr\Reports\Drainage\HYDRA\HEC-RAS\Hilltop.g02

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 1395

INPUT
Description:
Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	183.59	123.77	182.05	124.81	182.05	125.19	182.05	126.11	182.03
127.77	182.01	128.05	182.01	128.54	182	134.84	181.48	153.68	180
154.96	179.71	157.03	179.19	160.46	178.35	161.8	178	162.65	177.78
169.55	176	173.53	175	177.47	174	180.1	173.334	180.67	173.19
185.45	172	187.17	171.588	193.51	170.07	193.84	170	193.99	170
194.2	169.99	195.55	169.97	204.29	169.81	206.13	169.69	216.82	169.26
218.19	169.26	218.26	169.26	222.53	169.19	231.31	169.22	233.87	169.18
236.88	169.19	238.4	169.18	238.89	169.18	244.27	169.24	250.58	169.38
254.85	169.57	260.58	169.85	263.56	170	267.68	170.27	273.39	170.76
279.22	171.22	281.58	171.43	286.91	171.909	287.92	172	296.72	173.49
299.76	174	308.17	175.42	311.57	176	323.27	177.97	323.45	178
331.94	179.53	332.56	179.61	334.27	179.85	334.5	179.87	335.48	180
335.72	180.03	342.18	180.51	343.27	180.67	344.88	180.94	349.35	181.27
352.66	181.81	353.75	182	358.46	183.02	361.59	183.81		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	187.17	.03	286.91	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
187.17	286.91	95	95	.1	.3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 1300

INPUT
Description:
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	181.19	109.17	180.79	123.99	179.09	125.87	178.89	134.32	177.02
135.14	176.91	135.78	176.77	144.31	174.93	148.04	174.18	152.95	173.35
162.22	171.72	165.35	171.21	166.76	170.964	167.07	170.91	174.3	170.05
179.51	169.12	183.16	168.53	188.6	167.91	192.49	167.49	193.42	167.39
196.19	167.34	202.91	167.11	207.87	166.99	216.85	166.78	226.11	166.69
226.26	166.69	234.56	166.43	241.78	166.2	244.76	166.1	251.6	165.79
257.41	165.55	265.1	165.77	270.88	166.24	273.07	166.39	274.02	166.41
281.41	166.99	283.74	167.32	289.17	167.76	290.34	167.9	291.47	168.054
293.35	168.31	295.92	168.61	297.44	168.84	302.04	169.24	308.27	169.76
308.57	169.79	313.02	170.58	315.17	170.81	319.59	171.38	323.87	171.8
327.37	172.26	334.07	174.12	338.4	175.34	341.58	176.27	346.24	177.73
351.42	177.85	352.48	177.87	353.21	177.97	359.07	178.34	364.65	180.15
367.67	180.98	372.43	182.65	375.77	183.54	379.78	184.41	380.49	184.47

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	192.49	.03	291.47	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
192.49	291.47	69.37	59.58	48.41	.1 .3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 1240.42

INPUT
Description:
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	180.48	105.2	180.29	105.26	180.29	105.56	180.28	113.11	180
115.81	179.88	121.77	179.47	132.88	178.87	133.57	178.83	133.77	178.81
134.96	178.71	145.85	177.71	148.17	177.52	150.79	177.14	157.78	176.19
159.66	175.84	167.97	174.22	171.41	173.63	175.78	172.63	184.88	170.4
186.01	170.13	186.72	169.99	195.8	168.151	196.05	168.1	198.8	167.465
201.51	166.84	208.38	165.655	209.28	165.5	214.84	164.85	220.14	164.27
225.84	163.59	231.62	163.56	238.53	163.53	243.22	163.74	249.37	164.02
260.29	164.56	263.47	164.67	265.06	164.87	265.71	164.941	274.44	165.9
278.23	166.45	278.31	166.465	280.46	166.87	293.5	169.72	293.98	169.877
295.34	170.32	306.83	173.29	307.29	173.43	307.65	173.54	314.67	175.94
321.64	177.48	326.18	178.44	338.7	181.1	338.89	181.15	339.04	181.17
347.02	181.82	348.45	181.83	349.94	181.9	351.86	181.98	354.54	182.02
358.63	182.3	360.64	182.37	364.14	182.69	366.69	182.98	372.41	183.46
372.97	183.54	374.91	183.81	376.22	183.96				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	208.38	.03	265.71	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
208.38	265.71	17.56	18.63	15.22	.1 .3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 1221.79

INPUT
Description:
Station Elevation Data num= 111

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	175.24	100.27	175.19	102.02	174.37	102.06	174.5	103.87	174.01
103.91	174	107.03	173.15	108.89	172.85	111.66	172.16	111.68	172.15
111.87	172.07	112.04	171.97	114.41	171.48	117.04	170.92	120.18	170.44
120.52	170.37	121.54	170.17	121.79	170.02	121.81	170.01	121.87	170
122.07	169.87	127.92	168.8	129.9	168.4	129.91	168.39	130.97	168.02
131.04	168	132.06	167.64	135.98	166.95	137	166.5	139.31	166.03
139.38	166.01	139.46	166	142.08	165.46	144.78	165.19	145.66	165.02
145.76	165	146.07	164.93	146.51	164.83	146.76	164.79	146.97	164.62
151.37	164.11	152.03	163.99	156.88	163.63	156.9	163.62	156.96	163.64
157.08	163.59	157.55	163.6	158.01	163.6	160.17	163.57	160.3	163.55
161.99	163.51	162.07	163.51	167.03	163.53	167.92	163.47	168.01	163.59
171.12	163.65	171.98	163.77	172.08	163.77	177.03	164.01	177.89	163.94
178.03	163.92	181.98	164.3	186.88	164.47	186.98	164.48	187.02	164.57
194.54	164.8	195.22	165	196.98	165.18	197.07	165.21	197.38	165.236
202.04	165.63	205.82	165.76	205.86	165.78	207.38	165.87	209.64	166.3
211.99	167.11	212.07	167.15	212.24	167.2	219.37	168.1	220.66	168.34
221.83	169.16	222.83	168.83	225.71	170	226.03	170.02	226.96	170.75
228.31	170.56	231.94	172.26	234.63	172.52	238.59	174.2	240.89	175
240.95	175.01	241.85	175.14	242.11	175.21	242.22	175.73	247.14	177.06
250.52	177.57	252.03	178.01	252.05	178.34	252.27	178.1	254.02	178.45
256.96	179.54	258.93	180	259.26	180.08	260.07	179.98	261.99	180.52
262.05	180.4	266.92	180.99	272.34	181.39	272.74	181.42	273.63	181.47
275.1	181.44								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.044	146.07	.03	197.38	.044

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
146.07	197.38	31.54	31.78	32.08	.1	.3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 1190.01

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	177.11	109.08	177.03	109.99	177.02	110.88	177.01	111.76	177
112.61	176.99	112.62	176.99	113.24	175.8	113.31	176.97	115.48	176.22
119.47	174	119.54	174	119.6	174	121.87	173.09	124.12	172
125.03	171.62	128.27	170	129.61	169.33	132.27	168	132.57	167.85
133.67	167.3	136.28	166	140.68	163.76	141.26	163.47	142.78	163.42
151.29	163.1	152.58	163.15	161.32	163.43	165.3	164.32	166.58	164.63
167.61	165	169.02	165.72	173.51	167.879	177.92	170	178.64	170.37
183.76	172.78	188.27	174.71	189.17	175	197.74	177.92	200.38	178.71
203.95	179.49	204.04	179.5	205.86	180	211.8	181.5	213.77	182
217.86	182.15								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	132.57	.03	173.51	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
132.57 173.51 74.01 77.56 90.06 .1 .3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 1112.45

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	177	101.76	177	122.33	177.65	127.3	177	134.13	177.98
134.28	178	134.44	177.92	138.28	176	138.35	175.97	140.29	175
142.23	174.03	142.29	174	146.18	172.06	146.3	172	146.39	171.95
150.3	170	150.38	169.96	154.03	168.14	154.31	168	158.24	166.04
158.31	166	158.34	165.98	160.31	165	160.48	164.94	160.53	164.92
160.68	164.85	165.49	162.5	166	162.49	175.49	162.15	184.66	162.47
185.49	162.5	185.71	162.61	187.32	163.42	188.14	163.83	188.64	164.08
188.98	164.25	190.49	165	196.34	167.925	199.03	169.27	200.49	170
209.08	174.29	210.5	175	219.13	179.31	220.5	180	221.19	180.34
232.75	180.41	249.79	180.69	250	180.7				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	154.03	.03	196.34	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
154.03 196.34 109.26 76.75 49.28 .1 .3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 1035.70

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	177.57	100.23	177.57	104.9	178	106.65	177.11	108.92	176
109.83	175.54	110.93	175	111.86	174.52	112.93	174	114.91	172.99
116.94	172	119.04	170.92	120.93	170	123.17	168.85	124.19	168.355
124.92	168	127.31	166.77	128.9	166	130.13	165.37	130.89	165
133.7	163.23	136.33	161.73	139.35	161.62	146.34	161.39	147.2	161.42
148.11	161.45	151.65	161.58	151.67	161.58	154.98	161.7	156.57	161.76
157.81	162.36	164.66	165	168.7	167.107	171.64	168.64	174.25	170
182.59	174.35	183.62	174.83	183.99	175	194.16	179.71	194.35	179.79
194.58	179.86	195.1	179.99	196.68	180.02	200.57	180.05		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	124.19	.03	168.7	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
124.19 168.7 26.34 66.09 85.26 .1 .3

CROSS SECTION

RIVER: Hilltop

REACH: Hilltop RS: 969.61

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	178	101.52	178	103.89	178	104.18	178	105.79	177.32
108.25	176	109.89	175.31	110.5	175	112.51	174.16	112.83	174
115.55	172.86	117.02	172	117.53	171.86	123.25	170.35	124.43	170
124.58	169.96	131.24	168	134.02	166.85	135.18	166.17	135.47	166
135.65	165.92	137.24	165	139.4	164.47	152.98	161.12	159.05	161.08
159.27	161.08	159.6	161.09	165.66	160.87	169.78	160.72	178.99	161.02
179.96	161.06	186.37	164.2	188	165	188.99	165.49	190.16	166.061
194.05	167.96	196.61	169.23	198.11	170	205.5	174.05	206.84	175
208.73	175.32	209.93	175.58	215.04	176.73	215.87	176.92		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	135.18	.03	190.16	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
135.18	190.16	106.85	65.12	8.29	.1	.3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 904.49

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	172.85	108.88	172.58	110.61	171.46	110.67	173.92	124.49	170
130.01	167.24	134.49	165	134.82	164.835	141.35	161.57	141.85	161.32
142.44	161.03	142.56	160.97	143.29	160.6	143.64	160.43	149.48	160.22
153.64	160.08	159.49	160.28	163.64	160.43	164.74	160.98	172.51	164.87
172.77	165	173.21	165.22	174.77	166	177.87	167.55	178.77	168
182.22	169.72	182.77	170	186.64	171.94	186.77	172	190.64	173.93
190.77	174	190.84	174.04	192.77	175	192.86	175.04	194.77	176
195.02	176.12	196.74	176.98						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	134.82	.03	172.51	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
134.82	172.51	102.86	94.62	84.36	.1	.3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 809.87

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	177	107.83	177	114.43	177	115.58	176.67	116.06	176.7
116.78	176.79	130.19	176	132.08	175.14	132.37	175	132.57	174.91
134.56	174	134.77	173.9	137.31	172.74	138.44	172.18	138.79	172
141.73	170.52	142.76	170	145.25	168.75	146.74	168	148.91	166.91

150.71	166	151.74	165.48	152.36	165.17	152.7	165	157.39	162.64
162.64	160	163.56	159.8	164.53	159.51	165.22	159.5	167.88	159.41
175.22	159.14	178.6	159.26	179.22	159.28	184.47	159.49	184.64	159.56
185.28	160	185.66	159.72	189.83	161.8	195.08	164.833	195.37	165
197.42	165.99	205.45	170	212.13	170.15	214.15	170.13	216.86	170.1
220.57	169.79	242.78	169.47	242.87	170.19	244.26	170.2	250	170.02

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	152.36	.03	195.08	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
152.36	195.08	125.82	94.02	55.07	.1 .3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 715.85

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	176.34	109.29	176	110.02	175.65	111.44	175	112.25	174.61
113.58	174	115.49	173.09	117.85	172	120.16	170.9	122.1	170
124.82	168.69	126.32	168	129.49	166.47	130.51	166	132.22	165.17
132.59	165	132.72	164.937	138.23	162.26	143.5	160	146.42	158.71
146.9	158.5	147.37	158.49	147.77	158.48	153.18	158.34	157.73	158.22
158.07	158.21	158.46	158.21	163.42	158.38	167.69	158.53	170.02	158.61
175.23	159.49	176.2	159.65	176.88	159.79	177.01	159.83	177.32	160
179.7	161.19	187.01	164.395	188.39	165	190.51	166.07	192.96	167.13

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	132.72	.03	187.01	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
132.72	187.01	74.09	113.92	154.6	.1 .3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 601.93

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	171.54	104.26	171.49	113.93	171.37	131.13	171.15	131.21	172.23
131.24	172.65	132.15	172.32	142.14	168	144.22	168	147.82	166.2
148.23	166	150.14	165.04	150.23	165	150.68	164.776	159.68	160.29
160.25	160	161.5	159.41	162.02	159.16	162.05	159.14	163.49	158.45
165.63	157.43	169.78	157.28	175.67	157.07	178.37	157.16	185.7	157.41
188.76	158.979	190.01	159.62	190.13	159.69	190.3	159.79	190.66	160
191.05	160.19	202.6	164.766	203.19	165	205.62	166.46	235.51	164.34
248.57	163.95	249.77	163.98	250	163.98				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	150.68	.03	202.6	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
150.68	202.6	145.84	131.97	118.5	.1	.3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 469.96

INPUT
Description:
Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	168.37	102.72	168.11	103.16	167.96	103.82	168	103.92	167.95
104	167.92	104.13	167.86	106.69	166.61	107.34	166.29	107.44	164.87
107.44	164.79	108.33	164.77	133.24	164.13	133.34	165.52	133.34	165.63
138.9	165.49	147.12	165.26	151.09	164.78	151.27	164.77	153.2	164.52
154.25	164	154.81	163.76	158.04	162.23	158.27	162	161.13	160.58
162.3	160	162.41	159.93	164.42	158.65	164.83	158.39	165.43	158
166.38	157.39	168.39	156.09	177.73	155.78	178.43	155.75	179.52	155.78
186.06	155.87	190.1	157.58	194.39	160	194.83	160.31	194.91	160.64
199.16	160.71	199.7	160.712	200.52	160.715	202.37	160.72	204.95	160.41
206.17	160	210.92	158.47	212.39	158	227.03	158	231.34	158
235.24	158	237.04	158.6	241.24	160	243.86	161.312	246.85	162.81
248.86	163.811	249.24	164	250	164				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	162.41	.03	200.52	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
162.41	200.52	144.69	146.41	144.03	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	170		F
180	250		F

CULVERT

RIVER: Hilltop
REACH: Hilltop RS: 469.94

INPUT
Description:
Distance from Upstream XS = 22.02
Deck/Roadway Width = 94.21
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 39

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
100	162.55		100.9	162.42		102.92	162.4	
104.27	162.24		113.52	162.21		116.03	162.11	
116.55	162.1		126.08	162.09		126.51	162.09	
136.12	162.07		136.46	162.07		146.17	162.05	
146.41	162.05		151.06	162.04		151.85	161.93	
157.15	161.9		157.62	161.86		157.73	161.85	
167.83	161.48		169.2	161.4		172.42	161.31	
177.8	161.02		181.84	160.8		187.54	160.83	
189.25	160.76		189.98	160.76		195.5	160.65	
198.44	160.7		218.23	164.04		223.33	165	
225.5	165		228.19	165		229.52	165	
234.83	165		239.48	165		243.57	165	

249.32	165	252.66	165	256.75	165

Upstream Bridge Cross Section Data
Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	168.37	102.72	168.11	103.16	167.96	103.82	168	103.92	167.95
104	167.92	104.13	167.86	106.69	166.61	107.34	166.29	107.44	164.87
107.44	164.79	108.33	164.77	133.24	164.13	133.34	165.52	133.34	165.63
138.9	165.49	147.12	165.26	151.09	164.78	151.27	164.77	153.2	164.52
154.25	164	154.81	163.76	158.04	162.23	158.27	162	161.13	160.58
162.3	160	162.41	159.93	164.42	158.65	164.83	158.39	165.43	158
166.38	157.39	168.39	156.09	177.73	155.78	178.43	155.75	179.52	155.78
186.06	155.87	190.1	157.58	194.39	160	194.83	160.31	194.91	160.64
199.16	160.71	199.7	160.712	200.52	160.715	202.37	160.72	204.95	160.41
206.17	160	210.92	158.47	212.39	158	227.03	158	231.34	158
235.24	158	237.04	158.6	241.24	160	243.86	161.312	246.85	162.81
248.86	163.811	249.24	164	250	164				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	162.41	.03	200.52	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
162.41	200.52	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	170		F
180	250		F

Downstream Deck/Roadway Coordinates
num= 66

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
100	160.76		102.72	160.58		102.74	160.58	
102.77	160.58		106.73	160.32		106.74	160.31	
106.77	160.31		111.22	160.01		111.23	160.01	
111.44	160		111.73	159.98		111.74	159.98	
111.93	159.97		116.73	159.66		116.74	159.66	
116.82	159.65		121.73	159.33		121.74	159.33	
126.68	159		126.76	159		131.73	158.68	
131.75	158.67		131.75	158.67		136.73	158.38	
136.74	158.37		136.82	158.37		141.72	158.1	
141.74	158.1		141.74	158.1		143.51	158	
143.54	158		143.54	158		146.74	157.84	
151.74	157.6		151.74	157.6		156.74	157.39	
161.73	157.19		161.74	157.19		166.73	157.01	
166.74	157.01		166.75	157.01		171.74	156.86	
176.73	156.72		176.74	156.72		176.75	156.72	
181.74	156.6		181.75	156.6		186.74	156.51	
191.72	156.43		191.74	156.43		196.72	156.38	
196.74	156.38		196.76	156.38		201.74	156.34	
201.76	156.34		206.74	156.33		206.76	156.33	
211.74	156.33		211.76	156.33		216.74	156.35	
221.71	156.4		221.74	156.4		224.59	156.36	
224.61	156.35		224.61	156.36		224.71	156.46	

Downstream Bridge Cross Section Data
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	166.47	105.88	166.43	108.2	166.39	115.88	166.1	118.17	165.94
122.5	165.52	126.1	163.99	126.25	163.94	126.32	163.87	129.69	161.21
133.36	158.75	135.77	157.12	137.74	156.39	143.43	153.95	149.58	151.42
154.41	149.42	162.21	145.89	162.74	145.814	163.53	145.7	163.84	145.5
164.35	145.27	164.84	144.91	165.44	144.36	165.5	144.35	167.77	144

168.94	144.01	169.65	144.01	172.42	143.88	173.01	143.88	177.73	143.58
178.36	143.58	181.8	143.95	181.86	143.95	182.57	143.96	184.07	144.45
186.23	145.17	186.4	145.23	186.97	145.45	188.8	145.851	189.07	145.91
189.29	146.06	189.84	146.19	192.07	146.94	197.31	148.3	199.96	149.16
205.16	150.83	213.74	154.21	214.21	154.38	218.76	157.06	219.34	157.43
231.86	158.03	234.19	158.26	250	158.64				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	162.74	.03	188.8	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
162.74	188.8	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	168		F
181.5	250		F

Upstream Embankment side slope = 2 horiz. to 1.0 vertical
Downstream Embankment side slope = 2 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Circular	4	

FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 2 - Groove end entrance with headwall
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	.167	121	.013	.013	0	.5	1

Upstream Elevation = 153.17
Centerline Station = 174.98
Downstream Elevation = 145.08
Centerline Station = 175

CULVERT OUTPUT Profile #100yr Culv Group: Culvert #1

Q Culv Group (cfs)	124.80	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	11.09
Q Barrel (cfs)	124.80	Culv Vel DS (ft/s)	22.81
E.G. US. (ft)	159.39	Culv Inv El Up (ft)	153.17
W.S. US. (ft)	159.16	Culv Inv El Dn (ft)	145.08
E.G. DS (ft)	145.89	Culv Frctn Ls (ft)	0.00
W.S. DS (ft)	145.20	Culv Exit Loss (ft)	9.07
Delta EG (ft)	13.50	Culv Entr Loss (ft)	0.96
Delta WS (ft)	13.96	Q Weir (cfs)	
E.G. IC (ft)	158.88	Weir Sta Lft (ft)	
E.G. OC (ft)	159.39	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	156.52	Weir Max Depth (ft)	
Culv WS Outlet (ft)	146.88	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.59	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.35	Min El Weir Flow (ft)	160.91

Warning: Since the culvert has supercritical flow, the program should be run in

mixed flow in order to check if the cross section
downstream of the culvert has supercritical flow.
Note: The flow in the culvert is entirely supercritical.

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 323.55

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	166.47	105.88	166.43	108.2	166.39	115.88	166.1	118.17	165.94
122.5	165.52	126.1	163.99	126.25	163.94	126.32	163.87	129.69	161.21
133.36	158.75	135.77	157.12	137.74	156.39	143.43	153.95	149.58	151.42
154.41	149.42	162.21	145.89	162.74	145.814	163.53	145.7	163.84	145.5
164.35	145.27	164.84	144.91	165.44	144.36	165.5	144.35	167.77	144
168.94	144.01	169.65	144.01	172.42	143.88	173.01	143.88	177.73	143.58
178.36	143.58	181.8	143.95	181.86	143.95	182.57	143.96	184.07	144.45
186.23	145.17	186.4	145.23	186.97	145.45	188.8	145.851	189.07	145.91
189.29	146.06	189.84	146.19	192.07	146.94	197.31	148.3	199.96	149.16
205.16	150.83	213.74	154.21	214.21	154.38	218.76	157.06	219.34	157.43
231.86	158.03	234.19	158.26	250	158.64				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	162.74	.03	188.8	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
162.74	188.8	54.85	55.95	61.55	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	168		F
181.5	250		F

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 267.60

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	165.44	105.48	165.28	105.62	165.08	105.66	164.52	105.67	164.46
105.72	164.36	106.01	164.21	106.01	161.23	107.19	159.81	112.27	157.81
112.91	157.38	114.51	156.7	118.33	154.07	122.17	153.25	124.19	149.09
124.35	148.76	126.76	148.38	130.28	146.72	131.26	143.97	134.26	143.11
136.04	142.83	136.2	142.34	141.47	141.29	142.25	141.7	146.63	144.97
148.31	145.93	151.27	146.79	154.29	147.289	154.36	147.3	154.78	147.34
155.04	148.35	159.68	150.4	160.16	151.99	160.22	153.6	164.62	154.31
174.65	154.64	187.35	157.96	190.1	158.15	193.52	158.39	202.03	158.69
203.42	159.11								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	124.19	.03	154.29	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
124.19	154.29	67.6	67.6	67.6	.1	.3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 200

INPUT
Description:
Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	160.25	100	160.25	105.48	160.01	105.62	160	105.66	160
105.67	160	105.72	160	106.01	160	107.19	159.62	112.27	158
112.91	157.8	114.51	157.26	118.33	156	122.17	154.74	124.35	154
126.76	153.2	130.28	152	131.26	151.67	134.26	150.64	136.04	150.05
136.2	150	141.47	148.26	142.25	148	146.63	146.55	147	146.429
148.31	146	151.27	145.02	154.36	144	154.78	143.86	155.04	143.78
159.68	142	160.16	141.88	160.22	141.89	164.62	140.98	174.65	141.05
187.35	141.25	190.1	141.38	193.52	141.55	202.03	142	203.42	142.52
207.56	144	211.57	145.43	213.09	146	213.55	146.17	216.82	147.38
218.56	148	223.78	149.9	224.05	150	224.21	150.06	224.65	150.21
228.34	151.53	229.7	152	230.55	152.3	235.37	154	236.98	154.56
241.11	156	243.64	156.91	246.77	158	254.72	159.13	261.24	160
262.22	160.1	262.4	160.11	271.27	161.01	273.55	161.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	147	.03	213.55	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
147	213.55	130.73	176.68	215.84	.1	.3

CROSS SECTION

RIVER: Hilltop
REACH: Hilltop RS: 23.32

INPUT
Description:
Station Elevation Data num= 108

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	144.95	101.7	144.72	107.06	144	108.47	143.81	109.86	143.63
115.6	142	120.02	140.75	122.71	140	123.86	140	125.86	140
132.13	140	134.48	140	139.97	139.66	151.24	139.93	157.83	139.93
160.64	139.94	163.47	139.93	166.21	139.93	169.67	139.95	171.49	139.94
175.17	139.97	177.78	140	180.58	140.42	187.53	142	193.19	142.078
194.04	142.09	198.68	142.13	199.34	142.14	205.94	142.05	209.45	142.011
210.42	142	212.58	141.38	215.02	140.68	216.55	140.27	217.56	140
220.18	139.26	221.53	138.94	225.4	138	225.79	137.91	225.94	137.87
226.12	137.81	228.4	137.16	229.69	136.64	231.18	136	232.12	136
232.62	136	233.91	136	235.08	136	241.03	136	242.74	136
243.22	136	243.6	136	243.96	136	245.32	136.97	246.86	138
247.54	138.47	249.85	140	250.57	140.48	252.39	141.71	252.84	142
253.67	142.54	253.8	142.63	255.78	144	255.85	144.044	258.78	145.88
258.95	146	259.57	146.39	261.44	147.56	261.76	147.77	262.08	148
262.2	148	271.7	148.52	277.5	148.84	280.96	149.03	289.98	150
289.99	150	290	150	292.24	151.1	292.67	151.32	292.94	151.45
294.02	152	295.27	152.62	297.93	154	299.78	154.92	301.95	156
304.59	157.31	306	158	307.44	158.71	309.98	160	310.06	160
312.86	161.39	314.1	162	315.28	162.57	318.13	164	321.6	165.75
322.19	166	325.88	167.6	326.79	168	327.26	168	329.28	168
330.53	167.86	330.98	167.9	331.26	167.91	331.69	167.92	334.94	167.73

335.9	167.74	336.79	167.75	340.94	167.63

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.03	209.45	.03	253.8	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
209.45	253.8	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Hilltop

Reach	River Sta.	n1	n2	n3
Hilltop	1395	.03	.03	.03
Hilltop	1300	.03	.03	.03
Hilltop	1240.42	.03	.03	.03
Hilltop	1221.79	.044	.03	.044
Hilltop	1190.01	.03	.03	.03
Hilltop	1112.45	.03	.03	.03
Hilltop	1035.70	.03	.03	.03
Hilltop	969.61	.03	.03	.03
Hilltop	904.49	.03	.03	.03
Hilltop	809.87	.03	.03	.03
Hilltop	715.85	.03	.03	.03
Hilltop	601.93	.03	.03	.03
Hilltop	469.96	.03	.03	.03
Hilltop	469.94	Culvert		
Hilltop	323.55	.03	.03	.03
Hilltop	267.60	.03	.03	.03
Hilltop	200	.03	.03	.03
Hilltop	23.32	.03	.03	.03

SUMMARY OF REACH LENGTHS

River: Hilltop

Reach	River Sta.	Left	Channel	Right
Hilltop	1395	95	95	95
Hilltop	1300	69.37	59.58	48.41
Hilltop	1240.42	17.56	18.63	15.22
Hilltop	1221.79	31.54	31.78	32.08
Hilltop	1190.01	74.01	77.56	90.06
Hilltop	1112.45	109.26	76.75	49.28
Hilltop	1035.70	26.34	66.09	85.26
Hilltop	969.61	106.85	65.12	8.29
Hilltop	904.49	102.86	94.62	84.36
Hilltop	809.87	125.82	94.02	55.07
Hilltop	715.85	74.09	113.92	154.6
Hilltop	601.93	145.84	131.97	118.5
Hilltop	469.96	144.69	146.41	144.03
Hilltop	469.94	Culvert		
Hilltop	323.55	54.85	55.95	61.55
Hilltop	267.60	67.6	67.6	67.6
Hilltop	200	130.73	176.68	215.84
Hilltop	23.32	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Hilltop

Reach	River Sta.	Contr.	Expan.
Hilltop	1395	.1	.3
Hilltop	1300	.1	.3
Hilltop	1240.42	.1	.3
Hilltop	1221.79	.1	.3
Hilltop	1190.01	.1	.3
Hilltop	1112.45	.1	.3
Hilltop	1035.70	.1	.3
Hilltop	969.61	.1	.3
Hilltop	904.49	.1	.3
Hilltop	809.87	.1	.3
Hilltop	715.85	.1	.3
Hilltop	601.93	.1	.3
Hilltop	469.96	.3	.5
Hilltop	469.94	Culvert	
Hilltop	323.55	.3	.5
Hilltop	267.60	.1	.3
Hilltop	200	.1	.3
Hilltop	23.32	.1	.3